

# **PRE-CONSULTATION DOCUMENT**

**GB-ECM 10**

**TNUoS Generation Zoning Criteria**

**December 2007**

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## 1 Executive Summary

This pre-consultation aims to seek further views on some of the issues raised in a previous consultation issued in 2006 regarding generation zoning and in particular, the definition of 'exceptional circumstances' and the  $\pm£1.00/kW$  zoning criterion.

The Statement of Use of System Charging Methodology states that a rezoning exercise may be undertaken mid price control period in the case of exceptional circumstances. This pre-consultation aims to gauge industry opinion on the definition of an exceptional circumstance.

In addition, this pre-consultation discusses the  $\pm£1.00/kW$  zoning criterion that contributes towards defining the boundaries of generation charging zones and invites views on whether this value continues to be appropriate.

## 2 Introduction

This pre-consultation follows on from a previous consultation published in September 2006 regarding the application of the Transmission Network Use of System (TNUoS) charging methodology for determining generation charging zones.<sup>1</sup> The consultation invited views regarding the application of the methodology when determining generation charging zones for the five year price control period beginning 2007/08. It also considered whether Condition 5 information, which aims to forecast the future path of locational tariffs under a range of generation and demand scenarios, should be taken into account when determining generation charging zones. The consultation and the subsequent responses from industry participants were summarised and presented at the Transmission Charging Methodologies Forum (TCMF) in October 2006.<sup>2</sup>

The aim of this pre-consultation is to discuss the conclusions resulting from the previous consultation and invite views on what might be considered to be appropriate modification options to the Use of System charging methodology with a view to better meeting National Grid's relevant licence objectives.

## 3 Background

The TNUoS tariff comprises two elements. Firstly, a locationally varying element derived from the Direct Current Load Flow (DCLF) Investment Cost Related Pricing (ICRP) Transport Model to reflect the costs of capital investment in, and the maintenance and operation of, a transmission system to provide bulk transport of power to and from different locations. Secondly, a non-locationally varying element related to the provision of residual revenue recovery. The combination of both these elements forms the TNUoS tariff.

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<sup>1</sup> <http://www.nationalgrid.com/NR/rdonlyres/F40E67CB-E8DF-4088-9543-7D382C55C751/10569/GenerationZoningFINAL.pdf>

<sup>2</sup> <http://www.nationalgrid.com/NR/rdonlyres/D31D8EAB-B7B6-41AE-8B0D-6918B9672DB9/12057/ZoningConsultationPresentation.pdf>

The DCLF ICRP Transport Model calculates the marginal costs of investment in the transmission system which would be required as a consequence of an increase in demand or generation at each connection point or node on the transmission system, based on a study of peak conditions. The model uses the concept of MWkm as the measure of the marginal costs of investment. Hence, marginal costs are estimated initially in terms of increases or decreases in units of kilometres of the transmission system for a 1 MW injection onto the system.

Given the requirement for relatively stable cost messages through the ICRP methodology, generation and demand nodes are assigned to zones and the nodal marginal km are amalgamated into these zones by weighting them by their relevant generation or demand capacity.

Demand zone boundaries are fixed and relate to the Grid Supply Point (GSP) groups used for energy market settlement purposes, whilst the following criteria are used to determine the definition of TNUoS generation charging zones:

- i. Zones should contain relevant nodes whose marginal costs (as determined from the output from the DCLF Transport Model, the relevant expansion constant and the locational security factor, see below) are all within  $\pm£1.00/\text{kW}$  (nominal prices) across the zone. This means a maximum spread of  $£2.00/\text{kW}$  in nominal prices across the zone.
- ii. The nodes within zones should be geographically and electrically proximate.
- iii. Relevant nodes are considered to be those with generation connected to them as these are the only nodes which contribute to the calculation of the zonal generation tariff.

The process behind the criteria described above, is driven by initially applying the nodal marginal costs from the DCLF Transport Model onto the appropriate areas of a substation line diagram and grouping the generation nodes into initial zones using the  $\pm£1.00/\text{kW}$  range. All nodes within each zone are then checked to ensure that the geographically and electrically proximate criteria have been met using the substation line diagram. The established zones are then inspected to ensure that the least number of zones are used with minimal change from previously established zonal boundaries. The zonal boundaries are finally confirmed using the demand nodal costs for guidance.

