June 2002

FIRST CONSULTATION DOCUMENT FOR MODIFICATION PROPOSAL P81 REMOVAL OF THE REQUIREMENT FOR HALF HOURLY METERING ON THIRD PARTY GENERATORS AT DOMESTIC PREMISES

Prepared by ELEXON on behalf of the P81 Modification Group

Document Reference	P081DC
Version no.	1.0
Issue	Final
Date of Issue	12 June 2002
Reason for Issue	Consultation
Author	ELEXON Limited

I DOCUMENT CONTROL

a Authorities

Version	Date	Author	Signature	Change Reference
01	07/06/02	J Ellis		Mod group review
02	11/06/02	J Ellis		Final review
1.0	12/06/02	J Ellis		Issued for consultation

Version	Date	Reviewer	Signature	Responsibility
01	07/06/02	P81 Mod Group		Modification Group
02	11/06/02	J Lucas		Lead Analyst

b Distribution

Name	Organisation
Each BSC Party	Various
Each BSC Agent	Various
The Gas and Electricity Markets Authority	Ofgem
Each BSC Panel Member	Various
Energywatch	Energywatch
Core Industry Document Owners	Various

c Intellectual Property Rights and Copyright

II CONTENTS TABLE

1 INTRODUCTION

This Consultation Document has been prepared by ELEXON Ltd, on behalf of the P81 Modification Group, in accordance with the terms of the Balancing and Settlement Code ('the Code'). The Code is the legal document containing the rules of the balancing mechanism and imbalance settlement process and related governance provisions. ELEXON is the company that performs the role and functions of the BSCCo, as defined in the Code.

An electronic copy of this document can be found on the BSC website, at www.ELEXON.co.uk.

The document supports the first consultation on the issues raised in Modification Proposal P81 and is aimed at BSC Parties and other interested industry participants. It is based on the ideas presented at the first Modification Group meeting held to discuss P81, which was held on 30 May 2002. P81 is currently in the Definition Procedure.

The aim of the Definition Procedure and of this consultation is to clarify the issues raised in the Modification Proposal and clearly define the modification to enable the Panel to determine how to progress the Modification.

1.1 Structure of Document

The document is structured as follows:

- Section 2 provides background to the Modification Proposal;
- Section 3 provides details of the Modification Group membership and attendees at the first meeting;
- Section 4 provides an overview of the Modification Proposal;
- Section 5 provides a summary of the issues discussed at the first Modification Group meeting
- Section 6 contains the consultation questions.

1.2 References

Reference 1 DCRP Consultation on Banding/Classification of Distributed Generation (cons_28may2002.pdf), 28 May 2002, Ofgem. (www.ofgem.gov.uk/dso/consultations.htm).

Reference 2 Distributed generation: price controls, incentives and connection charging. Further discussion, recommendations and future action, March 2002, Ofgem (www.ofgem.gov.uk/projects/consultation.htm).

Reference 3 Electricity Supply Licence Standard Conditions, DTI, Sept 2001, DTI (www.dti.gov.uk/energy/gas-electricity.htm).

2 BACKGROUND

TXU UK LTD submitted Modification Proposal P81 'Removal of the Requirement for Half Hourly Metering on Third Party Generators at Domestic Premises' on 3 May 2002. The Initial Written Assessment (IWA) was submitted to the BSC Panel at their meeting on 16 May 2002. The Panel decided to submit the proposal to the Definition procedure in accordance with section F2.5 of the BSC, with a report due to be presented at the July Panel meeting.

The Modification Proposal seeks to remove the requirement for domestic premises with Third Party Generating Plant to have Half Hourly Metering. It suggests that this will better facilitate competition in the supply and generation of electricity, by removing an obstacle to the use of micro-generation e.g. domestic Combined Heat and Power (CHP) and photovoltaic (PV) cells.

The New Metering Technology Group and one of its sub committees, the Settlement Review Group (SRG), have been considering the current barriers to allowing new metering and generation technology and how these may be removed. The SRG has considered the profiling and other issues brought up by this modification and some of their work has been used as a basis for this modification.

2.1 Related industry Initiatives

Although this modification Proposal should be assessed on its own merits and against the applicable BSC Objectives, it should be noted that there are other initiatives that have taken place recently or are under way within the industry.

