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Dear Colleague

### **Transmission Network Output Measures**

This letter sets out background to transmission network output measures and invites interested parties to comment on methodologies which have been developed by the transmission licensees.

Under standard licence condition B17 (SLC B17) for electricity transmission and special condition C13 for gas the transmission licensees (NGET, SPTL, SHETL and NGG) are required to develop a methodology for determining network output measures. These measures are expected to enable the evaluation of:

- network asset condition
- network risk
- network performance; and
- network capability.

The network output measures are a key development in the present regulatory framework for the transmission licensees. They will enable us to better assess the efficiency of historic network investment and the need for future investment and, in particular, asset replacement. They will also facilitate more targeted incentives on network performance.

As required by the licence conditions, the licensees submitted their methodologies to the Authority on 31 May. Under the same licence conditions, the Authority must review the methodologies and decide whether or not to approve them as part of this process the Authority must consult with the licensees any interested parties.

This letter accompanies the network output methodologies submitted by the licensees and reports by consultants PB Power and TPA who reviewed the electricity and gas methodologies respectively and recommended a number of further amendments. We are minded to reflect these recommendations in the Authority's approval decision.

In light of responses to this consultation the Authority will decide whether or not to approve the methodologies. In the event of an approval, the licensees will begin recording the data which underlies the measures from 1 April 2009 and will submit reports on the measures to Ofgem from 31 July 2010. We intend to begin the work on the next phase of development of output measure after April 2009 this will focus on identifying comparator data against the transmission licensees' output measures and consider whether the licensees should be incentivised on any of the measures.

As part of this consultation we may hold public workshops, depending on the level of interest shown by respondents,.

## **Background**

### *Reliability and redundancy*

For both gas and electricity transmission, security and safety requirements govern the planning and design of the networks. They are required to deliver and maintain extremely high levels of resilience (n-2 for electricity). As a consequence, network performance (for example, loss of supply) is consistently and high.

### *Transmission price Control Review TPCR 4*

The last transmission price control review (TPCR 4) identified a significant increase in capex forecast by the transmission licensees, mostly notably in the areas of asset replacement and refurbishment. This increase is unprecedented since privatisation.

The increase in asset replacement has to be viewed against a background where non load-related expenditure has been relatively low and at relatively constant levels in the years since privatisation, throughout the nineties and in the early 2000's. During this period network reliability has been consistently high and asset replacement spend has been around £200m per year. This compares with a spend of £500m-£600m which is anticipated for the current price control period. The licensees believe this increased level of replacement will need to continue for many years to come.

The companies based their forecasts for increased capex in TPCR 4 using predictive asset age modelling which used limited asset condition information. At the time of the price control review, it was difficult for us to assess the need for non load-related capex in terms of the impact on network performance. Instead, the debate focussed on the subjective parameters in the modelling e.g. assumed asset lives etc. The high resilience of the networks which is required under the security and safety requirements also makes it harder to gauge the impact of varying levels of asset replacement.

### *Better network output measures*

Given the background described above, we are seeking to develop a variety of output measures which will allow us to develop a more focussed regulatory regime for the transmission licensees. In developing such a framework we would like to include indications of network performance that directly measure consumers' experiences. However, the immediate benefits of such measures are likely to be limited because of the way in which security standards result in high levels of system resilience. For these reasons, we consider that we will need to place more emphasis on the assessing the need for network investment and measures of network risk and condition.

The main objectives for developing transmission network output measures are:

- **assessing effective asset management;** we need to identify measures that will allow us better to assess the efficiency of historic and forecast capex with a focus on the replacement and the maintenance of network assets to ensure that the actual forecast network risk profile is within acceptable bounds.
- **understanding network performance;** if possible, we would like to improve the measures of network performance that impact consumers which have a clearer interaction with network investment
- **developing comparative analysis and sharper incentives;** the development of output measures should enable us to compare the performance of transmission and distribution companies. The benefits of comparative analysis have already been demonstrated in gas and electricity distribution and in other sectors such as

water. In addition, the measures may help us to target incentives on specific aspects of performance..

- **providing greater information to network users;** developing output measures should also reveal more information about network capability at present and in the future. This will inform users' decisions regarding network access or capacity arrangements.

#### *What are the output measures*

The measures set out in the licence will help us better assess the state of the transmission networks in terms of their ability to maintain the transfer of energy. The collection of data which underlies the output measures should allow us to see how the transmission networks have performed historically, and give us a basis for projecting future performance. The licence provided for the following measures:

