Distribution connection pricing – worked examples

15 August 2025

Version

Version	Date	Notes
0.9	August 2025	Published following decision paper and technical consultation on Code amendment drafting. Distribution connection pricing proposed Code amendment | Our consultations | Our projects | Electricity Authority

1. Purpose

1.1. The purpose of this document is to provide a practical guide to applying newly introduced connection pricing requirements for distribution networks – enhancement cost allocation, capacity costing, pioneer schemes, and connection charge reconciliation.

1.2. The document aims to make implementation and operation of the new requirements easier, and to promote consistent practices across New Zealand's distribution businesses.

1.3. The practical guidance provided in this document does not override distributors' obligations under the Electricity Industry Participation Code (the **Code**).

1.4. The illustrated examples are intended to be realistic, but they are indicative and should not be relied on as a guide to actual costs or charges for any specific connection.

1.5. The guidance in the document builds on connection charge calculation and reconciliation calculation worksheets, which should also help with consistent and cost-effective implementation. These spreadsheets are available in the 'Resources' section of the 'Distribution connection pricing reform' webpage.[1]

1.6. The Authority encourages distributors to work together on implementation to reduce costs and enhance consistency across New Zealand.

1.7. The Authority has also published separate guidance on the development of posted capacity rates to assist in implementing and operating the new capacity costing and charge reconciliation requirements.[2] The capacity costings developed in the posted capacity rates guidance inform the posted capacity rates used in the illustrated examples in this document.

[1] Distribution connection pricing reform | Our projects | Electricity Authority.

[2] https://www.ea.govt.nz/documents/8171/Worked_examples_of_posted_capacity_rates_-_guidance_document.pdf

2. Introduction

2.1. The Electricity Authority Te Mana Hiko (Authority) published a decision paper in July 2025 on four new requirements for distributor connection pricing.[3] Consumers will ultimately benefit through more connections, a reduction in overall investment costs and the benefits that flow through to housing development, electrification and business growth. The decision paper provides detailed information on the rationale for the new requirements and builds on an earlier consultation paper.[4]

2.2. The new requirements apply to new connections and connection upgrades for load, including hybrid connections (with both load and injection). There are long-standing pricing requirements for distributed generation that remain in place alongside these new requirements.[5]

2.3. Most of the requirements will first apply to connection applications received by a distributor from 1 April 2026. One requirement (capacity costing) applies to connection applications received from 1 April 2027.[6]

2.4. The new requirements are set out in Part 6B of the Code.[7]

2.5. This introduction section provides a brief overview of the connection pricing reform process, and the four new requirements. The following section then introduces the worked examples, which are set out in the balance of the document.

Connection pricing reform

2.6. The new requirements are intended to be the first step of a longer-term reform of distribution connection pricing. Prior to these requirements, there was limited regulatory oversight of connection pricing. The first set of requirements provide a meaningful step forward in terms of:

(a) consistent terminology, pricing concepts and features

(b) improving cost-reflectivity, particularly with respect to enhancements, flexibility and network capacity

(c) mitigating the 'last-straw' coordination problem, which occurs when the connection(s) that trigger an upstream capacity upgrade are allocated disproportionate costs (creating an incentive to jockey to avoid the last-straw position in queue)

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3 https://www.ea.govt.nz/documents/7857/Distribution_connection_pricing_Code_amendment_-_Decision_paper.pdf

4 https://www.ea.govt.nz/documents/5954/Distribution_connection_pricing_proposed_Code_amendment.pdf

5 The Authority is reviewing connection pricing for distributed generation as well and published an issues paper in 2024. https://www.ea.govt.nz/projects/all/distribution-pricing/consultation/distributed-generation-pricing-principles/

6 Distributors may apply any of the new methodologies ahead of these dates if they wish. Capacity costing is used as part of charge reconciliation from 1 April 2026 but does not have to be used for deriving charges until 2027.

7 The current version of the Code is available on the Electricity Authority's website. https://www.ea.govt.nz/code-and-compliance/code/

(d) mitigating the 'first-mover' coordination problem, which occurs when the connection that triggers a network extension is allocated high costs compared to later connections that use the extension (creating an incentive to jockey to avoid the first-mover position in queue)

(e) improving transparency of cost allocation, making it easier to separate differences in actual costs from differences in cost allocation as well as helping identify subsidies and discriminatory pricing.

2.7. However, the new requirements do not:

(a) fully prescribe how distributors must determine connection charges. Distributors must apply the new requirements, but retain considerable discretion for other aspects of their connection pricing – including their overall allocation of costs to connections

(b) mean that all connections will cost the same. It is important that connection charges are cost-reflective, so that lower-cost designs and locations pay lower charges (and vice versa). This provides an incentive to 'right-size' connection designs.

Further reform

2.8. The Authority has decided not to proceed with the reliance limits methodology as proposed in October 2024.[8] We will further consider potential modifications to the reliance limits as well as a range of other options alongside the related issue of distributors' obligation to connect.

2.9. The Authority will consult further before reaching any decisions on additional requirements. This view on direction of travel is provided for context and does not pre-determine future decisions.

2.10. The Authority is investigating potential further connection pricing reform. The least disruptive time to introduce more complete reform is for quotes from 1 April 2030. This aligns with the revenue control cycle for distributors, so limits the potential need to revisit revenue paths.

2.11. Potential further reform would build on the initial set of requirements, and could require all distributors to ensure the costs they allocate to connection are:

(a) above the 'neutral point' – that is, connections should at least cover their own cost so they are not subsidised by existing users. To assess the neutral point correctly involves estimating the incremental cost of a connection and the cost recovery from that connection – both up-front (from connection charges) and over-time (from lines charges). The charge reconciliation requirement that applies from April 2026 is designed to show how far charges are above (or below) this neutral point

(b) not materially above the 'balance point' – that is, new connections should not be allocated a markedly higher share of network costs than was allocated to earlier connections (unless the new connections pay lower lines charges). In other words, pricing should not be discriminatory as between like connections

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8 Distribution connection pricing proposed Code amendment, page 52-56

(including over time). This is because allocating very high charges to new connections risks dampening growth (in connections, and the services they provide – such as housing and new businesses). As long as new connections are not subsidised, they benefit all existing network customers by spreading shared costs.

Other scope limitations

2.12. The new requirements do not apply to secondary networks or generation connections, and the new pioneer scheme requirements do not apply to real estate developments.

2.13. 'Secondary networks' are distribution networks that connect to another distribution network (rather than to the transmission grid). There are dozens (or perhaps hundreds) of secondary networks in New Zealand ranging from large infrastructure sites (such as airports and ports) to (some) residential subdivisions, shopping malls, office buildings, etc.

2.14. The Authority intends to consider whether some requirements should be extended to at least some types of secondary networks. This extension could be introduced ahead of any potential further reform that was timed for 2030.

2.15. The pioneer scheme requirement (which is designed to mitigate the first-mover problem) does not apply to real estate developments – that is, distributors are not required to operate a pioneer scheme for a network extension funded by a real estate developer.

2.16. As above, the Authority intends to consider this matter further and could decide to extend requirements ahead of further reform.

2.17. In both cases, suppliers may wish to voluntarily align with the new pricing requirements – ie, secondary network owners could choose to price connections consistent with the requirements, and distributors could choose to operate pioneer schemes for real estate developments.

2.18. The new requirements apply to load connections, and the load-component of hybrid connections. They also require that the load component of hybrid connections is priced first, followed by the generation component. Generation pricing is governed by the long-standing distributed generation pricing principles in Part 6 of the Code.

Pioneer scheme

2.19. The key features of the pioneer scheme requirements are summarised in Table 2.1.

Table 2.1 – Summary of pioneer scheme requirements

Requirement	Comment	Reference
Distributor must publish a **pioneer scheme policy**	Policy sets out how distributor will set up and administer pioneer schemes.	6B.6

Requirement	Comment	Reference
Distributor must set up **pioneer scheme** when connection applicant contributes more than $50k to an **extension**	Distributor can opt for lower threshold if they wish. Certain exclusions apply.	6B.7(2)(a) **Pioneering connection works** definition
Distributor may estimate cost of **vested pioneering works** if actual costs are not known to the distributor	Relevant to entry thresholds and contribution amounts.	6B.8(4)(a)
Connection applicant can opt-out	Must be agreed in writing.	**Pioneering connection works** definition (subclause (b))
Distributor must publish locations and details of active **pioneer schemes**	Improves predictability for prospective connection applicants.	6B.7(2)(b) 6B.9
Pioneer schemes must run for at least seven years, and meet certain requirements	Schemes can run for longer and customise some requirements.	6B.7(1) 6B.7(3) 6B.8
Distributor must collect and distribute **pioneer scheme contributions** to the **pioneer** and **subsequent pioneers**	Subject to *de minimus* threshold.	6B.8(d)
Distributor may deduct a fee	Fee must reflect reasonable costs of administering the scheme.	6B.8(d)
Distributor is not required to set up **pioneer schemes** for **real estate developments**	Distributor can elect to do so if they wish.	6B.3(3)(a)

2.20. The pioneer scheme requirements:

(a) provide a backstop set of requirements, which distributors can choose to exceed (eg, longer scheme duration, lower eligibility thresholds, wider eligibility)

(b) mitigate first-mover disadvantage by ensuring first and subsequent movers are allocated similar costs (ie, by largely removing the benefit of being a second, or subsequent, mover).

3. Overview of new requirements

3.1. Table 3.1 provides a brief overview of the new requirements.

Table 3.1 – Overview of new connection pricing requirements

Requirement	Description	Benefits
Enhancement cost allocation	Prices determined with reference to 'relevant minimum scheme', with enhancement costs (if any) allocated to selecting party.	Cost-reflective pricing for enhancements and flexibility. Applicants protected from distributor-selected enhancement costs.
Network capacity costing (April 2027)[9]	If upstream costs allocated to access seekers, use published rates to allocate costs as capacity headroom is consumed (not as it is built).	Mitigates 'last-straw' problem. Improves consistency and predictability of charges for upstream network capacity.
Pioneer scheme policy	Distributor must operate schemes that provide rebates to extension-funding 'pioneers' when subsequent parties connect.	Mitigates 'first-mover' problem.
Connection charge reconciliation	Distributor must prepare standardised breakdown of connection charge into incremental and network cost components.	Improves transparency of costs allocated to connections. Improves consistency of communications across distributors.

3.2. These new requirements are accompanied by new dispute resolution arrangements for participants and non-participants.[10]

3.3. We summarise each of these requirements below and explain them in more detail as we step through the worked examples. The summaries include references to relevant Code clauses. In some places, we have bolded words to draw attention to specific terms that are defined in the Code.

Terminology

3.4. The Code amendment introduces various terms that are required to enable operation of the new requirements.

3.5. Table 3.2 provides an overview of key terms.

9 Used in connection charge reconciliations from April 2026 but not required to be used in charges until April 2027.

10 Participants are required to register with the Authority and are bound by the Code. Most connection applicants are not participants.

Table 3.2 – Overview of key connection pricing terms

Defined term	Comment
connection charge	Charge for **connection works**. Includes capital contributions and in-kind contributions (ie, where a connection applicant is required to build or pay for vested assets). Excludes **connection fees** and **pioneer scheme contributions**.
connection works	Includes **extensions** and **network capacity upgrades** (involved in providing a connection). Does not include work associated with **customer-owned assets**, or work covered by a **connection fee**. Can include **incremental transmission works**. Can include operational changes or capacity allocation, even where there is no physical works or change in capacity rights.
extension	**Connection works**, excluding any **network capacity upgrade**. Can include **extension-like upgrades** and **incremental transmission works**.
extension-like upgrade	Connection works that increase the capacity of the **shared network**, but primarily benefit only the **connection applicant** (initially, and in future).
incremental transmission works	Works to establish a new **grid** connection or alter **grid** connection assets to accommodate a new (or upgraded) distribution **connection**.
network capacity upgrade	Works (or operating arrangements) that increase the capacity of the **shared network**. Can include operational changes or capacity allocation, even where there is no physical works or change in capacity rights.
shared network	A part of a distribution network that is not **customer-owned assets** or **dedicated assets**.
dedicated assets	**Assets** owned and operated by a **distributor**, built for a **connection**, and not subsequently used to support another **connection**.

3.6. The requirements apply to in-kind contributions (vested assets) as well as capital contributions.

Enhancement cost allocation

3.7. The key features of the enhancement cost allocation requirements are summarised in Table 3.3.

Table 3.3 – Summary of enhancement cost allocation requirements

Requirement	Comment	Reference
Distributor must determine cost of **minimum scheme**	**Minimum scheme** has to meet distributor's **connection and operation standards**.	6B.4(1)(a) **Minimum scheme** definition
If requested, distributor must determine cost of the **minimum flexi scheme**	Flexible scheme should have a lower upstream capacity cost and may have a lower **extension** cost.	**Relevant minimum scheme** definition
Customer-selected enhancement costs must be allocated to the **connection applicant**	Enhancements are relative to the **relevant minimum scheme**.	6B.4(1)(b)
Distributor-selected enhancement costs must not be allocated to the **connection applicant**		6B.4(1)(c)
Distributor and **connection applicant** may agree not to design and cost the **minimum scheme**	Must be agreed in writing. Most likely for larger connections where design costs may be material.	6B.4(2)
Distributor and **connection applicant** may agree to alternative allocation	Must agree in writing.	6B.4(3)
Distributor does not need to cost **minimum scheme** for each connection if using **posted connection charge**	Posted connection charges reduce costs and improve predictability for smaller, high-volume connection types. They are optional.	6B.4(4)

3.8. The enhancement cost allocation requirements:

(a) do not require a distributor to allocate the full cost of the relevant minimum scheme to the connection applicant

(b) do require the full cost of customer-selected enhancements to be allocated to the connection applicant (unless agreed otherwise in writing)[11]

(c) do prevent allocation of distributor-selected enhancement costs to the connection applicant (unless agreed otherwise in writing)

(d) do not require a distributor to use posted connection charges (but do accommodate their use).

3.9. In addition, distributors have discretion as to whether they wish to treat a given network footprint-extending investment as:

(a) a customer extension, subject to the enhancement cost allocation requirements (and pioneer scheme requirements), or

(b) a network development with costs borne by the distributor. This may make sense where an investment is extending the network footprint into an area that is likely to be of wider value (eg, for future connections or to enhance resilience by creating a loop).

3.10. If a distributor chooses to treat an extension as a network development, they may choose to implement a localised scheme for allocating costs out to connection applicants – noting:

(a) such a scheme could also recover costs of distributor-selected enhancements (from subsequent connection applicants)

(b) requirements for such schemes are not set out in the Code, but are accommodated in the charge reconciliation requirements

(c) a distributor could not allocate the distributor-selected enhancement component of any such scheme to the initial connection applicant unless agreed in writing (under 6B.4(3)).

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11 We have taken the view that, if a distributor does not allocate capacity costs generally, they cannot allocate the capacity component of customer-selected enhancement costs. Conversely, if a distributor does allocate capacity costs (in whole or in part) they must take the same approach for minimum scheme and customer-selected enhancement costs.

Capacity cost allocation

3.11. The key features of the capacity cost allocation requirements are summarised in Table 3.4. More detail on capacity cost allocation requirements are set out in the posted capacity rate guidance that has been published alongside this report.[12]

Table 3.4 – Summary of capacity cost allocation requirements

Requirement	Comment	Reference
Distributor must determine **posted capacity rates** ($ per kVA) for each **network tier**	Rates are also used for connection charge reconciliation, so are needed from 1 April 2026.	6B.5(1)(a)
Distributor may segment their network into **network costing zones**	Allows distributor to choose how granular to make their capacity costing.	6B.5(1)(a)
Distributor may set **posted capacity rate** to zero	Allows distributor to 'turn off' capacity costing where there is no foreseeable upgrade need.	Posted capacity rate definition
Posted capacity **rates** must have five-year horizon and two-year lock	Lock relaxed for first operative year (from 1 April 2027).	6B(1)(b) 6B(5)
Distributor must not allocate **network capacity costs**, other than by using the **posted capacity rates**	Distributor does not have to allocate upstream capacity costs.	6B.5(1)
Distributor determines **capacity design assumption** (kVA) for each **connection** at each **network tier**	Design assumption should allow for diversity and coincidence.	6B.5(1)(c)
Requirement does not apply to **extension-like upgrades**	Allows an upgrade to be treated as an extension where more appropriate and means that enhancement cost requirements will apply rather than capacity cost allocation requirements at the network tier(s) of the extension-like upgrade.	Network capacity cost definition
Requirements relaxed for large- capacity increments and high- or low-cost upgrades	Provides for balance between predictability and accuracy.	6B.5(2) – large 62.5(3) – high- or low-cost

[12] https://www.ea.govt.nz/documents/8171/Worked_examples_of_posted_capacity_rates_-_guidance_document.pdf

3.12. The capacity cost allocation requirements:

(a) do not require a distributor to allocate up-stream capacity costs to connection applicants

(b) prevent last-straw pricing by requiring that, if a distributor does choose to allocate up-stream capacity costs, they must do so as capacity is consumed, rather than when capacity is added

(c) requires a consistent forward-looking approach to determining capacity costs (ie, rates are based on cost to add capacity, not on the cost of existing capacity)

(d) ensures connections are only allocated capacity costs that relate to connection growth.

