MOTT MACDONALD

Analysis of Ofgem's cost assessment in the RIIO-T2 Draft Determination

Cost assessment of Capital Expenditure projects approved by Ofgem

August 2020

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Contents

Executive summary

Ofgem has published its Draft Determination in response to National Grid Electricity Transmission (NGET)'s RIIO-T2 business plan[1]. NGET has commissioned Mott MacDonald to review the basis of this determination, since a significant gap remains between Ofgem's view of efficient costs of Load-Related and Non-Load Related Capital Expenditure and NGET's view of efficient costs. Mott MacDonald was asked to comment on the reasonableness of this aspect of the Draft Determination.

We examined Ofgem's methodology set out in consultations and guidance prior to submission; NGET's submission; and Ofgem's approach to cost assessment following submission of the RIIO-T2 plans. Our findings were reached in discussion with experts with many decades of combined experience in delivering electricity transmission and major infrastructure projects in the United Kingdom and overseas.

This document is a precis of our full report. Mott MacDonald consents for NGET to publish this precis in the public domain.

Our findings were as follows:

Ofgem's methodology set out prior to submission of RIIO-T2 plans

We carried out a chronological review of the Ofgem process for consulting on the RIIO-T2 Sector Specific Methodology for Electricity Transmission, the instructions provided to the Transmission Operators (TOs), NGET's response in the form of its business plan narrative, annexes, Business Plan Data Template (BPDT) and commentary, and the subsequent Supplementary Questions (SQ) process.

We concluded that:

1. The three-step sequence to setting allowances as set out by Ofgem was appropriate. However, the approach is dependent on an appropriate unit cost dataset to assess against. The three-step sequence involved reviewing the justification for interventions; then reviewing the asset additions and disposals required to carry out each justified intervention; then evaluating the efficient cost to deliver those asset additions and disposals. To be effective the process relies upon a close interaction between the Ofgem officers involved in reviewing the engineering justification for schemes and those responsible for judging the efficient cost to deliver schemes which were deemed justified. The teams should jointly identify areas in which cost benchmarking may fail due to a sparse dataset and should jointly investigate outliers. The process would have been more robust by committing to an explicit "fourth step" involving consistency checking and validation.
2. We can see all three steps followed through and evidenced in Ofgem's Load-Related cost assessment, but not in the Non-Load Related cost assessment. Ofgem shared with NGET a populated version of its cost assessment spreadsheet for Load-Related Expenditure, which is clearly structured to follow the three-step sequence followed by checks and validations[2].

[1] https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator

[2] Ofgem spreadsheet "NGET_Load_PAM_DD.xslm" provided to NGET

There was very limited evidence of the three-step sequence for Non-Load Related Expenditure or of follow-up checks and validations.

3. The guidance and instructions issued by Ofgem have proved to be open to interpretation. The Business Plan Data Template provided sufficient space for TOs to present the breadth of their interventions as itemised projects, but there were instances in which asset categories remained open to interpretation. We note that the Sector Specific Methodology Decision (SSMD) documents, Business Plan Guidance and Business Plan Data Template overlapped since the SSMD itself was a substantial document; as such all had to be read in conjunction with each other, with the risk that they did not fully align in all areas. It is noted that these were updated in October 2019, around 1½ months prior to the submission date which could have led to confusion.
4. In a number of cases, the use of standardised unit costs was not appropriate. We have identified three instances in which the discrepancy between Ofgem and NGET on Load-Related Expenditure appears to relate to new substations being established. The scheme papers submitted by NGET were clear that these represented new substations at green-field sites or brown-field sites. The concept of "Bay Equipment" which could have helped to reconcile these new substations with the costs of new-build on existing substations was not fully elaborated by Ofgem in its Business Plan Guidance or BPDT. Separately, with respect to Non-Load Related Expenditure, a single benchmark was applied to a wide variety of protection, control, telecoms and metering schemes, which is not appropriate in our view.
5. There are legitimate differences between transmission and distribution which should be reflected in cost assessment tools. One example is the complexity of short cable runs which may be required where a substation cannot easily be extended with direct air insulated connections (such as at Oldbury near West Bromwich in project NGT200125). The greater voltage stresses in terminations and higher system fault currents increases the mechanical strength and clearances required at cable terminations and substantially impacts the complexity of the jointing process and the associated temporary works. These become an out-sized contributor to the overall scheme cost. The efficient cost of these installations must be judged separately from long cable routes between substations and cannot be benchmarked by cost per kilometre.

NGET's submission

We carried out a review of NGET's submission documents as they pertained to Load-Related and Non-Load Related Capital Expenditure.