Ofgem held a consultation in March 2002, which followed on from an initial consultation held in September 2001. The consultation covered various issues, one of which was micro generation. In the report Ofgem states that they regard basic import/export active power metering as a minimum for all distributed generation, including Domestic CHP. Such metering would support pricing likely to accurately reflect the varying behaviour of Domestic

CHP and micro-generation users as they connect to networks in increasing numbers and with higher-capacity generating units. Consistency with metering of the increasingly efficient photovoltaic units now being developed is another relevant consideration. Half-hourly and reactive power metering is not included as a necessary minimum, see ref. 2.

The Technical Steering Group that reports to the joint DTI / Ofgem Distributed Generation co-ordinating Group has a work stream dedicated to solutions for micro-generation. They have a number of projects concerning micro generation issues, one of which corresponds with P81. ELEXON will feedback information and the decisions made by the P81 Modification Group.

3 MODIFICATION GROUP DETAILS

The Volume Allocation Modification Group (VAMG) was assigned Modification Proposal P81 and additional membership was sought from members of the Settlement Review Group (SRG).

Attendees at the meeting on 30 May 2002 were:

Member	Organisation
Justin Andrews	ELEXON (chairman)
John Lucas	ELEXON (lead analyst)
Joanne Ellis	ELEXON
Dave Sowden	MicroGen (BG Group)
John Parsons (Attendee)	Advantica
Katherine Bergin	SSE
Alec Thompson	LE Group
David Cooper	Electricity Association
Neil Magill	ScottishPower
Liz Cutting	TXU
Bob Brown	Cornwall Consulting
Rob Cullender	British Gas
Malcolm Piper	Seeboard Energy
Arthur Cooke	OFGEM
Martyn Hunter	St Clements

Additional members not attending the meeting:

Member	Organisation
Richard Westoby	Scottish & Southern
Clare Talbot	NGC

4 MODIFICATION PROPOSAL

4.1 The current BSC Requirements

Section L of the code states that Third Party Generating Plant wishing to trade in SVA must have Half Hourly Metering Equipment installed.

Section K of the code states that any Party responsible for any Exports or Imports of electricity at a boundary point shall ensure that Metering Equipment is installed that can separately measure quantities of Import and Export.

Third Party Generating Plant is defined in section X as Exemptable Generating Plant for whose Exports a BSC Party has for the time being elected to be responsible. The BSC Party must not be the person who generates electricity at the Generating Plant.

Exemptable Generating Plant is defined in sections K and X as being Generating Plant where the person generating electricity at that Generating Plant is exempt from the requirement to hold a Generation License.

This can be interpreted to give the following metering requirements;

- If the Exemptable Generator decides that the exports are not to be used in settlements and the metering equipment currently installed does not run backwards, the imports could be registered as Non Half Hourly (NHH). No additional charges would be needed and the exported electricity would spill onto the grid for free.
- If the Exemptable Generator decides that the exports are not to be used in settlements and the metering equipment currently installed runs backwards, the metering equipment would need to be replaced as net metering is not allowed.
- If the Exemptable Generator decides to use the export in SVA settlements and the Exemptable Generator is a Party to the Code and the Generating Plant is installed at non 100 kW premises, then NHH metering could be used. The NHH metering must be capable of measuring Import and Export separately as defined in section K of the Code. If any of these criteria are not met the Metering Equipment must be Half Hourly.
- If a Third Party seeks to register the Metering Systems on behalf of the Exemptable Generator and wishes use the exports in SVA Settlements, the Metering Equipment must be Half Hourly.

4.2 The Modification Proposal

Modification Proposal P81 seeks to relax these BSC requirements, to allow Exports from Domestic Premises to be taken into account for settlement purposes without Half Hourly Metering Equipment being installed. The rationale given for this is that the metering and data collection costs associated with Half Hourly metering are disproportionate for micro Combined Heat and Power (CHP) and photovoltaic (PV) technologies. The Modification Proposal suggests that removing this obligation will better facilitate competition in the generation and supply of electricity.

