Consultation on a Proposed Draft Code of Practice for Embedded Network Billing
5th August 2009

energynetworks association

energynetworks.org

Consultation Document on a Proposed Draft Code of Practice for Embedded Network Billing

1. The subject of this consultation is a proposed new code of practice for billing use of system charges to embedded networks. A preliminary draft of the code of practice is published alongside this consultation document.

2. The consultation has been drafted by Workstream 2 of the Common Methodology Group, which contains representatives from the Distribution Network Operators, Suppliers, Independent Distribution Network Operators and Ofgem.

3. The consultation period runs from [Wednesday 05 August 2009] to [Wednesday 16 September 2009] (six weeks). Please respond to CDCM@energynetworks.org.

Objective of the code of practice

4. The tariffs for embedded networks that were proposed in the 12 June 2009 consultation on the CDCM were "portfolio tariffs".

5. Portfolio tariffs mirror the tariff components of the all-the-way charges and credits (the charges and credits that would apply if the embedded network's users were connected to the DNO's network).

6. Portfolio tariffs include fixed, capacity and unit charges, as well as unit credits for generators connected to the embedded network.

7. The need for a new set of procedures and systems for arises directly from the choice of portfolio billing.

8. In order to apply portfolio tariffs, the host network operator (which might be either a DNO within its licence area or, in a nested network situation, a DNO outside its historic area or an IDNO) needs information about the loads on the embedded network. Information from boundary metering and an agreed maximum import capacity at the boundary are not enough to bill portfolio tariffs.

9. BSC change proposal CP1280 would have required ELEXON systems to provide some of the information needed for portfolio billing. This proposal was rejected by the Supplier Volume Group in March 2009 "because of concerns over the cost and complexity of the Change".

10. The objective of the proposed code of practice is to solve the data provision issues and permit the use of portfolio tariffs for use of system billing.

Interaction with boundary metering

11. The arrangements proposed in the draft code of practice can operate with or without boundary metering.

12. Where boundary metering is used, the billing process reconciles the settlement data from the embedded network to the metered boundary flow.

13. The inclusion of reconciliation within the draft code of practice does not imply that all embedded networks need to be metered at all boundaries.

14. Provided that LLFC are allocated appropriately and that the standing data are populated accurately, the proposed code of practice supports both cases where all embedded networks are metered and reconciled, and cases where some networks might not have boundary metering.

15. The following issues are not within the scope of this consultation:

    a) whether boundary metering or any particular type of boundary metering, is required at every network boundary or at any particular type of boundary;

    b) where boundary metering is used, who should be responsible, technically or financially, for boundary metering and boundary data collection.

16. Ofgem has told us that it intends to consult on boundary metering requirements in the next couple of months.

Interaction with boundary tariffs

17. Embedded networks are currently charged on the basis of boundary tariffs, which depend on an agreed import capacity at the network boundary and on the boundary flow.

> **Q1. Should boundary tariffs be offered to embedded networks alongside portfolio tariffs? If so, should the applicable tariff be at the option of the embedded network operator or based solely on capability to supply the necessary data?**

Background to the proposed code of practice

18. A working paper prepared by DNOs in April 2009 for an IDNO/DNO working group meeting (chaired by Ofgem) described a "simplified" (spreadsheet-based) approach to billing IDNOs on the basis of a portfolio tariff approach. This approach was originally described by EDF as part of their interim IDNO modifications[1], and some pertinent extracts of it are reproduced in the Appendix to this paper.

19. The proposals to use industry settlement data proposed in this consultation and in the accompanying code of practice are a development from the simplified approach in the appendix. It has been the consensus of the working group that such simplified approach is not fitted for an enduring solution.

> **Q2. Should the "simplified" method first considered by the working group be used for an enduring solution?**

Overview of the proposed code of practice

20. In these circumstances, we have begun to develop a new "code of practice" which would define the requirements for the new data processing and exchange required to support portfolio billing.

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[1] "Interim" modification refers to methodology changes to be implemented prior to April 2010, when the Common Distribution Charging Methodology comes into effect.

21. This code of practice defines the task of new data processing agents, and defines the rules under which all relevant industry parties would be operating.

22. Once the code of practice is agreed, the next step would be to appoint appropriate contractors or Agents to deliver and operate the relevant systems. Consideration will again be given to the possibility of close links with ELEXON systems at this implementation stage.

