
Meeting name	VASMG
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Paper Title	ISSUE 6 (3) - GSPGCF (FINANCIAL INCENTIVES DERIVED FROM THE VALUE OF ESTIMATED DATA)
Purpose of Paper	For information
Synopsis	This paper further details an example of how a corrective technique based on the application of Group Correction to Estimated data may be applied.

1. PURPOSE

- 1.1 As part of its consideration of Supplier Charges, the VASMG has been considering options for financial incentives. During this work it has been suggested that a revised method of calculating Suppliers' take might create an incentive within the trading arrangements to submit actual data.
- 1.2 The purpose of this paper is to explain the background to this idea, explore ways in which it might work, and identify the pros and cons of the approach.

2. BACKGROUND

Supplier Charges and the Pre-Estimate of Loss

- 2.1 The principal objective of the Performance Assurance Framework, and, within it, Supplier Charges is to ensure that adequately accurate data is submitted on time into settlement: "adequate" and "on-time" are, fundamentally, open to definition by BSC Parties. Defining these parameters has consequences on the one hand for the accuracy of settlement, and, on the other hand, for the costs of operating the settlement process.
- 2.2 Supplier Charges in the BSC are based on a pre-estimate of the loss resulting from a non-compliance with requirements.
- 2.3 Originally there was considerable discussion over the basis of this pre-estimate. The pragmatic conclusion was that it would be based, in essence, on the administrative costs of dealing with non-compliances.
- 2.4 However, it is clear that these administrative costs reflect only one perspective on the loss due to non-compliances. There is an argument that the most important loss relates to uncertainty about the accuracy of data in settlement.

Uncertainty in Settlement and the Use of EACs

- 2.5 The logic is that failure to submit the required actual data to settlement results in the use of estimates which in turn results in uncertainty over the accuracy of settlement. The size of this uncertainty must in some way be related to the amount of estimated data used.
- 2.6 Inaccuracy in estimated data is a contribution to the size of the GSP Group Correction Factor and the energy to which it corresponds. In any half hour, this GSP Group correction energy is distributed amongst NHH suppliers operating in the GSP Group. This energy has a value in imbalance settlement, determined by the cash out prices. Further, the submission of estimated data may mean, in essence, that an earlier step in the data correction/data aggregation chain has not been performed satisfactorily. This could indicate, for example, that it has not been possible to process readings for a particular MPAN. This, in turn, might indicate that the information which needs to be handed over at CoS might not be available, or might be of poor quality. Thus, the level of use of estimated data in settlement not only introduces an uncertainty in energy values, but also is a key indicator of the health of other MPAN related processes.
- 2.7 Supplier Volume Allocation in the NHH sector makes use of a particular method of producing estimates for half hourly settlement periods, Estimated Annual Consumptions, which are produced by extrapolating past consumption using profiles. So far as we are aware there has been no recent systematic study of the accuracy of half hourly values produced using EACs in comparison with those produced from "actuals" (Annualised Advances, AAs). Hence it is not clear how substantially the use of EACs affects the accuracy of settlement.
- 2.8 In general, however, it is possible to make some remarks about the accuracy of half hourly values produced using EACs. Since such values include an estimate of volume as well as shape, they are in principle subject to greater possible error than AAs. This inaccuracy may increase with the "age" of the EAC: a recently produced EAC may be a very good estimate of an actual consumption; on the other hand, an old EAC which, because of a process breakdown, has not been updated, may be less accurate.
- 2.9 For any given settlement day, settlement will include data from a range of EACs: some of an "acceptable age", and others which should have been replaced. It may be speculated that, by the time RF is reached, the EACs remaining in settlement are more likely to include a higher proportion due to process breakdowns.
- 2.10 A further point is that the use of profiling, profile classes, and EACs relies for its accuracy on the use of large populations of MPANs. No analysis has been carried out to determine whether, by the time RF is reached, the population of EACs in settlement remains representative.

Possible Approaches

- 2.11 There might be two approaches to taking account of the uncertainty caused by the use of estimates:
- An addition to estimated volumes related to the size of the GSP Group Correction Factor
 - An addition to estimated volumes reflecting the degree of uncertainty introduced by estimates, derived directly from the estimated volumes themselves.

