

National Grid Electricity Transmission

RIIO-T1: Initial Proposals consultation response

Supplementary information – Network Renewal Incentive

Table of contents

| | |
|--|-----------|
| Executive summary | 2 |
| Introduction | 3 |
| Incentives and principles | 4 |
| Incentives for under and over delivery | 4 |
| The use of a marginal incentive reward/penalty | 4 |
| Process and definitions..... | 6 |
| Proposed alternative process | 6 |
| NOMs target | 6 |
| Dead-band around NOMs target | 7 |
| Trade-offs between asset categories | 7 |
| “Underlying asset volume” | 7 |
| “Relevant unit costs” | 9 |
| RIIO-T1 NOMs target as opening position for RIIO-T2 allowances | 9 |
| Financing costs for non-load related capex advancement | 12 |
| Conclusions | 13 |
| Appendix A: Testing Initial Proposals | 14 |
| Asset degradation less than forecast | 14 |
| Asset degradation worse than forecast | 17 |
| Conclusion..... | 20 |

Executive summary

- 1 The description of the treatment of Network Output Measures as set out in the RIIO-T1 Initial Proposals 'Cost assessment and uncertainty Supporting Document' is incomplete and confused.
- 2 We agree that the NOMs targets should be set out in a Licence Condition, along with the associated dead-band. We welcome Ofgem's confirmation that the tier 1 and tier 2 network risk assessments will be based on Network Output Measures rather than asset replacement volumes. This is more consistent with the RIIO emphasis on the delivery of outputs rather than inputs.
- 3 We remain concerned that Ofgem's proposed treatment of under and over delivery does not achieve their stated aim to expose National Grid to the risk of uncertain asset renewal volumes. Furthermore, we are concerned that the marginal reward/penalty could skew the cost benefit analysis of asset management decision-making. Having an incentive that we have to ignore to make the 'right' decision is not logical and has the potential to create a conflict between our interests and those of consumers.
- 4 We also remain concerned that Ofgem's refusal to confirm the details of these proposals until the RIIO-T2 price control review will at best make these arrangements irrelevant to our RIIO-T1 asset management decisions and will at worst distort those decisions. This level of regulatory uncertainty on approaching £4bn of lead asset replacement expenditure significantly adds to the risk associated with the RIIO-T1 price control package. Without understanding the process, the definitions (e.g. justified/unjustified) or the parameters of any reward/penalty, we will not be able to make fully-informed investment decisions.
- 5 As part of this Supplementary Information document, we have therefore made a proposal which starts to address Ofgem's declared concerns around network renewal performance. There is no reason to delay further development of this process and we would wish to see the arrangements finalised as part of the RIIO-T1 price control review process. We note that non-load related expenditure appears to be receiving a significantly different treatment to load-related, where algebra is being developed for draft Licence conditions; we would prefer to see the full process for network renewal incentivisation set out in a Licence condition.
- 6 Finally, Ofgem have rejected the need for an uncertainty mechanism to cover the financing costs associated with advancing non-load related expenditure if load-related expenditure were triggered more slowly than forecast against the Best View Gone green scenario. In not recognising these costs, Ofgem are penalising us for developing a business plan which took appropriate consideration of adaptability and robustness to change. The potential financing cost of £76m is approximately two and a half times the effective materiality threshold proposed by Ofgem for other uncertain costs.

Introduction

- 7 We agree that Network Output Measures (NOMs) are an important secondary deliverable as all other performance indicators for reliability, safety and environmental performance (Energy Not Supplied, faults and failures) are lagging. Forecast Network Output Measures allow both TO and Regulator to explore whether asset replacement and refurbishment plans are sustainable in the longer-term. It is in the consumer interest for us to be regulated based on the outputs we deliver (NOMs) and not inputs (volume of assets replaced).
- 8 Ofgem's approach to the use of Network Output Measures to assess the TOs network risk performance over the RIIO-T1 period is set out in section 5 of their 'Cost assessment and uncertainty Supporting Document' (paragraphs 5.78 to 5.92). Ofgem do not clearly set out their objectives and methodology for assessment and therefore it is difficult to comment fully on the effectiveness of Initial Proposals. We have, however, identified a number of high-level issues which can be grouped under two headings:
 - (a) Incentives and principles
 - (b) Process and definitions
- 9 The following sections consider these headings in turn. All paragraph and table references are to Ofgem's 'Cost assessment and uncertainty Supporting Document' unless otherwise indicated.

Incentives and principles

Incentives for under and over delivery

- 10 We are concerned that treatment of Network Output Measures is not developed in sufficient detail to allow the TOs to make informed asset management decisions during RIIO-T1. We are also concerned that the associated penalties and rewards do not align our interests with those of consumers.
- 11 Ofgem state in paragraph 5.25 that due “to the uncertainty associated with the forecast of asset degradation and unexpected type faults, the asset renewal volumes forecast by NGET may vary over the RIIO-T1 period. NGET’s forecast on risk is P50 based and we consider that the risk of uncertain renewal volumes is symmetric. As an asset owner, NGET is best placed to manage this risk. Therefore we do not propose any uncertainty mechanism to address the risk associated with uncertain asset renewal volumes”.
- 12 We are concerned that the “Evaluation of NOMs performance as part of RIIO-T2 price control” section of Initial Proposals does not achieve this allocation of risk. These proposals are based around table 5.21 which is reproduced below.

Ofgem’s Table 5.21 – Treatment of under/over delivery against NOMs

| | Justified | Unjustified |
|-----------------------|---|--|
| Over delivery | The cost of the over delivery (net of the amount that has already been funded through the sharing factor) will be funded on a NPV neutral basis through the RIIO-T2 allowance. We will provide the company with a reward for carrying out this additional justified work. | The cost of the over delivery (net of the amount that has already been funded through the sharing factor) will be funded when the work is required. The company will be exposed to the financing costs associated with this work plus an additional penalty. |
| Under delivery | The costs of catching up with the RIIO-T1 targets will not be funded in the RIIO-T2 allowance. The TO will be rewarded for an efficient deferral of work. | The costs of catching up with the RIIO-T1 targets will not be funded in the RIIO-T2 allowance. The TO will be penalised for an inefficient deferral of work. |

- 13 Appendix A tests table 5.21 against a number of scenarios. For simplicity, we have focussed on the impact of our ability to manage asset degradation, however it is also necessary to consider the impact of actual unit costs encountered as opposed to the originally allowed unit costs.
- 14 Our conclusions from this review are that the arrangements currently described in table 5.21 do not provide the appropriate incentives, and further work is required. Changes to unit costs will affect the working of any incentive. In any case, further clarity is required for these incentives to influence RIIO-T1 asset management decisions. We see no reason why this should not be provided as part of Final Proposals.

