

Guidelines for Metering, Reconciliation, and Registry Arrangements for Secondary Networks

Version 8.2

Version control

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7.0	December 2007	Guideline name changed to “Guidelines for Metering, Reconciliation, and Registry Arrangements for Secondary Networks” and released for consultation.
7.2	13 May 2008	Commission Board approved guidelines.
8.0	26 Nov 2009	Updated into the Commission’s new format. Minor amendments, including: • insertion of rule references; • use of the new term ‘participant identifier’; • clarification that an embedded network owner also has responsibilities as a distributor and a certified reconciliation participant; and • other minor clarifications.
8.1	1 November 2010	Updated for transition to Electricity Authority.
8.2	December 2013	Updated for new Part 10 effective 29 August 2013

Disclaimer

The guidelines for metering, reconciliation, and registry arrangements for secondary networks (Guidelines) have been produced to promote understanding of the issues associated with embedded networks, as well as outline participants' obligations in situations where customers are able to switch between traders.

These Guidelines do not form part of the Code. They are provided for general information only and not as legal advice, and do not establish any legal obligation in themselves.

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The publishing of these Guidelines do not place any obligation on the Authority to follow any interpretation contained in them when carrying out any of its functions under the Electricity Industry Act 2010 (Act), or the Code.

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
GXP	Grid exit point
HH	Half hour
ICP	Installation control point
MEP	Metering equipment provider
Meter	Metering installation certified in accordance with the Code
MUoSA	Model Use of System Agreement
NHH	Non half hour
NSP	Network supply point
Residual volume trader	For the purposes of these Guidelines, the reconciliation participant that is responsible for the residual volume will be referred to as the 'residual volume trader'.
RM	Reconciliation manager
Trader	Buyer from or seller to the clearing manager
UFE	Unaccounted for electricity
UML	Unmetered load

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Introduction

1. To ensure energy purchases and line charges are allocated equitably to participants, the reconciliation of secondary networks must fit within the Code which governs electricity trading in New Zealand. This document describes the criteria necessary to ensure that this occurs, and needs to be read in conjunction with the Code, which is binding on traders and distributors, including secondary network owners.
2. These guidelines are intended to be advisory and are not legally binding. In line with its objective to persuade and promote rather than regulate, the Electricity Authority (Authority) recommends that these Guidelines be followed.
3. These Guidelines set out requirements relating to secondary networks. If the reader is interested in establishing an embedded network, customer network, or network extension they should contact the Authority to get further information on the relevant requirements.

Purpose

4. The purpose of these Guidelines is to:
 - (a) assist participants to manage their obligations under the Code relating to the metering, reconciliation, and registry requirements as they pertain to secondary networks; and
 - (b) assist participants with management of the appropriate allocation of line charges.

Secondary network types

5. There are many different types of networks. Distribution networks connected to Transpower's transmission grid are referred to in the Code (and therefore this document) as local networks. These local networks enable electricity to be transported to consumers who are connected to that distribution network.
6. In addition to local networks, there are networks that are connected to other networks. These networks are termed secondary networks, and will be one of the following:
 - (a) customer networks (section I);
 - (b) network extensions (section II); or
 - (c) embedded networks (section III).
7. The network that a secondary network is connected to is called the 'parent' network. This may be a local network or another secondary network, but is always the network that is closest electrically to the grid.
8. Secondary networks normally have a different owner and do have specific requirements to fit into the reconciliation and settlement process specified within the Code. Most secondary networks are extensions to a grid connected local networks, however secondary networks may also be connected to other secondary networks. Secondary networks may also have separate contractual arrangements to cover network operations and line charges. Appendix 2 has further explanation on network charging.
9. The Model Use of System Agreement (MUoSA) exists on the Authority's website for participants to use. The MUoSA Interposed is a document that sets out model distribution arrangements between the trader and the distributor. It covers commitments, payment obligations, operational requirements, and the rights of each party. This model contract presumes that the relationship with the consumer is through the trader.
10. Where one secondary network is supplied from another secondary network the same principles and processes apply, but for simplicity these Guidelines do not specifically refer to such situations.
11. The only secondary networks that require unique network supply point (NSP) codes to be allocated are embedded networks. The connection point between a parent network and an embedded network, and/or between two embedded networks, is known as an NSP. The NSP code for the installation control points (ICP) within a network extension and the single ICP for a customer network will be the NSP of the relevant parent network.

12. There are specific requirements that must be met by:
- (a) the secondary network owner/operator;
 - (b) the traders that want to supply electricity to the consumers on a secondary network;
 - (c) in the case of an embedded network, the residual volume trader¹ at the gateway meter ; and
 - (d) the parent network owner.
13. In order for a consumer on a customer network to switch traders, the customer network owner and the parent network owner must agree to the arrangements. Where the conditions can not be met for any of the reconciliation and settlement methods described, consumers connected to a customer network do not have a choice of trader and the network will remain a customer network, i.e. as a single consumer.

¹ For the purposes of these Guidelines, the reconciliation participant that is responsible for the residual volume will be referred to as the 'residual volume trader'.

Section I: Customer networks

14. A customer network is an electricity distribution network that is owned by someone other than the parent network owner, where consumers connected to it are not switchable and therefore have no choice of trader. A customer network is no different from a standard ICP for the purpose of the Code, and from the perspective of a parent network.

Characteristics of a customer network

15. The principal characteristic of a customer network is that there is one ICP connected to the parent network, and the consumer associated with that ICP is responsible for billing all other consumers connected to the customer network, for their electricity consumption.
16. This occurs when one of the following is true:
- (a) the customer network owner will not allow switching; or
 - (b) ICPs have not been allocated to individual consumer installations.

Example of a customer network

17. A typical example of a customer network is where a shopping mall owner elects to purchase all the electricity consumed throughout the mall complex from one trader at the point of connection of the mall to the parent network. The mall owner then recovers this cost from its tenants individually in accordance with whatever arrangements may have been agreed between the mall owner and each tenant.

Conversion to other network type

18. A customer network can be converted to a network extension or an embedded network to allow customers a choice of trader. This can occur in two ways:
- (a) for a network extension, the parent network owner, that the secondary network is connected to, must agree to manage the registry function for the ICPs; or
 - (b) for an embedded network, the customer network owner must accept the responsibilities of an embedded network owner (see paragraph 48) and initiate the appropriate requests to comply with the registry, metering, reconciliation, and settlement obligations in the Code.

