Schedule 12.4
cl 12.84

Transmission Pricing Methodology

1 Introduction

The **transmission pricing methodology** is used to recover the full economic costs of **Transpower's** services, with the exception of investment contracts entered into under clauses 12.70 and 12.71 of this Code, existing new investment contracts and other contracts of the kind referred to in clause 12.95 of this Code. The full economic costs of **Transpower's** services include costs relating to investments which are not subject to approval by the Commerce Commission under section 54R of the Commerce Act 1986 or to which the input methodology under section 54S of that Act applies.

Compare: Electricity Governance Rules 2003 clause 1 schedule F5 part F

2 Overview of the Pricing Methodology—

(1) **Transpower's** principal objective as a State Owned Enterprise is to operate as a successful business. To this end **Transpower's** pricing must, subject to Part 4 of the Commerce Act 1986, recover the costs of providing its transmission services, which include capital, maintenance, operating and overhead costs. Before the start of each **pricing year**, **Transpower's** Board approves forecasts of—

- (a) the revenue required to recover the costs of providing AC transmission services during the **pricing year**. This forecast is referred to as the **AC revenue** for that **pricing year**; and
- (b) the revenue required to recover the costs of providing the **HVDC assets** during the **pricing year**. This forecast is referred to as the **HVDC revenue** for that **pricing year**.

(2) The **transmission pricing methodology** comprises—

- (a) **connection** charges, which recover part of **Transpower's AC revenue** by reference to the cost of providing **connection assets**. Clauses 8 to 26 describe how **connection** charges are calculated;
- (b) interconnection charges, which recover the remainder of **Transpower's AC revenue**. Clauses 27 to 30 describe how interconnection charges are calculated; and
- (c) HVDC charges, which recover **Transpower's HVDC revenue**. Clauses 31 to 33D describe how HVDC charges are calculated.

(3) An overview of how **Transpower's AC revenue** and **HVDC revenue** are recovered through these charges is shown in diagrammatic form in Appendix A.

(4) The **transmission pricing methodology** also describes—

- (a) how the costs of **transmission alternative** services are charged and recovered, if and when **transmission alternatives services** are provided and/or funded by **Transpower** (clause 35); and
- (b) practical ways to facilitate greater transparency in relation to **Transpower's** prudent discount policy, which helps to ensure that the **transmission pricing**

methodology does not provide incentives for inefficient by-pass of the existing grid (clauses 36 to 42).

Compare: Electricity Governance Rules 2003 clause 2 schedule F5 part F
Clause 2(2)(a): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

3 Definitions and interpretation

Unless the context otherwise requires—

AC asset means a **grid asset** other than an **HVDC asset**

AC revenue has the meaning set out in clause 2(1)

AC switch means a switch that is an **AC asset**

alternative project means an investment proposed by a **customer**, which if implemented, would bypass existing **grid assets**, but does not include proposed new generation

annual charges means any or all of the **annual connection charge**, **annual interconnection charge** and **annual HVDC charge** for a **customer** at a **connection** location for a **pricing year**

Schedule 12.4, clause 3, **annual charges**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

annual connection charge has the meaning set out in clause 8(2)

annual HVDC charge has the meaning set out in clause 31

annual interconnection charge has the meaning set out in clause 27

anytime maximum demand or **AMD** for a **customer** at a **connection location** means the average of the 12 highest **offtake** quantities for that **customer** at that **connection location** during the **capacity measurement period** for the relevant **pricing year**. This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement

anytime maximum injection or **AMI** for a **customer** at a **connection location** means the average of the 12 highest **injection** quantities for that **customer** at that **connection location** during the **capacity measurement period** for the relevant **pricing year**. This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement

capacity measurement period means, for a~~ny~~ **pricing year**~~,~~

(a) for every purpose other than determining **regional peak demand periods**, the 12 month period commencing ~~starting~~ 1 September and ending with the close of 31 August ~~inclusive,~~ immediately before the commencement of the **pricing year**:

(b) for the purpose of determining **regional peak demand periods**, the period specified in paragraph (a), excluding within that period the period commencing 1 November and ending with the close of 30 April immediately before the commencement of the **pricing year**

connection asset has the meaning set out in clause 6(1)

connection link has the meaning set out in clause 5(c)

connection location means the **substation** or other location at which a **customer's assets** are directly **connected** to the **grid**

Schedule 12.4, clause 3, **connection location**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

connection node has the meaning set out in clause 5(b)

customer means a person who has or controls **assets** directly **connected** to the **grid** and, in relation to a **connection location**, means a person who has or controls **assets** directly **connected** to the **grid** at that **connection location**. A **customer** may be both an **offtake customer** and an **injection customer** at the same **connection location**

Schedule 12.4, clause 3, **customer**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

customer allocation has the meaning set out in clause 25(1)

financial year means the financial year adopted by **Transpower** from time to time, being a 12 month period or such other period as **Transpower** determines. **Transpower's** current financial year is a 12 month period from 1 July to 30 June

grid assets means assets and other works (including **land and buildings**) owned or operated by **Transpower**, which form part of the **grid** or are required to support the **grid**

GXP tie means a situation in which 2 or more **GXPs** are electrically connected by 1 or more **lines** that do not form part of the **grid**

historical anytime maximum injection or **HAMI** is the value calculated under clauses 33D and 34~~for a **customer** at a **South Island generation connection location** means either the average of the 12 highest injections at that **South Island generation connection location** during the **capacity measurement period** for the relevant **pricing year**; or the average of the 12 highest **injections** at that **South Island generation connection location** during any of the four immediately preceding **pricing years**, whichever is highest. This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement~~

HVDC assets means the **HVDC link** and all **land and buildings** associated with the **HVDC link**

HVDC customer means a **customer** who is, from time to time, the owner or operator of—

(a) **South Island generation** which is directly **connected** to the **grid assets**; or

(b) a **local network** to which **South Island generation** is **connected**, either directly or indirectly;

Schedule 12.4, clause 3, **HVDC customer**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

HVDC revenue has the meaning set out in clause 2(1)

independent expert means an independent person who is a recognised technical expert in the matter that has been referred to him or her. In appointing an **independent expert** the party referring the matter to the **independent expert** must nominate 3 persons and the other party may agree that any one of them be appointed. Failing agreement between the parties, the **independent expert** will be appointed by the **Authority**

injection means the net quantity of **electricity** flow into the **grid** at a **connection location** from a **customer's assets** during a **half hour** determined from **metering information**. This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement

injection customer means, subject to clause 34, in relation to a **connection location**, a **customer** who has or controls assets from which electricity flowed into the **grid** at that **connection location** in any **half hour** during the **capacity measurement period** for the relevant **pricing year** or, if the **connection location** is a **South Island generation connection location**, an **HVDC customer** who has or controls assets from which electricity flowed into the **grid** at the **South Island generation connection location** in any **half hour** during the **capacity measurement period** for the relevant **pricing year** or a **capacity measurement period** for any of the 4 immediately preceding **capacity measurement periods**

interconnection asset has the meaning set out in clause 6(2)

interconnection link has the meaning set out in clause 5(d)

interconnection node has the meaning set out in clause 5(a)

land and buildings means any and all land or interest in land (including easements) acquired by **Transpower** for the purposes of establishing a **connection location** or **substation**, or for supporting **grid assets**, together with all buildings, oil containment facilities and the capitalised cost of establishing a **connection location** or **substation** or other **grid asset** (as the case may be)

link has the meaning set out in clause 4(3)

monthly charges means any or all of the **monthly connection charge**, **monthly interconnection charge** and **monthly HVDC charge** for a **customer** at a **connection location**

monthly connection charge has the meaning set out in clause 8(2)

monthly HVDC charge has the meaning set out in clause 31

monthly interconnection charge has the meaning set out in clause 27

new investment contract means a contract entered into at any time between **Transpower** and a **customer** of **Transpower**, under which **Transpower** agrees to provide any new or upgraded **grid assets** and the **customer** agrees to pay charges based on **Transpower's** cost of providing the new or upgraded **grid assets**. It includes, but is not limited to a **new investment agreement contract** as defined in Part 1 of this Code

node has the meaning set out in clause 4(1)

offtake means the net quantity of **electricity** flow out of the **grid** at a **connection location** into **customer assets** during a **half hour** determined from **metering information**. This definition is subject to clause 34 of this transmission pricing methodology and any prudent discount agreement

offtake customer means, subject to clause 34, in relation to a **connection location**, a **customer** who has or controls assets into which electricity flowed from the **grid** at that **connection location** in any **half hour** during the **capacity measurement period** for the relevant **pricing year**

optimised replacement cost means, for any assets or group of assets, the optimised replacement cost of that asset or group of assets recorded in a Transpower asset register as at the **transition date**

point of injection means a **connection location** at which an **injection customer** has assets **connected** to the **grid**

Schedule 12.4, clause 3, **point of injection**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

pricing year means the period from April 1 to March 31, in respect of which **Transpower** calculates its prices

region means a group of **connection locations**, being one of the groups described ~~identified~~ in Appendix B as—

(a) Upper North Island; and

(b) Lower North Island; and

(c) Upper South Island; and

(d) Lower South Island;

regional coincident peak demand or **RCPD** for a **customer** at a **connection location** means the **customer's offtake** at that **connection location** during a **regional peak demand period**. This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement

Clause 3 **regional coincident peak demand**: inserted, on 15 May 2014, by clause 34(b) of the Electricity Industry Participation (Minor Code Amendments) Code Amendment 2014.

regional demand means, in any **half hour**, the sum over all **customers** at all **connection locations** in a **region** of all **offtake** quantities at those **connection locations**

regional peak demand period means, for each region,~~:~~

~~(a) in relation to the Upper North Island and the Upper South Island regions, a half hour in which any of the 12 highest regional demands occurs during the capacity measurement period for the relevant pricing year; and~~

~~(b) in relation to the Lower North Island and the Lower South Island regions,~~ a **half hour** in which any of the 100 highest **regional demands** occur during a **capacity measurement period** for the relevant **pricing year**.

