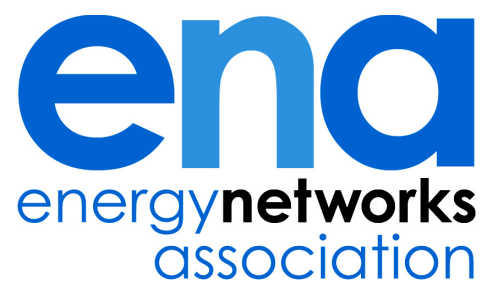


**EHV Distribution Charging Methodology (EDCM)
Export (generation) charges**

Report to Ofgem (1 June 2012)



EDCM for export charges

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Introduction

1. This report accompanies new proposals for a EHV Distribution Charging Methodology to set export use of system charges for Designated EHV properties (the EDCM for generation).
2. Electricity North West, Northern Powergrid, SP Energy Networks, SSE Power Distribution, UK Power Networks and Western Power Distribution have jointly developed these proposals on behalf of the 14 entities licensed as Distribution Services Providers pursuant to condition 50A of the Standard Conditions of the Electricity Distribution Licence.
3. These proposals have been developed to comply with the Relevant Objectives in Licence Condition 50A, the Direction issued pursuant to Licence condition 50A (issued on 18 May 2012) and additional guidance provided by Ofgem. These proposals have also been improved to take account of suggestions and feedback from stakeholders received following a six-week consultation exercise held in March/April 2012.
4. The proposed EDCM for export charges will result in charges to generation users based on a common methodology. Eligible generators will receive locational credits, reflecting the degree to which generation export helps offset the need for reinforcement of the distribution network. The cost of these credits would be recovered through charges to demand customers at all voltages to reflect the fact that limiting the need for network investment would put downward pressure on future charges for demand customers.
5. Although this report focuses on the methodology for calculating export charges for Designated EHV Properties, the draft methodology statements accompanying this report incorporate the calculation of both import and export charges.
6. These proposals do not aim to modify the current EDCM methodology for calculating import charges to Designated EHV Properties. However, minor consequential changes have been made to the demand calculations to allow the generation methodology to be integrated into the current text. A full list of such changes, along with an explanation, is attached to this report.
7. Subject to approval by Ofgem, a change proposal would be submitted with the intent to incorporate these combined methodology statements into the Distribution, Connection and Use of System Agreement (DCUSA) to replace the current EDCM demand-only methodology statements.
8. There are likely to be minor charge impacts on all demand users, both in the CDCM and EDCM. This is because the net revenue from EDCM export charges would be offset from the amount to be recovered by the application of import charges to EDCM customers and CDCM charges, and the introduction of the new methodology is expected to cause the net revenue from EDCM generators to change from their current levels.

9. Documents relating to the EDCM, including those relating to prior consultations, are available to download from the website of the ENA.¹
10. This report is accompanied by the following appendices:
 - a) Appendix 1 contains illustrative versions of the Schedule 18 (long run incremental cost – LRIC methodology statement) and Schedule 17 (forward cost pricing – FCP methodology statement) of DCUSA methodology statements with “track changes” showing the changes that would need to be made to the current version of DCUSA in order to implement the proposed EDCM for export charges. This is presented in four parts (two for FCP and two for LRIC) due to large file sizes.
 - b) Appendix 2 contains a full list of changes to the current EDCM import methodology, along with an explanation for each.
 - c) Appendix 3, attached as a Microsoft Excel workbook, gives, for each of the 14 DNO licence areas in Great Britain, illustrative export charges that might have resulted from the application of the new proposed EDCM in 2012/2013. These are presented under three different scenarios.
 - d) Appendix 4, attached as two Microsoft Excel workbooks, gives fully functional blank combined EDCM models (for import and export) for both methodologies (FCP and LRIC). These models are capable of implementing both the proposed export method and the current import-only methodology, amended as necessary to incorporate the proposed export method.
 - e) Appendix 5 contains a summary of the responses to the DNOs’ 1 March 2012 consultation, along with the DNOs’ responses to stakeholders.
 - f) Appendix 6 provides the super-red (peak) time bands applicable in each DNO area.
11. The LC13 and LC14 charging statements would be revised and submitted to Ofgem for approval following Ofgem’s decision on the proposed methodology.
12. Annex 1 of this report contains the text of Condition 50A of the standard distribution licence.

Background

13. These DNOs’ initial proposals for the EDCM were submitted by the ENA to Ofgem on 1 April 2011. This submission included methodologies to calculate import and export charges for eligible customers. Documents relating to the submission and previous consultations are available to download from the website of the ENA.²
14. On 6 September 2011, Ofgem published its decision to approve the DNOs’ proposals for import charges only, subject to several conditions.³ On 30 November 2011, the

¹ <http://www.energynetworks.org/electricity/>

² <http://www.energynetworks.org/electricity/regulation/structure-of-charges-edcm/edcm-file-storage.html>

³ Ofgem (2011) Electricity distribution charging: decision on the methodology for higher voltage import charges, ref 116/11

DNOs submitted revised proposals solely for import charges that were designed to meet Ofgem's conditions. On 20 December 2011, Ofgem published its decision to approve the revised proposals for import charges only.⁴

15. The EDCM for import charges was implemented on 1 April 2012, and was used to set use of system charges for demand users for the charging year that began on that date. The import methodology is part of the DCUSA and is subject to open governance arrangements.⁵
16. In its 6 September 2011 document, Ofgem announced its decision to delay the implementation of the EDCM for export charges. On 21 October 2011, Ofgem published a consultation document setting out a number of options for the EDCM for export charges.⁶
17. Following its consultation, Ofgem published a document containing guidance to the DNOs on the issue of generation (export) charging.⁷ The document also set a deadline of 1 June 2012 for the DNOs to submit their revised proposals for the EDCM for export charges.
18. The DNOs, through the Common Methodology Group (CMG), have been working to develop revised proposals for the EDCM for export charges. The DNOs published a consultation document setting out their draft proposals on 1 March 2012.
19. Our proposals have been revised to take account of feedback received. Most significantly, we have revised our method for the calculation of the generation revenue target, to reflect the suggestion made by British Gas.

The scope of application of the EDCM for export charges

20. The EDCM will apply to all Designated EHV properties, as defined by Ofgem in Condition 50A.11 of the standard distribution licence conditions.
21. The full text of Condition 50A.11 is set out in Annex 1.