The use of a marginal incentive reward/penalty

- 15 As discussed as part of Appendix A, Ofgem propose a marginal reward for justified under and over delivery, and a marginal penalty for unjustified over and under delivery. They state that the size of this reward/penalty will be related to the costs associated with under

(and presumably over) delivery, and that they would set out these parameters during the RIIO-T2 price control review. This is illogical.

- 16 In discussion, Ofgem said that this reward/penalty was intended to incentivise us to deliver asset replacement at the margin, i.e. if it is a marginal decision whether or not to replace an asset during the RIIO-T1 period rather than defer its replacement, it would be an encouragement to replace. However, they did not want to tell us the size of the reward/penalty in advance because this might influence our decision-making (albeit the intention is to influence our decision-making).
- 17 Not knowing the size of this percentage may encourage a company to be conservative, e.g. to replace all the assets exactly as forecast in their RIIO-T1 submission to be sure of receiving the appropriate allowances. The incentive to innovate would be reduced as the company would not be certain as to whether the outcome would receive favourable treatment at the end of the period, and an uncapped percentage penalty could be large. Furthermore, there is no guarantee that this reward/penalty would be symmetrical.
- 18 More specifically, if Ofgem do not want to influence our decision-making, they should not apply a reward/penalty. Without this, we will weigh up the cost benefit of delivering early rather than later (or later rather than early), and make the decision based on the relative project costs, financing costs, forecast constraint costs and network risk. This would be a 'pure' asset management optimisation decision for consumers and wider stakeholders.
- 19 Incentives should act to align company and consumer interests. An incentive you have to ignore to get the right answer is not a good incentive.

Process and definitions

Proposed alternative process

- 20 We agree that the NOMs target should be set out in a Licence Condition, along with the associated dead-band. Adjustments to allowances should be made on the basis of comparing the actual NOMs position delivered compared to the relevant dead-band values set in the Licence.
- 21 The treatment of under and over delivery should also be set out in the Licence Condition because incentives are generally most effective when set out at the start of a price control period. If they are only revealed at the end (or potentially beyond the end and after the start of RIIO-T2, as indicated in paragraph 5.92), there is nothing that a company can do to change their performance over that period.
- 22 Any adjustment to allowances for RIIO-T1 performance needs to be calculated and applied on 1 April 2021, allowing a 'clean start' to be made in terms of both funding and volumes. This approach would have the additional benefit that the TOs would not be exposed to any windfall gains/losses as a result of material changes to the sharing factor.
- 23 The following sections define the proposed parameters and methodology for this process in more detail.

NOMs target

- 24 We are seeking confirmation of the definition of the NOMs target values referred to by Ofgem. These are the P50 forecast of Replacement Priorities for each asset type and voltage as of March 2021 with the Gone Green Best View of investment; we have extracted these values from table 4.28 of our March 2012 submission.

| Replacement Priorities | | Expected (50%) | | | | |
|------------------------|-------------------|----------------|-----|------|--------|---------------|
| | | RP1 | RP2 | RP3 | Target | Range |
| 400kV Network | | | | | | |
| 1 | Circuit Breaker | 6 | 6 | 7 | 19 | 18 - 20 |
| 2 | Transformer | 9 | 8 | 29 | 46 | 44 - 48 |
| 3 | Reactor | 3 | 3 | 2 | 8 | 8 - 8 |
| 4 | Underground Cable | 1.6 | - | 4.5 | 6.1 | 5.8 - 6.4 |
| 275kV Network | | | | | | |
| 1 | Circuit Breaker | 21 | 41 | 58 | 120 | 114 - 126 |
| 2 | Transformer | 21 | 19 | 49 | 89 | 85 - 93 |
| 3 | Reactor | 3 | 4 | 1 | 8 | 8 - 8 |
| 4 | Underground Cable | 79.3 | 4.4 | 85.6 | 169.3 | 160.8 - 177.8 |
| 132kV Network | | | | | | |
| 1 | Circuit Breaker | 32 | 78 | 58 | 168 | 160 - 176 |
| 2 | Transformer | - | 2 | 1 | 3 | 3 - 3 |
| 3 | Reactor | 32 | 26 | 7 | 65 | 62 - 68 |
| 4 | Underground Cable | - | 1.5 | 2.6 | 4.1 | 3.9 - 4.3 |

| All voltages | | | | | | |
|--------------|--------------------|-------|-------|-----|-------|--------------|
| 5 | OHL line conductor | 1,317 | 1,442 | 888 | 3,647 | 3,465 - 3829 |
| 6 | OHL line fittings | 1,038 | 827 | 905 | 2,770 | 2,632 - 2909 |

- 25 We propose merging the 400kV, 275kV and 132kV rows for overhead lines conductor and fittings to simplify reporting and calculation as there is no material difference between these voltage categories: relative risk has already been assessed as part of criticality, and the unit cost is the same for each.

Dead-band around NOMs target

- 26 Ofgem state in a footnote to paragraph 5.88 that they are considering a dead-band around the NOMs target(s). We agree that a dead-band is needed, as a minimum to reflect that it is not credible that a TO will exactly meet each target when these have been forecast over an eight-year period. As NGET's deterioration forecasting is probabilistic in nature, we proposed a dead-band of $\pm 5\%$ based on the calculated standard error of the probabilistic forecast; this is shown in the table above and should also be captured in the Licence Condition. Given the small number of assets in many of the individual categories in the table above, this is sometimes less than one unit and we therefore believe that this is a reasonably tight target.