Charge reconciliation

3.13. The key features of the charge reconciliation requirements are summarised in Table 3.5.

Table 3.5 – Summary of charge reconciliation requirements

Requirement	Comment	Reference
Distributor must calculate standardised breakdown of quoted connection charges[13]	Breaks revenue side into connection and ongoing charges, and cost side into incremental and network costs.	6B.11
Distributor must provide breakdown to **connection applicant** and Authority on request	Distributor must let applicants know they can request this information.	6B.10
The Authority can also request supporting information	For example, on inputs, assumptions and judgements.	6B.10(3)(b)
Incremental cost **estimate** must reflect **enhancement cost allocation**	Includes presenting relevant minimum scheme costs, including customer-selected enhancement costs and excluding distributor-selected enhancement costs.	6B.11(2)
Incremental cost estimate must use **capacity costing**	Applies whether or not distributor allocates capacity costs.	6B.11(2)

[13] Connection charges do not include pioneer scheme contribution, or cost-based connection fees.

Requirement	Comment	Reference
Incremental cost estimate may include certain step changes in transmission costs	Includes physical works to **grid** connections, and certain repricing events.	**Incremental transmission costs** definition
Incremental revenue estimate must use standardised approach	Includes building up transmission and distribution components.	6B.11(3)
Default **connection revenue life** assumptions specified	Distributor can assume shorter connection lives if reasonable. Assumption relates to the connection, not the applicant or intended customer.	**Connection revenue life** definition
Distributor must determine an opex scaling factor to adjust revenue estimates	Factor updated annually based on disclosed data. Adjusts for portion of revenue that goes to connection opex.	6B.11(5)
Distributor must determine discount factor used to adjust for cashflow timing	Discount factor updated annually based on Commerce Commission determination.	6B.11(4)(c)

3.14. The charge reconciliation requirement:

(a) provides information only. It does not directly constrain how a distributor determines connection charges

(b) reveals if a connection is subsidised – ie, where revenue (from connection (CC) and lines charges (IR)) is less than incremental cost (IC). This would present as a network cost contribution (NC) less than zero

(c) provides a basis for comparing network contribution levels between connections, consumer groups and distributors.

3.15. While the charge reconciliation requirements apply to in-kind contributions (ie, vested assets) as well as capital contributions, in practice:

(a) distributors are not required to estimate the cost of in-kind works

(b) accordingly, in-kind contributions may typically be presented as zero on both sides of the equation (ie, in the connection charge term and the incremental cost term).

4. Overview of worked examples

4.1. This section introduces the worked examples we have used to illustrate application of the new requirements.

Overview of scenarios

4.2. The worked examples are designed to traverse most of the features of the new requirements. They:

(a) are intended to reflect relatively realistic scenarios, including in terms of cost and capacity parameters and network designs

(b) should not be relied on as a guide to actual connection charges, including because costs can vary significantly and connection pricing approaches (outside the new requirements) can vary.

4.3. We have structured the examples with three broad scenarios, each of which has several variations that enable us to traverse pricing features. Table 4.1 provides an overview of the scenarios.

Table 4.1 – Overview of scenarios

Scenario	Examples
Small connection	Seven variations, including a connection upgrade and connection to an active pioneer scheme.
Remote, mid-sized connection	Two variations, including an extension-like upgrade and a flexible connection.
Large connection	Four variations, including with special pricing, incremental transmission costs, and hybrid connections (with injection).

4.4. The following sections provide summaries of variations within each scenario, highlighting the pricing features they traverse.

Small connection examples

4.5. Table 4.2 summarises variations on the small connection scenario and highlights pricing features introduced in each variation.

Table 4.2 – Summary of variations on small connection scenario (Scenario 1)

No.	Variation	Comment
1a	Small urban residential	Distributor has **posted connection charge** for which this connection is eligible. Introduces: • notional **minimum scheme** (for posted charges) • **charge reconciliation** inputs, calculation, presentation • **capacity costing** (as reconciliation input) • top-down revenue estimate

No.	Variation	Comment
1b	As above, but customer requests two-phase connection	Introduces **customer-selected enhancement**
1c	As above, with distributor allocating capacity costs	Introduces **capacity costing** (as input to charges)
1d	As above, but second phase is an upgrade to existing connection	Introduces pricing for **connection upgrade**
1e	As per 1a, but connection is rural, non-residential and capacity costs are allocated	Introduces: • tailored pricing (ie, not a posted connection charge) • zero-rated **posted capacity rates** • non-residential **connection revenue life**
1f	As above, but with active pioneer scheme	Introduces **pioneer scheme contribution**
1g	As above, except local cost recovery scheme (rather than pioneer scheme)	Introduces **localised historical cost recovery**

Remote, mid-sized connection examples

4.6. Table 4.3 summarises variations on the remote, mid-sized connection scenario and highlights pricing features introduced in each variation.

Table 4.3 – Summary of variations on remote, mid-sized connection scenario (Scenario 2)

No.	Variation	Comment
2a	Remote mid-sized connection	Applicant wishes to connect a Coolstore in a rural location. Introduces: • **extension-like upgrade** • bespoke **capacity rate** • bottom-up **incremental revenue** estimate
2b	As above, but customer requests flexible connection	Flexibility avoids need for network upgrade and reduces upstream capacity cost Introduces: • **minimum flexi scheme** • **capacity costing** for a flexi connection

Large connection examples

4.7. Table 4.4 summarises variations on the large connection scenario and highlights pricing features introduced in each variation.

Table 4.4 – Summary of variations on large connection scenario (Scenario 3)

No.	Variation	Comment
3a	Large connection at zone substation level	Capacity costing for **upper network tiers** only. Reconciliation for customer with **special pricing**.
3b	As above, also involves GXP work and transmission repricing	Introduces **incremental transmission costs**
3c	As per 3a, but new connection will also inject (<1 MVA)	Introduces treatment of hybrid (load and injection) connections where injection is small (and therefore there is no associated incremental cost)
3d	As above, injection is mid-sized (~1.5 MVA)	Introduces treatment of hybrid connections where there is an incremental cost associated with injection

Reference guide

4.8. Table 4.5 provides a guide on where to look for the most complete explanation of each feature.

Table 4.5 – Guide to which examples provide the most information on each feature

Feature	Example(s)
Financial parameters (discount rate, opex scaling factor)	1a
Posted connection charge	1a
Revenue and tariff adjustment factors	1a
Top-down (revenue-based) revenue estimate	1a
Minimum scheme	1a
Capacity costing	1a
Charge reconciliation	1a
Customer-selected enhancement	1b, 1c
Connection upgrade	1d
Pioneer scheme	1f
Local cost recovery scheme	1g

Feature	Example(s)
Extension-like upgrade	2a
Bottom-up (tariff-based) revenue estimate	2a
High-cost capacity upgrade (bespoke rate)	2a
Flexible connection	2b
Special pricing	3a
Incremental transmission costs	3b
Hybrid connections (distributed generation)	3c, 3d

5. Small connection (Examples 1a to 1g)

5.1. This section covers seven examples based on variations of a small connection scenario. Each variation introduces new features, and each new feature is explained in greater detail when first introduced.

5.2. The first four examples (a - d) involve a low-cost urban residential connection and the other three (e – g) involve a higher-cost rural non-residential connection, as shown below in Table 5.1.

Table 5.1 – Summary of small connection examples

No.	Variation	Comment
1a	Small urban residential	Distributor has **posted connection charge** for which this connection is eligible. Introduces: • notional **minimum scheme** (for posted charges) • **charge reconciliation** inputs, calculation, presentation • **capacity costing** (as reconciliation input) • top-down revenue estimate
1b	As above, but customer requests two-phase connection	Introduces **customer-selected enhancement**
1c	As above, with distributor allocating capacity costs	Introduces **capacity costing** (as input to charges)
1d	As above, but second phase is an upgrade to existing connection	Introduces pricing for **connection upgrade**
1e	As per 1a, but connection is rural, non-residential and capacity costs are allocated	Introduces: • tailored pricing (ie, not a posted connection charge) • zero-rated **posted capacity rates** • non-residential **connection revenue life**
1f	As above, but with active pioneer scheme	Introduces **pioneer scheme contribution**
1g	As above, except local cost recovery scheme (rather than pioneer scheme)	Introduces **localised historical cost recovery**

1a – Small urban residential connection with posted charge

5.3. A distributor has decided to create a **posted charge** for certain small residential connections – ie, the distributor charges a standard fixed amount for connections that meet certain eligibility criteria.

Use of posted charges

5.4. Creating a posted charge is an optional step. It is not a requirement, but the connection pricing requirements are designed to work with and accommodate use of posted charges.

5.5. Posted charges are appropriate where a distributor deals with a relatively high volume of connections that have similar costs and will generate similar revenue – for example, "standard" residential connections.

5.6. Use of a posted charge trades off reduced pricing accuracy for improved predictability (for applicants) and reduced administrative costs (for distributors). This trade-off can be appropriate for connection types that are high in volume and reasonably uniform in cost and expected revenue.

5.7. To set up a posted charge, a distributor:

(a) must design and cost a notional **minimum scheme** that corresponds with the posted charge. This will be used for charge reconciliation, and for enhancement cost allocation (when applicable)

(b) should set eligibility criteria for the posted charge. This allows the distributor to exclude connections that are materially higher cost than the notional connection or are likely to have a materially different revenue profile

(c) must **publish** the posted charge

(d) must prepare a **charge reconciliation** associated with the posted charge. The Authority also encourages distributors to include this in a published connection pricing methodology document

(e) may use the pre-prepared charge reconciliation for connections that use the posted charge.[14]

5.8. Examples of eligibility criteria could include:

(a) eligibility limited to new standard capacity residential connections

(b) different posted charges for overhead and underground networks

(c) maximum eligible extension length

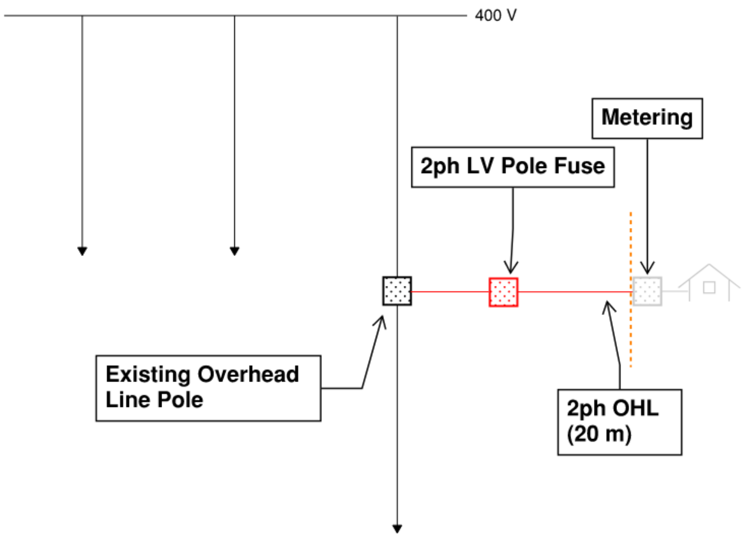
(d) exclude areas with high construction costs (eg, where state highway traffic control required, expensive ground conditions, or shared right of way).

14 Refer clause 6B.4(4)

Notional minimum scheme

5.9. Figure 5.1 presents the electrical design of the notional minimum scheme – that is, the least-cost technically acceptable design for a typical connection of the type that is eligible for the posted charge.

Figure 5.1 – Electrical diagram for notional minimum scheme (Example 1a – small residential)



5.10. Table 5.2 presents the distributor's cost build up for the notional minimum scheme **extension works**. Note that:

(a) the notional length of the extension is based on the anticipated average length of the eligible connections (not the maximum length)

(b) the cost build-up excludes the cost of **customer-owned works** – noting metering is usually customer-owned (from the distributor's perspective) and so its cost is usually out of scope for connection pricing requirements[15]

(c) **extension costs** exclude any costs associated with using or adding to the capacity or security of shared upstream assets (ie, they exclude **network capacity upgrade** works)

(d) extension costs can include the cost of working with or modifying shared assets to establish a physical connection to the extension assets.

15 Metering is typically provided as a service by third-party metering equipment providers, however on some networks a

distributor may supply additional metering for network management purposes.

Table 5.2 - Extension cost build-up for notional minimum scheme (Example 1a – small residential)

Component	Cost ($)	Assumptions
400 V LV overhead line	600	$15/m - 95mm2 Al Fluorine AAAC (or similar). All lengths assumed to be 20 m * 2.
400 V single phase pole fuse	100	Single Phase 63 A Fuse
Installation	1,200	3 x 4 hours @ $100 / hour
TOTAL	**$1,900**	

5.11. For reconciliation purposes, the distributor must assess the capacity cost associated with the notional minimum scheme. To do this, the distributor:

(a) selects the appropriate **posted capacity rate** for each network tier. All distributors are required to develop and publish posted capacity rates. Posted capacity rates can apply network-wide, or a distributor may decide to split their network(s) into network costing zones with different rates

(b) determines an appropriate **capacity demand assumption** for each applicable tier. In this case, the notional connection is at the LV tier and the connection will consume capacity at all tiers. The distributor uses demand assumptions that are consistent with their network planning for standard residential connections. These take demand diversity and coincidence into account (for each tier).

5.12. Table 5.3 presents the capacity cost build-up for the notional minimum scheme. Note that:

(a) demand at LV level is smaller than the connection size, reflecting a diversity assumption (ie, residential connections on an LV network are unlikely to simultaneously draw at full connection capacity)

(b) demand is different at each level, reflecting the distributor's prudent and efficient approach to network planning and sizing[16]

(c) the costs for each tier are summed together to determine the total capacity cost (ie, the cost that will one day be incurred by the distributor to replace capacity headroom consumed by the connection).

[16] The after-diversity demand per connection decreases as the number of connections increase. We expect distributors may wish to adopt standard default capacity demand assumptions for their residential and small non-residential consumer groups.

Table 5.3 – Capacity costing for notional minimum scheme (Example 1a – small residential)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*15*	-
LV mains	$240	5	1,200
Distribution substation	$600	2.5	1,500
HV feeder	$85	2.5	213
Zone substation	$380	2	760
Sub-transmission line	$140	1.5	210
TOTAL	**-**	**-**	**$3,883**

5.13. Note that, in this example:

(a) the typical cost of the network capacity needed to serve a new residential connection is assessed as $3,883 in current dollar terms

(b) if capacity cost were re-assessed the following year, the number would increase if the distributor's input costs had increased (and vice versa)

(c) the figure excludes associated operating expenditure (opex) because incremental opex is addressed through a revenue adjustment[17]

(d) this cost equates to approximately $50 per kVA per year – ie, when the capital cost is annualised and divided by the 5 kVA design demand[18]

(e) the corresponding long-run marginal cost (LRMC) of capacity (often used for setting lines charges) may be higher or lower than this figure and varies by location and over time.[19]

Setting the level of the posted connection charge

5.14. The distributor has decided to set the posted connection charge at **$1,330 per connection**.

5.15. The new pricing requirements do not impose any direct constraints on this pricing level, noting that in this case:

(a) the distributor is not required to allocate any particular portion of the minimum scheme extension cost to the connection charge

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17 Except in the case of large connections with special pricing, where opex is added as a separate cost.

18 Assuming a 6% financing cost and 45 year life.

19 The LRMC is typically high if the need for an upgrade is imminent. This reflects that a relatively small (but sustained) reduction in peak demand may enable a full capacity increment to be deferred for a year.