Arrangements for pre-2005 connected distributed generators

22. The EDCM for import charges currently applies to all designated EHV properties. The EDCM for export charges would, subject to Ofgem approval, apply from 1 April 2013.
23. Generators that connected before 1 April 2005 would be granted an optional time-limited exemption from distribution use of system charges (i.e. EDCM export charges).⁸ According to the Ofgem decision document, the exemption from distribution use of system charges (export charges) would apply for a period of 25

⁴ Ofgem letter dated 20 December 2011. Available from <http://www.ofgem.gov.uk/Networks/ElecDist/Policy/DistChrgs/Pages/DistChrgs.aspx>

⁵ www.dcusa.co.uk

⁶ Ofgem (2011) Distribution use of system charging: way forward on higher voltage generation charging, ref 134/11.

⁷ Ofgem letter dated 2 February 2012. Available from <http://www.ofgem.gov.uk/Networks/ElecDist/Policy/DistChrgs/Pages/DistChrgs.aspx>

⁸ Ofgem letter dated 10 February 2012. Available from <http://www.ofgem.gov.uk/Networks/ElecDist/Policy/DistChrgs/Pages/DistChrgs.aspx>

years from the date of connection. EDCM import charges to mixed demand-generation sites would not be covered by the exemption.

24. Generators eligible for the exemption may opt in to use of system export charges and credits at any time. By 30 June 2012, generators eligible for the exemption should indicate to their DNO whether they wish to opt in to EDCM use of system export charges and credits for the charging year beginning 1 April 2013. If they do not do so, the DNO will calculate and apply the EDCM under the assumption that those generators that are eligible for the exemption are indeed exempt from EDCM export charges and credits. The deadline for opting in to use of system export charges and credits for subsequent years is 1 November of the year that immediately precedes the charging year. A decision to opt in cannot be reversed.
25. Ofgem guidance to DNOs is that the exemption would apply to EDCM export charges as well as EDCM credits. This means that those generators that qualify for the exemption, but do not opt in to charges would not be eligible to receive credits under the EDCM.
26. The guidance also states that generators that “currently pay annual O&M charges—where such charges form part of a customer’s connection agreement should continue to be paid regardless of any exemption from UoS charges”.

Illustrative charges under the EDCM

27. Appendix 3 contains illustrative export charges under the proposed EDCM methodology. These charges are illustrative and are based on data relating to the charging year 2012/2013.
28. Under the proposed EDCM methodology for export charges, the total amount of generation capacity that is subject to export use of system charges and credits affects the export capacity charge payable by all eligible generators. This means that the final export capacity charge for 2012/2013 will depend on the numbers and export capacities of those generators that do choose to opt in by the deadline of 30 June 2012.
29. To reflect this uncertainty, we submit illustrative charges under three scenarios (as we did for our March 2012 consultation exercise):
 - a) under the assumption that all generators that are eligible for exemption from DUoS charges are exempt for the charging year, unless they have opted in before this submission is finalised;
 - b) under the assumption that all generators eligible for exemption have chosen to “opt in” to the EDCM; and
 - c) under the assumption that generators eligible for exemption and would have received a net EDCM credit in the charging year 2012/2013 would choose to “opt in” to the EDCM (and no one else).
30. In most DNO areas, these scenarios resulted in different export capacity charges.
31. These illustrative charges are not intended to be a reasonable forecast of eventual export charges that might apply from 1 April 2012, and therefore must not be used for any purpose other than as a tool for understanding the proposed methodology.

Charges from 1 April 2013 will depend, amongst other things, on how many generators choose to “opt in” before the deadline of 30 June 2012.

32. For confidentiality reasons, customer names are not included with this submission.

How the proposed EDCM for export charges meets its objectives

33. The EDCM is designed to produce cost reflective use of system charges to encourage existing and new users of the electricity distribution networks in Great Britain to:
- a) use existing network capacity more efficiently; and
 - b) avoid prompting inefficient network reinforcement.
34. Where the EDCM leads to lower investment in the distribution network, this will result in lower use of system charges for all customers over time.
35. Within the context of the proposed EDCM for export charges, we expect this to be achieved by including locational credits based on LRIC and FCP for distributed generation that are deemed to offset the need for demand-led network investment.
36. The proposed EDCM for export charges includes an export capacity charge that will apply to all eligible EDCM generators. This charge is designed to be applied at a uniform rate within a DNO area, and aims to recover an EDCM generation revenue target.
37. The EDCM generation revenue target in a charging year includes the following elements:
- a) an allowance for qualifying capital expenditure incurred on or after 1 April 2010 to facilitate the connection of new distributed generation ;
 - b) the revenue allowance determined by Ofgem associated with the DG incentive revenue scheme pertaining to the fourth Distribution Price Control Period (DPCR4) carried forward; and
 - c) an allowance for operating and maintenance expenditure in respect of assets associated with pre-2005 DG and post-2010 DG. DG that connected between 2005 and 2010 are excluded from this because the DPCR4 carry-forward amount already reflects this.
38. The DNOs believe that it is appropriate to recover this revenue target using a uniform export capacity charge applied to all eligible EDCM generation.
39. The proposed EDCM for export includes a fixed charge that reflects the direct costs and network rates associated with assets that are for the sole use of a generator. These charges are calculated on the same basis as the charges for the sole use assets of a demand user.
40. Our proposed method for export charges does not include charges based on LRIC or FCP to reflect the costs associated with generation-led reinforcement. This is a

change from our April 2011 proposals, and reflects new guidance from Ofgem and the issue of a subsequent Direction.⁹

41. A letter from Ofgem accompanying the Direction states:

“... we no longer require DNOs to submit an EDCM for export charges which conforms to all the principles and assumptions set out in the original July 2009 publication. Specifically DNOs do not need to submit a methodology which contains LRIC or FCP charges. DNOs may still use these methods for the calculation of credits to DG and if they do use these methods they still have the choice over which methodology (FCP/LRIC) to use in their submission.”

42. Condition 50A of the Distribution Licence applicable to the DNOs contains the Relevant Objectives of the EDCM. The relevant text from Condition 50A is set out in Annex 1 of this report. We now describe how our proposals meet the Relevant Objectives.

First relevant objective

50A.7 The first Relevant Objective is that compliance with the EDCM facilitates the discharge by the licensee of the obligations imposed on it under the Act and by this licence.

