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# Memorandum

**TO:** **TLFMG**

**FROM:** **Graham Shuttleworth**

**SUBJECT:** **Phasing by Volume: Further Clarification for the TLFMG**

**DATE:** **10 September 2002**

Earlier this year, NERA presented two proposals for phasing in the application of marginal loss factors (under P75 or P82). One proposal involved sliding gradually from the current system (average losses) to the new system (marginal losses) by applying a weighting factor that moved from 1 to 0. The second proposal provided risk-hedging opportunities in the form of a fixed volume (F) to which average losses would apply, as at present; deviations from this volume in output or consumption would attract the new rate. The advantages of the second scheme are (1) that it preserves any short-term efficient incentives of marginal loss factors from day 1 and (2) that it allows system users to hedge against unpredictable variation in marginal loss factors, by matching output or consumption to the volume (F). In principle, F is intended to proxy the forecast level of output or consumption of the system user, and would be derived from historical data for recent years, by a process to be defined.

In discussion, the TLFMG asked for clarification of "Phasing by Volume", which uses an "F-Factor" to allocate the average rate of losses to a fixed quantity. In particular, members requested further details about the way in which the F-Factor scheme would treat demand, generators in the South (ie, those that benefit from the proposed reform and those that leave the system) and new entrants (into generation and presumably into consumption). The following note provides these details.

## 1.1. Demand

### 1.1.1. Background

The F-Factor scheme is intended to prevent "rate shock" whilst retaining efficient signals by distinguishing between average and marginal costs. For many consumers, the avoidance of "rate shock" (sudden changes in tariffs) is very important. The following therefore explains how the F-Factor scheme would operate on the demand side.

### 1.1.2. Proposed approach

Involving suppliers or retail consumers raises a number of logistical difficulties, but is in any case unnecessary. Instead, the F-Factor scheme would apply to the balancing accounts of demand-side entities that are *physically* connected to the transmission network, ie, large industrial customers and distribution network operators (DNO). (The definition of such users might refer to agreements outside the BSC, or simply to the voltage of connection.) Each entity that falls within this definition would receive a fixed allowance for average losses (F) on the same basis as generators -- past patterns of usage, standard duration of investment commitment, etc.

Suppliers would continue to pay for demand scaled up (or down) by a standard marginal loss factor. For each connected party (large customer or DNO), however, settlement would work out the net rebate or surcharge due to the difference between marginal losses and average losses for the fixed allowance (= F * (TLF-ALF)).[1] This rebate or surcharge would then be allocated directly to the connected party's balancing account, as a quantity of energy, through the BSC.

This approach to the F-Factor scheme avoids the need to involve suppliers in the allocation of fixed allowances. It might be the first time that DNOs take on energy settlement responsibilities under the BSC, but they already have some responsibility for the losses incurred within the distribution network. DNOs would be able to avoid this involvement in energy settlement (which still receiving equivalent surcharges or rebates), if the fixed allowances were transferable to other signatories of the BSC. Transferability is discussed below, in the context of exiting generators.

The cost recovery equation (TLMO-) would need to be adapted slightly, to include both losses allocated to suppliers and rebates/surcharges allocated to connected parties on the demand side, but the calculation would be straightforward. Currently, the equation compares (1) 45% of actual losses with (2) charges under the new scheme. It then "smears" the difference over all consumption (ie, all negative values of QMij). The new formula would compare (1) with (2) plus the volumes surcharged/rebated to connected parties on the demand side.

[1] Each F-Factor would entitle the holder to receive in their Balancing Account an allocation of kWh equal to the amount [F * (TLF – ALF)]. This rule is equivalent to rebating the charge for marginal losses and imposing a charge for average losses, for the fixed volume F.

## 1.2. Benefiting Generators

The TLFMG asked for further clarification on the treatment of existing generators that would expect to *benefit* from the introduction of marginal (or half-marginal) loss factors.