The Modification Group have discussed the proposal and have agreed that the definition of the Modification should be as follows, subject to the consultation responses;

- The Modification does not seek to change the current requirements for separate metering of Imports and Exports.
- The supply licence definition of ‘domestic premises’ will be used, however the consultation will determine if Condition 22 should also be taken into account.
- Three different options for profiling were discussed and the consultation will be used to determine which of these will be used in progressing the modification.
- The solution could be defined as an interim solution or as a long term solution. The consultation responses will be used to determine how this should be progressed.

These issues are all described in more detail in section 5.

5 ISSUES RAISED BY THE MODIFICATION PROPOSAL

The issues raised in the IWA were discussed at the Modification Group meeting on 30 May 2002 and details of the discussions can be found in this section. These issues will be consulted on using the questions in section 6 of this report.

5.1 Requirement for Import/Export Metering

The Modification Proposal as it stands does not seek to change the requirements in section K1.2.1 of the Code for separate metering of Imports and Exports at the boundary point of a premise.

The Modification Group discussed this issue and noted that an alternative Modification that could be proposed during the Assessment Procedure, should the Panel decide to submit the proposal to assessment, may consider whether this restriction should be relaxed. The group discussed other options that they may wish to progress, these were;

- allowing net metering of Non Half Hourly (NHH) imports and exports at the boundary point, by use of a meter that can run backwards;
- oblige the customer to measure a gross generation and a gross consumption figure for the premises. This would then allow the consumption and generation to be settled against two different profiles. This could be done in one of two ways:
  - (i) gross metering of the generation at the generation unit within the domestic premises and net metering at the boundary point.
  - (ii) Gross metering of the generation and consumption at the boundary point. This would be effectively the same as having an import feeder and an export feeder into the premises.

5.2 Profiling Options

The Modification Proposal does not specify how Exports with NHH metering should be settled. The Modification Group considered this at the meeting and did not reach any decision. It was decided to seek Party views on the options below as part of the consultation and a question has been included in section 6.

The different profiling options possible are summarised below. A more detailed explanation can be found in Annex 1 of this report;

Option A Use of existing demand profiles to settle the net consumption on the site. This option would support separate Import / Export metering at the boundary point, Net metering and Gross metering of the consumption and generation. There would be no central development costs but could potentially lead to significant profiling errors as the number of users increases.

Option B Use of existing demand profiles, but with multi-rate metering and 'chunked' profiles to reduce the resultant profiling errors. This option would also support separate Import / Export metering at the boundary point, net metering and Gross metering of the consumption and generation.

Option C Creation of new profiles for specific micro-generation technologies. This potentially allows more accurate profiling, however this would need to be

confirmed empirically for each form of micro-generation. This option would lead to relatively high central development costs and would also be a longer term solution to the problem due to the need for load research for development of the profiles.

5.3 Criteria for Allowing Non Half Hourly Metering

The Modification Proposal seeks to change the requirement for half hourly metering on third party generators at domestic premises, however the term 'domestic premises' is not defined within the BSC.

The Modification Group discussed what constitutes 'domestic premises' for the purposes of this Proposal and agreed that the Supply Licence definition should be used (see ref. 3). On further investigation by ELEXON it has been found that there is a simple definition used in the licence, this is given below. However there are other circumstances defined in Condition 22 of the Supply Licence where the term Domestic Premises may apply. As part of the definition procedure the Modification Group should clarify if Condition 22 should be taken into account as part of this proposal. This will be addressed in the consultation questions in section 6 of this report.

The definition given in the Electricity Supply Licence Standard Conditions is:

'Domestic Premises' means premises at which a supply is taken wholly or mainly for domestic purposes

It was also suggested that a capacity related limitation could be progressed as a potential alternative modification should the Panel decide to submit the modification to the Assessment Procedure. It was noted that there is a consultation underway on the banding of generation, which is being carried out by the Distribution Code Review Panel. In their paper they suggest that a band is created to include Domestic CHP and all micro-generation up to either 5 kW or 16 Amp per phase (the value to be used has not yet been defined), including both single and three phase installations.

5.4 Long and Short Term Solutions

The Modification Group discussed the issue of whether this Modification should be seen as an interim solution to the problem or as a long term solution. The group reached no decision on this and decided to consult on it as part of the Definition Consultation. A question has been included in section 6 to seek Party views on this.