1. **Network Condition** - this is about the physical condition of network assets and their ability to perform their function. Network condition is an important factor in assessing the transmission licensees' requirements for maintenance and asset replacement expenditure. This measure should also inform us about the reliability of the network – for example, the fault rate is closely related to condition. Measures of condition should ideally combine empirical data (for example, visual appearance, forensic testing etc), with credible assumptions on expected asset deterioration and lifetimes.
2. **Network Risk** – specifically the risk to network reliability. In other words, the transmission network's ability to maintain the uninterrupted flow of energy. In the short term, reliability is dependent on critical elements of the network, critical in terms of system loading. Other key areas of short term risk are environmental impact and the safety of the public and employees. In the short term, the risk profile will be skewed towards these critical elements and the output measures will need to focus on indicating the level of this risk and the cost of managing this level of risk. In the longer term, risk assessment should focus on the sustainability of the whole network in terms of condition, performance, asset stewardship and economic worth at stake.
3. **Network performance**, in particular, that which impacts on services to consumers. One aspect that can directly affect all consumers is interruption to the supply of electricity/gas caused by a failure or fault (i.e. unplanned interruption) on the transmission system. Related to this are the concepts of *reliability* i.e. how often an asset fails and *availability* i.e. how much an asset operates compared to its original design specification. The latter will also take into account how long the transmission licensee take to rectify the fault. As with risk in the short term the focus will be on performance of critical assets, failure of these can lead to incidents such as the London and Birmingham blackouts in 2003.
4. **Network capability & utilisation** - for transmission networks this will relate to its capacity to transport energy. The actual capacity of the network at any time, may differ from the original designed capacity due to the prevailing energy flow, weather conditions etc. In the short term, measures of capacity and utilisation allow us to gauge how efficiently the transmission licensees are providing capacity on the existing (baseline) network. This information. This may be useful to network users, particularly in relation to transmission access/capacity arrangements. In the longer term, such measures will also help us assess the need for network reinforcement with new load connecting to the network (e.g. generation, beach terminals etc)

#### *The electricity transmission reliability incentive*

In the TPCR 4 final proposals we set out our decision and rationale for introducing licence obligations on the transmission licensees to develop network output measures from 1 April 2007. We also linked the development of output measures to the electricity licensees' reliability incentive scheme, which establishes targets on their performance in relation to

unplanned outages with rewards for outperformance and penalties for underperformance. The licensees had consistently outperformed their targets due, in part, to the high levels of redundancy built into their networks. As a consequence, We proposed to repackage the incentive as a minimum standard by making it a “penalty only” scheme. In the final proposals we stated that we would postpone the introduction of a “penalty only” scheme pending the satisfactory development of output measures.

### ***Progress to date***

The new output measures licence conditions took effect on 1 April 2007, since that date all four transmission licensees have been developing their methodologies. The electricity transmission licensees have agreed a joint methodology (to ensure some consistency of approach) as required by their licence condition (SLC B17). The licence conditions also required the licensees to consult any interested parties where appropriate in developing their methodologies. Accordingly the electricity licensees held a joint workshop on May 8 2008 and NGG (gas transmission) held a workshop on April 3. All four licensees submitted their methodologies to us by the licence deadline (31 May 2008) The electricity licensees have highlighted that their methodology is incomplete in the area of network risk which they were still developing with aim to complete this by January 2009

### ***Licensees Proposals***

The table below summarises the output measures proposed by the licensees in their methodologies, which are published as annexes to this letter.

	<b>Proposed Output measures</b>			
	<b>Network Condition</b>	<b>Network Risk</b>	<b>Network Performance</b>	<b>Network capability &amp; utilisation</b>
Electricity (NGET, SPT and SHETL)	Remaining useful life (4 grades) for each key asset type	Remaining useful life adjusted for system environmental, and safety criticality (all still being developed)	Use existing reporting on the number of incidents, defects, faults failures, planned and unplanned outages by key asset types,	Use existing reporting on available capacity and flows across system boundaries at peak
Gas (NGG)	Remaining useful life (4 grades) for each primary and secondary asset types	“Traffic light” scale for each secondary asset type based on risk to security of supply public safety environment and metering	No. of unplanned events (restriction of flow or reduction of pressure) for pipelines, entry and exit points	Use existing reporting on aggregate baseline entry capacity v peak flow

### ***Our consultants’ findings***

We engaged consultants PB Power (electricity) and TPA (gas) to review the licensees’ methodologies and to develop their own output measures, drawing on developments and best practice from other countries and industries. TPA’s and PBP’s reports are published as annexes to this letter.

## *1) Electricity*

The key conclusions from PB Power regarding the proposed electricity transmission output measures are:

- The licensees need to calibrate their asset condition grading to ensure consistency between their reported outputs. The licensees are already working on this. In addition they should also provide more detail on the rate of deterioration of assets, which as this is the key assumption behind the remaining useful life measures.
- Wherever practicable the licensees should record and provide more fault and failure information data ideally correlated to asset condition and age.
- The measure of network risk should be broken down to provide greater transparency of its constituent elements, i.e. system criticality, environmental and safety etc. In the longer term, the licensees need to consider measures that reflect network-wide risks so that the licensees can demonstrate they are managing within acceptable limits.
- In addition to collecting boundary capacity and flow data under the capability and utilisation measure, the licensees should provide similar information for zones of the transmission network to capture the impact of changing generation mix in a given area e.g. wind, nuclear etc.

