

Digital Meeting Etiquette

- Welcome to the Issue 119 Workgroup– We'll start shortly
- We encourage attendees to **use video**, where bandwidth allows, especially if talking
 - There is a setting on Teams to “Turn off incoming video” if you are having persistent connection issues
- **Mute when not speaking**
 - Minimise background noise to maintain focus
 - Use Teams chat if you cannot get through
- Stay on topic: Keep contributions relevant to the agenda
- Respect all perspectives: Foster a collaborative and inclusive environment
- This session will be recorded for the notes taking purposes. The recording will not be shared outside Elexon

23 July 2025

Issue 119 Workgroup

Meeting 1



Welcome to the Issue 119 Workgroup

What we'll cover today...

Agenda

- Welcome and Introductions
- LLF Audit Process
- LLF Methodology
- Crystallised Settlement Error
and LLFs
- AOB
- Meeting Close

BSC Issue 119 - Workgroup #1

Understanding and assurance of increasing electricity losses (LLF & GCF)

Context & Introduction

23rd July 2025

Together, we have the power to make
energy work for people and planet



What are electricity losses?

	Electricity
What are Energy Losses?	Energy industry settlement calculations must ensure every kWh of metered energy entering the network is allocated to an industry participant. Due to inefficiencies during energy transportation across the network, metered energy exiting the network is always slightly lower. Energy Losses are the adjustments that are made to metered volumes exiting the network to true up volumes to align with metered import onto the network.
What are relevant Industry Terms and what do they mean?	<p>Transmission Loss Multiplier (TLM) - Adjustments for losses on HV Transmission Network, calculated from metered data in real time on a HH basis.</p> <p>Distribution Losses (Line Loss Factors, LLFs) - Adjustments made for losses on the LV Distribution Network. These are forecast in advance and fixed values are applied based on the customer meter and connection type.</p> <p>GSP Group Correction Factor (GCF) - The balancing factor which reconciles in every settlement run to ensure total energy allocated in each Settlement Period in each Grid Supply Point Group matches the energy entering the system.</p>
What are the rough magnitudes of losses for a Domestic supplier	<p>TLM = ~1.6%</p> <p>Distribution Losses = ~8.6%</p> <p>GCF = ~1.5%</p>

Simple summary

Total network losses (LLF+GCF) are increasing and there isn't a clear narrative / understanding why.

Some settlement controls exist, but changes in losses are difficult to explain.

Collaboration required to unpick and understand - no single party has the answer.



Full detail (pre-read only)

Proposal form - Issue Description :

There is a concern across the industry regarding the increasing trend in electricity losses, specifically as reflected in Line Loss Factors (LLFs) and Group Correction Factors (GCF). While BSCP128 sets out provisions for LLF calculation, there is insufficient widespread understanding among industry participants regarding the drivers behind these increasing losses and changes in LLF and GCF values. Issues highlighted in industry forums include concerns that the current methodology for calculating generic LLFs should be reviewed in light of increased embedded generation, behind the meter consumption and, in some networks, exporting GSPs.

Although existing controls and assurance activities are in place to mitigate Settlement errors, there is a perception among industry participants that it remains challenging, despite these processes, to widely understand the underlying drivers behind changes in LLF and GCF, and to therefore predict their future values.

To better understand and manage the drivers behind increasing electricity losses, we believe it is essential to bring industry parties together with Elexon to review current BSC processes. This collaborative approach could enable increased data sharing and transparency across the industry and strengthen Elexon's capacity for oversight and investigation into significant LLF and GCF anomalies. Working together in this way is key to achieving improved industry understanding and strengthening the Settlement control environment.

Simple summary

Are we collectively taking appropriate actions to understand / fix issues?

Evidence of an issue is clear. MHHS may increase the issue and so reviewing now may provide improved controls / time to fix.

GCF is not included in the domestic energy price cap resulting in a material under-recovery of costs for domestic suppliers.



Full detail (pre-read only)

Proposal form - Justification for Examining Issue :

Accurate Settlement is crucial for the effective operation of the GB energy market. LLFs and GCFs play a fundamental role in determining the amount of energy attributed to parties in Settlement, effectively allocating network losses (>£1bn per annum).

Under the current state of affairs, Settlement Parties are not confident that Settlement Errors resulting from non-Compliance with Code will be detected, investigated, and resolved. Nor are they confident that the material impacts of inherent error resulting from assumptions and abstractions necessary in Settlement processes will be equitably mutualised. Based on our analysis and industry discussions, the financial impact associated with inaccurate allocation due to unexplained LLF and GCF trends will be worth tens of millions of pounds annually, impacting different parties inequitably.

Leaving this issue unresolved poses a material financial risk to all parties due to ongoing inaccurate Settlement, which may later be discovered and corrected via future Trading Disputes. The probability of occurrence is high, as the increasing trend in GCF/ADR across multiple GSP Groups indicates a systemic issue that existing processes are not addressing. Failure to address this could also undermine confidence in the Settlement process, especially with the transition to Market-Wide Half Hourly Settlement (MHHS), where prompt identification and resolution of errors will be even more critical due to the shortened Settlement and reconciliation timetable. Examining this issue directly supports the effective running of the BSC by promoting accurate settlement and fair cost allocation, aligning with the objectives of the Code.

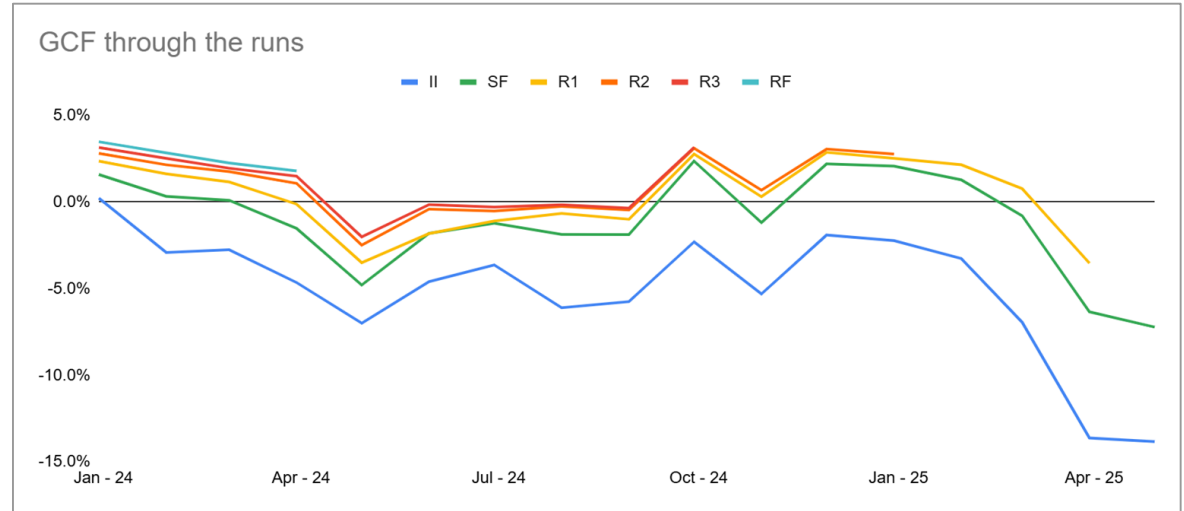
In addition, Ofgem's model to set the Default Tariff Price Cap does not contain any allowance for GCF, as when the cap was introduced in 2019 it was assumed that GCFs would average to 100%. The material increase in GCFs has resulted in an under recovery of costs by all domestic suppliers, damaging the resilience and investability of the sector. Understanding the cause of the increase in losses is crucial to addressing this, either through identifying steps that can return GCFs to 100%, or to provide evidence and explanations that support the inclusion of GCF cost allowance in the Price Cap.