43. The proposed methodology is designed to, as far as possible, reflect costs incurred in enabling distributed generation to export power into the distribution network, encourage behaviour that is beneficial to all users of the network and facilitate the discharge by the licensee of its duties to plan and operate an efficient network.

Second relevant objective

50A.8 The second Relevant Objective is that compliance with the EDCM facilitates competition in the generation and supply of electricity and will not restrict, distort, or prevent competition in the transmission or distribution of electricity or in participation in the operation of an Interconnector.

44. The methodology facilitates new entry into distributed generation (and the associated energy trading or aggregation services) by providing for the payment of credits to reflect the benefits to distribution networks of distributed generation, and by ensuring simplicity and commonality in the application of these credits.

45. The methodology facilitates new entry into supply by introducing a common charging methodology across all 14 licensees, and by standardising charge application.

46. The methodology addresses a potential risk of distortion to competition in the distribution of electricity by introducing portfolio charges for generators connected to distribution systems operated by independent LDNOs.

⁹ Ofgem Derogation issued under SLC 50A, 18 May 2012. Available from <http://epr.ofgem.gov.uk/Pages/EPRInformation.aspx?doc=http%3a%2f%2fepr.ofgem.gov.uk%2fEPRFiles%2fDerogation+issued+under+SLC+50A+-+18-05-2012.pdf>

Third relevant objective

50A.9 The third Relevant Objective is that compliance with the EDCM results in charges which, so far as is reasonably practicable after taking account of implementation costs, reflect the costs incurred, or reasonably expected to be incurred, by the licensee in its Distribution Business.

47. The methodology is designed to reflect costs incurred, or reasonably expected to be incurred, by the licensee in its Distribution Business, in a way that is consistent with Ofgem's guidance on these issues.
48. An explanation of how this is achieved is set out at the top of this section.

Fourth relevant objective

50A.10 The fourth Relevant Objective is that, so far as is consistent with the first three Relevant Objectives, the EDCM, so far as is reasonably practicable, properly takes account of developments in the licensee's Distribution Business.

49. The methodology is designed to take into account any changes to the licensee's network and changes in customer characteristics.
50. Whilst the introduction of a common methodology inevitably introduces a degree of rigidity, our proposals for governance ensure that, where appropriate, developments in the distribution businesses will be able to be reflected in modification proposals submitted to Ofgem for decision.

Paragraphs 50A.15 to 50A.19

51. Condition 50A also specifies five requirements for the development of the EDCM

50A.15 The first requirement is that the EDCM must be developed by the licensee in conjunction with every Associated Licensee.

52. The six DNO groups worked closely together in developing these proposals, through the CMG and its workgroups.

50A.16 The second requirement is that the EDCM must be able to be given effect by the licensee by not later than the Import Implementation Date (in respect of Import Charges) and the Export Implementation Date (in respect of Export Charges).

53. The DNOs are confident that these proposals are capable of approval by Ofgem, and that subject to receiving such approval, can be implemented by 1 April 2013.

50A.17 The third requirement is that the EDCM for Import Charges must be submitted to the Authority by not later than 1 April 2011 and the EDCM for Export Charges must be submitted to the Authority by not later than 1 June 2012.

54. This submission fulfils this requirement.

50A.18 The fourth requirement is that a full set of illustrative Use of System Charges for the Regulatory Year 2011/12 for Import Charges and 2012/13 for Export Charges that which would have resulted from the licensee's compliance with the EDCM if it had been in force under this licence at 1 April 2011 for Import Charges and 1 April 2012 for Export Charges must be submitted to the Authority by not later than 1 April 2011 for Import Charges and 1 June 2012 for Export Charges.

55. See Appendix 3.

50A.19 The fifth requirement is that, during the development of the EDCM and before submitting it to the Authority in accordance with the third requirement, the licensee must have taken all reasonable steps (including, where appropriate, approaching the Authority to discuss how the licensee proposes to address any unforeseen charging implications of the EDCM) to ensure that the EDCM in the form in which it is being developed will be capable of being approved by the Authority in accordance with the requirements of Part B of this condition.

56. This requirement was satisfied through continuous engagement with Ofgem throughout the process, using both Ofgem staff's participation in working group meetings, as well as ad hoc meetings and correspondence where required.

Overview of the EDCM for export charges

57. The proposed EDCM for export charges involves five main steps:

- a) Step 1 is the application of load flow techniques and the LRIC or FCP methodologies to determine the locational demand-led reinforcement charge elements, known as Charge 1.
- b) Step 2 is the calculation of locational credits to qualifying export charges based on the FCP or LRIC Charge 1.
- c) Step 3 involves the calculation of an EDCM generation revenue target.
- d) Step 4 is the allocation of this target to export charges as a fixed capacity charge.
- e) Step 5 is the calculation of fixed charges associated with sole use assets associated with export charges.

Application of EDCM export charges

58. In the EDCM, each set of charges comprises import rates, export rates, or both, as applicable to the customer. The DNO Party's Relevant Charging Statement includes information that enables a Supplier to determine which Designated EHV Property each set of charges applies to.

59. This report focuses on export charges only. Import charges associated with generators would be subject to separate charges (either CDCM or EDCM, as appropriate)

60. We have modified the description of the application of EDCM charges to allow some flexibility in the treatment of premises that are covered by a single connection

agreement, but have several MPANs or connection points. The words currently in DCUSA are as follows:

“Under the EDCM, a Connectee is defined by reference to a site as determined in the Connection Agreement. However, where a site is a group of connection points that relate to a single Connection Agreement, these connection points are treated as a single Connectee for charging purposes.

The unit of application of EDCM charges is a “tariff”. Each tariff represents an entry in the EDCM model input data sheet, and therefore would have a full set of outputs, i.e. EDCM tariff components.

The EDCM currently recognises only import (demand) tariffs.”

