ELEXON

Metering Dispensation D/524 – Glassenbury 10MW BESS

Imbalance Settlement Group (ISG)

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Summary

On 5 October 2021, we presented Metering Dispensation D/524 (Glassenbury 10MW BESS) to the ISG for approval on a lifetime basis. This was subject to a condition that future Registrants for the Glassenbury Metering Systems agree with the method and apportionment arrangements for compensating the 10MW BESS Metering Systems for losses on the Glassenbury private network. The ISG deferred its decision and asked the applicant to provide further information on the costs and timescales for installing new Meters for the 10MW BESS Metering System; compensating them more accurately for private network losses; and modifying the control systems. This paper provides the applicant's responses. We invite the ISG to approve Metering Dispensation D/524 on a lifetime basis, subject to the same condition.

1. BSC requirements

1.1 Section L[1] of the Balancing and Settlement Code (BSC) requires all Metering Equipment to either:

- comply with the requirements set out in the relevant Code of Practice (CoP) at the time the Metering System is first registered for Settlement under the BSC (L3.2.2); or
- be the subject of, and comply with, a Metering Dispensation (L3.4).

1.2 Section L allows the Registrant of a Metering System to apply for a Metering Dispensation if, for financial or practical reasons, Metering Equipment will not or does not comply with some or all the requirements of a CoP.

1.3 The process for applying for a Metering Dispensation is set out in BSCP32[2].

2. Background to Metering Dispensation D/524

2.1 The Glassenbury site (Glassenbury A) currently consists of a 50MW UK Power Networks (UKPN) connection with a 40MW Battery Energy Storage System (BESS). This is metered at the 132kV Boundary Point (the Defined Metering Point (DMP)) to UKPN's Distribution System with CoP2[3] compliant Metering Equipment. The 40MW BESS has an existing 15-year, 2016 awarded, Capacity Market (CM) contract.

2.2 Gazprom Energy Ltd (Gazprom) proposes to utilise the Glassenbury 50MW site connection capacity by having two separate, and different, CM contracts, albeit both CM contracts being with the same party. The second CM contract is for a 10MW BESS (Glassenbury B) to be built on land adjacent to the Glassenbury A site.

2.3 The option of having separate 132kV connections and metering points at the same 132kV connection substation is not acceptable to UKPN and the cost of establishing a separate adjacent 132kV connection is

[1] 'Metering'
[2] 'Metering Dispensations'
[3] 'Code of Practice for the metering of circuits with a rated capacity not exceeding 100MVA for Settlement purposes'

prohibitive and would not be manageable in an acceptable timeline. Gazprom estimates that it would cost £5.0m for a compliant 132kV connection for the 10MW BESS. However, UKPN have issues with the number of ends on the 132kV circuit (Policy issue regarding Engineering Recommendation P2 Issue 7) - two separate 132kV supplies into a single site will not be allowed.

2.4 Gazprom estimates that it would cost £100k to establish a separate 33kV sub-circuit and associated 33kV metering breaker, with associated metering capabilities, and it would still not be fully compliant due to location below the DMP.

2.5 Therefore, the logic is for the new Glassenbury B 10MW BESS to be connected into, and metered at, the 33kV level, within the existing Glassenbury A site, where electrical separation can be achieved, and to make appropriate allowances for the electrical losses from the Actual Metering Point (AMP) for the new 10MW BESS, to the DMP. The proposed solution will cost £15-20k.

3. Metering Dispensation application D/524

3.1 Gazprom has applied for a lifetime[4] Metering Dispensation (D/524), against CoP2 (Attachment A). The Metering Dispensation application is for the location of the Metering Equipment associated with a proposed new 10MW BESS at Glassenbury B (Attachment B).

3.2 The Metering Equipment for the proposed new 10MW BESS will also be to CoP2 standards and located below the DMP at 33kV (the AMP), within the existing Glassenbury A site private network. The 10MW BESS itself will be located on land adjacent to the existing Glassenbury A site.

3.3 Gazprom (the Registrant of the 40MW BESS and 10MW BESS) proposes to compensate the 10MW BESS Metering System for all the no-load losses[5], and a proportion of the full load losses[6], of the Glassenbury A site 132/33kV transformer and the separate, 100m of, cable losses[7] (Attachments C and D). This will be done using appropriate scaling factors[8] in the complex site supplementary information form[9] aggregation rule.