Q3. Is it appropriate to develop a "code of practice" as a statement of the rules and data processing requirements before undertaken any further procurement or development work?

23. The draft envisages that the code of practice will be given contractual force by incorporating it within the DCUSA.

Q4. Is DCUSA an appropriate contractual vehicle for this code of practice? If not, what should be the contractual structure?

The proposed reconciliation rules

24. The code of practice is designed to permit implementation of a boundary metering reconciliation procedure based on the method set out at paragraphs 2.44 to 2.54 of the 12 June 2009 consultation document on the CDCM. The 12 June 2009 consultation document is available from http://2009.energynetworks.org/structure-of-charges/.

25. The 12 June 2009 consultation document proposed to aggregate the data by distribution time band before reconciliation. This was specified in this way to be compatible with a manual, spreadsheet-based process. For an automated system based on settlement flows, as envisaged in the code of practice, it seems more appropriate to rely on data for settlement periods (individual half hours).

26. For each embedded network, host network, network level of connection (if metered), and financial period, the processing using the following input data:

QMNHH — total non half hourly boundary meter import on the embedded network operator's networks within the GSP Group.

$QMHH_j$ — total half hourly boundary meter import on the embedded network operator's networks within the GSP Group, by settlement period (denoted by the j subscript).

$QENHH_R$ — total non half hourly billed units (from settlement) against tariff/TPR combination (denoted by the R subscript) in embedded and nested networks.

$QEHH_{Tj}$ — total half hourly billed units against tariff (denoted by the T subscript) and time band in embedded and nested networks.

A series of loss adjustment factors to adjusted billed units to be consistent with boundary meter readings.

27. Applying the loss adjustment factors to $QENHH_R$ and $QEHH_{Tj}$ gives:

$QLNHH_R$ — total non half hourly billed units against tariff/TPR combination in embedded and nested networks, adjusted for estimated losses.

$QLHH_{Tj}$ — total half hourly billed units against tariff and time band in embedded and nested networks, adjusted for estimated losses

28. The non half hourly correction factor is defined by (the equivalent formula, at paragraph 2.49 of the 12 June 2009 paper, was incorrectly stated):

$$CNHH = (QMNHH + \sum_j QMHH_j) / (\sum_R QLNHH_R + \sum_{Tj} QLHH_{Tj}).$$

29. The half hourly correction factor is defined for each settlement period as:

$$CHH_j = 1 + (CNHH - 1)*(QMHH_j/\sum_T QLHH_j - 1)/(\sum_j QMHH_j/\sum_{Tj} QLHH_{Tj} - 1).$$

30. The output from the reconciliation process is a set of adjusted billed volumes:

$QLNHH_R$*CNHH for each non half hourly tariff/TPR combination.

$QLHH_{Tj}$*CHH_j for each half hourly tariff and each settlement period.

31. The effects of these formulae are:

a) The total units billed agree with the total units metered in the financial period.

b) Any total discrepancy between boundary meter reading and billed units is allocated between the half hourly and non half hourly sectors in proportion to their volumes. In particular, if there are no half hourly billed units on the embedded network then the embedded network operator is not exposed to any half hourly charges.

c) Any discrepancy attributed to the half hourly sector between time bands is allocated in proportion to the observed discrepancy between half hourly boundary flows and half hourly billed amounts.

32. We have considered the alternative of using a single reconciliation factor for all non-half-hourly and all half-hourly data.

33. This change would eliminate the need for processing of half hourly data (or of data by distribution time band). However, it would not change any of the data flows, since half hourly data (or aggregates by time band) would still be collected from relevant meters, and would still need to be supplied to the Company for billing. The only change would be a modest simplification of the calculation rules operated by the Agent.

34. Against this, there would need to be stronger performance assurance duties on embedded network, since the reconciliation to boundary metering would be less effective at mitigating the risks caused by possible registration errors or data collection failures that might affect the determination of billed units (units consumed by users on the embedded network).

35. There is also a risk that a system that would ignore settlement period or distribution time band data could be more difficult to migrate to a situation where de-linking is implemented for distribution use of system billing across the industry.

Q5. Should reconciliation by settlement period for half hourly tariffs be specified in the code of practice?