We concluded that:

1. NGET used the Business Plan Data Template Commentary effectively to flag certain outliers. A significant proportion of expenditure discrepancy for Load-related schemes was due to the interpretation and use of the categories "275kV CB (Air insulated busbar) (OD)" and "400kV CB (Air insulated busbar) (OD)" at new sites or at new compounds. This was however addressed in a note to this effect by NGET in the Business Plan Data Template Commentary[3][4]. As such, there was sufficient evidence that some 275kV and 400kV switchgear costs were not ready "as is" for use in a benchmarking process.
2. It is common practice in a wide variety of businesses to use "dummy projects" to contain efficiencies commitments. NGET's submission did not provide enough itemised detail of asset categories and volumes of assets within the "dummy projects" to allow these

[3] Page 67, Question 2, "Circuit breakers" in relation to tables B4.2c CV Table Gen, B4.2c CV Table Demand, B4.2c CV Table WW, B4.4b Asset Cost List, B4.5 Scheme Asset Breakdown, B4.5a Scheme Asset Breakdown

[4] Page 88, bullet 5, Question 7, in relation to tables C2.7 Replacement, C2.8 Refurb_Major, C2.9 Refurb_Minor

efficiencies to be re-allocated to generate the “lean costs”. As such, Ofgem was not able to re-calculate a set of figures inclusive of efficiency (and therefore compliant with paragraph 2.17). NGET’s response to SQ 37 would have been more helpful if it had used the asset categories defined in the BPDT.

3. NGET had a strong narrative about “high complexity”, “medium complexity” and “low complexity” replacement schemes[5]. We agree with NGET that this high/medium/low rating is not in itself a one-to-one match to project risk. As such, it is reasonable that it was not elaborated into “standardised” risk and contingency amounts for projects.

Ofgem’s cost assessment approach following submission

We reviewed a sample of 5% of the **Load-Related** schemes which were approved by Ofgem as having a legitimate Engineering Justification and supporting Cost-Benefit Analysis. The sample of schemes contained £57.7m (that is, 29%) of the £198.7m disparity between Ofgem’s view of gross lifetime project costs[6] for the approved schemes and NGET’s view.

For **Non-Load Related**, we reviewed samples of transformer replacement projects, overhead line conductor replacement projects and overhead line fittings replacement projects. These asset categories accounted for 29% of the Non-Load Related projects in NGET’s BPDT. We reviewed the cost assessment approach to Protection, Control, Telecomms and Metering which represented a further 29% of the Non-Load Related projects.

Across both Load Related and Non-Load Related we concluded that:

1. Ofgem only followed its stated three-step cost assessment sequence in the case of Load Related Expenditure: the justification for interventions was reviewed; then the asset additions and disposals required to carry out each justified intervention were reviewed; then the efficient cost to deliver those asset additions and disposals was evaluated. We found, however, that the review of the number of asset additions and disposals for Load Related schemes had added little value: no material changes were made, but this was the stage in the process which was essential for identifying outliers which would affect the cost assessment, or for triaging unexpected results from the cost assessment.
2. Ofgem carried out a healthy process of disaggregating to asset categories and voltage levels then checking results at project level for Load-Related expenditure, but this relied upon the asset categories themselves being well defined and appropriate. We have commented in Section 3 on discrepancies in six schemes amounting to £57.7m of Load-Related investment. We are confident that with greater disaggregation within the categories of 275kV CB (Air Insulated Busbars) (OD) and 400kV CB (Air Insulated Busbars) (OD), the existing process can be used to reach agreement between NGET and Ofgem on efficient costs. Our conclusions are based on a sample of schemes and so are not exhaustive; it does not exclude the possibility of other instances in which asset categories are not well defined, or cover too many varieties of a particular item of plant to be effective for cost assessment.
3. Ofgem did not effectively validate results from its cost assessment model for Non-Load Related schemes. In one worked example of a transformer replacement project which we examined, the allowance for the overall project inclusive of pre-construction, civils, indirects, risk and contingency was less than Ofgem’s efficient unit cost for the Lead Asset itself. In another worked example of a transformer replacement which we examined, the allowance for all other works inclusive of pre-construction, civils, indirects, risk and contingency was less than £100,000. In one worked example of an overhead line re-conductoring scheme, the

[5] Annex NGET_A16.02 - Deliverability

[6] As provided to NGET confidentially in the populated cost assessment model “NGET_Load_PAM_DD.xlxsm”

project budget appears to have been cut to a level which, even at Ofgem's efficient unit costs, would cover only 61% of the route. Each of these has been identified by re-aggregating costs at project level and carrying out a reasonableness test.

4. Ofgem was not clear about NGET's efficiencies commitment on asset unit costs but did not pursue this as a sufficiently visible priority early in the Supplementary Questions process. In Mott MacDonald's view, all cost assessment should take place from the most efficient costs provided by the TOs; costs before efficiencies offered by the TOs are for information only, with stakeholders as the primary audience, and should not form the basis of cost benchmarking; otherwise any licensee which commits to a significant catch-up during a price control period is penalised.
5. There is a significant risk that Ofgem's "ratchet" calculation has under-estimated NGET's risk and contingency costs. We do not find it appropriate that Risk and Contingency has been restricted to civils, other and indirect costs. Ofgem's written paper does not confirm that Supplementary Question (SQ124) was used to ensure fair treatment of NGET's BPDT, which did not break out risk and contingency amounts for the majority of schemes.
6. It would have been beneficial for Ofgem to clearly signpost where dry-run submissions in July and October had not provided the necessary data to facilitate Ofgem's cost assessment models . Whilst the BPDT guidance and instructions were extensive, they were not effective at signposting where data tables had been changed following trial runs of Ofgem's cost assessment tools which had identified difficulties or shortfalls in the dataset. We understand, for example, that NGET used the same approach to represent asset unit cost efficiencies in its October 2019 dry-run submission, and this was not signposted as inappropriate in the Ofgem Business Plan Guidance.