One reason for defining an interim solution is that field trials are still at an early stage and the ultimate level of take-up remains uncertain, it may therefore be appropriate to determine a solution that can be revisited when and if the volume of micro-generation becomes significant.

6 CONSULTATION QUESTIONS

BSC Parties and other interested parties are invited to respond to this consultation expressing their views with respect to the matters contained within this document. In particular views are sought in respect of the following questions. Parties are invited to supply the rationale for their responses.

Respondent:	

Responding on Behalf of	Please list all Parties responding on behalf of (including the respondent company if relevant).
Role of Respondent	(Generator/Supplier/Distribution Business/Other)[1]

	Question	Response
Q1	**Do you believe that the principle of removing the requirement for half hourly metering on Third Party Generators at Domestic Premises better facilitates the applicable BSC objectives?**	**Yes/No**[1]
Rationale:		
Q2	**Do you believe that the Modification as defined by the Modification Group in Section 4 of this report is the most appropriate interpretation?**	**Yes/No** [1]
Rationale:		
Q3	**Do you believe that there are any alternative Modifications that the Modification Group should consider during the Assessment Procedure, should the Panel decide to submit the Modification to the Assessment Procedure?**	**Yes/No** [1]
Rationale:		
Q4	**Do you agree with the Modification Group view that "Domestic Premises" should be the same as the definition in the Electricity Supply Licence?** **If YES do you believe that the definition used, should be the simple definition at the start of the Licence or that the extra conditions defined in Condition 22 of the Licence should also apply?**	**Yes/No** [1]
Rationale:		
Q5	**Do you believe that there is a need for a short term solution that is potentially different to the long term solution to this issue?** **If so what do you believe are the triggers for a change to a longer term solution?**	**Yes/No** [1]

[1] Delete as appropriate

Rationale:		
Q6	**Which of the three profiling options do you believe better facilitates the applicable BSC objectives and should be used in progressing this Modification?**	**Option A / Option B / Option C** [1]
Rationale:		
Q7	**Does the Modification Proposal raise any issues that you believe have not been identified so far and that should be progressed as part of the Assessment Procedure for this Modification, should the Panel decide to submit the Modification to the Assessment Procedure?**	**Yes / No** [1]
Please state your views:		
Q8	**Do you have any further comments on Modification Proposal P81 that you wish to make?**	**Yes / No** [1]
Please state your comments		

Please send your responses by **17:00 Tuesday 25 June 2002** to Modifications@elexon.co.uk

Please entitle your email '**P81 Definition Consultation**'

Any queries on the content of the consultation pro-forma should be addressed to Joanne Ellis (020 7380 4316), email address Joanne.ellis@elexon.co.uk or John Lucas (020 7380 4345), email address: john.lucas@elexon.co.uk.

ANNEX 1: SETTLEMENT AND METERING OPTIONS

OPTION A - SETTLING MICRO-GENERATION ON DEMAND PROFILES

The first option identified is a 'do-nothing' option, as follows:

- No profiling changes i.e. customers with micro-generation are settled on the standard profiles. (It should however be noted that if a significant proportion of customers adopted any particular micro-generation technology, it would eventually be included in the random samples of customers used for load research purposes.)
- No special metering requirements (other than a requirement to ensure that all imports and exports are measured).

This would potentially allow a simple one-rate meter to be used, provided it was capable of 'running backwards' to record generation exported onto the distribution system, although some concerns about this possibility were raised at the New Metering Technology Working Group:

- It would make it more difficult to detect theft of electricity (as backwards running would no longer be a reliable indicator of theft);
- Some types of 1-rate meter are less accurate when running backwards;
- Meter certification does not currently cover meters running backwards; and
- Distribution Businesses may have a requirement for separate metering of imports and exports.

Metering Configurations Supported by Option A

There are a number of possible options for metering customers with micro-generation as described in Section 5.1 of this report.

Option A is consistent with any of these metering options. All meter advances would be settled on demand profiles, irrespective of whether they represented import, export, generation or consumption. It should however be noted that there may be non-settlement reasons for choosing one metering configuration over another. For example:

- It has been suggested that net metering may be inconsistent with Distribution Businesses requirements.
- In the case of renewable generation (e.g. photovoltaic cells), Suppliers may wish to meter gross generation, in order to ensure that they get the full benefit of the renewable generation (e.g. Renewable Obligation Certificates).