Technical interfaces and impact on suppliers

36. The proposed code of practice has sought to stay as close as possible to existing industry data flows. Whilst new interfaces and functionality will be required in billing systems of all parties to support portfolio billing, we hope that this approach minimises IT development and testing costs by enabling a degree of adaptation and reuse of existing code.

37. One effect of this minimum-change approach is that the method relies on LLFCs to tag data through the settlement system.

38. Most embedded network operators will need to migrate most existing MPANs to new LLFCs in order to implement the proposals in the code of practice.

Q6. Is the migration of most MPANs on embedded networks to new LLFCs by 1 April 2010 feasible? What is the impact on suppliers' systems?

39. Given the need for a wholesale migration of MPANs to new LLFCs, there might be an opportunity to standardise the way in which LLFCs are allocated on IDNO and out-of-area networks.

Q7. Should a common allocation of LLFCs be mandated for IDNO and out-of-area networks?

40. LLFCs are limited to three digits, and separate LLFCs are needed for each combination of GSP Group and boundary level, and for each nested network configuration. There is a risk that some distributors could run out of LLFCs.

41. We propose the following mitigation measures:

a) The same LLFCs can be given to different types of customers at the same network level of supply. This means that the applicable distribution use of system tariff depends on the combination of LLFC, profile class and standard settlement configuration, not just on the LLFC. GTC already uses this approach.

b) Additional distributor IDs could be allocated to distributors who run out of LLFCs. There are 90 possible distributor IDs, of which only 19 are currently in use, and each distributor ID gives access to 999 new LLFCs.

Q8. Are suppliers able to validate distribution use of system charges where the applicable tariff depends on the combination of LLFC, profile class and standard settlement configuration?

Q9. Would allocating additional distributor IDs to existing distributors to release additional LLFCs cause any problems for existing industry systems?

42. Despite these measures, there might be a need to expand the range of codes available at some point in the future, particularly if site-specific LLFCs are needed for all cases involving EHV boundaries to permit locational charging.

43. Further expansion would require widespread changes to systems. For example, they could involve lengthening LLFCs or allowing alphanumeric characters in them. This would affect suppliers and MRA and SVA systems. Customer-facing S-numbers would also change as a result.

Q10. Given the LLFC conservation measures proposed, is there an immediate need to plan for changes to industry system to allow for more disaggregated tagging of data, e.g. through longer LLFC?

Governance arrangements for a central Agent

44. If a central Agent is to be established then contracting and governance arrangements for that Agent will be needed.

45. Whilst the DCUSA can prescribe data flows and processes, it is unlikely that such a central agency is within the scope of DCUSA. Any agency performing such a role or providing such services will not be a party to DCUSA and therefore, will not fall under DCUSA governance arrangements.

46. However, it would be appropriate for the DCUSA to give a clear allocation of the responsibility for appointing the Agent. Options include:

a) That each User should be responsible for appointing an Agent. Whilst one might expect that a joint procurement exercise yielding a single Agent would be in Users' interests, there would be no DCUSA obligation to that effect.

b) That each Company should be responsible for appointing an Agent. Whilst one might expect that a joint procurement exercise yielding a single Agent would be in Companies' interests, there would be no DCUSA obligation to that effect.

c) That the Users collectively should be responsible for appointing an Agent (perhaps using the Competitive Networks Association).

d) That the Companies collectively should be responsible for appointing an Agent (perhaps using the Energy Networks Association).

e) That a central body such as DCUSA Limited or Ofgem should be responsible for appointing the Agent.

Q11. Who should be responsible under DCUSA for appointing the Agent?

47. The funding arrangements for the Agent would depend on the appointment method: it would be desirable that the person who selects and appoints the agent should have a financial interest in its performance. But given the likelihood of a collective procurement under all appointment options, there is a need for an agreement on the sharing of costs. Options include:

a) That the costs be paid for by DNOs and recovered through DNOs' price controls, if Ofgem is able to accommodate an additional cost category (perhaps as a cost pass-through) in the forthcoming price controls.

b) That the costs be paid for by DNOs and recovered, in whole or in part, through transactional charges to embedded network operators.

c) That the costs be shared between all distributors and not further recovered.

