# National Grid Electricity Transmission
# RIIO-T1: Initial Proposals consultation response
# Supplementary information –
# TPCR4+R efficiency review

## Table of contents

# Executive summary

1 In section 5.23 of Ofgem's document 'RIIO-T1: Initial Proposals for National Grid Electricity Transmission and National Grid Gas, Cost assessment and uncertainty Supporting Document', Ofgem are proposing an adjustment to the TPCR4 revenue of between £12m and £31m to avoid duplicating funding for delayed 132kV switchgear investment.

2 This is based on the sharing factor of 25% being applied to an under-delivery gap of between £50m and £122m. We understand that the figure of £122m is derived from the difference between the modelled volumes used to set allowances for TPCR4 multiplied by unit cost.

3 Implicit in this calculation is an assumption that TPCR4 was a volumes-based package. This is incorrect because asset replacement volumes were not specified as part of Ofgem's proposals (in fact, Ofgem have only shared the volumes associated with TPCR4 Final Proposals within the last year). The allowances were set for us to manage network risk (our safety, reliability and environmental performance) for the benefit of our customers and consumers, which we have done.

4 A comparison with TPCR4 modelled volumes is irrelevant because these were based on our previous technical asset lives. Had we delivered this volume, we would have significantly reduced asset risk over the TPCR4 period and that was not Ofgem's intention in setting our TPCR4 allowances. Advancing this replacement could have been considered to be inefficient for consumers.

5 Using our current asset lives and the final actual volume of additions delivered in 2011/12 (eight more than originally forecast), the apparent under-delivery reduces from [text deleted] to [text deleted] (using Ofgem's model which does not take into account criticality) or [text deleted] (using NGET's risk and criticality model).

6 On the basis that we have innovated over the period to improve our asset management processes as we have learnt more about our assets, we do not believe that our TPCR4 allowances should be adjusted at all. If they were to be adjusted, then they should not be adjusted based on the modelled volumes used to set allowances for TPCR4. At most, they should be adjusted based on our new technical asset lives that we have worked hard to introduce. The upper range therefore reduces from £122m to £59.5m or ~£49.9m (pre-sharing factor).

7 Furthermore, if Ofgem were to adjust our allowances for under-delivery, they should also recognise the over-delivery of other asset types such as [text deleted] transformers (£37.7m) which were excluded from our Rollover allowances. It is not reasonable or consistent to set allowances based on avoiding duplication of funding for switchgear having never funded us for [text deleted] transformers that were delivered over the same period.

8 Following the methodology above for 132kV switchgear volumes and offsetting this amount by the £37.7m for transformers, this equates to a maximum revenue reduction of £3.1m. As final figures for 2011/12 volumes are now available (from our 2012 Regulatory Reporting Pack), this adjustment should be confirmed as part of Final Proposals in December 2012 thus completing Ofgem's efficiency review of TPCR4.

# Introduction

9 As part of making their Initial Proposals, Ofgem have reviewed our historical asset renewal performance during the TPCR4 period in order to help assess our forecast for the RIIO-T1 period (Chapter 5 of the 'Cost assessment and uncertainty Supporting Document'). This review was based not just on our July 2011 and March 2012 submissions, but also on our annual Regulatory Reporting Packs and a specific document entitled 'NGET's asset management actions' which was submitted to Ofgem in November 2011 in response to specific questions in this area.

10 They conclude that, for the majority of asset classes, they can see that after taking account of the trade-off between different voltage levels, our asset renewal volumes are close to Ofgem allowances and the forecast from Ofgem's 'survivor model' using updated (2010) technical asset lives. However, their one area of concern is the apparent under-delivery of 132kV switchgear, for which they estimate a cost of between £50m and £122m. We understand that the figure of £122m is derived from the difference between the modelled volumes used to set allowances for TPCR4 multiplied by unit cost.

11 Firstly, implicit in this calculation is an assumption that TPCR4 was a volumes-based package. This is incorrect because asset replacement volumes were not specified as part of Ofgem's proposals (in fact, Ofgem have only shared the volumes associated with Final Proposals within the last year). The allowances were set for us to manage network risk (our safety, reliability and environmental performance) for the benefit of our customers and consumers, which we have done.

12 Secondly, a comparison with TPCR4 modelled volumes is irrelevant because these were based on our previous technical asset lives. Had we delivered the replacement volume underlying our TPCR4 allowances, we would have reduced asset risk over the TPCR4 period and Ofgem set allowances based on maintaining asset risk[1]. Advancing this replacement could have been considered to be inefficient for consumers.

13 In contradiction to the analysis contained in Chapter 5, paragraph 1.14 states "Although we have considered issues related to the TOs' performance during the previous price control, TPCR4, and the forecasts in the one year adapted Rollover control (together TPCR4+R) during this assessment process, the analysis has been focused on the implications for RIIO-T1. During 2013, we will carry out a full efficiency review of expenditure in TPCR4."