61. This requires the DNO to aggregate several connection points and always treat them as a single EDCM charge.
62. However, such treatment may not always be appropriate. For example:
 - a) These connection points might be at different voltage levels, and therefore qualify for different demand customer categories.
 - b) These connection points may be served by different suppliers. In such cases, it would be impractical to aggregate them as a single EDCM charge.
 - c) These connection points could be fed from different points of supply and therefore utilise different distribution assets.
63. Consequently, we propose new words to replace the text quoted above:

In the EDCM, each set of charges comprises import rates, export rates, or both, as applicable to the Connectee. The DNO Party’s Relevant Charging Statement includes information that enables a Supplier to determine which Designated EHV Property each set of charges applies to.
64. The benefit of this change, other than simplicity, is that it is flexible enough to allow the DNO to take site-specific factors into account in deciding whether or not to aggregate several metering points into a single EDCM charge unit.
65. The requirement to include sufficient information in the DNO’s LC14 charging statement to allow the relevant supplier to work out which site each charge applies would add clarity compared to the current situation.

Overview of EDCM export charge components

66. This section sets out the different charge components that make up export charges under the EDCM. Charge components are the outputs of the EDCM and make up the distribution use of system charges applied to customers.
67. Standard Licence Condition 1.3 of the distribution licence states that “export charges”:

“means Use of System Charges in relation to electricity generated and placed on a Distribution System via a direct connection to the source of generation.”

68. The proposed EDCM charge components for export charges are listed in table 1.

Table 1 Tariff components for export charges

Tariff component	Unit	Description
Export super-red unit rate	p/kWh (negative)	Reflect the locational FCP/LRIC charge 1.
Export fixed charge	p/day	Sole use asset charges for direct operating costs and network rates
Export capacity rate	p/kVA/day	Reflects an allocation of the EDCM generation revenue target and transmission exit credits for qualifying generators. It may also include transmission exit credits to eligible generators.
Export exceeded capacity rate	p/kVA/day	Charged at the same rate as the export capacity rate

69. The next section explains the calculation of the EDCM charge components described above.

Calculation of tariff components for export charges

70. This section describes the proposed methodology for calculating each charge component for export charges.

Credits based on FCP/LRIC Charge 1 to generation

71. This section describes the method for calculating credits for generation based on the outputs of the FCP and LRIC methodologies.

72. A detailed description of the FCP and LRIC methodologies can be found in the methodology statements attached to this report.

73. Both FCP and LRIC methods separate the distribution network into a number of locations.

74. In the case of LRIC, a location is a node on the EHV network, typically a primary substation or an EHV customer (which might be a demand customer or generator).

75. In the case of FCP, a location is a network group at one of three possible levels on the network:

- a) A level 1 network group contains 132 kV and similar circuits;

- b) A level 2 network group contains 132kV/33kV and similar substations and 33kV and similar circuits; and
 - c) A level 3 network group contains primary substations, e.g. 132kV/11kV or 33kV/11kV.
76. Both LRIC and FCP methods provide the following information for each location:
- a) Charge 1 (£/kVA/year). If positive, this relates to future demand-led reinforcement costs associated with demand at the relevant location. It is therefore expected to drive charges to demand and credits to generation where generation can be considered to avoid or defer the need for future demand-led reinforcement.
 - b) Active (kW) and reactive (kVAr) flows from generators and to demand in the maximum demand scenario. In FCP there can be both generation and demand on the same network group, whereas LRIC requires that either generation or demand be modelled at any single node. The method for deciding whether a node is to be modelled as demand or generation is set out in the LRIC methodology statement.
77. In the case of FCP each location (network group) is linked to a “parent location” if one exists, i.e. the higher-level network group to which the network group in question is connected. This establishes a hierarchy of network groups with up to three levels. Some entries in the FCP dataset can be notional hybrid network groups constructed to handle cases where a customer or lower-level network group is supplied out of two different network groups.
78. In the case of LRIC, the Charge 1 at a location is broken down into two components, one related to the voltage level of the location and the other related to all other levels.
79. Each Designated EHV property in the EDCM model is associated with a LRIC or FCP location.
80. The Charge 1 in £/kVA/year for each location is split into two components; Charge 1 Local and Charge 1 Remote:
- a) In the case of LRIC, Charge 1 Local is the component of Charge 1 related to the voltage level of the relevant location, and Charge 1 Remote is the component of Charge 1 that is related to all other voltage levels.
 - b) In the case of FCP, Charge 1 Local relates to the relevant location (network group) and Charge 1 Remote relates to the sum of the Charge 1 associated with the “parent” and “grandparent” locations of the relevant location.
81. Under these proposals for EDCM export charges, generators would be eligible to receive credits (in p/kWh) based on FCP and LRIC Charge 1, since this relates to future demand-led reinforcement costs at the relevant location.
82. The p/kWh credits would only apply to active power units exported during the DNO’s super-red time band. See Appendix 6 for details of each DNO’s super-red time band. Export at other times would not qualify for these credits. This is because the benefit provided by generation is deemed to be felt most when the network is most loaded. This is also consistent with the way the FCP and LRIC Charge 1 are calculated.

83. Charge 1 is applied to generation tariffs as a credit. The credit is expressed as a negative charge rate in p/kWh and is applied in respect of active power units exported during the DNO Party's super-red time band:

$$[\text{p/kWh super-red generation rate}] = -100 * (([\text{Proportion eligible for local charge 1 credits}] * [\text{local charge 1 } \text{£/kVA/year}] + [\text{remote charge 1 } \text{£/kVA/year}]) * ([\text{Chargeable export capacity}] / [\text{Maximum export capacity}]) / [\text{number of hours in the super-red time band}]$$

Where:

The Proportion eligible for local charge 1 credits is zero if the generator is deemed to make no contribution to security of supply and 1 otherwise (i.e. F factor that is assigned to the generator in the LRIC or FCP methodologies is equal to zero).

The Chargeable Export Capacity for each Connectee is defined as the Maximum Export Capacity minus any capacity that is exempt from use of system charges in the charging year.

The super-red generation rate is not applied to Connectees with zero Chargeable Export Capacity.

84. The approved method to determine the contribution to security of supply is set out in the FCP and LRIC methodology statements, and is reproduced below:

"The Network Demand Data (Generation) element of the Maximum Demand Data shall be constructed with generation output set at zero unless the generation can be considered to have a contribution to security of supply under ER P2/6, in which case the ER P2/6 level of export shall be modelled.