Further development

19. Additional detail defining processes relating to customer networks will be developed.

Section II: Network extensions

20. A network extension is an electricity distribution network that is owned by someone other than the parent network owner, where consumers have ICPs allocated and managed by the parent network owner, and the electricity traded is reconciled at the NSP for the parent network at the grid exit point (GXP). Consumers connected to them are switchable and therefore have a choice of trader.

Characteristics of a network extension

21. The principal characteristics of a network extension are:
- (a) consumers have a choice of trader; and
 - (b) there is no subtractive metering process required to establish the electricity consumed by any individual consumer.
22. A network extension exists when all of the following are true:
- (a) all consumer meters are compliant with the Code²;
 - (b) all installations are allocated an ICP on the registry by the parent network owner³;
 - (c) ICPs on the network extension are managed by the parent network owner and are treated as if they were on the parent network;
 - (d) any unmetered load (UML) is treated in accordance with the requirements for UML in Parts 11 and 15 of the Code and the Unmetered Load Management Guidelines on the Authority's website⁴;
 - (e) in respect of line charges, either:
 - (i) the parent network owner imposes, and traders collect, line charges in respect of each ICP on the network extension directly or through 'GXP charges'; or
 - (ii) a meter at the point of connection with the parent network (the meter is the responsibility of the network extension owner) is used for line charge purposes only, and the parent network owner charges the owner of the network extension in bulk, based on the consumption information from this meter. The network extension owner then recovers the line charges directly from the consumers, while electricity reconciliation and settlement will be via consumer metering information adjusted for losses back to the GXP. In this case, the distributor price category in the registry for the network

² Clause 26 of Schedule 10.7 of the Code.

³ Clause 1 of Schedule 11.1 of the Code.

⁴ <http://www.ea.govt.nz/act-code-regs/code-regs/guidelines/market-guidelines/>

extension ICPs must be coded as 'ZERO', and, unless otherwise agreed, no line charge needs to be invoiced by the trader.

Example of a network extension

23. A typical example of a network extension (as in (e)(i) above) is a shopping mall where the parent network owner has allocated ICPs to each tenant. Each tenant then pays their electricity trader of choice for electricity consumed plus line charges – exactly the same as if the tenant was directly connected to the parent network.
24. An alternative example (as in (e)(ii) above) would be a shopping mall where the parent network owner has allocated ICPs to each tenant and each tenant pays their electricity trader of choice for the electricity consumed, as above. However, in this case, the parent network owner charges the mall owner in bulk for line services to the point of connection between the parent network and mall, and the mall owner then recovers this cost from its tenants individually, in accordance with arrangements between the mall owner and each tenant.
25. In both these examples, the parent network owner will maintain all the relevant registry fields and populate the loss factor table in the registry with the appropriate loss factors to apply for each loss category code to enable the metered consumption to be adjusted for losses to an equivalent consumption at the GXP.

Further development

26. Additional detail defining processes relating to network extensions will be developed. It is suggested that the creation of ICPs and the transfer from network extension to other secondary networks are dealt with on an individual basis between the network owners and traders where relevant.

Section III: Embedded networks

27. Part 1 of the Code defines an embedded network as:

embedded network means a system of lines, substations and other works used primarily for the conveyance of **electricity** between two points (point A and point B), where:

- (a) point A is a point of connection with either a local network or another embedded network; and
 - (b) point B is a point of connection with a consumer, an embedded generating station, or both; and
 - (c) the electricity flow at point A is quantified by a metering installation in accordance with Part 10
28. This means an embedded network is an electricity distribution network that is owned by someone other than the parent network owner, where consumers have ICPs allocated and managed by the embedded network owner acting as the distributor for that network (or another distributor appointed for that purpose), and the electricity traded is reconciled at the point of connection between the embedded network and the parent network, by the embedded network owner who must be certified as a reconciliation participant.
29. A feature of embedded networks, as distinct from customer networks and network extensions, is that the electricity purchases of at least one party may be determined by a subtractive process. That party would be the reconciliation participant that is responsible for the purchase of residual volume for the embedded network. Consumers with ICPs for that point of connection are switchable and therefore have a choice of trader.
30. Embedded network owners are participants because they are 'line owners' as defined in the Code. This means that all embedded network owners must register with the Authority as a participant and comply with all other obligations placed on participants in the Act and the Code. The Authority's website contains further information on participant registration and becoming a participant.⁵:

Characteristics of an embedded network

31. The principal characteristics of an embedded network include:

- (a) consumers have a choice of trader, subject to the necessary conveyance agreement in place between the trader and the embedded network owner; and
- (b) the network is not directly connected to the grid.

⁵ <http://www.ea.govt.nz/act-code-regis/participant-register/>

32. An embedded network exists when all of the following are true:
- (a) all consumers, that are switchable, are allocated an ICP on the registry by the embedded network owner (or its agent), and these ICPs are managed in accordance with the Code⁶;
 - (b) the embedded network owner has had an NSP created for the point of connection between that embedded network and either:
 - (i) the local network; or
 - (ii) another embedded network.
 - (c) all ICPs on the embedded network refer to this NSP in the registry;
 - (d) the parent network owner has established loss factors for each of the NSPs connected to its network, and has included these with the loss category codes and loss factors published in the loss factor table on the registry; and
 - (e) the parent network owner has had an ICP identifier⁷ (distributor-only ICP) created for the point of connection to the embedded network. This ICP is to have a reconciliation type of LE, a price category code, and a loss category code that will represent the losses assigned by the parent network owner between the point of connection of the embedded network, and the parent NSP to that embedded network.
33. In the case that all of paragraph 32 is true, the following applies:
- (a) there is a Code compliant half hour (HH) meter at the embedded network NSP;
 - (b) for the purposes of clearing and settlement, the embedded network owner (as a reconciliation participant), or its agent, has obtained the appropriate certification under the Code for collection and submission of information to the reconciliation manager (RM) for the NSP HH metered volumes in accordance with the Code;⁸
 - (c) the embedded network owner (as a distributor) has established loss factors for ICPs within the embedded network, has published these in the loss factor table on the registry, and populated the loss category code against each ICP within the embedded network on the registry;⁹ and
 - (d) any UML is managed within the registry¹⁰.

⁶ Part 11 of the Code.

⁷ Clause 1 of Schedule 11.1 of the Code.

⁸ Certification requirements can be found in clause 15.38 of the Code. The *Information paper for reconciliation participants and distributors audit and certification requirements* can be found at <http://www.ea.govt.nz/act-code-regs/code-regs/guidelines/market-guidelines>.