This definition is subject to clause 34 of this **transmission pricing methodology** and any prudent discount agreement

regional coincident peak *[Revoked]*

Clause 3 **regional coincident peak**: revoked, on 15 May 2014, by clause 34(a) of the Electricity Industry Participation (Minor Code Amendments) Code Amendment 2014.

replacement cost means—

(a) for a **connection asset** commissioned before the **transition date**, the cost of replacing that asset (either separately or as part of a group of assets) with a modern equivalent asset with the same service potential, multiplied by the **replacement cost adjustment factor**; and

(b) for any other **grid asset**, the cost of replacing that asset (either separately or as part of a group of assets) with a modern equivalent asset with the same service potential,

as determined by **Transpower** and (unless stated otherwise) recorded in a **Transpower** asset register;

replacement cost adjustment factor means for any asset (or group of assets) the percentage which is the **optimised replacement cost** divided by the cost, as at (or about) the **transition date**, of replacing that asset (or group of assets) with the then modern equivalent asset with the same service potential

reverse flow means electricity exiting the **grid** at a **GXP** and entering the **grid** at another **GXP** as a result of a **GXP tie**

South Island generation means, subject to clause 34, any **generating unit** or **generating station** located in the South Island, which:

(a) is directly **connected** to the **grid** or is **connected** to a **local network** which is **connected** (directly or indirectly) to the **grid**; and

(b) has (directly or indirectly) injected electricity into the **grid** at any time during any **capacity measurement period** for all or any of the previous 5 **pricing years**

Schedule 12.4, clause 3, **South Island generation**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

South Island generation connection location means any **connection location** at which **South Island generation** is **connected** to the **grid** either directly, or indirectly via **connection** of a **local network**, to which **South Island generation** is in turn either directly or indirectly **connected substation** means a substation, including all **land and buildings**, switches, transformers, revenue meters and all other assets comprising or located at that substation

Schedule 12.4, clause 3, **South Island generation connection location**: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

South Island mean injection or **SIMI** is the value calculated under clauses 33B and 34

transition date means the date of the last ODV report published on **Transpower's** website before the date on which this **transmission pricing methodology** takes effect

weighted average cost of capital means, for any **pricing year**, the pre-tax nominal weighted average cost of capital used by **Transpower** to determine **AC revenue** or **HVDC revenue** (as the case may be) for that **pricing year**.

Compare: Electricity Governance Rules 2003 clauses 3.1 to 3.53 schedule F5 part F

4 Definition of Nodes and Links

(1) A **node** is any of the following:

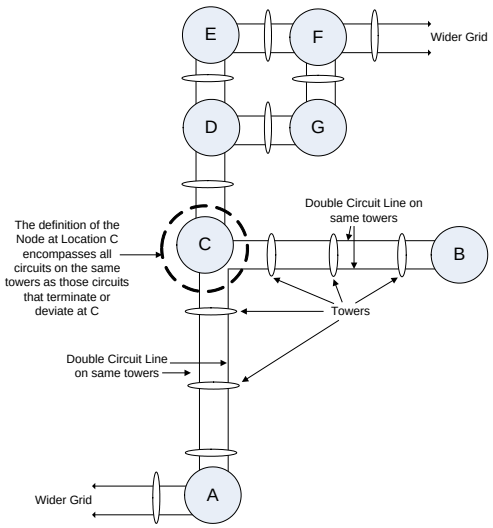
(a) a **connection location**:

(b) a location where a circuit, which is **connected** to 2 or more other **nodes**, diverges or terminates (such as a "tee" point or a deviation):

(c) any **substation** or switching station.

(2) Any **node** which connects with 1 or more multiple circuits on the same towers or poles where at least 1 of those circuits deviates or terminates at that **node** is treated as a single **node** encompassing all of those circuits at that location.

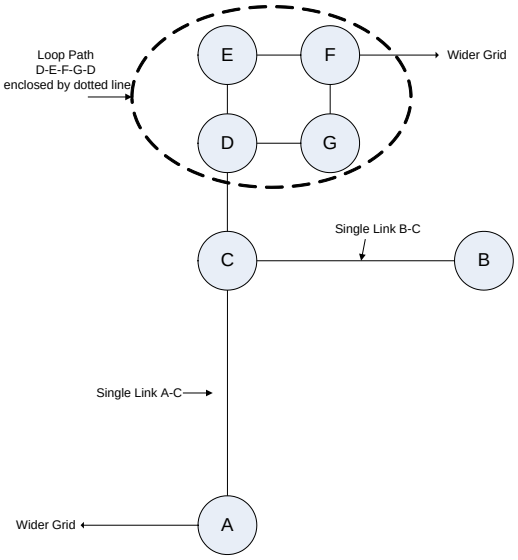
Figure 1: Illustration of definition of a node



(3) A **link** is either a single circuit or multiple parallel circuits (of the same voltage) **connecting** 2 **nodes** (and includes any **grid assets**, such as circuit breakers, that are required to **connect** the **link** at either **node**).

(4) Figures 1 and 2 illustrate how **nodes** and **links** are identified. In Figure 1, A, B, C, D, E, F and G are all **nodes**. C is a single **node**, because 1 of the circuits of the **link** AC terminates at C. AC, CD (and DE, EF, FG and GD) and BC are separate **links**, although AB may be recorded as a single line in a Transpower asset register. Figure 2 shows the same configuration as Figure 1 but describes the circuits by way of **links**.

Figure 2 – Illustration of links and loop path



Compare: Electricity Governance Rules 2003 clauses 3.54 to 3.57 schedule F5 part F
Clause 4(1)(b): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.
Clause 4(3): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

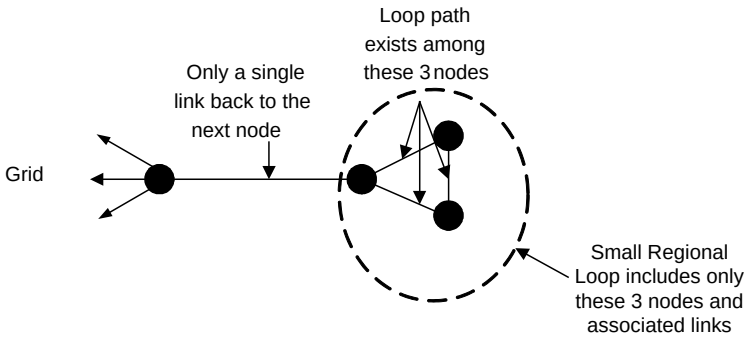
5 Identification of Nodes and Links as Connection or Interconnection

Nodes and **links** are identified as **connection nodes** or **connection links** or **interconnection nodes** or **interconnection links** according to the following rules:

(a) an **interconnection node** is any **node connected** to 2 or more **nodes** in a "loop", other than a "small regional loop". A loop is a continuous path of **nodes** and **links** with the same start and end **node**. A "small regional loop" is where a loop path exists between any group of **nodes** (excluding the **nodes** at Benmore and Haywards) with only a single **link** from the loop back to the next **node** that is outside the loop (see Figure 3 below):

(b) a **connection node** is any **node** that is not an **interconnection node**:

Figure 3 – Example of a small regional loop



(c) a **connection link** is a **link** with a **connection node** at one or more of its ends:
(d) an **interconnection link** is a **link** that connects 2 **interconnection nodes**:
(e) l**inks** and **nodes** that comprise a "small regional loop" are **connection links** and **connection nodes**.

Compare: Electricity Governance Rules 2003 clause 3.58 schedule F5 part F
Clause 5(a): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

6 Definition of Connection Assets and Interconnection Assets

(1) A **connection asset** is—
(a) any **grid asset** at a **connection node** other than **voltage support** equipment that is for **grid voltage support** purposes and has not been installed at a **customer's** request; and
(b) at an **interconnection node** that is a **connection location**,—
(i) any **grid asset** that is specifically required to **connect** a **customer**, including a supply transformer, feeder bay or supply transformer high voltage or low voltage breaker. Low voltage breakers, low voltage bus section breakers, voltage transformers, revenue meters and other equipment where they are on the same bus as the feeders are also **connection assets**; and
(ii) any **grid asset** that is used both to **connect** a **customer** (whether injection or offtake) and for **grid** operation generally; and
(iii) a proportion of the **land and buildings** at that **connection location**. The proportion of **land and buildings** defined as a **connection asset** is that proportion which the **replacement cost** of the **connection assets** identified in subparagraph (i) but excluding **land and buildings**, bears to the **replacement cost** of all **grid assets** (excluding **land and buildings**) at the **connection location**; and
(c) any **grid asset** that is a **connection link**. A single line, recorded as such in a **Transpower** asset register, may form part of more than 1 **link**, so that a portion of a line may be identified as a **connection asset** with the remaining portion identified as an **interconnection asset**. For example, in Figure 1, if a line AB were recorded in a **Transpower** asset register, it would form part of a **connection link** BC and an **interconnection link** AC. If part of a line is, or forms part of, a **connection link**, the value and costs ascribed to the **connection link** for the purposes of calculating **connection** charges is the same proportion that the ratio of the length of the **connection link** bears to the total length of the line.

(2) An **interconnection asset** is any **grid asset** that is not a **connection asset**, or an **HVDC asset**.

(3) A **connection asset** which connects a **customer's assets** at a **connection location** to the **interconnection assets** is referred to as a **connection asset** "for" or "which connects" (or other grammatical form of that phrase) that **connection location** or **customer's assets** (as the case may be).

Compare: Electricity Governance Rules 2003 clauses 3.59 to 3.61 schedule F5 part F
Clause 6(1)(b)(i) and (ii): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

Clause 6(1)(c): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

7 Interpretation

Unless the context otherwise requires—

(a) all defined terms are shown in bold text; and

(b) terms defined in Part 1 of this Code have that defined meaning:

(c) terms defined below and elsewhere in the text of this **transmission pricing methodology** take that defined meaning, and any other grammatical form of that term has a corresponding meaning; and

(d) if there is any inconsistency between the text description of a calculation for which there is formula and the particular formula, the formula takes precedence; and

(e) diagrams are for information only and do not form a binding part of this **transmission pricing methodology**; and

(f) a reference—

  (i) to the singular includes the plural and conversely; and

  (ii) to a person includes an individual, company, other body corporate, association, partnership, firm, joint venture, trust or Government agency; and

(g) the word "including" is to be read as "including, but not limited to", and the word "includes" is to be read as "includes, without limitation"; and

(h) if any matter is to be determined by **Transpower** or **Transpower's** Board, it is to be determined in **Transpower's** or **Transpower's** Board (as the case may be) sole discretion while acting at all times reasonably; and

(i) a reference to a preceding **financial year** is a reference to the first complete **financial year** that precedes the start of the **pricing year** in respect of which the relevant calculation is undertaken; and

(j) a reference to a prudent discount agreement includes any agreement entered into under the prudent discount policy in clauses 36 to 42 and any agreement which has the same or similar purpose as the prudent discount policy (including a **notional embedding contract**) entered into between **Transpower** and a **customer** whether before or after commencement of this **transmission pricing methodology**.