Settlement focus for this Issue Group

Proposal : Issue Group focuses on settlement losses that are, A). Reconciled at RF, and B). Averaged over a long time period.

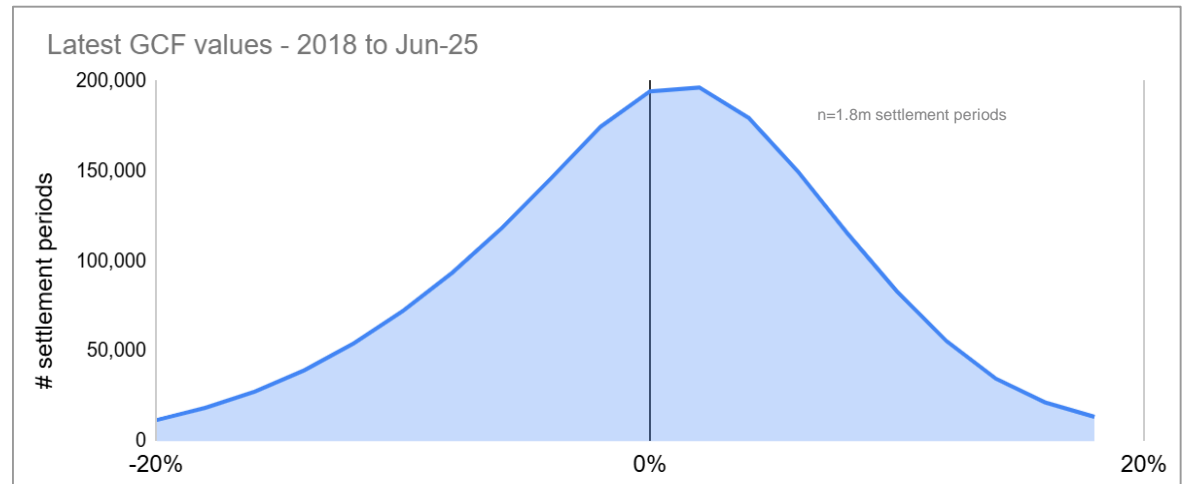
A). Reconciled at RF

- GCF consistently rises through the settlement runs
- From II to SF to R1 (and even to R2) the main driver of this appears to be large SVA export submitting reads into settlement. Before reads are submitted they are estimated as zero, which instead creates negative GCF. This disappears when reads are submitted, increasing GCF.
- Propose this is not an issue of concern for this issue group



B). Averaged over a long time period (remove HH volatility)

- Profiling error - as HH metered consumption differs to Elexon profiled, GCF values are volatile and range from < -20% to > +20%.
- Profiling processes are changing with MHHS and so there is limited value in focussing on profiling accuracy of import or export energy.
- When averaging over a longer time period, the underlying cause of distribution losses (and increases) are unlikely to be resolved by MHHS.