Trade-offs between asset categories

- 27 Ofgem stated in their meeting with all three TOs (11 September 2012) that they would be happy for 'trade-offs' or 'substitution' to occur between categories, but not too much substitution. The concept is that over-delivery of transformers (say) could be offset by under-delivery of switchgear if this were due to justifiable reasons (e.g. outage optimisation). However, Ofgem were of the view that there should be a limit to these trade-offs, e.g. doing none of an asset class (even if this were substituted by doing more from all other classes) could increase network risk disproportionately. Again, without this point being clarified, it will be difficult for TOs to know whether they are making asset management decisions that will be ultimately acceptable to Ofgem.
- 28 We would welcome further discussion with Ofgem to understand their proposed limits around trade-offs.

"Underlying asset volume"

- 29 Ofgem describe their two-tier process for assessing RIIO-T1 NOMs performance. Tier 1 (a comparison of the actual March 2021 NOMs position with the forecast) would be straightforward once the target and any dead-band have been defined.
- 30 Tier 2 is described as "review the required replacement volume that underlie the under or over target delivery. The volume will enable us [Ofgem] to estimate the costs associated with the under or over delivery against the NOMs target. The estimate will be based on the underlying asset volume and relevant unit costs."
- 31 This could mean that the forecast NOMs and the actual NOMs are compared. Comparing 'Actuals' with the dead-band around the 'Expected' would give a 'gap' to quantify under or over delivery (as shown in the table below). From our conversation with Ofgem on 11 September 2012, we believe that this is the intent but ask that this be confirmed.

| Replacement Priorities | | Expected (50%) | | | | | Actuals | | | | Adjust? |
|------------------------|--------------------|----------------|-------|------|--------|---------------|---------|-------|------|-------|---------|
| | | RP1 | RP2 | RP3 | Target | Range | RP1 | RP2 | RP3 | Total | |
| 400kV Network | | | | | | | | | | | |
| 1 | Circuit Breaker | 6 | 6 | 7 | 19 | 18 - 20 | 3 | 6 | 7 | 16 | Y |
| 2 | Transformer | 9 | 8 | 29 | 46 | 44 - 48 | 9 | 8 | 29 | 46 | N |
| 3 | Reactor | 3 | 3 | 2 | 8 | 8 - 8 | 4 | 6 | 2 | 12 | Y |
| 4 | Underground Cable | 1.6 | - | 4.5 | 6.1 | 5.8 - 6.4 | 1.6 | - | 4.5 | 6.1 | N |
| 275kV Network | | | | | | | | | | | |
| 1 | Circuit Breaker | 21 | 41 | 58 | 120 | 114 - 126 | 21 | 41 | 58 | 120 | N |
| 2 | Transformer | 21 | 19 | 49 | 89 | 85 - 93 | 21 | 19 | 49 | 89 | N |
| 3 | Reactor | 3 | 4 | 1 | 8 | 8 - 8 | 3 | 4 | 1 | 8 | N |
| 4 | Underground Cable | 79.3 | 4.4 | 85.6 | 169.3 | 160.8 - 177.8 | 79.3 | 4.4 | 85.6 | 169.3 | N |
| 132kV Network | | | | | | | | | | | |
| 1 | Circuit Breaker | 32 | 78 | 58 | 168 | 160 - 176 | 32 | 78 | 58 | 168 | N |
| 2 | Transformer | - | 2 | 1 | 3 | 3 - 3 | - | 2 | 1 | 3 | N |
| 3 | Reactor | 32 | 26 | 7 | 65 | 62 - 68 | 32 | 26 | 7 | 65 | N |
| 4 | Underground Cable | - | 1.5 | 2.6 | 4.1 | 3.9 - 4.3 | - | 1.5 | 2.6 | 4.1 | N |
| All Voltages | | | | | | | | | | | |
| 5 | OHL line conductor | 1,317 | 1,442 | 888 | 3,647 | 3,465 - 3,829 | 1,317 | 1,442 | 868 | 3,627 | N |
| 6 | OHL line fittings | 1,038 | 827 | 905 | 2,770 | 2,632 - 2,909 | 1,038 | 827 | 905 | 2,770 | N |

32 We propose that, if the NOMs target for a category (e.g. 275kV circuit breakers) is met, that is the end of the process for that category. Missing a NOMs target would trigger a review of the missed category only.

33 The calculation process to assess the financial impact of under/over delivery would then consider only those categories where the target has been missed. Any/each over delivery gap would be multiplied by the relevant unit cost and offset against any/each under delivery gap multiplied by the relevant unit cost. The example from above is used to illustrate this process in the table below; a positive gap represents over delivery while a negative gap represents under delivery.

| Voltage | Plant type | Adjust? | Gap to dead-band | Relevant unit cost | Financial impact |
|---------------------------------------|-----------------|---------|------------------|--------------------|------------------|
| 400kV | Circuit breaker | Y | 2 | £1m | +£2m |
| 400kV | Reactor | Y | -4 | £1m | -£4m |
| TOTAL ADJUSTMENT TO ALLOWANCES | | | | | -£2m |

34 In this fictitious case, the net adjustment to allowances would be -£2m before application of the sharing factor. However, as explained in Appendix A, we are not clear how this analysis would differentiate between justified and unjustified under delivery.

