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RIIO-T2 Uncertainty Mechanisms

Supplementary response on the generation and demand volume driver

Scottish Hydro Electric Transmission plc

T2BP-DD-SHE-006	SSEN Transmission response to Ofgem's Draft Determination consultation questions
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Contents

1. Purpose of this paper

This paper outlines SSEN Transmission's response to Ofgem's proposed ET specific Uncertainty Mechanism for generation and demand connections, as outlined in paragraphs 4.5 – 4.21, pages 65-68 of the RIIO-2 Draft Determinations - Electricity Transmission Annex and Table 31 of the Scottish Hydro Electric Transmission Annex.

Ofgem did not include a specific consultation question on its proposals but given the significant role the mechanism is intended to play in connecting renewable generation and the determination of load related allowances in RIIO-T2 for the Transmission Owners (TOs), we have drafted this supplementary paper outlining our views on the proposed approach for consideration by Ofgem ahead of Final Determinations.

2. Background

As the TO in the North of Scotland, we have a legal obligation to facilitate the connection of new generation and demand customers onto our network.

A recent internal update to our likely outturn position, which we originally outlined in our Planning for Net Zero Scenarios paper[1] submitted alongside our RIIO-T2 business plan, shows a material upward movement in connections. This could result in connected generation exceeding our Certain View by more than 5GW in RIIO-T2. On this basis, we support the continued use of volume driver mechanisms to ensure TOs can recover costs for works associated with the provision of uncertain, customer-driven generation and demand connections.

In our experience there are five principles that should be applied in designing a volume driver mechanism. It should:

1. allow TOs to adapt flexibly to uncertainty
2. incorporate robust and tested Unit Cost Allowances (UCAs) which have been verified against a range of potential outcomes and make "engineering sense"
3. be cost reflective, therefore avoiding windfall gains and losses for TO or consumer
4. ensure there is no regulatory gap by providing appropriate allowances for high-cost, atypical schemes
5. adhere to the principle of proportionate regulation (i.e. applies a tailored approach for individual TOs in line with unique network characteristics and risk profiles)

Ofgem's proposed approach and UCAs outlined in the Draft Determinations do not achieve the above. Furthermore, no evidence has been presented by Ofgem to suggest the approach was tested against a range of scenarios to verify that calculated allowances are within a reasonable range of the expected costs, which is contrary to what is stated in the Draft Determinations. Our core concerns can be summarised into five key points:

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[1] https://www.ssen-transmission.co.uk/riio-t2-plan/planning-for-net-zero-scenarios-certai-view-and-likely-outturn/

1. Application of Draft Determinations UCAs results in a c£146m under recovery against costs based upon our historical RIIO-T1 portfolio and RIIO-T1/T2 crossover schemes.
2. Our investigations concluded there were a significant number of errors in the calculations used by Ofgem to determine the UCAs.
3. The statistical analysis applied within the modelling was not based upon established practices, undermining confidence in proposed UCAs.
4. The proposed recovery for high-cost, atypical schemes via the Medium Sized Infrastructure Projects (MSIP) reopener results in a proposal that the TOs carry significant and unjustifiable risk, therefore restricting our ability to react to customer needs.
5. Ofgem's application of an efficiency stretch to already incurred historical costs used to determine UCAs presents an unrealistic and unachievable cost baseline for RIIO-T2 volume driver schemes.

We are therefore of the view the Draft Determinations UCA rates and volume driver approach incorporates unnecessary barriers to timely, cost effective action hindering our ability to deliver licence commitments and stifling net zero progress. **It is therefore crucial that Ofgem takes on board these points and collaborates with us to ensure these constraints are removed.**

In recognition of this, we actively engaged with Ofgem throughout the Draft Determinations consultation period to ensure the design of the volume driver improved to better meet the needs of both consumers and SSEN Transmission.

3. Draft Determinations SSEN Transmission/Ofgem bilateral engagement

Initial engagement focussed on us obtaining the input data used by Ofgem to carry out the multivariate regression analysis used to determine UCAs. It was important that we could validate this data as Ofgem did not use the same input costs we provided to model UCAs. Key conclusions are noted below.