(b) the posted charge is based on the minimum scheme, so there is no customer-selected enhancement

(c) the distributor has chosen not to allocate upstream network capacity costs

(d) pioneer scheme contributions can, if applicable, be added to the posted connection charge (but are not included in charge reconciliations).[20]

5.16. Table 5.4 sets out a standard build-up of the connection charge we will use throughout this document. In the table, bolded figures are mandatory calculations or parameters (unless agreed in writing).

Table 5.4 – Posted charge composition (Example 1a – small residential)[21]

Component	Amount ($)	Charge ($)
MS – extension (EC)	**1,900**	
MS – capacity (NCC)	**3,883**	
Minimum scheme (total)	**5,783**	1,330
CSE – extension component	**-**	
CSE – capacity component	**-**	
Customer-selected enhancement (total)	**-**	-
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Total incremental cost	$5,783	
CONNECTION CHARGE		**$1,330**

5.17. Note that, in this case:

(a) the distributor has set a posted connection charge that is less than the extension cost for the minimum scheme

(b) a posted charge does not include components relating to:

(i) customer-selected enhancement costs (because it is based on the minimum scheme)

20 The definition of connection charge excludes connection fees and pioneer scheme contributions.

21 Note that this presentation of charge composition is purely for illustration and clarity. Distributors are not required to build up their connection charges in this format, nor do we expect distributors to adopt methodologies that allocate a fixed percentage of incremental cost.

   (ii) incremental transmission costs (because those costs are bespoke, and only apply to certain large connections)

   (iii) localised historical cost recovery (because such charges are inherently local and bespoke)

   (iv) an operating cost loading (because connections eligible for posted connection charges will also pay posted lines charges)

5.18. In addition to the posted connection charge, the distributor sets connection fees of:

(a) $140 for application processing

(b) $80 for technical observation.

5.19. These fees are based on the costs of administering the connection process.

Charge reconciliation inputs

5.20. The distributor is required to prepare a standardised charge reconciliation associated with the posted connection charge and its notional minimum scheme. The distributor must:

(a) advise connection applicants that they can request a copy of the reconciliation

(b) provide the reconciliation to a connection applicant on request

(c) provide reconciliations to the Electricity Authority if requested

(d) provide supporting analysis to the Electricity Authority if requested.

5.21. The Authority recommends distributors:

(a) include the charge reconciliation in a published connection pricing methodology document

(b) maintain structured records of the reconciliation for each connection quote, along with a record of enquiry status (eg, quote requested, quote provided, quote accepted, quote rejected, connection completed).

5.22. To prepare charge reconciliations, distributors need to determine (and update annually) several key figures:

(a) discount rate – used to adjust the timing of future cashflows so they are consistently stated in present value terms

(b) opex scaling factor – used to adjust distribution lines charge revenues to recognise that some annual revenue goes to covering new opex costs

(c) revenue adjustment factors – used to adjust the revenue forecast for each year to reflect movements in the distributor's overall target revenue

(d) tariff adjustment factors – used if the distributor is intending to rebalance or restructure its tariffs in a way that may further alter future revenue from the connection.

Discount rate

5.23. The **discount rate** is not distributor-specific – ie, every distributor will use the same rate based on the same inputs. The rate is updated annually.

5.24. The discount rate is used to make compounding downward adjustments to revenue from future years – to reflect that future income is worth less than income today. It is used in the same way to adjust connection expenditures if they span multiple years into the future.

5.25. The specification for the rate is at clause 6B.11(4)(c)(ii):

> …a discount rate equal to the most recent available mid-point estimate of vanilla WACC (being the weighted average cost of capital) made by the Commerce Commission in accordance with the Electricity Distribution Information Disclosure Determination 2012 made under Part 4 of the Commerce Act 1986 less an adjustment to remove inflation consistent with inflation projections for the year ahead from the most recent Monetary Policy Statement published by the Reserve Bank of New Zealand;

5.26. The Commerce Commission publishes a determination each May,[22] and distributors should update the discount rate they use in their charge reconciliation calculations each year at that time.

5.27. Referring to the May 2025 determination, the mid-point vanilla WACC for EDBs is 6.53%.[23]

5.28. The Reserve Bank publishes Monetary Policy Statements (MPS) quarterly in May, February, November, and August.[24]

5.29. To ensure reasonable consistency between the WACC figure and the inflation adjustment, the May MPS should be used to adjust the May WACC determination.

5.30. Referring to the May 2025 MPS, forecast annual CPI inflation for the year to 1 June 2026 is **1.9%**.[25]

5.31. Subtracting the CPI inflation figure from the mid-point vanilla WACC figure gives a discount factor of (6.53% - 1.9% =) **4.63%**. This is the figure that would be used in reconciliations for connection pricing quotes supplied to connection applicants from June 2025 to May 2026.

Incremental opex scaling factor

5.32. The **incremental opex scaling factor** (OSF) is distributor-specific and is updated annually.

5.33. The opex scaling factor is used in the **incremental distribution revenue estimation** (IDR) to recognise that some of the ongoing revenue collected through

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22 https://comcom.govt.nz/regulated-industries/input-methodologies/input-methodologies-for-electricity-gas-and-airports/cost-of-capital-guidelines-and-determinations

23 https://comcom.govt.nz/__data/assets/pdf_file/0028/366076/2025-NZCC-7-Cost-of-capital-determination-EDBs-and-WIAL-ID-6-May-2025.pdf. Table 1, p3.

24 https://www.rbnz.govt.nz/monetary-policy/monetary-policy-statement/monetary-policy-statement-filtered-listing-page#sort=%40computedsortdate%20descending

25 https://www.rbnz.govt.nz/-/media/project/sites/rbnz/files/publications/monetary-policy-statements/2025/may-0525/mpsmay25-data.xlsx Tab A.5, cell D80 – ie, the forecast annual CPI figure for 1 June 2026.

lines charges will go toward covering incremental operating costs for the new connection.[26]

5.34. The specification for the scaling factor is set out in the Code at clause 6B.11(5):

$$OSF = 1 - \frac{ASO}{AEDR}$$

where

OSF is the incremental opex scaling factor

ASO is the average selected opex, being the average value over the five most recent available **disclosure years** of the sum of a **distributor's**—

(a) service interruptions and emergencies opex as defined in the **EDB IMs**; and

(b) vegetation management opex as defined in the **EDB IMs**; and

(c) routine and corrective maintenance and inspection opex as defined in the **EDB IMs**; and

(d) any costs described in clause 3.1.2(1)(a) of the **EDB IMs**

AEDR is the average electricity distribution revenue, being the average value over the five most recent available **disclosure years** of a **distributor's** distribution line charge revenue (excluding revenue relating to pass through of electricity transmission costs)

5.35. Clause 3.1.2 of the EDB IMs sets out pass-through costs and the specific clause cited links to a list of local government rates and industry levies paid by distributors and passed on through lines charges.

5.36. Each distributor prepares their own disclosures, which are also published by the Commerce Commission in large, consolidated Excel databases. To illustrate, the Commission's latest published database contains records for 2022 to 2024.[27] Taking the average across those years only, the relevant values for Wellington Electricity are:[28]

(a) service interruptions and emergencies opex = $4.6m

(b) vegetation management opex = $1.8m

(c) routine and corrective maintenance and inspection opex = $8.9m

(d) pass-through costs = $4.0m

(e) distribution revenue = $153.8m

5.37. These figures give an ASO value of $19.3m, AEDR value of $153.8m and scaling factor (OSF) of (1 - $19.3m ÷ $153.8m =) **87.5%**.

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26 For (typically large) connections with "special pricing" an alternative approach is used – an operating cost load is added to the incremental cost instead of scaling down the incremental distribution revenue.

27 Database downloaded from https://comcom.govt.nz/regulated-industries/electricity-lines/electricity-distributor-performance-and-data/information-disclosed-by-electricity-distributors

28 Note that the calculations here are illustrative and not fully compliant with the Code. To derive compliant figures, distributors should use a five-year average period and should adjust (upward) figures from earlier years for movement in CPI to ensure all values are expressed in consistent dollar terms.

Revenue adjustment factors

5.38. Revenue adjustment factors are updated each pricing year. There are two sets of factors used to adjust:

(a) incremental distribution revenue – these are distributor-specific

(b) incremental transmission revenue – these can either be based on Transpower's published revenue path, or distributor-specific forecasts of transmission charges.

5.39. The revenue scaling factors are used to adjust first-year revenue figures for overall movements in target revenue (which, all things being equal, flow into lines charges).[29]

5.40. Taking Wellington Electricity as an example again:

(a) the Commerce Commission determined an annual real rate of change (x-factor) of **9.6%** for each year of DPP4 (that is, the five years starting April 2025)

(b) Transpower published indicative prices for RCP4 for each customer. For Wellington Electricity, this shows a 15% increase in 2026, followed by further 2% increases[30]

(c) Transpower also published a revenue model that projects its smoothed maximum allowable revenue (SMAR) to 2035. This indicates a 3% increase in 2030, followed by a 4% decrease in 2030 and then 2% increases each year[31]

5.41. Table 5.5 sets out the factors that would be used to adjust distribution and transmission revenues for Wellington Electricity based on the above, noting that:

(a) adjustment factors reflect year-on-year movement in revenue in real terms (ie, excluding CPI)[32]

(b) beyond the year for which the distributor has specific forecast information, revenue is assumed to stay at the same level (in real terms – ie, increases are assumed to match CPI)

(c) the table assumes the connection is livened and starts to produce revenue for the distributor sometime during the 12-month period ending 31 March 2026.

Table 5.5 – Revenue adjustment figures (Wellington Electricity)

Revenue adjustment factors	2026	2027	2028	2029	2030	2031	2032	…
Distribution	1	1.10	1.20	1.32	1.44	1.44	1.44	1.44

29 Refer clause 6B.11(4)(iii).

30 We adjusted each of Transpower's figures down by 2% to remove forecast CPI. https://static.transpower.co.nz/public/uncontrolled_docs/RCP4%20indicative%20transmission%20charges%20-%20Dec-24.xlsx?VersionId=8EUpHsiiRt68M5HVYec3Ez_cES.lipv8

31 As above, we have adjusted figures to remove forecast CPI movement. https://static.transpower.co.nz/public/uncontrolled_docs/Transpower%20RCP4%20revenue%20model_November2024.xlsm?VersionId=xD8JerPeKYE7GfiP5sL98v1Zb.wQVeOM Tab 'SMAR'

32 This is consistent with the use of a real discount rate.

Revenue adjustment factors	2026	2027	2028	2029	2030	2031	2032	…
Transmission	1	1.15	1.16	1.19	1.21	1.24	1.20	1.20

Tariff adjustment factors

5.42. Tariff adjustment factors are consumer group or connection specific. They can be used to further adjust revenue if the distributor is planning to:

(a) rebalance target revenue allocation between consumer groups (eg, reduce allocation to residential consumers)

(b) restructure tariffs in a way that alters estimated revenue for a connection (eg, increased fixed component and reduced variable component).[33]

5.43. Tariff adjustment factors would often be set to 100% – reflecting no specific, material planned changes.

5.44. Wellington Electricity's most recent pricing methodology sets out that it is part-way through transitioning to new target revenue allocation approach for transmission.[34]

5.45. For 2025/26, the portion allocated to residential connections is 61%. This will reduce gradually to 51%. We'll assume this transition occurs over five years, as shown in Table 5.6.

Table 5.6 – Tariff adjustment figures for residential customers (Wellington Electricity)

Revenue adjustment factors	2026	2027	2028	2029	2030	2031	2032	…
Distribution	1	1	1	1	1	1	1	1
Transmission	1	0.97	0.94	0.90	0.87	0.84	0.84	0.84

Year-One revenue amounts

5.46. The process for determining the incremental revenue estimate (IR) starts with estimating revenue from lines charges for the first pricing year in which the connection is in service. Revenue is built up separately for:

(a) transmission component – this is the portion of lines revenue that relates to pass-through of connection charges

(b) distribution component – all other lines revenue.

5.47. In this case, the connection is for a standard residential connection, so it is appropriate to use a "top-down" approach – ie, divide revenue from residential tariffs by the number of active residential ICPs.

[33] This could be relevant if year-one revenue is estimated using a bottom-up (tariff-based) approach.

[34] https://www.welectricity.co.nz/disclosures/pricing/2025-pricing/document/389, Section 6.3

5.48. For consistency, we will again use Wellington Electricity figures. Wellington Electricity's most recent pricing methodology provides the data points shown in Table 5.7.[35]

Table 5.7 – Top-down revenue figures for standard residential connection (Wellington Electricity)

Information	Value	Reference
Portion of target revenue allocated to residential consumers (distribution revenue)	64.5%	DPM Figure 18
Target revenue (excl. transmission)	$131.2m	DPM Figure 11
Portion of target revenue allocated to residential consumers (transmission revenue)	61%	DPM Figure 21
Target revenue (transmission)	$58.8m	DPM Figure 11
Number of residential connections	159,201	Price schedule

5.49. Using the above figures, the Year-One revenue figures are (64.5% x $131.2m ÷ 159,201 =) **$532** for distribution revenue and (61% x $58.8m ÷ 159,201 =) **$225** for transmission revenue.

Charge reconciliation calculation

5.50. In the discussion above, we have collected the figures we need to complete the charge reconciliation calculation set out in 6B.11(1):

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

5.51. In this calculation:

(a) CC is the actual connection charge, which is the posted charge in this case

(b) IC is the incremental cost, which is built up from several components (see below)

(c) IR is the incremental revenue from ongoing charges. This is estimated by projecting a stream of revenue and discounting to today (see below)

(d) NC is the contribution that revenue from the connection will make to shared network costs (ie, beyond the incremental cost of adding the connection).

Incremental cost

5.52. The incremental cost calculation is set out at 6B.11(2):

$$IC = EC + CSE + NCC + ITC + LHCR + OCL$$

35 https://www.welectricity.co.nz/disclosures/pricing/2025-pricing/document/389

where

IC	is the **incremental cost estimate**
EC	is the **extension cost** of the **relevant minimum scheme**, excluding any **incremental transmission cost**
CSE	is the **customer-selected enhancement** costs, if any
NCC	is the **network capacity cost** of the **relevant minimum scheme** calculated in accordance with clause 6B.5
ITC	is the **incremental transmission cost**, if any
LHCR	is the **localised historical cost recovery**, if any
OCL	is the **operating cost loading**, if any

5.53. Table 5.8 sets out the components summed to calculate the incremental cost.

Table 5.8 – Incremental cost build-up (Example 1a – small residential)

Component	Value ($)	Comment
EC	1,900	Based notional minimum scheme extension works
CSE	-	Based on minimum scheme, so no enhancements
NCC	3,883	Based on notional minimum scheme capacity cost build-up. Must be added to IC regardless of whether cost is allocated to the connection.
ITC	-	Notional minimum scheme does not produce a material step-change in transmission costs[36]
LHCR	-	If a connection that was otherwise eligible for a posted charge were built in an area where the distributor had an active cost-recovery scheme in place then this component would be added to charge and reconciliation.
OCL	-	Connection is for a consumer group with posted tariffs, so revenue scaling approach is used for incremental opex instead.
IC	**$5,783**	**Sum of the above terms**

Incremental revenue

5.54. The incremental revenue calculation is described at 6B.11(3) and (4).

5.55. For a posted charge, we will assume that:

[36] Refer definition of incremental transmission works for threshold for including transmission costs.

(a) eligible connections will (on average) be livened halfway through the year. As such, we adjust year-one revenue by 50% to estimate 'year-zero' revenue

(b) connection charges will be paid, and the connection built and livened in the same year. This means all cashflows start from year-zero

(c) the connection will generate revenue for 30 years – ie, the default **connection revenue life** for residential connections[37]

5.56. Table 5.9 shows the build-up of the increment distribution revenue estimate, bringing together the applicable values derived earlier.

Table 5.9 – Distribution revenue calculation (Example 1a – small residential)

	2026	2027	2028	2029	2030	2031	2032	…
Year-zero revenue	$532							
Incremental opex scaling factor	0.875							
Scaled year-zero revenue	$465							
Discount rate	4.63%							
Year	0	1	2	3	4	5	6	…
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.5	1	1	1	1	1	1	1
Revenue adjustment factor	1	1.10	1.20	1.32	1.44	1.44	1.44	1.44
Tariff adjustment factor	1	1	1	1	1	1	1	1
Adjusted revenue	$232	$489	$510	$536	$559	$534	$510	…
Incremental distribution revenue (IDR)	**$10,669**							

5.57. Note that:

(a) labels are for pricing years (ie, year ended 31 March)

(b) the adjusted revenue value for each year is calculated by multiplying the scaled year-zero revenue by all of the adjustment factors (eg, for year zero the calculation is $465 x 1 x 0.5 x 1 x 1 =) $232

(c) discount factors are derived using the formula 1 ÷ (1 + DR) ^ N, where DR is the discount rate of 0.0463 and N is the year number (with 2026 = 0, 2027 = 1, etc)

37 Note that the approach adopted here, of starting from a 'year-zero' estimate differs slightly from the 'year-one' approach set out in the Code – however, the result is the same.

