Issue Report

Issue 65 'Causes and treatment of large Line Loss factors'

Contents

About This Document

This document is the Issue 65 Group's Report to the Balancing and Settlement Code (BSC) Panel to inform the outcomes of the two Issue Group meetings held to devise a solution to large Line Loss Factors. ELEXON will table this report at the BSC Panel's meeting on 8 June 2017.

There are six parts to this document:

- This is the main document. It provides details of the Issue Group's discussions and proposed solutions to the highlighted issue and contains details of the Issue Group's membership;
- Attachment A contains proposed redlining for BSCP128[1];
- Attachment B contains proposed redlining for BSCP128 Appendix 1[2];
- Attachment C contains proposed redlining for BSCP128 Appendix 3[3];
- Attachment D contains proposed redlining for BSCP128 Appendix 10[4]; and
- Attachment E contains the LLF 2017/18 audit scenario.

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[1] 'Production, Submission, Audit and Approval of Line Loss Factors'
[2] 'Methodology of Self-Assessment Document (MSAD) for Host LDSOs and Embedded LDSOs that do not Mirror'
[3] 'Calculation Self-Assessment Document (CSAD) for Host LDSOs and Embedded LDSOs that do not Mirror'
[4] 'Calculation Self-Assessment Document (CSAD) for mid-year LLF submissions'

1 Summary

Background

The Supplier Volume Allocation Group (SVG) was alerted to, and discussed two large Supplier Volume Allocation (SVA) Line Loss Factor (LLF) values calculated for the forthcoming 2017/18 Balancing and Settlement Code (BSC) Year. The SVG noted that the values were calculated in a compliant manner in accordance with BSCP128 and that there was therefore no audit non-compliance identified. The SVG also noted that the two large values calculated were below the Data Transfer Catalogue (DTC)'s permitted maximum. However, SVG Members expressed concern over whether the large values were representative of the losses actually caused by the site.

The SVG requested that ELEXON initiates a review of BSCP128 via an Issue Group to determine whether any subsequent action or change should be made to the Code or its Code Subsidiary Documents. ELEXON raised Issue 65 'Causes and treatment of large Line Loss Factors' to investigate the causes of large LLF values, whether they are appropriate and reflect the true losses at the site, and (if not) the different options for handling them under the BSC.

Conclusions

The Issue Group devised a solution for where the customer's profile does not contain sufficient volumes. The Issue Group concluded that a Change Proposal (CP) should be raised to include a 17th Principle into BSCP128 to specifically address scenarios whereby insufficiently large energy consumption/generation values for a Seasonal Time of a Day (SToD) period create a resultant LLF value that may not be reflective of the actual losses at the site.

2 Background

What are Line Loss factors?

LLFs are values, which are calculated and applied to Metered Volumes, scaling the Metered Volumes to account for distribution losses.

Balancing and Settlement Procedure (BSCP) 128 'Production, Submission, Audit and Approval of Line Loss Factors' details a set of principles by which Licensed Distribution System Operators (LDSOs) must calculate their LLFs. It requires ELEXON to annually review LDSOs' calculation methodologies for compliance with these principles, and then to audit the resulting LLFs against the calculation methodologies. The Imbalance Settlement Group (ISG) and the SVG approve the methodologies and LLFs that pass the audit for Central Volume Allocation (CVA) and SVA respectively, ahead of the implementation of new annual LLF values into Settlement on 1 April annually.

SVA LLFs are submitted into Settlement through the D0265 data flow ('Line Loss Factor Data File'). The DTC permits a maximum value for the D0265's LLF data item (J0156) of 99.999. CVA LLFs are submitted to Settlement via the Central Data Collection Agent (CDCA)-I022 flow. The maximum permitted for CVA LLFs is 9.9999999 (as described in the NETA[5] Interface Definition and Design: Part 1 - Interfaces with BSC Parties and their Agents).

What is the Issue?

The SVG recently discussed two large SVA LLF values calculated for the 2017/18 BSC Year (see SVG191 Headline Report). The SVG noted that the values were calculated correctly in accordance with BSCP128 and that there was therefore no audit non-compliance. The SVG also noted that the values were below the DTC's permitted maximum. However, SVG Members expressed concern over whether these values were representative of the losses actually caused by the site.

The SVG noted that BSCP128 only allows it to default LLF values where they are non-compliant with the audit. It noted that the BSCP contains no principle that determines if and when an LLF value is too large for approval. It therefore agreed that the calculated values should enter Settlement for 2017/18.

The SVG asked ELEXON to investigate the large LLF via Issue Group. We therefore raised Issue 65 to investigate the causes of large LLF values.