Compare: Electricity Governance Rules 2003 clauses 3.62 to 3.71 schedule F5 part F

Connection Charges

8 Calculation of the Connection Charges

(1) A **connection** charge for each **connection asset** for a **connection location** is calculated for each **pricing year** for each **customer** at that **connection location** by multiplying the sum of the asset, maintenance, operating and (for **injection customers**) overhead cost components for a **connection asset** by the relevant **customer allocation**, as follows:

$$\text{connection charge} = (A_{conn} + M_{conn} + O_{conn} + IO_{conn}) \times CA_{conn}$$

where

A_{conn}	is the asset component for the **connection asset** calculated in accordance with clauses 10 to 12
M_{conn}	is the maintenance component for the **connection asset** calculated in accordance with clauses 13 to 17 and is $\mathbf{M_{conn\ subs}}$ or $\mathbf{M_{conn\ line\ type}}$ depending on the nature of the **connection asset**
O_{conn}	is the operating component for the **connection asset** calculated in accordance with clauses 18 to 20
IO_{conn}	is the injection overhead component for the **connection asset** calculated in accordance with clauses 21 to 24
CA_{conn}	is the customer allocation for the **connection asset** for the **connection location** in respect of which the **connection** charge is being calculated, calculated in accordance with clause 25(1) and (2)(a) to (c).

(2) The sum of all **connection** charges calculated for a **customer** for all **connection assets** for a **connection location** in accordance with subclause (1) is the **annual connection charge** for that **customer** at that **connection location** in that **pricing year**. The **customer's monthly connection charge** at that **connection location** for that **pricing year** is (subject to clause 34 of this **transmission pricing methodology**) calculated as 1/12 of the **annual connection charge**. The example **connection** charge report at clause 25(3)~~(2)(d)~~ illustrates how a **customer's annual connection charge** for a **connection location** is calculated.

(3) If a **customer** is both an **offtake customer** and an **injection customer** at a **connection location**, **connection** charges for that **connection location** are calculated separately for that **customer** as an **offtake customer** and an **injection customer**.

Compare: Electricity Governance Rules 2003 clauses 4.1 to 4.3 schedule F5 part F
Clause 8: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

9 Calculation of Connection Charge Components

(1) Each of the asset, maintenance, operating and overhead cost components of the **connection** charge is calculated by reference to a rate set for that component which is then applied to the particular **connection asset**. Different rates may be set for different types of **connection assets**; for example, different rates are used to calculate the **maintenance component** depending on whether the **connection asset** is located at a **substation** or is a line. Different types of lines have different rates. Clauses 10 to 26 describe how the rates are set and applied to determine each component of the **connection** charge.

(2) The rates for each component of the **connection** charge are recalculated for each **pricing year**.

Compare: Electricity Governance Rules 2003 clauses 4.4 and 4.5 schedule F5 part F
Clause 9: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

10 Asset Component

The asset component of the **connection** charge allocates a portion of the cost of funding all **connection assets** plus their depreciation to the **connection asset** for which the **connection** charge is being calculated.

Compare: Electricity Governance Rules 2003 clause 4.6 schedule F5 part F
Clause 10: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

11 Asset Return Rate

The asset return rate used to calculate the asset component is referred to as $\mathbf{ARR_{conn}}$ and is expressed as a proportion. $\mathbf{ARR_{conn}}$ is calculated by dividing the product of the **weighted average cost of capital** and the regulatory asset value of all **connection assets** plus the annual depreciation of those assets by the **replacement cost** of all **connection assets** as follows:

$$ARR_{conn} = \frac{WACC \times RAV_{conn} + D_{conn}}{\sum_{conn} RC_{conn}}$$

where

WACC	is the **weighted average cost of capital** (expressed as a percentage)
RAV_{conn}	is the regulatory asset value of all **connection assets**, as determined by **Transpower** and recorded in a **Transpower** asset register (expressed in dollars)
D_{conn}	is total annual depreciation of all **connection assets** in the preceding **financial year** as determined by **Transpower** and recorded in a **Transpower** asset register (expressed in dollars)
$\sum_{conn} RC_{conn}$	is the total **replacement cost** of all **connection assets**.

Compare: Electricity Governance Rules 2003 clause 4.7 schedule F5 part F

12 Calculation of Asset Component

The **asset component** of a **connection** charge is calculated by multiplying $\mathbf{ARR_{conn}}$ by the **replacement cost** of the **connection asset** for which the **connection** charge is being calculated as follows:

$$A_{conn} = ARR_{conn} \times RC_{conn}$$

where

RC_{conn} is the **replacement cost** of the **connection asset** for which the **connection** charge is being calculated (expressed in dollars).

Compare: Electricity Governance Rules 2003 clause 4.8 schedule F5 part F
Clause 12: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

13 Maintenance component

(1) The maintenance component of the **connection** charge allocates a portion of **Transpower's** total maintenance costs for all **connection assets** to the **connection asset** for which the **connection** charge is being calculated.

(2) Maintenance recovery rates are set separately for **connection assets** located at **substations** and for the different types of lines. The different line types (all AC) used are—

(a) 220kV or higher voltage tower lines;

(b) other tower lines; and

(c) pole lines.

Compare: Electricity Governance Rules 2003 clauses 4.9 and 4.10 schedule F5 part F
Clause 13(1): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

14 Substation Maintenance Recovery Rate

The maintenance recovery rate used to calculate the maintenance component of the **connection** charge for **connection assets** located at **substations** is referred to as $\mathbf{MRR_{conn\ subs}}$ and is expressed as a proportion. $\mathbf{MRR_{conn\ subs}}$ is calculated as the average of the annual maintenance costs incurred by **Transpower** for all **connection assets** located at all **substations** in each of the 4 immediately preceding **financial years** divided by the sum of the **replacement costs** of all **connection assets** located at all **substations** as follows:

$$MRR_{conn\ subs} = \frac{MC_{conn\ subs}}{\sum_{subs}\sum_{conn} RC_{conn\ subs}}$$

where

$MC_{conn\ subs}$ is the average of the annual maintenance costs incurred by **Transpower** for all **connection assets** located at all **substations** in each of the 4 immediately preceding **financial years**, as determined by **Transpower** and recorded in **Transpower's** Maintenance Management System accounts for each of those **financial years** (expressed in dollars)

$\sum_{subs}\sum_{conn} RC_{conn\ subs}$ is the sum of the **replacement costs** of all **connection assets** located at all **substations**.

Compare: Electricity Governance Rules 2003 clause 4.11 schedule F5 part F
Clause 14: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

15 Calculation of Maintenance Component for a Connection Asset Located at a Substation

The maintenance component of the **connection** charge for a **connection asset** located at a **substation** is calculated by multiplying $\mathbf{MRR_{conn\ subs}}$ by the **replacement cost** of the **connection asset** for which the **connection** charge is being calculated as follows:

$$M_{conn\ subs} = MRR_{conn\ subs} \times RC_{conn\ subs}$$

where

$RC_{conn\ subs}$ is the **replacement cost** of the **connection asset** for which the **connection** charge is being calculated (expressed in dollars).

Compare: Electricity Governance Rules 2003 clause 4.12 schedule F5 part F
Clause 15: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

16 Line Maintenance Recovery Rate

The maintenance recovery rate used to calculate the maintenance component of the **connection** charge for **connection assets** which are lines is referred to as $\mathbf{MRR_{conn\ line\ type}}$ and is expressed as a dollar cost per length (expressed in km) of line for each line type. $\mathbf{MRR_{conn\ line\ type}}$ is calculated for each of the 3 types of line referred to in clause 13(2) and is the average of annual maintenance costs incurred by **Transpower** for all lines of the type for which $\mathbf{MRR_{conn\ line\ type}}$ is being calculated in each of the preceding 4 **financial years** divided by the total line length of line of that type as follows:

$$MRR_{conn\ line\ type} = \frac{MC_{conn\ line\ type}}{TL_{conn\ line\ type}}$$

where

$MC_{conn\ line\ type}$ is the average of the annual maintenance costs incurred by **Transpower** for all lines of the type for which the maintenance recovery rate is being calculated in each of the 4 immediately preceding **financial years**, as determined by **Transpower** and recorded in **Transpower's** Maintenance Management System accounts for each of those **financial years** (expressed in dollars)

$TL_{conn\ line\ type}$ is the total length of line of the type for which the maintenance recovery rate is being calculated forming part of the **grid assets** (other than **HVDC assets**), as determined by **Transpower** and recorded in a **Transpower** asset register at the end of the immediately preceding **financial year** (expressed in km).

Compare: Electricity Governance Rules 2003 clause 4.13 schedule F5 part F

Clause 16: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

17 Calculation of the Maintenance Component for Line Connection Assets

The maintenance component of the **connection** charge for a **connection asset** which is a line is calculated by multiplying $\mathbf{MRR_{conn\ line\ type}}$ by the length of the line which is the **connection asset** for which the **connection** charge is being calculated as follows:

$$M_{conn\ line\ type} = MRR_{conn\ line\ type} \times L_{conn\ line}$$

where

$L_{conn\ line}$	is the length of the line which is the **connection asset** for which the **connection** charge is being calculated, as determined by **Transpower** and recorded in a **Transpower** asset register (expressed in km).

Compare: Electricity Governance Rules 2003 clause 4.14 schedule F5 part F
Clause 17: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

18 Operating Component

The operating component of the **connection** charge allocates a portion of **Transpower's** total operating cost for all **AC assets** to the **connection asset** for which the **connection** charge is being calculated.

Compare: Electricity Governance Rules 2003 clause 4.15 Schedule F5 part F
Clause 18: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

19 Operating Recovery Rate

The operating recovery rate used to calculate the operating component of the **connection** charge is referred to as **ORR** and is expressed as a dollar cost per switch. **ORR** is calculated by dividing the cost of operating all **AC switches** incurred by **Transpower** in the preceding **financial year** by the total number of **AC switches** less the product of 0.1 multiplied by the total number of **AC switches** operated by **customers** as follows:

$$ORR = \frac{OC}{TS}$$

where

OC	is the cost associated with operating all **AC switches** incurred by **Transpower** in the immediately preceding **financial year**, as determined by **Transpower** and recorded in its Maintenance Management System accounts for that **financial year** (expressed in dollars)
TS	is the total number of **AC switches**, based on the number of

switching devices in a **substation** or switching station, (as determined by **Transpower** and recorded in a **Transpower** asset register as at the end of the immediately preceding **financial year**) less the product of 0.1 multiplied by the total number of **AC switches** operated by **customers**.