48. Under options (b) and (c), there is also a need to specify the basis on which costs would be split between distributors — e.g. on the basis of MPAN counts, licensed entities, etc.

Q12. On what basis should the costs of the Agent be recovered?

Possible use of a spreadsheet solution on a temporary basis

49. Even if the code of practice is finalised and implemented without delay, developing and testing the relevant IT systems is likely to take some time. There can be no certainty that a fully automated implementation of the data flows specified in the code of practice will be in place in all cases on 1 April 2010.

50. We have therefore considered the possibility of using a spreadsheet-based solution on a temporary basis until fully automated processes are ready.

Q13. Is the use of a spreadsheet solution on a temporary basis acceptable?

51. Given the objective to move to an automated solution as soon as possible, we consider that the procedure under any interim solution should match as closely as possible those of the code of practice. For example, the mapping tables using All-the-way Codes and Boundary Codes would be put in place before 1 April 2010.

52. One simplification of the specification that would seem appropriate for a temporary spreadsheet-based solution would be to use aggregates by distribution time bands for half hourly settled volumes, instead of the settlement period by settlement period calculations specified in the code of practice. The billing arrangements outlined in the consultation document published on 12 June 2009 were on that simplified basis.

Q14. Are any changes other than the use of distribution time band aggregates necessary for a temporary spreadsheet solution?

Performance assurance

53. Table 1 sets out a preliminary draft of the issues and risks register for the code of practice.

Table 1 Issues and risks register			
No	*Issue or risk*	*Effect*	*Mitigation*
Ongoing risks			
1	Standing data tables may be wrong.	Units will be allocated to the wrong tariffs/networks and charges are likely to be wrong.	Standing data can be checked by any interested parties against published information.
2	Boundary meters may be incorrectly registered or not read.	Units will be reconciled to the wrong amounts and charges will be wrong.	Commissioning / post-commissioning checks. Correction factors far away from unity might highlight any large errors.
3	LLFCs may be incorrectly attributed by the embedded network operator	Billed units will not reflect actual consumption in each network type. Charges may be made for the wrong tariffs.	
4	Settlement meters on the embedded network may be missing, incorrectly registered or not read.	Billed units will not reflect actual consumption. Charges may be made for the wrong tariffs.	The reconciliation process ensures that charges are based on actual consumption. It is normally in the embedded network operator's own interest to ensure correct registration. The BSC Audit arrangements apply. Correction factors far away from unity might highlight large errors.
5	Input data files are rejected by the Agent.	The Agent will not be able to load the files in its system, or will not have the right data.	

Table 1 Issues and risks register			
Initial implementation and transition risks			
6	Funding arrangements have not been agreed.	Implementation may be delayed.	The funding issues are raised in this consultation; however, this is also a matter for Ofgem to consider in the context of price controls. A temporary spreadsheet solution might plug any gap.
7	Framework and governance arrangements for central agent have not been agreed (this is outside the scope of DCUSA).	No Agent appointed.	IDNO/DNO workstream to consider procurement issues. A temporary spreadsheet solution might plug any gap.
8	The data transfer network (DTN) does not currently recognise the new data flows.	Files would have to be sent by e-mail rather than over the DTN, creating additional work at both ends and a higher risk of error.	Changes need to be made to data transfer catalogue (DTC), Electralink systems etc.
9	Not all embedded network operators have structured their LLFCs to be able to determine the connection voltage.	Settlement data cannot be used for DUoS billing unless LLFCs are changed.	Embedded network operators will need to create, enter into MDD, and assign new LLFCs to most MPANs. This will take substantial effort and time.
10	Cutover issues from existing NHH boundary billing if the meter is not read on 1 April 2009.	The Agent will not have boundary meter data for the first month.	Company and User to agree an estimated boundary meter reading.
11	Processes, procedures and data flows (for settlement data for boundary metering data) have not been agreed.	Implementation may be delayed.	This consultation tries to mitigate this risk. A temporary spreadsheet solution might plug any gap.