The zoning criteria are applied to a reasonable range of DCLF Transport Model scenarios, the inputs to which are determined by National Grid to create appropriate TNUoS generation charging zones. The minimum number of zones which meet the stated criteria are then used. If there is more than one feasible zonal definition of a generation charging zone, National Grid determines and uses that which best reflects the transmission system boundaries that trigger a need for reinforcement.

Zones are typically not reviewed more frequently than once every price control period to provide stability of TNUoS charges. However, in exceptional circumstances, it may be necessary to review zoning more frequently to maintain appropriate, cost reflective, locational cost signals. For example, if a new generator connecting to the transmission system would cause the creation of a new generation zone for that generator alone, it may not be appropriate from a cost reflective perspective to wait until the next price control period to undertake this rezoning. If any such rezoning is required, it will be undertaken against a background of minimal change to existing generation zones and in line with the notification process set out in the Transmission Licence and CUSC.

## 4 Issues

In March 2005, the Authority approved National Grid's Great Britain (GB) TNUoS charging methodology subject to National Grid taking forward a set of five conditions, which might reasonably be expected to further attain the relevant licence objectives of the methodology, namely:

- a) the facilitation of competition in the sale, distribution and purchase of electricity;
- b) a use of system charging methodology which reflects, as far as reasonably practicable, the costs incurred by the transmission licensees in their transmission businesses; and
- c) a use of system charging methodology which, as far as reasonably practicable, properly takes account of the developments in transmission licensees' transmission businesses.

The fifth of these charging conditions determined by the Authority related to the publication by National Grid of the forecast future path of tariffs at least once a year, under a range of credible demand and generation scenarios.

Section 5 of the September 2006 information paper,<sup>3</sup> highlighted a number of examples during the period of analysis where it may be necessary to modify the indicative 2007/8 generation charging zones throughout the five-year price control period to ensure that the generation zones continue to meet the relevant zoning criteria.

The 2006 consultation considered the potential use of Condition 5 information to create more robust, forward-looking generation charging zones. The option of using a weighting system over the five year price control period was also considered, with greater weighting given to the earlier years of the analysis given the reduced certainty of the validity of information when looking further into the future. Industry response to the consultation however, suggested that the forward-looking approach should not be used due to concerns over the reliability of generation commissioning dates contained in the GB Seven Year Statement (SYS), and that weightings would bring an arbitrariness and subjectivity to the charging methodology. It was also noted that the proposal would not necessarily provide greater stability to generation charging zones, as changes may still be required in the event of exceptional circumstances.

In response to the 2006 consultation, three respondents expressed uncertainty as to exactly what would qualify as an 'exceptional circumstance' and suggested that a clearer definition in the Statement of the Use of System Charging Methodology would provide further transparency.

Responses to the consultation also suggested that it was an appropriate time to review the existing zoning criteria, although most responses were in favour of an appropriate balance being struck between cost reflectivity and the stability of tariffs.

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<sup>3</sup> <http://www.nationalgrid.com/NR/rdonlyres/E1C7183E-7C31-4C18-8A8F-309A87FB459C/10765/InformationPaperFINALv2.pdf>

## 4.1 Definition of Exceptional Circumstances

The Statement of the Use of System Charging Methodology states that:

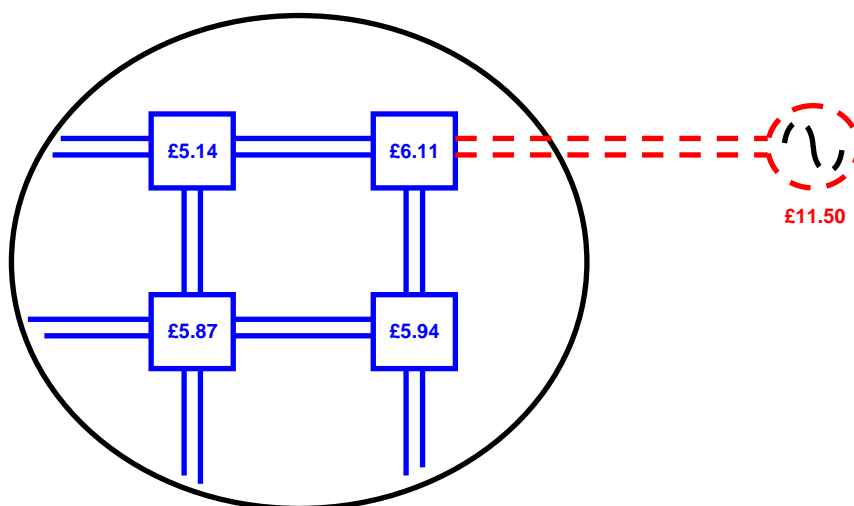
*“The zones are themselves fixed for the duration of the price control period. The methodology does, however, allow these to be revisited in exceptional circumstances to ensure that the charges remain reasonably cost reflective or to accommodate changes to the network. In rare circumstances where such a re-zoning exercise is required, this will be undertaken in such a way that minimises the adverse impact on Users.”*

The industry expressed the need for a clearer definition of an exceptional circumstance and a number of options are considered in this Section, the two perspectives being exceptional circumstances in terms of changes to the transmission network / generation and demand backgrounds, or in terms of changes to the wider industry framework.