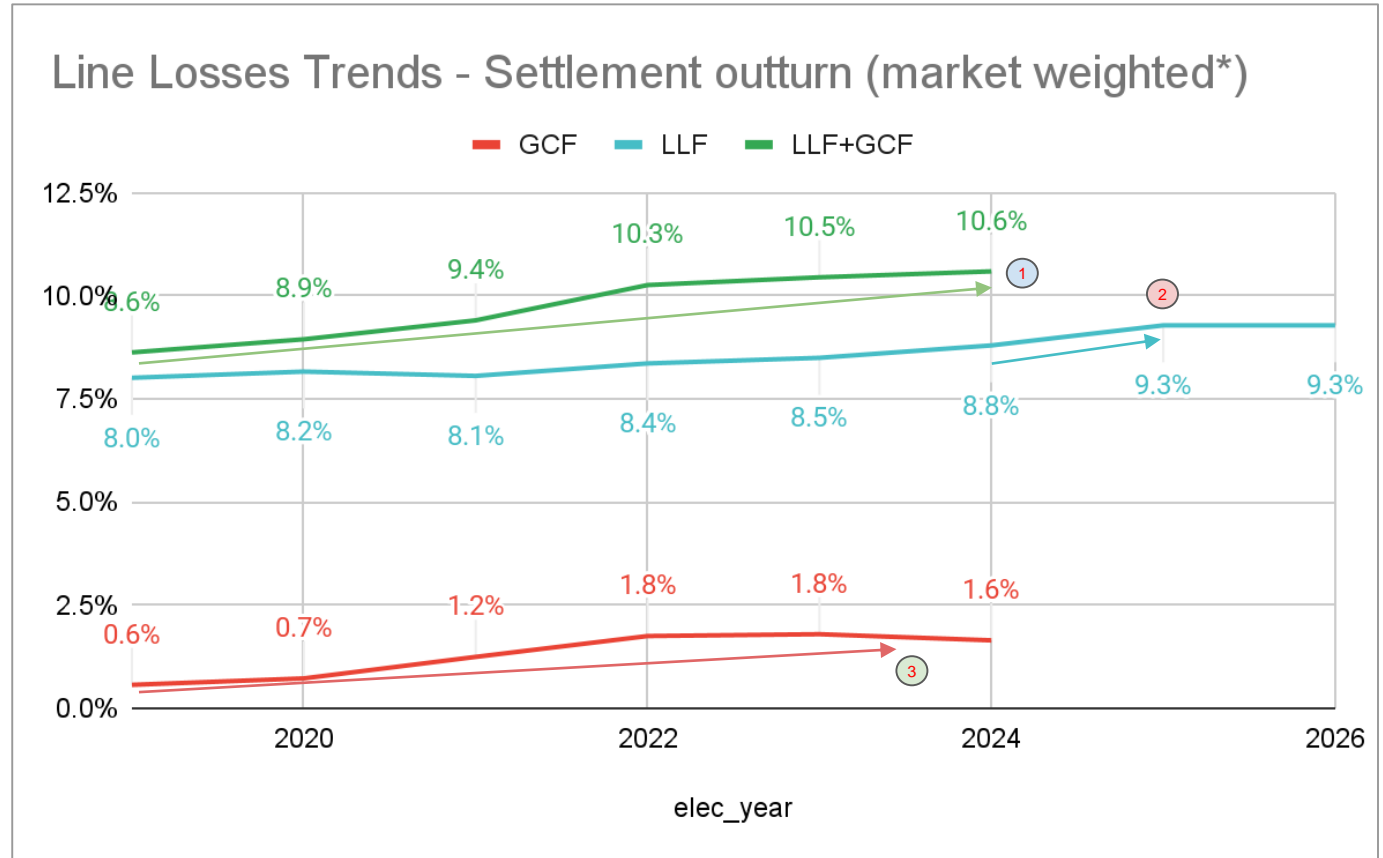




Distribution network losses (LLF+GCF) are increasing

Line Loss Trends

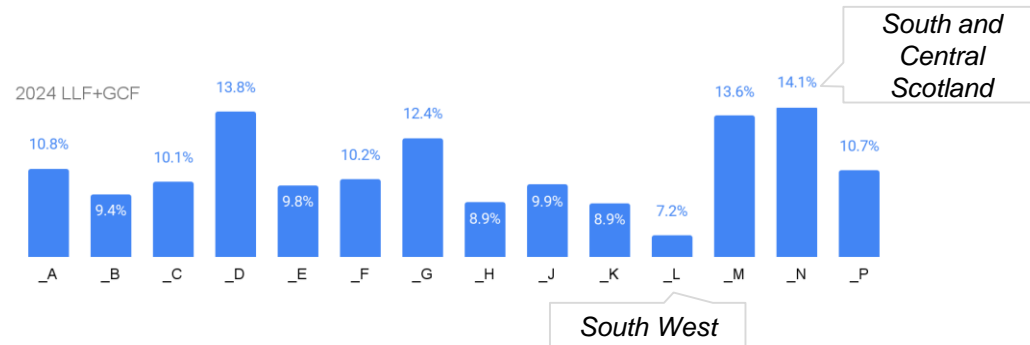
- 1 Over the last 5 years, outturned total distribution losses (LLF + GCF) have increased +2.0% from 8.6% to 10.6%.
 - 2 LLF's have lagged total loss increases (+0.8%) but are set to increase into the 2025 and 2026 elec years.
 - 3 GCFs increased from 0.6% in 2019 to 1.8% in 2022 and 2023, with 2024 continuing to reconcile.
- Between 2010 and 2018 (not shown), GCFs averaged **~0.5%** (likely the period that the price cap methodology considered).





Distribution network losses (LLF+GCF) are increasing in almost every GSP

- In general, an increasing trend in losses (LLF+GCF) is observed across most GSPs.
- There is a wide range of values in terms of total distribution losses with 2024 currently reconciled as follows:



Q: Why the range of losses 7% to 14%?

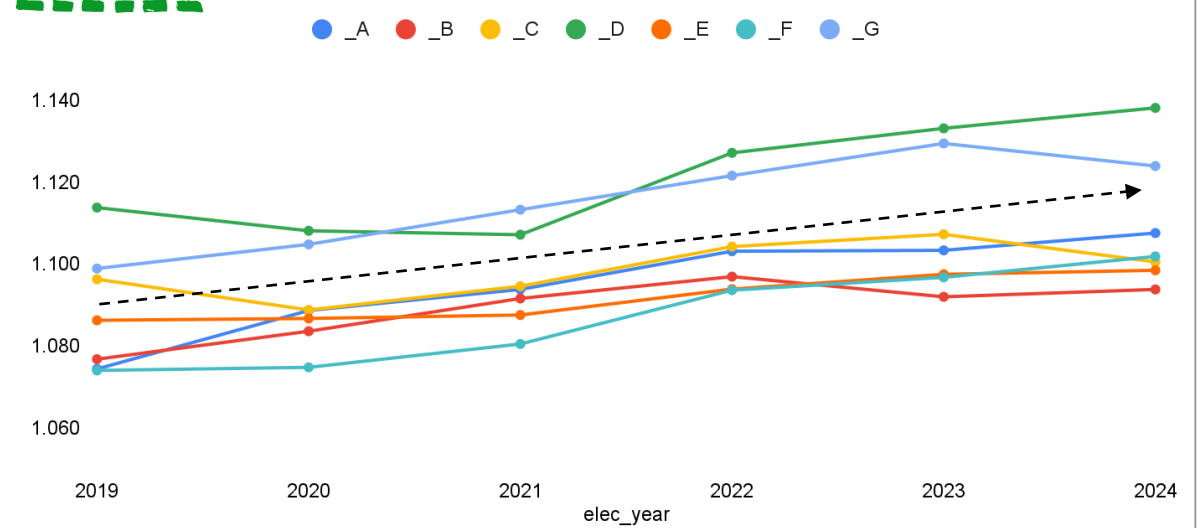
Change in total losses - 2024 vs 2019



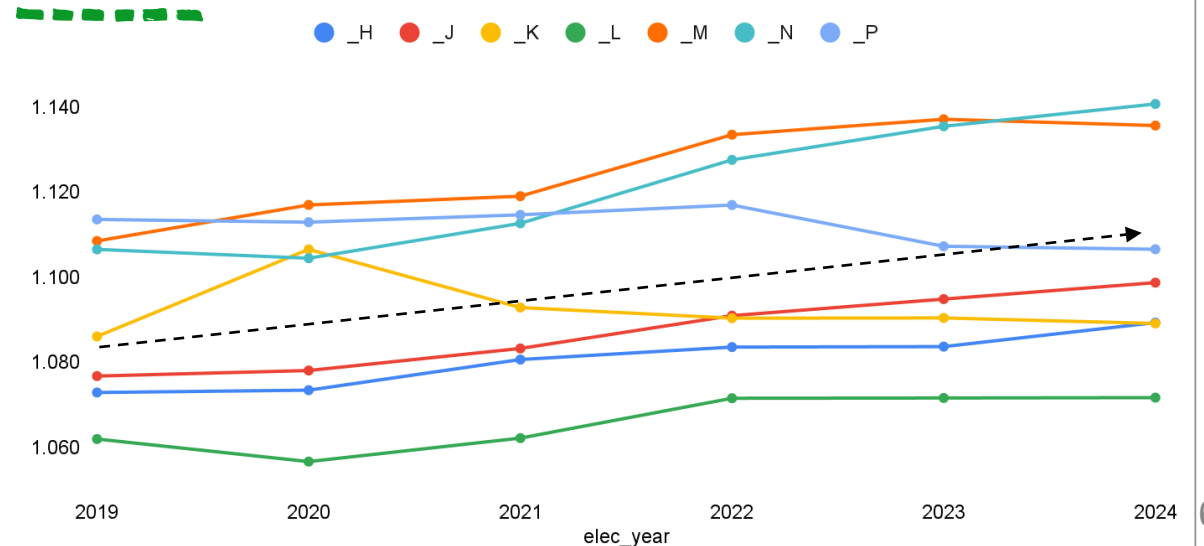
Q: Change in losses: nearly all GSPs have seen an increase in losses, why? Why the disparity in rate of change?

- Exceptions to increasing trend, _P, _K, _C

LLF + GCF by GSP (part i)



LLF + GCF by GSP (part ii)



