Appendix C.2

Distribution Low Voltage Connection Scheme Methodology

Proposed revisions to the access arrangement

1 February 2022

westernpower

Access Arrangement (AA) for the period
1 July 2023 to 30 June 2027

EDM 56956403

Distribution Low Voltage Connection Scheme Methodology

1 July 2023

Contents

1. Defined Terms and Interpretation

1.1 Defined Terms

In this methodology document the following terms are used and have the same meaning given to them or as given in the *contributions policy* or the *Code* (reproduced below for convenience).

"**applicant**" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "applicant" means "a person (who may be a user, a customer or a developer) who has lodged, or intends to lodge, a connection application, and includes a person who does so on behalf of another person".}

"**Code**" means the *Electricity Networks Access Code 2004* (as amended).

"connection application" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "connection application" means "an application lodged with Western Power under the *applications and queuing policy* that has the potential to require a modification to the *network".}*

"connection point" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "connection point" means "an *exit point* or an *entry point* or a bi-*directional point* identified or to be identified as such in an *access contract"*.}

"contribution" has the same meaning given to it in the *Code*, but also includes an *alternative option contribution*.

{Note: Under the *Code* "contribution" in relation to a *covered network*, means "*a capital contribution, a non-capital contribution or a headworks charge*".}

"contributions policy" has the same meaning given to it in the *Code*.

{Note: Under the *Code* "contributions policy" means "a policy in an access arrangement under section 5.1(h) dealing with *contributions* by *users*".}

"distribution low voltage connection scheme" means the scheme described in clause 6 of the *contributions policy*.

"distribution low voltage connection scheme application" has the same meaning given to "distribution low voltage connection headworks scheme application" in the *contributions policy*.

{Note: Under the *contributions policy* "distribution low voltage connection headworks scheme application" means a *connection application* where the proposed or existing *connection point* for a new or upgraded connection is to the *distribution system low voltage network* and is within 25 kms of the *relevant zone substation.*}

"distribution low voltage connection scheme base charge" has the same meaning given to "distribution low voltage connection headworks scheme base charge" in the *contributions policy*.

{Note: Under the *contributions policy* "distribution low voltage connection headworks scheme base charge" means the dollar value defined in section 6.3 of this *contributions policy*.}

"distribution low voltage connection scheme works" has the same meaning given to "distribution low voltage connection headworks scheme works" in the *contributions policy*.

{Note: Under the *contributions policy* "distribution low voltage connection headworks scheme works" with respect to a *distribution low voltage connection scheme application,* means *works* on the *distribution system* reasonably adjacent the *connection point* (to which the *distribution low voltage connection headworks scheme application* relates) that directly provides for delivery of electricity capacity to that *connection point* and that may include switchgear, *HV* cable, transformers, *low voltage* cable and equipment.}

"distribution system" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "distribution system" has the same meaning given to it in the *Code*, but excludes equipment within zone substations used for the transportation of electricity at nominal voltage of less than 66 kV.}

"forecast costs" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "forecast costs" means "any or all of the *forecast new facilities investment* or the forecast *alternative option costs*, as applicable, to be incurred by Western Power with regards to *works*".}

"headworks charge" has the same meaning given to it in the *Code*.

{Note: Under the *Code* "headworks charge" means, "in respect of a *headworks scheme*, means a payment made, or to be made, by a *user* under the *headworks scheme* in respect of a *connection point*".}

"headworks scheme" has the same meaning given to it in the *Code*.

{Note: Under the *Code* "headworks scheme" means "a scheme under section 5.17C".}

"load" has the same meaning given to it in the *Code*.

{Note: Under the *Code* "load" means "the amount of electrical power transferred out of a *network* at a *connection point* at a specified time".}

"low voltage" has the same meaning given to it in the *contributions policy*

{Note: Under the *Contributions Policy "low voltage"* means "the low voltage level of the distribution *network* where the voltage is less than 1 kV.}

"network" has the same meaning given to "Western Power Network" in the *Code*.

{Note: Under the *Code* "Western Power Network" means "the *covered network* that is *covered* under section 3.1". The "Western Power Network" is the portion of the SWIN that is owned by the Electricity Networks Corporation.}

"relevant distribution transformer" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "relevant distribution transformer" with respect to the *distribution low voltage connection scheme* means the transformer from which the new or upgraded *connection* will be supplied under normal system operating conditions.}

"relevant zone substation" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "relevant zone substation" means the zone substation to which the new or upgraded *connection* will be connected under normal system operating conditions.}

"SWIS" has the meaning given to it in the *Code*.