⁹ Loss factor and loss category maintenance can be found in clauses 21 and 22 of Schedule 11.1 of the Code.

¹⁰ Clause 7(m) of Schedule 11.1 of the Code.

34. One of the fundamental premises of the Code as it relates to clearing and settlement is that metering information will be adjusted for network losses to produce equivalent metering information at the GXP. Therefore, embedded network loss factors and parent network loss factors will be applied by the RM to the consumption information for ICPs connected to an embedded network. The overall loss factor will be the product of the embedded network loss factor and the parent network(s) loss factor.
35. The submission files provided to the RM in respect of ICPs on the embedded network must refer to the embedded network NSP, must not be loss adjusted, and must be submitted in accordance with the Code and the requirements of the RM.
36. The RM will apply losses to HH consumption information submitted by the embedded network owner.
37. The RM will apply losses to non half hour (NHH) consumption information submitted by the trader.
38. In order to facilitate the application of losses by the RM, the embedded network owner (as a distributor), or its contractor¹¹, must maintain the loss category code assigned to each ICP, and populate the loss factor table on the registry.¹²

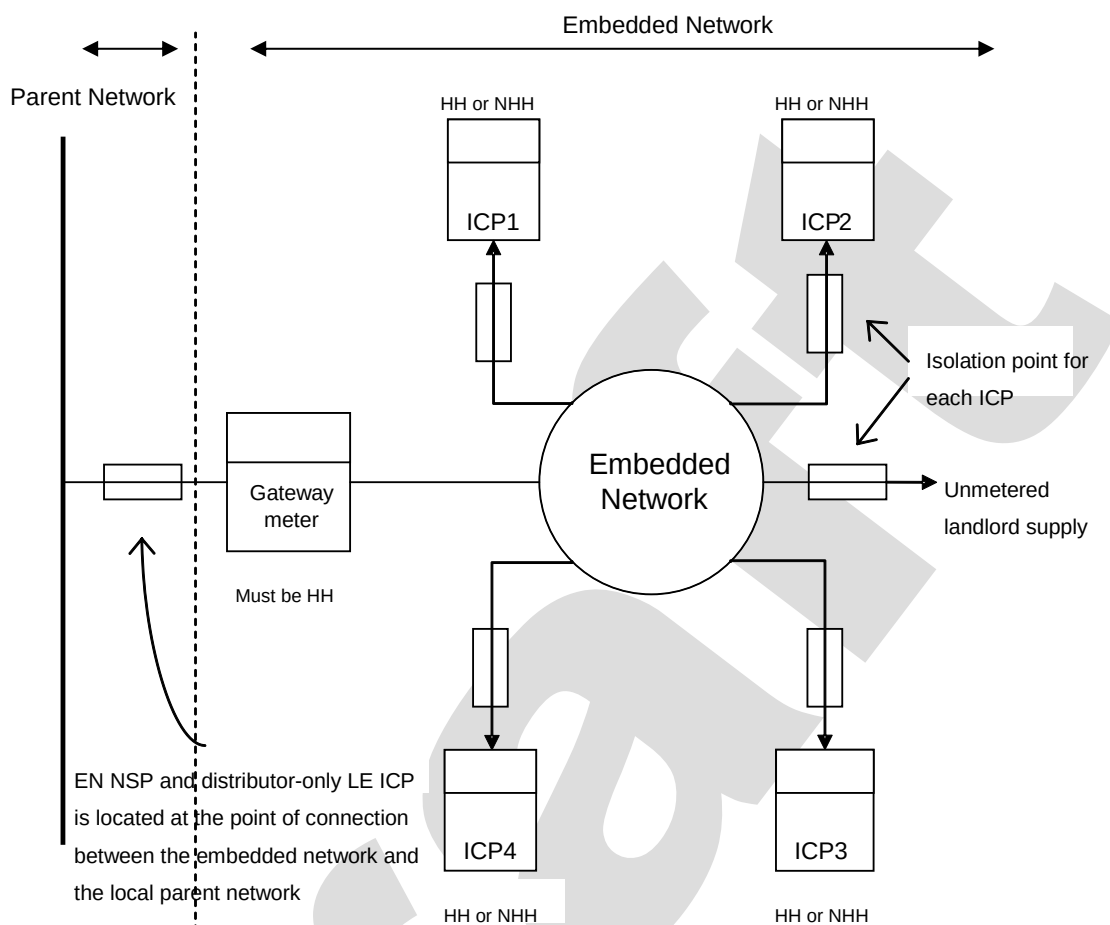
Example of an embedded network

39. A typical example of an embedded network is a shopping mall where the embedded network owner, or its contractor, has allocated ICPs to each tenant, which refer to the embedded network NSP in the registry. Each tenant pays their trader of choice for the electricity consumed, plus line charges as imposed by the embedded network owner to cover both parent network and embedded network line charges. A further example is attached as Appendix 1 to these Guidelines. The following is a diagram of a reconciled embedded network.

¹¹ Clause 11.2A notes the requirements for the use of contractors by participants.

¹² Clauses 21 and 22 of Schedule 11.1 of the Code.

Figure 1: Reconciled embedded network diagram



40. Note that an ICP identifier must also be assigned to the point of connection to the parent network (embedded network NSP). This is a distributor-only ICP with reconciliation type LE and should have a dedicated status if it is on a balancing area with more than 1 NSP located within it.¹³ See Table 1 for a complete list of reconciliation types.
41. The section below summarises each party's responsibilities for trading on an embedded network. These Guidelines are not intended to make the formation of an embedded network difficult, but to arrange equitable settlement of energy through the reconciliation process.

¹³ Clause 7(1) of Schedule 11.1 of the Code.