The following examples of changes to the transmission network may or may not be considered as an exceptional circumstance:

1. The commissioning of new generation which does not meet the relevant zoning criteria of an existing zone;
2. The commissioning of new generation which meets the criteria of an existing generation zone, but has an impact such that an existing generator no longer meets the relevant criteria of that zone; or
3. The decommissioning of generation which has an impact on existing generation such that they no longer meet the criteria of that zone.

**Figure 1. Commissioning of new generation which does not meet the relevant zoning criteria of an existing generation zone**



A new generator connecting to the system as in Figure 1, may have a nodal tariff that is greater than the  $\pm£1.00/\text{kW}$  criterion to fit into an existing generation zone. To maintain cost reflectivity in this example, a new zone may be required for that new generator.

**Figure 2a. Commissioning of new generation which meets existing generation zoning criteria, but impacts on other generators**

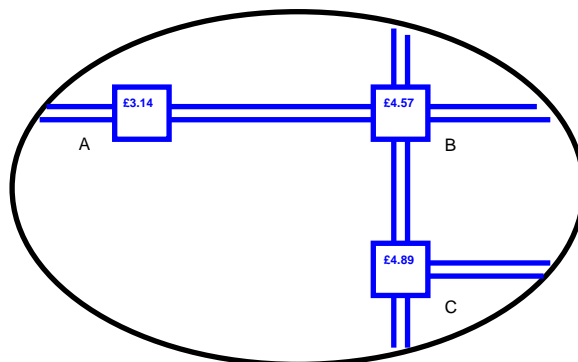
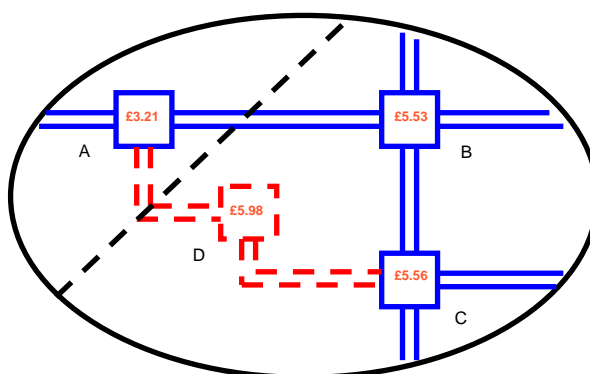


Figure 2a (above) shows three generators 'A', 'B' and 'C', with varying nodal tariffs that are all within the relevant generation zoning criterion of  $\pm£1.00/\text{kW}$  and subsequently fall within the same generation zone. Figure 2b (below) demonstrates how the commissioning of a new generator 'D' has an impact on the directional flows of generation on the transmission system such that this changes the marginal kilometres to the extent that generator 'A' no longer meets the  $\pm£1.00/\text{kW}$  criterion of the generation zone.

**Figure 2b. Commissioning of new generation which meets existing generation zoning criteria, but impacts on other generators**



If this example were to be considered as an exceptional circumstance, then a rezoning exercise would be undertaken mid price control period to maintain the cost reflectivity of TNUoS tariffs. Generator 'A' would no longer form part of this generation zone, but part of another, or a generation zone of its own.