1 Introduction

National Grid Electricity Transmission (NGET) commissioned Mott MacDonald to review the cost efficiency challenges associated with Capital Expenditure within Ofgem's Draft Determination for RIIO-T2.

Ofgem has published its Draft Determination and a narrative on its assessment procedure for National Grid Electricity Transmission (NGET)'s RIIO-T2 business plan[7]. Capital Expenditure on the transmission network (categorised as Load-Related and Non-Load Related Expenditure) was subject to a three-step sequence:

1. Ofgem's "Engineering Hub" formed an opinion based on NGET's RIIO-T2 Business Plan whether each project was justified, and met the requirements of a project as defined in the business plan guidance issued to Transmission Operators (TOs) by Ofgem;
2. For those projects which were perceived as justified, Ofgem's Engineering Hub formed an opinion on whether the volume of asset additions and asset disposals within the project were efficient and necessary to deliver the outputs;
3. For those projects which were perceived as justified, Ofgem's Costs and Outputs team formed a view of the efficient cost to deliver the number of asset additions and asset disposals, including associated civil works and consenting works, required by the project.

The efficient costs arrived at by step 3 were then phased over years using the project's original phasing, and then aggregated into an allowance for Capital Expenditure. We have not investigated this phasing calculation within the assignment.

NGET has commissioned Mott MacDonald to review the basis of this determination, since a significant gap remains between Ofgem's view of efficient costs and NGET's view of efficient costs, and to **comment on the reasonableness of the allowances** allocated to Capital Expenditure within the Draft Determination.

Ofgem states in its Draft Determination that NGET's submission has, in some respects, prevented it from carrying out cost assessment effectively. Mott MacDonald has been asked to **comment on this assertion**.

Mott MacDonald consents for NGET to share this report with Ofgem.

1.1 Scope of the assignment

We have reviewed NGET's Business Plan Data Templates submitted in December 2019 alongside the guidance and unpopulated Business Plan Data Template issued by Ofgem on 31 October 2019.

We did not review earlier versions of the Business Plan Data Template submitted in July 2019 or October 2019, or the format of the Business Plan Data Template for those submissions.

The assignment has only examined steps 2 and 3 in the three-step assessment process for Load Related and Non-load Related Capital Expenditure explained on page 11. We have not reviewed instances in which Ofgem's Engineering Hub has rejected the engineering justification provided by NGET.

[7] https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator

The assignment solely relates to capital projects with a Load-Related and Non-Load Related (i.e. condition) driver. We have not reviewed the Draft Determination and Ofgem's view of NGET's proposed expenditure on Non-operational Capex, Network Operating Costs, Indirect costs and Other Costs.

NGET confirmed that its cost efficiency benchmarks established with their advisor TNEI were calibrated against past data submitted to Ofgem as part of the Regulatory Reporting Pack. As such, we have not reviewed any historic actuals as part of this assignment. We have reviewed the way in which "stretches" have been applied by NGET to its own expenditure estimates in order to meet the benchmarks it established with TNEI.

We have assumed that, to the extent that there may have been variations in the past, the cost variations associated with differing equipment specifications, or the use of Tier 1 versus Tier 2 contractors, are no longer material for equipment which is commonly installed by all three TOs. We have also assumed that variations in transport costs are not material and that all three TOs are similarly affected by underlying dynamics in the equipment market (raw materials prices and global demand).

Ofgem has not provided NGET with the cost assessment model for Non-Load Related Expenditure populated with NGET's submission values at project level and Ofgem's assessed values, we cannot therefore comment on this output. Furthermore, Mott MacDonald has not examined any historic scheme forecasts agreed with Ofgem at RIIO-T1 and thus the clawback of unspent non-load allowances for T1/T2 cross-over work has not been reviewed as part of this assignment[8].

We have not reviewed the extent to which efficiency savings included by NGET as an overarching efficiency saving to its Load-Related Expenditure and Non-Load Related Expenditure portfolio were driven by continual improvement, purchasing and delivery efficiencies as opposed to applying innovation or benefits from previous innovation projects.

[8] https://www.ofgem.gov.uk/system/files/docs/2020/07/draft_determinations_-_nget_annex_redacted_0.pdf, Footnote 38 on page 39

2 Review of sector specific methodology, business plan guidance and NGET submission

Mott MacDonald carried out a chronological review of the instructions issued by Ofgem, NGET's response in the form of the business plan, relevant subsequent correspondence and Ofgem's Draft Determination.

2.1 Summary of our findings

Sections 2.2 and 2.3 provide analysis of our findings and we have summarised key items against high level headings below. We have only summarised areas where we have concerns.

Our Red-Amber-Green (RAG) status represents a chronological review of the instructions issued by Ofgem, NGET's December 2019 submission, and Ofgem's draft determinations. It identifies areas which have contributed to the difference in opinion between the two parties.

We note that there had been two previous submissions by NGET in July and October 2019 and that Ofgem intended *"the draft July BPDT submission to inform the direction of our analysis and ensure we have the necessary details and data to come to a timely view for our draft determinations"*[9]. The Business Plan Guidance did not, however, provide feedback on the July and October 2019 submissions or identify them as the reason for changes in the table format or for new instructions.

We categorise observations using ratings of amber (indicating a medium impact on Ofgem's assessment process and/or minor discrepancy between Ofgem and NGET's interpretations) or red (indicating a major impact on Ofgem's assessment process and/or a /major discrepancy between Ofgem and NGET's interpretations).