### 1.2.1. Would generators be required to participate in the scheme, even if it meant foregoing possible benefits?

The short answer to this question is "Not necessarily". The scheme is intended to substitute for the risk management techniques that generators and consumers might have wanted to put in place, if they had been able to. For this reason, the F-factor is configured rather like a contract-for-differences that generators might have signed with NGC. However, some generators might have been willing to take the risk that they would benefit from reform of transmission losses. In principle, there is no reason to compel them to take on risk mitigation measures that they would not have adopted voluntarily. Acceptance of a positive (ie, non-zero) F-factor *could* therefore be a matter of choice by the connected party.

The main consequence of offering the possibility of voluntary exemption would be that generators would most likely fall into two distinct groups.

- those whose TLF is higher than *average* losses, who will opt to accept the fixed allowance;
- those whose TLF is *lower* than average losses (or *negative*), who will opt to pay the new TLF on their full output.

As a result, charges based on TLFs and the F-Factor would underrecover the generators' share of total losses. The cost recovery equation (TLMO+) would compensate automatically for this underrecovery, by imposing a uniform additive shift to all loss factors.

It is therefore possible for the TLFMG to decide to make participation in the phasing scheme voluntary on the part of each connected party. Alternatively, a scheme implemented through the Balancing and Settlement Code could, in principle, apply the F-Factor formulae to all connected parties.

### 1.2.2. What happens when benefiting generators exit from the system?

If participation in the scheme were voluntary, as discussed above, the short answer to this question could be "Nothing", since benefiting generators would not have taken on long-term fixed allowances (F Factors) if they expected to benefit. However, the TLFMG might decide that the scheme should be compulsory for all. Moreover, some generators might take on fixed allowances in the expectation that marginal loss factors were going to be adverse to their interests (in order to receive a rebate), only to find that the loss factors were beneficial (so that they incurred a surcharge).

In these cases, **long-term** efficiency would require the F-Factor to remain operational for as long as had previously been agreed. Hence, one possible option is to continue to require exiting generators to meet their obligations under the BSC until those obligations come to an end. However, the F-Factor scheme might also allow generators to extricate themselves from these obligations in two ways:

1. Cancel the agreement for any generator (or customer) that ceases to be a signatory to the BSC; or

2. Make the allocation of the surcharges (or receipt of any rebates) transferable to other parties.

The first option would undo some of the long-term incentive properties of the scheme, but would preserve at least the **short-term** incentives for efficient despatch of generation. The second option would allow exiting generators to pay a remaining BSC signatory to take over their obligations.

Transferability would require a slight addition to the scheme's information requirements; the balancing account to which the surcharge/rebate was allocated would have to be identified separately from the BMU, meter, balancing account or other information point that give rise to the obligations. This information requirement does not appear to be very large and has other benefits for the treatment of DNOs (as mentioned above).

## 1.3. Fixed Allowance (F-Factor) for New Entrants

The desire to extend the scheme to new entrants springs in part from the principle of risk mitigation – offering protection against unpredictable fluctuations in loss factors. However, theoretical discussions of transmission pricing have also identified a problem with predictable variation in short-run transmission costs (including marginal loss factors). Any generator (for instance) that connects to a particular node to take advantage of a beneficial loss factor may find that its presence reduces the benefit, by worsening the marginal loss factor for that node. This fear has led to a search for ways in which investors can "tie in" the current level of transmission costs, to secure potential benefits and to avoid exposure to *predictable* changes in loss factors (rather than unpredictable risks).

In principle, new entrants can access the necessary risk mitigation measures by buying a fixed allowance from an existing player – either one who is exiting the market early or one who no longer values the allowance so highly (eg, a portfolio generator). However, the F-Factor scheme can also accommodate the allocation of *additional* fixed allowances to new entrants, avoiding the need for them to negotiate with incumbents.