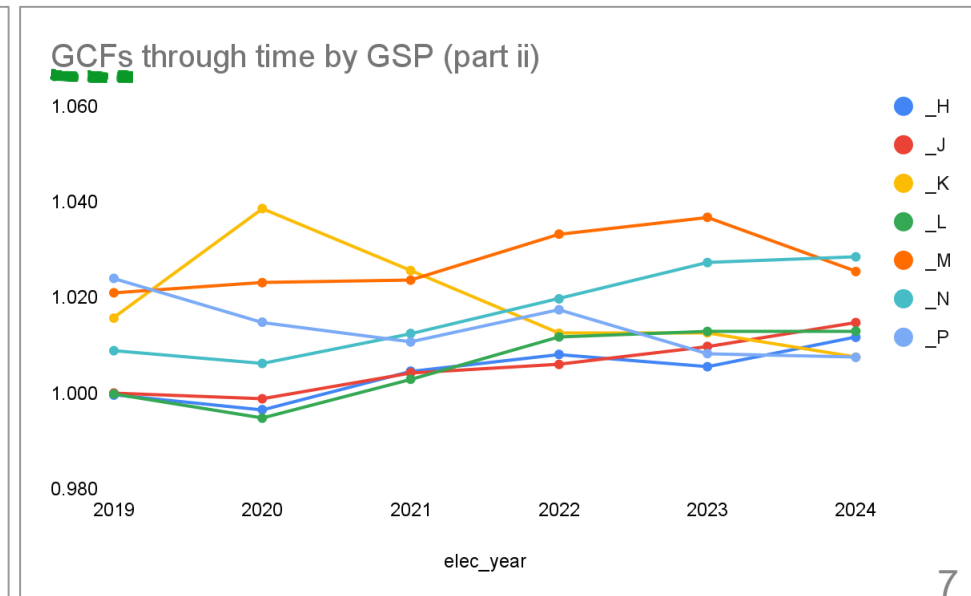
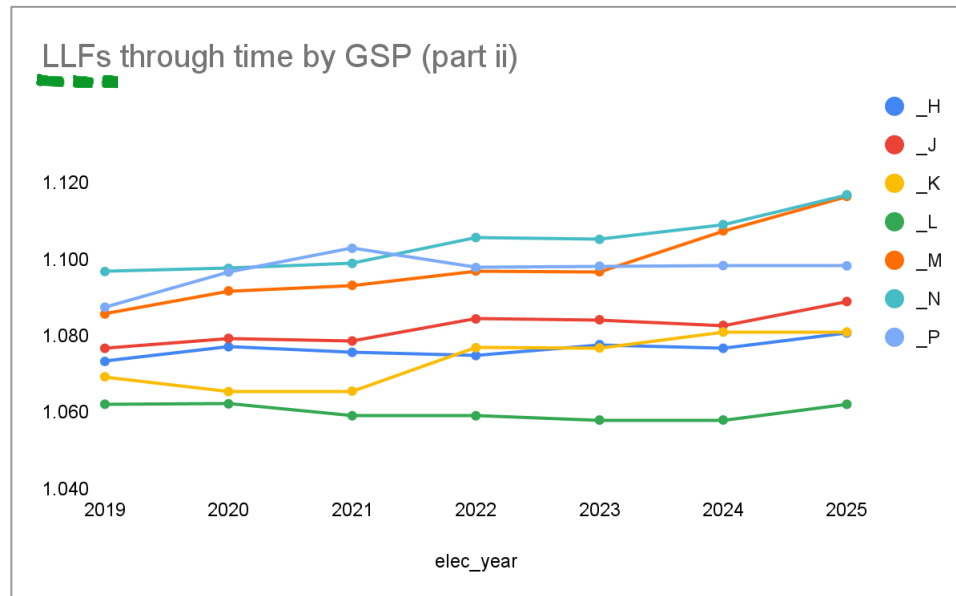
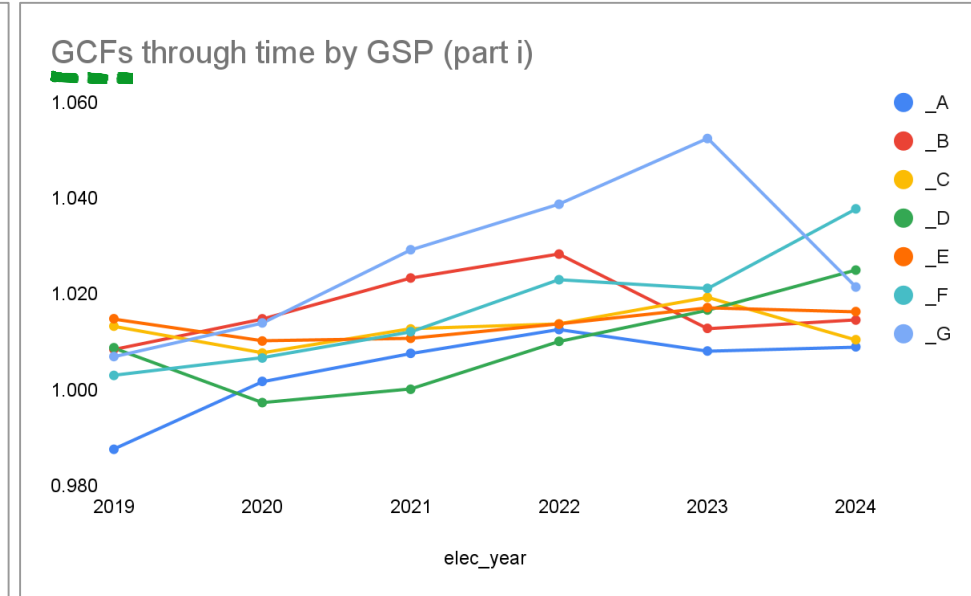
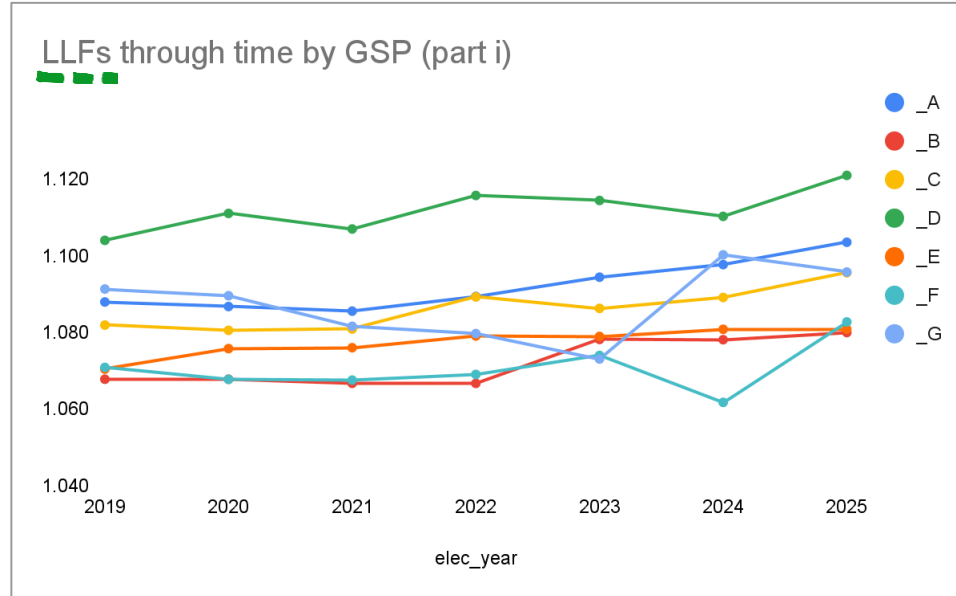


Distribution network losses (LLF+GCF) are increasing in almost every GSP

Breaking total losses into constituent elements of LLF and GCF, there is less of a clear pattern shared by all GSPs.