Table 2.1 Summary of Observations

Category	Description	RAG status
Business Plan Incentive	From a quantitative perspective we believe NGET has met the minimum requirements. However, Ofgem's assessment determines that from a qualitative perspective NGET has not met the minimum requirements and therefore incurred a stage 1 penalty. We find that in general the criteria applied by Ofgem and reasons detailed for NGET failing the minimum requirements are in line with what was set out. However, we also feel there is insufficient substantiation provided by Ofgem to allow NGET to robustly challenge this position. We have not seen any feedback from Ofgem on the July and October submissions from NGET to suggest that they were non-compliant.	
Business Plan Incentive	Although it does not affect NGET's position, Ofgem has introduced a "materiality test" as part of its draft determination for passing or failing stage 1 of the BPI. This means that two other companies who failed the test had their penalties revoked after the materiality test. We have not found the application of this test documented in the SSMD or guidance.	

[9] https://www.ofgem.gov.uk/system/files/docs/2019/07/final_riio2_open_letter_290719.pdf

Category	Description	RAG status
Cost Allowances	A major gap exists between NGET and Ofgem with regards to the quantity of justified costs. In particular for Non-Load related expenditure there appears to be a 72% overall disallowance with a 51% disallowance by Ofgem under the business plan incentive. We comment on this further in Section 3. A significant contributor were the treatment of costs for new substations or substation extensions at green-field or brown-field sites.	
Cost assessment Methodology	We consider that in some instances this is not clearly defined by Ofgem and confusion could arise as a result of the definition of "Closely Associated Indirects" which includes costs which may previously have been classified as capital expenditure. This could lead to benchmarking issues or problems comparing against historical data.	
Engineering Justification Paper (EJP) assessment	The assessment of EJP's is key in determining whether projects pass or fail stage 1 of the BPI and whether their costs are simply dis-allowed. The exact criteria for assessing EJP's is not clear and it appears that an "assessment framework" has been produced by Ofgem after business plan submission. It would have been helpful to provide this to TO's in advance of business plan submission so they could more easily confirm compliance.	
Average Unit Costs	Ofgem has stated the use of "average unit costs" in their assessment method. No clear information has been provided in the Draft Determination as to how these have been calculated but we have provided analysis in Section 3 of two spreadsheets issued to NGET bilaterally by Ofgem following the Draft Determination, "NGET_Load_PAM_DD.xslm" and "NGET Cost Assessment Works.xslsx". These have, in our view, suffered from mis-alignment between Ofgem's Engineering Hub, Cost and Outputs team and NGET on certain asset categories used in Load-Related schemes at new greenfield and brownfield sites. Ofgem has also carried out, in our view, inappropriate averaging across asset categories. A significant contributor was the treatment of costs for new substations or substation extensions at green-field or brown-field sites.	
RIIO-T1 Clawback	Ofgem's determination includes a clawback of over £500m from RIIO-T1. Our scope of work does not include a review in this respect but we consider the RIIO-T2 process as outlined does not make provision for any clawback.	
Portfolio level EJP's	EJP's (in the form of Investment Decision Packs) have been submitted by NGET at portfolio level and supported by Cost-Benefit Analyses (CBAs) at scheme level. The guidance documents confirm this is acceptable but NGET appears to have been criticised for this as part of Ofgem's determination. We have included in our review scheme papers which we understand NGET provided to Ofgem in April/May 2020. These have been sufficient to understand the challenge of carrying out cost-assessment across both greenfield, brownfield and existing sites.	
Cost Assessment	Having reviewed the cost assessments for load and non-load related investment it is not possible to make all the summary figures provided in the NGET Annex for the Draft Determination reconcile with underlying spreadsheets provided by Ofgem to NGET following Draft Determination. The listed dis-allowed cost and cost reductions do not appear to tally with the overall deductions applied by Ofgem. Further information needs to be provided by Ofgem or the data needs to be presented in a clearer manner.	
NOA Schemes	National Grid's business plan was submitted in December 2019. A new NOA was published by ESO in January 2020 which removed the need for some of the schemes included in NGET's business plan. The Ofgem draft determinations have removed these schemes and inferred that NGET should have re-submitted its business plans. This does not	

Category	Description	RAG status
	appear reasonable and is not documented in any of the processes. It did not take into account additional schemes identified in the NOA.	
Provision of risk, civil and pre-construction costs	The Ofgem guidance clearly instructs companies to split out costs for risk/contingency, civil and pre-construction. NGET have not fully complied with this request and its cost assessment has been affected accordingly, in particular with regards to risk/contingency. However, it is also noted that schemes do not usually have a "risk pot" until they are at the development stage and that for such schemes NGET has complied with Ofgem's request. It may be possible for NGET to reverse engineer a risk pot based on appropriate supporting evidence, albeit with caveats identified in Section 5.3.3. of our full report.	
Treatment of ongoing efficiencies	It is noted that the Ofgem guidance clearly asks companies to populate data tables inclusive of any ongoing efficiencies. NGET has entered ongoing efficiencies as a standalone line item. This was done in good faith, in order to be transparent with Ofgem and consistent with its communications with stakeholders. However, NGET's submission did not provide enough itemised detail of asset categories and volumes of assets within the "dummy projects" to allow these efficiencies to be re-allocated to generate the "lean costs". It would have been highly beneficial for NGET to have included asset volumes and subtotals by asset category for the efficiencies projects in tables B4.5, B4.5a, C2.5 & C2.5a, in the same way that it did for the other projects in the BPDT. The "dummy projects" containing efficiencies commitments could have been re-entered as ongoing efficiencies[10].	