## *2) Gas*

The key conclusions from TPA regarding the proposed gas transmission output measures are:

- NGG should rank all secondary assets depending on their criticality in terms of impact on supply of gas to NTS exit points. This will allow condition measures to be focussed on the most critical assets. NGG should also separately identify planned and unplanned maintenance expenditure; as the latter may provide another indicator of asset reliability,
- NGG's proposed measure of risk could be more transparent enough - it may be difficult to interpret the proposed traffic light outputs. NGG should disaggregate this measure so that it is that is transparent which factor(s) is driving a particular asset's risk score and why,
- TPA suggest that NGG further analyse performance measures i.e. unplanned events to provide the duration and downtime to enable the calculation of reliability and availability measures.
- NGG's measures of capability and utilisation are incomplete and should include the baseline capacity of each entry/exit point. NGG should then report actual capacity against each node on an ex-post basis.

## **Next Steps**

### *This Consultation*

As part of its review of the licensees' output measures methodologies the Authority is to consult the licensees and where appropriate other interested parties. This letter is the main form of this consultation. Interested parties are invited to respond to the key questions which are set out at the end of the consultation. In addition we may hold public workshops

to discuss gas and electricity network outputs depending on the level of interest. Again, we provide interest, registration details at the end of this letter.

#### *The Authority's decision whether to approve the output methodologies*

The network output measures licence condition sets out three options for the Authority's decision regarding the licensees' output methodologies:

**Approve** if the Authority believes the methodologies facilitate the network output measure objectives in the licence.

**Approve with conditions** where the Authority believes the methodologies could facilitate the network output measure objectives if certain amendments are made. The Authority must direct the licensees to make the necessary changes and,

**Disapprove** where the Authority is not satisfied that the methodologies facilitate the network output measure objectives even with further amendments. The Authority must issue a notice of disapproval setting out the reasons for its decision. After consultation, the Authority must then direct the licensees to make improvements to their methodologies.

We are presently minded to reflect PBP's and TPA's findings. This would mean issuing a conditional approval such that the licensees are directed to make the required amendments by January 2009 or later, where appropriate. We will publish the Authority's decision having considered responses to this consultation.

#### *Output measures data collection and publication*

We anticipate that we will direct the licensee to start recording the data that underlies the output measures from 1 April 2009. The licensees must then submit a report on the network output measures by 31 July 2010. It is presently our intention to publish a summary of these reports, however we may need to consider the form in which the information is published. In general we will consider the level of detail output measure data should be published.

#### *Electricity transmission reliability incentive*

As mentioned above we have linked the development of output measures with the electricity reliability incentive which we said would become a penalty only from 1 April 2009. In the new year, we will consult on the form of the next reliability incentive.

#### *Further work on Transmission Network Outputs*

Once the methodologies have been approved, both the licensee and the Authority are required to keep the methodologies under review and propose amendments where they ensure the output measures better meet the licence objectives. We expect begin work developing potential comparators and incentives after April 2009.

#### **Key questions for consultation**

1. Do you consider that the licensee's proposed output measures are appropriate?
2. Do you agree with the recommendations of our consultants (TPA & PB Power)?
3. Can you identify other output measures that should be developed?
4. In what format, and in how much detail, would you like to see the output measure data published?

## Responding to this consultation and registering interest in the public workshops

We welcome your views from interested parties on the consultation questions set out above in this letter. Written responses should be received by **Wednesday 26 November 2008** and should be addressed to:

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Senior Manager  
Ofgem  
9 Millbank  
London SW1P 3GE

It would be helpful if responses could be sent electronically to  
[haren.thillainathan@ofgem.gov.uk](mailto:haren.thillainathan@ofgem.gov.uk).

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Public workshops (separate ones for electricity and gas) maybe held, depending on interest shown by respondents to this consultation. If sufficient interest is registered, the workshops will take place on Wednesday 19 November (one in the morning and one in the afternoon). Further details on the location and agenda will be issued nearer the time. It is essential to register in advance for one or both of workshops please email us your name, company/organisation and contact details to us at [haren.thillainathan@ofgem.gov.uk](mailto:haren.thillainathan@ofgem.gov.uk) by **31 October 2008**.

If you have any questions about this consultation or the workshop please contact Haren Thillainathan on 0207 901 7055 or [haren.thillainathan@ofgem.gov.uk](mailto:haren.thillainathan@ofgem.gov.uk)

Yours sincerely.



**Stuart Cook**  
**Director Transmission**

## Appendix 1 Transmission Network Output Measures: Current Timetable

<b>2008</b>	
October & November	Consultation on the outputs methodologies
December	Authority decision on the approval of the methodologies
December onwards	Licensees undertake any required amendments
<b>2009</b>	
January	Begin incorporating output measures into Transmission RRP (if methodologies approved)
February - March	Licence mods for the reliability incentive from 1 April 2009
Beyond April 2009	Further development of output measures