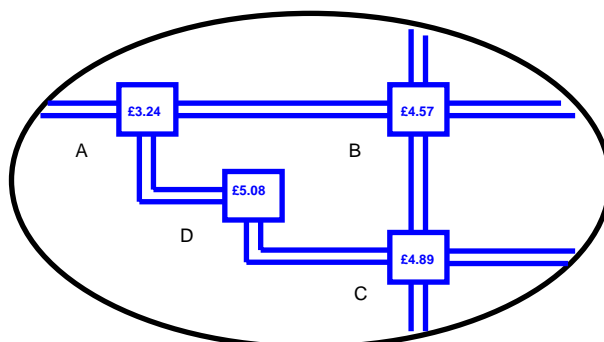
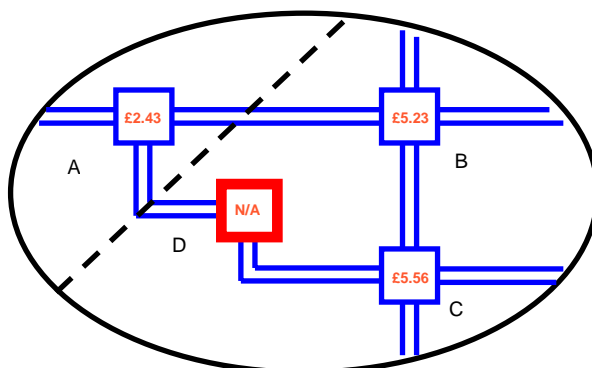
**Figure 3a. Decommissioning of existing generation**

Figure 3a (above) and Figure 3b (below) identify how the nodal generation tariffs can be impacted upon by the decommissioning of generation, generator 'D' in this example. The decommissioning of generator 'D' causes a redistribution in the flows of generation across the transmission network resulting in an increase in the tariffs of some generators on the network and decreases to others. In this example, generator 'A' no longer meets the relevant generation zoning criterion of  $\pm£1.00/\text{kW}$  of the generation zone. If this example were to be considered as an exceptional circumstance, it would be necessary to undertake a re-zoning exercise mid price control.

**Figure 3b. Decommissioning of existing generation**

The use of the term 'exceptional circumstances' in the current TNUoS charging methodology is not definitive and it may therefore be unclear as to what scenario might be considered as an exceptional circumstance and trigger a rezoning exercise mid price control period. This consultation seeks to gauge industry opinion as to what exactly should be considered as an exceptional circumstance and under what scenario(s) it would be appropriate to undertake a rezoning exercise.

Discussions at the Charging Issues Standing Group (CISG) industry meeting in November, considered each of the examples above. The general feeling was that example 1 should clearly be considered as an exceptional circumstance. Further discussion regarding examples 2 and 3 considered the applicability of setting a 'range' within which nodal tariffs should fit in order to remain within a generation zone. In this situation, generation charging zones could be determined by the

existing zoning criteria with the addition of a definitive range within which the differentials between the nodal tariffs within that zone must remain.

A possible solution might be to link the  $\pm£1.00/\text{kW}$  criterion to the reconciliation of manifest errors (paragraph 4.23 of the statement of the use of system charging methodology). If a material discrepancy in a Users TNUoS tariff occurs from errors in the calculation of TNUoS tariffs, a reconciliation process is undertaken if that error is  $\pm£0.50/\text{kW}$  or greater. It may therefore be appropriate to consider rezoning during the price control period when the spread between generator tariffs within a zone exceeds a pre-determined amount in a similar way to the reconciliation of manifest errors. For example, if the spread between generator tariffs within one zone were to exceed  $\pm£1.50$ . If changes to the network or generation and demand background were to result in one or more tariffs in the zone to exceed the  $\pm£1.00/\text{kW}$  by less than  $£0.50/\text{kW}$ , then the zones would remain the same until at end of the price control period.

Exceptional circumstances could alternatively be defined in terms of the major restructuring of industry frameworks such as the recent reforms resulting from BETTA or PLUGS which may have a significant impact on a Users TNUoS tariff.

## 4.2 The $\pm£1.00/\text{kW}$ Zoning Criterion

Five respondents to the 2006 consultation expressed that now would be an appropriate time for the zoning criterion of  $\pm£1.00/\text{kW}$  to be reviewed. This figure is used as the maximum spread of nodal tariffs permitted in any single generation zone. Relevant generation nodes that exceed the limit are not permitted to be in the same generation charging zone and must form part of an alternative zone or have a generation zone created for themselves.

The  $\pm£1.00/\text{kW}$  value has remained the same since its introduction, whilst other parameters such as the expansion constant and global locational security factor have been reviewed at the beginning of each price control and in the case of the expansion constant, subsequently inflated by RPI on an annual basis. This has the effect of annually increasing the marginal km spread between relevant generation nodes within that zone, meaning that a generator may no longer meet the  $\pm£1.00/\text{kW}$  criterion in latter years of a price control. During industry discussions at the CISG, it was suggested that the  $\pm£1.00/\text{kW}$  zoning criterion could be adjusted in line with the expansion constant to ensure consistency.