Compare: Electricity Governance Rules 2003 clause 4.16 schedule F5 part F
Clause 19: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

20 Calculation of the Operating Component of the Connection Charge for a Connection Asset

The operating component of the **connection** charge for a **connection asset** is calculated by multiplying **ORR** by the number of **AC switches** that form part of the **connection asset** for which the **connection** charge is being calculated less the product of 0.1 multiplied by the number of **AC switches** within the **connection asset** that are operated by **customers** as follows:

$$O_{conn} = ORR \times S_{conn}$$

where

S_{conn} is the number of switches that form part of the **connection asset** for which the **connection** charge is being calculated, (as determined by **Transpower** and recorded in a **Transpower** asset register) less the product of 0.1 multiplied by the number of **AC switches** within the **connection asset** that are operated by **customers**.

Compare: Electricity Governance Rules 2003 clause 4.17 schedule F5 part F
Clause 20: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

21 Injection Overhead Component

Offtake customers pay a portion of **AC revenue** overhead costs through the interconnection charge. **Injection customers** are not charged an interconnection charge, so a share of **AC revenue** overhead cost is allocated through their **connection** charges. The injection overhead component of the **connection** charge is calculated only for **connection assets** that **connect** a **customer's assets** at a **point of injection** to the **interconnection assets** and therefore applies only to **injection customers**.

Compare: Electricity Governance Rules 2003 clause 4.18 schedule F5 part F
Clause 21: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

22 Injection Overhead Revenue

The portion of AC overhead cost to be recovered from **injection customers** is referred to as $\mathbf{OHC_{inj}}$. $\mathbf{OHC_{inj}}$ is calculated by reference to the proportion that the sum of the maintenance components for all **connection assets** for all **points of injection** bears to total maintenance costs of **AC assets** as follows:

$$OHC_{inj} = OHC_{AC} \times \frac{MC_{inj}}{MC_{AC}}$$

where

OHC_{AC} is the overhead cost component of **Transpower's AC revenue** for the relevant **pricing year**, as determined by Transpower when setting the **AC revenue**

MC_{inj} is the sum of the maintenance cost of the **connection assets** for all **points of injection** in the preceding **financial year**, as determined by **Transpower** and recorded in **Transpower's** Maintenance Management System accounts for that **financial year**

MC_{AC} is the sum of the maintenance cost of the **AC assets** in the preceding **financial year**, as determined by **Transpower** and recorded in **Transpower's** Maintenance Management System accounts for that **financial year**.

Compare: Electricity Governance Rules 2003 clause 4.19 schedule F5 part F

23 Injection Overhead Rate

The injection overhead rate used to calculate the injection overhead component of the **connection** charge is referred to as **IOR**. **IOR** is calculated by dividing $\mathbf{OHC_{inj}}$ by the sum of the proportion of the **replacement cost** of each **connection asset connecting injection customer** assets at all **points of injection** to the **interconnection assets** as follows:

$$IOR = \frac{OHC_{inj}}{\sum_{conn\ inj} RC_{conn\ inj} \times CA_{conn\ inj}}$$

where

$RC_{conn\ inj}$ is the **replacement cost** of a **connection asset connecting injection customer assets** at a point of injection to the **interconnection assets**

$CA_{conn\ inj}$ is the **customer allocation** of the relevant **connection asset** for the relevant **injection customer** at the relevant **connection location**

$\sum_{conn\ inj} RC_{conn\ inj} \times CA_{conn\ inj}$ is the sum of all amounts calculated as $RC_{conn\ inj}$ x $CA_{conn\ inj}$ for all **injection customers' connection assets** for all **points of injection**.

Compare: Electricity Governance Rules 2003 clause 4.20 schedule F5 part F

Clause 23: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

24 Injection Overhead Component

The injection overhead component of the **connection** charge is calculated for a **connection asset** for a **point of injection** by multiplying the **IOR** by the **replacement cost** of that **connection asset** for which the **connection** charge is being calculated as follows:

$$\mathbf{IO_{conn} = IOR \times RC_{conn\ inj}}$$

Compare: Electricity Governance Rules 2003 clause 4.21 schedule F5 part F
Clause 24: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

25 Customer Allocation

(1) Each **customer** at a **connection location** is allocated a proportion (expressed as a percentage) of each **connection asset** for that **connection location**. This percentage is referred to as the **customer allocation** for that **connection asset** at that **connection location**. The **customer allocation** is calculated in accordance with subclause (2). If a **customer** is both an **offtake customer** and an **injection customer** at a **connection location**, a **customer allocation** for each **connection asset** for that **connection location** will be calculated for that **customer** as both an **offtake customer** and as an **injection customer**.

(2) The **customer allocation** is calculated as follows:

(a) for a **connection asset** which connects only 1 **connection location** to **interconnection assets**, except for a **connection asset** of the kind referred to in clause (6)(1)(b)(ii), the **customer allocation** is the proportion that the **customer's anytime maximum demand** or **anytime maximum injection** (as the case may be) at that **connection location** bears to the sum of all **customers' anytime maximum demands** and **anytime maximum injections** at that **connection location**:

(b) for a **connection asset** which connects more than 1 **connection location** to **interconnection assets**, except for a **connection asset** of the kind referred to in clause (6)(1)(b)(ii), the **customer allocation** is the proportion that the **customer's anytime maximum demand** or **anytime maximum injection** (as the case may be) at that **connection location** bears to the sum of all **customers' anytime maximum demands** and **anytime maximum injections** at all **connection locations** for that **connection asset**:

(c) for a **connection asset** of the kind referred in clause (6)(1)(b)(ii), the **customer allocation** is the proportion that the **customer's anytime maximum demand** or **anytime maximum injection** (as the case may be) at the **connection location** bears to the total capacity of that **connection asset**, as specified in a **Transpower** asset register.

(3) The following table illustrates the calculation of an **offtake customer's annual connection** charge at a particular **connection location**. It lists all **connection assets** for that **connection location** and the proportion of the **connection** charge for each of those **connection assets** (including the amount of each of the asset, maintenance, and operating components of the **connection** charge) included in the **annual connection**

charge together with the **customer allocation** for the relevant **connection asset**). The column headed "Recovery" is provided for information only and indicates whether the asset, maintenance and operating components (respectively) are recovered under this **transmission pricing methodology** (TPM) or under a **new investment contract** (NIC).

Connection charge report

2007 - Connection Charge Components

Customer: Southern Electric

Substation: Johnston **Load Type:** OFT

Asset	Asset Id	Physical Location	Recovery	Asset Value	Asset Component	Maintenance Component	Operating Component	Customer Allocation	Connection Charge
			A M O	$	$	$	$	%	$
LINE	JTN-PVL A		TPM -TPM	4,513,794	393,151	187,603	0	4.27	24,798
LAND/BLDGS	JTN	JTN	TPM -TPM	1,343,443	117,014	14,106	0	100.00	131,120
TRAN	T1	JTN	NIC -TPM	694,012	0	7,287	0	100.00	7,287
SWIT	1	JTN	TPM -TPM-TPM	113,644	9,898	1,193	1,104	100.00	12,195
SWIT	2	JTN	TPM -TPM-TPM	113,664	9,898	1,193	1,104	100.00	12,195
SWIT	3	JTN	NIC -TPM-TPM	113,664	0	1,193	1,104	100.00	2,297
SWIT	92	PVL	TPM -TPM-TPM	344,087	29,970	3,613	2,208	100.00	35,791
							Annual Connection Charge		225,683

Example figures only

Compare: Electricity Governance Rules 2003 clauses 4.22 to 4.24 schedule F5 part F
Clause 25(3): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

26 Exceptions to the Application of the Connection Charge

(1) If a **connection asset** is provided by **Transpower** under a **new investment contract**, in which the capital costs of that **connection asset** are recovered, calculation of the **connection** charge for that **connection asset** for the **customer** who is a party to that **new investment contract** (irrespective of when that agreement was entered into) is as follows:

(a) for the purposes of calculating the **connection** charge for that **connection asset** under clause 8(1), the asset component A_{conn} is $0. Recovery of the amount that would otherwise be recovered as the asset component for that **connection asset** is determined by, and recovered under, the **new investment contract**, in accordance with the provisions of the **new investment contract**:

(b) the maintenance component and operating component of the **connection** charge are calculated as per clauses 15, 17, and 20; and

(c) if the **connection asset** connects more than 1 **connection location** or it connects a **connection location** at which there is more than 1 **customer**, the **customer allocation** is determined in accordance with the relevant **new investment contract**, rather than in accordance with clause 25(2) of this **transmission pricing methodology**.

(2) If **Transpower** has entered into a prudent discount agreement in which it is agreed that notional **connection assets** that form part of the **alternative project** specified in the prudent discount agreement substitute for **connection assets** at a **connection location**, then for the purposes of clause 8(1) the **customer's customer allocation** for the **connection assets** so substituted is deemed to be 0.

(3) If a **customer** is **connected** at a **connection location** subject to an **input connection contract**, the following apply:

(a) those assets that the **customer** uses to **connect** at that **connection location** will not be included in the calculation of the total **connection** charge for that **connection location**:

(b) the **customer** will be charged in accordance with the terms of the applicable **input connection contract**.

Compare: Electricity Governance Rules 2003 clauses 4.25 to 4.27 schedule F5 part F
Clause 26: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

Interconnection Charge

27 Interconnection Charge

The purpose of the interconnection charge is to recover the remainder of **Transpower's AC revenue** that is not recovered via **connection** charges. **Monthly interconnection charges** are paid by **offtake customers** in respect of each **connection location** at which they have **assets connected** to the **grid**. An **annual interconnection charge** is calculated for each **customer** at a **connection location** in accordance with clauses 28 to 30. A **customer's monthly interconnection charge** at that **connection location** is $^{1}/_{12}$ of the **annual interconnection charge**, subject to clause 34 of this **transmission pricing methodology**.

Compare: Electricity Governance Rules 2003 clause 5.1 schedule F5 part F
Clause 27: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

28 Interconnection Revenue

The portion of **AC revenue** to be recovered by interconnection charges is calculated as the difference between **Transpower's AC revenue** and the amounts recovered by the **connection** charges for that **pricing year** as follows:

$$R_{IC} = \text{AC revenue} - \sum \text{connection charges}$$

where

AC revenue	is **Transpower's AC revenue** for the relevant **pricing year**
$\sum$ connection charges	is the sum of all **connection** charges calculated for the relevant **pricing year**.