The contribution of distributed generation to security of supply is dealt with in ER P2/6 through the application of F factors. Each distributed generator is assigned an F factor and this represents the percentage of the generator's declared net capacity that can be considered when assessing network security. ER P2/6 also uses the term 'Persistence' to reduce the F factor for intermittent generation, as the time period (in hours) for which its contribution to security is being assessed increases. Table 2-4 of ER P2/6 recommends values of 'Persistence'; these values are dependent on the demand class being assessed. The value of 'Persistence' to be used for intermittent generation will be as stated in Table 2-4 of ER P2/6 for 'Other outage', using the maximum GSP (or GSP groups) demand instead of the demand class of the demand group."

85. This approach to assessing contribution to security of supply risks ignoring some contributions from certain types of generation that are considered "intermittent". For example, a wind turbine connected at an HV substation may not reduce the need for capacity at that substation, but it might (along with other generation in the area) reduce the flow at the time of peak demand at the 132kV/EHV substation. The extent to which the benefit offered by each generator is felt at the higher level substation could be approximated by its load factor (i.e. the probability that it is exporting at any instant).
86. The proposed method for calculating generation credits recognises this by making credits (in p/kWh of active export during the super-red time band) based on the FCP

and LRIC Charge 1 Remote element (relating to higher network levels) available to all EDCM generators.

87. Credits based on the FCP and LRIC Charge 1 Local element (relating to the network level of connection) would only be available to those generators that were assigned a non-zero F factor, i.e. it is deemed to make a non-zero contribution to security of supply in the power flow analysis.
88. The current approach to assessing generation contribution to security of supply (and ER P2/6) needs to evolve to take account of new developments, particularly in light of the forecast increase in renewable generation connected to distribution networks. This might, for instance, include taking account of local storage facilities in assessing contribution to security of supply. The DNOs will work with generators and other stakeholders to address these issues.
89. Table 2 summarises the current proposed approach to locational credits.

Table 2 Charge components for export

Locational charge element	Description	Application
Local Charge 1	This relates to the cost of demand-led reinforcement at the generator's network level of connection.	Applies as a credit to generators that are deemed to make a contribution to security of supply (i.e. is assigned a non-zero F factor)
Remote Charge 1	This relates to the cost of demand-led reinforcement at higher network levels.	Applies as a credit to all generators.

Transmission connection (exit) credits for qualifying export

90. EDCM export charges will include a capacity-based credit related to National Grid transmission connection (exit) charges.
91. Transmission exit credits would be paid to qualifying generators that have an agreement with the DNO, the terms of which require the generator, for the purposes of P2/6 compliance, to export power during supergrid transformer (SGT) outage conditions.
92. The rate in p/kVA/day for each generation customer would be calculated as follows:

$$\text{Transmission exit credit p/kVA/day} = -[\text{Transmission exit charging rate in p/kW/day}] * [\text{Capacity eligible for credits in kW}] / [\text{Chargeable Export Capacity in kVA of that Connectee}]$$

Where:

Transmission exit charging rate in p/kW/day is calculated as described for demand tariffs. See methodology described in Schedules 17 and 18 of DCUSA for a description of how this is calculated.

Capacity eligible for credits (in kW) is the capacity that is made available by the generator under the agreement with the DNO.

Chargeable Export Capacity (in kVA) is the forecast average value of the maximum export capacity of the generator over the charging year, less any capacity that is exempt from use of system charges in the charging year.

The generation transmission connection (exit) rate is not calculated for Connectees with zero Chargeable Export Capacity.

93. This £/kVA/year transmission exit credit would be applied to the Chargeable Capacity of the generator.

Reactive power charges

94. Export charges under the EDCM do not include a separate charge component for reactive power flows. This is because export charges (other than sole use asset charges) are based on export capacity (in kVA), rather than active power export (in kW or kWh).

Fixed charges for export

95. A export fixed charge in p/day would be applied to eligible generators. This fixed charge corresponds to an allocation of DNO direct operating costs and network rates associated to generation sole use assets. The method to calculate the fixed charges is the same as in the existing EDCM methodology.
96. The value of a customer's generation sole use assets used is expressed in the form of a modern equivalent asset value (MEAV) in £.
97. Sole use assets are assets in which only the consumption or output associated with a single customer can directly alter the power flow in the asset, taking into consideration all possible credible running arrangements, i.e. all assets between the customer's Entry/Exit Point(s) and the Distribution Point(s) of Common Coupling (DPCC) with the general network are considered as sole use assets. The DPCC for a particular single customer is the point on the network where the power flow associated with the single customer under consideration, may under some (or all) possible arrangements interact with the power flows associated with other customers, taking into account all possible credible running arrangements.
98. Where a Designated EHV Property has both import and export charges, associated with import and export meter registrations, the sole use assets are allocated between the import and export charges proportionally to maximum import and maximum export capacities respectively.
99. Where any part of the maximum export capacity associated with an export meter registration is exempt from use of system charges in the charging year, the value of sole use assets allocated to the export charge is reduced by multiplying it by the ratio of the Chargeable Export Capacity to the Maximum Export Capacity.

100. Where a Designated EHV Property that was originally connected as a single customer has subsequently been split into multiple sites, these sites continue to be considered as one site for the purposes of determining sole use assets. The sole use asset MEAV is allocated between these sites in proportion to their maximum import or maximum export capacities.
101. Fixed charges for sole use assets associated with export charges would be calculated using the same charging rates as for import charges within a DNO area.
102. The fixed charge corresponds to the MEAV of the sole use assets allocated to the export charge and is calculated for each export charge as follows:

Fixed charge on sole use assets in p/day = $(100 / DC) * S * ([NR \text{ contribution rate}] + [DOC \text{ contribution rate}])$

Where

DC is the number of days in the charging year.

S is the MEAV of sole use assets allocated to that export charge.

NR contribution rate is the network rates contribution rate in per cent. This is calculated as described in the EDCM for import charges. See methodology described in Schedules 17 and 18 of DCUSA for a description of how this is calculated.

DOC contribution rate is the direct operating costs contribution rate in per cent. This is calculated as described in the EDCM for import charges. See methodology described in Schedules 17 and 18 of DCUSA for a description of how this is calculated.

Capacity charges for export

103. The proposed EDCM includes an export capacity charge in p/kVA/day applied to the maximum export capacity.
104. The proposed approach to the calculation of the export capacity charge involves the following steps:
- a) An EDCM generation revenue target is determined. This is the total amount of revenue that would be recovered through export capacity charges.
 - b) A single fixed p/kVA/day charge is then calculated that, when applied to eligible export users, is forecast to recover the EDCM generation revenue target.
105. Under these proposals, the EDCM generation revenue target is calculated as the sum of three elements:
- a) An allocation of the cost of capital associated with qualifying capital expenditure incurred, or forecast to be incurred, by the DNO to enable the connection of distributed generation to its network on or after 1 April 2010. This allocation is done on the basis of ratio of EDCM capacity connected on or after 1 April 2010 to the total DG capacity connected on or after 1 April 2010.