3.4 Gazprom has assumed the worst case on the transformer and cable losses and assigned the full losses to the 10MW BESS metering even though in reality this scenario is very unlikely. There will be no impact on other Registrants other than the Boundary Point Metering System Registrant (who is also Gazprom). The 33kV metering loss factor will allocate losses between the 40MW and 10MW Metering Systems. The Registrant of the Boundary Point Metering System (Gazprom) will not be impacted other than deduction of the CoP2 10MW BESS Meter readings (and private network losses by over accounting the losses caused by its operation).

4. MDRG comments

4.1 We circulated the Metering Dispensation application and its attachments to the Metering Dispensation Review Group (MDRG) for comments (Attachments A - D).

4.2 All four MDRG members responded. One MDRG member declined to comment as they had worked on the site from a Half Hourly Data Collector point of view. Another MDRG member also declined to comment as their (different) company is the Meter Operator Agent appointed to both Metering Systems.

4.3 One MDRG member does not support the Metering Dispensation on the following bases:

- The purpose of the Dispensation is to allocate energy to two different MPANs and to allocate the energy to each MPAN correctly. At the moment there is a common Registrant for each MPAN, however there is no reason that this will remain for the life of this site/Dispensation;
- The losses within the 132/33kV transformer should be allocated appropriately based on the load that each MPAN is taking. Particularly when the site is generating and taking a demand so the directions of flow will differ depending on the respective load flows for each MPAN and the DNO network. This can be achieved more accurately by applying losses within the metering equipment than through a flat value in the aggregation rule;

[4] The expected life span of the site is estimated at around 30 years should the site continue be viable.
[5] The applicant has not pro-rated the 15.6kW of no-load (iron) losses on the basis that the 10MW BESS could be operational when the 40MW BESS is not operational.
[6] The stated full load (copper) losses for the 132/33kV transformer are 194.1kW, as per the attached datasheet (Attachment C). The applicant therefore proposes to pro-rate the copper losses on the basis 10/50MW which is the appropriate pro rata of 20% of the full load copper losses for the 10MW BESS, i.e. 38.6kW.
[7] The different additional losses for the cable connection between the existing incoming 132kV Metering Point and the proposed new 33kV Metering Point have been calculated and allowed for by the appropriate loss factor adjustment.
[8] 1.0036 for Active Import Meter readings and 0.9926 for Active Export Meter readings.
[9] Ex-BSCP514/8.4.8. Now part of the Retail Energy Code Metering Operation Schedule.

- I believe the meters shown on the SLD as a CEWE Pro are capable of this compensation. However the applicant says they have chosen not to procure metering that can facilitate this arrangement[10].
- The Registrant should have applied for the Dispensation at the earliest time to ensure that the proposed deviation from the BSC arrangements were acceptable to SVG [ISG is what they meant]. They stated that they failed to make an early application in 2020. However, the reason stated do not seem to have prevented them making the Dispensation request at that time:

  "Whilst this site was fully built in 2020. The commissioning was delayed because of both Covid and issues with UKPN clarifying/developing policy to deal with new G99 plant and equipment being connected within existing G59 connected sites. This resulted in significant delays, however, discussions re the required Metering Dispensation date back into 2020 which could not be progressed until commissioning date and process could be agreed with UKPN"

4.4 The MDRG member also added: I am not clear whether the proposed aggregation rule applying losses would correctly in all scenarios of loading. The losses should be seeking to attribute the power at the DMP in all cases, the boundary point with the DNO network. The proposed approach does not seem to do that in all cases:

- MPAN1 exporting, MPAN2 exporting
- MPAN1 exporting, MPAN2 importing
- MPAN1 importing, MPAN2 exporting
- MPAN1 importing, MPAN2 importing

4.5 The applicant had originally responded to suggestions from this MDRG member that suitable Meters be installed that could be compensated for private network losses. The applicant provided the following response:

- "The MDRG member is correct that alternative meters could be fitted that could be compensated. However, from the client's perspective this would involve both additional costs and changes to site control system and strategy which would add significant additional complexity. Therefore that option was deemed to be not a viable or practical solution; and
- The Meters are fully CoP2 compliant."

4.6 The other MDRG member supports the application on the following basis:

- Subject to suitable compensation being applied (and my preference is always for this to be in the meter rather than a fixed multiplier in the aggregation rule unless there are compelling reasons why it can't be implemented in the meters).

4.7 The applicant had recently confirmed that:

"The situation with the Glassenbury site is unique because essentially we have two separate facilities within a single curtilage operating two contracts all connected to a single 132kV point of supply feed via a single 132/33kV transformer. Whilst there is a single 132/33kV transformer essentially on the 33kV side both the 40MW and 10MW facilities need to operate separately whilst at the same time both are connected to a common winding therefore by definition each facility will impact on each other. For example the 40MW facility could be exporting full capacity at the same time as the 10MW facility was importing 10MW meaning at the 132kV metering this would only be register 30MW export.