Assessment of Profile Errors Under Option A

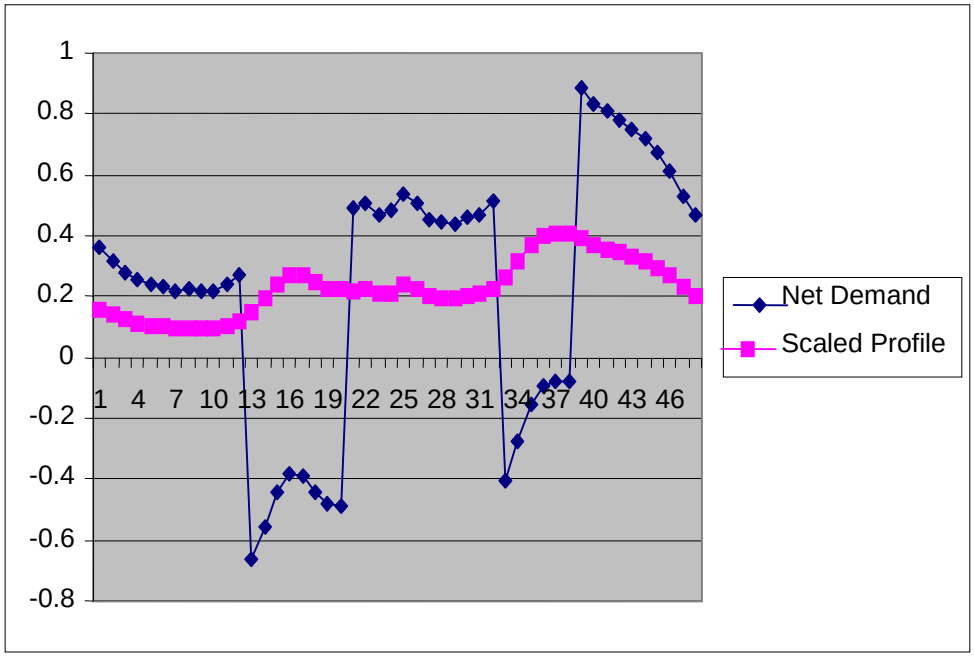
This option clearly leads to a significant error in profile shape for those customers with micro-generation. This profile error can be regarded as having two separate components:

1. As the profile used in settlement doesn't allow for micro-generation, the profile shape will be inaccurate at those times of the day when the micro-generation is running.

2. Because the presence of generation reduces the meter readings (and hence the Annualised Advances used in settlement), the profile used in settlement will be scaled down, reducing the profiled consumption at all times of the day.

It should be noted that these two errors will have equal and opposite energy volumes when considered over the whole of a Meter Advance Period. In this sense the overall error can be regarded as an error in profile shape, rather than profile volume.

The graph below illustrates a hypothetical example of these profile errors:



- The blue curve represents the actual consumption of the customer. For most of the day the consumption closely matches the standard demand profile, but in the periods 6:00-10:00 and 16:00-19:00 micro-generation starts running, reducing the overall demand by 1 kW, and causing energy to spill onto the distribution system.
- The pink curve represents the profiled consumption used in settlement i.e. the standard demand profile, but scaled down because of the effect of the generation on the meter readings.

The effect of these profile errors on BSC Parties can be summarised as follows:

- The profiled consumption for the customer in question will typically be too high when the micro-generation is running, and too low at other times of the day. However, the mechanism of GSP Correction will compensate for this, with the following results:

  (a) At times of the day with significant micro-generation, the Non Half Hourly metered volumes for all Suppliers in the GSP Group will be scaled down.

  (b) At times of the day without micro-generation, the Non Half Hourly metered volumes for all Suppliers in the GSP Group will be scaled up.

- Unless all Suppliers (not just those with such customers in their portfolios) take this into account in their contractual positions, the effect of this will be to shift energy imbalance volumes from periods without micro-generation into periods with micro-generation:

(a) At times of the day with significant micro-generation, Suppliers' energy imbalances will become larger (i.e. the amount of spill sold at System Sell Price will be increased, or the amount of top-up purchased at System Buy Price will be decreased).