Table 1 Issues and risks register			
12	No agreement on circumstances for where boundary metering is required.	No direct impact on billing arrangements, but could lead to a withdrawal of support from some parties and/or difficulties in agreeing technical interfaces and data flows for boundary metering data.	Ofgem is expected to consult on these issues. A temporary spreadsheet solution might plug any gap.
13	Users might be unable to provide data to the Agent.	Data for portfolio billing cannot be provided.	If LLFCs have been migrated, then the arrangements are designed to use data that all parties will have or need to have for other reasons, e.g. D0030, D0275/D0036, capacity notifications. Otherwise, a temporary spreadsheet solution might plug any gap.
14	Modifications to DCUSA might be rejected.	Implementation may be delayed.	Contact DCUSA panel to carry out initial assessment. If there are problems, consider other contractual vehicles and/or develop new contractual framework.
15	Possible opposition from Ofgem, suppliers or distributors.		This consultation tries to mitigate this risk. Start work immediately on addressing other risks and issues listed above.
Other issues			

Table 1 Issues and risks register			
16	Distribution time bands for half hourly settled users will vary between areas and over time.	Embedded network operators will need to keep time band data for each area in which they have half hourly settled users. This is needed to validate DUoS bills, to bill their users if their charging methodology is to mirror the DNO's time bands, and to operate a spreadsheet-based temporary method.	The Agent makes its calculations on a settlement period basis — it does not need to know the distribution time bands. Suppliers will also need to keep their time band data up to date — whatever communications arrangements and restrictions on updates are agreed for suppliers will also benefit embedded network operators.
17	Depending on the timescale and all participants being ready for changeover to the new method, there could be an effect on cashflow.	There is a potential to have two systems running in conjunction if there is a delay to some participants being ready for a changeover date, when others are ready to go, and have spent time and money on internal systems.	

Q15. Have we captured the main risks and issues?

Incorporation of the code of practice into DCUSA

1. The Distribution Connection and Use of System Agreement (DCUSA) governs the contractual relationships between one distributor who connects his distribution system to that of another and who receives use of that system for the purpose of conveying electricity to and from premises. Whilst Section 2A deals with distributor to supplier relationships, Section 2B of the DCUSA deals with the distributor to distributor relationships.

2. It would be inappropriate that the detail about the timescales and about how the data is provided (format, method and process) be detailed in the main body of the DCUSA. Such detail is better detailed in a separate code of practice. Whilst such code of practice could be a separate document referenced by DCUSA, this would require a separate governance arrangements to be established for such document. Therefore it might be more appropriate, at least in the first instance, to incorporate the arrangements as a Schedule to DCUSA.

3. Incorporation into the DCUSA would also allow the DCUSA's dispute resolution processes to be used for any disputes under the code of practice.

Q16. Should the code be established as a Schedule to the DCUSA, subject to DCUSA governance and dispute resolution processes?

4. In order to make a change to DCUSA a Party will need to raise a change proposal to describe the intent of the change and where possible provide legal drafting. Following submission of the change proposal the DCUSA Panel are likely to establish a working group to review and develop the change.

5. The extent of the work required by this working group will in part be determined by the quality and the completeness of the proposal. It would make sense that, prior to a Party submitting a change proposal, IDNOs and DNOs endeavour to agree on the detailed wording of the proposed code of practice. This is the purpose of this consultation and of the work undertaken under Work Stream 2 of the CMG to develop this consultation and the draft code of practice.

6. On completion of the work change proposals will be put to DCUSA parties for voting. Since this proposal only impacts on Section 2B of the DCUSA it is likely that only IDNO and DNO constituencies will be allowed to vote. For the Panel to recommend acceptance of the change a majority in both the IDNO and DNO constituencies will be required.

7. The decision as to whether the change should be made will lie with Ofgem (since such change is likely to be a Part 1 matter).

Changes to the main text of DCUSA

8. Table 2 highlights DCUSA clauses potentially affected by the code of practice.

Table 2 Initial review of affected DCUSA clauses

Clause	*Provision*	*Action proposed*
40.2	**Provision of Loss Adjustment Factors** This clause requires that the Company (the upstream distributor) provide to the User loss adjustment factors in respect of each Connection Point. Currently this is not done.	Loss adjustment factors for DUoS billing would be provided under the proposed code of practice, for boundary meter reconciliation. For energy settlement purposes, embedded networks may continue to publish seasonal time of day loss adjustment factors that replicate the all the way loss adjustment factors published by the upstream DNO.