{Note: Under the *Code* "SWIS" has the same meaning as given to it in the *Electricity Industry Act 2004*, being "the interconnected transmission and distribution systems, generating works and associated works -

(a) located in the South West of the State and extending generally between Kalbarri, Albany and Kalgoorlie; and

(b) into which electricity is supplied by -

(i) one or more of the electricity generation plants at Kwinana, Muja, Collie and Pinjar; or

(ii) any prescribed electricity generation plant".}

"user" has the same meaning given to it in the *Code*.

{Note: Under the *Code* "user" means "a person, including a *generator* or a *consumer*, who is a party to a *contract for services* with a *service provider*, and under section 13.4(e) includes an *other business* as a party to a *deemed access contract*".}

"works" has the same meaning given to it in the *contributions policy*.

{Note: Under the *contributions policy* "works" includes "*headworks* and all *works* required to be undertaken to provide an *applicant* with the *covered services* sought by the *applicant* in a *connection application*".}

1.2 Interpretation

(a) Unless the contrary intention is apparent:

(i) a rule of interpretation in the *Code*; and

(ii) the Interpretation Act 1984,

apply to the interpretation of this methodology document.

(b) Unless:

(i) the *contrary* intention is apparent; or

(ii) the term has been redefined in clause 1.1 or in the *contributions policy*,

a term with a defined meaning in the *Code* has the same meaning in this methodology document.

2. Introduction

~~This document explains~~ Under section 5.17C of the *Code* (as set out in section 2.1 below*)* Western ~~Power's~~Power may approve a *contributions policy* that includes a *headworks scheme*.

Under section 5.17D(d) of the *Code* (as set out in section 2.1 below*)* the *headworks scheme* must set out the method for calculating the *headworks charge*.

The *distribution low voltage connection scheme* is a *headworks scheme* established in relation to distribution low voltage connection points.

This document explains the methodology used under the *distribution low voltage connection scheme* to determine the prices that may be applied under the *contributions policy*~~, as provided for under~~ and how the requirements of sections 5.~~17C and 5.17D of the *Code*. This *distribution low voltage connection scheme* complies with those *Code* provisions which apply to all *headworks schemes*~~17D(d) have been met in the Contributions Policy.

2.1 *Code* Requirements

The following *Code* provisions apply to a *headworks scheme*.

"5.17C Despite section 5.14, the *Authority* may approve a *contributions policy* that includes a "**headworks scheme**" which requires a *user* to make a payment to the *service provider* in respect of the *user's* capacity at a *connection point* on a *distribution system* because the *user* is a member of a class, whether or not there is any *required work* in respect of the *user*.

5.17D A *headworks* scheme must:

(a) identify the class of *works* in respect of which the scheme applies, which must not include any *works* on a *transmission system* or any *works* which effect a geographic extension of a *network*; and

(b) not seek to recover *headworks charges* in an *access arrangement period* which in aggregate exceed 5% of the *distribution system target revenue* for the *access arrangement* period; and

(c) identify the class of *users* who must make a payment under the scheme; and

(d) set out the method for calculating the *headworks charge*, which method:

(i) must have the objective that *headworks charges* under the *headworks scheme* will, in the long term, and when applied across all *users* in the class referred to in section 5.17D(c), recover no more than the *service provider's* costs (such as would be incurred by a *service provider efficiently minimising costs*) of any *headworks*; and

(ii) must have the objective that the *headworks charge* payable by one *user* will differ from that payable by another *user* as a result of material differences in the *users'* capacities and the locations of their *connection points*, unless the *Authority* considers that a different approach would better achieve the *Code objective*; and

(iii) may use estimates and forecasts (including long term estimates and forecasts) of *load*s and costs; and

(iv) must contain a mechanism designed to ensure that there is no double recovery of costs in all the circumstances, including the manner of calculation of other *contributions* and *tariffs*; and

(v) may exclude a rebate mechanism (of the type contemplated by clauses A4.13(d) or A4.14(c)(ii) of Appendix 4) and may exclude a mechanism for retrospective adjustments to account for the difference between forecast and actual values~~.~~.”

~~This methodology document explains how the requirements of sections 5.17D(d)(i), (ii) and (iii) have been met in the *contributions policy*.~~

2.2 *Code* Compliance of the Methodology with Section 5.17D (d)

With respect to section 5.17D(d)(i), the *distribution low voltage connection scheme* is designed to recover the *forecast costs* of *distribution low voltage connection scheme works*. The prices of the *distribution low voltage connection scheme* ~~are to~~will be reviewed at least once every 12 months to reflect ~~the~~Western Power's actual costs of the provision of *distribution low voltage connection scheme works* determined by reference to the costs incurred in the immediately preceding 36-month.