2.2 Our approach

We have considered the following documents as part of this assessment:

- **Sector Specific Methodology Decision (SSMD) – Core Document:** Overarching document covering electricity transmission, gas transmission, gas distribution and electricity system operator. Electricity distribution sits outside of this framework as its price control period runs to a different year. The document describes at a high level the RIIO 2 framework and outlines some key principles.
- **RIIO-ET2 Sector Decision Annex:** This document is specific to electricity transmission (ET) and sets out specific criteria to be met by the transmission owners (TOs)
- **RIIO-2 Business Plan Guidance:** Comprising of
  - Business Plan Guidance: Originally issued 9th September but updated on 31st October. This describes in detail the specific criteria which must be met, items which must be included within the business plan, guidance on presentation and structure of business plans and information on how business plans will be assessed
  - Business Plan Data Templates (BPDT): Blank templates which are issued by Ofgem to be completed by TOs
  - BPDT Guidance: This is effectively a set of instructions to be followed by the TOs when completing the BPDT's.

We concentrated on reviewing the way in which the following issues were addressed by the RIIO-T2 process:

- **Assessment process for Business Plan Incentive:** What was the documented process and was this followed by both parties?
- **Methodology for Cost Assessment:** What was the documented process and was this followed by both parties?

[10] In worksheet A1.6_RPE_Table

- **Approach to Capital Cost Efficiencies:** How were cost efficiencies to be identified by the TO's and how would they be assessed by Ofgem?
- **Treatment of joint projects (2 TOs or TO/DNO)** Where costs are split between different parties how would they be proportioned and assessed?
- **Evaluation Level:** is assessment to be made at scheme, project or programme/portfolio level?
- **Evaluation units:** is evaluation to take place using unit costs or gross cost?
- **Treatment of civils and preconstruction costs**: How were these to be presented by the TO's and how would they be treated by Ofgem?
- **Treatment of risk & contingency**: How were these to be presented by the TO's and how would they be treated by Ofgem?
- **Clarity of directions provided:** Were the instructions and guidance provided by Ofgem clear and un-ambiguous?

2.3 Conclusions

General:

- We consider that in certain areas the process for cost assessment is not clearly defined and that there is room for confusion or misunderstanding, in particular as a result of the treatment of closely related indirects.
- We are concerned that Ofgem has stated the use of an average unit cost across all three TO's. Our analysis in Section 3 identifies specific schemes and specific asset categories for which this process has resulted in large discrepancies. Further investigation would be required to assess whether this has also contributed to other discrepancies outside of these sample schemes.
- We note that NGET has been criticised for providing EJP's at "portfolio level". This seems unjust as the guidance document in relation to EJP's allows this. We have included in our review scheme papers which we understand NGET provided to Ofgem in April/May 2020. These have been sufficient to understand the challenge of carrying out cost-assessment across both greenfield, brownfield and existing sites.
- We note that Ofgem is stated to still be in discussion with NGET to clarify certain items ahead of final determinations and recommend that NGET and Ofgem collaborate together in order to ensure the interests of consumers are protected.
- We consider that in some instances Ofgem has deviated from the process it set out, specifically in relation to the assessment level and units. In general NGET's plan has been evaluated using unit costs at scheme level although instructions allow for different methods at both project and portfolio level.
- We consider that both the instructions provided and the draft determinations are not clear and transparent. We note that the SSMD, Business Plan Guidance and Business Plan Data Template overlapped since the SSMD itself was a substantial document. As such, there is some ambiguity across the SSMD and guidance documents and the level of information provided in the determinations is insufficient in some areas to fully explain Ofgem's decision.

Load Related Expenditure:

For load related expenditure it is difficult to fully determine whether Ofgem has followed the process as set out. The information in the NGET specific document is not presented in a manner which allows a precise comparison and it is not possible to get the figures to add up. However, some specific observations are as follows:

- Schemes relating to an updated NOA have been removed by Ofgem. The process does not mention NOA or the removal of schemes as a result of such updated information. It seems unreasonable to expect NGET to update a business plan submitted in December as a result of new information being made available in January. We regard this as an exercise which the TOs should be involved with in order to understand both benefits and missed opportunities for efficiencies as a result of both additions and removals identified in the NOA, and should not simply be treated as an exercise to be carried out by Ofgem.
- Ofgem has applied what it considers to be efficient unit costs at asset level and then checked and validated at project level. We highlight in Section 3 instances in which this has not succeeded, and significant discrepancies remain.