Reconciliation of electricity volumes within an embedded network

42. Embedded networks can be settled in two different manners:
- (a) as differencing reconciliation; or
 - (b) as global reconciliation (as occurs on local networks).
43. The method used, is at the discretion of the embedded network owner; however, agreement needs to be reached with a nominated certified reconciliation participant (the residual volume trader) if the embedded network is to be reconciled by difference.¹⁴

Differencing reconciliation

44. Differencing reconciliation is where a subtractive process is used to determine the difference between the gateway metered load and the loss adjusted volume information of reconciliation participants trading within the embedded network. The resultant difference volume is referred to as the 'residual load volume'. This volume is determined within the reconciliation process and is allocated to the residual volume trader.
45. Requirements for differencing reconciliation include:
- (a) the embedded network owner must create an ICP on the embedded network that is to represent the residual load. This ICP is to have a reconciliation type of 'SB' and indicates that the results are calculated by subtraction;
 - (b) a certified reconciliation participant must have accepted the role of being the residual volume trader and will have its electricity purchases calculated based on the difference between the embedded network NSP meter consumption (unaccounted for electricity (UFE) adjusted for an allocation from the parent network), and the sum of loss adjusted ICP meters' consumption;
 - (c) one ICP (designated SB) on the embedded network (as designated by the relevant trader in its submission file) will have its volume information calculated by difference by the RM. This is the residual volume on the embedded network;
 - (d) the residual volume trader is to purchase the balance load at the embedded network NSP, after independently retailed ICPs are removed in the reconciliation process from the NSP total load. The balance of the load is made up of ICPs traded by the residual volume trader, UML, loss factor accuracy, parent network UFE, and reconciliation variations by independent traders due to forward estimates for both the initial reconciliation round, and any changes that may occur within subsequent revision reconciliations;

¹⁴ Clause 3 of Schedule 15.4 of the Code.

- (e) ICPs at all tradable points of connection must either be metered in accordance with the Code, or have a UML process also in accordance with the Code;¹⁵
- (f) reconciliation participants trading on the embedded network are required to submit information in accordance with the Code, as if they were trading on a local network;
- (g) the embedded network is not subject to balancing as described within Schedule 15.4 of the Code. Volumes for reconciliation participant submissions are calculated by applying the appropriate loss factors to the submission information; and
- (h) the embedded network will receive a share of any UFE assigned to the point of connection with the parent network and this will be allocated to each ICP within the embedded network including the residual volume ICP.

Global reconciliation

- 46. Global reconciliation occurs when all traders are independent traders and there is no residual volume load at the embedded network NSP. Any balance of load is allocated to all traders as UFE, in proportion to the volume of energy traded. In this instance the embedded network is treated the same as a local network.
- 47. Requirements for global reconciliation include:
 - (a) all points of connection must have ICPs, and either be metered in accordance with the Code, or have a UML process also in accordance with the Code;¹⁶
 - (b) all points of connection to the embedded network must have a reconciliation participant associated with that ICP before they can become active;
 - (c) reconciliation participants trading on the embedded network are required to submit information in accordance with the Code as if they were trading on a local network;
 - (d) the embedded network is subject to balancing as described within Schedule 15.4 of the Code; and
 - (e) the embedded network will receive a share of any UFE assigned by the RM to points of connection within the parent network. The RM will allocate both this UFE and any internal embedded network UFE to ICPs within the embedded network.

¹⁵ Clause 10.14 of the Code.

¹⁶ Clause 10.14 of the Code.

Embedded network owner/distributor's responsibilities

48. It is the responsibility of the embedded network owner/distributor to comply with the Code, and:
- (a) agree connection terms and conditions with the parent network owner;
 - (b) where the embedded network is being settled using the differencing methodology, contract a certified reconciliation participant (residual volume trader) to purchase the residual volume load for both the initial reconciliation cycle and any changes that may occur with subsequent revision cycles;
 - (c) meet the compliance costs of operating the embedded network. These costs include:
 - (i) NSP metering and provision of HH gateway metering data at the embedded network NSP to the RM;
 - (ii) NSP establishment fees;
 - (iii) the provision of information to assist with UML management;
 - (iv) compliance with audit requirements¹⁷, which will consist of either an audit of the embedded network owner, or provision of the audit results of the embedded network owner's agent; and
 - (v) the costs of managing the registry function;
 - (d) at least one month before a customer network is to be converted to an embedded network, inform the trader responsible for the ICP at the point of connection between the parent network and embedded network of the change in status (see paragraph 61 for further information);
 - (e) at least one month before a section of a local network or a network extension is to be converted to an embedded network inform all traders and metering equipment owners trading on the section of the network or within the network extension and put agreements in place prior to the embedded network NSP being created (see paragraph 61 for further information);
 - (f) if the embedded network is to be reconciled by difference:
 - (i) ensure that an ICP is created for residual volumes on the embedded network, which points to the embedded network NSP, has a reconciliation type SB, a meter type of UML, and a profile code of DFP¹⁸;
 - (ii) ensure the relevant residual volume trader updates the ICP in the registry;

¹⁷ Distributor audit requirements are under clause 11.10 of the Code. Reconciliation participant audit requirements are under clause 15.37 of the Code.

¹⁸ Clause 13(4) of Schedule 15.5 of the Code

- (iii) the residual volume trader must make a '0' submission within its NHH submission file to the RM, with a reconciliation type of SB in accordance with the Code. These attributes signify that the RM calculates the residual volume for the residual ICP by difference and allocates a proportion of the embedded network share of the parent network UFE to this residual volume. The registry field section sets out the key registry attributes for the ICP;
- (g) arrange for an NSP code for the embedded network for each point of connection at a different parent NSP to be created and notified to affected parties in accordance with the Code¹⁹. Note that where an embedded network is connected to two parent networks, this should in fact be two separate embedded networks;
- (h) advise the parent network owner of the date the embedded network is to be made active and separately reconciled so that the parent network owner can decommission the old ICP and create a new distributor-only ICP with the reconciliation type of LE. This ICP may contain a reference to the decommissioned ICP to allow records to be traced;
- (i) provide the parent network owner with sufficient description of the expected connections that will be part of the embedded network (e.g. street names that will form the embedded network or a commercial building name);
- (j) ensure that a Code-compliant HH meter is provided at the NSP²⁰;
- (k) for the purposes of clearing and settlement, arrange for embedded network NSP HH metered volumes to be delivered to the RM each month in the prescribed format, in accordance with the Code. If there is more than one physical meter at the NSP, the separate meter registers must be aggregated for each trading period. Note that this activity does require the embedded network owner to become a certified reconciliation participant under the Code;²¹
- (l) maintain relevant information and advise the reconciliation participants trading within the embedded network about UML on the embedded network in accordance with the Code;
- (m) allocate ICPs to points of connection:
 - (i) that can be switched between traders when the differencing reconciliation method is being used and also to the residual volume; or
 - (ii) for all points of connection when the global reconciliation method is being used;

¹⁹ Clause 11.8 of the Code

²⁰ Clause 10.25 of the Code

²¹ Clause 15.38 of the Code. An *Information paper for reconciliation participants and distributors audit and certification requirements* can be found at: <http://www.ea.govt.nz/act-code-regs/code-regs/guidelines/market-guidelines>