(d) the calculation extends to 2056, which means revenue is assessed for 30.5 years (counting the 2026 half-year)[38]

(e) incremental revenue (IR) is calculated by summing together all of the adjusted revenue figures.

5.58. Table 5.10 shows the build-up of the incremental transmission revenue estimate, bringing together the applicable values derived earlier.

Table 5.10 – Transmission revenue calculation (Example 1a – small residential)

	2026	2027	2028	2029	2030	2031	2032	…
Year-one revenue	$225							
Discount rate	4.63%							
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.5	1	1	1	1	1	1	1
Revenue adjustment factor	1	1.15	1.16	1.19	1.21	1.24	1.20	1.20
Tariff adjustment factor	1	0.97	0.94	0.90	0.87	0.84	0.84	0.84
Adjusted revenue	$113	$240	$224	$211	$198	$187	$173	…
Incremental transmission revenue (ITR)	**$3,823**							

5.59. Note that:

(a) unlike distribution, transmission revenue is not adjusted by the incremental opex scaling factor[39]

(b) the discount and part-year adjustment factors are the same for distribution and transmission

(c) the revenue and tariff adjustment factors are not the same.

5.60. We now have all of the components to complete the reconciliation, which is shown in Figure 5.2.

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38 Refer clause 6B.11(4)(a).

39 Refer clause 6B.11(4)(d).

Figure 5.2 – Charge reconciliation (Example 1a – small residential)

CC = (IC - IR) + NC		
CC =	$1,330	*Connection charge*
IC =	$5,783	*Incremental cost*
IR =	$14,492	*Incremental revenue*
NIC (IC-IR) =	-$8,710	*Net incremental cost*
NC =	$10,040	*Network contribution (= CC - NIC)*

Reliance =	23%	*Portion of IC contributed up-front*
Up-front revenue =	8%	*Portion of revenue contributed up-front*
NC ratio =	63%	*Portion of revenue contributing to network costs*

5.61. Note that:

(a) **net incremental cost** (NIC) of a connection is its incremental cost less the ongoing incremental revenue it will earn. In this example, the net incremental cost is negative – ie, the connection will generate ongoing revenue in excess of its up-front and ongoing costs. This means that, even if the connection charge were set to zero, new connections would benefit existing customers

(b) the network contribution (NC) is determined by subtracting net incremental cost from the connection charge

(c) the Authority refers to an NC of zero as 'neutral point' pricing. At the neutral point:

(i) the new connection does not make existing customers worse off, but also does not make any contribution to spreading fixed and sunk costs (ie, does not make existing customers better off)

(ii) charges are at the very lower bound of the subsidy-free range (the floor)

(d) a negative NC value would indicate that the connection will be subsidised by existing customers

(e) a positive NC value indicates the new connection will contribute to spreading fixed and sunk costs – ie, the new connection will make existing customers better off

(f) in this case:

(i) the connection applicant pays nearly one-quarter of the incremental cost of their connection up-front

(ii) the up-front payment is a relatively small part of the revenue generated by the connection over its life

(iii) over 60% of the total lifetime revenue from the connection contributes to spreading the cost of sunk and shared network costs.

1b – Second-phase enhancement

5.62. Building on the previous example, we now consider a case where a new residential connection:

(a) would meet the eligibility criteria for the posted connection charge, except

(b) the connection applicant requests a two-phase connection.

5.63. In this case:

(a) the second phase is a **customer-selected enhancement**

(b) the connection will be allocated to a standard residential consumer group, so will pay similar ongoing charges to any other residential consumer

(c) the distributor determines the connection charge using the posted charge, plus an addition to cover the cost of the customer-selected enhancement.

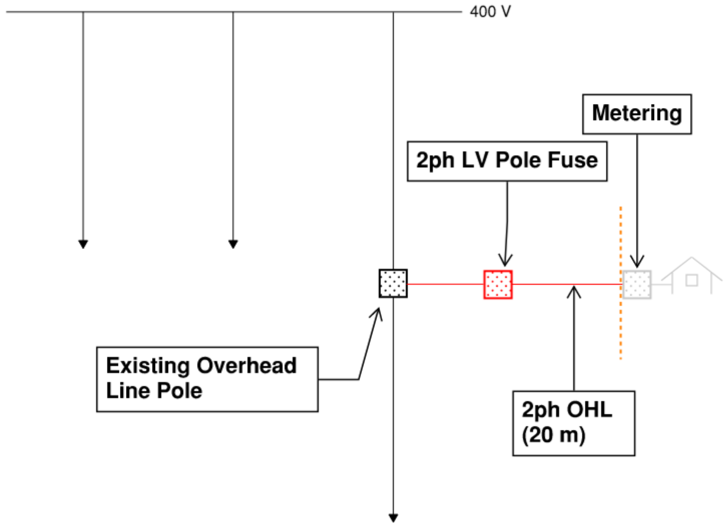
5.64. The enhancement cost potentially has two components:

(a) extension cost – the additional (incremental) cost of building a two-phase connection (compared to the notional minimum scheme)

(b) capacity cost – the additional costs (if any) associated with higher assumed network capacity demand.

5.65. Figure 5.3 illustrates the electrical configuration for this example.

Figure 5.3 – Electrical diagram (Example 1b)



5.66. Table 5.11 presents the distributor's cost build up for the extension cost component of the customer-selected enhancement.[40] For extension costs, the distributor directly estimates the costs of the additional components.

Table 5.11 – Extension cost build-up for second phase (Example 1b – second-phase enhancement)

Component	Cost ($)	Assumptions
Additional 400V LV overhead line	300	$15/m - 95mm2 Al ABC / Fluorine AAAC (or similar). All lengths assumed to be 20 m
400V 2-phase pole fuse (upgrade)	100	Additional 60A fuse
Additional install costs	600	Additional 2 hr x 3 pax @ $100 /hr
TOTAL	**$1,000**	

5.67. Table 5.12 presents the distributor's estimate of the capacity cost associated with the customer-selected enhancement. In this case, the cost can be determined by estimating the cost associated with a two-phase connection and deducting the cost of the (single phase) notional minimum scheme.

Table 5.12 – Capacity costing for second phase (Example 1b – second-phase enhancement)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*30*	-
LV mains	$240	8	1,920
Distribution substation	$600	3	1,800
HV feeder	$85	3	255
Zone substation	$380	2.5	950
Sub-transmission line	$140	2	280
TOTAL	-	-	5,205
less capacity cost of the notional minimum scheme			(3,883)

40 Note that because the notional minimum scheme was costed independently alongside the posted charge, the distributor assesses the cost by building up the additional cost components (rather than costing a two-phase connection and deducting the single-phase cost).

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Capacity cost of the customer-selected enhancement			**$1,323**

5.68. Table 5.13 shows the charge build-up.

Table 5.13 – Charge composition (Example 1b – second-phase enhancement)

Component	Amount ($)	Charge ($)
MS – extension (EC)	**1,900**	
MS – capacity (NCC)	**3,883**	
Minimum scheme (total)	**5,783**	1,330
CSE – extension component	**1,000**	
CSE – capacity component	**1,323**	
Customer-selected enhancement (total)	**2,323**	1,000
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Total incremental cost	$8,105	
CONNECTION CHARGE		**$2,330**

5.69. Note that, in this case the distributor:

(a) allocates the full customer-selected enhancement cost

(b) does not allocate the capacity portion of the customer-selected enhancement cost.

5.70. Figure 5.4 shows the reconciliation for this example.

Figure 5.4 – Charge reconciliation (Example 1b – second-phase enhancement)

CC = (IC - IR) + NC		
CC =	$2,330	*Connection charge*
IC =	$8,105	*Incremental cost*
IR =	$14,492	*Incremental revenue*
NIC (IC-IR) =	-$6,387	*Net incremental cost*
NC =	$8,717	*Network contribution (= CC - NIC)*

Reliance =	29%	*Portion of IC contributed up-front*
Up-front revenue =	14%	*Portion of revenue contributed up-front*
NC ratio =	52%	*Portion of revenue contributing to network costs*

5.71. Note that, compared to Example 1a:

(a) the connection charge increased, because the distributor allocates the extension component of the customer-selected enhancement costs to the connection applicant

(b) this distributor does not pass on the capacity cost component of network extension costs, so:

(i) the incremental cost estimate increased by more than the connection charge

(ii) estimated contribution to network costs therefore decreased (and the reliance metric increased).

1c – Second-phase with capacity costs

5.72. This example is the same as the previous example, except this distributor allocates network capacity costs.

5.73. Because the distributor allocates network capacity costs, they must do so using network capacity costing. They cannot, for example:

(a) allocate upgrade project costs to 'last straw' connection applicants[41]

(b) use an alternative method of determining network capacity costs, even if rate based.

5.74. We summarised the relevant costs in Table 5.13. We will assume the distributor:

(a) has set the same posted charge as before. We've notionally presented this a being made up of a combination of minimum scheme extension and network capacity costs

(b) passes on 100% of the cost of customer-selected enhancements.[42]

5.75. The connection charge build-up is shown in Table 5.14.

Table 5.14 – Incremental cost (Example 1c – second phase with capacity costs)

Component	Amount ($)	Charge ($)
MS – extension (EC)	**1,900**	
MS – capacity (NCC)	**3,883**	
Minimum scheme (total)	**5,783**	1,330
CSE – extension component	**1,000**	
CSE – capacity component	**1,323**	
Customer-selected enhancement (total)	**2,323**	2,323
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Total incremental cost	$8,105	
CONNECTION CHARGE		**$3,653**

41 Unless the upgrade meets the criteria for an extension-like upgrade, or large capacity increment (clause 6B.5(2)).

42 Noting this requirement does not apply until 1 April 2027, and that the distributor and customer may agree (in writing) to an alternative allocation (refer clause 6B.4(3)).

5.76. Note that, in this case:

(a) the posted charge is set at the same level as the earlier examples

(b) the distributor passes on the full customer-selected enhancement cost, including the extension and capacity components

(c) accordingly, the increase in connection charge for adding a second phase is larger than the previous example.

5.77. Figure 5.5 shows the charge reconciliation for this example.

Figure 5.5 – Charge reconciliation (Example 1c – second phase with capacity costs)

CC = (IC - IR) + NC

CC =	$3,653	*Connection charge*
IC =	$8,105	*Incremental cost*
IR =	$14,492	*Incremental revenue*
NIC (IC-IR) =	-$6,387	*Net incremental cost*
NC =	$10,040	*Network contribution (= CC - NIC)*

Reliance =	45%	*Portion of IC contributed up-front*
Up-front revenue =	20%	*Portion of revenue contributed up-front*
NC ratio =	55%	*Portion of revenue contributing to network costs*

5.78. Note that:

(a) in contrast to Example 1b, the capacity cost associated with the customer-selected enhancement is now added to the connection charge

(b) accordingly, the estimated contribution to network costs for this connection as the same as for Example 1a

(c) for this distributor, enhancement costs fully flow through to connection charges (rather than changes in network cost contribution) – in other words, this pricing is more cost-reflective than the earlier examples.

1d – Second-phase upgrade

5.79. This example is identical to Example 1c, except in this case the applicant has an existing residential connection and they want to upgrade it with a second phase.

5.80. Upgrades fall within the definition of **connection works**.

> **connection works** means the works involved to provide a **connection**, or to increase the security or capacity of or at, a **point of connection**

5.81. In this case, adding a second phase is the connection works. This means the work to add the second phase is treated as the minimum scheme (rather than as a customer-selected enhancement).

5.82. The distributor is:

(a) required to design and cost the minimum scheme

(b) not required to allocate the full cost of the minimum scheme to the connection applicant

(c) not required to allocate any upstream capacity costs, but if they do then they must use their posted capacity rates

(d) required to prepare a charge reconciliation, which must include capacity costs.

5.83. In this example, we'll assume the distributor's connection pricing methodology sets out that they will allocate the full cost, including the network capacity cost. We'll also assume that the distributor's posted tariffs (for lines charges) do not change (ie, the second phase will not alter annual lines charges).

5.84. The extension cost for the second phase is shown in Table 5.15.

Table 5.15 – Extension cost build-up (Example 1d – second phase upgrade)

Component	Cost ($)	Assumptions
400 V LV overhead line	300	$15/m - 95mm2 Al ABC / Fluorine AAAC (or similar). All lengths assumed to be 20 m.
400 V single phase pole fuse	100	Single Phase 63 A Fuse
Installation	1,000	3 x 3.3 hours @ $100 / hour
TOTAL	**$1,400**	

5.85. Note that, in this case:

(a) material costs are the same as earlier two-phase examples

(b) labour costs are estimated as lower than building a single-phase connection, but higher than the incremental labour involved in building a two-phase connection in one visit.

5.86. Table 5.16 sets out the connection charge composition for this example.

Table 5.16 - Connection charge composition (Example 1d – second phase upgrade)

Component	Amount ($)	Charge ($)
MS – extension (EC)	**1,400**	
MS – capacity (NCC)	**1,323**	
Minimum scheme (total)	**2,723**	2,723
CSE – extension component	**-**	
CSE – capacity component	**-**	
Customer-selected enhancement (total)	**-**	-
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Total incremental cost	$2,723	
CONNECTION CHARGE		**$2,723**

5.87. Note that, in this Example the network capacity cost is the same cost estimated for adding a second phase enhancement (Example 1c).

5.88. For charge reconciliation, the distributor assumes the second phase will not alter ongoing revenue from the connection. This is because:

(a) the tariffs assigned to the connection will not change

(b) the distributor does not expect consumption to change materially.[43]

5.89. Given these assumptions, the charge reconciliation is as shown in Figure 5.6.

43 In making this assessment, the distributor takes into account its relatively high-level, top-down approach to estimating revenue from residential consumers.

Figure 5.6 – Charge reconciliation (Example 1d)

_CC = (IC - IR) + NC_	

CC = $2,723	*Connection charge*
IC = $2,723	*Incremental cost*
IR = $0	*Incremental revenue*
NIC (IC-IR) = $2,723	*Net incremental cost*
NC = $0	*Network contribution (= CC - NIC)*

Reliance = 100%	*Portion of IC contributed up-front*
Up-front revenue = 100%	*Portion of revenue contributed up-front*
NC ratio = 0%	*Portion of revenue contributing to network costs*

5.90. Note that:

(a) because the distributor is allocating 100% of the incremental cost and is not expecting any incremental revenue, the network cost contribution is zero

(b) this means pricing for the upgrade is at the lower boundary (the floor) of the subsidy-free range

(c) the upgraded connection is nonetheless expected to continue to contribute to network costs. The pricing approach has preserved the connection's earlier contribution level

(d) if the second phase does result in increased consumption (and assuming that in turn results in higher monthly lines charges) the upgrade will end up increasing the connection's contribution to recovering network costs.

1e – Small rural non-residential connection

5.91. In this example, the connection is similar to Example 1a except it is:

(a) non-residential. It has the same capacity (15 kVA) as the residential examples, but is intended to supply a small business

(b) rural. The connection will involve a longer extension than the earlier examples, and the connection is in a low-growth costing zone.