(b) At times of the day without micro-generation, Suppliers' energy imbalances will become smaller (i.e. the amount of spill sold at System Sell Price will be decreased, or the amount of top-up purchased at System Buy Price will be decreased).

- Because of the dual cash-out prices used in settlement, the materiality of these disturbances in imbalance volumes depends significantly upon the contractual position of the Supplier:

(a) A hypothetical Supplier who would have been in balance[2], had the profiling errors not occurred, would be left with a negative energy imbalance in periods without micro-generation, and an equal and opposite positive energy imbalance in periods with micro-generation. As the Supplier is paid for positive energy imbalances at System Sell Price (SSP), but pays for negative energy imbalances at System Buy Price (SBP), the cost to the Supplier is the volume of energy shifted, multiplied by the SBP/SSP spread.

(b) A Supplier who is in balance on average (i.e. energy imbalance volumes average to zero), but whose imbalances volumes in individual periods are larger than the profiling errors, would be much less affected. In this case the Supplier will be paid SSP for a mixture of positive and negative profiling errors (unlike in case (a), where only the positive profiling errors are paid for at SSP). Similarly, the Supplier will pay SBP for a mixture of positive and negative profiling errors. The financial effects of the profiling errors will therefore tend to cancel out, leading to a much smaller impact on the Supplier.

(c) In the case of a Supplier who is significantly out of balance (i.e. the magnitude of his energy imbalance volumes is much larger than that of the profiling errors), all the profiling errors will be settled at a single cash-out (i.e. SSP if the energy imbalance volumes are positive, or SBP if the energy imbalance volumes are negative). In this case the errors will again tend to cancel out, leading to a small effect on the Supplier.

In summary, therefore, the impact on Suppliers of profiling errors caused by micro-generation depends significantly upon the Suppliers' imbalance positions. However, in the worst possible case of all Suppliers being in balance except for the effects of the profiling error, the overall cost to Suppliers in the GSP Group will be[3]:

(Magnitude of profiling error) x (SBP/SSP spread)

In this worst case scenario, the impact on Suppliers of the profiling errors arising from a single domestic CHP customer generating 1500 KWh per annum[4] would amount to £37.50 per annum (assuming a SBP/SSP spread of £25/MWh).

[2] i.e. whose energy imbalance volumes would have been zero (or small compared to the effect of the profiling error).

[3] In other cases, the effect on Suppliers of the profiling errors may cancel out over the Meter Advance Period, reducing the overall financial impact.

[4] This worst case estimate is based on the assumption that the total amount of profile error is equal to the amount of generation. This is actually a slight over-estimate of the profile error, as explained in Annex 3 to this document.

In all cases where profiling errors increase the imbalance charges paid by Suppliers, the money is redistributed to BSC Parties in proportion to their Credited Energy Volumes, through the mechanism of Residual Cashflow Reallocation.

Costs of Option A

Of all the metering and settlement options discussed in this document, option A places the least requirements on central systems and on Suppliers of customers with micro-generation, and is therefore a least cost option:

- No changes would be required to central systems, as existing profiles and Standard Settlement Configurations would continue to be used.
- The Supplier would be free to install any meter they chose, provided it was capable of measuring export, thus minimising metering costs. (It should be noted however that meter replacement would still be required in many cases, as many domestic meters cannot accurately record export onto the distribution system).

OPTION B – USE OF MULTI-RATE METERING AND CHUNKED PROFILES

One way of reducing the profile errors caused by settling micro-generation on demand profiles would be to oblige Suppliers to install multi-rate metering, in order that the standard demand profiles can be 'chunked' appropriately:

- For each type of micro-generation technology, the Panel (or an appropriate sub-committee) would agree which blocks of time should be separately measured. This would preferably be done following analysis of metered Half Hourly data from a sample of customers. For instance, if analysis showed that the load shape for customers with domestic CHP installed was significantly different to the Profile Class average between 6:00 and 10:00 on weekdays, this might be defined as one of the blocks of time to be measured separately.
- A new Standard Settlement Configuration would then be defined, whose Time Pattern Regimes corresponded to the agreed time blocks. Suppliers would be obliged to install multi-rate metering for those customers, with the registers programmed to match the defined Time Pattern Regimes.