- (n) manage the registry functions of the embedded network²², including the allocation and publication of line charges, loss factors, and loss category codes. Note that the loss factors are those that apply to the embedded network only and do not allow for losses on the parent network (which are additional and identified from the schedule of loss category codes and loss factors published by the parent network owner). The embedded network owner must disclose the relevant parent network loss factor code for the NSP (obtained either from the parent network owner or the LE ICP at the embedded network NSP) to traders on the embedded network;
 - (o) ensure that information is presented to the parent network owner for the calculation of line charges to the embedded network NSP; and
 - (p) for the metering at the NSP²³:
 - (i) contract with a metering equipment provider (MEP) or become the MEP for the NSP; and
 - (ii) arrange for metering installation to be provided for the NSP; and
 - (iii) advise the reconciliation manager of the reconciliation participant for the NSP; and
 - (iv) advise the reconciliation manager of the participant identifier for the MEP responsible for each metering installation; and
 - (v) advise the reconciliation participant for the NSP of the earliest certification expiry date for the metering installations; and
 - (q) inform and educate contractors working on the embedded network of the relevant requirements of these Guidelines.
49. Note that no supply must be connected to load unless an ICP for that load has been accepted by a trader²⁴.

Residual volume trader responsibilities

50. Where the embedded network is settled by the differencing methodology, it is the responsibility of the residual volume trader to:
- (a) provide appropriate notifications to the RM for reconciliation of the embedded network in accordance with the Code and the RM's requirements;
 - (b) ensure that its residual volume load SB (reconciliation type) ICP is updated in the registry;

²² Schedule 11.1 of the Code

²³ Clause 10.25 of the Code

²⁴ Clause 11.7 of the Code

- (c) note that when switching the residual volume SB ICP on an embedded network, this volume is reconciled by difference, so all the implications of historic revisions must be considered;
 - (d) ensure that it has an arrangement with the embedded network owner for the conveyance of electricity over the embedded network before agreeing to supply electricity on the embedded network;
 - (e) present information to the parent network owner for the calculation of network line charges, if required, in accordance with the arrangement with the embedded network owner;
 - (f) arrange for NHH residual volume submission information to be sent to the RM each month in accordance with the Code for the embedded network, where residual load within an embedded network is represented at an ICP on the embedded network with the reconciliation type of SB;
 - (g) submit a 0 load value for the residual load ICP, with a reconciliation type of 'SB', in a NHH submission file for the initial reconciliation cycle and any subsequent revision reconciliation cycles in accordance with Part 15 of the Code. This will signal to the RM that this party is to be responsible for the differencing; and
 - (h) make arrangements for the residual load volume in accordance with the contract with the embedded network owner.
51. It is the responsibility of all reconciliation participants trading electricity within the embedded network to:
- (a) provide appropriate notifications to the RM for reconciliation of the embedded network in accordance with the Code and the RM's requirements;
 - (b) arrange for HH metering information to be sent (by the certified reconciliation participant or its agent) to the RM each month in the prescribed format for all HH metered ICPs connected to the embedded network it supplies with electricity;
 - (c) arrange for NHH consumption information to be sent (by the certified reconciliation participant or its agent) to the RM each month in the prescribed format for all NHH metered ICPs connected to the embedded network it supplies with electricity;
 - (d) ensure that it has an arrangement with the embedded network owner for the conveyance of electricity over the embedded network before agreeing to supply electricity to any consumer on the embedded network;
 - (e) present information to the parent network owner for the calculation of network line charges, if required, in accordance with the arrangement with the embedded network owner;
 - (f) ensure that its embedded network ICPs are updated in the registry;

- (g) note that when switching the residual volume ICP (reconciliation type of SB) on an embedded network, this volume is being reconciled by difference, so all the implications of historic revisions must be considered; and
- (h) note that notifications, in accordance with Part 15 of the Code, only need to be notified to the RM for those networks where a reconciliation participant has customers. Where a reconciliation participant has a customer connected to an embedded network but has no customers connected to the parent network from which the embedded network is supplied, the RM only needs to be advised that the reconciliation participant has contracted to purchase at the NSP to the embedded network. However, if the reconciliation participant is purchasing from the clearing manager, they should submit bids at the local network GXP. Purchases from the clearing manager will also be referenced to the parent network's GXP.

Distributor responsibilities on the parent network

- 52. The agreement between the embedded network owner and the distributor for the parent network that the embedded network is connected to is the primary agreement that will determine subsequent reconciliation participant and customer relationships.
- 53. The distributor for the parent network has the right to specify the technical and commercial terms and conditions of any connection to its network to enable it to properly operate its network and manage its business. In doing so, the distributor for the parent network should act reasonably and help embedded network owners through the process of establishing all the necessary agreements and relationships to facilitate competition.
- 54. The distributor for the parent network should allocate an ICP identifier in accordance with the Code²⁵ for the point of connection between the parent network and embedded network, and the reconciliation type for this ICP is to be LE. This ICP does not have a trader attached to it, and so is not switchable. If the embedded network previously existed as a single customer or customer network and had an ICP allocated to it, that ICP should be decommissioned, and a new ICP created that complies with the Code.
- 55. The parent network owner should populate the loss category code and loss factor table in the registry and advise the embedded network owner of these codes and loss factors. This is required:
 - (a) for use in the embedded network NSP submission file to the RM; and
 - (b) so that the embedded network owner can advise reconciliation participants with customers on the embedded network both the parent network and embedded network loss category codes applicable.

²⁵ Clause 1 of Schedule 11.1 of the Code.

56. After the creation of an embedded network the parent network owner must notify the RM of:
- (a) the NSP connected;
 - (b) the energisation date;
 - (c) the participant identifier of the MEP for each meter and
 - (d) the certification expiry date of each meter.²⁶

Service providers' responsibilities

57. Service providers, as defined in the Code are:
- (a) the system operator²⁷;
 - (b) the market administrator²⁸;
 - (c) the pricing manager;
 - (d) the clearing manager;
 - (e) the RM²⁹;
 - (f) the registry manager³⁰; and
 - (g) anyone else appointed by the Authority to be a service provider.
58. All service providers must act promptly to any request from participants to help set up changes in the infrastructure or trading arrangements in accordance with the Code.
59. The provisions of the Code determining the registry as a database of record impose obligations on all participants and service providers to ensure that their own systems and interfaces are consistent with the registry.
60. In particular, the format and codes used when supplying metering and consumption information to the RM for reconciliation must be consistent with the codes used in the registry. For example, embedded network NSP metering information must refer to the same point of connection, network, and reconciliation type as the registry.