3.1. Embedded efficiencies in costs

As proposed in our RIIO-T2 Regulatory Framework[2], the risk of consumers paying more than what is efficient is significantly reduced by our proposal to base UCAs substantively on historical costs. UCAs will therefore have built-in embedded efficiencies so consumers can be confident that they are efficient and if we were to outperform, it will be due to finding further innovations, which will in turn drive down costs for RIIO-T3. Throughout the Business Plan Supplementary Questions process, we provided Ofgem with detailed cost and asset data on all RIIO-T1 schemes that could be used to determine RIIO-T2 UCAs[3]. This was in conjunction to the forecast data provided as part of our RIIO-T2 business plan for our RIIO-T1/T2 crossover schemes.

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[2] https://www.ssen-transmission.co.uk/riio-t2-plan/regulatory-framework-uncertainty-mechanisms
[3] SHETL_SQ_CA_68 (relating to request for additional cost and asset information on 39 schemes subject to the volume driver)

Ofgem's approach takes our inputs costs and applies a further efficiency stretch to them. It is illogical to apply a further stretch to efficient outturn costs.

All costs used to determine UCAs were put through Ofgem's cost efficiency testing (i.e. assessed via their Project Assessment Model (PAM)) as outlined in their Transmission cost assessment process (paragraphs 3.10-3.61 of the Electricity Transmission Annex). This means that Ofgem applied an efficiency stretch to both already incurred historical costs and forecasted costs.

3.2. Data input issues

From initial publication of the Draft Determinations on 9 July 2020, Ofgem took six weeks to release the PAM input data to us for consideration. It should also be noted that Ofgem did not release the UCA regression analysis model until 27 July 2020, more than two weeks after initial publication. Furthermore, the regression model provided was of poor quality – it lacked instructions, included no modelling assumptions and was full of obsolete/irrelevant data.

This led to a substantial amount of time wasted throughout the initial weeks of the consultation period as we were left to interpret an ineffective regression model without understanding the input data.

However, within this initial period we did identify a number of asset data errors and discovered schemes above £25m had been omitted from the modelling. On raising this issue with Ofgem, it transpired there had been an internal misunderstanding whereby it had been assumed all schemes above £25m would fall under the MSIP reopener, which Ofgem subsequently agreed was incorrect as the volume driver provides for schemes up to £100m.

Ofgem committed to releasing a new regression model which included schemes above £25m. We received this on the 14 August 2020, with the input data and associated PAM being received on 18 August 2020.

3.3. Overview of modelling errors and statistical issues

The untimely provision of input data, together with the lack of robust explanation of the regression modelling significantly restricted our ability to provide meaningful feedback. However, our analysis of the PAM input data identified a substantial number of errors, therefore calling into question the applicability of the revised UCAs and the overarching volume driver approach proposed.

These errors are summarised in the flow chart in **Error! Reference source not found.** and listed below and were presented to Ofgem during a bilateral meeting on Friday 21 August.

PAM data input errors

- A substantial number of data input errors were identified, mainly related to data assurance where data hadn't been copied correctly into the cost modelling (i.e. £19m preconstruction costs mistakenly removed, £38.5m civils costs double counted and civils, other (direct) and risk & contingency costs allocated to wrong schemes. There was also erroneous re-categorisation between lead and non-lead assets).

- In response to SQ68 we provided data for 39 schemes; 19 were missing from Ofgem's analysis. Of the missing, 14 were Shared Use[4] schemes meaning there was a significant under representation of these types of network upgrade schemes within Ofgem's modelling (on average in RIIO-T1 Shared Use schemes cost £40m compared to £23m for Sole Use[5]). This meant the data used to determine UCAs did not accurately represent our RIIO-T1 portfolio where 73% of spend under the volume driver mechanism related to Shared Use schemes.