This approach is potentially a simple and cost-effective way of reducing the errors in imbalance volumes attributed to Suppliers, without the need for significant development costs:

- As described below, it could reduce significantly the magnitude of the profile errors caused by using demand profiles to model micro-generation.
- Unlike option C (discussed below), it avoids the need for an additional ongoing program of load research to create and maintain new profiles for micro-generation. The only central development cost is the analysis and administrative overhead required to agree the new Standard Settlement Configurations.
- As multi-rate Seasonal Time of Day (SToD) meters are relatively inexpensive, the additional metering cost is small.

It should however be noted that the extent to which this option reduces profiling error depends significantly on how accurately the defined timeslots match the actual behaviour of customers micro-generation.

Metering Configurations Supported by Option B

Like option A, option B is consistent with net metering, gross metering, or import/export metering.

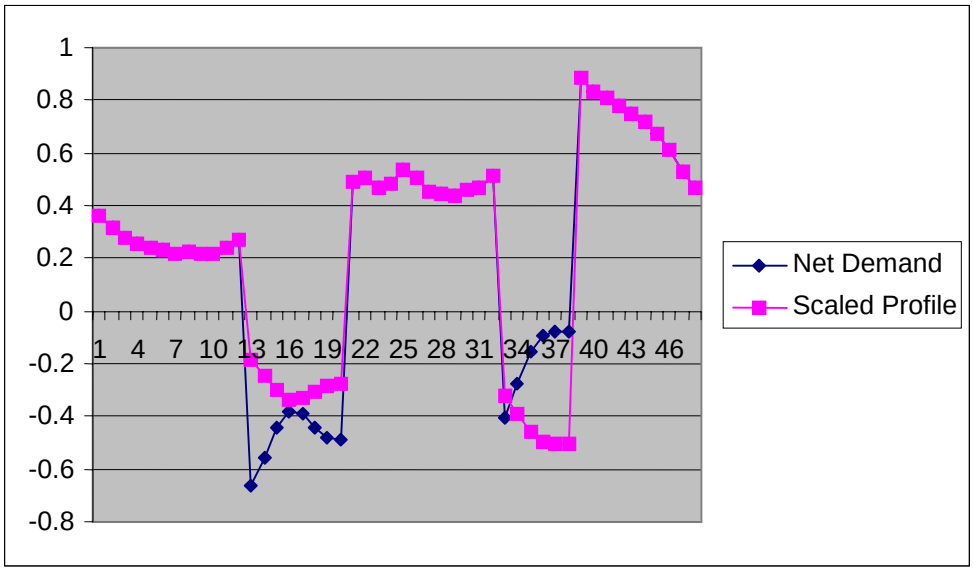
In the case of gross metering, the obligation to use a multi-rate meter would apply only to the generation meter. A customer's existing one-rate meter could be used to measure the consumption.

Of the three possible meter options, separate metering of gross consumption and gross generation would be preferable from a settlement viewpoint. However, the choice of metering is likely to be affected by non-settlement as well as settlement issues.

Assessment of Profile Errors Under Option B

Under option B, the customer's meter advances are still settled on the demand profile. However, the different 'chunks' of the profile corresponding to the different Time Pattern Regimes are scaled up and down separately, to ensure that the total profiled volume over the Meter Advance Period matches the meter advance for the associated meter register.

The graph below illustrates a hypothetical example of this:



- The blue curve represents the actual consumption of the customer. For most of the day the consumption closely matches the standard demand profile, but in the periods 6:00-10:00 and 16:00-19:00 micro-generation starts running, reducing the overall demand by 1 kW, and causing energy to spill onto the distribution system.
- The pink curve represents the 'chunked' demand profile used to model this. The day is assumed to be divided into two Time Pattern Regimes: the part of the day when the generation is running (i.e. 6:00-10:00 and 16:00-19:00); and the remainder (i.e. 00:00-06:00, 10:00-16:00 and 19:00-00:00).

Points to note about this graph are as follows:

- It shows the actual net demand as being equal to the scaled profile during the part of the day without generation. In practice, of course, this wouldn't be the case, as the actual demand of any individual customer will differ from the profile shape for reasons unconnected with the presence of micro-generation.