Non-Load Related Expenditure:

For non-load related expenditure Ofgem has followed the approach of reviewing the needs case for each asset category presented by NGET in its Investment Decision Papers followed by reviewing cost-to-deliver, as documented in the SSMD and accompanying documents. However, when reviewing cost-to-deliver, Ofgem did not appear to validate results from its cost assessment model at project level. Mott MacDonald has the following specific observations:

- NGET has been heavily criticised for the way in which NARM has been used to justify investments. The main criticism is that the use of the NARM assessment results in healthy assets which have a high consequence of failure being listed for replacement. NGET appears to have applied NARM to the correct asset categories and, given that the NARM process is set out by Ofgem and on the assumption that it has been correctly followed by NGET, it is difficult to understand how Ofgem could dis-allow such significant quantities of costs. On the other hand, Ofgem in its methodology documents did clearly state that the use of NARM was “not absolute” and should be supported by EJP’s and CBA. However, questions have to be asked as to whether the NARM system is effective or not
- NGET has been criticised for insufficient substantiation in a variety of areas resulting in significant volumes of work being disallowed. We understand that additional information has been presented to Ofgem in this regard and that discussions are ongoing. We believe that this additional information along with constructive bilateral discussions should result in a significant closure of the current gap which exists between the two parties. As per comments in previous sections, it is important that Ofgem focusses on the interests of the consumer as part of these discussions
- A large proportion of the costs have been disallowed as part of stage 1 (needs case). We believe that by actioning the two preceding bullet points it would be possible for the parties to reach a positive outcome in this regard
- No information is provided by Ofgem as to how its unit costs have been derived, beyond column headings which refer to it being an “ET Sector Weighted Mean” and that it is likely to have been derived from “NLR Replacement Activities & LR Scheme Activities” and only from the current RIIO-T2 submissions. In a number of instances , which we identify in Section 4, these do not appear reasonable when reviewed and checked at individual project level.

3 Review of cost assessment for Load-Related projects

Mott MacDonald reviewed a sample of load-related projects representing the greatest discrepancies to Ofgem's view. We reviewed the source of unit costs used by Ofgem in both its load-related and non-load related capital expenditure assessment.

3.1 Summary of our findings

NGET provided documents to address the requirements of sections 3.10, 3.14, and 3.21 of Ofgem's Business Plan guidance.

On the sample of Load Related Expenditure schemes we reviewed, NGET met the quality requirements of sections 3.10 and 3.14 of Ofgem's business plan guidance by describing any divergence of transformer costs from historical trends; cost drivers; profiling of costs; and how efficiency will be used to reduce costs, including the use of an external benchmark. This was readily applied to transformers on the schemes we reviewed.

We find that, in respect of load related expenditure, NGET met quality requirement 3.21 of Ofgem's business plan guidance in assembling its projects and allocating these unique reference numbers in the Business Plan Data Template (BPDT).

NGET provided the annualised efficiency savings associated with the dummy project NGT200239 It would have been highly beneficial for NGET to have included asset volumes and subtotals by asset category for the efficiencies projects in tables B4.5, B4.5a, C2.5 & C2.5a, in the same way that it did for the other projects in the BPDT. The "dummy projects" containing efficiencies commitments could have been re-entered as ongoing efficiencies[11]. We have re-modelled the efficient costs and these are not the driving factor for the difference between Ofgem's view and NGET's view of costs.

A significant proportion of expenditure discrepancy was due to the interpretation and use of the categories "275kV CB (Air insulated busbar) (OD)" and "400kV CB (Air insulated busbar)" at new sites or at new compounds. This was however addressed in a note to this effect by NGET in the Business Plan Data Template Commentary[12][13]. As such, there was sufficient evidence that some 275kV and 400kV switchgear costs were not ready "as is" for use in a benchmarking process.

There is also a strong possibility that a proportion of the expenditure discrepancy has been due to short cable sections required at sites such as Oldbury and to support East Anglia 3 offshore wind farm by establishing a new substation. These cable sections internal to a substation are too short to be effectively benchmarked against other, longer, circuits between substations.

3.2 Our approach

Multiple projects were created in the B0.7_Load_Master_Data table to record benefits from a single scheme (and a single Cost-Benefit Analysis and single Engineering Justification Paper).

[11] In worksheet A1.6_RPE_Table

[12] Page 67, Question 2, "Circuit breakers" in relation to tables B4.2c CV Table Gen, B4.2c CV Table Demand, B4.2c CV Table WW, B4.4b Asset Cost List, B4.5 Scheme Asset Breakdown, B4.5a Scheme Asset Breakdown

[13] Page 88, bullet 5, Question 7, in relation to tables C2.7 Replacement, C2.8 Refurb_Major, C2.9 Refurb_Minor

This allowed the benefits to be itemised with respect to several different transmission boundaries, or to several different categories of output.

As such, the total of 237 projects identified in the Business Plan Data Template (BPDT) accounted for only 128 schemes. This was explained in NGET's Business Plan Data Template Commentary[14].

Of these, 115 were approved with a total discrepancy of £198.7m between the Ofgem view of gross lifetime project costs and NGET's view of gross lifetime project costs shown in Ofgem's working sheet "NGET_Load_PAM_DD.xlxsm".