- b) An element equal to the amount of revenue added to the DNO's allowed revenue in the charging year in respect of the distributed generation incentive scheme (DG Incentive) for qualifying generation connected between 1 April 2005 and 31 March 2010. This allocation is done on the basis of the ratio of EDCM capacity connected between 1 April 2005 and 31 March 2010 to the total DG capacity connected between 1 April 2005 and 31 March 2010.
 - c) An element representing an estimate of the operation and maintenance (O&M) costs that might be incurred by the DNO in connection with network assets that are built to accommodate new generation.
106. The qualifying capital expenditure, the applicable rate for the cost of capital, and the allowed revenue addition in respect of generators connected between 1 April 2005 and 31 March 2010 are all defined in the special conditions of the distribution licence (CRC11).
 107. Capital expenditure that might have been incurred to accommodate the connection of distributed generation before 1 April 2005 is not considered as this is deemed to have been paid by connectees through deep connection charges.
 108. For the purpose of estimating O&M costs the DNOs have relied on information contained within each DNO's Forward Business Plan Questionnaire (FBPQ) submissions to Ofgem. The most recent FBPQ submissions were prepared by the DNOs and sent to Ofgem as part of the fifth distribution price control review (DPCR5, April 2010 to March 2015) in a common format. Sheet LR2 of these submissions contains each DNO's forecasts of new generation capacity and the qualifying capital expenditure that would need to be incurred to connect them.
 109. An analysis of these FBPQ submissions suggests that the average forecast capital expenditure (excluding expenditure on sole use assets) per unit of new generation capacity (in £/kW) in each DNO area over the DPCR5 period ranges from 0 to £67/kW. The simple average of these numbers is £20.02/kW and a weighted average (weighted by new capacity) is £19.74/kW. The median is £15.66/kW.
 110. DNOs believe that an O&M rate of 1 per cent of the forecast capital expenditure (excluding expenditure on sole use assets) is reasonable, and when applied to these estimates would suggest an O&M contribution of approximately £0.20/kW. The O&M rate of 1 per cent is consistent with rates used for the DG incentive revenue calculations.
 111. We only consider capital expenditure associated with non-sole use assets as sole use assets are separately subject to generation and demand fixed charges. Adding capital expenditure relating to sole use assets here could result in double charging.
 112. To determine the total O&M allowance to include in the EDCM generation revenue target, we apply the O&M contribution rate of £0.20/kW to the aggregate maximum export capacities of all eligible EDCM export charges, excluding capacity that connected between 1 April 2005 and 31 March 2010. This is because the DG incentive revenue relating to qualifying generation connected between 1 April 2005 and 31 March 2010 includes an O&M allowance.
 113. The EDCM generation revenue target would be calculated as follows:

EDCM DG revenue target £/year = $GL * \left(\frac{[\text{Total 2005-2010 EDCM generation capacity}]}{([\text{Total 2005-2010 EDCM generation capacity}] + [\text{Total 2005-2010 CDCM generation capacity}])} + \frac{AGPa * [\text{Total post 2010 EDCM generation capacity}]}{([\text{Total post 2010 EDCM generation capacity}] + [\text{Total post 2010 CDCM generation capacity}])} + (OM * ([\text{Pre 2005 EDCM DG capacity}] + [\text{Post 2010 EDCM DG capacity}])) \right)$

Where:

GL is the incentive revenue in the charging year in respect of DG connected between 2005 and 2010 calculated for the charging year as in paragraph 11.10 of the Special Conditions of the Electricity Distribution Licence (CRC11).

AGPa is the average of the values of GPa for the charging year and each of the two years immediately preceding the charging year. GPa is calculated for the charging year, and the two years immediately preceding the charging year, using a modified version of the formula in paragraph 11.6 of the Electricity Distribution Licence (CRC11).¹⁰ To calculate GPa, the term GPX is replaced by the term GPS in the formula in paragraph 11.6. Both GPX and GPS are defined in paragraph 11.7 of the same document.

Pre 2005 EDCM DG capacity is the aggregate maximum export capacity of all non-exempt EDCM generators that connected before 1 April 2005. In the case of generators that have subsequently increased their maximum export capacity, the part of their capacity that was added after 1 April 2005 would be ignored.

2005-2010 EDCM generation capacity is the sum of the maximum export capacities of all non-exempt EDCM generators that connected between 1 April 2005 and 31 March 2010, adjusted for part-year connected generators.

Post 2010 EDCM generation capacity is the sum of the maximum export capacities of all non-exempt EDCM generators that connected on or after 1 April 2010, adjusted for part-year connected generators. In the case of generators that originally connected before 1 April 2010 and have increased their maximum export capacity on or after 1 April 2010, the capacity that was added after 1 April 2010 will be included.

2005–2010 CDCM generation capacity is the sum of the maximum export capacities of all non-exempt CDCM generators that connected between 1 April 2005 and 31 March 2010, adjusted for part-year connected generators.

Post–2010 CDCM generation capacity is the sum of the maximum export capacities of all non-exempt CDCM generators that connected on or after 1 April 2010, adjusted for part-year connected generators.

OM is an allowance in £/kW in respect of the operational and maintenance costs for assets that are deemed to have been installed for the purposes of connecting generators to the distribution network. See the next section for details of its calculation.

¹⁰ Special Conditions of the Electricity Distribution Licence, 31 March 2010 – Available from <http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR5/Documents1/CRCs%20master%20merged.pdf>

114. A fixed export capacity charge in p/kVA/day is calculated as follows:

Fixed export capacity charge in p/kVA/day = $(100 / DC) * [EDCM \text{ DG revenue target}] / [\text{Total EDCM generation capacity}]$

Where:

EDCM DG revenue target in £/year is calculated as described above

Total EDCM generation capacity (in kVA) is the aggregate Chargeable Export Capacity of all Connectees, adjusted, if necessary for Connectees connected part of the year. Chargeable Export Capacity (in kVA) is the forecast average value of the maximum export capacity of all Connectees over the charging year, less any capacity that is exempt from use of system charges in the charging year.