Table 2 Initial review of affected DCUSA clauses		
Clause	*Provision*	*Action proposed*
42	**Provision of Data and Metering Equipment** Clause 42.1 requires the User to provide to the Company data provided from the metering equipment installed at the boundary or from an Alternative Solution. The DCUSA leaves it for each Company to specify timescales for data provision in the Charging statement.	Strictly speaking, Clause 42 does not need to change to implement the code of practice. Embedded network operators believe that Clause 42 needs to be reviewed. Timescales and formats for data provision should be prescribed in the code of practice.
43	**Charges**	The invoicing of embedded networks needs to align with the invoicing of suppliers. The purpose of this is to align cash flows so that neither the IDNO or DNOs suffer cash flow gains or losses. Provisions need to be in place as to what mechanisms are in place when data is not provided for invoicing.
44	**Billing and Payment**	The equivalent Clause in Section 2A of DCUSA (Clauses 21 and 22) deals with billing by settlement class (aggregate or portfolio billing) and site specific billing. These sections may need significant work, particularly to allow for reconciliation runs. A review is needed to ensure that the DCUSA does not preclude the payment of credits to be paid in respect of generation on embedded networks.

Summary of questions

This section lists the specific questions raised in this consultation document.

Q1. Do you agree with the overall philosophy of our proposals?

Q2. Are there any other philosophies that we should considered? If yes, what are they?

Q3. Is the use of loss adjustment factors necessary? Does the estimation of these factors raise any particular issues?

Q4. Should boundary tariffs be offered to embedded networks alongside portfolio tariffs? If so, should the applicable tariff be at the option of the embedded network operator or based solely on capability to supply the necessary data?

Q5. Is it appropriate to develop a "code of practice" as a statement of the rules and data processing requirements before undertaken any further procurement or development work?

Q6. Is DCUSA an appropriate contractual vehicle for this code of practice? If not, what should be the contractual structure?

Q7. Should reconciliation by settlement period for half hourly tariffs be specified in the code of practice?

Q8. Is the migration of most MPANs on embedded networks to new LLFCs by 1 April 2010 feasible? What is the impact on suppliers' systems?

Q9. Should a common allocation of LLFCs be mandated for IDNO and out-of-area networks?

Q10. Are suppliers able to validate distribution use of system charges where the applicable tariff depends on the combination of LLFC, profile class and standard settlement configuration?

Q11. Would allocating additional distributor IDs to existing distributors to release additional LLFCs cause any problems for existing industry systems?

Q12. Given the LLFC conservation measures proposed, is there an immediate need to plan for changes to industry system to allow for more disaggregated tagging of data, e.g. through longer LLFC?

Q13. Who should be responsible under DCUSA for appointing the Agent?

Q14. On what basis should the costs of the Agent be recovered?

Q15. Is the use of a spreadsheet solution on a temporary basis acceptable?

Q16. Are any changes other than the use of distribution time band aggregates necessary for a temporary spreadsheet solution?

Q17. Have we captured the main risks and issues?

Q18. Should the code be established as a Schedule to the DCUSA, subject to DCUSA governance and dispute resolution processes?

Appendix A: Extract from DNO Working Paper 30 April 2009

Simplified case if there are no half hourly metered embedded users

1. In a paper entitled "Proposals for interim IDNO charging methodology", EDF Energy Networks has put forward an outline specification for data interchange to underpin a set of portfolio tariffs. We have expanded this method in a way that only affects the results for embedded networks which have half hourly metered end users.

2. For ease of presentation, we set out first how the method would work in the case where all the users are non-half-hourly metered users. The full rules covering all cases, including where there are half hourly metered embedded users, are detailed later in this paper.

Data required from embedded network operator

3. The billing method involves asking the embedded network to submit, in respect of each financial period (e.g. a month), each GSP Group and each voltage level of connection of the embedded network:

    a) Embedded and nested user counts for each end user tariff that has a fixed charge.

    b) A percentage allocation of units consumed on embedded and nested networks broken down by tariff, and for multi-rate tariffs by rate (e.g. day/night).

Application of unit rates

4. To issue a bill, the DNO takes total boundary meter load, aggregated over the financial period (e.g. a month) and across all the relevant embedded network sites in the GSP Group, and uses the stated proportions submitted by the embedded network to allocate the total units to tariffs and rates.