[5] New Electricity Trading Arrangements

3 Issue Group's Discussions

What are the causes of large LLF's?

Issue Group members discussed the fact that perceived large LLF's are currently rare with most never calculated higher than 1.500. The Issue Group members noted that this would make an example LLF of 10.000 an extreme exception. These values can occur on Generation sites such a Photo Voltaic (PV) farms, where import active energy usage (KWh) can often be very low with high levels of reactive power import (kVArh) during specific time periods.

In the example scenario presented to the Issue Group (attachment E), the Site was SVA registered and included embedded generation that had produced LLF values in excess of 10.000 for two winter Seasonal Time of Day (SToD) periods. In the scenario, the cause was low Active Import (AI) on site during the SToD periods and high Active Import Related Reactive Power (AIRRP).

What risks do high LLF values present to Settlement?

Issue Group members noted that if consumption patterns in any given SToD period changed at a site with a LLF value of 10.000 this could have significant implications for the Customer in terms of costs. Another member noted that there would be distortive impacts on the calculation of Group Correction Factor (GCF) for Grid Supply Point (GSP) groups.

What values of LLF are representative of losses on the network?

Issue Group members discussed and agreed that any SVA or CVA LLF value produced using a valid methodology within the 16 Principles set out in BSCP128, should be eligible for submission into Settlement. The actual size of the value cannot be wrong if produced using valid calculations. One member noted that they had never had first-hand experience of a value as high as the one presented to the group in the case study, or any value over 1.500 in the distribution areas they have exposure to. Other members agreed that they had not experienced values this high previously, or any over 2.000.

Members questioned if there was anything unique about the Site in the case study causing the large LLF values. For example, whether the Site is using metering installed prior to P266 'Improving the allocation of Reactive Power flows between Import and Export Metering Systems', which introduced steps to ensure Active Import and Active Export (AE) energy is measured by separate Meters. ELEXON confirmed that the Site was using P266 compliant metering and there was nothing unusual about the Site, other than its low levels of AI compared to high levels of AIRRP in the SToD periods.

Why are not all LDSOs presenting similar LLF values?

During the Issue Group discussions, two members revealed that they take corrective actions for sites with low amounts of energy volumes for a given SToD period. The members advised that for such sites they are amending the LLF calculation to prevent calculation of large LLF values. Two methods were described:

1. On sites where the maximum demand or generation is less than 200kVA/200kW, the LDSO sets the consumption/generation to 200kVA/200kW as a minimum threshold to produce a realistic LLF value; and

2. Where the resulting LLF was determined as being high, the LDSO uses a generic LLF for the equivalent voltage level.

Both of these methodologies, when being applied to the example LLF, would have the effect of reducing the LLF value of 11.000 to a lower level, for example between 0.997 and 1.025.

Are the current provisions in BSCP128 and the 16 LLF methodology Principles sufficient?

Issue Group members noted that if some LDSO's are already taking steps within the current 16 Principle framework to correct high LLF values, it may not be necessary to make any changes. However, some members expressed concern that the lack of consistency in approach across LDSO's could lead to issues. Concern was also raised at how auditors might interpret such actions if they are not clearly defined.

ELEXON noted that clarification could be added to the Line Loss Factor Guide and suggested specifying limits for low consumption or apparent power in BSCP128.

A member noted that using a workaround would be the preferred solution, as calculating LLFs using small quantities (<1kW) of energy increases the level of error in calculation. For instance, the same load flow could be calculated twice, both with different results. This generally encourages calculating several times and using an average value for submission, which is time consuming. Currently this is not an issue as these type of sites remain rare (one member suggested it was four out of 300 sites they were responsible for) but the increasing number of PV and soon battery storage sites could escalate the volumes of sites that have large LLF values calculated for them. Another member stated that a similar scenario could happen for the wind, PV or hydro generation EHV sites, as a low consumption is expected in certain time periods.

The Issue Group agreed that regulation through set principles, rather than prescription, is the most appropriate way forward.

What new mechanisms should be introduced to facilitate default calculation of high LLFs?

The Issue Group members discussed potential mechanisms that could be introduced to facilitate the calculation of High LLFs, with two approaches being the main focus of discussion:

1. Should industry seek to introduce common methodology in calculation of LLFs rather than the current principle based methodology; or

2. Should industry seek to introduce additional principles which loosely guide how low usage sites should be treated in Methodology's to prevent high LLFs.