The fixed export capacity charge in p/kVA/day is applied to the Chargeable Export Capacity of each eligible EDCM Connectee.

Application of EDCM charges for end users

115. The charge application rules for the EDCM are the same as for the CDCM wherever possible.

Network unavailability rebates

116. Network unavailability rebates will be paid for qualifying generators in line with the CDCM methodology set out in Part 3 of Schedule 16 of DCUSA.

Exceeded capacity charges

117. Where a customer uses additional capacity over and above the maximum export capacity without authorisation, the excess will be classed as exceeded capacity.

118. For the purposes of determining capacity used, the following formula would be used for each half hour:

For export charges:

Export capacity used = $2 * (\text{SQRT}(\text{AE}^2 + \text{MAX}(\text{RI}, \text{RE})^2))$

Where:

AE = Import consumption in kWh

RI = Reactive import in kVArh

RE = Reactive export in kVArh

119. For the purposes of calculating exceeded export capacity charges, any reactive flows during half hours when there is no active power export would not be taken into account.

120. Any reactive flows associated with a site which operates subject to grid code requirements for generation or sites providing voltage control as a requirement of the

DNO would not be taken into account when calculating capacity used. This is to reflect the fact that the continuous operation of required voltage control apparatus could lead to reactive power flows that indicate a capacity utilisation that is higher than the maximum export capacity associated with that site.

121. The exceeded portion of the capacity will be charged at export capacity charge rate calculated as described earlier. This will be charged for the duration of the month in which the breach occurs.

Charges for new customers

122. New customers could connect at any time between the publication of EDCM charges for the new charging year and the end of that charging year.
123. If the connection of such customers has been anticipated before the publication of charges, DNOs will have included forecast data after seeking indicative export profile information relating to the new customer in both the power flow model and the EDCM model. The resulting charge would be applied to the new customer based on the number of days connected in the charging year if the price is produced during the charging year.
124. If prices need to be produced for new connections that have not been anticipated at the time of calculating EDCM charges for that charging year, the DNO will:
 - a) Run the power flow model after including the new customer to produce a full set of LRIC or FCP Charge 1 values, including those for the new customer;
 - b) Include the new customer's details, including LRIC or FCP charges in the EDCM model, to produce a full set of new charges;
 - c) Use the charge relating to the new customer to calculate charges and credits; and
 - d) Charges or credits applied to existing customers would not change as a result of this process.
125. If the new connection occurs during the year, the charges would apply from the energisation date.

Generation side management (GSM)

126. EDCM users may be subject to Generation side management (GSM) agreements with the DNO. Users subject to such agreements have interruptible connections and agree to stop or reduce production at the request of the DNO.
127. The April 2011 EDCM submission included proposals for reduced EDCM charges for generators that enter into a generation side management (GSM) agreement with the DNO.
128. DNOs believe that reduced EDCM export charges for generators with GSM agreements are not relevant to the current proposals. This is because the locational element (the FCP/LRIC charge 2) is no longer applied as a charge to generation.

129. Charges to generators under these proposals would be calculated by combining elements of the DG incentive revenue (which relates to new DG connections) and an O&M element derived from forecasts of capital expenditure associated with new DG connections. The other element of the EDCM export charge relates to sole use assets.
130. The proposed method does not include any charge that can be linked to costs that are potentially avoided by a temporary reduction in the capacity usage of a generator. Consequently, no reduction in EDCM charges under a GSM agreement can be justified.
131. The EDCM proposals do not affect the terms of any existing GSM agreement.

LDNO charges

132. This section describes the proposed methodology applicable to independent licensed distribution network operators (LDNOs).
133. Under the EDCM, the following charges would apply for LDNOs with distribution systems that qualify as designated EHV properties:
 - a) portfolio discounts for those end users who would have qualified as Designated Properties eligible for the CDCM had they been connected directly to the host DNO (also called “CDCM-like end users”) using the extended price control disaggregation model (extended “Method M”); and
 - b) EDCM charges for those end users who would have qualified as Designated EHV Properties eligible for the EDCM had they been connected directly to the host DNO (also called “EDCM-like end users”).
134. The method to calculate these portfolio discounts for CDCM-like end users is described in the EDCM for import charges proposed by the DNOs and approved by Ofgem in December 2011.
135. LDNOs with distribution systems that qualify as an EDCM “Designated EHV Property” could themselves have end users who would fall under the scope of the EDCM. In the case of generation EDCM end users, the host DNO would calculate EDCM export charges (and credits) at the DNO boundary for each EDCM-like generation end user on the LDNO’s network. No discounts would be calculated for such users as the DNO charges would be based only on the specific site’s equivalent use of the DNO network.
136. These EDCM export charges would be calculated as if each EDCM end user on the LDNO’s distribution system were notionally connected at the boundary between the DNO and LDNO.
137. Such end users would attract credits in respect of any reinforcements avoided on the DNO’s network only, i.e. any network branches that are on the LDNO’s network would be attributed a zero FCP/LRIC credit.
138. The setting of final charges to embedded Designated EHV Properties including the calculation of charges or credits for assets used on the embedded network will be established by the LDNO.

139. All EDCM export charges would be calculated using “boundary equivalent” data provided by the LDNO to the host DNO for each embedded Designated EHV Property. For the purposes of the EDCM, the LDNO should allow for boundary equivalent data at the DNO-LDNO boundary, for each EDCM end user, after taking into consideration the diversity and losses within the LDNO’s network. Data relating to CDCM end users must be considered for the purposes of calculating boundary equivalent data in order to cater for the effect of diversity and losses.
140. The EDCM would include in the charges for embedded Designated EHV Properties a fixed charge relating to any assets on the DNO’s network that are for the sole use of an embedded LDNO network. These fixed charges would be calculated in the same way as it would be for EDCM customers connected directly to the host DNO’s network.
141. In calculating charges for assets on the DNO’s network that are for the sole use of an embedded LDNO distribution system, DNOs will charge only for the proportion of sole use assets deemed to be used by embedded Designated EHV Properties. This proportion will be calculated, in respect of each embedded Designated EHV Properties, as the ratio of the boundary equivalent capacity of that end user to the capacity at the LDNO/DNO boundary.
142. If there are no embedded Designated EHV Properties on the LDNO’s network, no sole use asset charges would apply.
143. EDCM export capacity charges will be applied as normal to generators connected to the LDNO’s network. Again, boundary equivalent export capacities would be used to calculate the generation revenue target and the export capacity charge.
144. The following table lists the different types of data that the LDNO would be required to provide in respect of each EDCM-like demand or generation end user site that can export (including any nested or offshore networks).