5. Under the enduring structure for portfolio tariffs, unit rates in portfolio tariffs will have the same structure as all-the-way unit rates, but be lower for two reasons:

    a) because only parts of the DNO's network are charged for; and

    b) to reflect estimated electricity losses between the boundary meter and the end user meter (since unit rates in portfolio tariffs apply to boundary units).

6. The proposal is to use loss adjustment factors relating to relevant network levels of the DNO's network as a whole in order to make these calculations (not an estimate of losses on embedded networks specifically). The factors used would be published in the use of system tariffs or in the model used to set tariffs.

Application of fixed charges

7. Fixed charges are applied on the basis of user counts provided by the embedded network operator, without any adjustment.

8. Under the enduring structure for portfolio tariffs, the rate at which these charges are levied is likely to be low, since fixed and availability charges recover mainly costs at

or near the voltage of supply. The impact of any errors in these data is therefore likely to be modest: this help address some of the DNOs' concerns about data audit.

No availability charges for non half hourly metered users

9. Under the CDCM, no availability or capacity charges are proposed for non half hourly metered users. Thus there is no availability element in portfolio tariffs relating to non half hourly metered users.

10. Consistent with the concept of portfolio billing, there is no charge related to the capacity agreed at the embedded network boundary.

11. Charges for half hourly metered users on the embedded network are discussed below.

Worked example

12. The following tables give a simplified example of the operation of the system for one embedded network operator, one host network and one financial period (31 days).

Table 1 Data submitted by IDNO A for LV connected networks in DNO B area

Tariff	Rate	MPAN Count	Percentage Energy
Domestic Unrestricted	Standard	200	70%
Domestic Two Rate	Day	20	5%
Domestic Two Rate	Night		10%
Business Unrestricted	Standard	10	15%
Check Total			100%

Table 2 Boundary metered data for IDNO A LV connected networks in DNO B area

Inset Network ID	Consumption (kWh)
Network M	30,000
Network N	60,000
Network O	10,000
Total	100,000

Table 3 Bill sent to IDNO A for LV connected networks in DNO B area

Tariff	Rate	MPAN Count	Percen-tage Energy	Allo-cated kWh	Applicable portfolio tariff		Charg e (£)
					Fixed charge (p/day)	Unit Charge (p/kWh)	
Domestic Unrestricted	Standar d	200	70%	70,000	0.50	0.800	591.0 0
Domestic Two Rate	Day	20	5%	5,000	1.00	0.900	51.20
Domestic Two Rate	Night		10%	10,000		0.300	30.00
Business Unrestricted	Standar d	10	15%	15,000	2.00	0.900	141.2 0
Total			100%	100,000			**813.40**

Treatment of nested networks

13. The data submitted by each embedded network operator must include consumption by end users on nested networks. If the embedded network operator chooses to use the same structure of charges and billing arrangements for nested networks as the DNO uses for embedded networks, then the embedded network operator will be producing the necessary data from the data it receives from netsted networks and from boundary meter readings in order to bill use of system charges to nested networks, and only needs to aggregate those data with other billed volume data to produce its submission to the DNO.

14. Thus, under this proposal, there is no need to define any special allocation rules for nested networks. However, procedural arrangements and timescales between embedded and nested network operators need to take account of the time needed for data aggregation at each stage.

Reasons for additional rules in addition to the EDF Energy Networks proposal

15. A risk with the method outlined above is that it does not make the best possible use of half-hourly boundary meter data.

16. In particular, it would fail to make an appropriate correction to billed volumes if a meter registration error or billing error on the embedded network was to lead to an incorrect balance between consumption in the various time bands.

17. For half hourly charges under the CDCM, DNOs propose to use distribution time bands that reflect the time of distribution system peak (instead of supplier-led incentives to shift consumption toward an off-peak baseload generation period).

18. One effect of using distribution time bands based on distribution peaks is that there are likely to be very large differences in unit rates between time bands: potential very low charges at night and very high charges within a narrowly defined peak period.

19. This time structure of charges for half hourly tariffs means that, on embedded networks with significant half hourly metered load, an erroneous allocation of load between distribution time bands could have significant financial consequences.

20. In the absence of an appropriate automatic adjustment rule, there might therefore be difficult disputes in cases where the allocation of units to time bands notified by the embedded network operator seem inconsistent with boundary meter readings.