5.92. The distributor determines that:

(a) the connection is not eligible for any of its posted connection charges. This means it will build-up a tailored charge for this connection and will need to prepare a tailored charge reconciliation

(b) new extension assets (which include a new pole) are unlikely to become shared assets in future, so the distributor will not need to consider whether to:

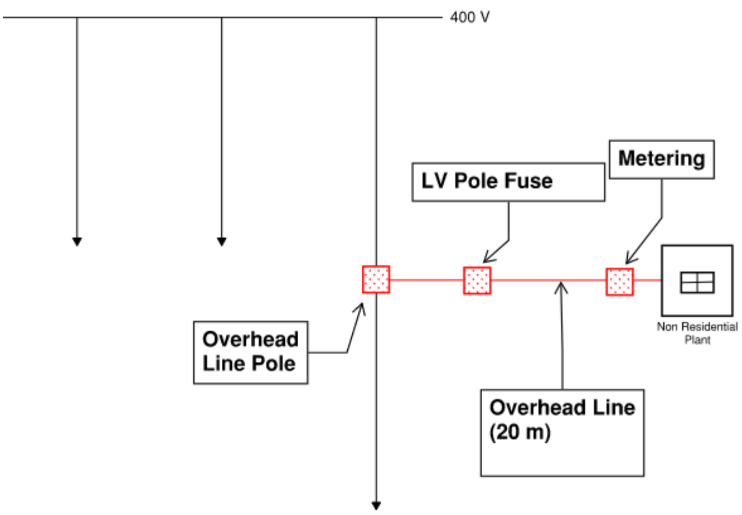
(i) start a pioneer scheme, or

(ii) treat the extension as a network development

(c) the connection is in a location where it is unlikely to be stranded if the connection applicants ceases operation – so a standard revenue life assumption is appropriate.

5.93. Figure 5.7 presents the electrical design of the minimum scheme for this connection.

Figure 5.7 – Electrical drawing of minimum scheme (Example 1e)



5.94. In this case, we'll assume the distributor sets connection charges by crediting up to 65% of incremental revenue toward meeting incremental costs.

5.95. Because the distributor allocates upstream capacity costs, it must use follow the capacity costing requirements when setting that part of its charges.

Extension cost

5.96. The minimum scheme for the connection must align with the distributor's **connection and operating standards**, which in turn must reflect reasonable and prudent measures and practices. These requirements are embedded in the distributor's engineering standards and procurement arrangements, so amount to the minimum scheme simply reflecting the distributor's standard design practices.

5.97. The extension cost:

(a) includes installing a fully dressed pole with cable termination equipment to provide a suitably located **point of connection** on the distributor's existing network

(b) includes constructing a new service line between the **point of connection** and the connection applicant's **consumer installation**[44]

(c) excludes work covered by **connection fees**, which in this case include processing the connection application and observing testing of the new line.

5.98. Table 5.17 sets out the cost build-up for the extension.

Table 5.17 – Extension cost build-up (Example 1e)

Component	Cost ($)	Assumptions
400 V LV Overhead line	600	$15/m * 20 m * 2 95mm2 Al Fluorine AAAC (or similar)
400 V Pole / Cross Arm	13,200	The cost is inclusive of a fully dressed pole and cable termination equipment.
400 V Single Phase Pole Fuse	100	Single Phase 63 A Fuse
Install Costs	2,085	Labour
TOTAL	**$15,985**	

5.99. Note that:

(a) the extension cost in this example is higher than earlier examples, reflecting the need to install a new pole to provide a nearby point of connection.

Capacity cost

5.100. We'll assume the distributor has set up two **costing zones** on their network to reflect that:

(a) the more urban part of their network has growing demand from new connections and new activity at existing connections (eg, switching from gas

44 Practices vary between distributors as to the demarcation between customer-owned and distributor-owned assets. Connection charge requirements (including the charge reconciliation) do not cover customer-owned assets.

to electric heating). This part of their network also has a mix of overhead and underground construction

(b) the more rural part of their network has limited growth and is fully overhead.

5.101. Setting up two costing zones has given the distributor flexibility to:

(a) adopt different capacity rates ($ per kVA) for each zone, reflecting differences in network upgrade costs

(b) zero-rate capacity for rural LV mains and distribution substations. This reflects these components having sufficient capacity that the distributor thinks they are unlikely to run out of capacity within their network planning horizon.[45]

5.102. Table 5.18 presents the capacity cost build-up for the minimum scheme.

Table 5.18 – Capacity costing for minimum scheme (Example 1e)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*15*	-
LV mains	0	4	-
Distribution substation	0	4	-
HV feeder	85	2	170
Zone substation	380	2	760
Sub-transmission line	100	1.5	150
TOTAL	**-**	**-**	**$1,080**

5.103. Note that:

(a) LV mains and distribution substation rates have been set to zero. This applies to all connections within the distributor's rural costing zone

(b) the rates for this costing zone are different from the earlier examples

(c) demand is different at each level, reflecting the distributor's prudent and efficient approach to network planning and sizing

(d) capacity demand assumptions for lower tiers are higher than the earlier examples. This reflects the smaller population of connections (and hence less diversity benefit)[46]

45 Zero-rating allows a distributor to 'turn off' cost allocation in areas where there is high headroom and low growth such that consuming headroom is effectively costless. Refer definition of **posted capacity rate**.

46 In practice, the higher demand assumptions do not impact the capacity cost in this example because capacity costs are also zero-rated at the applicable tiers.

(e) the costs for each tier are summed together to determine the total capacity cost – ie, the cost that will one day be incurred by the distributor to replace capacity headroom consumed by the connection.

Charge composition

5.104. Table 5.19 sets out the connection charge composition for this example.

Table 5.19 – Connection charge composition (Example 1e)[47]

Component	Amount ($)	Charge ($)
MS – extension (EC)	**15,985**	
MS – capacity (NCC)	**1,080**	
Minimum scheme (total)	**17,065**	11,476
CSE – extension component	**-**	
CSE – capacity component	**-**	
Customer-selected enhancement (total)	**-**	-
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Incremental cost (total)	17,065	
Total incremental cost	$17,065	
CONNECTION CHARGE		**$11,476**

5.105. Note that, in this case:

(a) the distributor sets connection charges by putting up to 65% of incremental revenue toward meeting the incremental cost

(b) in this case, the estimated incremental revenue is $8,598 (refer charge reconciliation below) so the incremental cost is reduced by up to $5,589.

47 Note that this presentation of charge composition is purely for illustration and clarity. Distributors are not required to build up their connection charges in this format, nor do we expect distributors to adopt methodologies that allocate a fixed percentage of incremental cost.

Charge reconciliation

5.106. To prepare a reconciliation, the distributor must estimate the incremental transmission and distribution revenue from the connection.

5.107. Because the connection is non-residential, the default revenue life assumption is 15 years (ie, half as long as a residential connection). This reflects the greater risk that non-residential connections may:

(a) have extended periods where they are inactive (ie, disconnected)

(b) materially reduce their consumption, leading to lower lines revenue

(c) be decommissioned prematurely.

5.108. For this example, we'll assume:

(a) revenue adjustment factors are the same as Example 1a

(b) tariff adjustment factors are the inverse of Example 1a[48]

5.109. In this case, we'll start from Year-One (rather than Year Zero). We'll again use a top-down approach based on figures from Wellington Electricity. This time, we've sourced data points from Wellington Electricity's latest available information disclosures.[49]

Table 5.20 – Top-down revenue figures for small non-residential customer (Wellington Electricity)

Information	Value	Reference
GLV15 consumer group distribution revenue	$ 1.86m	Schedule 8(ii)
GLV15 consumer group transmission revenue	$1.30m	Schedule 8(ii)
GLV15 number of ICPs	5,171	Schedule 8(i)

5.110. Using the above figures, the Year-One revenue figures are ($1.86m ÷ 5,171 =) $360 for distribution revenue and ($1.30m ÷ 5,171 =) $251 for transmission revenue.

5.111. Table 5.21 shows the build-up of the incremental distribution revenue estimate, bringing together the applicable values derived earlier.

Table 5.21 – Distribution revenue calculation (Example 1e)

	2026	2027	2028	2029	2030	2031	2032	…
Year-one revenue	$360							

48 For example, where the adjustment factor in 1a is 0.97, the adjustment factor in this example is (1 ÷ 0.97 =) 1.03. This is consistent with rebalancing allocation between residential and non-residential consumers.

49 https://www.welectricity.co.nz/disclosures/information-disclosures/document/367

	2026	2027	2028	2029	2030	2031	2032	…
Incremental opex scaling factor	0.875							
Scaled year-one revenue	$315							
Discount rate	4.63%							
Year	0	1	2	3	4	5	6	…
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.5	1	1	1	1	1	1	1
Revenue adjustment factor	1	1.10	1.20	1.32	1.44	1.44	1.44	1.44
Tariff adjustment factor	1	1	1	1	1	1	1	1
Adjusted revenue	$157	$331	$345	$363	$378	$361	$345	…
Incremental distribution revenue (IDR)	**$4,775**							

5.112. Table 5.22 shows the build-up of the incremental transmission revenue estimate, bringing together the applicable values derived earlier.

Table 5.22 – Transmission revenue calculation (Example 1e)

	2026	2027	2028	2029	2030	2031	2032	…
Year-one revenue	$251							
Discount rate	4.63%							
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.5	1	1	1	1	1	1	1
Revenue adjustment factor	1	1.15	1.16	1.19	1.21	1.24	1.20	1.20
Tariff adjustment factor	1	1.03	1.06	1.11	1.15	1.19	1.19	1.19
Adjusted revenue	$126	$285	$283	$290	$292	$296	$274	…
Incremental transmission revenue (ITR)	**$3,824**							

5.113. We now have all the components needed to complete the reconciliation, which is shown in Figure 5.8.

Figure 5.8 – Charge reconciliation (Example 1e – small non-residential)

CC = (IC - IR) + NC	
CC = $11,476	*Connection charge*
IC = $17,065	*Incremental cost*
IR = $8,598	*Incremental revenue*
NIC (IC-IR) = $8,467	*Net incremental cost*
NC = $3,009	*Network contribution (= CC - NIC)*
Reliance = 67%	*Portion of IC contributed up-front*
Up-front revenue = 57%	*Portion of revenue contributed up-front*
NC ratio = 15%	*Portion of revenue contributing to network costs*

5.114. Note that:

(a) the net incremental cost is positive in this example – that is, the revenue from ongoing lines charges is unlikely to cover the incremental cost. This makes sense, because the incremental cost is higher and the incremental revenue is lower (due to lower annual charges and a short revenue life assumption)[50]

(b) the connection charge 'tops-up' revenue from the connection so it will fully cover its incremental cost, plus make a contribution to network costs.

50 The incremental revenue estimate is just over 40% lower. Around half of this difference is due to lower annual charges and half due to the shorter revenue life assumption. This means reducing the revenue life from 30 years to 15 years reduces estimated revenue by around 20% (in present value terms).

1f – Pioneer scheme contribution

5.115. The connection in this example is identical to 1e, except it is in a location with an active pioneer scheme.

5.116. Five years earlier, a nearby connection applicant funded construction of an LV mains that runs past this new connection and has ample capacity. Since then, two other parties have connected and made pioneer scheme contributions. The first of these was over the threshold to become a **subsequent pioneer**, so a total of two parties are now eligible for rebates.

5.117. Table 5.23 sets out the information needed to determine the pioneer scheme contribution payable by the new connection applicant.

Table 5.23 – Pioneer scheme information (Example 1f – pioneer scheme)

Information	Value	Comment
Opening value	$80,000	Value of the pioneer's contribution to the cost of the **pioneering connection works**
Scheme duration	7 years	Default value
Elapsed time	5 years	Pioneer scheme is still active
Depreciation duration	20 years	Default value
Current value	$60,000	Opening value reduced by (5 ÷ 20 =) 25%
Total length	600 m	Length of LV mains funded by the pioneer
Distance (new connection)	300 m	Distance of new connection along the length of the LV main
Distance ratio	50%	New connection is half-way along the LV mains
Capacity demand – earlier pioneers	12 kVA	Three parties have now contributed to the original cost, each with 6 kVA LV demand
Capacity demand – new connection	4 kVA	Demand at LV tier
Capacity ratio	25%	New connection will contribute one-quarter of total capacity demand (4 kVA ÷ 12 kVA)
Contribution	**$7,500**	**Current value × distance ratio × capacity ratio**

5.118. The distributor deducts a $250 administration fee from the contribution and then distributes the contribution among the two earlier pioneers in proportion to their current balances (ie, net contributions).

5.119. Figure 5.9 shows how the distributor has tracked contributions and pioneer scheme balances over time. In this case, the $7,500 contribution has a $250 fee deducted and is then distributed to the two pioneers in roughly equal shares.

Figure 5.9 – Tracking pioneer scheme operation (Example 1f – pioneer scheme)

Opening value		$80,000					
Depreciation duration		20	years				
Length		600	m				
Fee		$250					
Connection	1	2	3	4			
Year	0	0.5	2	5			
Current value	$80,000	$78,000	$72,000	$60,000			
Distance	600	550	500	300			
Distance ratio	100%	92%	83%	50%			
Capacity	4	4	4	4			
Capacity ratio	100%	50%	33%	25%			
Contribution	$80,000	$35,750	$20,000	$7,500			
Minimum	*$1,250*	*$1,262*	*$1,301*	*$1,380*		*Minimum contribution level, adjusted for 2% inflation*	
Pioneer threshold	*$25,000*	*$25,249*	*$26,010*	*$27,602*			
	1	2	3	4	sum		
Position 1	$80,000						Opening position
Distribution 2	-$35,500	$35,750			$250		P2 pays P1, fee deducted
Balance	$44,500	$35,750			$80,250		Net amounts paid
Distribution 3	-$10,952	-$8,798	$20,000		$250		Distributed in proportion to balances
Balance	$33,548	$26,952	$0		$60,500		Updated balances
Distribution 4	-$4,020	-$3,230	$0	$7,500	$250		
Balance	$29,528	$23,722	$0	$0	$53,250		
Balance	*55%*	*45%*	*0%*	*0%*			*Balances reflect timing, length and capacity*

5.120. Note that:

(a) the Code does not set out in detail how distributions should be determined, other than requiring distributors to take into account shares of extension length and capacity[51]

(b) the Code does require distributors to develop and publish a pioneer scheme policy that sets out this (and other) detail[52]

(c) in this example, a key outcome is that the "pay-off" from being the second mover (pioneer two) is small. In other words, the first-mover disadvantage is significantly mitigated

(d) all contributions must be collected because they are above the minimum threshold[53]

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51 Refer clause 6B.8(4)(c).

52 Refer clause 6B.6.

53 Refer definition of **pioneer**. Threshold is $1,000 (adjusted up each year for inflation) plus the fee. Distributors can opt for a lower threshold.

(e) contributions from the third and fourth connections are below the default $25,000 (adjusted for inflation) threshold for becoming pioneers, and the distributor has not opted for a lower threshold. This means those parties are not eligible for rebates under the pioneer scheme.

5.121. Pioneer scheme contributions are excluded from the definition of connection charges, so the charge reconciliation for this example is identical to Example 1f.

5.122. Note however that the $80,000 paid by the original pioneer would be included in its charge reconciliation. For that original customer, the reconciliation would show:

(a) connection charge of at least $80,000 (plus any contribution to upstream capacity)

(b) correspondingly high incremental cost (with a large extension cost component)

(c) if the distributor adopts 'balance point' pricing, the network cost contribution would have been similar to other small non-residential connections.[54]

54 The outcome depends on the distributor's pricing methodology. Balance point pricing refers to a pricing approach where similar customers make a similar network cost contribution (including as between current connections and earlier connections).

1g – Local cost-recovery scheme

5.123. The connection in this example is identical to 1f, except when the first pioneer connected the distributor opted to:

(a) treat the LV mains as a network development (rather than as an extension). This is consistent with the distributor anticipating future connection growth along the length of the LV mains and opting to take on the financing task and bear the uptake risk (ie, the risk that new connections may not occur)

(b) establish a local cost recovery scheme to allocate costs of the network development back out to new connections to that LV mains. This reduces the extent to which the cost of the LV main is socialised across the distributor's wider customer base.

5.124. This approach is not a requirement but is accommodated in the charge reconciliation.[55] Where a distributor opts to take this approach:

(a) they may determine their own methodology for allocating costs back to connections. This need not be designed to ensure full recovery, but should be designed to prevent over-recovery

(b) first-mover disadvantage is eliminated, making this a pro-growth option but shifting the financing task to the distributor and uptake risk to existing customers (who ultimately pay for any unallocated costs).

5.125. For the purposes of illustration, assume that:

(a) the network development investment costs $120,000

(b) the distributor is reasonably confident that at least 6 customers will connect over time

(c) accordingly, the distributor's scheme allocates $20,000 per customer to the first 6 customers

(d) the distributor adjusts the $20,000 each year for inflation only.

5.126. Figure 5.10 illustrates cost recovery payments under these settings with new connections occurring over several years.