With respect to section 5.17D (d)(ii), the *distribution low voltage connection scheme* is designed such that the *contribution* for an *applicant* depends on their individual required electricity demand, and the point of the *network* to which they are connected. Consequently, *headworks charges* for each *applicant* will differ as a result of differences in ~~the *users'*~~each applicant's capacity requirements and the locations of their *connection point*s.

With respect to section 5.17D(d)(iii), the *distribution low voltage connection scheme* prices are based on estimates and forecasts (including long term estimates and forecasts) of *load*s and costs.

2.3 Overview of the *Distribution Low Voltage Connection Scheme*

(a) The *distribution low voltage connection scheme* and associated prices apply to the provision of *distribution low voltage connection scheme works* only. The class of *applicants* must have a proposed or existing *connection point* for a new or upgraded *connection* to *the distribution system low voltage network* which is within 25 kms of the *relevant zone substation.*

(b) The prices are in terms of $/kVA.

(c) The *distribution low voltage connection scheme* price that an *applicant* pays depends on their incremental capacity requirement and whether the location of the *connection point* is on the same, adjoining or nearby lot of land ~~lot separate from~~as the *relevant distribution transformer*.

3. Objectives of the *Distribution Low Voltage Connection Scheme*

This section sets out the objectives used in determining the ~~*Distribution Low Voltage Connection Scheme.*~~*distribution low voltage connection scheme*.

(a) The *distribution low voltage connection scheme* has been designed to meet the high-level objectives described below.

(i) Comply and be consistent with the regulatory framework;

(ii) Provide a method for allocating the costs of the provision of *distribution low voltage connection scheme works* in a fair and equitable manner;

(iii) Be as cost reflective as is reasonable to reflect the *network user's* utilisation of the *network* capacity;

(iv) Be as simple and straight forward as is reasonable taking into account other objectives; and

(v) Provide price stability and certainty to enable *network user*s to make informed investment decisions.

(b) The methodology must ensure *contributions* from the *distribution low voltage connection scheme* will, in the long term, recover no more than Western Power's costs of *distribution low voltage connection scheme works*.

4. Methodology Overview

This section provides an overview of the methodology used in determining the *distribution low voltage connection scheme* prices. ~~It is noted that the~~

The cost of the provision of electricity capacity at a particular location is a function of:

(a) the incremental capacity requirement sought by an *applicant*; and

(b) whether:

(i) the location of the *connection point* is on the same, adjoining or nearby lot of land~~lot~~ as the *relevant distribution transformer* (transformer direct connection); or

(ii) the *connection point* is supplied from the *low voltage* street *network* (street feed connection),

as determined by Western Power having regard to what is the most prudent and efficient *network* connection design.

On this basis, the approach taken to ~~develop~~determine the *distribution low voltage connection scheme* prices is as follows~~.~~:

(a) Western Power determines the actual costs of *distribution low voltage connection scheme works* for *connection* of *applicants* that meet the eligibility ~~criterion~~criteria for the *distribution low voltage connection scheme* ~~over a~~for the immediately preceding 36-month period ~~of 12 months~~.

(b) The actual costs of *distribution low voltage connection scheme works* are determined ~~under (a) have been allocated~~with regard to ~~categories as follows~~the following:

(i) whether the incremental capacity requirement at the *connection point* determined under clause 6.3 (a) of the *contributions policy* is:

- less than 216 kVA; or
- between 216 kVA and 630 kVA; or
- greater than 630 kVA, and

(ii) whether:

(A) the location of the *connection point* is on the same, adjoining or nearby lot of land~~lot~~ as the *relevant distribution transformer* (transformer direct connection); or

(B) the *connection point* is supplied from the *low voltage* street *network* (street feed connection),

as determined by Western Power having regard to what is the most prudent and efficient *network* connection design.

(c) From the costs of *distribution low voltage connection scheme work* and the incremental capacity requirement associated with the categories defined in paragraph (b) above, the total costs of supply for each tranche can be determined in terms of $ per kVA.

(d) The price structure and prices are then derived to reflect the average costs ~~derived~~determined under (a) and (b) above. Prices are expressed in a block structure that provides for a continuous price path. Note that there is a separate price path for a *connection point* on the same, adjoining or nearby lot of land~~lot~~ as the *relevant distribution transformer* to those with a *connection point* supplied from the *low voltage* street *network*.