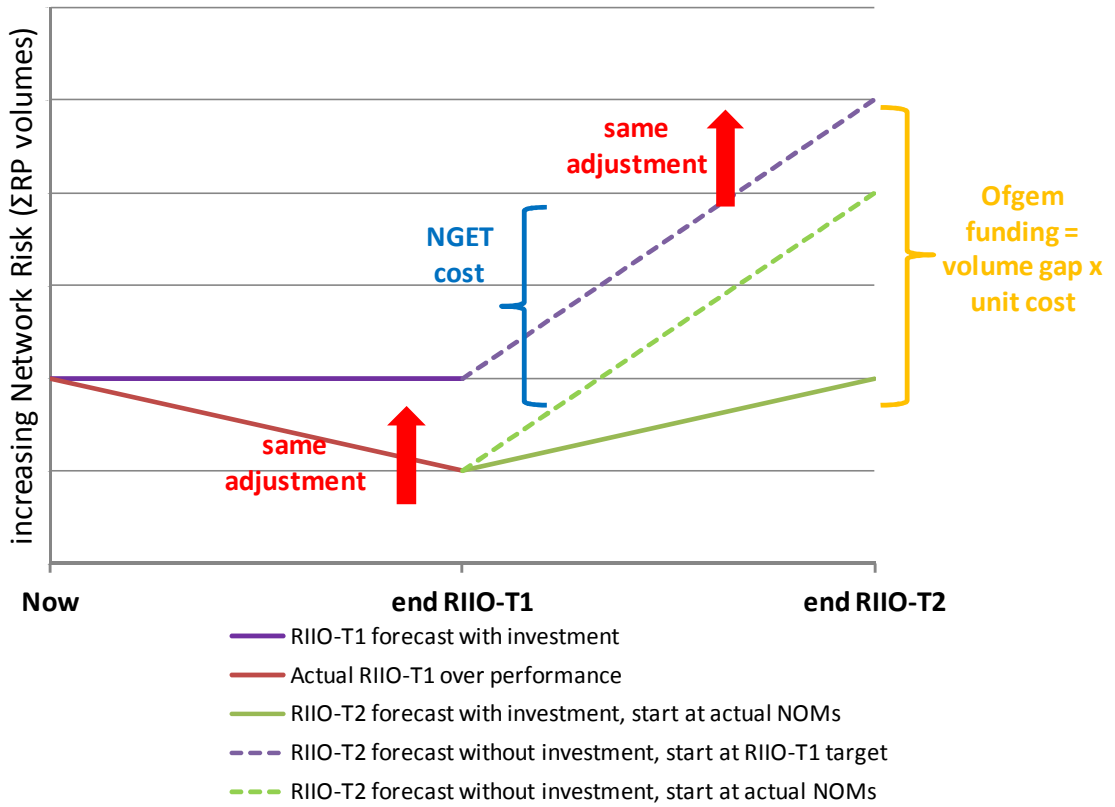
“Relevant unit costs”

- 35 There are several unit costs that could be used. Table 4.27.1 contains our forecast of non-load related unit costs based on Ofgem’s RIIO-T1 definitions prior to the application of our in-built construction efficiencies. These will be modified as a result of the consultants’ challenge and Ofgem’s setting of allowances. These allowed unit costs could be used, but even this would require methodology definition because they will be different in each year due to:
- (a) The cost of debt tracker changing WACC and therefore financing costs
 - (b) The construction efficiency and RPE factors being different each year
- 36 It would be relatively straightforward to calculate this at the end of the RIIO-T1 period. In order to be accurate, an average construction spend profile would need to be agreed in advance for each lead asset (as has been done for load-related projects in order to ensure that appropriate adjustments are made to baseline allowances as generation and demand actuals differ from the baseline scenario).
- 37 As discussed in Appendix A, there might also be a need to make a downward adjustment to allowances at the highest of actual unit cost and allowed unit cost. If this were to be done, the ‘actual unit cost’ for each year would also have to be defined.

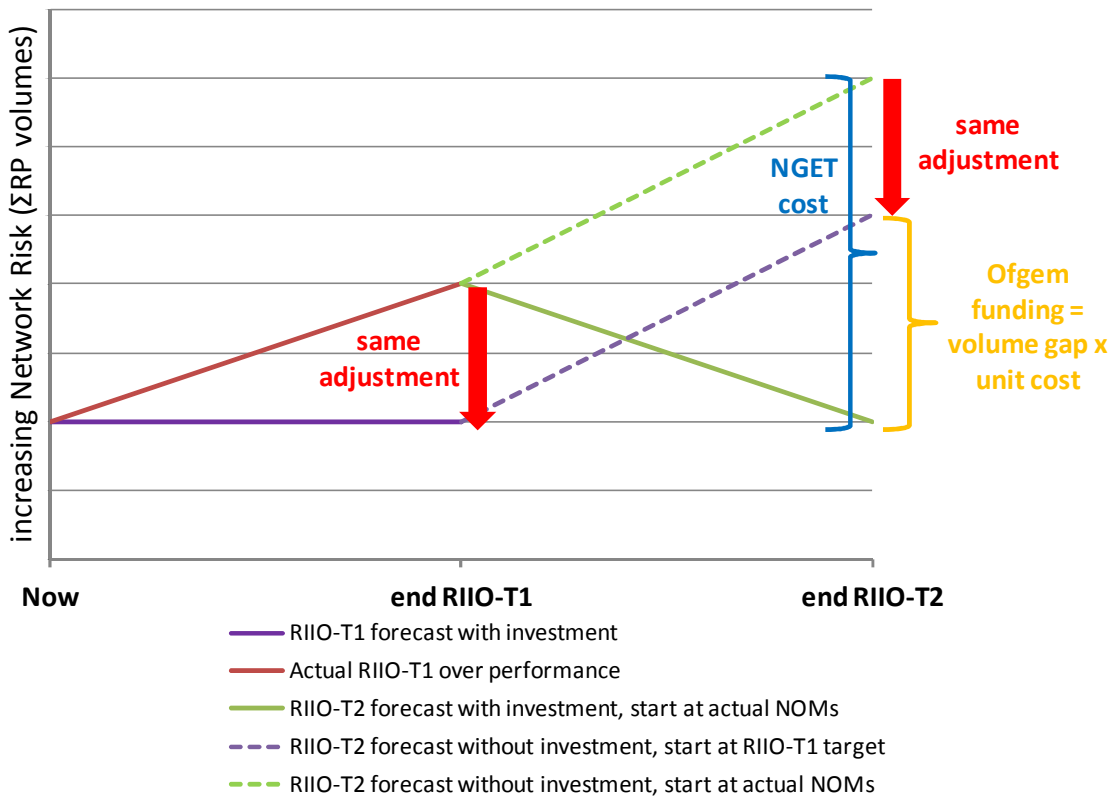
RIIO-T1 NOMs target as opening position for RIIO-T2 allowances