However, trends become more clear when we group the GSPs into those with similar patterns:

1. Those with LLF step changes (B,F,G,M), see detail on next slide
2. Those without LLF changes



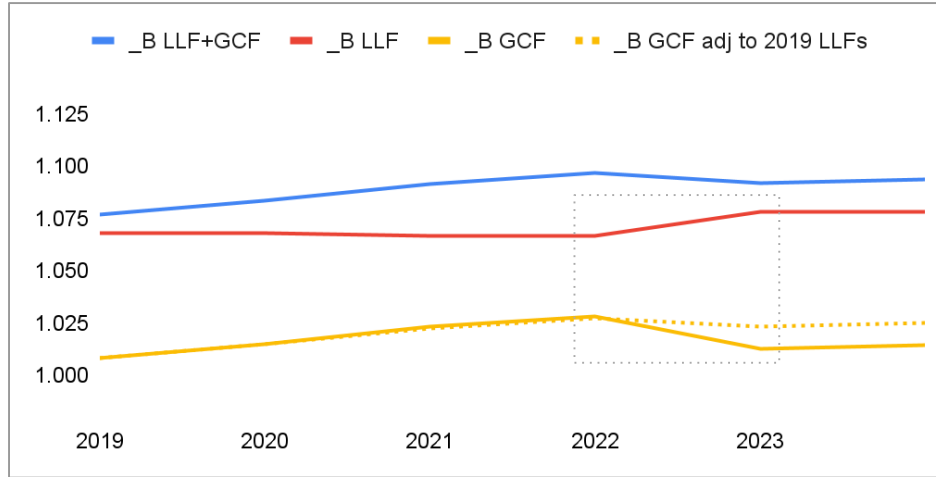


GSPs with LLF step changes (B, F, G, M)

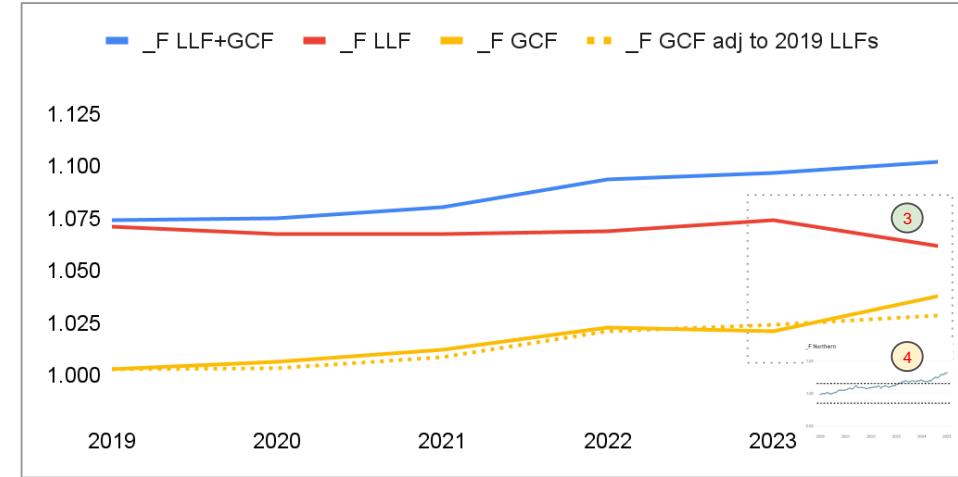
By definition, when LLFs go up/down there is a corresponding change in GCFs.

Questions for Issue Group consideration on LLF changes :

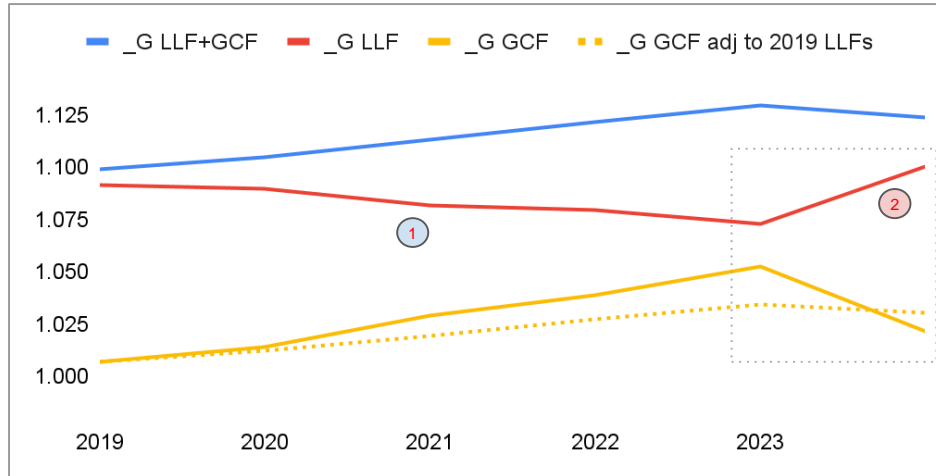
- Why were **_G** LLFs decreasing through 2019-23 before a large correction?
- ①
- How was the large **_G** correction calculated?
- ②
- Why did **_F** LLFs decrease in 2024?
- ③
- Could/Should the LLF approval process take account of current GCF/ADR position?
- ④



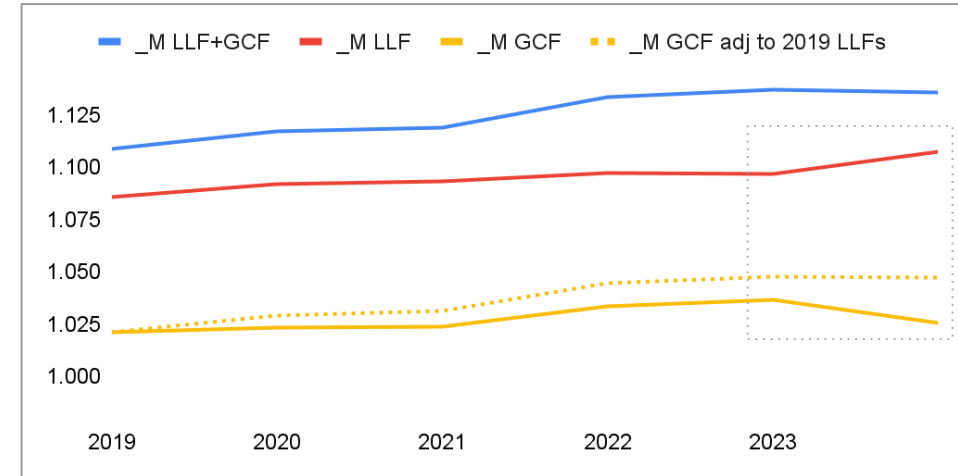
_B LLF increase of +1.1% (2023) offset by -1.6% reduction in GCF



*LLF decrease of -1.2% (2024) offset by +1.7% GCF. This will be contributing to the increase in ADR observed in **_F***



_G LLF reduction from 2019 thru' 2023 of -1.8% offset by +4.6% increase to GCF, so definitely not the only contributor. 2024 LLF increase of +2.7% helping GCF reduce -3.1%.



_M LLF increase of +1.1% (2024) offset by -1.1% GCF.