14 The analysis in paragraphs 5.19 to 5.24 (entitled 'TPCR4 Asset Renewal Performance') is more than looking at the implications for RIIO-T1 (which has been done on a plant-specific basis in Figures 5.4 to 5.8). Paragraph 5.24 concludes with "Our modelling is based on actual figures for the first four years of TPCR4 (2007/8 to 2010/11) and NGET's forecast

[1] In making their Initial Proposals for TPCR4, Ofgem and their consultants were of the view that NGET's submission was too risk averse and that we should not be funded to reduce the (then) existing levels of network risk. Instead, we should be funded based on maintaining our reliability, safety and environmental performance. For example, the following is taken from Ofgem Ref 104/06 "Transmission Price Control Review: Initial proposals":

*3.13. Non-load related capex comprises costs of maintaining the existing capability of the network - mainly the replacement or refurbishment of existing assets. Our proposed reduction in comparison with NGET's forecast is driven by the following adjustments:*

- *to reflect more appropriate levels of asset replacement and refurbishment, both in terms of volume of activity and unit cost. These adjustments are based on advice from our consultants, who have carried out in-depth assessments of NGET's asset base and management processes;*

for expenditure in the final year of TPCR4 (2011/12). Rather than base any revenue clawback on partly-forecast figures, we will determine the correct amounts during 2013. This will also enable us to evaluate performance against the Rollover year allowances."

15 This document starts with information that we have already supplied to Ofgem and uses an appropriate logic to explore whether we have materially over- or under-delivered, and whether we should benefit from the related under-spend achieved over the TPCR4 period. New information is provided where this is salient, e.g. we now have actual figures for 2011/12 volumes.

# Non-load related volumes

## Treatment of over-/under-delivery

### 132kV circuit breaker volumes

16 In section 5.23 of Ofgem's document 'RIIO-T1: Initial Proposals for National Grid Electricity Transmission and National Grid Gas, Cost assessment and uncertainty Supporting Document', Ofgem are proposing an adjustment to the TPCR4 revenue of between £12m and £31m to avoid duplicating funding for delayed 132kV switchgear investment. This range has been derived by applying the 25% sharing factor to an estimated under-delivery gap of between £50m and £122m.

17 Discussions with Ofgem following Initial Proposals indicated that the range £50m - £122m was calculated from permutations of volumes and unit costs. Three values for a volumes gap were used: NGET's TPCR4 volumes as reported in our March 2012 submission versus the volumes implicit in setting Ofgem's TPCR4 allowances[2], Ofgem's 2009/10 survivor modelling volumes and volumes taken from our response to RT1-Ph3-238. Four values were then used for unit costs: the unit costs used to derive Ofgem's TPCR4 allowances, the 2009/10 unit cost reported via our an Regulatory Reporting Pack, the RIIO-T1 'most likely' unit cost and the consultants' median unit cost. These 12 permutations are tabulated below.

*Re-creation of analysis under-pinning Ofgem's Initial Proposals*

| £m | | TPCR4 unit cost allowed | 2009/10 unit cost from RRP | RIIO-T1 'most likely' post adjustment | Consultants' median |
|---|---|---|---|---|---|
| | | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| Variance vs Ofgem allowance | [text deleted] | -122.5 | -109.4 | -124.7 | -95.7 |
| Variance vs Ofgem's 2009/10 model | [text deleted] | -67.2 | -60.0 | -68.4 | -52.4 |
| Variance vs RT1-Ph3-238 | [text deleted] | -49.0 | -43.7 | -49.9 | -38.3 |

18 The selected range therefore appears to be taken from the TPCR4 unit cost (inflated to 2009/10 prices) and multiplied by the volume 'gap' between Ofgem's TPCR4 allowances and our March 2012 forecast (£122.5m) or the 'gap' between RT1-Ph3-238 and our March 2012 forecast (£49m).

19 In understanding how Ofgem have arrived at these numbers, it is important to consider additions and disposals separately. Additions are directly comparable with Ofgem allowances whereas disposals are directly comparable with network risk. Ofgem's modelling was based on actual figures for the first four years of TPCR4 and NGET's forecast for the final year of TPCR4 (2011/12). Since this time, we have submitted our annual Regulatory Reporting Pack with actuals for 2011/12; we have therefore used these final volumes for the full five-year period.

[2] In terms of whether the TPCR4 package was linked to specific volumes, we did not receive the volumes implicit in Ofgem's allowances until October 2011 and we never received the unit costs associated with TPCR4 Final Proposals. The figure used is that from Updated Proposals.