- 38 Ofgem state that they propose to take the RIIO-T1 NOMs target as an opening position when setting out the allowance for a company to deliver its RIIO-T2 NOMs target. The intention is to ensure that any under-delivery is not funded twice, and that any over-delivery receives funding.
- 39 In discussion with Ofgem and the three TOs (11 September 2012), Ofgem indicated that this would mean that the TOs would have to make a different kind of submission for non-load related expenditure including two sets of NOMs modelling using the latest technical asset lives.
- (a) There would be a ‘traditional submission’ (list of projects with volumes on/off and forecast costs) which would be used to run a forecast of NOMs with investment based on the actual network risk position achieved at the end of RIIO-T1 (presumably based on a forecast of the last year?). This would give a NOMs target for the end of the RIIO-T2 period (the end of RIIO-T2 point on the green line). In the example below, this is shown as being the same as our RIIO-T1 NOMs target, i.e. our aim is to maintain current network performance (the solid purple line).
 - (b) There would be a second forecast of NOMs at the end of RIIO-T2 using the RIIO-T1 target NOMs (as per the March 2012 submission) as the start point and assuming no investment (the end of RIIO-T2 point on the purple dotted line).
- 40 We then assume that funding would be based on the difference in NOMs volumes at the end of RIIO-T2 between scenario b (no investment, the purple dotted line on the graph below) and scenario a (with investment, the solid green line). These volumes would be multiplied by RIIO-T2 unit costs which are calculated from the mix of projects making up our RIIO-T2 submission.

Schematic showing setting of RIIO-T2 allowances following over-delivery in RIIO-T1



Schematic showing setting of RIIO-T2 allowances following under-delivery in RIIO-T1



- 41 As can be seen from the above graphs, the net effect of making the adjustment to RIIO-T1 allowances at the end of RIIO-T1 and the adjustment to RIIO-T2 allowances going forward is the same. Therefore, in the interests of avoiding the need for an extra set of NOMs forecasting, we propose that any adjustment is made to RIIO-T1 allowances.
- 42 This approach would have the additional benefit that the TOs would not be exposed to any windfall gains/losses as a result of material changes to the sharing factor.

Financing costs for non-load related capex advancement

- 43 As part of our well-justified business plan, we showed how (if Gone Green or a similar generation and demand scenario occurred which required an ambitious spend profile in the early years of the RIIO-T1 period) we would delay some of our asset replacement work to make the plan as a whole more deliverable. As was made clear in our submission, this was just one view of many possible future scenarios. If the works related with new generation (in particular) were to be triggered more slowly and over a longer period, we would wish to move our asset replacement spend back to the beginning of the period. This would avoid the temporary increase in network risk (i.e. we would again be replacing our assets in line with their Replacement Priorities), and would also make more efficient use of our resources (internal manpower, external manpower and system access opportunities).
- 44 The financing costs associated with moving from post- to pre-profile adjustment plan are forecast to be £76m over the RIIO-T1 period based on our financial package proposals and our March 2012 non-load related submission. In our July 2011 submission, we had proposed that the load-related uncertainty mechanisms be developed to include a dead-band such that we were held whole against the time value of money costs associated with efficient non-load related work advancement.
- 45 Initial feedback from Ofgem indicated that they would prefer to see a more positive option which allowed more on the basis of delivery of advanced non-load related works. Having said this, table 3.5 of the Initial Proposals 'Cost assessment and uncertainty Supporting Document' stated about a NLRE advancement mechanism "Do not intend to include. The efficiency incentive will provide some protection to financing costs."
- 46 In not recognising these costs, Ofgem are penalising us for developing a business plan which took appropriate consideration of adaptability and robustness to change. We note that the potential financing cost of £76m is approximately two and a half times the effective materiality threshold proposed by Ofgem for other uncertain costs.
- 47 To address this, the simplest option would be a comparison of year-on-year NOMs targets which would be undertaken at the end of RIIO-T1. This comparison can be used to identify any advancement and our unit costs can then be used to quantify any additional financing costs associated with advancement. Adjustments can then be made to correct this on an NPV neutral basis using the financial model.
- 48 Undertaking this exercise would also provide the data and opportunity to remove any financing costs ultimately determined to be due to unjustified under delivery (as described in a previous section).

Conclusions

- 49 We agree that the NOMs targets should be set out in a Licence Condition, along with the associated dead-band. We welcome Ofgem's confirmation that the tier 1 and tier 2 network risk assessments will be based on Network Output Measures rather than asset replacement volumes. This is more consistent with the RIIO emphasis on the delivery of outputs rather than inputs.
- 50 We remain concerned that Ofgem's proposed treatment of under and over delivery does not achieve their stated aim to expose National Grid to the risk of uncertain asset renewal volumes. Furthermore, we are concerned that the marginal reward/penalty could skew the cost benefit analysis of asset management decision-making. Having an incentive that we have to ignore to make the 'right' decision is not logical and has the potential to create a conflict between our interests and those of consumers.
- 51 We also remain concerned that Ofgem's refusal to confirm the details of these proposals until the RIIO-T2 price control review will at best make these arrangements irrelevant to our RIIO-T1 asset management decisions and will at worst distort those decisions.
- 52 As part of this Supplementary Information document, we have started to define some of the parameters required for a working methodology. There is no reason to delay further development of this process and we would wish to see the arrangements finalised as part of the RIIO-T1 control and captured in the relevant Licence Condition.
- 53 Finally, Ofgem have rejected the need for an uncertainty mechanism to cover the financing costs associated with advancing non-load related expenditure if load-related expenditure were triggered more slowly than forecast against the Best View Gone green scenario. In not recognising these costs, Ofgem are penalising us for developing a business plan which took appropriate consideration of adaptability and robustness to change. The potential financing cost of £76m is approximately two and a half times the effective materiality threshold proposed by Ofgem for other uncertain costs.