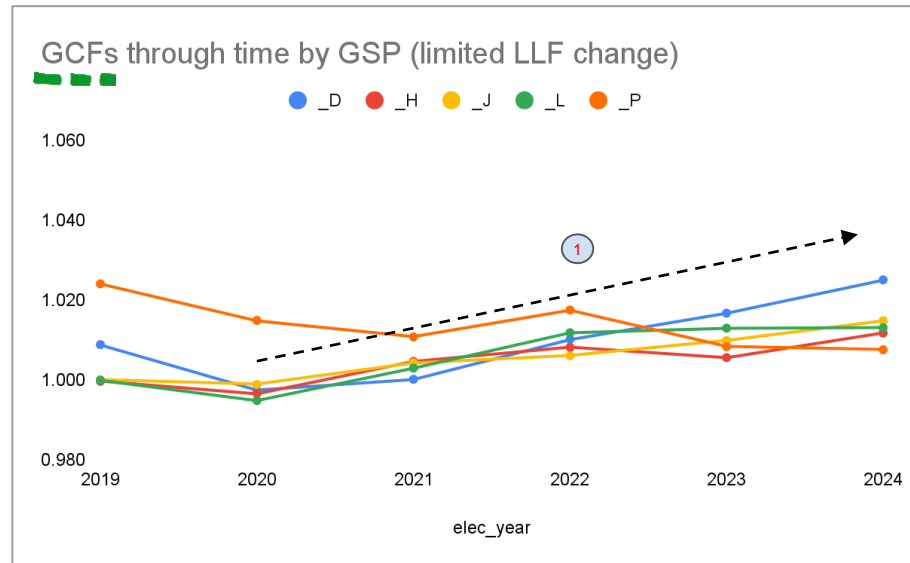
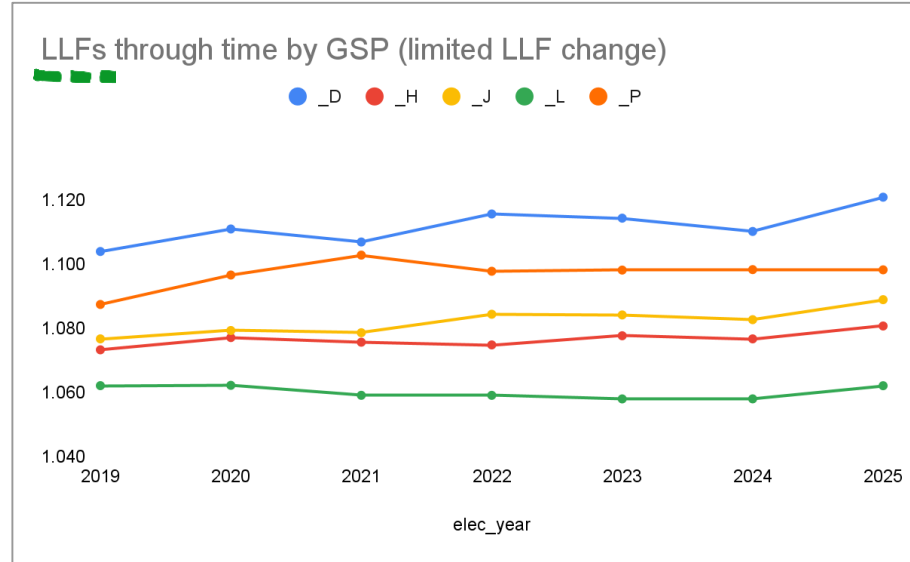
GSPs without LLF step changes

- 1 With limited changes to LLF, the trend of increasing GCF is clear to see (exception of _P)
- 2 For those GSPs with increasing LLFs, as the rise takes effect GCF is stabilised (exception of _N)
- 3 It appears that the updating of LLFs may lag behind increased GCFs although this is not well understood (eg. _A, _C). Do LLFs need to consider Settlement data from a 12-month period three years prior to the target BSC Year?

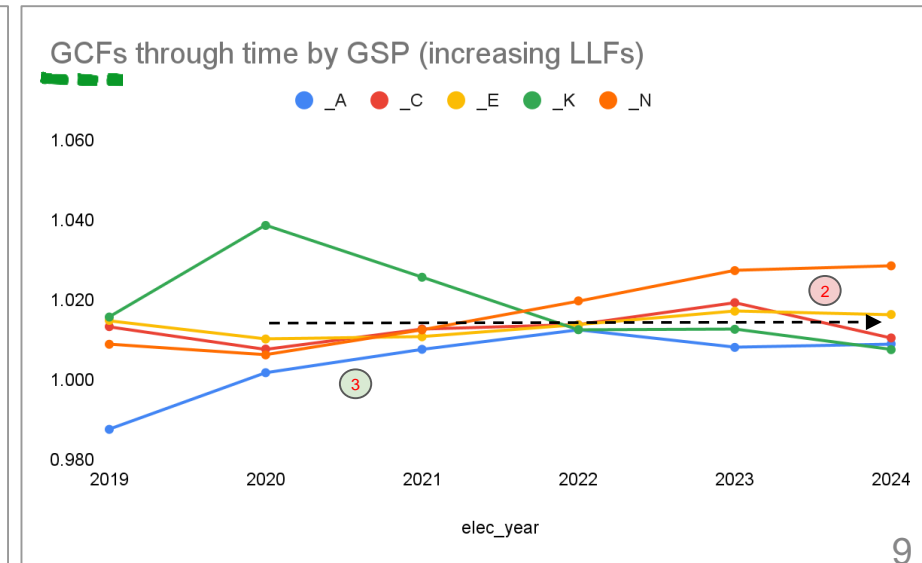
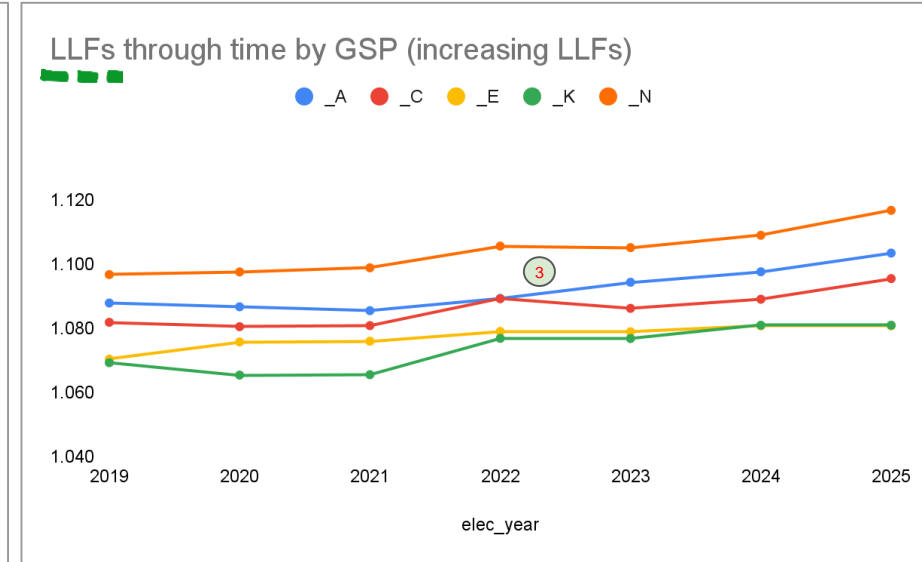
Questions for Issue Group consideration on LLF changes :

- Why do we see some GSPs with increasing LLFs where others do not change much?