Table 3 Boundary equivalent data items that the LDNO must provide

Item	Description
LLFC	This is the line loss factor class for the charging unit (or any other short identifier). This is for labelling purposes and does not affect any calculations.
Tariff name	This is a full name/identifier for the charging unit.
Demand or Generation	Whether demand or generation, or both charges are to be determined.
Proportion eligible for local Charge 1 credits	This is zero in the case of sites with that would have been assigned a zero F factor by the host DNO, and 1 otherwise.
Forecast maximum export capacity (kVA)	The figure is the boundary-equivalent forecast average over the charging year along.

Forecast average exceeded capacity (kVA)	The figure is the forecast average excess over the charging year. Excess capacity is to be measured on the basis of maximum use in each billing month.
Forecast active power units (kWh)	This is the forecast active power generation during the host DNO's super-red time band

145. The method for calculating the generation revenue target within the EDCM requires an estimate of total installed generation capacity on the DNO's network. LDNOs must therefore provide the DNO an estimate of the following:
- a) aggregate embedded CDCM generation capacity on their network, split between pre-April 2005 capacity, capacity that connected between 1 April 2005 and 31 March 2010, and post-April 2010 capacity; and
 - b) aggregate embedded EDCM generation capacity, split between pre-April 2005 capacity, capacity that connected between 1 April 2005 and 31 March 2010, and post-April 2010 capacity.

Glossary

<i>Term</i>	<i>Explanation</i>
CDCM	The common distribution charging methodology. (The average charging model used for setting charges for high-voltage and low-voltage connections.)
Charging year	The financial year (12 month period ending on a 31 st March) for which charges and credits are being calculated.
DCUSA	The Distribution Connection and Use of System Agreement.
EHV	In this document, EHV normally refers to nominal voltages of at least 22kV.
Embedded network	An embedded distribution network operated by an LDNO.
FBPQ	Forecast business plan questionnaire, a dataset produced by each regional distribution network operator for Ofgem as part of the price control review.
GSP	Grid supply point: where the distribution network is connected to a transmission network, except an offshore transmission network.
HV	Nominal voltages of at least 1kV and less than 22kV.
kV	Kilovolt (1,000 Volts): a unit of voltage.
kVA	Kilo Volt Ampere: a unit of network capacity.

<i>Term</i>	<i>Explanation</i>
kVAr	Kilo Volt Ampere reactive: a unit of reactive power flow. The network capacity used by a flow of A kW and B kVAr is $\text{SQRT}(A^2+B^2)$ kVA.
kVArh	kVA reactive hour: a unit of total reactive power flow over a period of time. Reactive power meters usually register kVArh.
kW	Kilowatt (1,000 Watts): a unit of power flow.
kWh	Kilowatt hour: a unit of energy. Meters usually register kWh.
LDNO	Licensed distribution network operator. This refers to an independent distribution network operator (IDNO) or to an distribution network operator (DNO) operating embedded distribution network outside its distribution service area.
Licensee	The distribution network operator using this methodology to set use of system charges for its network.
LV	Nominal voltages of less than 1kV.
MVA	Mega Volt Ampere (1,000 kVA): a unit of network capacity.
MW	Megawatt (1,000 kW): a unit of power flow.
MWh	Megawatt hour (1,000 kWh): a unit of energy. Energy trading is usually conducted in MWh.
Network level	The network is modelled as a stack of circuit and transformation levels between supplies at LV and the transmission network. A network level is any circuit or transformation level in that stack. An additional network level is used for transmission exit.
Portfolio charge	A tariff for use of the network by another licensed distribution network operator where charges are linked to flows out of/into the other licensed distribution network from its end users or further nested networks.
Settlement period	One of 46, 48 or 50 consecutive periods of a half hour starting at 0:00 UK clock time on each day.
Standard distribution licence conditions	The standard conditions of the electricity distribution licence that have effect under section 8A of the Electricity Act 1989 (introduced by section 33 of the Utilities Act 2000).
System simultaneous maximum load	The maximum load for the GSP Group as a whole.
Unit	Where the context permits, the word unit refers to kWh.

<i>Term</i>	<i>Explanation</i>
Unit rate	A charging or payment rate based on units distributed or units generated. Unit rates are expressed in p/kWh. Charges applied to multi-rate meters and/or using several time bands for charging have several unit rates.

Annex 1: Condition 50A of the Standard Distribution Licence Conditions

146. Condition 50A, introduced into the standard distribution licence conditions by Ofgem specifies four relevant objectives for the EDCM:

50A.7 The first Relevant Objective is that compliance with the EDCM facilitates the discharge by the licensee of the obligations imposed on it under the Act and by this licence.

50A.8 The second Relevant Objective is that compliance with the EDCM facilitates competition in the generation and supply of electricity and will not restrict, distort, or prevent competition in the transmission or distribution of electricity or in participation in the operation of an Interconnector.

50A.9 The third Relevant Objective is that compliance with the EDCM results in charges which, so far as is reasonably practicable after taking account of implementation costs, reflect the costs incurred, or reasonably expected to be incurred, by the licensee in its Distribution Business.

50A.10 The fourth Relevant Objective is that, so far as is consistent with the first three Relevant Objectives, the EDCM, so far as is reasonably practicable, properly takes account of developments in the licensee's Distribution Business.

147. Condition 50A also defines a Designated EHV property:

50A.11 For the purposes of this condition, Designated EHV Properties are any of the following:

(a) Distribution Systems connected to the licensee's Distribution System at 22 kilovolts or more;

(b) premises connected to the licensee's Distribution System at 22 kilovolts or more;

(c) Distribution Systems (that are not LDNO Distribution Systems) connected directly to substation assets that form part of the licensee's Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and where the Metering Point is located at the same substation;

(d) LDNO Distribution Systems connected directly to substation assets that form part of the licensee's Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and where the LDNO Asset Ownership Boundary is at the same substation; and

(e) premises connected directly to substation assets that form part of the licensee's Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and where the Metering Point is located at the same substation.