Members were generally against adopting an approach that was prescriptive as they recognised that this would have cost implications for LDSOs who would require systems changes to adapt. A member noted that under Distribution Connection and Use of System Agreement (DCUSA) LDSOs use a common methodology but that it can be expensive to maintain. Members accepted that having a common methodology has appealing points but that it was not the prevailing direction in other codes. An example was given of Transmission losses, which had commonality but have just switched to a Zonal approach.

Could the existing principles be amended to facilitate the workarounds?

The Issue Group discussed the potential for amending Principle 11 "Robust error detection and correction processes shall be in place throughout the calculation and submission of LLFs" by potentially creating an 11 (a). However the Issue Group did not feel that this was appropriate, as the high values are not an 'error', they are calculated correctly. The Issue Group agreed that a better approach would be to create a 17th Principle that specifically addresses scenarios with insufficiently large consumption and generation for a SToD period.

How would a 17th Principle work?

Issue Group members engaged in much discussion over how a 17th Principle would work. They agreed on key points of the approach:

- the principle must be used in order to devise a methodology that is clearly defined and auditable;
- it must be clear to all participants what steps are permitted and what are not; and
- the principle should ideally avoid being prescriptive of one method or another whilst still adhering to the above two points.

ELEXON drafted some potential redlined alterations to BSCP128 that would introduce options for a 17th Principle and amended BSCP128 Appendixes 1, 3 and 10 to reflect the necessary Audit steps would be required.

Issue Group's view on the draft redlined texts

The Issue Group discussed the draft redlined texts and suggested some changes. One Issue member questioned whether 'Generic' or 'All' would be more appropriate to define BSCP128 3.1:

> *As a minimum, 'Generic/all' LLFs shall be calculated separately for Day and Night.*

One Issue Group member noted that there are no reasons why LLF should not be determined on a day/night (or more logically a SToD basis) for all LLF, Generic and site specific. The member noted that this is already done by some Distribution Network Operators (DNOs) and should be done by all DNOs. The Issue Group believed that this suggestion was out of scope as Issue 65 is focused on tackling the identified large LLF value. The Group unanimously agreed that 'Generic' should be replaced with 'all'. The Group suggested that a consultation question be added to the CP Consultation (when the CP is raised and sent for consultation) to confirm this change with the Industry. Following the Issue Group second meeting, one member sent a note to flag that the scope of BSCP128, as it currently stands, does not include fixed loss constants (as they are used in CVA aggregation rules). However, the member noted that using the LLFs Calculations Methodology as Guidance is a very useful option for DNOs/Independent Distribution Network Operators (IDNOs), and as such, might be considered in this context. Therefore, the member believed that the changes proposed to the BSCP128 wording might limit this opportunity.

Another member noted that under Principle 1(b) the LDSO does not need to agree site specific LLF for High Voltage (HV) sites. Therefore, the member suggested that using this approach under Principle 17 should be restricted to Extra High Voltage (EHV) sites only as there is not an obligation to determine site specific losses for an HV connected site. An Issue member also noted that where the usage profile for a given site contains insufficiently large consumption or generation volumes to enable calculation of realistic EHV Site Specific LLFs then a default calculation, or default replacement process shall be undertaken. In addition, the member believed that continued use of this approach should be reviewed annually. One member noted that Principle 17 should not be restricted to EHV sites as a similar issue may occur for non-EHV sites (i.e. low consumption at certain SToDs). ELEXON added that we should review the methodology when necessary. In addition, if a customer changes its consumption within the 5 year re-calculation period, specified in the BSCP128 Methodology Principles, the DNO can recalculate and provide updated LLF with a justification of that re-calculation on the basis that there has been a material change. Therefore, there is no need to review the methodology annually as material changes are already considered by the DNO as part of their process. Four members agreed to not include the annual review and to not add any specific reference to EHV. Two members had a neutral view, as they believed there is not sufficient information enabling a decision.

An Issue member also noted that the results in a LLF of [*twice]* the generic values should be subject by review by ELEXON (or someone independent) and the reasons reported specifically to SVG/ISG. The Issue Group agreed by majority (2 members were neutral) that the ISG and SVG had no power to default/amend the values; therefore, it would not be beneficial to request their reviews.

The Issue Group also discussed whether removing the word 'large' from the 17th Principle: '... for a given site contains insufficiently large consumption or generation volumes...'. Four Issue members were neutral, one member wished to remove 'large' and one wished to keep it. Some members noted that the main reason for wishing to keep the word 'large' was to differentiate between absent data (i.e. insufficient consumption/generation) and very low usage. The Issue Group was happy for ELEXON to consider which the best option is. There were no objections to ELEXON including the word 'large' in the draft redlined texts, which will be sent out for consultation with the potential CP.