Compare: Electricity Governance Rules 2003 clause 5.2 schedule F5 part F
Clause 28: amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

29 Interconnection Rate

The interconnection rate used to determine the **annual interconnection charge** is referred to as **IR** and is the same for all **offtake customers** at all **connection locations**

in all **regions**. The **IR** is calculated by dividing the interconnection revenue by the sum of the average of the **RCPDs** for each **customer** at a **connection location** for all **customers** at all **connection locations** for all **regions** as follows:

$$IR = \frac{R_{IC}}{\sum_{regions}\sum_{cust}\sum_{loc}\frac{1}{N_{reg}}\sum_{i=1}^{N_{reg}}RCPD_i}$$

where

R_{IC}	is the interconnection revenue calculated in accordance with clause 28
$\sum_{regions}\sum_{cust}\sum_{loc}\frac{1}{N_{reg}}\sum_{i=1}^{N_{reg}}RCPD_i$	is the sum of the average **RCPDs** for each **customer** at a **connection location** for all **customers** at all **connection locations** for all **regions**.

Compare: Electricity Governance Rules 2003 clause 5.3 schedule F5 part F

30 Calculating the Interconnection Charge

An **annual interconnection charge** is calculated for each **offtake customer** at a **connection location** by multiplying the interconnection rate by the sum of the **customer's RCPD** at a **connection location** as follows:

$$\text{interconnection charge} = IR \times \frac{1}{N_{reg}}\sum_{i=1}^{N_{reg}}RCPD_i$$

where

IR	is **IR**
$\frac{1}{N_{reg}}\sum_{i=1}^{N_{reg}}RCPD_i$	the average **RCPD** for the **offtake customer** in respect of whom the interconnection charge is being calculated at the relevant **connection locations**.

Compare: Electricity Governance Rules 2003 clause 5.4 schedule F5 part F

HVDC charge

31 HVDC Charge

The purpose of the HVDC charge is to recover **Transpower's HVDC revenue**. HVDC charges are paid by all **HVDC customers**. An **annual HVDC charge** is calculated for each **HVDC customer** at each **South Island generation connection location**. The **monthly HVDC charge** is $^1/_{12}$ of the **annual HVDC charge** subject to clause 34 of this **transmission pricing methodology**.

Compare: Electricity Governance Rules 2003 clause 6.1 schedule F5 part F

~~32 HVDC Rate~~

~~The HVDC rate used to calculate HVDC charges is referred to as **DCR** and expressed as \$/kW. **DCR** is calculated for each **pricing year** by dividing the **HVDC revenue** by the sum of the **HAMI** for the relevant **pricing year** for all **HVDC customers** at all **points of injection** where **South Island generation** connects (directly or indirectly) to the **grid assets** as follows:~~

$$DCR = \frac{R_{HVDC}}{\sum_{HVDC} HAMI_{HVDC}}$$

~~where~~

~~R_{HVDC}~~	~~is **HVDC revenue** (expressed in dollars)~~
~~$\sum_{HVDC} HAMI_{HVDC}$~~	~~is the sum of **HAMI** (expressed in kW) of all **HVDC customers** at all **points of injection** where **South Island generation** connects (directly or indirectly) to the **grid assets**.~~

~~Compare: Electricity Governance Rules 2003 clause 6.2 schedule F5 part F~~

33 Calculating the HVDC Charge

The **annual HVDC charge** is calculated for each **HVDC customer** at each **South Island generation connection location** ~~by multiplying **DCR** by the **HAMI** for the **HVDC customer** in respect of whom the **annual HVDC charge** is being calculated at each **South Island generation connection location** as follows:~~

~~HVDC charge = DCR x HAMI~~

~~where~~

~~DCR~~	~~is **DCR**~~
~~HAMI~~	~~is the **HAMI** for the **HVDC customer** in respect of whom the **annual HVDC charge** is being calculated at that **South Island generation connection location**.~~

~~Compare: Electricity Governance Rules 2003 clause 6.3 schedule F5 part F~~

HVDC charge = (DCR_{SIMI} x SIMI) + (DCR_{HAMI} x HAMI)

where

DCR_{SIMI}	is the **SIMI**-based rate calculated in accordance with clause 33A, in \$/MWh
SIMI	is the **South Island mean injection** for the **HVDC customer** at the **South Island generation connection location** calculated in accordance with clause 33B, in MWh

DCR_{HAMI}	is the **HAMI**-based rate calculated in accordance with clause 33C, in $/kW
HAMI	is the **historical anytime maximum injection** for the **HVDC customer** at the **South Island generation connection location** as calculated in accordance with clause 33D, in kW.

33A SIMI-based rate

The **SIMI**-based rate is calculated by each **pricing year** by dividing the weighted **HVDC revenue** by the sum of the **SIMI** of all **HVDC customers** at all **South Island generation connection locations**, as follows:

$$DCR_{SIMI} = \left(\frac{i}{4}\right) \frac{R_{HVDC}}{\sum SIMI}$$

where

DCR_{SIMI}	is the **SIMI**-based rate for the relevant **pricing year**, in $/MWh
i	in the **pricing year** 2017/18 *i*=1 in the **pricing year** 2018/19 *i*=2 in the **pricing year** 2019/20 *i*=3 in each subsequent **pricing year** *i*=4
R_{HVDC}	is **HVDC revenue** for the relevant **pricing year**, in dollars
$\sum$ SIMI	is the sum of the **SIMI** of all **HVDC customers** at all **South Island generation connection locations** for the relevant **pricing year**, in MWh

Compare: Electricity Governance Rules 2003 clause 6.2 schedule F5 part F

33B Calculation of South Island mean injection

South Island mean injection or **SIMI** is calculated for each **HVDC customer** at each **South Island generation connection location** for a **pricing year**, and is the average of the total **injection** from the **HVDC customer's assets** at the **South Island generation connection location** in the **capacity measurement periods** over previous **pricing years,** as follows:

$$SIMI = \frac{\sum injection}{p}$$

where

SIMI	is the **HVDC customer's South Island mean injection** for the relevant **pricing year**, in MWh

$\sum$injection	is the total **injection** from the **HVDC customer's assets** at the **South Island generation connection location** in the **capacity measurement periods** applying for the previous *p* immediately preceding **pricing years**, in MWh

where

p	for the **pricing year** 2017/18	*p*=1
	for the **pricing year** 2018/19	*p*=2
	for the **pricing year** 2019/20	*p*=3
	for the **pricing year** 2020/21	*p*=4
	for each subsequent **pricing year**	*p*=5

33C HAMI-based rate

The **HAMI**-based rate is calculated for each **pricing year** by dividing the weighted **HVDC revenue** by the sum of the **HAMI** for all **HVDC customers** at all **South Island generation connection locations** for the relevant **pricing year**, as follows:

$$DCR_{HAMI} = \left(\frac{4 - i}{4}\right) \frac{R_{HVDC}}{\sum HAMI}$$

where

DCR_{HAMI}	is the **HAMI**-based rate for the relevant **pricing year**, in $/kW

i	in the **pricing year** 2017/18	*i*=1
	in the **pricing year** 2018/19	*i*=2
	in the **pricing year** 2019/20	*i*=3
	in each subsequent **pricing year**	*i*=4

R_{HVDC}	is **HVDC revenue** for the relevant **pricing year**, in dollars
$\sum$ HAMI	is the sum of the **HAMI** of all **HVDC customers** at all **South Island generation connection locations** in kW

33D Calculation of historical anytime maximum injection

Historical anytime maximum injection or **HAMI** is calculated for each **HVDC customer** at each **South Island generation connection location** for a **pricing year**, and is—

(a) for the **pricing year** 2016/17, calculated as if the [***Code Amendment***] had not been made; and

(b) for the **pricing year** 2017/18, the greater of—

(i) the average of the **customer's** 12 highest **injections** at the **connection location** during the **capacity measurement period** for the **pricing year** 2016/17; and

(ii) the average of the **customer's** 12 highest **injections** during the period 1 April 2013 to 31 August 2015; and

(c) for the pricing year 2018/19, the greater of—

(i) the average of the **customer's** 12 highest **injections** at the **connection location** during the **capacity measurement period** for the **pricing year** 2016/17; and

(ii) the average of the **customer's** 12 highest **injections** during the period 1 April 2014 to 31 August 2015,

(d) for the pricing year 2019/20, the greater of—

(i) the average of the **customer's** 12 highest **injections** at the **connection location** during the **capacity measurement period** for the **pricing year** 2016/17; and

(ii) the average of the **customer's** 12 highest **injections** during the period 1 April 2015 to 31 August 2015.

34 Adjustments to AMD, AMI, HAMI, SIMI and RCPD and calculation of customer charges

(1) Before the start of a **pricing year**, and otherwise during a **pricing year** as provided in this clause, **Transpower** will calculate—

(a) **AMD AMI**, **HAMI**, **SIMI** and **RCPD** quantities (for each **regional peak demand period**); and

(b) **annual charges**; and

(c) **monthly charges**—

in each case for every **customer** at every **connection location** for that **pricing year**. When a **monthly charge** is recalculated for part of a **pricing year**, all inputs used in the calculation will be the same as those used to calculate that **monthly charge** before the start of the **pricing year** except for the adjustments specifically provided in this clause.

(2) If, when calculating **AMD**, **AMI**, **HAMI**, **SIMI** and **RCPD** quantities before the start of a **pricing year**, **Transpower**, in its sole discretion, considers that exceptional operating circumstances during the relevant **capacity measurement period(s)** have resulted in—

(a) abnormal **regional demand** resulting in an exceptional **regional peak demand period** for that **pricing year**; and/or

(b) distortions to a **customer's AMD**, **AMI**, **HAMI**, **SIMI** and/or any **RCPD** quantity at a **connection location** for that **pricing year**—

Transpower may, but is under no obligation to—

(c) determine that the exceptional **regional peak demand period** is to be ignored when assessing the **regional peak demand periods** for that **pricing year**; and/or

(d) adjust the **customer's AMD**, **AMI**, **HAMI**, **SIMI** and/or any **RCPD** for the quantity at the relevant **connection location** to minimise the impact of such distortion, as assessed by **Transpower** acting reasonably but otherwise in its sole discretion, as applicable. Such adjusted **AMD**, **AMI**, **HAMI** and **RCPD** qualities,

as the case may be, shall be used to calculate **monthly charges** for that **customer** for that **connection location** for that **pricing year**.