5. Methodology Detail

This section provides additional detail with respect to the price determination process.

5.1 Price Tranche Thresholds

At least once every 12 months, Western Power ~~develops~~will develop standard *distribution low voltage connection scheme* prices based on modelling of *connections* over the ~~past 12~~ immediately preceding 36-month period.

Costs per unit of capacity (kVA) reduce as ~~the~~ demand increases due to economies of scale~~. Those economies reflect~~ based on the following factors:

- fixed costs including cable trenching, reinstatement, traffic management, mobilisation costs and installation costs are incurred regardless of capacity supplied;
- increased utilisation of installed assets; and
- reduction in the per unit cost of transformers in terms of dollars per kVA of capacity. (transformers are purchased in standard sizes, typically 315 kVA, 630 kVA and 1000 kVA and on a per kVA basis the costs of these transformers reduce significantly as ~~the~~their size increases).

In order for these economies of scale to be recognised in the pricing structure, tranche thresholds are set that reflect both the cost of plant and the nature of the *network* required to provide the requested capacities.

For example, in general customers seeking less than 216 kVA are supplied from the *low voltage* street *network*, customers seeking demand between 216 kVA and 630 kVA require installation of a new transformer and may require ~~that~~the transformer to be installed on their lot, and in almost all circumstances customers seeking *load*s in excess of 630 kVA will require direct connection to a new transformer on their lot. ~~Consequently the thresholds identified are:~~

Consequently, the tranche thresholds are as follows:

(a) Tranche 1 - less than 216 kVA of incremental capacity requirement*;*

(b) Tranche 2 - between 216 kVA and 630 kVA of incremental capacity requirement; and

(c) Tranche 3 - greater than 630 kVA of incremental capacity requirement.

5.2 Price Setting

Prices are set within each tranche to ~~only~~ recover Western Power's costs over the long term, when applied across all *distribution low voltage connection scheme applicant*s.

5.3 Separate Prices for Transformer Direct Connection and L*ow Voltage* Street Connection

Direct connection to transformers avoids the cost of connection to the *low voltage* street *network*~~ and as such~~. Therefore, the prices for these connections reflect this lower cost. Connection to the *low voltage* street *network* involves increased cost and consequently separate prices are put in place.

The difference between the two sets of prices is based on the average cost of the *low voltage* street *network*. The price tranches are applied to both *relevant distribution transformer* direct connections and *low voltage* street *network* connections.

5.4 Price Structure

Two sets of prices are provided in block structure that reflects the separate price tranches for direct transformer connections and *low voltage* street *network* connections. Prices are illustrative only. Actual prices will be published on Western Power's website as detailed in this document.

Table 5.1: Price Structure

	Load tranche for incremental capacity	Fixed price	Variable price for incremental kVA in excess of tranche lower threshold
Direct transformer connection	0 to 216 kVA	$0	$500/kVA
Direct transformer connection	216 to 630 kVA	$108,000	$250/kVA
Direct transformer connection	Greater than 630 kVA	$211,500	$125/kVA
Low voltage street connection	0 to 216 kVA	$0	$600/kVA
Low voltage street connection	216 to 630 kVA	$129,600	$350/kVA

6. Exclusion

A *distribution low voltage connection scheme application* is excluded from the provisions of the *distribution low voltage connection scheme* where the *distribution low voltage connection scheme base charge* plus the exclusion threshold is less than the *forecast costs* of *works* as determined under clause 5.4 of the *contributions policy*.

The methodology for determining the exclusion threshold is as follows:

(a) For all *works* in the *last* ~~*twelve*~~*12 months* Western Power will:

  (i) determine the amount of the *forecast costs* of the *works* applied to the *applicants* as per section 5.4 of the *contributions policy*; and

  (ii) subtract from the amount in section (a) the *distribution low voltage connection scheme base charge*.

(b) The exclusion threshold is equal to two standard deviations of all instances where the value in section (ii) is positive.

Western Power will publish the amount of the exclusion threshold as detailed in this document.

7. Publishing and Review of Prices and Exclusion Threshold

Western Power publishes the *distribution low voltage connection scheme* prices as a price list and the exclusion threshold on its website. The price list is as illustrated in section 5.4.

Prices and the exclusion threshold will be reviewed ~~periodically~~at least once every 12 months to reflect changes in the cost of provision of *network* assets. Any adjustments will apply for a minimum of six months.