Therefore the control strategy derived needs to take into consideration the contractual requirements of both the 10MW and 40MW contract provisions (both MW and MVARs) and the actual output 132kV metering. This was possible without any major control system changes utilising the existing primary and secondary metering inputs (individual inverter outputs referenced to existing meters). However, when the option of installing meters with internal loss factor adjustments was considered, this triggered the requirement for a complete control system redesign because of the control system impact of the meter outputs containing the proposed loss adjustments."

5. NETSO and LDSO comments

5.1 We circulated the Metering Dispensation application and its attachments to the National Electricity Transmission System Operator (NETSO) and the Licensed Distribution System Operator (LDSO) for comments (Attachments A - D).

5.2 The NETSO confirmed it had no additional comments and supports the application.

[10] The applicant provided a copy of the complex site supplementary information form aggregation rule and this was circulated to the MDRG, NETSO and ELVA. It shows that the main Meter is a Prometer W, which can have power transformer and cable loss compensation applied to it. The check Meter is an A1700 which can't.

5.3 The LDSO said it trusts that the new arrangements will be difference metered and therefore any inaccuracy in the metering adjustment to accommodate the electrical losses from the 132kV boundary to the embedded 33kV Meter will be captured in the boundary Meter. The applicant has confirmed this by providing a copy of the complex site supplementary information form aggregation rule showing the embedded Metering Systems (Import and Export readings) are differenced off the Boundary Point Metering Systems (Import and Export readings).

5.4 The LDSO also noted that the Supplier may need to submit suitable MTC and associated updates to show that the MTC is embedded in a private network and consequently valid with the sites import and export LLFCs (697 & 844 for Glassenbury).

6. ELVA comments

6.1 We circulated the Metering Dispensation application and its attachments to the Electrical Loss Validation Agent (ELVA) and asked it to validate the proposed loss factors (Attachments A - D).

6.2 The ELVA validated the proposed loss compensation factors on 5 October 2021 (after the ISG meeting) and confirmed they were suitable:

'We concur with the figures sent on the D/524 application for the cable and the TRX losses'.

7. ISG deferral and applicant responses

7.1 We originally presented Metering Dispensation application D/524 to the ISG (ISG246/06) at its meeting on 5 October 2021. The ISG deferred its decision on D/524 because it:

- Was concerned about how they could monitor a condition Elexon suggested of: "Future Registrants of all the Metering Systems related to Glassenbury A and B agree with the method, and apportionment, arrangements for compensating the 10MW BESS Metering Systems for losses on the private network" and suggested that compensating the Meters would reduce the Risk to Settlement;
- Wanted to understand the costs and timescales associated with adding compensation to the Meters (i.e. replacing one of them to facilitate this) and changing the control system;
- Wanted to understand how the output from the Meters is used for the control system, with one ISG Member suggesting the error between the inverter outputs and compensated Meter outputs (pulse outputs?) would be minimal; and
- Suggested a possible conditional (or temporary) Metering Dispensation until the Meters are changed in 10-15 years' time for ones that can be compensated and the control system updated.

7.2 The applicant provided the following initial responses:

- 'With respect to the point re apportionment arrangements for compensating for losses on the private network. The situation with Glassenbury is that both sites (A&B) are owned and operated by Gresham House. The overall losses for both secondary networks are still being measured by the main 132kV metering system with only a proportion of the secondary network with the associated losses feeding Glassenbury B being metered under this derogation request. Therefore any Settlement errors or significant variances can be identified from the metering and the loss factors adjusted if required (which we believe would be highly unlikely). This means that there is no real risk to Settlement associated with this derogation request'.
- 'The main issue at the moment is the non-availability of meters and the ISG insisting on the installation of new meters when a viable loss factor adjustment option is available seems to be counter intuitive option to insist on'.[11]
- These type of BESS site provide a range of grid support services to Grid ESO (frequency/voltage and VARs). Therefore the respective control systems response times and error/difference compensation factor requirements mean any/all changes to the current control programme by definition are not simple changes.
- The original logic was for a temporary 15-20 year dispensation which would still be acceptable if that option is acceptable to the ISG.