For the scheme to operate under the BSC, it must be based on mechanical rules, rather than commercial alternatives like auctions or negotiations with NGC. The following are simple

proposals that would allocate a defined fixed allowance (F-Factor) to each new entrant, using objective criteria.

### 1.3.1. Duration of the allowance

The scheme for existing users would contain some rule for the duration of the allowance from when the modification entered into force. In principle, this duration would reflect their commitment to use the transmission system. It would be defined by reference to the investment commitment made by the user (standard generator plant life, for example, or the remaining life of key connection assets). The simplest approach would be to apply this same principle from the time at which the new entrant enters the market or connects to the transmission system.

### 1.3.2. Level of the fixed allowance

Each fixed allowance is defined in MW, which may be constant, or vary by half-hour. The rule setting this figure for existing users would most likely be derived from data on past levels of generation and offtake (by user, or by user type), but such information would not be available for new users. The solution is to derive a standard figure, applicable to all new users, from average information about existing users.

For instance, suppose that the TLFMG decides to offer a specific level of allowance for CCGTs. The fixed allowance allocated to each new CCGT would equal a share of the total allowances already awarded to CCGTs. That share would be estimated as the ratio of the new CCGT's Registered Capacity to the total Registered Capacity of all existing CCGTs.

This approach could apply to categories of user (like CCGT, OCGT, DNO, consumer, etc), or it could apply to generation / demand in general.

### 1.3.3. Benefit from protected losses

The settlement formulae need a figure for the stable or pre-existing loss factor, to be compared with the actual loss factor in each period. The difference between these figures defines the benefit to the affected user. In the current context, it is easy to identify such a figure for existing users: the average rate of losses (divided 45/55) applicable in each half-hour. For future users, one possibility is to use the same figure; another possibility is to apply the average of the marginal loss factors applying to generation or demand (as appropriate). Both these figures would provide a relatively stable baseline, as a means of risk mitigation.

However, such averages would not help investors to secure the potential benefits of locating advantageously. For example, generators located in (say) the South may want to tie in a beneficial zonal loss factor, not the average rate for the system as a whole. To achieve this aim (which is additional to what has been discussed so far) it would be necessary to identify

the *hypothetical* loss factor that would have applied, if the new user did not exist. The most objective basis for estimating such a figure is either:

- Consistent forecasts of loss factors in future years for the scenario "before" addition of the new user; or

- Observed values in the recent past.

An average of these values would provide the hypothetical loss factor to be compared with the current loss factor in settlement. Different figures would apply to different users, depending upon the date and location of their connection.

Finding a credible forecast of the "before" scenario would be difficult. Even NGC's Seven Year Statement is likely to have anticipated new connections, so its forecasts would in fact represent the "after" scenario. Consequently, past figures are likely to represent the best information source.

However, to avoid instability (eg lots of generators connecting to a zone where loss factors happen to have been highly beneficial in the past), it might be desirable to reduce the potential benefits that new entrants can secure. For instance, new entrants might be allowed to lock in the average observed marginal loss factor times 80%, or less 2 percentage points or adjusted some other way to take account of the likely instability in MLFs. The TLF calculation project should shed some light on this amount.

#### 1.3.4. Summary

The proposals set out above provide mechanical rules for setting the duration of the allowance, the MW level of the fixed allowance (F-Factor) and the potential benefit ("average loss factor" applying to new entrants). Together, they allow the scheme to be extended to new entrants, (1) in order to provide risk mitigation measures and (2) to allow them to secure the potential benefits of locating advantageously. The second of these objectives goes beyond anything discussed to date, but may be considered an additional advantage of the scheme.

## 1.4. Conclusion

This short note indicates that the proposed scheme can be adapted to deal with a variety of cases and even entirely new demands (such as securing potential benefits for new users). The key to finding solutions is to set out clearly the aim of the proposal, define what commercial negotiations might come up with as a solution, and identify objective (mechanistic) rules for defining a proxy of available data sources.