UCA regression modelling issues

The UCAs were not underpinned by sound statistical analysis[6] on the basis that:

- Only 12 schemes, out of a possible 39, were included in the second regression modelling provided by Ofgem on 14 August 2020, calling into question the statistical relevance of the results on the basis of a small dataset.
- Ofgem applied "data cleansing" to determine schemes that should be included in the regression analysis to derive UCAs. It appeared the cleansing was carried out on the basis of seeking a high r^2 value, illustrating the modelling was being carried out independent of engineering review or common sense checks, or had been tested on a range of scenarios.
- There were both cost and asset data errors in the modelling (e.g. earth wire was being counted as additional circuit length, despite this being installed along with OHL conductor) and some costs were being duplicated.
- No evidence was provided to corroborate the claim that multivariate models provide better predictions than multiple single variable regression models.
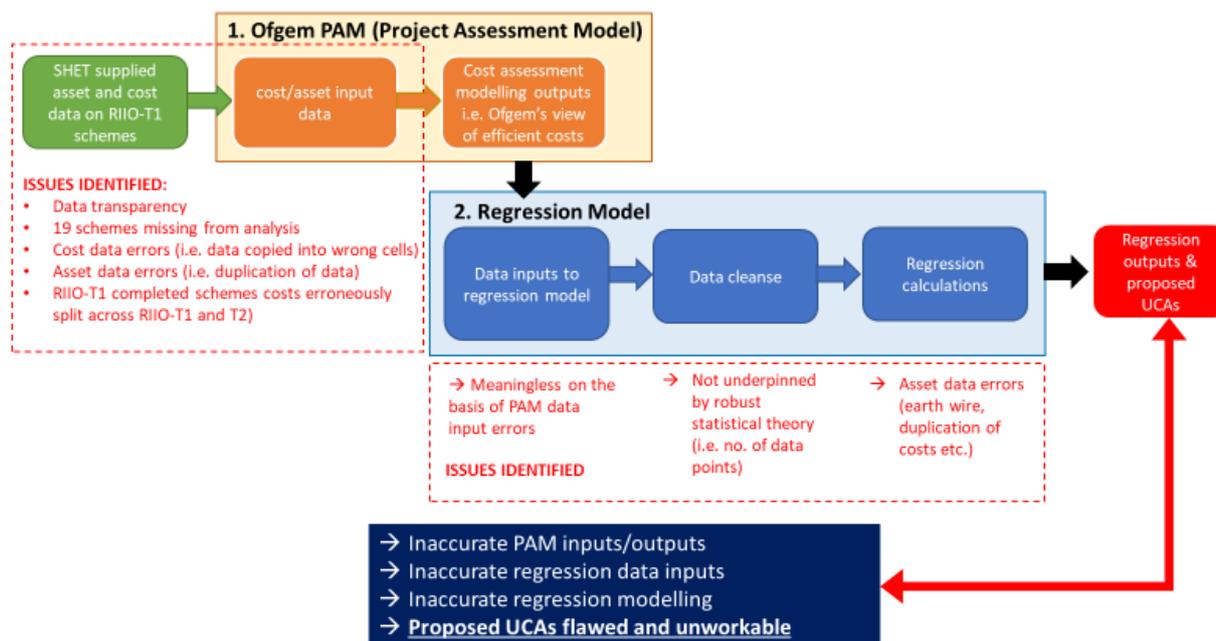
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[4] Shared Use schemes relate to the requirement to increase system capacity via a network upgrade resulting from more than one new or additional generation connection. Costs cannot be attributed to a single user so are deemed "Shared Use". These works are measured in megavolt amperes (MVA).

[5] Sole Use schemes relate to the connection of new or additional generation from a single generating station to the Transmission System (or connected to a distribution system which in turn connects to the Transmission System)

[6] Oxera also comment on the inappropriate statistical modelling approach applied by Ofgem in the initial Draft Determinations UCA regression in the Consultation Report appendix titled *"Oxera: Ofgem's TOTEX assessment approach at the RIIO-ET2 draft determinations: a review, August 2020"* document reference T2BP-DD-CON-001

Figure 1: Ofgem modelling issues overview

Ofgem was receptive to the concerns highlighted on 21 August 2020 and committed to rectifying the issues in line with our proposed deadline of 28 August 2020. The key issue for us related to the use of incorrect SQ68 input data, which was fundamental to calculating adequate UCAs. New regression rates and the associated back-up PAM were provided in line with this deadline, incorporating the correct SQ68 input data.