(2A) Subclause (2C) applies if—

(a) a **customer** has given notice to **Transpower**, no later than 20 **business days** before the start of a **capacity measurement period** for a **pricing year**, that the **customer** proposes to change the amount or timing (or both) of the **customer's offtake** in the **capacity measurement period** compared with the **customer's** previous **offtake**; and

(b) the **customer** requests that **Transpower** applies the adjustment provided for under subclause (2C) in respect of the **customers** change in **offtake**; and

(c) **Transpower** is satisfied that—

(i) the change in **offtake** will alter the incidence of the majority of **regional peak demand periods** in the **region** in which the change in **offtake** will occur; and

(ii) the change in **offtake** is unlikely to occur in the absence of the adjustment provided for in subclause (2C); and

(iii) the change in **offtake** is unlikely to give rise to a need for investment in the **grid**; and

(d) **Transpower** has notified the **customer,** before the commencement of the **capacity measurement period,** that it intends to apply the adjustment provided for in subclause (2C) in respect of the **customer**'s change in **offtake**.

(2B) **Transpower** must **publish** on its website the notice referred to in subclause (2A)(d).

(2C) When this clause applies in respect of a **customer's** change in **offtake, Transpower** must disregard the change for the purposes of identifying **regional peak demand periods** in the **region** in which the change occurs.

(3) If **Transpower**—

(a) is notified that **South Island generation** at a **connection location** has been permanently de-rated (including decommissioning) to a specified aggregate rate capacity ("maximum de-rated capacity"); and

(b) is satisfied that such **South Island generation** has been so permanently de-rated,—

then, for the purposes of calculating a **customer's HAMI** and **SIMI** at the relevant **connection location** for any **pricing year** that commences not less than 6 months after the date on which **Transpower** is satisfied under paragraph (b), any **injection** at that **connection location** in any **half-hour** period up to the date on which **Transpower** is satisfied under paragraph (b) which:

(c) is used to determine the **customer's HAMI** and **SIMI**; and

(d) exceeds the maximum de-rated capacity,—

will be deemed to be equal to the maximum de-rated capacity.

(4) If not less than 6 months before the start of a **pricing year**, **Transpower**—

(a) is notified that the **offtake** and/or **injection** capacity of a **customer's assets** at a **connection location** has been permanently de-rated (including decommissioning); and

(b) is satisfied that the **offtake** and/or **injection** capacity of such **assets** has been so permanently de-rated—

then, for the purpose of calculating the **customer's AMD**, **AMI** and/or **RCPD** quantities at that **connection location** for any **pricing year** that commences not less than 6 months after the date on which **Transpower** is satisfied under paragraph (b),—

(c) **Transpower** will estimate (acting reasonably but otherwise in its sole discretion) the **customer's** likely future **offtake** or **injection** (as the case may be) at that **connection location**, having regard to the change in the **customer's offtake** and/or **injection**; and

(d) **injection** or **offtake** quantities for any **half-hour** period up to the date on which **Transpower** is satisfied under paragraph (b) which—

(i) are used to determine the **customer's AMD**, **AMI** or **RCPD** quantities; and

(ii) exceed **Transpower's** estimate under paragraph (c),—

will be deemed to be no more than the amounts estimated by **Transpower** under paragraph (c).

(5) If—

(a) **Transpower** decommissions a **connection location**; or

(b) a **customer** causes all of its **assets connected** to the grid at a **connection location** to be, and **Transpower** is satisfied that the **customer's assets** have been, permanently disconnected from the **grid** at that **connection location**,—

then—

(c) the **customer's monthly charges** for the month in which the **connection location** is decommissioned, will be pro-rated for the number of days that the **connection location** was decommissioned or **assets** were disconnected and the **monthly charges** will be reduced accordingly; and

(d) from the month following the month in which such decommissioning or disconnection occurred, the **customer's AMD**, **AMI**, **HAMI**, **SIMI** and all **RCPD** quantities at that **connection location** and the **customer's monthly charges** at that **connection location** will be deemed to be 0.

(6) If a **customer** connects **assets** to the **grid** at a **connection location** where that **customer** does not already have **assets connected** to the **grid** (including a **new connection location**), the following applies:

(a) **Transpower** will agree with the **customer** whether the **customer** is to be an **offtake customer** or an **injection customer** at the relevant **connection location** and the **customer** will, until such time as the **assets** have been **connected** for a full **capacity measurement period**, be deemed to be an **offtake customer** and/or an **injection customer** accordingly:

(b) if the **asset** is a **generating unit** or **generating station** located in the South Island, the **generating unit** or **generation station** will be deemed to be **South Island generation**:

(c) **Transpower** will assign the **new connection location** to a **region** (unless it is an existing **connection location**):

(d) from the time of **connection** of the **assets** until such time as the **assets** have been **connected** to the **grid** for the whole of the **capacity measurement period** for a **pricing year**, or, in the case of assets which are deemed to be **South Island generation** under paragraph (b), have been **connected** to the grid for 5

consecutive **capacity measurement periods**, the **customer's AMD**, **AMI**, **HAMI**, **SIMI** and **RCPD** quantities at the **connection location** will be determined using **Transpower's** estimates of the customer's likely offtake and/or injection at the **connection location** for that period:

(e) the **customer** will pay **monthly charges** at the **connection location** from the date the **customer's assets** are **connected** to the **grid**. If the **customer's assets** are **connected** part way through a month, the **monthly charges** for that month will be reduced by an amount, being a pro-rata proportion of the **monthly charges** for the number of days in the month that the **customer's assets** were not **connected**.

(7) If—

(a) a **customer's connection** of new **assets** at a **connection location** to which subclause (5) applies, (the "first **connection** location") is a direct consequence of that **customer's** de-rating of **assets** at another **connection location**, (the "second **connection** location") without the **customer** terminating the second **connection location** as a **point of connection** under any relevant **transmission agreement**; and

(b) the **connection assets** for the second **connection location** are shared with any other **customer**,—

then—

(c) **Transpower** will estimate (acting reasonably but otherwise in its sole discretion) the **customer's** likely **offtake** or **injection** at the second **connection** location from the date on which the new **assets** are **connected** at the first **connection** location ("load transfer date") until those assets have been **connected** to the **grid** for the whole of a **capacity measurement period** for a **pricing year**; and

(d) the **customer's monthly connection charges** at the second **connection** will be recalculated from the load transfer date. When recalculating the **customer's monthly connection charges** from the load transfer date, any **injection** and/or **offtake** prior to the load transfer date used to calculate the **customer's AMD** and/or **AMI** at the second **connection** location will be capped at **Transpower's** estimates in accordance with subclause (6)(a); and

(e) if the load transfer date occurs part way through a month, the **customer's monthly connection charges** at the second **connection** location for that month will be the sum of:

(i) a pro-rata proportion of the **customer's monthly connection charges** at the second **connection** location immediately before the load transfer date, based on the number of days in the month prior to the load transfer date; and

(ii) a pro-rata proportion of the **customer's** monthly **connection** charges at the second **connection location** recalculated in accordance with subclause (6)(e)~~b)~~, based on the number of days in the month including and subsequent to the load transfer date.

(8) If **Transpower** enhances or upgrades **connection assets** for a **connection location** under a **new investment contract** with a **customer** (a "NIC customer"), excluding NIC customers to whom subclause (5) applies,—

(a) if the enhancement or upgrade is commissioned part way through a **pricing year**, **monthly connection charges** at that **connection location** for the NIC customer will be recalculated from the date the enhanced or upgraded **connection assets** are commissioned to take into account those enhanced or upgraded **connection assets**; and

(b) if the **connection asset** enhancement or upgrade is commissioned part way through a month, the NIC **customer's monthly connection charge** for that month will be the recalculated **monthly connection charge** reduced by an amount, being a pro-rata proportion of the recalculated **monthly connection charge** for the number of days in the month before commissioning of the enhancement or upgrade.

(9) If under this clause, **Transpower** estimates a **customer's** likely **offtake** or **injection** over any period, **Transpower** may, but is not obliged to, review its estimate from time to time, but not more frequently than at 3 monthly intervals. If **Transpower** revises its estimate, the **customer's**—

(a) **AMD**, **AMI**, **HAMI**, **SIMI** and **RCPD** quantities; and

(b) **monthly charges**—

will be recalculated accordingly and such recalculated **monthly charges** will be payable upon **Transpower** giving such notice as required in the relevant **transmission agreement** with the **customer**.

(10) If subclauses (6), (7) or (8) apply, or **Transpower** revises any estimate and **monthly grid charges** under subclause (9), there will be a wash-up and reconciliation at the end of the relevant **pricing year** of—

(a) **monthly connection charges** paid by—

(i) all **customers** at the **connection location**; and

(ii) all other **customers** at **connection locations** which share the same **connection assets**; and

(b) **monthly HVDC charges** paid by all **HVDC customers**,—

in each case, in that **pricing year** as follows:

(c) in the case of **monthly connection charges**, the wash-up and reconciliation is to be undertaken in respect of all charges calculated in accordance with clause 8(1) for each shared **connection asset**—

(i) using **AMD** or **AMI** for each **customer** as at the last day of the **pricing year** (including any **Transpower** estimate); and

(ii) so that the sum of the percentage proportions allocated to **customers** in accordance with clause 25(1) does not exceed 100% for any **connection asset** and so that **Transpower**, in turn, does not recover, in aggregate, more than 100% of the sum of the asset, maintenance, operating and overhead cost components calculated in accordance with clauses 8 to 26 for any **connection asset**:

(d) in the case of **monthly HVDC charges**, the wash-up and reconciliation is to be undertaken—

(i) using **HAMI** and **SIMI** for each **HVDC customer** as at the last day of the **pricing year**; and

(ii) so that the sum of all **monthly HVDC charges** paid by the **HVDC customer** for that **pricing year** does not exceed the **HVDC revenue** for that **pricing year**:

(e) **Transpower** will issue a credit note for any overpayment by a **customer** consequent upon the wash-up.

(11) If a prudent discount agreement commences part way through a **pricing year**, Transpower will recalculate the **customer's monthly charges** at the relevant **connection location**(s) consistently with the prudent discount agreement from the date the prudent discount agreement takes effect until it terminates or otherwise ceases to apply. If the prudent discount agreement commences part way through a month, the customer's **monthly charges** for that month will be the sum of—

(a) a pro-rata proportion of the **monthly charges** calculated in accordance with this **transmission pricing methodology** being the proportionate number of days in the month before the commencement of the prudent discount agreement; and

(b) a pro-rata proportion of the **monthly charges** calculated in accordance with the prudent discount agreement being the proportionate number of days in the month on and from commencement of the prudent discount agreement.

(12) Transpower must adjust a customer's **AMD, AMI, HAMI,** or **RCPD** at a **connection location** to minimise the impact of **reverse flow** at the **connection location** if—

(a) the **customer** has notified **Transpower** that there is **reverse flow** at the **connection location**; and

(b) **Transpower** agrees that there is **reverse flow** at the **connection location**.