GSPs with limited LLF change ①

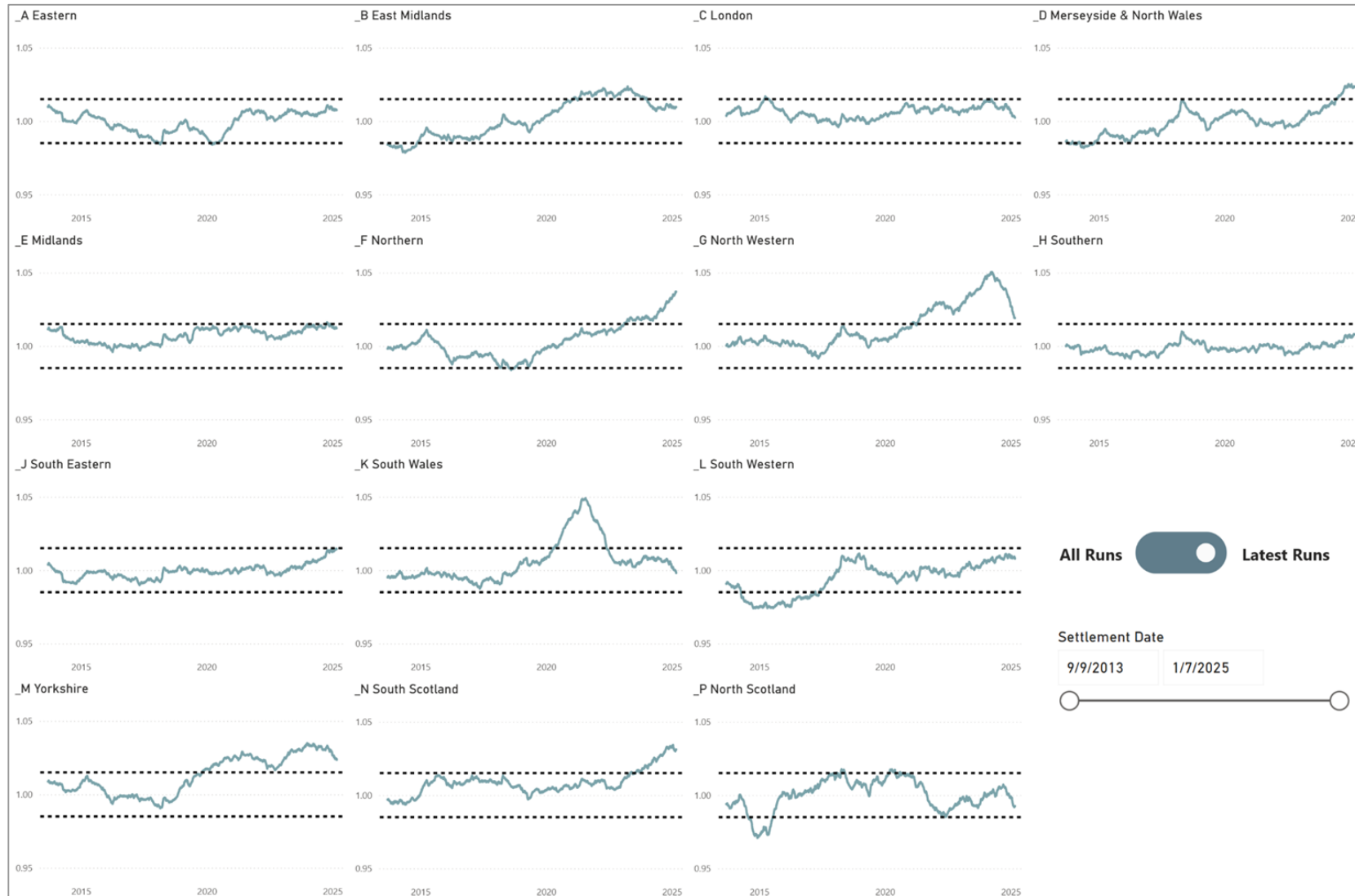


GSPs with LLF increase ②



Changes in GCF go unexplained and difficult to resolve (eg. ADRs)

After LLF changes are factored into the understanding, there remain large changes in GCF that go largely unexplained.



- Primary tool to publicly monitor GCF is the Elexon Annual Demand Ratio (ADR) values published [here](#).
- ADR provides a high-level overview of the NHH SVA market and identifies any significant under-/over-accounting of energy.
- The ADR measures annual metered consumption as a ratio of the profiled consumption (which includes LLFs).
- As it is annual, the ADR is a lagged metric and so updates of LLF / settlement corrections take time to come through.
- When ADR breaches tolerance, it is difficult to explain why / get it back in tolerance.



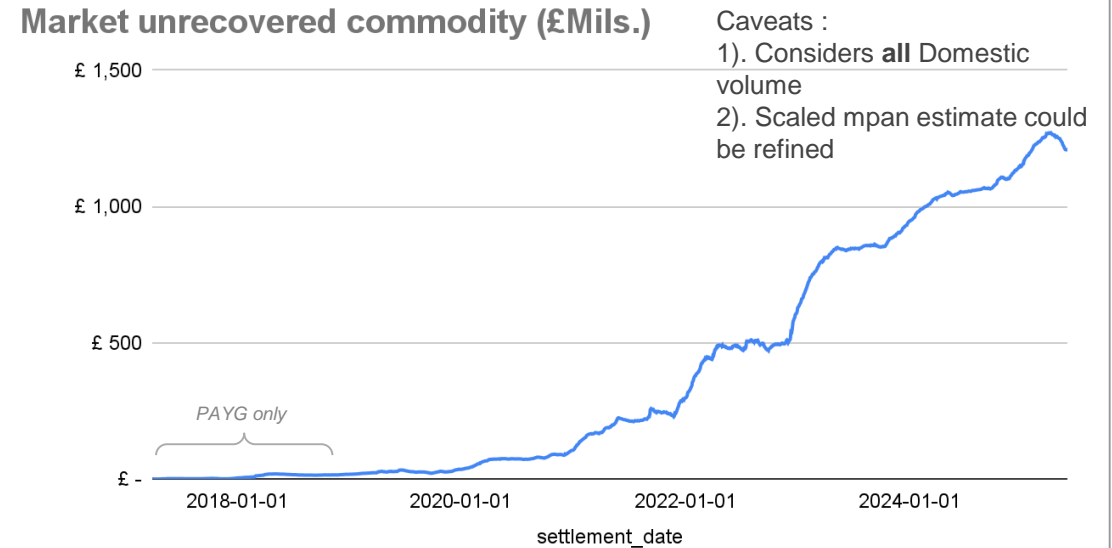
Impact of GCF cost on price cap cost recovery

GCF is not factored into Ofgem's price cap allowances.

We estimate that since cap inception, market wide GCF commodity (wholesale) cost has been ~£1.2bn (if 70% on SVT tariffs then ~£0.8bn)

GCF also impacts non-commodity costs which are not factored into cap or the analysis below: TNUOS, BSUOS, CFD, CM, AAHEDC.