However, given the significant role the volume driver will play in connecting renewable generation and determining load allowances in RIIO-T2, there has been insufficient time to fully assess these updated UCAs and PAM outputs. We therefore expect and welcome continued engagement with Ofgem on the derivation of UCAs as well as the volume driver's interaction with MSIP, post the Draft Determinations deadline.

4. Overview of proposed approach

The Draft Determinations note the range of options provided by TOs were reviewed and a disaggregated approach comprising the capacity to be provided (MVA or MW) and the associated linear elements (overhead line (OHL) and/or underground cable (UGC)) best meets the requirements of the volume driver.

It should be noted that to date, we have not received any information as to why our proposed approach outlined in our RIIO-T2 business plan did not meet requirements, despite it offering better cost reflectivity, delivering more statistically robust UCAs and it being designed to meet the unique engineering/technical requirements of our network. We would welcome more detailed feedback from Ofgem on this.

4.1. UCA rates analysis

A comparison of the proposed UCAs outlined in the Draft Determinations, and subsequent rates provided throughout our engagement with Ofgem, are shown in **Error! Reference source not found.**. As noted above, applying the Draft Determinations rates to our historical RIIO-T1 portfolio and RIIO-T1/T2 crossover schemes results in £146m under recovery of costs. Breaking this down into linear (OHL and UGC) and electrical output, the linear elements result in a £170m under recovery, with £24m over recovery on the electrical output.

Subsequent iterations of UCAs carry similar results, and even though there are improvements in the overall delta in the UCAs provided on 28 August 2020, the disaggregated results (Electrical output +£73m and OHL -£144m) still indicate large swings in recovery.

Table 1: Draft Determinations UCA rate comparison

£m	Cost metrics	Unit	Original DD UCAs (09 Jul 2020)	Revised DD UCAs (14 Aug 2020)	Final DD UCAs (28 Aug 2020)
1. Electrical output	MW (sole)	£/MW	0.061	0.035	0.0735
	MVA (shared)	£/MVA			
2. OHL	OHL (all types)	£/cct km	0.101	0.543	0.207
3. UGC	UGC	£/cct km	0.774	0.796	Removed from analysis
Testing on RIIO-T1 & RIIO-T1/T2 crossover schemes (total spend £413m, excl. UGC 357m)			-£146m (35%) EO +£24m OHL-£146m UGC -£24m	-£95m (23%) EO -£98m OHL +£27m UGC -£25m	-£72m (20%) EO +£72m OHL -£144m

We cannot accept rates that do not result in fair and balanced allowance recovery against a known portfolio of projects and costs. We accept it is impossible to design a mechanism that yields perfect results in terms of cost reflectivity, but the approach must be pragmatic and balanced "in the round" i.e. as part of the UCA derivation process, disaggregated elements should be tested individually to understand the drivers behind over/under recovery of costs on a portfolio level.

There is no evidence to suggest Ofgem tested the cost reflectivity on a disaggregated basis was presented in the Draft Determinations, or subsequently received analysis. However, through our engagement, Ofgem acknowledged this analysis should be carried out as part of the process to define final UCAs, but we received no material ahead of the Draft Determinations deadline to enable us to comment on this.

4.2. Application of efficiency stretch on outturn costs

In relation to tailoring the UCAs in line with individual network characteristics, we agree with the Draft Determinations position that models based on individual network company project portfolios give

better predictions than those based on a pooled sample of all TOs' projects. However, we disagree with Ofgem's application of an efficiency stretch on historical, actual costs.

As noted in the RIIO-2 Sector Specific Methodology consultation document[7], the strongest evidence a company can provide on determining whether costs are "high-confidence" would be to provide a direct link to historical expenditure, which is the approach we took in our proposed RIIO-T2 volume driver. We outperformed our RIIO-T1 volume driver allowances by c20% for Sole Use (typical) and c11% for Shared Use so basing RIIO-T2 UCAs on this data implies efficiency savings are already embedded.

The application of an additional efficiency stretch undermines the outcomes of the RIIO-T1 regulatory process and could present an unrealistic and unachievable cost baseline for RIIO-T2 volume driver schemes. As noted above, the untimely provision of the corrected PAM data has meant we have not been able to fully assess the impact of these additional efficiency cuts and their interaction with the revised volume driver UCAs presented 28 August 2020.