Figure 5.10 – Cost recovery scheme payments (Example 1g – local cost recovery scheme)

Original cost	$120,000						
Number of connectio	6						
Allocation	$20,000						
Inflation	2%						
Connection	1	2	3	4	5	6	7
Year	0	1	1	4	6	9	10
Contribution	$20,000	$20,400	$20,400	$21,649	$22,523	$23,902	$0

55 Refer definition of **localised historical cost recovery** and its use in clause 6B.11(2). Note that this approach can also be used for distributor-selected enhancements. In that case, the first mover would be allocated minimum scheme costs, and the cost of future-proofing capacity would be allocated to the distributor initially and then recovered over time from future connections that use the new assets.

5.127. Note that:

(a) by adjusting for inflation, payments are consistent in real terms

(b) payments will under-recover the original costs but result in a significantly more targeted cost recovery than would occur without a cost-recovery scheme[56]

(c) a distributor could achieve a more targeted cost recovery by adjusting payments using their allowable rate of return, but this would result in a steeper discontinuity at the end of the scheme (ie, between the 6th and 7th connections) and could make the scheme more costly (for connection applicants) than the equivalent pioneer scheme

(d) a distributor could manage discontinuities by operating the equivalent of a pioneer scheme (ie, redistributing payments to earlier connections), but this would add complexity

(e) the cost recovery approach socialises uptake risk – ie, existing customers carry unallocated costs if uptake to lower or slower than expect and benefit if uptake is faster or higher.

5.128. Figure 5.11 shows the charge reconciliation for the first connection. This reconciliation is identical to the Example 1e, except:

(a) incremental cost includes localised historical cost recovery (LHCR) amount of $20,000

(b) the connection charge likewise includes an additional $20,000 component.

Figure 5.11 – Charge reconciliation (Example 1g – local cost recovery scheme)

_CC = (IC - IR) + NC_		
CC =	$31,476	*Connection charge*
IC =	$37,065	*Incremental cost*
IR =	$8,598	*Incremental revenue*
NIC (IC-IR) =	$28,467	*Net incremental cost*
NC =	$3,009	*Network contribution (= CC - NIC)*

Reliance =	85%	*Portion of IC contributed up-front*
Up-front revenue =	79%	*Portion of revenue contributed up-front*
NC ratio =	8%	*Portion of revenue contributing to network costs*

56 Ring-fencing is relatively uncommon in distribution network pricing. Most costs (including renewals and opex) are pooled and socialised through common tariffs.

5.129. Note that:

(a) the network contribution is the same as Example 1e, because the connection's contribution to the cost of the new network mains is recognised in the connection charge and incremental cost terms

(b) the network contribution would also be the same as Example 1f, because pioneer scheme contributions are excluded from both the connection charge and incremental cost terms.

6. Remote, mid-sized connection (Examples 2a and 2b)

6.1. This section covers two examples based on variations of a remote mid-sized connection scenario. Each variation introduces new features, and each new feature is explained in greater detail when first introduced.

6.2. Features that are applied to all connections in the same way (such as some inputs for charge reconciliation (discount rate, incremental opex scaling factor, revenue adjustment factors) and the charge reconciliation calculation) are not explained in this section—these features are set out in the discussion of Example 1a in section 5, above.

Table 6.1 – Summary of variations on remote, mid-sized connection scenario (Scenario 2)

No.	Variation	Comment
2a	Remote mid-sized connection	Applicant wishes to connect a Coolstore in a rural location. Introduces: • **extension-like upgrade** • bespoke **capacity rate** • bottom-up **incremental revenue** estimate
2b	As above, but customer requests flexible connection	Flexibility avoids need for network upgrade and reduces upstream capacity cost Introduces: • **minimum flexi scheme** • **capacity costing** for a flexi connection

2a – Extension-like and high-cost upgrades

6.3. In this example, a connection applicant has applied for a connection to supply a new Coolstore in a rural location that does not have an existing connection.

6.4. The Coolstore has a maximum demand of 225 kVA.

6.5. The distributor:

(a) does not have a posted charge for mid-sized connections, given such connections are relatively low volume and have relatively high and variable cost and revenue profiles (meaning it is worthwhile to price each connection separately)

(b) has a policy of putting up to 30% of incremental revenue toward incremental costs.

Extension costs

6.6. The distributor assesses the minimum scheme for the Coolstore based on its maximum demand (and the distributor's **connection and operation standards**) and determines:

(a) the connection is too large to supply using the nearby LV mains and existing distribution transformers

(b) to supply 225 kVA, the distributor will need to add a new distribution transformer and LV mains (with a small HV feeder extension)

(c) the minimum feasible capacity for the new transformer and LV mains, taking into account the distributor's connection and operating standards, is 300 kVA

(d) the new transformer and LV mains will only supply the Coolstore, and this is likely to remain the case. The distributor expects any future growth in the area will be served by the existing LV mains and distribution transformer

(e) the Coolstore will consume less than 80% of the capacity of the LV mains and distribution transformer.

6.7. Given the circumstances and the distributor's assessment of how the network is likely to evolve, the LV mains and new distribution transformer meet **extension-like upgrade** definition:

extension-like upgrade means works or operating arrangements that increase the capacity of the **shared network** that—

(a) substantially benefits only the **connection applicant**, and where the **distributor** reasonably considers this is likely to remain the case; and

(b) does not meet the threshold to use an estimate in clause 6B.5(2)

…

6B.5 Capacity costing requirements

…

(2) If the **capacity demand assumption** determined by a **distributor** for a **network tier** (other than **distribution** substations and low voltage mains)

is greater than 80% of the **nominal capacity increment** for that **network tier**, the **distributor** may use the estimated capacity upgrade costs for that network tier instead of the **posted capacity rate** in the calculation under subclause (1)(d)

6.8. In particular:

(a) the Coolstore is much larger than the typical load in the area

(b) the upgraded capacity is only required because of the Coolstore

(c) the Coolstore is likely to remain the main user of the new capacity

(d) the Coolstore does not meet the exemption criteria in in clause 6B.5(2).[57]

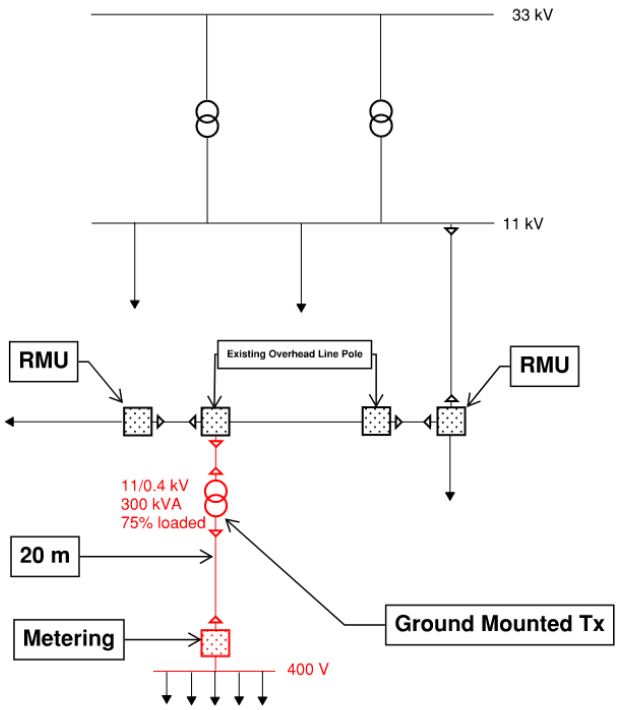
6.9. This means that:

(a) the new distribution transformer, new LV mains and line from the LV mains to the Coolstore are all subject to enhancement cost allocation requirements (clause 6B.4) rather than capacity cost allocation requirements (clause 6B.5)

(b) the tiers above the distribution transformer (HV feeder, zone substation and sub-transmission line) are all subject to the capacity cost allocation requirements.

6.10. Figure 6.1 presents the electrical design for the Coolstore connection.

Figure 6.1 – Electrical design (Example 2a)



57 In this case, it is not using more than 80% of the new capacity and the connection is at distribution substation level.

6.11. Table 6.2 presents the distributor's cost build up for the minimum scheme extension works based on estimated costs for this specific project.

Table 6.2 – Extension cost build-up for minimum scheme (Example 2a)

Component	Cost ($)	Assumptions
Ground-mounted transformer	100,000	Dyn11 - 11kV/415-240V - Ground Mt 300kVA 3Ph (incl install)
400 V LV overhead line	1,200	$15/m - 95mm2 Al Fluorine AAAC (or similar) (incl install). 20 m * 4
400 V switchboard	44,000	
TOTAL	**$145,200**	

Capacity cost allocation

6.12. Capacity costs for the HV feeder and higher tiers are allocated using capacity cost allocation requirements.

6.13. In this case, the HV feeder supplying the new distribution transformer has been identified by the distributor as having a significantly higher upgrade cost than is typical for the applicable costing zone. To upgrade capacity, the distributor will (one day) need to add a relatively expensive new HV feeder with an underwater crossing.

6.14. Based on high-level cost estimation, the distributor assesses that the HV feeder is likely to cost on the order of 180% of the posted capacity rate (on a $ per added kVA basis). Given this is higher than the 150% threshold specified in the Code (at clause 6B.5(3)) the distributor opts to use a bespoke capacity rate for the HV feeder capacity.

6.15. The distributor has not flagged the other tiers (zone substation and sub-transmission) as exceptionally high (or low) cost for this connection location.[58]

6.16. Table 6.3 shows the capacity cost build-up for Example 2a.

Table 6.3 – Bespoke capacity costing for remote mid-sized connection (Example 2a)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*225*	-
LV mains	170	-	0
Distribution substation	530	-	0

58 Use of bespoke rates is optional. It is only available as an option of cost per unit is more than 150% or less than 80% of the posted rate (ie, the average for the costing zone).

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
HV feeder*	153	100	15,300
Zone substation	380	80	30,400
Sub-transmission line	100	60	6,000
TOTAL	-	-	**$51,700**

* Indicates bespoke rate

6.17. Note that, in this case:

(a) capacity at the first two tiers is set to zero, because extension costing is used at those levels

(b) the rate at the HV feeder level is 1.8 times the distributor's posted rate for that tier and this costing zone

(c) capacity demand at the upper tiers is lower than the connection capacity, reflecting the distributor's reasonable and prudent assumptions regarding diversity and coincidence.

Connection charge composition

6.18. The connection charge composition for Example 2a is set out in Table 6.4. We've assumed the distributors' connection pricing methodology put up to 15% of incremental revenue toward covering incremental costs

6.19. The incremental revenue in this case is $218,194, so the connection charge is up to $32,730 lower than the incremental cost.

Table 6.4 – Connection charge composition (Example 2a – remote Coolstore)

Component	Amount ($)	Charge ($)
MS – extension (EC)	**145,200**	
MS – capacity (NCC)	**51,700**	
Minimum scheme (total)	**196,900**	164,170
CSE – extension component	**-**	
CSE – capacity component	**-**	
Customer-selected enhancement (total)	**-**	-
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-

Component	Amount ($)	Charge ($)
Total incremental cost	$196,900	
CONNECTION CHARGE		**$164,170**

6.20. In addition to the posted connection charge, the distributor sets connection fees of:

(a) $770 for application processing

(b) $180 for technical observation.

6.21. These fees are based on the costs of administering the connection process for mid-sized connections.

Charge reconciliation inputs

6.22. Many of the inputs for charge reconciliation are consistent across connections or consumer groups. In this case, we will assume:

(a) the discount rate is the same as Example 1a. The discount rate is the same for all distributors and is updated annually

(b) the revenue adjustment factors are the same as Example 1a. Revenue adjustment factors are distributor-specific

(c) tariff adjustment factors are the same as Example 1e. Tariff adjustment factors are consumer group-specific, though in this case the same tariff rebalancing applies to all non-residential connections

(d) the opex scaling factor is the same as Example 1a. Opex scaling factors are distributor specific.

6.23. For Year-zero revenue, the distributor decides that a bottom-up approach is more appropriate than a top-down approach (as used in Scenario 1 examples). This means the distributor will estimate revenue based on the applicable tariffs and estimated usage.

6.24. Based on discussion with the connection applicant, the distributor determines the following settings relevant to the way revenue is expected to phase in over the first few years.

Table 6.5 – Customer phase-in assumptions (Example 2a)

Year	Date	Comment
0	Jan 26 to Mar 26	Part year.
1	Apr 26 to Mar 27	First full year. 15% load factor.
2	Apr 27 to Mar 28	Full operation. 30% load factor.

6.25. Using Wellington Electricity again for consistency, the applicable tariffs as set out below along with estimated usage used to build-up estimated Year One revenue.

The figures are for the first full disclosure year, which in this case is the year ending March 2027.[59]

Table 6.6 – Year-One revenue build-up (Example 2a)

Component	Rate	Metric	Revenue	Comment
Transmission revenue				
Fixed	$13.5051 per day	365 days	$4.9k	
Total transmission revenue			**$4.9k**	
Distribution revenue				
Fixed	$8.6226 per day	365 days	$3.1k	
Energy	$0.014 per kWh	296 MWh	$4.1k	Assuming 15% load factor[60]
Total distribution revenue			**$7.3k**	

6.26. For the second year, the increased charging metrics increase the energy-based distribution revenue by $4.1k. This increases the total distribution revenue by (4.1 ÷ 7.3 =) 57%.

6.27. Table 6.7 shows the build-up of the incremental distribution revenue estimate based on the preceding information.

Table 6.7 – Incremental distribution revenue estimate (Example 2a)

	2026	2027	2028	2029	2030	2031	2032	…
Year-one revenue	$7.3k							
Incremental opex scaling factor	0.875							
Scaled year-one revenue	$6.4k							
Discount rate	4.63%							
Year	0	1	2	3	4	5	6	…
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.25	1	1.57	1.57	1.57	1.57	1.57	1.57
Revenue adjustment factor	1	1.10	1.20	1.32	1.44	1.44	1.44	1.44

59 Based on 1 April 2025 tariffs, adjusted using revenue adjustment factors to estimate tariffs from 1 April 2026 (ie, 2027 disclosure year). https://www.welectricity.co.nz/disclosures/pricing/2025-pricing

60 Energy is based on 225 kW x 24 hours x 365 days x 15%.

	2026	2027	2028	2029	2030	2031	2032	…
Tariff adjustment factor	1	1	1	1	1	1	1	1
Adjusted revenue (000s)	$1.6	$6.7	$11.0	$11.5	$12.0	$11.5	$11.0	…
Incremental distribution revenue (IDR)	**$144,453**							

6.28. Note that:

(a) the "part-year" adjustment is set to 25% for Year Zero to reflect part-year operation, and to 157% from Year Two to reflect the increased demand from the site as production scales up.

6.29. Table 6.8 shows the build-up of the incremental transmission revenue estimate based on the preceding information.

Table 6.8 – Incremental transmission revenue estimate (Example 2a)

	2026	2027	2028	2029	2030	2031	2032	…
Year-zero revenue	$4.9k							
Incremental opex scaling factor	1.0							
Scaled year-one revenue	$4.9k							
Discount rate	4.63%							
Year	0	1	2	3	4	5	6	…
Discount factor	1	0.96	0.91	0.87	0.83	0.80	0.76	…
Part-year adjustment	0.25	1	1	1	1	1	1	1
Revenue adjustment factor	1	1.15	1.16	1.19	1.21	1.24	1.2	1.2
Tariff adjustment factor	1	1.03	1.06	1.11	1.15	1.19	1.19	1.19
Adjusted revenue (000s)	$1.2	$5.6	$5.6	$5.7	$5.7	$5.8	$5.4	…
Incremental transmission revenue (ITR)	**$73,742**							

6.30. Note that:

(a) transmission revenue is recovered through a fixed ($ per day) charge only, so does not scale up with increased production.

6.31. We now have all the components to complete the reconciliation, which is shown in Figure 6.2.

Figure 6.2 - Charge reconciliation (Example 2a)

CC = (IC - IR) + NC		
CC =	$164,170	*Connection charge*
IC =	$196,900	*Incremental cost*
IR =	$218,194	*Incremental revenue*
NIC (IC-IR) =	-$21,294	*Net incremental cost*
NC =	$185,464	*Network contribution (= CC - NIC)*

Reliance =	83%	*Portion of IC contributed up-front*
Up-front revenue =	43%	*Portion of revenue contributed up-front*
NC ratio =	49%	*Portion of revenue contributing to network costs*

6.32. Note that:

(a) incremental revenue is higher than incremental cost (ie, net incremental cost is negative) – that is, the connection is expected to more than pay for itself from lines charges alone.