We developed criteria to select a sample of Load-Related projects. The criteria were intended to identify the projects which present the greatest challenge to deliver for NGET within the allowances proposed within the Draft Determination, and to test the cost assessment mechanism on a variety of assets and at a variety of regional locations:

Table 3.1: Process for selecting a sample of Load-Related schemes

Selection criteria	How was criteria applied?
Schemes where the major purchase commitments have not already taken place (and therefore Ofgem is legitimate to challenge)	Work commencing in regulatory year 20/21 at the earliest
Schemes where there is no material opportunity to address revenue shortfalls in a future price control	>50% of expenditure in RIIO-T2
Absolute rather than percentage cost challenge (since savings and efficiencies will have to come from identified, discrete savings elsewhere)	Largest absolute differences in £m between Ofgem's view of scheme cost and Company's view of scheme cost
Variety of lead assets represented	Greatest contribution to cost on sheet B4.5a_Scheme_Asset_Breakdown
Variety of regions in England & Wales represented	Project location

Source: Mott MacDonald

The schemes include the highest discrepancy for a single project between gross project cost assessed by NGET and gross project cost assessed by Ofgem. All have been flagged in Ofgem's assessment spreadsheet as exceeding a threshold of 15% difference between Ofgem's view and NGET's view. The sample represents 5% of the approved schemes but £57.7m (that is, 29%) of the discrepancy between Ofgem's view of gross lifetime project costs and NGET's view of gross lifetime project costs.

In all cases in the sample, the cost reduction identified by Ofgem in its Draft Determination was a reduction in Lead Costs (Direct), i.e. the costs of purchasing and installing the primary or "Lead" assets required to deliver the project's output, excluding civil costs, consenting, and office-based design and project management activities. The definitions of "Lead Costs (Direct)" and "Direct" are provided in the Business Plan Data Template Guidance document.

We reviewed the schemes as follows:

- **Are the schemes outliers within NGET's plan?** How does the gross cost of the scheme compare with other schemes within NGET's plan installing the same or similar lead assets? Are there site-specific constraints or significant lengths of linear assets (cables or overhead line) compared to other schemes delivering the same Lead Assets?

[14] Page 57, question 7 in relation to tables B0.7 Load Master Data and B4.6 Output Profile

- **What unit cost was proposed by NGET?** How had this unit cost been derived and what narrative was provided supporting this?
- **Was the unit cost included within the efficiencies which NGET proposed?** Having compared its existing "Cost Book" estimates being used by project managers and development engineers with the benchmarks established by TNEI, NGET aggregated the cost differences for those assets which cost more than the benchmark into a global "stretch" or efficiencies target. This was applied as a single global stretch in the Load Related Expenditure as project NGT200239 with negative values provided in worksheet "B4.2a_Scheme_Summary". We review whether these are relevant to this scheme and would benefit the scheme once in delivery.
- **What unit cost was used by Ofgem?** We review how Ofgem derived a unit cost and the reasonableness of any source information and calculations visible within its cost assessment template.
- **Did the scopes of the two unit costs correspond to one another in terms of assets?** To the extent that we are able, we compared the scope of the unit cost used by Ofgem and the unit costs used by NGET. We note that in the Business Plan Data Template Commentary, only overhead line conductors and fittings were identified as having created an issue in mapping historic scope to the BPDT asset categories[15].

In Mott MacDonald's view, all cost assessment should take place from the most efficient costs provided by the TOs; costs before efficiencies offered by the TOs are for information only, with stakeholders as the primary audience, and should not form the basis of cost benchmarking; otherwise any licensee in a price control which has a significant catch-up but has committed to this catch-up, is penalised.

It is more appropriate to be looking at and sense-checking absolute difference between the most efficient costs quoted by the TO for a particular scheme in £m and the absolute costs of the same scheme derived from benchmarks. This is the approach taken in the remainder of this Section 3 and in Section 4, to identify and apply the efficiencies which NGET offer and apply to the scheme, then to sense-check absolute differences in Ofgem's best view and NGET's cost estimates at scheme level.

[15] Page 58, question 7 in relation to tables B0.7 Load Master Data and B4.6 Output Profile

4 Review of cost assessment for Non-Load Related projects

Mott MacDonald reviewed a sample of Non-Load Related Projects and their associated Investment Decision Papers, alongside the information provided to NGET about Ofgem's cost assessment process.

4.1 Summary of our findings

We reviewed a sample of transformer replacement, overhead line re-conductoring, overhead line fittings replacement. We reviewed the investment decision paper for protection replacement schemes and the associated unit costs used by Ofgem.

There was very limited evidence of the three-step sequence for cost assessment being followed for Non-Load Related Expenditure or of follow-up checks and validations.

Ofgem's cost assessment for Non-Load Related Expenditure was based upon a list of the asset categories from the BPDT, whether a benchmark unit cost was available or not, and the benchmark unit cost where available in worksheet "OfgemView_DefaultUC" of the Load-Related cost assessment model[16]. When sense-checked at a project level, Ofgem's cost assessment of transformer replacement and overhead line conductor and fittings replacement schemes were significantly lower than the unit cost Ofgem it derived within the model for the purposes of scaling NGET's submitted costs.

In one worked example of a transformer replacement which we examined, the allowance for the overall project inclusive of pre-construction, civils, indirects, risk and contingency was less than Ofgem's benchmark unit cost in "OfgemView_DefaultUC" for the Lead Asset itself.

In another worked example of a transformer replacement which we examined, the allowance for all other works inclusive of pre-construction, civils, indirects, risk and contingency was less than £100,000.

In one worked example of an overhead line re-conductoring scheme, the project budget appears to have been cut to a level which, even at Ofgem's efficient unit costs, would cover only 61% of the route.

In all of the sample of fittings replacement projects we reviewed, the cost of fittings was the major cost driver. However, we found an instance in which the allowance for fittings had been reduced by Ofgem to the extent that it fell below the budget for the civils works and indirects associated with the scheme.