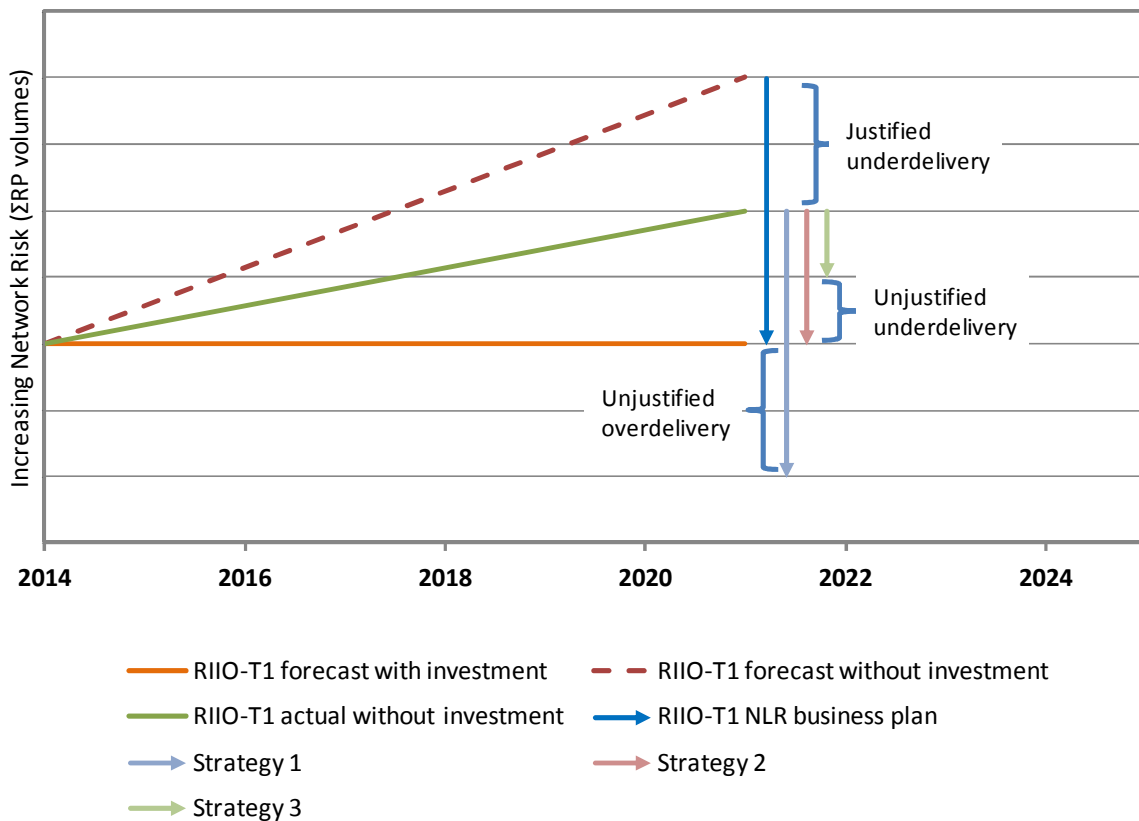
Appendix A: Testing Initial Proposals

54 Appendix A tests table 5.21 against a number of scenarios. For simplicity, we have focussed on the impact of our ability to manage asset degradation; however it is also necessary to consider the impact of actual unit costs encountered as opposed to the originally allowed unit costs.

Asset degradation less than forecast

55 Graph 1 below illustrates circumstances in which asset degradation during RIIO-T1 is slower (i.e. asset condition is better) than forecast.

Graph 1 – Asset degradation is better than forecast



56 The dotted red line represents the forecast of network risk at the RIIO-T1 price control without non-load related investment. The increasing trend through RIIO-T1 represents an increase in network risk, measured as the sum of all Replacement Priority one, two and three assets (Σ RP1, 2, 3). This increase is driven by the degradation of assets.

57 The orange line represents the forecast of network risk over the RIIO-T1 price control with the asset replacement work described in our business plan. In this example, the network risk is maintained at a constant level as asset degradation is matched by the replacement of assets with higher Replacement Priorities. The vertical dark blue line between the red dotted line and the orange line represents the impact of the asset replacement contained in our RIIO-T1 business plan. The end of the orange line in March 2021 becomes the agreed network risk target at the end of the RIIO-T1 period.

58 The green line represents the actual degradation over the RIIO-T1 period without investment; in this case, the network risk is lower than forecast throughout the period. National Grid could respond to these circumstances in a number of ways. The following sections explore what would be the right treatment (in principle) of the various responses, and then tests whether Table 5.21 appears to be doing the right thing.

Strategy 1 [vertical light blue line] – *deliver asset replacement consistent with the business plan such that network risk at the end of RIIO-T1 is better than the agreed forecast.*

What should happen, in principle?

59 If this strategy is adopted, there is no requirement for an adjustment to allowances. National Grid would have completed some asset replacement expenditure earlier than necessary but as a result it would not have benefitted financially from the asset degradation being better than forecast.

Application of table 5.21

60 In applying table 5.21 to this over delivery, we assume that the over delivery is unjustified. If the over delivery was justified, then it would be funded on an NPV neutral basis and National Grid would not be exposed to the risk associated with uncertain asset renewal volumes.

61 The treatment for unjustified over delivery is that the cost of the over delivery “will be funded when the work is required.” In this case, the over delivery has already been funded so this statement does not make sense. The table goes on to state that the company will be exposed to the financing costs associated with this work plus an additional penalty. As described above, National Grid would be exposed to the extent that it would not benefit financially from the asset degradation being better than forecast.

62 We cannot see any justification for the application of an arbitrary additional penalty in this situation. If National Grid were seeking to complete the work in RIIO-T1 rather than RIIO-T2 to take advantage of other favourable circumstances (e.g. lower unit costs or outage availability), then a penalty would distort the trade-off leading to a non-optimal solution.

63 Table 5.21 does not work; we propose that no adjustment to allowances should be made.

Strategy 2 [vertical pink line] – *deliver a reduced volume of asset replacement such that the network risk at the end of RIIO-T1 is consistent with the agreed target.*

What should happen, in principle?

64 If this strategy is adopted, there is again no requirement for an adjustment to allowances. National Grid would benefit from the under spend afforded by the asset degradation being better than forecast.

Application of table 5.21

65 This is consistent with the approach proposed by Ofgem. The tier 1 assessment would be ‘on target’ and that would represent the end of the assessment.

Strategy 3 [vertical green line] – *deliver a reduced volume of asset replacement such that the network risk at the end of RIIO-T1 is worse than the agreed target.*

What should happen, in principle?