²⁶ Clause 10.30 of the Code

²⁷ The system operator service provider function is performed by Transpower NZ Limited.

²⁸ The market administrator function is currently performed by the Authority.

²⁹ The pricing manager, clearing manager, and the RM service provider functions are performed by NZX.

³⁰ The registry service provider function is performed by Jade.

Process to establish an embedded network

61. Although the specific steps to establish an embedded network will be slightly different depending on whether the embedded network is an entirely new un-energised network or a change in status of an existing customer network or network extension, the process is very similar once the key concepts are understood.
62. For simplicity, it is assumed that an entirely new embedded network has been built and is ready for energisation. Specific differences for an existing customer network are commented on below as appropriate.
63. The following process outlines the steps that must be commenced in chronological sequence.

Relationship with parent network

64. The first step to establishing an embedded network is discussion of the proposal with the parent network owner and negotiating both the technical and commercial terms and conditions to connect the embedded network to the parent network. During these discussions, the parent network owner may propose preferred names and codes for the point of connection between the two networks (these preferred names and codes for the point of connection will then be approved by the RM).

Energising an embedded network

65. Before an embedded network can be energised:
 - (a) in the case of differencing reconciliation, there should be a certified reconciliation participant willing to accept responsibility for the residual volume load (SB ICP where applicable); or
 - (b) in the case of global reconciliation, all points of connection should have been allocated by the embedded network owner to traders; and
 - (c) the parent network distributor must not carry out the initial energisation of a new point of connection without the agreement of the embedded network owner³¹; and
 - (d) the embedded network owner may not energise any point of connection to the network unless a reconciliation participant has requested the energisation³²; and
 - (e) only a reconciliation participant may authorise energisation of a point of connection³³ only if it has accepted responsibility for the point of connection, has an arrangement with an MEP for the provision of a metering installation for each

³¹ Clause 10.28 of the Code

³² Clause 10.30 of the Code

³³ Clause 10.33 of the Code

point of connection and the approval of the distributor to do so for a new point of connection³⁴.

66. The certified reconciliation participant willing to accept responsibility in (a) above is the residual volume trader for the embedded network. The embedded network owner will need to reach agreement with a certified reconciliation participant to become the residual volume trader. Although this can only be negotiated when the details of the agreement with the parent network are known, it may be convenient for the embedded network owner to negotiate with the residual volume trader concurrently and a three way meeting between parent network owner, embedded network owner and residual volume trader might be the best way to finalise arrangements.
67. When there is an existing customer network being converted to an embedded network, there will already be a certified reconciliation participant responsible for the customer network. This certified reconciliation participant must be advised of the proposed change and should be given first opportunity to negotiate a deal to become the residual volume trader for the embedded network. However there is no obligation on either party to accept a deal, unless the existing energy supply contract with the customer obliges the parties.
68. Embedded network owners need to be aware that for a certified reconciliation participant to accept responsibility as residual volume trader, it will be required to accept responsibility for payment of any residual load.³⁵

NSP metering

69. Arrangements need to be made by the embedded network owner for the installation of a Code compliant HH metering at the point of connection with the parent network.³⁶

Approval and certification

70. Embedded network owners have various responsibilities to fulfil within the Code. Performing these tasks requires approval as a distributor, and, in the case of submission of NSP data, certification as a reconciliation participant, both of these from the Authority.
71. In either case, the embedded network owner must:
 - (a) apply to the Authority for certification as a reconciliation participant³⁷, noting that if an agent is used, the application will need to include details and authorisations of

³⁴ Refer to the Connection and Energisation Guideline on <http://www.ea.govt.nz/act-code-regs/code-regs/guidelines/market-guidelines>

³⁵ Clause 3 of Schedule 15.4 of the Code.

³⁶ Clause 10.25 of the Code

³⁷ Clause 15.37 of the Code.

the contract between the embedded network owner and the reconciliation participant;³⁸ and/or

- (b) be audited as a distributor³⁹, noting that if an agent is used the application would need to include details and authorisations of the contract between the embedded network owner and the distributor.⁴⁰

Industry codes

72. There are several codes used in the software and systems by service providers to simplify the processing of large volumes of data. These are used separately and in combination to:

- (a) define the electrical location of an ICP; and
- (b) define what the data in an electronic file relates to.

Participant identifier

73. The participant identifier is a four letter code to describe the embedded network and is assigned by the Authority on application from the network owner.⁴¹

ICP unique identifier

74. The ten digit code to ensure uniqueness of the ICP is created by a distributor and must contain a two digit code assigned by the Authority on application from the distributor and a 3 digit checksum generated by the market administrator⁴².

NSP unique identifier

- 75. The RM is responsible for creating the NSP unique identifier between two networks. In the case of embedded networks, the embedded network owner should propose codes to the RM for the point of connection to the parent network⁴³.
- 76. The NSP code, which comprises a combination of the point of connection code and the participant identifier, is used in combination to uniquely identify specific points of connection between networks.

³⁸ The application form for certification as a reconciliation participant can be found at <http://www.ea.govt.nz/our-work/forms/>. The *information paper for reconciliation participants and distributors audit and certification requirements* can be found at <http://www.ea.govt.nz/industry/market/retail-audits/certified-reconciliation-participants/>.

³⁹ Clause 11.10 of the Code.

⁴⁰ The *information paper for reconciliation participants and distributors audit and certification requirements* can be found at <http://www.ea.govt.nz/industry/market/retail-audits/certified-reconciliation-participants/>.

⁴¹ Clause 15.39 of the Code.

⁴² Clause 1 of Schedule 11.1.

⁴³ Clause 26(1) of Schedule 11.1.

77. All the ICPs on an embedded network refer to an NSP in the registry.

Reconciliation type

78. Reconciliation type is a code assigned to each ICP and NSP. (It was initially used by the RM to determine whether data submitted to it related to consumers connected to a local network, consumers connected to an embedded network, direct consumers, or generators). The same codes are now assigned to each ICP in the registry to help traders identify where an ICP is and to alert them to ICPs of particular interest prior to switching.
79. The codes currently in use are GN, EN, LE, SB and SI. The codes of particular relevance and their meaning are in Table 1.

Table 1 Reconciliation type codes

Code	Used as an NSP descriptor	Used as an ICP descriptor
GN	Connection type for any ICP on a local network.	ICP on a local network.
EN	Connection type for any ICP within an embedded network.	ICP on an embedded network.
SB	N/A	ICP on the embedded network that represents the residual volume load on the embedded network (if it is being reconciled by difference). The trader attributed to this ICP is the residual volume trader on the embedded network.
Distributor-only ICPs		
LE	N/A	ICP at the point of connection between a parent network and embedded network. It is not a normal switchable entity and is a distributor-only ICP on the parent network side of the NSP. It does contain the loss category code that identifies the loss factors within the registry loss factor table for the embedded network losses on the parent network.
SI	N/A	ICP on a local or embedded network that represents the point of connection for shared unmetered load.