[11] Issue 97 'Meter shortage risk driven by global materials availability and supply chain challenges' is looking into the risks associated with a shortage of Meters due to a shortage of semi-conductors, among other crucial components, which impacts the ability of Meter manufacturers to produce Meters: https://www.elexon.co.uk/smg-issue/issue-97/

7.3 Elexon asked the applicant to elaborate on how the control system uses the Meter primary and secondary inputs and outputs (?) for the control system and how compensating the Meter would impact this, and what the estimated costs of changing the control system, and any impact of the control strategy, are. The applicant responded:

'Grid support BESS sites like Glassenbury provide Grid and the System a range of different services covering voltage and frequency stability, reactive power control and finally arbitrage/system MW support which is simple MWh/MVA. The non-arbitrage services are all dynamic and require very rapid response times in most instances sub one second.

Essentially at Glassenbury the two 33kV sites control systems operate on designated profiles for each different service as follows:

- Glassenbury Site 132kV metering (Glassenbury A&B total site)
- Glassenbury B, 33kV (Glassenbury B less 132/33kV losses)
- Glassenbury A 33kV (Glassenbury 132kV - Glassenbury B)

Therefore changes to the existing metering outputs because of the Grid Services response requirements will require changes to the control system algorithms because we are not just measuring/responding to simple MWh/MVAh control requirements.

With respect to the associated costs for changing the meters initial indication from Siemens is circa £30k. However, the main cost would be with the control system changes and initial estimate (because this type of reprogramming is done on t&m) is £250k plus.

In terms of the point the ISG make about allocating losses between different BSC parties. In this instance the fact is the two parties are in reality the same. In addition, and to hopefully give the ISG further comfort, the physicality and proximity, not to mention the direct electrical connection of two sites at Glassenbury, mean it would not be physically practical to split the real ownership of the site. Therefore, in this instance both BSC parties are fully aware and support the derogation. If the ISG require further reassurance then a suitable commitment could be entered that if the Registrants change the derogation falls away.'

7.4 Elexon asked why it would cost £30k to replace the Meters (if they were available) and the applicant provided this response:

'Firstly to be fair to Siemens for them to undertake the required works at Glassenbury B it is far from a straight forward activity because of all the required site permits and associated liaison issues and proving issues associated with the control system mean changing meters on this site is far from straight forward.

With respect to the control system as I tried to explain before the control system depending upon the service provision being supplied needs to measure and vary the input/output voltages and power factor on a dynamic basis comparing the 33kV out puts with the 132kV outputs. In terms of some functions these are taken from the instrument/metering CT's and VT's whilst other signals are taken directly from the meters (both 33kV and 132kV). The control logic needs to reconcile any measured differentials between the inputs to ensure that both Glassenbury A and B site outputs are delivered.'

8. Elexon's view

8.1 Elexon agrees that programming the 10MW BESS Meters with compensation for a suitable share of no-load and load losses in the 132/33kV power transformer, and the 100m of 33kV cable, would result in a more accurate allocation of private network losses between the two BESSs' Metering Systems, however changing the Meters at this stage will add more costs and require a complete control system redesign (section 7 sets out the details). As it stands the inaccuracies of the chosen method of compensation, via the aggregation rule, will only impact the existing Registrant for the 40MW BESS, which is the same as the Registrant for the 10MW BESS Metering System.

8.2 Elexon therefore supports this application as (the Registrant asserts that) CoP2 overall accuracy limits will be maintained at the DMP, for the 10MW BESS, and no other Registrants will be impacted.

8.3 Elexon still recommends that, if the ISG grants a Metering Dispensation for the 10MW BESS Metering Systems, then the following condition applies:

- Future Registrants of all the Metering Systems related to Glassenbury A and B (2 MPANs for each BESS) agree with the method and apportionment arrangements for compensating the 10MW BESS Metering Systems for losses on the private network.

9. Recommendations

9.1 We invite the ISG to:

a) **NOTE** the applicant's responses to the ISG's request to provide further information on the costs and timescales for installing new Meters for the 10MW BESS Metering System; compensating them more accurately for private network losses; and modifying the control systems; and

b) **APPROVE** Metering Dispensation D/524, for the Glassenbury B 10MW Battery Energy Storage System, on a lifetime basis on condition that future Registrants of all the Metering Systems related to Glassenbury A and B agree with the method and apportionment arrangements for compensating the 10MW BESS Metering Systems for losses on the private network.

Attachments

Attachment A – Metering Dispensation application D/524 – Glassenbury B 10MW BESS

Attachment B – Metering Dispensation D/524 - Glassenbury 40MW and 10MW BESS SLD

Attachment C – Metering Dispensation D/524 – Glassenbury A 132/33kV transformer test sheet

Attachment D – Metering Dispensation D/524 – Glassenbury A 33kV cable parameters

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