- 2.12 Both of these approaches would create an incentive to submit actual data as an intrinsic part of the trading arrangements, rather than relying on “add-ons” in the form of separate Supplier Charges.
- 2.13 Consequently, the complex and expensive measurement and calculation schemes which are required to support separate Supplier Charges would not be required for these approaches.
- 2.14 Further, the incentives in both approaches are linked to the value of energy, rather than administrative costs.
- 2.15 On the other hand, both approaches require the up front definition and agreement of a model of how the level of estimated data is linked to uncertainty in settlement.
- 2.16 Both of the possible approaches are discussed below.

3. APPROACH 1: ADDITION TO ESTIMATED VOLUMES TO REFLECT GROUP CORRECTION ENERGY

Principles of GSP Group Correction

- 3.1 Fundamentally, energy provided to a GSP Group must equal energy used by customers plus losses. For settlement, this energy must, for every half hour, be allocated appropriately to Suppliers with customers in the GSP Group.
- 3.2 Energy provided from the transmission network to the GSP Group is measured for every half hour. Energy taken by customers may be measured for every half hour (HH metered), estimated individually (HH estimates), estimated by profiling cumulative consumption (NHH Annualised Advances, normally referred to as “actual” data), or estimated using profiled extrapolations of previous consumption (NHH Estimated Annual Consumption).
- 3.3 If there were no errors or uncertainties, then the total calculated consumption of all customers, adjusted for losses, would equal the measured GSP Group Take. In fact, there are errors and uncertainties associated with each component of the GSP Group Take which vary in size, probability, and over time (This is explained further in Attachment A). These errors mean that measured GSP Group Take does not in general, equal the sum of customer consumptions.
- 3.4 GSP Group Correction scales the calculated take of customers (including metered and estimated consumption, and taking account of losses) to match the measured energy supplied to a GSP Group.
- 3.5 In effect, the gross difference between the measured GSP Group Take, and the total calculated take of customers (the “Correction Energy”) is allocated across the NHH components of the calculated customer take pro rata to the size of the component. Therefore, in allocating Correction Energy, NHH values based on “actuals” (i.e. Annualised Advances) have the same weight as NHH values based on estimates (Estimated Annual Consumptions).
- 3.6 This in turn means that suppliers with the same calculated take in settlement are allocated the same amount of correction energy, regardless of whether the suppliers have submitted high or low percentages of actual data.

A Possible Adjustment to the Allocation of Correction Energy

- 3.7 The current method of allocating correction energy is simply a rule of the BSC: it was originally agreed by Pool Members to be adequately fair, and was subsequently agreed by Parties as part of the BSC. There would appear to be no fundamental reason why BSC Parties should not reconsider the allocation rules, if they so wish, in the light of experience.
- 3.8 A possible change would be, simply, that NHH data based on EACs would attract a greater share of correction energy than NHH data based on AAs.
- 3.9 It would be envisaged that the weighting to be applied would be determined by consideration of the likely level of error in AAs and EACs.
- 3.10 It would be impossible to determine exactly the value of the weighting factor for any half hour. However, it would seem feasible to derive an average value by a consideration of the fundamentals of AAs and EACs. In principle half hourly values based on AAs are subject to shape error in profiles, whilst those based on EACs are subject to both shape and volume errors.

Issues

- 3.11 **There are many contributions to GCF, why only address EACs?** The rule for allocating correction energy is currently very simple, and makes no attempt to reflect the relative sizes of the different sources of error (other than, at a gross level, allocating all correction energy to the NHH sector). It would seem possible to amend the allocation rule to whatever level of refinement that is considered justifiable, without necessarily attempting to reflect all possible factors. So far as we are aware there has been no comprehensive work on assessing which components generally dominate GSP Group Correction. However, as a starting point for discussion, it may be suggested that the size of errors (in descending order) might be: errors in EACs; errors in AAs; errors in losses; errors in metering.
- 3.12 **EACs are allowed under the BSC, why punish their use? The use of profiles to obtain half hourly values for NHH meters is an intrinsic part of settlement. Similarly,** the use of EACs in settlement is quite acceptable. However, should the use of EACs exceed a level set out in the BSC there is no reason why the consequences of this should not fall upon those responsible.
- 3.13 **What Would Happen when GCF is less than or equal to 1?** it appears that when supplier takes are being scaled back, then the incentive effect of this approach would be lost. Further consideration would be necessary of the approach to be taken in these circumstances. A different approach which avoids this issue is described in Section 4 below.
- 3.14 **How about Parties' Imbalance Position?** The proposed approach would change the energy volumes allocated to suppliers' BMUs. In principle, it would seem that Suppliers' could deal with this in the same way that they deal with the effect of GSP Group Correction.
- 3.15 **Would this approach remove the need for standards for % actual energy submitted?** This is open to debate. As described, the approach could have an incentive effect for any level of submission below 100% actual, increasing as the % of estimated data increases. This differs from an approach that says, for example, that 97% actual data is acceptable. It would be