Create an ICP at the NSP to the embedded network

80. Once the codes have been allocated by the relevant parties, the parent network owner must create a distributor-only ICP at the point of connection between the parent network and the embedded network if one does not already exist and populate it in the registry⁴⁴. The ICP must refer to the parent NSP code and must be reconciliation type LE in the registry.
81. In the case of an existing customer network, an ICP will already exist but this is a switchable ICP. This ICP should be decommissioned and a new ICP created with a reconciliation type of LE by the parent network owner. This is a distributor-only ICP, is not switchable, and does not contain a reconciliation participant code for buying and selling electricity.

Arrange for reconciliation

82. When the NSP metering has been commissioned, and either:
 - (a) a certified reconciliation participant has accepted responsibility as residual volume trader for the embedded network (if it is to be reconciled by difference); or
 - (b) all active points of connection have reconciliation participants attached to them (if it is being globally reconciled);

The embedded network owner, or its agent, must advise the RM of the details of the new network and arrange for it to be reconciled from the date of connection (or the date of conversion to an embedded network if it was previously a customer network). Note that traders who have not notified the RM that they are trading at a point of connection to the grid on the parent network are required to give the RM not less than 5 business day's notice of intention to trade at a point of connection to the grid.

Establish embedded network ICPs

83. Once all of the above has been completed, the embedded network owner can allocate ICPs to all contestable consumers and populate the registry with them. Concurrently, it must populate the loss factors applicable to each loss category code (including the parent network loss category code for the embedded network NSP) within the registry loss factor table and publish the line charges for each price category code.
84. The transfer of these ICPs to the embedded network NSP from the local network NSP is a process that must be authorised by the Authority⁴⁵.

⁴⁴ In accordance with Schedule 11.1.

⁴⁵ Contact the Authority for further information via marketoperations@ea.govt.nz.

Registry fields for the mandatory gateway ICP

85. The registry fields, and information regarding the population of these fields by the parent network owner for the mandatory gateway ICP ('LE' ICP) are:
- (a) Point of connection – the code for the point of connection of the parent network;
 - (b) Network code – the code assigned to the participant that owns the parent network at the time the request is made;
 - (c) Reconciliation type – LE;
 - (d) Status – inactive;
 - (e) Status reason code – 05 (reconciled elsewhere);
 - (f) Distributor price category – parent network price category code as applicable to the gateway ICP;
 - (g) Distributor loss code – parent network loss factor code as applicable to the gateway ICP;
 - (h) Flow direction – if the ICP is a generator, generator and consumer or consumer only; and
 - (i) Dedicated ICP status.

Registry fields for the optional residual volume load ICP

86. The registry fields, and information regarding the population of these fields, for the optional residual volume load ICP ('SB' ICP) are:
- (a) By the embedded network owner:
 - (i) Point of connection – embedded network point of connection;
 - (ii) Network code – the embedded network owner participant identifier;
 - (iii) Reconciliation type – SB;
 - (iv) Status – inactive;
 - (v) Status reason code – 05 (reconciled elsewhere);
 - (vi) Distributor price category – 'zero';
 - (vii) Distributor loss code – no code is applicable;
 - (viii) Dedicated NSP – Y; and
 - (ix) Installation type – as applicable.

- (b) By the residual volume trader:
 - (i) Metering type – UNM;
 - (ii) Profile – DFP;
 - (iii) Unmetered kWh/day – ENG; and
 - (iv) Reconciliation participant – the embedded network residual volume trader participant identifier.

Sources of information

87. Summary of sources contained in these Guidelines:

- (a) The Code: <http://www.ea.govt.nz/act-code-regs/code-regs/>;
- (b) Participant registration: <http://www.ea.govt.nz/our-work/forms/>.
- (c) Registry information: <http://www.ea.govt.nz/industry/market/registry-icps/registry-information-access/>;
- (d) Reconciliation participant certification and audit requirements: <http://www.ea.govt.nz/industry/market/retail-audits/certified-reconciliation-participants/>;
- (e) Reconciliation manager website: <https://electricityreconciliation.co.nz/page/home>;
- (f) Unmetered load management guidelines: <http://www.ea.govt.nz/act-code-regs/code-regs/guidelines/market-guidelines/>;
- (g) Application form for certification as a reconciliation participant: <http://www.ea.govt.nz/our-work/forms/>.