2b – Flexi-connection

6.33. Building on the previous example, we now consider an example where the connection applicant asks the distributor to consider a flexible connection.

6.34. In this case, the distributor has a load management system and associated business processes they can use to:

(a) signal periods of network stress

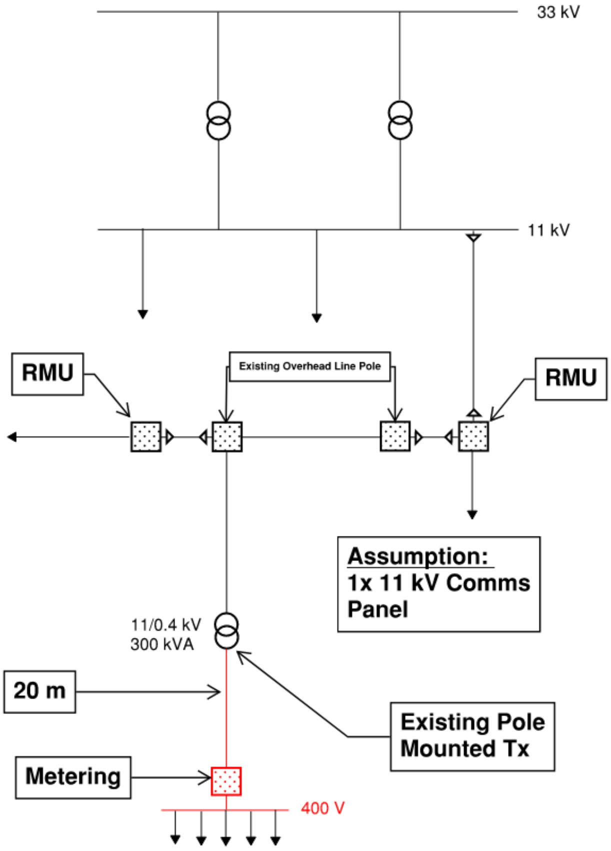
(b) validate responses

(c) record the status (firm or flexi) of each connection on its network.

6.35. The Coolstore is a good candidate for flexibility because its cooling load can be interrupted for several hours at a time without affecting the stored goods.

6.36. Accordingly, the distributor agrees that it can design and quote a **minimum flexi scheme**. The electrical diagram for the minimum flexi scheme is shown in Figure 6.3.

Figure 6.3 – Electrical diagram (Example 2b – flexi connection)



6.37. Compared to the minimum scheme, the minimum flexi scheme:

(a) no longer requires a new transformer and switchboard

(b) requires installation and configuration of a network communications panel between the distribution substation and the customer site.

6.38. As such, the minimum flexi scheme does not involve an extension-like upgrade. The cost build up for the extension is shown in Table 6.9.

Table 6.9 – Extension cost build-up for minimum flexi scheme (Example 2b – flexi connection)

Component	Cost ($)	Assumptions
11 kV comms panel	20,000	Including fibre connection between two sites
400 V LV overhead line	1,200	$15/m - 95mm2 Al Fluorine AAAC (or similar) (incl install). 20 m * 4
Labour	2,000	
TOTAL	**$23,200**	

6.39. The minimum flexi scheme also has reduced design capacities at all network tiers – ie, the distributor does not expect the connection to consume as much capacity headroom within the network. The capacity costing is shown in Table 6.10.

Table 6.10 – Capacity cost for minimum flexi scheme (Example 2b – flexi connection)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*225*	-
LV mains	170	-	0
Distribution substation	530	50	26,500
HV feeder*	153	50	7,650
Zone substation	380	2	760
Sub-transmission line	100	2	200
TOTAL	**-**	**-**	**$35,110**

* Indicates bespoke rate

6.40. Note that:

(a) design capacity is very low for the two upper-most tiers, because the distributor operates load control when these tiers are at their peak loading. This means the main loads at the Coolstore will be controlled off at the relevant design peak times

(b) design capacity is reduced (compared to the firm connection example) at the three lower tiers, because their relevant peaks are somewhat correlated with network peak times

(c) capacity cost at the upper levels is much lower than the firm connection example

(d) capacity cost at the two lower tiers is lower than the cost of the corresponding extension-like upgrade costs in the firm connection example.

6.41. Table 6.11 presents the charge build-up for the minimum flexi connection. Note that, as before, the distributor puts up to 15% of incremental revenue toward meeting the incremental cost. In this case, we assume the flexible connection is expected to pay the same lines charges as the firm connection, so the credit remains up to $32,730.

Table 6.11 – Connection charge composition (Example 2b – flexi connection)

Component	Amount ($)	Charge ($)
MFS – extension (EC)	**23,200**	
MFS – capacity (NCC)	**35,110**	
Minimum flexi scheme (total)	**58,310**	25,580
CSE – extension component	**-**	
CSE – capacity component	**-**	
Customer-selected enhancement (total)	**-**	-
Incremental transmission cost (ITC)	**-**	-
Localised historical cost recovery (LHCR)	**-**	-
Operating cost loading (OCL)	**-**	-
Total incremental cost	$58,310	
CONNECTION CHARGE		**$25,580**
Compared to firm connection		*$164,170*
Saving		*$138,590*

6.42. Given the saving, the connection applicant opts for the minimum flexi scheme. This means:

(a) the **relevant minimum scheme** in this case is the minimum flexi scheme

(b) should the customer wish to opt out of load control at some time in the future, they will incur connection charges for a connection upgrade. These may have extension and network capacity cost components.

6.43. For charge reconciliation purposes, we will assume:

(a) the distributor will allocate the connection to the same tariff category as before – ie, the distributor does not have a separate flexi tariff for this type of customer

(b) energy demand is unchanged (ie, the timing is shifted but overall cooling load is materially unchanged)

(c) as a result, the incremental revenue is unchanged.

6.44. We now have all the components to complete the reconciliation, which is shown in Figure 6.4.

Figure 6.4 - Charge reconciliation (Example 2b – flexi connection)

CC = (IC - IR) + NC

CC =	$25,580	*Connection charge*
IC =	$58,310	*Incremental cost*
IR =	$218,194	*Incremental revenue*
NIC (IC-IR) =	-$159,884	*Net incremental cost*
NC =	$185,464	*Network contribution (= CC - NIC)*

Reliance =	44%	*Portion of IC contributed up-front*
Up-front revenue =	10%	*Portion of revenue contributed up-front*
NC ratio =	76%	*Portion of revenue contributing to network costs*

6.45. Note that:

(a) the reduction in incremental costs associated with a flexible connection is fully passed through to lower connection charges in this example

(b) the connection will nonetheless still make a network contribution – ie, contribute to lower charges for existing customers.

7. Large connection (Examples 3a to 3d)

7.1. This section covers four examples based on variations of a large connection scenario. Each variation introduces new features, and each new feature is explained in greater detail when first introduced.

7.2. Features that are applied to all connections in the same way (such as some inputs for charge reconciliation (discount rate, incremental opex scaling factor, revenue adjustment factors) and the charge reconciliation calculation) are not explained in this section—these features are set out in the discussion of Example 1a.

Table 7.1 – Summary of variations on large connection scenario (Scenario 3 – large connection)

No.	Variation	Comment
3a	Large connection at zone substation level	Capacity costing for **upper network tiers** only. Reconciliation for customer with **special pricing**.
3b	As above, also involves GXP work and transmission repricing	Introduces **incremental transmission costs**
3c	As per 3a, but new connection will also inject (<1 MVA)	Introduces treatment of hybrid (load and injection) connections where injection is small (and therefore there is no associated incremental cost)
3d	As above, injection is mid-sized (~1.5 MVA)	Introduces treatment of hybrid connections where there is an incremental cost associated with the injection

3a – Large connection with special pricing

7.3. In this example, a connection applicant has applied for a connection to supply a new factory with a maximum demand of 5 MVA (ie, 5,000 kVA).

Special pricing

7.4. Because the connection is large the connection will not be assigned to one of the distributor's consumer groups with posted tariffs. Instead, the connection will have 'special pricing' negotiated between the connection applicant and the distributor.[61]

7.5. In this type of scenario, the distributor must determine both revenue components – connection charge and lines charge (ie, incremental or ongoing revenue) at the same time. The distributor is effectively making two decisions in sequence:

(a) how much cost to allocate to the connection. To avoid providing a subsidy (at the expense of existing customers), the distributor should allocate at least the incremental cost of the connection, and will typically also require connections to contribute to network costs (ie, sunk and shared costs)

(b) how to structure cost recovery. Because lines charges are not pre-determined for these customers, the distributor and applicant can negotiate the balance between up-front and over-time recovery of the costs allocated in step (a).[62]

7.6. In this case, we assume the distributor and connection applicant agree the following parameters:

(a) incremental cost will be assessed consistent with the connection pricing requirements (ie, applying the enhancement and capacity costing approaches)

(b) up-front costs will be recovered through up-front connection charges. This eliminates stranding risk

(c) ongoing costs (ie, annual operating and maintenance costs) will be recovered through ongoing charges

(d) a contribution to network costs will also be recovered through ongoing charges

(e) the contribution to network costs will be commensurate with other customers of similar scale (on an annual energy (GWh) basis)

(f) the above will be modified if necessary to avoid uneconomic bypass.[63]

7.7. Note that these parameters are not part of the connection pricing requirements.

61 Distributors use a variety of terms to describe customers or pricing that is outside their posted tariffs. Other examples include 'individual pricing' and 'non-standard contracts'.

62 Distributors publish schedules of generally available tariffs, which we refer to as 'posted tariffs'. For larger connections, distributors will typically negotiate special pricing tailored to the customer.

63 In this case, uneconomic bypass could occur where the customer opts to bypass the distribution network and connect directly to the grid, and this is a higher cost solution (in terms of underlying costs) but more favourable to the customer due to pricing (eg, allocation of distribution network costs, or structure of prices).

Minimum scheme

7.8. The distributor assesses the minimum scheme for the connection based on its location and load profile (and the distributor's **connection and operation standards**) and determines that:

(a) the site should connect directly to the nearest zone substation

(b) the distributor will need to upgrade capacity at the zone substation to accommodate the connection

(c) the new connection will not use more than 80% of the distributor's **nominal capacity increment** for zone substations[64]

(d) the new capacity is likely to be taken up over time by other connection and organic growth.[65]

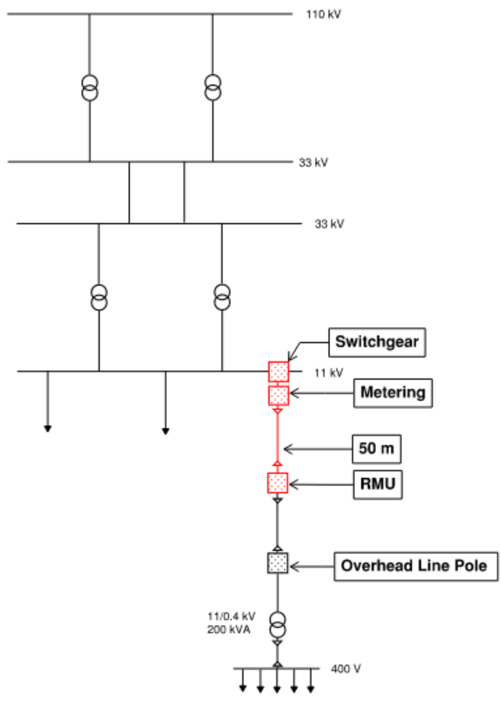
7.9. Items (c) and (d) above mean that the connection is not exempt from a rate-based approach to capacity cost allocation. Given the above, the costing of the minimum scheme will comprise:

(a) extension costs relating to tying the site to the zone substation, and making necessary modifications to establish a physical connection

(b) network capacity costs based on posted capacity rates for the zone substation (and above) tiers and assessed capacity demand for each tier.

7.10. Figure 7.1 presents the electrical design of the minimum scheme.

Figure 7.1 – Electrical diagram for minimum scheme (Example 3a – special pricing)



64 Refer clause 6B.5(2).

65 We use the term 'organic growth' to refer to growth in demand per connection – ie, consumption of capacity headroom that is not due to connection growth. The zone substation capacity upgrade in this case cannot be classified as an **extension-like upgrade**.

7.11. Table 7.2 shows the cost build-up for the extension works.

Table 7.2 – Extension cost build-up for minimum scheme (Example 3a – special pricing)

Component	Cost ($)	Assumptions
11 kV switchgear	119,000	Schneider GHA switchgear 11 kV
11 kV cable	7,000	$140/m 300mm2 3c AL XPLE. 50 m
RMU	78,000	RMU from ABB
TOTAL	**$204,000**	

7.12. Table 7.3 shows the capacity cost build-up for the minimum scheme.

Table 7.3 – Capacity cost for minimum flexi scheme (Example 3a – special pricing)

Tier	Rate ($ per kVA)	Demand (kVA)	Cost ($)
Connection	-	*5,000*	-
LV mains	240	-	-
Distribution substation	600	-	-
HV feeder	85	-	-
Zone substation	380	4,000	1.52m
Sub-transmission line	140	3,000	0.42m
TOTAL	**-**	**-**	**$1.94m**

7.13. Note that:

(a) because the connection is at zone substation level, it does not consume any capacity at the lower three network tiers

(b) capacity demand assumptions are lower than the connection size because the distributor expects the timing of peak demand for the connection will not coincide with peak zone substation and sub-transmission demand.

7.14. Because the connection will have special pricing:

(a) the distributor estimates an operating cost loading (OCL) to recognise that the new connection assets will add to the distributor's annual operating costs – including for inspections, fault response, rates and levies, vegetation management, etc

(b) when the distributor prepares a charge reconciliation for this connection they will include the operating cost loading as part of the incremental cost instead of scaling down the incremental revenue.

7.15. The distributor:

(a) estimates an operating cost equivalent to 5% of the up-front extension asset cost each year

(b) converts the annual operating costs into a present value lump sum using the charge reconciliation discount rate and revenue life assumptions

(c) adopts the default revenue life assumption for non-residential connections (ie, 15 years).

7.16. This produces an opex cost loading estimate of $111,121.

Table 7.4 – Incremental cost estimate (Example 3a – special pricing)

Component	Amount ($k)
Extension cost (EC)	$204k
Customer-selected enhancement (CSE)	0
Network capacity cost (NCC)	$1,940k
Incremental transmission cost (ITC)	0
Localised historical cost recovery (LHCR)	0
Operating cost loading (OCL)	$111k
TOTAL	**$2,255k**

7.17. The distributor now has almost all the information they need to determine both the connection charge and the annual tariff. The additional two components are:

(a) the distributor assesses that a network contribution of $200k per year would be commensurate with other similar connections. In making this assessment the distributor considers:

(i) the size of the connection (in kVA and GWh per year terms)

(ii) network contribution made by similar connections

(b) the distributor makes a preliminary assessment that grid connection would be both a more costly (to build) and less attractive (to the applicant) option – ie, that the risk of uneconomic bypass appears low.

7.18. Given the above, the distributor determines the following charges:

(a) connection charge (based on incremental cost estimate less operating cost loading) of $2.144m

(b) target annual charge (based on operating cost loading plus network contribution) of $210k per year.

7.19. The distributor then packages the target annual revenue into special tariff components, comprising:

(a) a peak period tariff to signal the long-run marginal cost (LRMC) of zone substation and sub-transmission capacity. This amount is updated each year as part of the distributor's annual pricing cycle[66]

(b) a fixed ($ per day) charge to recover the balance of the target annual charge[67]

(c) annual updates to the target annual charge based on:

(i) CPI for the opex cost loading

(d) the distributor's target revenue for the network cost contribution.[68]

Charge reconciliation

7.20. For charge reconciliation, the distributor assumes:

(a) the connection will be commissioned for the final quarter of the current pricing year

(b) there is no tariff adjustment factor – in this case, the special pricing does not include any change in share of the distributor's target revenue allocated to the customer over time

(c) the network contribution component of the target annual charge is divided between distribution and transmission in proportion to the distributor's overall target revenue for each component (assume 60% to distribution and 40% to transmission)

(d) revenue adjustment factors and the discount rate are as per earlier examples

(e) the full target annual charge will be achieved each year.

7.21. Applying these assumptions produces the charge reconciliation shown in Figure 7.2.

66 This tariff would initially be set relatively low, given the zone substation will have been recently upgraded and is unlikely to make any contribution to LRMC. The tariff may be non-zero if the sub-transmission line has a capacity upgrade within the distributor's planning horizon.