None of these worked examples represented outliers within NGET's plan. They are within or just above one standard deviation of its external benchmark developed by TNEI, or within or just above one standard deviation of the average of the schemes due to complete within RIIO-T2.

A similar procedure was used to benchmark and set allowances for protection, control, telecoms and metering schemes. A single benchmark was applied to a wide variety of indicative unit costs and a wide variety of differing schemes, which is not appropriate in our view.

[16] Ofgem spreadsheet "NGET_Load_PAM_DD.xslm" provided to NGET

4.2 Our approach

NGET's Business Plan Data Template for Non-Load Related Capital Expenditure comprised 294 entries, and two efficiency commitments. These were entered as projects in worksheet "C0.7 Non Load Master Data".

Of the 294 entries, NGET were able to categorise 123 projects (42%) by the replacement of a single asset type (i.e. it was the "lead asset").

Of these, transformer replacements and replacement of overhead line equipment were significant drivers of volume. Of the 123 projects, 41 were transformer replacements or portfolios of transformer replacements and 47 related to overhead line conductors and fittings.

As such, we reviewed a sample of transformer replacement, overhead line conductor, and overhead line fittings replacement projects and the associated Investment Decision Papers (IDPs). We used the selection process set out in Table 3.1 to identify a long list of projects from which to select the sample. The purpose of the selection process was to identify projects which were not already in development. In these cases both Ofgem and NGET were reliant on historic data from previous similar projects, submissions from other TOs, and independent benchmarking information, with which to propose allowances (in NGET's case) or adjust allowances (in Ofgem's case).

Of the 294 entries, a further 85 projects (29%) are associated with Protection, Control, Telecomms and Metering. As such, we reviewed the Investment Decision Paper and the cost assessment information which was provided to us. These were identified as requiring replacement, major refurbishment or minor refurbishment.

We note that the scope of asset replacement schemes for overhead line fittings, tower line conductor and transformers were agreed through consultation with the TOs and defined in the Transmission Glossary. We have not sought to check NGET's proposed scope in any further detail than provided in the IDP paper.

We nevertheless reviewed the scope of protection schemes, since there is no agreed scope within the Transmission Glossary for a protection replacement scheme.

We reviewed the schemes as follows:

- **Are the schemes outliers within NGET's plan?** If so, what reasons were provided?
- **What unit cost was proposed by NGET in the project entry?** How had this unit cost been derived and what narrative was provided supporting this?
- **Was the unit cost included within the efficiencies which NGET proposed?** Similar to the approach discussed in Section 3, NGET compared its "Cost Book" estimates for asset replacement and refurbishment with the benchmarks established by TNEI. NGET applied a single global stretch to its non-load related expenditure plan as project entry NGNLT20296 with negative values provided in worksheet "C2.2a_Scheme_Summary_AP".
- **What unit cost was used by Ofgem?** We review, to the extent that we can, how Ofgem derived a revised allowance for NGET.

5 Review of treatment of Risk and Contingency

Mott MacDonald reviewed the Business Plan Data Template (BPDT) and Annexes to the Business Plan and Ofgem's written note on how it calculated its view of "efficient costs" associated with risk and contingency.

5.1 Summary of our findings

NGET was not an outlier in stating that risks are typically quantified later in the delivery cycle and therefore contingency funds are allocated later in the delivery cycle.

NGET is not an outlier in stating that its Cost Book is based on out-turn project costs which embodied funds spent mitigating risks or addressing issues in previous projects.

Ofgem's written note on its assessment process for Risk and Contingency confirms these two points.

NGET had a strong narrative about "high complexity", "medium complexity" and "low complexity" replacement schemes[17]. This represents one driver of project risk namely the circumstances on site once the site has been accessed. Project risk remains multi-dimensional, though, with the ease or difficulty in accessing site presenting a separate, independent driver for risk. For these reasons, our panel of experts was also not able to provide a single figure or range of figures for project risk as a percentage of overall project cost and which would be applicable across all sites.

In our view, NGET was not constrained by the data template.

Ofgem's approach of calculating risk and contingency allowances for schemes completing in RIIO-T2, where there is an approved Engineering Justification Paper, is reasonable.

There is a significant risk that Ofgem's "ratchet" calculation has under-estimated NGET's risk and contingency costs. Ofgem's written paper does not confirm that Supplementary Question (SQ124) was used to ensure fair treatment of NGET's BPDT, which did not break out risk and contingency amounts for the majority of schemes.

We believe that contingency amounts associated with delays on site are necessary and efficient, if calculated on a 50% level of confidence (P50) basis. There is a risk that costs of delay are not fully captured by Ofgem's analysis of the risk and contingency costs declared against the categories Civils, Other and Indirects; and by excluding risk and contingency declared against Lead Assets (Direct).

5.2 Our approach

We reviewed the following documents which discussed risk and contingency:

- NGET Annex "NGET_A8.03 – Demand"
- NGET Annex "NGET_A16.01 – Deliverability"
- NGET's BPDT and associated commentary

[17] Annex NGET_A16.02 - Deliverability

- The Transmission Glossary issued by Ofgem
- The Business Plan Data Template Guidance issued by Ofgem
- Ofgem’s written note describing its assessment of “efficient” risk and contingency costs
- We also discussed with our experts the ability to provide a single estimate of risk and contingency based on project type or Lead Asset.