88. If you require further assistance, please contact the retail operations team:

Electricity Authority
PO Box 10041
Wellington

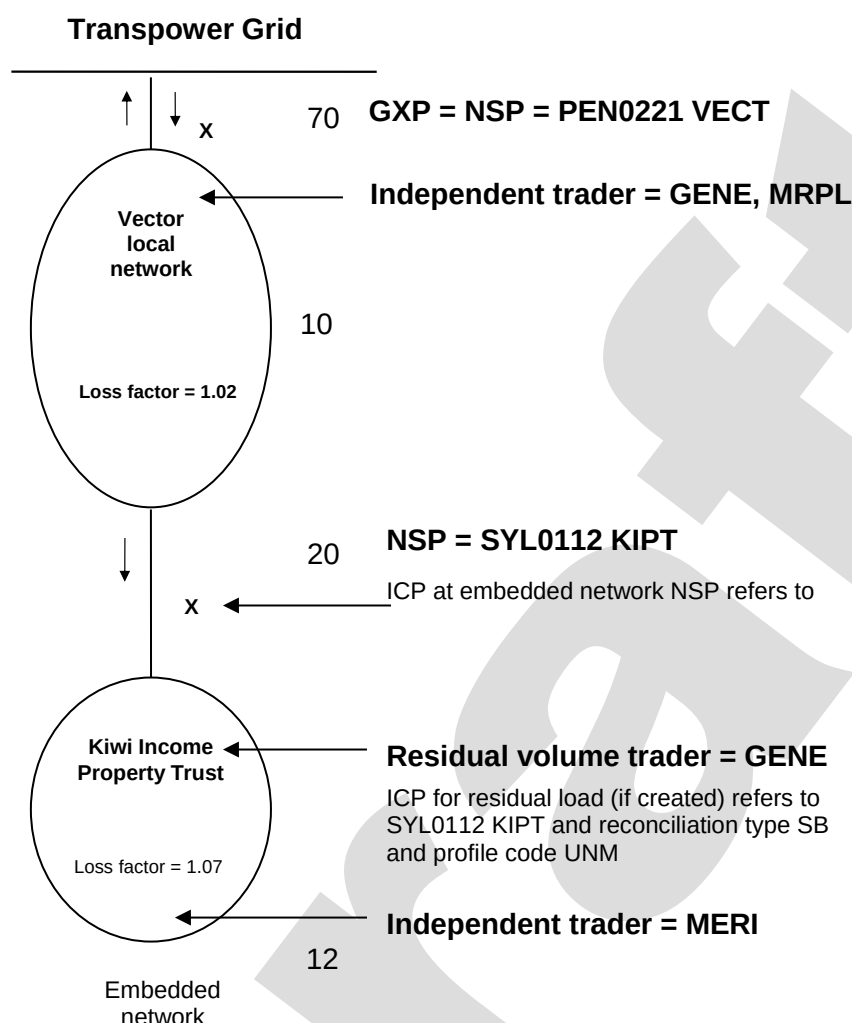
Attention: Retail operations team

Telephone: 04 460 8860
Fax: 04 460 8879
Email: retailoperations@ea.govt.nz

Appendix A Embedded network example

- A.1 One example of an embedded network that is reconciled by difference is a shopping mall known as Sylvia Park owned by Kiwi Income Property Trust in Auckland and embedded within Vector's local network. The details are:
- (a) The NSP for the ICP on the parent network is PEN0221 VECT and all the ICPs associated with this NSP are reconciliation type GN.
 - (b) The NSP for the ICPs on the embedded network is SYL0112 KIPT and all ICPs connected to the embedded network are reconciliation type EN.
 - (c) This particular embedded network was created for the mall but prior to that was an existing ICP customer within the Vector network.
 - (d) For the embedded network:
 - (i) the embedded network owner must either itself, or obtain the services of a certified reconciliation participant to, present half hour (HH) NSP metering information to the reconciliation manager (RM) each month in the prescribed format (prescribed formats are available from the RM);
 - (ii) independent reconciliation participants trading within the embedded network must be certified as reconciliation participants to present HH and NHH consumption information to the RM each month in the prescribed format (available from the RM) for all ICPs connected to the embedded network that they supply with electricity; and
 - (iii) the residual volume trader must be certified as reconciliation participant to present NHH metering information to the RM each month in the prescribed format (available from the RM) for the residual volume ICP connected to the embedded network.
 - (e) For the purposes of settlement in this example, all volumes are reconciled at the GXP, PEN0221 VECT (i.e. at the grid exit point). However, the files submitted to the RM in respect of ICPs on the embedded network must be non loss adjusted and referenced to the embedded network NSP SYL0112 KIPT. Both HH and NHH consumption information submitted will have losses applicable to networks applied by the RM.
 - (f) Currently the RM provides reconciliation information to entitled parties referenced to the grid exit point PEN0221 VECT. However, it can also provide reconciliation information referenced to the embedded network NSP SYL0112 KIPT upon request.

A.2 A diagram of the embedded network example is presented below.



Reconciliation of the embedded network

A.3 Meridian submits files for consumers connected to the embedded network supplied through NSP SYL0112 KIPT for 12 units, and the RM calculates:

(a) Consumption at PEN0221 VECT = $12 \times 1.07 \times 1.02 = 13.0968$ units

A.4 Genesis submits a file for consumers connected to the local network supplied through NSP PEN0221 VECT for 10 units and the RM calculates:

(a) Consumption at PEN0221 VECT = $10 \times 1.02 = 10.2$ units

- A.5 Kiwi Income Property Trust as embedded network owner submits the file for NSP SYL0112 KIPT for 20 units and the RM calculates.
- (a) Consumption at PEN0221 VECT = $20 \times 1.02 = 20.4$ units
- A.6 UFE of 5 units is allocated to the point of connection by the RM as part of the parent network's global settlement.
- A.7 Purchase by GENE at PEN0221 VECT is then:
- (a) GENE at PEN0221 VECT = $10.2 + (20.4 - 13.0968) + 5 = 23.5032$ units
- A.8 In the above example, Genesis is both an independent reconciliation participant on Vector's local network and the residual volume traders on Kiwi Income Property Trust's embedded network. The total purchases are both combined in the buyer files produced by the RM.

Appendix B Line charges

- B.1 Settlement for energy purchases is different to settlement for line charges, and may also be at different settlement points on a network. Line charges are external to the Code and can take a number of different forms.
- B.2 These guidelines are not intended to specify how line charges can be applied, but to explain two of the more common methods, and alert participants to the risk of double counting of line charges on embedded networks.
- B.3 There are two common forms of calculating charges for parent networks:
- (a) ICP Pricing: Metering information recorded at each ICP is used to calculate the line charges; and
 - (b) GXP Pricing: Reconciliation information at the GXP is used to calculate the line charges for the aggregated customers.
- B.4 The key for parent network charges based on GXP pricing is for traders to ensure before operating on an embedded network that the correct arrangements are in place with the party calculating the line company's information used for charging, so that there is no double charging for the same service.

Appendix C Attributes of secondary networks

Function	Responsibility	Customer network	Network extension	Embedded network (differencing)	Embedded network (global)
Connected to parent network	Secondary network owner	X	X	X	X
Parent network agrees to manage registry functions on behalf of secondary network	Parent network		X		
Network owner allows trade on network	Secondary network owner		X	X	X
Use of system agreement with network owner	Reconciliation participant		X	X	X
All internal points of consumption have installation control point (ICP) numbers	Secondary network owner		X		X
Internal points of consumption metered or treated as unmetered supplies	Secondary network owner		X	X	X
All switchable internal points of consumption have ICP numbers	Parent network owner		X		
All switchable internal points of consumption have ICP numbers	Secondary network owner			X	X
Point of connection to parent network has a parent network ICP	Parent network owner	X		X	X
NSP created	Secondary network owner			X	X
Network owner has arranged for an MEP to meter the NSP with a half hourly compliant NSP meter	Secondary network owner			X	X
Network owner has arrangement with a trader to accept residual volume	Secondary network owner			X	
Embedded network owner is certified reconciliation	Secondary network owner			X	X

participant for submission of NSP volumes to the RM					
Network owner provides required metering attributes and MEP to the reconciliation manager	Embedded network owner			X	X
Residual volume arrangements	Secondary network owner			X	