(13) **Transpower** is not required to calculate **HAMI** quantities under this clause 34 for any **pricing year** after the **pricing year** 2019/2020.

Compare: Electricity Governance Rules 2003 clause 7 schedule F5 part F
Clause 34(5), (6) and (7): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

Transmission alternatives

35 Transmission Alternatives

(1) Charges for **transmission alternative** services will apply when **transmission alternative** services are provided and/or funded by **Transpower**. **Transmission alternative** services are services which substitute for the services provided by **connection assets** or **interconnection assets** or both.

(2) If a **transmission alternative** service substitutes for a service which would otherwise be provided by **connection assets**, a charge recovering **Transpower's** costs of funding that **transmission alternative** service is added to the **connection** charge(s) of the **customer(s)** for the relevant **connection location(s)**. The costs of the **transmission alternative** service are allocated between all **customers** at the relevant **connection locations(s)** in the same proportion that each **customer's** total **connection** charges for the relevant **connection location(s)** bears to the sum of all **customers' connection** charges for those **connection location(s)**.

(3) If a **transmission alternative** service substitutes for services which would otherwise be provided by **interconnection assets** a charge recovering the cost of the **transmission**

alternative service is allocated between **offtake customers** in the same proportion that each **offtake customer's** interconnection charges bears to the sum of all **offtake customers'** interconnection charges.

(4) If a **transmission alternative** service substitutes for both **connection assets** and **interconnection assets**, the allocation of the costs of the **transmission alternative service** as between **connection assets** and **interconnection assets** is made according to the rules set out in clause 25(2) for shared **connection assets** at an **interconnection node**.

(5) The costs of funding **transmission alternative** services will be charged to, and payable by, **customers** in the month following the month in which **Transpower** is invoiced for those costs.

Compare: Electricity Governance Rules 2003 clause 8 schedule F5 part F
Clause 35(2): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014.

Prudent Discount Policy

36 Purpose of the Prudent Discount Policy

(1) The purpose of the prudent discount policy is to help ensure that the **transmission pricing methodology** does not provide incentives for the uneconomic bypass of existing **grid assets**. The prudent discount policy aims to deter investment in **alternative projects** which would allow a **customer** to reduce its own transmission charges while increasing the total economic costs to the nation as a whole.

(2) In order for a **customer** to obtain a prudent discount a **customer's alternative project** must be—

(a) technically, operationally and commercially viable and have a reasonable prospect of being able to be successfully implemented; and

(b) uneconomic to implement given **Transpower's** economic costs of providing existing **grid assets** and the economic costs that would be incurred by the customer if it proceeded with the **alternative project**,—

determined in accordance with this prudent discount policy.

Compare: Electricity Governance Rules 2003 clauses 9.1 and 9.2 schedule F5 part F

37 Information Required in a Prudent Discount Application

(1) In order for an **alternative project** to be accepted by **Transpower** as a prudent discount application it must be developed to a level of detail equivalent to the detail that a prudent company Board would reasonably expect when considering an investment proposal.

(2) If a **customer** wishes to apply for a prudent discount, that **customer** must (at its own expense) submit to **Transpower** a written proposal describing the **alternative project** and the likely impact of that **alternative project** on that **customer's** transmission charges.

(3) The proposal must, to the extent relevant, contain all of the information described in Appendix C, together with any other information which is likely to be relevant to **Transpower's** consideration of the **alternative project**.

(4) Without limiting subclause (3) **Transpower** may require the **customer** to provide any additional information which **Transpower** considers is reasonably necessary to enable it to conduct its assessment of the **alternative project** in accordance with clauses 38 and 39.

Compare: Electricity Governance Rules 2003 clauses 9.3 to 9.6 schedule F5 part F

38 Assessment of Technical, Operational and Commercial Viability of Alternative Project

(1) **Transpower** will, within a reasonable time of receiving the proposal, assess the **alternative project** to determine whether or not—

(a) it is technically feasible; and

(b) it is operationally feasible and compliant with the **asset owner performance obligations** and **technical codes**, and any other relevant requirements as set out in Part 8 of this Code; and

(c) the **alternative project** could reasonably be expected to provide the **customer** with transmission charges that would result in a lower overall commercial cost having regard to the capital, operating, maintenance and all other costs likely to be incurred by the **customer** as a result of undertaking the **alternative project** to the **customer** than the current **Transpower** charges, for the same or a similar level of service.

(2) In undertaking its assessment of the **alternative project**, **Transpower** may adjust any of the information provided by the **customer** to reflect **Transpower's** reasonable assessment of current market prices, good engineering practice and any consequential impacts of the **alternative project** on the **grid assets** and the **customer's** assets.

Compare: Electricity Governance Rules 2003 clauses 9.7 and 9.8 schedule F5 part F

39 Assessment that the Alternative Project is Uneconomic

(1) If **Transpower** considers that the **alternative project** does not satisfy one or more of the criteria specified in clause 38(1), no prudent discount will be provided.

(2) If **Transpower** considers that the **alternative project** satisfies all of the criteria specified in clause 38(1), **Transpower** will, within a reasonable time thereafter, assess the **alternative project** to determine whether or not it is uneconomic in accordance with subclauses (3) to (7).

(3) **Transpower** will calculate the present value of the estimated total costs of the **alternative project** including capital costs and operating and maintenance costs. **Transpower** may use the cost estimates provided by the **customer** or may reasonably adjust those costs to reflect current market prices, good engineering practice and consequential impacts of the **alternative project** on **grid assets** and the **customer's assets**.

(4) The discount rate used to undertake the calculations required by subclauses (3) to (7) must be a discount rate determined by the **Authority**, from time to time, or if the

Authority has not determined a discount rate, a discount rate of, or equivalent to, a pre-tax real rate of 7%. The calculations required by subclauses (3) to (7) will be carried out using a period of 15 years or the remaining life of the **grid assets** which the **alternative project** would bypass, whichever is the lesser.

(5) **Transpower** will then calculate the present values of—

(a) **Transpower's** costs of continuing to provide transmission services to the **customer** if the **alternative project** does not proceed, including operating and maintenance costs and planned future capital expenditure needed to maintain required service levels; and

(b) **Transpower's** costs of continuing to provide transmission services to the **customer** if the **alternative project** does proceed, including operating and maintenance costs and planned future capital expenditure needed to maintain required service levels.

(6) If the amount calculated under subclause (5)(a) minus the amount calculated under subclause (5)(b) is greater than the amount calculated under subclause (3), the **alternative project** will be determined to be economic and no discount will be provided.

(7) If the amount calculated under subclause (5)(a)minus the amount calculated under subclause (5)(b)is less than the amount calculated under subclause (3), the **alternative project** will be determined to be uneconomic.

Compare: Electricity Governance Rules 2003 clauses 9.9 to 9.15 schedule F5 part F

40 Independent Review

(1) The **customer** may, within 60 days of being notified of **Transpower's** decision to offer a prudent discount agreement or that no discount will be provided, request a review by an **independent expert** of any or all of the assessments undertaken by **Transpower** for the purposes of that decision.

(2) Within a reasonable time of being appointed, the **independent expert** is to report his or her findings to **Transpower** and the **customer**. The findings of the **independent expert** will be binding on **Transpower** and the **customer**. If the **independent expert** finds that the **customer's alternative project** is uneconomic and satisfies all the requirements of clause 38(1), the provisions of clause 41(1) will apply.

(3) The costs of the **independent expert** are to be met by the party requesting the review if the information or assessments reviewed are confirmed as reasonable; otherwise the costs will be met by the other party.

Compare: Electricity Governance Rules 2003 clauses 9.16 to 9.18 schedule F5 part F

41 Prudent Discount Agreement

(1) If the **customer's alternative project** is considered by **Transpower** to be uneconomic and to satisfy all the requirements of clause 38(1), **Transpower** will offer a prudent discount agreement to all **customers** that are directly affected by the proposal. The prudent discount agreement will provide for—

(a) the **customer** to pay to **Transpower** an annuity (the amount of which is to be specified in the prudent discount agreement) determined by reference to the

customer's cost of funding, maintaining and operating the **alternative project** over the duration of the prudent discount agreement, applying a commercial discount rate; and

(b) **Transpower** to calculate the **customer's** transmission charges in accordance with this **transmission pricing methodology** as if the **alternative project** had been implemented.

(2) The commencement date of a prudent discount agreement will take full account of the time that would reasonably be required for the **customer** to implement the **alternative project**.

(3) The duration of a prudent discount agreement will be the lesser of the remaining economic life of the **grid assets** that are affected by the agreement, or 15 years.

Compare: Electricity Governance Rules 2003 clauses 9.19 to 9.21 schedule F5 part F

42 Prudent Discount Details to be Published

(1) As soon as reasonably practicable after concluding a prudent discount agreement with a **customer**, **Transpower** must publish on its website the decision made, the analysis supporting that decision and the following information:

(a) the cost estimate used by **Transpower** in assessing the **alternative project** and the calculations undertaken by **Transpower** using those cost estimates:

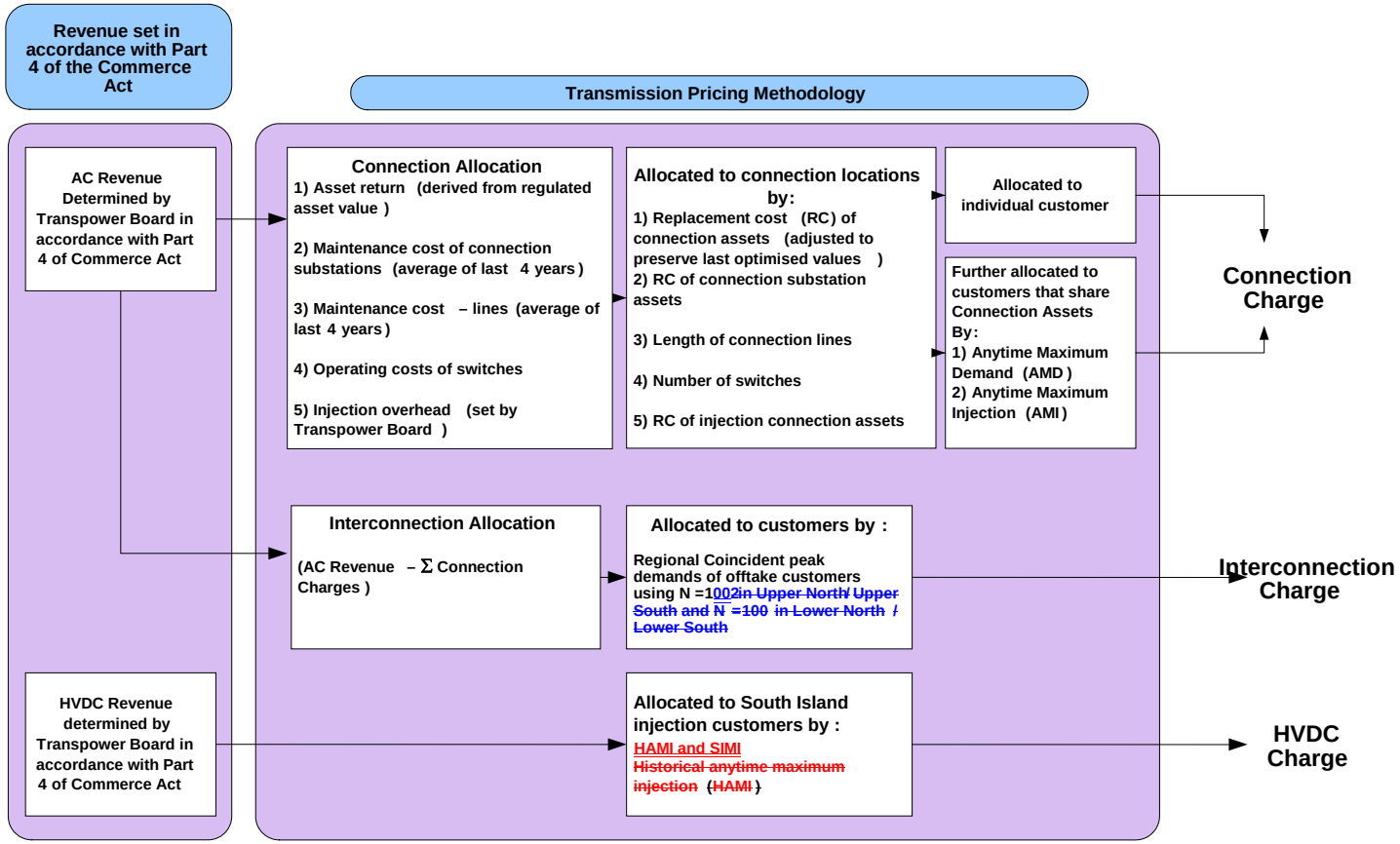
(b) any report prepared by an **independent expert**:

(c) the annual amount payable by the **customer** under clause 41(1)(a):

(d) details of how the **customer's** transmission charges will be calculated under clause 41(1)(b).

Compare: Electricity Governance Rules 2003 clause 9.22 schedule F5 part F

Appendix A – Allocation of Transpower's AC Revenue and HVDC Revenue to its Charges



Compare: Electricity Governance Rules 2003 appendix A schedule F5 part F

Appendix B
Regions

North Island

The Upper North Island (UNI) is all of the **connection locations** in ~~described in the Annual Planning Report (APR) as~~ "the geographical area north of Huntly, including Glenbrook, Takanini, Auckland and the Northern Isthmus".

~~The **connection locations** in the UNI region are:~~

~~**Code**~~	~~**Name**~~
~~ALB~~	~~Albany~~
~~BOB~~	~~Bombay~~
~~BRB~~	~~Bream Bay~~
~~DAR~~	~~Dargaville~~
~~GLN~~	~~Glenbrook~~
~~HEN~~	~~Henderson~~
~~HEP~~	~~Hepburn Rd~~
~~HLY~~	~~Huntly~~
~~KEN~~	~~Kensington~~
~~KOE~~	~~Kaikohe~~
~~KTA~~	~~Kaitaia~~
~~MDN~~	~~Marsden~~
~~MER~~	~~Meremere~~
~~MNG~~	~~Mangere~~
~~MPE~~	~~Maungatapere~~
~~MTO~~	~~Maungaturoto~~
~~OTA~~	~~Otahuhu~~
~~PAK~~	~~Pakuranga~~
~~PEN~~	~~Penrose~~
~~ROS~~	~~Mt Roskill~~
~~SVL~~	~~Silverdale~~
~~SWN~~	~~Southdown~~
~~TAK~~	~~Takanini~~
~~TWH~~	~~Te Kowhai~~
~~WEL~~	~~Wellsford~~
~~WES~~	~~Western Rd~~
~~WIR~~	~~Wiri~~

The remainder of the **connection locations** in the North Island are in the Lower North Island (LNI) region.

South Island

The Upper South Island (USI) is ~~defined in terms of~~ all of the **connection locations** in the geographical area that includes all GXPs supplied from the major concentration of generation in the Waitaki Valley and south of the Waitaki Valley. These GXPs are supplied by the 220kV system from Tekapo B, Twizel and Livingstone (refer Fig 5-19 in the APR).

~~The **connection locations** in the USI region are:~~

~~**Code**~~	~~**Name**~~
~~ABY~~	~~Albury~~
~~ADD~~	~~Addington~~
~~APS~~	~~Arthurs Pass~~
~~ARG~~	~~Argyle~~
~~ASB~~	~~Ashburton~~
~~ASY~~	~~Ashley~~
~~BLN~~	~~Blenheim~~
~~BRY~~	~~Bromley~~
~~CLH~~	~~Castle Hill~~
~~COB~~	~~Cobb~~
~~COL~~	~~Coleridge~~
~~CUL~~	~~Culverden~~
~~DOB~~	~~Dobson~~
~~GYM~~	~~Greymouth~~
~~HKK~~	~~Hokitika~~
~~HOR~~	~~Hororata~~
~~ISL~~	~~Islington~~
~~KAI~~	~~Kaiapoi~~
~~KIK~~	~~Kikiwa~~
~~KKA~~	~~Kaikoura~~
~~KUM~~	~~Kumara~~
~~MCH~~	~~Murchison~~
~~MOT~~	~~Motueka~~
~~MPI~~	~~Motupipi~~
~~ORO~~	~~Orowaiti~~
~~OTI~~	~~Otira~~
~~PAP~~	~~Papanui~~
~~RFT~~	~~Reefton~~
~~SBK~~	~~Southbrook~~
~~SPN~~	~~Springston~~
~~STK~~	~~Stoke~~
~~UTK~~	~~Upper Takaka~~
~~TIM~~	~~Timaru~~
~~TKA~~	~~Tekapo A~~
~~TMK~~	~~Temuka~~
~~WPR~~	~~Waipara~~
~~WPT~~	~~Westport~~

The remainder of the **connection locations** in the South Island are in the Lower South Island (LSI) region.

Compare: Electricity Governance Rules 2003 appendix B schedule F5 part F

Appendix C
Information Required to Support a Prudent Discount Application

General information

1. Location of the **alternative project**.
2. A brief description of the **alternative project**.
3. A sketch or schematic of the **alternative project**.

Part A: Information required to enable a technical evaluation of the proposal

(1) A report on the technical viability of the **alternative project**, provided by either the **customer**, or an external consultant on behalf of the **customer**. The report must include details of voltage quality, especially if there are switched capacitors and/or switched loads, such as motor starting, and information on the size of load, the size of any capacitors, the frequency of switching and the size of voltage steps.

(2) A circuit diagram.

(3) For a **customer** who operates a distribution network, a diagram of the **customer's** distribution network that is sufficiently detailed to run load-flow models. The network diagram should contain load distribution data, circuit parameters and the parameters of any embedded generation.

(4) A description of how the requirement for any additional physical space will be met. (When attaching to existing equipment, or to an existing facility, there may be a need for physical space for new equipment, e.g. a new circuit breaker bay or a **connection** point to a generator bus.)

(5) The following information, except if it is not applicable to the **alternative project**:

- Voltage (kV)
- Demand (peak MW/low MW)
- Conductor rating and type
- Circuit length (km) and type (single or double)
- Voltage support type and rating (VARs)
- Estimated losses (MW/km)
- Transformers: size (VA) and impedance (Ω)

Part B: Cost of the alternative project

The following information is required to enable independent validation of the **customer's** cost estimates. This information must be provided, except if it does not apply to the **alternative project**.

Capital cost (line)

(1) Conductor type, capital cost per metre, distance in metres and total estimated cost.

(2) Type of structures (poles or lattice towers), number of structures, capital cost per structure and total estimated cost.

(3) Type and number of insulators, capital cost per insulator and total estimated cost.

(4) The capital cost of line fittings.

(5) Any other capital costs of lines.

Capital cost (substation)

(1) The type and number of transformers, the capital cost per unit and the total estimated cost.
(2) The type and number of circuit breakers, the capital cost per unit and the total estimated cost.
(3) The type and number of disconnectors, the capital cost per unit and the total estimated cost.
(4) The type of protection and metering, the capital cost per unit and the total estimated cost.
(5) The type and capital cost of buswork.
(6) The type and capital cost of other infrastructure.
(7) Any other miscellaneous substation costs.

Labour cost

(1) Estimated labour costs.
(2) Estimated design and project management costs.

Cost of system losses

The estimated cost of the electrical line losses that would result if the alternative were implemented, specifically:

- Estimated additional losses in MW/km.
- Estimated additional losses per annum in MWh.
- The estimated average price of energy in $/MWh.
- Total estimated value of additional electrical losses per annum in dollars.

The cost of easements and consents

(1) A topographical map of the line route in sufficient detail to verify estimates of the costs of easements and consents, or to verify that easements and consents are not required.
(2) An estimate of consent costs.
(3) An estimate of easements costs.
(4) Estimate of property right costs.

Part C: Commercial evaluation

An analysis by the **customer** that provides a prima facie demonstration that the proposed **alternative project** would provide the **customer** with **Transpower** charges that would result in a lower overall commercial cost to the **customer** than the current **Transpower** charges, for the same or a similar level of service.

Part D: Legal matters

The implementation of some **alternative project** proposals will require the **customer** to enter into contractual agreements with third parties and to satisfy statutory requirements. In this

case, the **customer** must provide reasonable evidence that the **alternative project** would be able to be successfully implemented, including but not limited to—

(1) a report from appropriately qualified planning, legal and property consultants that demonstrates that all consents required to implement the **alternative project** are either held, or are reasonably likely to be obtained; and

(2) evidence of access, easement and other property rights required to implement the alternative project.

Compare: Electricity Governance Rules 2003 appendix C schedule F5 part F

Part A(4): amended, on 23 February 2015, by clause 75 of the Electricity Industry Participation Code Amendment (Distributed Generation) 2014