The  $\pm£1.00/\text{kW}$  zoning criterion has remained the same since its introduction, if it had been adjusted inline with inflation it would now be around  $\pm£1.50/\text{kW}$ . Analysis performed, indicates that there would be a small change to the number of generation charging zones had this criterion been inflated annually by inflation, see Figure 4.

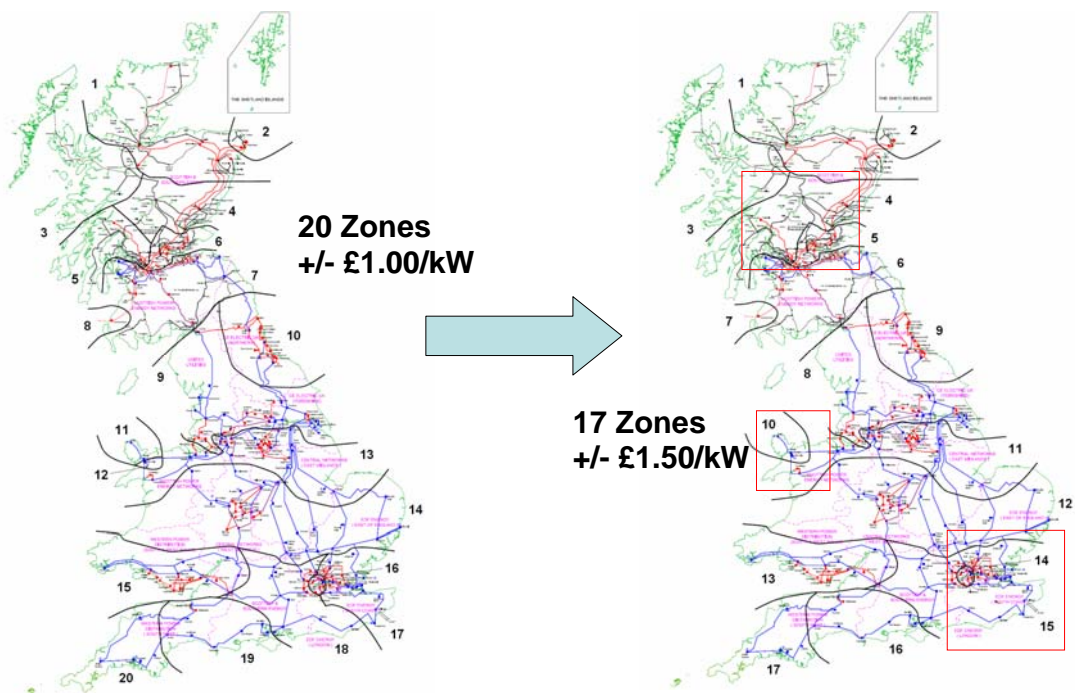
As generation charging zones are determined using a  $\pm£1.00/\text{kW}$  criterion which is derived from the locational marginal km output from the Transport Model, the Expansion Constant and the Global Locational Security Factor, the optimal solution might be to index the  $\pm£1.00/\text{kW}$  to these factors by reviewing the zoning criterion at the end of every price control period and inflating annually inline with RPI within a price control period.

Increasing the relevant criterion to  $\pm£1.50/\text{kW}$  serves to reduce the number of generation zones, increasing their size and the number of generators within them.

Generation TNUoS charging subsequently becomes less cost reflective as the cost is spread across a larger area, leading to reduced locational signals.

One respondent to the 2006 consultation suggested that  $\pm£2.50/\text{kW}$  would be an appropriate zoning criterion. Analysis shows that  $\pm£2.50/\text{kW}$  would create 11 generation charging zones shown in Figure 5. These larger zones, whilst being less susceptible to changes due to being spread over a large area, do not reflect the locational costs associated with generation in that area as well as the smaller zones.

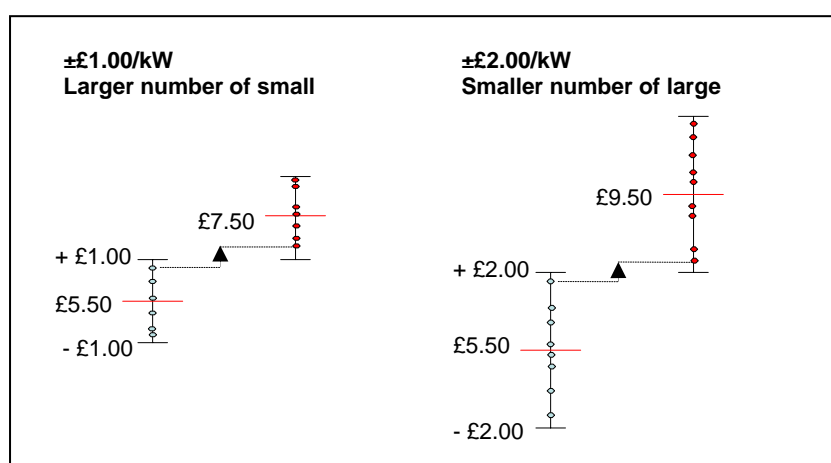
**Figure 4** Locational generation charging zones ( $\pm £1.50/\text{kW}$ )