21. There is also a need for loss adjustment factors to be taken into account in cases where the embedded network serves both HV and LV users. A simple percentage allocation does not seem to work well in that case.

Proposed unit allocation rules

22. The revised method would require data from the embedded network about absolute billed unit volumes in each tariff and each rate — not just proportions. Given that the proportions would have been derived from absolute amounts billed by the embedded network operator to its users and any nested networks, this is not an onerous additional data requirement.

23. For each embedded network, host network, network level of connection (e.g. LV or HV), and financial period, the billing process requires data from two sources.

24. From meter data collectors and/or aggregators, the billing process determines:

    QMNHH — total non half hourly boundary meter import on the embedded network operator's networks within the GSP Group.

    $QMHH_b$ — total half hourly boundary meter import on the embedded network operator's networks within the GSP Group, aggregated by distribution time band (denoted by the b subscript).

25. From the embedded network operator, the billing process receives:

    $QENHH_R$ — total non half hourly billed units (from settlement) against tariff/TPR combination (denoted by the R subscript) in embedded and nested networks.

    $QEHH_{Tb}$ — total half hourly billed units against tariff (denoted by the T subscript) and time band in embedded and nested networks.

26. From the use of system charging statement, the billing system takes loss adjustment factors needed to adjust $QENHH_R$ and $QEHH_{Tb}$ for estimated losses to be consistent with boundary meter readings. The relevant loss adjustment factors are based on an average for the relevant network level for the DNO's network as a whole. They would be published as part of the use of system charging statement. Applying the loss adjustment factors to $QENHH_R$ and $QEHH_{Tb}$ gives the following:

    $QLNHH_R$ — total non half hourly billed units against tariff/TPR combination in embedded and nested networks, adjusted for published loss adjustment factors.

$QLHH_{Tb}$ — total half hourly billed units against tariff and time band in embedded and nested networks, adjusted for published loss adjustment factors

27. The non half hourly correction factor is defined by:

$$CNHH = (\sum_R QLNHH_R + \sum_{Tb} QLHH_{Tb}) / (QMNHH + \sum_b QMHH_b)$$

28. This is a single number for the whole financial period. It uses the same principle as in the simplified non half hourly only method: a single factor is determined to allocate the total boundary meter reading across non half hourly tariff/TPR combinations on the basis of the data submitted by the embedded network operator.

29. In particular, if the adjusted embedded billed volumes match the boundary meter readings on aggregate, then CNHH is 1.

30. The half hourly correction factor is defined for each time band as:

$$CHH_b = 1 + (CNHH - 1)*(QMHH_b/\sum_T QLHH_b - 1)/(\sum_b QMHH_b/\sum_{Tb} QLHH_{Tb} - 1)$$

31. If there are three distribution time bands, then this calculation gives three numbers, which will apply uniformly across the financial period.

32. These factors only differ from 1 to the extent needed to reconcile total volumes: if CNHH is 1 for a financial period, then all CHH_b for that period are also 1.

33. The embedded network is charged for use of the DNO's network on the basis of the following unit volumes:

$QLNHH_R$*CNHH for each non half hourly tariff/TPR combination.

$QLHH_{Tb}$*CHH_b for each half hourly tariff/time band combination.

34. The effect for these formulae is:

a) The total units billed agree with the total units metered in the financial period.

b) Any total discrepancy between boundary meter reading and billed units is allocated between the half hourly and non half hourly sectors in proportion to their volumes. In particular, if there are no half hourly billed units on the embedded network then the embedded network operator is not exposed to any half hourly charges.

c) Any discrepancy attributed to the half hourly sector between time bands is allocated in proportion to the observed discrepancy between half hourly boundary flows and half hourly billed amounts.

Application of availability charges for half hourly metered users

35. Half hourly portfolio tariffs will have an availability charge, mirroring the corresponding all-the-way tariffs (but charged at a lower rate to reflect that not all DNO network levels are included in the portfolio tariff).

36. A similar method will be used to charge for availability charges as for fixed charges: these will be levied on the basis of aggregate capacity data by tariff for embedded

and nested network users, as provided by the embedded network operator, with no adjustment.

37. Consistent with the concept of portfolio billing, there is no charge related to the capacity agreed at the embedded network boundary.