4.3. Additional considerations on proposed disaggregated elements

As the engagement with Ofgem throughout the consultation period has focused on input data errors and modelling issues, we have not had time to fully evaluate the principles underpinning Ofgem's proposed approach in terms of the applicability of their suggested level of disaggregation.

Ahead of Final Determinations, Ofgem should consider, at a minimum, the following points regarding the disaggregated elements to be included within the volume driver mechanism:

1. **Electrical output –** the application of a combined capacity approach for electrical output where a single blended UCA is used for both Shared Use (MVA) and Sole Use (MW) recovery involves merging two different output metrics into the one UCA. This does not make "engineering sense" and will likely drive artificially high or low UCAs, reducing cost reflectivity and leading to windfall gains and losses (as illustrated in the above assessment of our RIIO-T1 portfolio using Draft Determinations UCAs). We therefore suggest Ofgem consider the application of two separate UCAs to recover costs for the two different types of outputs. More details are included below on each element for clarity:
   a. MVA is a measurement of increased network capacity from, for example, installing additional transformers which is based upon multipliers of transformer sizes which range from 90-240MVA e.g. installation of 2*240MVA transformers would result in a 480MVA capacity uplift which would be used as the MVA used in volume driver recovery.
   b. MW is a measurement of connected generation based upon customer dictated MW capacity, which can have any value depending upon the generation type.

2. **Overhead Lines (OHL) –** the application of a single UCA for OHL does not encapsulate the range of OHL engineering solutions used on our network which are installed at varying voltage

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[7] https://www.ofgem.gov.uk/system/files/docs/2019/01/riio-2_sector_methodology_0.pdf

levels. In our experience, and as noted in our proposed volume driver approach, there is a large range in UCAs for the installation of different OHL types and voltages, which includes a separate rate for reconductoring i.e. replacing the cable or wire on an electric circuit, typically a high-voltage transmission line, to afford a greater electric-current-carrying capability.

3. **Underground Cable (UGC)** – We agree with the application of a single UCA for UGC, however we note the large confidence range in the Draft Determinations regression analysis is not statistically robust (i.e. £0.201-1.390m/km). Throughout the engagement process, we were made aware other TOs tested the removal of UGC from the regression, which improved the statistical robustness of the model. We have carried out testing of our data yielding similar results, so we support the removal of UGC from volume driver regression modelling. The UCA for UGC should be agreed via a separate process, taking account of TO's unique network characteristics.

5. Treatment of atypical/high-cost volume driver schemes

With regards to the identification of need for atypical treatment, we agree in principle to a separate approach being applied to high-cost, atypical projects which we have set out within our response to MSIP ET-Q13. However, we do not agree the MSIP volume driver parameters "strike the right balance between the proportionality of the approach and reflecting of efficient costs" as noted in paragraph 4.20 of the Electricity Transmission Annex:

- The percentage threshold applied to costs versus UCAs should be specific to each TO and dependent on the cost reflectivity and risk of the finalised volume driver methodology. For example, we proposed a 33% threshold in our RIIO-T2 Regulatory Framework based on the level of risk in relation to our proposed volume driver UCAs – this might not be suitable for other TOs. The threshold must therefore follow the outcome of the UCAs derived and an assessment of the risk that will be carried by individual TOs based upon scenario analysis and portfolio testing. The current proposed 100%[8] threshold, coupled with the absence of cost reflectivity testing on UCAs, results in SSEN Transmission carrying a disproportionate amount of risk on high-cost schemes. It is unreasonable to create a regulatory gap and expose us significant risk in relation to the recovery of costs for atypical schemes when it can be avoided.

- We do not believe the £25m minimum threshold "to be a proportionate response to the likely scale of the works in question and an appropriate approach to the sharing of commercial risk to which the TO is exposed under totex regulation" as noted in paragraph 4.56 of the Electricity Transmission Annex. This threshold should be removed. Despite this matching what we submitted in our RIIO-T2 Regulatory Framework, as above, this was based upon our assessment of the portfolio risk based upon the UCAs and volume driver methodology we proposed which were aligned with a more disaggregated approach in terms of asset

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[8] No back-up modelling for the determination of the 100% threshold has been provided by Ofgem, despite this being requested at the MSIP workshop that took place 07 August 2020.

breakdown. Given Ofgem are seeking a less disaggregated approach, we are of the view the £25m minimum threshold should be removed to protect us from significant under-recovery on atypical schemes below £25m. The overall risk proposed RIIO-T2 Draft Determinations has also influenced our view on removing the materiality threshold.