67 The distributor may recover less than its target annual revenue if the customer is able to respond to the peak tariff. Since the peak tariff is cost-reflective, this would be an efficient outcome.

68 The distributor adopts a weighted adjustment factor based on distribution and transmission revenue adjustment factors.

Figure 7.2 – Charge reconciliation (Example 3a – special pricing)

CC = (IC - IR) + NC		
CC =	$2,144,000	*Connection charge*
IC =	$2,255,121	*Incremental cost*
IR =	$2,981,335	*Incremental revenue*
NIC (IC-IR) =	-$726,214	*Net incremental cost*
NC =	$2,870,214	*Network contribution (= CC - NIC)*

Reliance =	95%	*Portion of IC contributed up-front*
Up-front revenue =	42%	*Portion of revenue contributed up-front*
NC ratio =	56%	*Portion of revenue contributing to network costs*

7.22. Note that, in this case:

(a) the incremental cost term includes incremental opex costs (and the incremental revenue term is not scaled down for opex). This is the approach adopted for connections with special pricing

(b) due to this treatment, the reliance figure shown here is not comparable to earlier reliance measures.[69] If IC is adjusted to remove incremental opex, then the adjusted (capex only) reliance level is 100%

(c) the net incremental cost is negative, indicating the connection will generate revenue in excess of its costs

(d) consistent with the above, the connection makes a material positive network contribution.[70]

69 The reliance level shown is calculated by dividing the CC value by the IC value.

70 We note some of this benefit may be consumed by increased transmission residual charges (which increase, with a lag, as a function of local energy consumption growth relative to nationwide growth).

3b – Large connection with incremental transmission costs

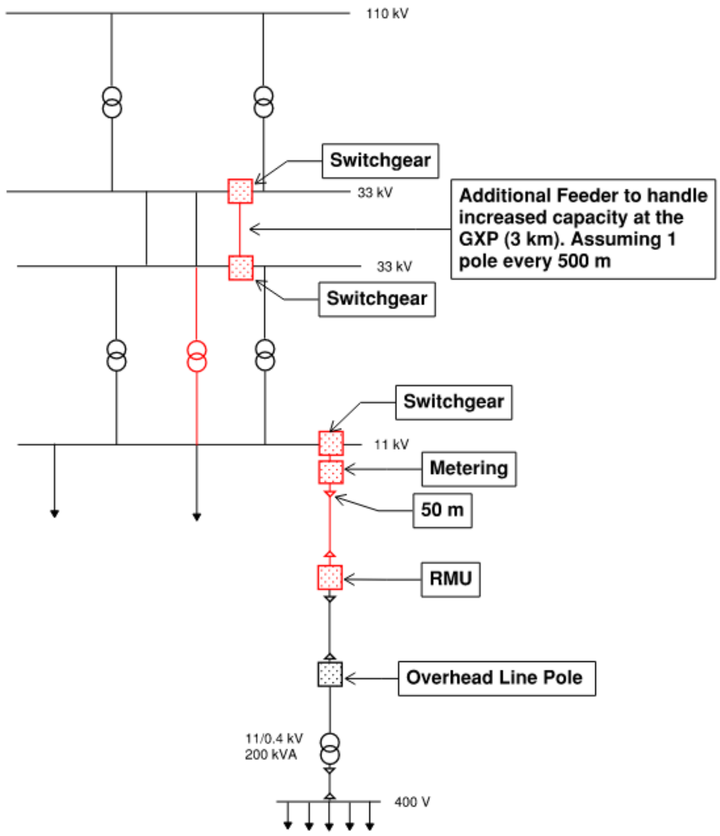
7.23. The example is the same as the previous example, except to accommodate the connection the distributor also needs to:

(a) build a new sub-transmission line, and

(b) contract with Transpower to carry out work at the grid connection to enable to capacity needed to support the new connection.

7.24. Figure 7.3 presents the electrical design of the minimum scheme.

Figure 7.3 – Electrical diagram for minimum scheme (Example 3b – incremental transmission costs)



7.25. Note that, in this case:

(a) the switchgear on the first 33kV bus is owned by Transpower. This is excluded from the extension costs (as it is not part of the distribution network) but will be captured in incremental transmission costs

(b) all of the other switchgear (including the other 33 kV switchgear) is part of the distribution network and is included in extension costs.

7.26. Table 7.5 shows the cost build-up for the extension works. In this case, the distributor has determined that the zone substation and sub-transmission line upgrades should be treated as an extension-like upgrade, as the new capacity is primarily for the benefit of this customer and is unlikely to be taken up by other growth.

Table 7.5 – Extension cost build-up for minimum scheme (Example 3b – incremental transmission costs)

Component	Cost ($)	Assumptions
11 kV switchgear	119,000	Schneider GHA switchgear 11 kV
11 kV cable	7,000	$140/m 300mm2 3c AL XPLE. 50 m
RMU	78,000	RMU from ABB
11/33 kV transformer	2,157,000	15 MVA 33/11 kV Ground Transformer
33 kV feeder overhead line	315,000	$35/m including installs (Simplex sulphur AAAC conductor). 3 kms * 3 phase
33 kV pole/cross arm	86,400	1 pole per 500 m. $14400/pole * 6. Inclusive fully dressed pole and cable termination equipment
33 kV switchgear	288,000	Schneider GHA switchgear 33 kV
TOTAL	**$3,050,400**	

7.27. With the increased extension cost, the operating cost loading in this example increases to $153k per year (or $1.66m in present value terms).

7.28. In this case, there are no network capacity costs to allocate. This is because:

(a) the connection is to a zone substation, so it is not allocated any costs for the lower network tiers

(b) the distributor has treated the zone substation and sub-transmission works as extension-like upgrades.

7.29. In addition to extension costs, the connection triggers two types of **incremental transmission cost**.

7.30. The first relates to **incremental transmission works**:

> **incremental transmission works** means, in relation to a **connection** works to establish a new **grid** connection, increase security or capacity of **grid** connection **assets** or otherwise alter **grid** connection **assets** to accommodate the new or altered **connection**

7.31. In this case, the distributor needs to contract with Transpower to carry out works on the grid to accommodate the new sub-transmission assets – including adding switchgear and related configuration works. Transpower quotes $250,000 for this work, and the distributor assesses its annual transmission charge will also increase by $10,000 per year.

7.32. The second relates to repricing events that can be treated as **incremental transmission costs**:

> **incremental transmission cost** means an estimate of the cost of **incremental transmission works** including—
>
> (a) a change in transmission charges due to a benefit-based charge adjustment event under paragraph 81(1)(e), (g), (h), (i) or (l) of the **transmission pricing methodology**; or
>
> (b) new transmission charges relating to a high-value post-2019 BBI (as those terms are defined in the **transmission pricing methodology**)

7.33. In this case, we'll assume that the demand from this new connection will:

(a) trigger a benefit-based charge adjustment event under clause 81(1) – ie, because it is a large embedded plant. The distributor assesses that this will amount to an $80,000 per year increase in charges

(b) materially alter cost allocation for a pending major grid upgrade. The distributor assesses that, when Transpower commissions the grid upgrade (five years into the future) it will allocate an additional $100,000 per year to the distributor (compared to what would have been allocated without the large embedded plant).

7.34. In present value terms, the incremental transmission costs sum to $1.91 million. The first eight years of this calculation is shown in Figure 7.4.[71] Note that the distributor uses:

(a) a 15-year connection life assumption for this cost build-up (for consistency with the revenue life assumption)

(b) the transmission revenue adjustment factor to escalate the connection charge (but not the other transmission charges)[72]

---

71 For our example we have assumed that transmission costs are passed on from the beginning of year one (the first full pricing year).

72 Benefit-based investment charges track the value of specific grid investments (rather than Transpower's aggregate target revenue).

Figure 7.4 – Incremental transmission cost build-up (Example 3b)

Year		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**...**
Pricing year	**year**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**...**
Discount factor	#	1.00	0.96	0.91	0.87	0.83	0.80	0.76	0.73	...
Transmission RAF*	#	1.00	1.15	1.16	1.19	1.21	1.24	1.20	1.20	...
GXP works	$		250,000							...
Connection charge uplift	$		10,000	10,087	10,348	10,522	10,783	10,435	10,435	...
Adjustment event	$		80,000	80,000	80,000	80,000	80,000	80,000	80,000	...
New BBI	$						100,000	100,000	100,000	...
Present value	$		324,955	82,290	78,877	75,531	152,145	145,147	138,724	...
Total ITC**	**$**	**1,907,840**								

* Applied to connection charge uplift only
** Calculated over 15 year period

7.35. In this case, the distributor and connection applicant agree to the same pricing approach as 3a but with the pricing-related incremental transmission costs recovered through annual charges.

7.36. The resulting charge reconciliation is show in Figure 7.5.

Figure 7.5 – Charge reconciliation (Example 3b – incremental transmission costs)

CC = (IC - IR) + NC

CC =	$3,289,337	*Connection charge*
IC =	$6,619,823	*Incremental cost*
IR =	$6,774,890	*Incremental revenue*
NIC (IC-IR) =	-$155,067	*Net incremental cost*
NC =	$3,444,404	*Network contribution (= CC - NIC)*

Reliance =	50%	*Portion of IC contributed up-front*
Up-front revenue =	33%	*Portion of revenue contributed up-front*
NC ratio =	34%	*Portion of revenue contributing to network costs*

7.37. Note that:

(a) the incremental cost is significantly higher than Example 3a, reflecting the increased upstream network investment costs allocated to the connection. This increased allocation is cost reflective in this case because:

(b) the large, embedded load is triggering a need for capacity within the distribution network that is unlikely to be taken up by other growth.[73] This

73 In making this assessment, the distributor should consider connection growth and organic growth (ie, growth in demand per existing connection).

means the connection is allocated the full cost of upgrade works, rather than an allocation related to its actual demand

(i) the load is similarly triggering a material change in transmission costs.

(c) this type of outcome would be more common where a large load is embedded in an otherwise small (and low-growth) distribution network

(d) in this example, the distributor (and its existing customers) are largely protected from the risk of carrying increased costs should the new customer fail.

3c – Large hybrid connection with small injection

7.38. The next two examples build on Example 3a but explore the treatment of 'hybrid' connections – ie, connections that will both offtake energy from the distribution network (load) and inject energy into the distribution network (distributed generation).

7.39. The new Part 6B of the Code introduces a definition of 'load' and sets out how connection applications that include both load and distributed generation should be treated:

> **load** means, for the purposes of Part 6B, any **connection** to a **distribution network** or to a consumer installation that consumes **electricity**, other than **distributed generation** except as provided for in clause 6B.2(3)(b)[74]
>
> …
>
> **6B.2 Application of this Part**
>
> …
>
> (3) If an application under Part 6 includes both **load** and **distributed generation**—
>
> (a) the **connection enhancement cost requirements** and the **capacity costing requirements** must be applied to the **load** component of the application before the requirements of Part 6 are applied to the **distributed generation** component of the application; and
>
> (b) the **pioneer scheme pricing methodology requirements** and **connection charge reconciliation methodology requirements** must be applied, with all necessary modifications, to the connection as a whole.

7.40. In this example, we assume the connection:

(a) will have onsite generation and battery that can inject up to 900 kVA

(b) as before, the connection must also supply up to 5 MVA of load.

7.41. The distributor assesses that:

(a) there are no incremental extension costs for injection – ie, the minimum scheme as designed can accommodate the injection without modification

(b) the battery will provide 500 kVA of avoided capacity cost benefits at zone substation and sub-transmission levels.[75]

7.42. Accordingly, the distributor:

(a) sets connection charges for load identical to Example 3a

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74 Note the Code amendment as published for technical feedback omits the word 'generation' from this definition.

75 In this case, we assume the battery enables injection to be relatively well aligned with network peak timing and price signals (for energy and distribution costs) encourage this outcome.

(b) uses capacity costing rates to assess avoided costs of distribution (ACOD)[76]

(c) applies an ACOD credit of $260k to reduce the net connection charge

(d) estimates that the generation will reduce annual distribution revenue from the connection by 3%.[77]

7.43. Table 7.6 sets out the distributor's assessment of the ACOD credit for capacity.

Table 7.6 – Avoided cost of distribution (Example 3c)

Tier	Rate ($ per kVA)	Injection (kVA)	Credit ($)
Connection	-	*900*	-
LV mains	240	-	-
Distribution substation	600	-	-
HV feeder	85	-	-
Zone substation	380	500	190k
Sub-transmission line	140	500	70k
TOTAL	**-**	**-**	**$260k**

7.44. When preparing a charge reconciliation, the distributor must use figures that relate to the connection as a whole. As such, the distributor:

(a) reduces incremental cost and connection charge values by the amount of the ACOD credit

(b) reduces incremental distribution revenue by 3%.

76 The distributed generation pricing principles require "consideration of any identifiable avoided or avoidable costs" but do not prescribe how such costs are to be identified or quantified. Using the capacity costing rates is a pragmatic approach but is not a requirement and may not be appropriate in all circumstances.

77 This is because the distributor plans to use a cost-reflective tariff that includes a peak-period energy charge. This charge also contributes to the distributor assessing that the generation will make a 500 kVA contribution to reducing peak demand.

Figure 7.6 – Charge reconciliation (Example 3c – hybrid with small injection)

CC = (IC - IR) + NC

CC =	$1,884,000	*Connection charge*
IC =	$1,995,121	*Incremental cost*
IR =	$2,923,023	*Incremental revenue*
NIC (IC-IR) =	-$927,902	*Net incremental cost*
NC =	$2,811,902	*Network contribution (= CC - NIC)*

Reliance =	94%	*Portion of IC contributed up-front*
Up-front revenue =	39%	*Portion of revenue contributed up-front*
NC ratio =	58%	*Portion of revenue contributing to network costs*

7.45. Note that:

(a) the connection charge and incremental cost terms are net of ACOD credits

(b) despite the reduced lines charge revenue, the connection has a larger negative net incremental cost than Example 3a (ie, is more beneficial to existing users)

(c) the network contribution is slightly smaller than Example 3a, due to the lower incremental distribution revenue assumption

(d) the impact of the battery is to reduce costs allocated to the connection. This results in a smaller up-front connection charge and lower annual charges. This is a cost-reflective outcome in this case given the network benefits of peak injection (and the absence of incremental costs).

3d – Large hybrid with mid-size injection

7.46. This example is the same as 3c, except the distributed generation is larger and may inject up to 1.5 MVA.

7.47. We also assume that in this case the generation:

(a) does not have associated battery storage

(b) does not reliably provide injection during the winter evening network peak

(c) provides peak injection in summer daytimes when load at the site (and on the network) is low.

7.48. The distributor assess that:

(a) there is an incremental extension cost for injection of $20,000 associated with supplying and configuring network protection equipment

(b) the minimum scheme is not otherwise altered – ie, the connection as sized for load can accommodate 1.5 MVA of injection

(c) the generation will not provide avoided capacity cost benefits at zone substation and sub-transmission levels

(d) the generation will not (at this stage) drive any upstream network costs during its summer daytime peak.[78]

7.49. Given the above, the distributor sets charges identically to Example 3a but with an additional $20k up-front connection charge and without a $260k ACOD credit.

Figure 7.7 – Charge reconciliation (Example 3d – mid-size injection)

CC = (IC - IR) + NC

CC =	$2,164,000	*Connection charge*
IC =	$2,275,121	*Incremental cost*
IR =	$2,981,335	*Incremental revenue*
NIC (IC-IR) =	-$706,214	*Net incremental cost*
NC =	$2,870,214	*Network contribution (= CC - NIC)*

Reliance =	95%	*Portion of IC contributed up-front*
Up-front revenue =	42%	*Portion of revenue contributed up-front*
NC ratio =	56%	*Portion of revenue contributing to network costs*

[78] The distributed generation pricing principles provide for a distributor to reassess such costs at a later date – eg, if daytime injection begins to drive network costs in future. Refer Schedule 6.4 clause 2(c).

7.50. Note that:

(a) the net incremental cost is $280k higher (less beneficial) than Example 3a (because the incremental cost has increased by $280k, but the incremental revenue is unchanged)

(b) the network contribution terms are identical between Examples 3a and 3d because the increased incremental cost is allocated to the connection charge

(c) the effect of the generation is to increase the cost allocated to the connection. This is cost reflective, given the incremental cost of protection and absence of any incremental network benefits in this case.

Appendix A Worked examples of distribution connection pricing – connection charge calculation

Appendix B Worked examples of distribution connection pricing – reconciliation calculations