possible, at the expense of added complexity, to stop the use of the weighting once a defined standard (such as 97%) was achieved.

Assessment Against Principles

3.16 An assessment against the principles discussed by the VASMG is given below:

- **Simplicity** There would probably need to be detailed work to explore and justify the size of the weighting factor, but once this was agreed the application and execution of this approach is no more complex than that of GSP Group Correction itself.
- **Transparency and Clarity** The underlying principle is clear, and any one who understands the idea of GSP Group Correction will probably understand how the underlying principle is put into practice.
- **Significant in Magnitude** The significance would be determined by the weighting factor, but the sums could be considerable.
- **Predictable** In essence, for an individual supplier, the outcomes of this approach are as predictable as the GCF
- **Securely Based** So long as the definition and establishment of the weighting factor is transparent and justified, the basis of this approach should be secure. The actual execution of the mechanism should be relatively simple and, hence, secure.
- **Automated and Consistent** This approach would be implemented as an integral part of the SVA system and hence would be fully automated and applied consistently across all suppliers and GSP Groups.
- **Explicitly linked to a clearly desired outcome** The weighting factor means this approach is directly linked to the level of estimated data submitted. Nonetheless, the other driving factor in this approach is GSP Group Correction Energy, which, comprising as it does a number of components, need not always reflect accuracy of Suppliers' data.
- **Reflective of Performance and Progressive** The approach would reflect the degree to which a supplier failed to submit actual data.
- **Immediate** In the simplest application of this approach, it would be applied in all runs of SVA, from SF onwards. However, it could be argued that the approach is best applied only to RF: this would avoid transient cash flows due to the normal process of actual data replacing estimated data through the reconciliation cycle.

4. APPROACH 2: ADDITION DIRECTLY TO ESTIMATED VOLUMES TO REFLECT UNCERTAINTY

- 4.1 The essence of this approach is that estimated volumes used in settlement would be incremented by a defined amount to reflect the uncertainty inherent in the use of EACs.
- 4.2 The effect of this would be that it would *increase* the probability that Suppliers using estimates would be allocated in SVA *at least* the amount of energy corresponding to their actual demand
- 4.3 Similarly, such a change would *decrease* the probability that Suppliers submitting actual data would be allocated more than their actual demand by SVA.

- 4.4 To implement this approach it would be necessary to define and justify the method for calculating the increment to be applied to estimated data. This would involve investigating and assessing why the use of EACs is not believed to provide a sufficiently accurate estimate (if it were sufficiently accurate then there would be no need to set standards for the submission of actual data).
- 4.5 The incremental energy could be managed separately as a new Consumption Component Class.

Issues

- 4.6 **There are many contributions to GCF, why only address EACs?** As for Approach 1, if errors due to EACs are believed to be significant, then it is reasonable to try to find a way to address them, even if other, perhaps less significant, causes are not addressed individually.
- 4.7 **EACs are allowed under the BSC, why punish their use?** The use of EACs in settlement is quite acceptable, but there is no reason why the consequences of their use should not fall upon those who use them.
- 4.8 **How could the size of the increment be established?** This will require further analysis. It may be possible to consider the question from first principles to establish an overall model. This by itself could not take account of the effect of "real world" effects such as process breakdowns. To take this into account would require an analysis of actual data.
- 4.9 **How about Parties' Imbalance Position?** The proposed approach would change the energy volumes allocated to suppliers' BMUs. In principle, it would seem that Suppliers' could deal with this in the same way that they deal with the effect of GSP Group Correction.