*Additions 2007/08 – 2011/12 in comparison with Ofgem allowance*

| TPCR4 only | A | B | C |
|---|---|---|---|
| 145kV (132kV) only | TPCR4 forecast non-load only from table 9.5 TPCR4 forecast | Actuals non-load only from table 4.15 RIIO-T1 submission updated with 2011/12 actuals from 2012 RRP | Implicit Ofgem allowance |
| OCB | [text deleted] | [text deleted] | |
| CAB | [text deleted] | [text deleted] | |
| PAB | [text deleted] | [text deleted] | |
| GCB | [text deleted] | [text deleted] | |
| GIS OD | [text deleted] | [text deleted] | |
| GIS ID | [text deleted] | [text deleted] | |
| **Totals** | **[text deleted]** | **[text deleted]** [3] | **[text deleted]** |

*Disposals 2007/08 – 2011/12*

| TPCR4 only | D | E | F | G | H | I |
|---|---|---|---|---|---|---|
| 145kV (132kV) only | Ofgem model 2005 lives (disposals) | Ofgem model 2010 lives (disposals) | TPCR4 forecast non-load only (disposals) from table 9.5 TPCR4 forecast | TPCR4 forecast non-load and load in window (disposals) from table 9.5 TPCR4 forecast | Actuals Non-load only (disposals) from table 4.15 2012 RRP | Actuals non-load and load in window (disposals) from table 4.15 2012 RRP |
| OCB | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| CAB | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| PAB | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| GCB | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| GIS OD | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| GIS ID | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| **Totals** | **[text deleted]** | **[text deleted]** | **[text deleted]** | **[text deleted]** | **[text deleted]** | **[text deleted]** |

20 The first change required is therefore to update our March 2012 RIIO-T1 submission forecast with 2011/12 actuals from our July 2012 Regulatory Reporting Pack (i.e. [text deleted] as opposed to [text deleted]). Paragraph 5.24 states that Ofgem wish to base

[3] At the time of Initial Proposals, Ofgem calculated this number to be [text deleted] based on a forecast figure for 2011/12; the actual final value was [text deleted] more. As explained in our 2012 RRP table narrative, the majority of this increase is due to an additional [text deleted] indoor GIS gas circuit breakers that were commissioned earlier than anticipated as part of ongoing works at Littlebrook.

any revenue clawback on actual figures (rather than partly-forecast figures). As we now have those for 2011/12, it is not necessary to wait until 2013 to determine the correct amount; this can be done as part of Final Proposals. The range calculated on the same basis would then reduce to between £41m and £115m.

*Analysis under-pinning Ofgem's Initial Proposals updated for 2011/12 final outturn*

| £m | | TPCR4 unit cost allowed | 2009/10 unit cost from RRP | RIIO-T1 'most likely' post adjustment | Consultants' median |
|---|---|---|---|---|---|
| | | [text deleted] | [text deleted] | [text deleted] | [text deleted] |
| Variance vs Ofgem allowance | [text deleted] | -114.8 | -102.5 | -116.9 | -89.7 |
| Variance vs Ofgem's 2009/10 model | [text deleted] | -59.5 | -53.1 | -60.6 | -46.4 |
| Variance vs RT1-Ph3-238 | -[text deleted] | -41.3 | -36.9 | -42.1 | -32.3 |

## Oil circuit breaker life extension

21 National Grid has undertaken extensive work over the TPCR4 period to enhance our understanding of the end-of-life criteria for all asset types. One of the technologies where life extension has been achieved is oil circuit breakers of all voltages. The document titled 'NGET's asset management actions' submitted to Ofgem in November 2011 included information on the analysis undertaken with regard to ensuring reliability of oil circuit breakers by managing the integrity of the bushings and the longer-term cost benefit of replacing bushings vs replacing the breakers. The increased opex costs of maintaining oil circuit breakers as opposed to more modern gas circuit breakers were also taken into account.

22 'NGET's asset management actions' document modelled the net impact of all the technical asset life changes for circuit breakers of all voltages, but it is possible to repeat this analysis family-by-family. Using the Ofgem 'survivor model' for 132kV oil circuit breakers only, the impact of this asset life change accounts for a difference of [text deleted] circuit breakers (comparing the OCB row for columns D and E). Ofgem's December 2010 'RIIO-T1 Tools for cost assessment' strategy consultation document lists asset life changes under the category of efficient deferment, saying, "We would expect ever increasing levels of sophistication in asset management and the targeting of particular failure modes to result, on average, in longer expected asset lives". The Strategy document also stated that "Longer asset lives benefit customers through reductions in current and future replacement expenditure. Indeed, in our assessment at TPCR4, we anticipated that lower replacement quantities than those proposed by the TOs would be required."

23 From this, it is evident that variance with the volumes implicit in Ofgem's TPCR4 allowances should not be used as the upper value for the estimated under-delivery gap. Instead, Ofgem's 2009/10 survivor modelling would be more appropriate as this at least reflects the updated technical asset lives. The upper value for the under-delivery gap is then £67.2m based on Ofgem's analysis in their Initial Proposals, or £59.5m (from the table above) once the additions are updated to reflect 2011/12 actuals.