The Issue Group also agreed by majority that the substituted value should be used for only the affected SToD period not for all SToD periods (two members were neutral). Defaulting all will reduce the accuracy of all the losses for the whole year.

The Issue Group suggested to change BSCP128 Section 3.5, 7(f) from 'SVA' to 'CVA or SVA' (or to remove the reference completely). ELEXON agreed with the suggestion that the reference should be made for both SVA and CVA.

4 Conclusions

Issue Group's final view

Five Issue Group members recommended ELEXON to raise a CP while one member was neutral. The member that was neutral believed that the proposed redlined changes could potentially complicate the audit process and undermine the existing 16 Principles with unwanted consequences. In addition, the member sent a post meeting note asking for more clarity about what is meant by 'default replacement process' and the 'default calculation'. Therefore, this Issue member noted that some further work is required to bring the current suggestion to a workable solution.

The recommended change is to include a 17th Principle into BSCP128 to address situations where insufficiently large energy consumption/generation values, for a STOD period, create an LLF value, which does not reflect the actual losses at the site.

Appendix 1: Issue Group Membership

Issue Group membership and attendance

Issue 65 Group Attendance			
Name	Organisation	07/3/17	04/05/17
Elliot Harper	ELEXON (Chair)	✓	✓
Royston Black	ELEXON (Lead Analyst)	✓	✓
Paulina Stelmach	ELEXON (Proposer)	✓	✓
Kevin Spencer	ELEXON (Design Authority)	✓	✓
Anika Brandt	SSE Networks	✓	☎
Kristian Pilling	SSE	☎	☎
Martin Mate	EDF Energy	✗	✗
Patrick Barnes	UK Power Networks	✓	☎
Phillip Russell	Independent	✗	✗
Richard Ellis	Western Power	✓	✗
Roshan Bhatterai	Northern Power Grid	✓	☎
Chris Allanson	Northern Power Grid	☎	✗
Paul Grady	SP Energy Networks	✓	✗
Russell Bryans	SP Energy Networks	✓	☎
Stacey Buck	Brookfield Infrastructure	☎	☎
Tom Chevalier	Power Data Associates	✗	✗

Appendix 2: Glossary & References

Acronyms

Acronyms used in this document are listed in the table below.

Acronyms	
Acronym	Definition
AE	Active Export
AI	Active Import
AIRRP	Active Import Related Reactive Power
BSC	Balancing and Settlement Code
BSCP	Balancing and Settlement Procedure
CDCA	Central Data Collection Agent
CVA	Central Volume Allocation
DCUSA	Distribution Connection and Use of System Agreement
DNO	Distribution Network Operator
DTC	Data Transfer Catalogue
EHV	Extra High Voltage
GCF	Group Correction Factor
GSP	Grid Supply Point
HV	High Voltage
IDNO	Independent Distribution Network Operator
ISG	Imbalance Settlement Group
kVA	Apparent Power
KVAR	Reactive Power
kW	Kilowatts
LDSO	Licensed Distribution System Operators
LLF	Line Loss factor
PV	Photo Voltaic
SToD	Seasonal Time of Day
SVA	Supplier Volume Allocation
SVG	Supplier Volume Allocation Group

DTC data flows and data items

DTC data flows and data items referenced in this document are listed in the table below.

DTC Data Flows and Data Items	
Number	Name
D0265	Line Loss Factor Data File

DTC Data Flows and Data Items	
Number	Name
J0156	Line Loss Factor

External links

A summary of all hyperlinks used in this document are listed in the table below.

All external documents and URL links listed are correct as of the date of this document.

External Links		
Page(s)	Description	URL
2	Issue 65 page on the ELEXON website	https://www.elexon.co.uk/smg-issue/issue-65/
3	BSCP128 page on the ELEXON website	https://www.elexon.co.uk/wp-content/uploads/2016/11/BSCP128_v7.0.pdf
3	NETA Interface Definition and Design on the ELEXON website	https://www.elexon.co.uk/bsc-related-documents/related-documents/interface-definition-documents/
3	SVG191 Headline Report on the ELEXON website	https://www.elexon.co.uk/meeting/svg-191-2/?from_url=https://www.elexon.co.uk/events-calendar-item/svg-191/
4	P266 page on the ELEXON website	https://www.elexon.co.uk/mod-proposal/p266-improving-the-allocation-of-reactive-power-flows-between-import-and-export-metering-systems/
5	Line Loss Factor Guide on the ELEXON website	https://www.elexon.co.uk/bsc-related-documents/bsc-guidance-notes/