It is also our view that MSIP volume driver projects should not be subject to one reopener window if the mechanism is to be agile as intended to avoid delays to connection projects. Pragmatic parameters that are aligned with the level of risk associated with final UCAs should result in minimal volume driver schemes being considered under the MSIP reopener. This would balance the regulatory workload rather than one large reopener with many submissions within tight timescales. An "as and when" or annual reopener window would also address the cash flow risk borne by TOs through the limited window of opportunity to apply for MSIP in the current Draft Determinations position.

The mechanism currently is not fit for purpose. Given the anticipated growth in connections to our network over the RIIO-T2 period, this could cause significant delays to connections, jeopardising our ability to deliver our duty, as outlined in section 9(2) of the Electricity Act, to develop and maintain an efficient, co-ordinated and economical system of electricity transmission.

On the basis that the RIIO-T2 volume driver UCAs are still to be finalised, we believe it is possible to set applicable parameters relating to MSIP volume driver projects and therefore expect to continue our engagement with Ofgem post Draft Determinations deadline.

6. Our position and suggested next steps

The volume driver proposals presented by Ofgem to date have been based on weak statistical modelling with no supplementary evidence provided to suggest UCAs have been tested from an engineering perspective in terms of deliverability, or from a financial feasibility perspective in terms of cost reflectivity.

Furthermore, the proposed treatment of atypical schemes via the MSIP reopener exposes us to an unacceptable level of risk for connection projects and network upgrades. On this basis, Ofgem's proposals do not protect the needs of consumers, transmission network customers or SSEN Transmission.

The case for investment over and above our Certain View is evident and is vital for the delivery of Net Zero so it's pivotal we can be satisfied the RIIO-T2 volume driver uncertainty mechanism proposal presents:

1. UCA rates that are fair, cost reflective and aligned with individual TO technical requirements and the uncertainty each faces in the possible mix of future projects;
2. Evidence to demonstrate Ofgem has followed a robust process to derive UCAs, which is not independent of engineering judgement; and
3. The models used to determine UCAs are statistically sound and have been tested upon a range of scenarios to verify calculated allowances are within a reasonable range of the expected costs.

As noted above, we reserve our position on the final set of UCAs proposed by Ofgem on the 28 August 2020 on the basis that we have not had enough time to carry out detailed analysis, risk assessment and consider the applicability of the proposal from a practical perspective. We therefore expect to continue our engagement with Ofgem on the derivation of UCAs as well as the volume driver's interaction with MSIP, post Draft Determinations deadline.

Unless Ofgem presents a volume driver mechanism that delivers on the three criteria above, the only option will be to revert back to our RIIO-T2 business plan proposal.

7. Related documentation

There were numerous RIIO-T2 business plan SQs related to the volume driver:

1. SHETL_SQ_CA_33 (relating to preconstruction being included in volume driver for sole and shared use schemes)
2. SHETL_SQ_CA_63 (relating to HVP projects)
3. SHETL_SQ_CA_64 (relating to HVP projects)
4. SHETL_SQ_CA_65 (relating to OPEX escalator)
5. SHETL_SQ_CA_68 (relating to request for additional cost and asset information on schemes subject to the volume driver)

Submissions to Ofgem on the volume driver:

1. December 2019 - T2 plan Regulatory Framework document outlining proposed approach, alongside SSEN Transmission working volume driver model
2. May 2020 – relating to SQ68, we provided Ofgem with a view of historical T1 volume driver projects in BPDTs format, alongside updated VD modelling to show option2 and option3b.
3. April/May 2020 – multiple bilateral meetings with Ofgem where presentation material was provided throughout the SQ process.
4. July/August 2020 – multiple bilateral meetings with Ofgem where presentation material was provided throughout the Draft Determinations consultation process.