24 As was explained in our November 2011 submission, as well as extending technical asset lives (which has had the most significant impact on the volumes assessed as being in a

state requiring replacement), we also introduced our risk and criticality methodology for asset replacement. By considering the potential consequences of failure, we can assign a criticality to each circuit breaker. This is then used to prioritise replacement, with the effect that replacement of low criticality circuit breakers can be deferred even if their condition is poor. From our Network Output Measures modelling, it is estimated that the impact of criticality on 132kV circuit breakers is to defer approximately [text deleted] units as compared to considering their condition alone. The total based on Ofgem's survivor modelling ([text deleted], column E) would therefore become [text deleted] following the application of criticality, further reducing the maximum value for under-delivery to [text deleted].

25 Given that, following the application of the TPCR4 sharing factor, customers have benefited by 75% of the saving associated with the deferral of these [text deleted] oil circuit breakers, and will continue to benefit from extended technical asset life for the remaining population of oil circuit breakers throughout the RIIO-T1 period, it does not seem unreasonable that NGET should benefit by 25% of the TPCR4 saving given the innovation required to achieve this development.

## Treatment of over-delivery in setting TPCR4 Rollover allowances

### Supergrid transformer volumes

26 In setting our allowances for the Rollover year (2012/13), Ofgem's consultants proposed (and Ofgem implemented) a reduction in allowances of £37.7m based on their belief that the "transformer volumes already purchased in TPCR4 and proposed to be installed by the end of 2012/13 already exceed the replacement volumes indicated by the revised NGET modelling by approximately [text deleted] units". Our November 2011 document (page 66 of 'NGET's asset management actions') provided more detail behind the graph that the consultants used to reach their conclusion at that time. In summary, comparing the volume forecast to be delivered over TPCR4 with the volume modelled according to NOMs, we were [text deleted] units (or [text deleted] of the total population) ahead of modelled volumes. This is within the bounds of variation that we would expect to see due to delivery optimisation.

27 It was too late when Final Proposals for the Rollover year were published (November 2011) for us to adjust our plans for 2012/13 and so we have progressed in line with our submission. Furthermore, we did not have [text deleted] transformers in our plan that could not be replaced in 2012/13 (forecast non-load related additions totalled [text deleted]). Consumers and customers have therefore benefited by [text deleted] transformers delivered over the TPCR4 period that have not been funded.

28 Given that Ofgem are proposing to disallow revenue for under-delivery, to also disallow revenue based on over-delivery is inconsistent and unreasonable. We therefore believe that, if Ofgem were to proceed with making a disallowance for under-delivery of 132kV switchgear, they should offset this by the £37.7m calculated for over-delivery of transformers.

# Conclusions

29 Ofgem's initial upper valuation of £122m for under-delivery of 132kV circuit breaker volumes appears to be based on the difference between the volumes implicit in TPCR4 allowances and those actually delivered multiplied by the TPCR4 unit cost.

30 Once this analysis has been updated to reflect the final volumes delivered in 2011/12 (an additional [text deleted] units), this figure reduces to £115m. However, it would be wrong to base an adjustment on this volume variance because this would ignore the work that we undertook to extend the technical asset lives of oil circuit breakers. A better upper range is therefore based on Ofgem's 2009/10 survivor modelling which reflects these new technical asset lives, and the upper value then reduces to £59.5m. It would be even more accurate to use the volumes implied by NGET's risk and criticality approach, giving a value for the gap of £49.9m.

| Scenario | Volume difference (units) | Upper valuation (£m) |
|---|---|---|
| Ofgem's Initial Proposals | [text deleted] | 122 |
| Update for 2011/12 actual figures | [text deleted] | 115.2 |
| Ofgem's 2009/10 survivor modelling | [text deleted] | 59.5 |
| NGET's risk and criticality modelling | [text deleted] | 49.9 |

31 If this adjustment is to be made, over-delivery should also be reflected. Specifically, as part of setting the Rollover allowances, Ofgem disallowed £37.7m because the consultants indicated that we were [text deleted] units ahead of our own policy. We have not been and would never be funded for these units unless this amount was netted off the £41.3m, leaving a net adjustment to allowances of £12.2m.

32 This would equate to a £3.1m adjustment to allowed revenues after the application of the 25% sharing factor.

33 Ofgem indicated that they would not want to base any revenue clawback on partly-forecast figures and propose waiting until 2013. However, actual figures for 2011/12 are now available and can be used to determine the correct amount for inclusion in Final Proposals in December 2012. This would complete the review of TPCR4 performance. We would expect Rollover performance to be reviewed on the basis of our 2013 Regulatory Reporting Pack.