- 66 If this strategy is adopted, there is a requirement for an adjustment to allowances for the under spend associated with difference between the actual network risk at the end of RIIO-T1 and the target. National Grid would benefit from the under spend afforded by the asset degradation being better than forecast, but it would additionally benefit from the under spend associated with the under delivery against the network risk target.
- 67 The under spend associated with the under delivery against the network risk target would need to be clawed-back. The most accurate way to achieve this would be to use the financial model to claw-back the associated allowance in the year(s) of under delivery. This would completely remove the incentive to under deliver against the network risk target.
- 68 If the actual unit cost is the same as the allowed unit cost, then arguably this would leave National Grid indifferent to the choice between completing the asset replacement such that the network risk target is met, or not completing the work and having the associated allowance clawed-back. In reality, exposure under the primary reliability output of Energy Not Supplied would incentivise replacement.
- 69 If the actual unit cost increased above the allowed unit cost however, National Grid would benefit by not meeting the target since this would avoid exposure to the difference between the actual unit cost and the allowed level. This could be addressed by clawing back at the higher of the allowed unit cost and the actual unit cost.
- 70 The problem with this approach is the distortion introduced by the end of the price control period. If there is a spike in prices, it may be more efficient to defer asset replacement into RIIO-T2, but a claw-back at the higher of allowed and actual unit costs would not allow for this. This could be addressed with a process to allow National Grid to justify under delivery against the network risk target at the end of RIIO-T1. Unjustified under delivery would then be clawed back at the higher of the actual and allowed unit cost. Justified under delivery would be clawed back at the allowed unit cost with the justification being used to set RIIO-T2 allowances.

Application of table 5.21

- 71 During a recent meeting, Ofgem stated that the under delivery mentioned in table 5.21 would be based on the network risk target rather than asset replacement volume targets. We welcome this approach, but it is not clear how under delivery associated with the asset degradation being better than forecast and under delivery associated with completing insufficient asset replacement volumes would be disaggregated without the approach collapsing to input-based regulation, i.e. reconciling the volumes actually delivered with those in our submission.
- 72 The under delivery associated with asset degradation being better than forecast is not covered explicitly in table 5.21. We assume that this would be classified as justified under delivery, so that National Grid is exposed to the risk associated with uncertain asset renewal volumes. The table states that the costs of catching up with the RIIO-T1 targets will not be funded in the RIIO-T2 allowance. We note that in this instance, these costs may be zero. The table also states that the TO will be rewarded for an efficient deferral of work. We cannot understand the rationale for this reward.
- 73 On the other hand, we assume that the under delivery associated with completing insufficient asset replacement would be classified as unjustified under delivery in table 5.21. The costs of catching up with the RIIO-T1 targets will not be funded in the RIIO-T2 allowances, but this represents a benefit to National Grid in avoided financing costs and in

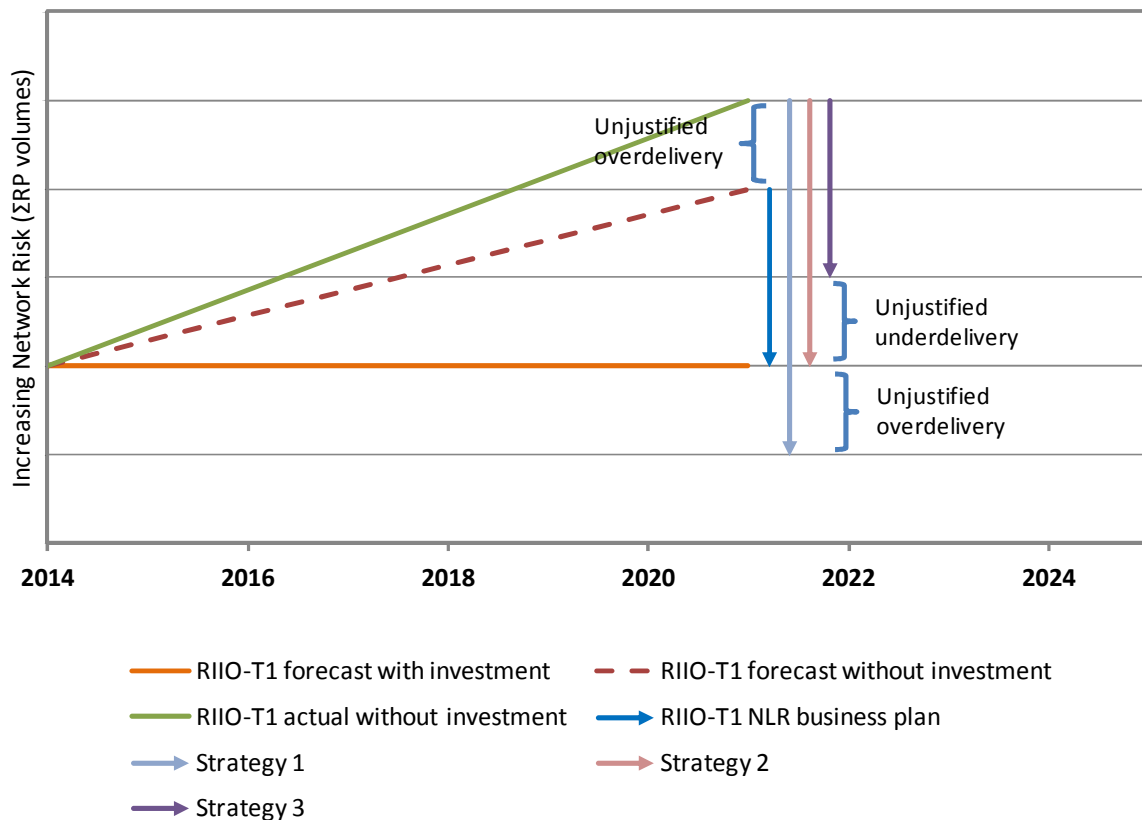
itself could even incentivise deferral. National Grid would also be penalised for an inefficient deferral of work, but the level of this penalty is not specified. Given that the benefit of deferral depends on the extent of that deferral, it is unlikely that a fixed penalty percentage would provide the appropriate incentive.