- Typically each individual 'chunk' of a chunked demand profile will have the same shape as the basic unchunked profile, but scaled up or down to match the appropriate meter advance. In the case shown above, however, the 'chunk' of the profile corresponding to the periods with generation has been scaled to match a negative meter advance, which has the effect of inverting the profile shape.
- In practice, it would not be possible to define a Time Pattern Regime that corresponded exactly to those times of the day when the micro-generation was running, because these times would differ from customer to customer.

In summary it would appear that the 'chunking' technique has the potential to significantly reduce the profile errors arising from the use of demand profiles to settle micro-generation. However, further analysis (preferably using Half Hourly data from a sample of actual customers) would be required to quantify this.

Costs of Option B

Option B requires a multi-rate meter to be installed, and does therefore increase the cost per customer of metering. Further assessment of this would be required in order fully to evaluate the merits of this option, although anecdotal evidence from one of the SRG members suggests the additional cost could be quite low[5].

The only central cost under option B is the cost of approving new Standard Settlement Configurations, which is relatively low.

OPTION C – ADDITIONAL PROFILES FOR MICRO-GENERATION

The third option identified is to use separate profiles for micro-generation, as follows:

- The Profile Administrator would carry out additional load research to create (and maintain) new profiles for specific generation technologies. For instance, there might be new profiles for micro-CHP, and for photo-voltaic cells.
- Each of these new profiles would be in the same format as the existing demand profiles[6], and would be identified by a new Profile Class. For example, Profile Class 9 might be micro-CHP, and Profile Class 10 might be photo-voltaic cells. (Alternatively, more than one Profile Class might be required for a single micro-generation technology, to allow for different types of customer e.g. domestic, non-domestic, Maximum Demand).

Metering Configurations Supported by Option C

Because this option has separate profiles for generation, it would require separate metering of gross and consumption and gross generation[7]:

- The generation metering system would be assigned to one of the new generation Profile Classes, and settled on a generation profile.

[5] It was suggested that a meter capable of measuring import and export separately on up to eight registers might be available for approximately £30, as opposed to £15-£20 for a one-rate meter.

[6] The format for demand profiles includes regression coefficients for the Noon Effective Temperature and Time of Sunset.

[7] Of course, the 'separate' metering could potentially be installed in one physical box. However, it would still be treated as two distinct metering systems for purposes of settlement and registration.

- The demand metering system would be assigned to one of the existing demand Profile Classes, and settled on a demand profile.

If there were a requirement to ensure that the two metering systems were registered by the same Supplier, this would be achieved by registering the metering systems as 'related' in the Supplier Meter Registration Service[8]. Alternatively, if they weren't registered as related, the two could potentially be traded independently. However, this might not be appropriate in some cases e.g. consumption and generation metered by the same physical meter.

Possible Use of Net Demand Profiles for Micro-generation

Another possibility is to create additional profiles representing the net energy usage of customers with micro-generation. For example, the Profile Administrator could carry out load research to construct a profile for the net energy usage of domestic customers with photo-voltaic cells. However, this option should be approached with caution, for the following reasons:

- Separate profiles would potentially be required for each combination of micro-generation and demand (e.g. a profile for non-domestic customers with Economy 7 and photo-voltaic cells). This could lead to an unmanageable explosion in profile numbers. The use of separate profiles for demand and generation would require a much smaller number of profiles in total.
- The Profile Administrator expressed concern that statistical anomalies could arise when carrying out regression analysis on the very small energy volumes that might result from netting off demand and generation.

Costs of Option C

Option C has the highest central costs of the three options, in that additional load research would be required to create and maintain the new profiles. Further impact assessment would be required to establish these costs (although as a very rough guide, the load research contract for the current eight Profile Classes and two switched load profiles costs in excess of £1m per annum, suggesting that costs could be in the region of £100,000 per profile required).

Further points to note include:

- The attractiveness of this option clearly depends upon the number of customers involved. For a million customers, a new profile could be very cost-effective, but for a thousand customers the cost per customer would be extremely high (compared for example to option B).
- One of the disadvantages of this option is that separate profiles would be required for each specific micro-generation technology. It might therefore be appropriate to adopt this solution only for the more popular micro-generation technologies.

[8] Subject to confirmation that this is consistent with the definition of Related Metering Point in the Master Registration Agreement.