Larger zones are generally more stable, in that changes to the network and generation and demand backgrounds are less likely to cause a generator to move outside the zoning criterion. However, if the generator were to change zone, the change in tariff could be considerably higher than for a similar case with smaller generation zones, as illustrated in Figure 6. A generator at the periphery of one zone may be pushed into an adjoining zone due to a change in the network or generation and demand background. In the case of the existing zones based on the  $\pm£1.00/\text{kW}$  criterion, the tariff increases by  $\text{£}2.00$  from  $\text{£}5.50$  to  $\text{£}7.50$ . With a larger zoning criterion of  $\pm£2.00/\text{kW}$ , tariff of the larger zones could increase by  $\text{£}4.00$ , from  $\text{£}5.50$  to  $\text{£}9.50$ . In summary, the possibility of the generator of changing charging zones is reduced with the larger zones however, the new zonal tariff is likely to be of greater impact to generators.

**Figure 6** Impact on generators of change in generation zone with increasing zoning criteria



The Expansion Constant and Security Factor are parameters of the DCLF Transport Model that are used to convert the zonal marginal km into costs. Currently both parameters are adjusted annually inline with inflation. In addition to being adjusted inline with inflation, the Expansion constant is reviewed at the end of every price control period.

Annually adjusting the zoning criterion inline with inflation would prevent the generation charging zones from reducing in size by maintaining the relationship with the expansion constant. To negate the effect that inflation has already had on the zoning criterion, the  $\pm£1.00/\text{kW}$  could be set to  $\pm£1.50$  and be inflated henceforth, as though it had been adjusted annually since it was introduced. Alternatively, the  $\pm£1.00/\text{kW}$  could remain at the present value and then be subject to annual inflation from 2008 onwards. In the interest of producing generation charging zones which remain as stable as possible, the latter could represent the preferred solution.

## 5 Responses to this consultation

This consultation effectively, seeks industry views on two issues, the first being exceptional circumstances. Exceptional circumstances could be viewed in terms of modifications to the network or demand and generation data that cause significant changes to generator nodal tariffs. Alternatively exceptional circumstances could be defined in terms of the major restructuring of industry frameworks such as BETTA or PLUGS. Specifically National Grid invites views on:

1. Given each of the examples presented in Section 4.1, whether the following scenarios should be considered as an exceptional circumstance:
  - a) The commissioning of new generation which does not meet the relevant zoning criterion of an existing zone.
  - b) The commissioning of new generation which meets the criterion of an existing generation zone, but has an impact such that an existing generator no longer meets the relevant criterion of that zone.
  - c) The decommissioning of generation which has an impact on existing generation such that they no longer meet the criteria of that zone.
2. Whether additional criteria is necessary, such as the consideration of an additional range (£0.50/kW?) within which nodes must remain in order to remain within the relevant generation charging zone.
3. Whether major industry reform impacting on a Users tariff should constitute an exceptional circumstance.

Secondly, this consultation seeks industry views on the current generation zoning criterion of  $\pm£1.00/\text{kW}$ , particularly:

4. Whether the current  $\pm£1.00/\text{kW}$  criterion should be reviewed.
5. Whether the current  $\pm£1.00/\text{kW}$  criterion remains appropriate, but should be inflated annually in line with RPI.
6. Whether the current  $\pm£1.00/\text{kW}$  criterion remains appropriate, but should be index-linked to the Expansion Constant and Global Locational Security Factor calculations.
7. Whether consideration should be given to removing the existing generation zoning criterion in favour of the existing demand zones, with no periodic review.

Comments and views are invited on all of the issues raised in this consultation document by the 4<sup>th</sup> of February 2008.

If you wish to provide comments on this consultation document, responses are preferred via email to: [mathew.hofton@uk.ngrid.com](mailto:mathew.hofton@uk.ngrid.com)

Alternatively, Users can send their comments in writing, addressed to:

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