74 Table 5.21 does not provide the appropriate incentives, and further work is required.

Asset degradation worse than forecast

75 Graph 2 below illustrates circumstances in which asset degradation during RIIO-T1 is faster (i.e. asset condition is worse) than forecast.

Graph 2 – Asset degradation is worse than forecast



76 The dotted red line represents the forecast of network risk at the RIIO-T1 price control without non-load related investment. The increasing trend through RIIO-T1 represents an increase in network risk, measured as the sum of all Replacement Priority one, two and three assets ($\Sigma RP_{1, 2, 3}$). This increase is driven by the degradation of assets.

77 The orange line represents the forecast of network risk over the RIIO-T1 price control with the asset replacement work described in our business plan. In this example, the network risk is maintained at a constant level as asset degradation is matched by the replacement of assets with higher Replacement Priorities. The vertical dark blue line between the red dotted line and the orange line represents the impact of the asset replacement contained in our RIIO-T1 business plan. The end of the orange line in March 2021 becomes the agreed network risk target at the end of the RIIO-T1 period.

78 The green line represents the actual degradation over the RIIO-T1 period without investment; in this case, the network risk is higher than forecast throughout the period.

National Grid could respond to these circumstances in a number of ways. The following sections explore what would be the right treatment (in principle) of the various responses, and then tests whether Table 5.21 appears to be doing the right thing.

Strategy 1 [vertical light blue line] – *deliver asset replacement significantly above the business plan such that network risk at the end of RIIO-T1 is better than the agreed forecast.*

What should happen, in principle?

79 If this strategy is adopted, there is no requirement for an adjustment to allowances. National Grid would have completed additional asset replacement expenditure to address asset degradation being worse than forecast and further asset replacement earlier than necessary resulting in an over delivery against the network risk target. As a result of this, National Grid would have been exposed to the over spend required to address asset degradation being worse than forecast and to the over spend associated with completing further asset replacement earlier than necessary.

Application of table 5.21

80 During a recent meeting, Ofgem stated that the over delivery mentioned in table 5.21 would be based on the network risk target rather than asset replacement volume targets. We welcome this approach, but it is not clear how the over delivery associated with the asset degradation being worse than forecast and the over delivery associated with completing greater asset replacement volumes than required would be disaggregated without the approach collapsing to input-based regulation.

81 In applying table 5.21 to this over delivery, we assume that all of the over delivery is unjustified. If the over delivery was justified, then it would be funded on an NPV neutral basis and National Grid would not be exposed to the risk associated with uncertain asset renewal volumes.

82 The treatment for unjustified over delivery is that the cost of the over delivery 'will be funded when the work is required.' For the over delivery associated with the asset degradation being worse than forecast, this would be in the past and therefore this approach does not appear to be logical.

83 The table goes on to state that the company will be exposed to an additional penalty. We cannot see any justification for the application of an arbitrary additional penalty in this situation.

84 For the over delivery associated with the asset degradation being worse than forecast, National Grid are taking the appropriate action and a penalty would be inappropriate. For the over delivery against the network risk target, if National Grid were seeking to complete the work in RIIO-T1 rather than RIIO-T2 to take advantage of other favourable circumstances (e.g. lower unit costs or outage availability) then the penalty would distort the trade-off leading to a non-optimal solution.

85 Table 5.21 does not provide the appropriate incentives, and further work is required.

Strategy 2 [vertical pink line] – *deliver an increased volume of asset replacement such that the network risk at the end of RIIO-T1 is consistent with the agreed target.*

What should happen, in principle?

- 86 If this strategy is adopted, there is no requirement for an adjustment to allowances. National Grid would be exposed to the over spend required to address asset degradation being worse than forecast.

Application of table 5.21

- 87 This is consistent with the approach proposed by Ofgem. The tier 1 assessment would be 'on target' and that would represent the end of the assessment.

Strategy 3 [vertical purple line] – *deliver a reduced volume of asset replacement such that the network risk at the end of RIIO-T1 is worse than the agreed target.*

What should happen, in principle?

- 88 If this strategy is adopted, there is a requirement for an adjustment to allowances for the under delivery associated with difference between the actual network risk at the end of RIIO-T1 and the target. National Grid would otherwise not be exposed to the risk associated with uncertain asset renewal volumes.
- 89 The most accurate way to make this adjustment would be to use the financial model to make a downward adjustment to the associated allowance in the year(s) of under delivery.
- 90 If the actual unit cost is the same as the allowed unit cost, then arguably this would leave National Grid indifferent to the choice between completing the asset replacement such that the network risk target is met, or not completing the work and having the associated downward adjustment made to allowances. In reality, exposure under the primary reliability output of Energy Not Supplied would incentivise replacement.
- 91 If the actual unit cost increased above the allowed unit cost, however, National Grid would benefit by not meeting the target since this would avoid exposure to the difference between the actual unit cost and the allowed level. This could be addressed by basing the downward adjustment on the higher of the allowed unit cost and the actual unit cost.
- 92 The problem with this approach is the distortion introduced by the end of the price control period. If there is a spike in prices, it may be more efficient to defer asset replacement into RIIO-T2, but a downward adjustment at the higher of allowed and actual unit costs would not allow for this. This could be addressed with a process to allow National Grid to justify under delivery against the network risk target at the end of RIIO-T1. Unjustified under delivery would then result in a downward adjustment at the higher of the actual and allowed unit cost. Justified under delivery would result in a downward adjustment at the allowed unit cost with the justification being used to set RIIO-T2 allowances.

Application of table 5.21

- 93 The under delivery associated with asset degradation being worse than forecast is not covered explicitly in table 5.21. We assume that this would be classified as unjustified under delivery, so that National Grid is exposed to the risk associated with uncertain asset renewal volumes. The table states that the costs of catching up with the RIIO-T1 targets will not be funded in the RIIO-T2 allowance. The table also states that the TO will be penalised for an inefficient deferral of work. We cannot understand the rationale for this penalty.

Conclusion

- 94 Our conclusions from this review are that the arrangements currently described in table 5.21 do not provide the appropriate incentives, and further work is required. Changes to unit costs will affect the working of any incentive. In any case, further clarity is required for these incentives to influence RIIO-T1 asset management decisions. We see no reason why this should not be provided as part of Final Proposals.