Assessment Against Principles

- 4.10 At an earlier meeting the VASMG discussed a set of principles that any scheme for financial incentives should seek to meet: an assessment against these principles is given below:
- **Simplicity** There would probably need to be detailed work to explore and justify the size of the increment, but once this was agreed the application and execution of this approach is straightforward.
 - **Transparency and Clarity** The underlying principle is clear.
 - **Significant in Magnitude** The significance would be determined by the increment, but the sums could be considerable.
 - **Predictable** In essence, for an individual supplier, the outcomes of this approach are as predictable as the GCF
 - **Securely Based** So long as the definition and establishment of the weighting factor is transparent and justified, the basis of this approach should be secure. The actual execution of the mechanism should be relatively simple and, hence, secure.
 - **Automated and Consistent** This approach would be implemented as an integral part of the SVA system and hence would be fully automated and applied consistently across all suppliers and GSP Groups.

- **Explicitly linked to a clearly desired outcome** The weighting factor means this approach is directly linked to the level of estimated data submitted. Nonetheless, the other driving factor in this approach is GSP Group Correction Energy, which, comprising as it does a number of components, need not always reflect accuracy of Suppliers' data.
- **Reflective of Performance and Progressive** The approach would reflect the degree to which a supplier failed to submit actual data.
- **Immediate** In the simplest application of this approach, it would be applied in all runs of SVA, from SF onwards. However, it could be argued that the approach is best applied only to RF: this would avoid transient cash flows due to the normal process of actual data replacing estimated data through the reconciliation cycle.

ATTACHMENT 1

GSP GROUP CORRECTION

1. GSP GROUP CORRECTION

- 1.1 The total energy provided to a GSP Group must be allocated to Suppliers to reflect the actual demand of their MPANs in the GSP Group.
- 1.2 Whilst the total energy provided to the GSP Group is measured for each half hour (and is therefore known to the accuracy of the meter), the consumption of all the individual MPANs is not known to the same resolution.
- 1.3 Individual consumptions may be measured by half hourly meters, estimated individually, estimated by profiling cumulative period consumptions (Annualised Advances, AAs), or estimated by extrapolating previous consumption (Estimated Annual Consumptions, EACs), or, in some cases, default EACs.
- 1.4 If there were no uncertainties or errors in the individual consumptions, and all exit points were taken into account, then the sum of the individual consumptions adjusted for losses would equal the measured total GSP Group Take.
- 1.5 In fact, there are errors and uncertainties in all the component parts of this calculation, so individual consumptions seldom sum to the measured GSP Group Take. The difference between the two, the "Correction Energy", is allocated to suppliers by the GSP Group Correction Process
- 1.6 GSP Correction allocates the correction energy to the various components of NHH demand, pro rata to the size of that component. Suppliers receive shares of the allocated energy reflective of their take.

2. UNCERTAINTIES AND ERRORS

- 2.1 GSP Group Correction energy is the net total of all the "errors" in the individual components of GSP Group Take. Here, "error", simply means where the actual value of consumption for an individual MPAN differs from that used in settlement.
- 2.2 The measured half hourly GSP Group Take is subject to errors in metering, and errors in aggregation rules and data collection, should any occur.

Errors in Individual Consumptions

- 2.3 All of the below are in addition subject to possible failures in data collection and data aggregation.

Half Hourly metered

- 2.4 These are subject to errors in metering.

Individual Estimates

- 2.5 These estimates are produced on the basis of previous consumption.

Profiled Cumulative Consumptions (AAs)

2.6 These are subject to errors in metering, to errors in the shapes of profiles, and to the misallocation of MPANs to profile classes.

Extrapolations of previous consumptions (EACs)

2.7 These are subject to the same errors as AAs, and, in addition to volume error resulting from any change in the pattern of consumption.

Losses

2.8 Loss factors used in SVA reflect estimates of actual losses. Actual losses include electrical losses and mechanisms by which energy is taken through irregular means.

2.9 It is generally believed that over, say, a year, the loss factors used in settlement are a reasonable representation of actual losses. However, at the half hourly level, actual losses may deviate noticeably from the estimates used in settlement.

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