Avg commodity cost per customer											
		PAYG Cap		PAYM Cap							
Customers	GSP	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
3,925,728	_A	£ (0.14)	£ 0.38	£ (0.87)	£ 1.56	£ 6.33	£ 10.28	£ 8.39	£ 5.38	£ 1.87	£ 3.69
2,876,874	_B	£ 0.19	£ 0.38	£ 1.29	£ 4.08	£ 12.14	£ 21.70	£ 11.84	£ 6.01	£ 2.82	£ 6.72
2,548,728	_C	£ (0.00)	£ 0.30	£ 0.47	£ 0.57	£ 0.77	£ 4.30	£ 7.22	£ 2.05	£ (0.38)	£ 1.70
1,587,433	_D	£ 0.24	£ 0.38	£ 0.65	£ 1.14	£ 0.41	£ 3.35	£ 8.65	£ 8.45	£ 2.77	£ 2.89
2,631,601	_E	£ 0.15	£ 0.56	£ 1.67	£ 2.67	£ 5.90	£ 8.45	£ 10.04	£ 5.93	£ 1.97	£ 4.15
1,685,832	_F	£ (0.11)	£ 0.00	£ 0.31	£ 1.82	£ 5.73	£ 12.36	£ 11.14	£ 10.14	£ 4.84	£ 5.14
2,519,823	_G	£ 0.23	£ 0.49	£ 0.37	£ 2.75	£ 14.76	£ 29.36	£ 20.88	£ 9.13	£ 2.32	£ 8.14
3,300,962	_H	£ 0.19	£ 0.46	£ (0.08)	£ 1.04	£ 2.25	£ 3.86	£ 7.34	£ 5.04	£ 2.40	£ 2.50
2,458,233	_J	£ 0.02	£ 0.41	£ 0.30	£ 1.18	£ 3.78	£ 3.38	£ 7.17	£ 6.19	£ 2.94	£ 2.82
1,167,125	_K	£ (0.02)	£ 0.46	£ 1.15	£ 5.86	£ 12.25	£ 6.87	£ 7.57	£ 3.37	£ (0.61)	£ 4.10
1,715,164	_L	£ 0.22	£ 0.81	£ 0.30	£ 1.98	£ 5.06	£ 5.94	£ 9.15	£ 6.59	£ 2.53	£ 3.62
2,386,765	_M	£ (0.07)	£ 0.42	£ 1.79	£ 3.65	£ 10.83	£ 17.95	£ 15.89	£ 8.66	£ 1.60	£ 6.75
2,239,004	_N	£ 0.25	£ 0.43	£ 0.72	£ 1.47	£ 3.90	£ 9.04	£ 11.57	£ 9.48	£ 3.43	£ 4.48
872,284	_P	£ 0.57	£ 0.90	£ 1.86	£ 3.42	£ (6.70)	£ (5.50)	£ 4.91	£ 1.24	£ (8.88)	£ (1.13)
31,915,556		£ 0.10	£ 0.44	£ 0.57	£ 2.18	£ 6.00	£ 9.90	£ 10.38	£ 6.35	£ 1.90	£ 4.20



- At the point of setting the price caps, the recent history of GCF was averaging ~0.5%.
- Since the cap methodology has been introduced, GCF has increased to 1.8%, coinciding with increases in wholesale prices.
- The average GCF commodity cost per customer has risen from £0.10 per year to a peak of £10.38 per year.
- We believe that GCF cost should be an allowance under the price cap.
- *Analytical assumptions : PC 1 & 2 volume is all domestic; GCF volume is valued at imbalance price*

What next?

1. Proposals to agree on

Issue Group focuses on settlement losses that are :

1. Reconciled at RF (ie. ignore early settlement runs), and,
2. Averaged over a long time period (ie. ignore HH volatility and profiling error of import and export)

2. Discussion points for this session

- Why the range of values in total distribution losses (range 7% _L to 14% _N)?
- Change in losses: nearly all GSPs have seen an increase in losses, why? Why the disparity in rate of change?
- Why were _G LLFs decreasing through 2019-23 before a large correction?
 - How was the large _G correction calculated?
- Why did _F LLFs decrease in 2024?
- Could/Should the LLF approval process take account of current GCF/ADR position?
- Why do we see some GSPs with increasing LLFs where others do not change much?
- How are LLFs calculated? Is there a breakdown between technical vs non-technical? Do LLFs lag underlying losses?
- Do we have any collective hypotheses that explain these trends?
- Do we agree that GCF costs should be reflected in the price cap?

3. Agenda for a future session

- MHHS GCF scaling weights
- Shape of GCF in MHHS

02

LLF Audit Process and LLF Methodology

Andrew Spurr, Senior Energy Settlement Assurance Advisor

LLF Methodologies

For Host LDSOs and Embedded LDSOs that do not mirror:

LLF methodologies and Methodology Self Assessment Documents (MSADs) are submitted by LDSOs, reviewed by Elexon and presented to the Panel for approval.

Following approval of the LLF methodologies, the LDSOs calculate their LLFs in accordance with their approved methodology and submit these to Elexon.

The LLFs are audited by Elexon, presented to the Panel for approval and provided to CDCA or SVAA for use in Settlement. Elexon also publish the approved LLFs on the Elexon Portal.

For Embedded LDSOs that mirror:

MSADs are submitted by LDSOs and reviewed by Elexon.

The LDSOs can obtain the Host LDSO LLFs that they intend to Mirror from the Elexon Portal. They will use these values to produce their LLF submission which they will submit to Elexon.

The LLFs are audited by Elexon, presented to Panel for approval and provided to CDCA or SVAA for use in Settlement. Elexon also publish the approved LLFs on the Elexon Portal.

LLF Methodology Principles

1. LLFs shall be calculated using a generic (non Site Specific) method except for:
 - (a) Sites that are connected at Extra High Voltage (EHV); or
 - (b) Where the customer has requested a Site Specific LLF, and the LDSO is in agreement.
2. All Site Specific LLFs shall account for Technical Losses only.
3. All Generic LLFs shall account for all losses (Technical and Non Technical).
4. Site Specific losses and the total Grid Supply Point Group (GSPG) losses shall be considered in the calculation of Generic LLFs.
5. As a minimum, Generic LLFs shall be calculated separately for Day and Night.
6. LDSOs shall utilise Settlement data from a Settlement Run at R3 or greater and from a complete 12-month period, for calculating Generic LLFs. The 12-month period to be used shall be the BSC Year 3 years prior to the BSC Year for which the LLFs are being calculated.
7. Robust error detection and correction processes shall be in place throughout the calculation and submission of LLFs.
8. All Generic LLFs shall be re-calculated at least every 2 years.

LLF Audit

The LLF Calculation audit covers the checks outlined below:

1. Conduct a validation check, which will pick out:
 - (a) All SVA LLFs which are <0.750 or >1.250 .
 - (b) All CVA LLFs which are <0.750 or >1.250 .
 - (c) All revised SVA LLFs which are outside a range specified as:
 $\{\text{last year's LLF minus } 20\% \text{ of last year's loss}\}$ to $\{\text{last year's LLF plus } 20\% \text{ of last year's loss}\}$.
2. Check a representative sample of LLFs to confirm that they have been calculated in accordance with the audited methodology. This check may be performed at the LDSO's offices, and will include discussions with the LDSO and consideration of the audit trail.

For the site specific audit the LDSOs are required to submit details of how the site specific LLFs have been calculated.
3. Check a representative sample of Metering Systems to confirm that the correct LLFC has been applied. This check may be performed at the LDSO's offices. For clarity, this check will look at the application of an LLFC to Metering Systems during the last year.

03

Crystallised Settlement Error and Generic LLFs

Simon Waltho

Performance Assurance Manager (MHHS
Transition)

Background

- Investigation into GCF trends in one GSP Group
- GCF corrects for difference between volumes recorded *entering* Distribution System (“GSP Group Take”) and volumes recorded *within* Distribution System
 - Required because Settlement involves some assumptions and abstractions
- GCF is expressed as a ratio – ideal is 1, but in practice considered “within tolerance” if ratio of annualised volumes post-R2 (“Annual Demand Ratio” or ADR) is between 0.985 and 1.015
 - Anything beyond this suggests there *may* be a significant Settlement Error i.e. a non-Compliance with the Code introducing incorrect volume data
- Appeared to be a correlation between Generic Line Loss volumes and GCF

Illustration - Breakdown of Settlement Volumes

Recorded Annualised Settlement Volumes at RF

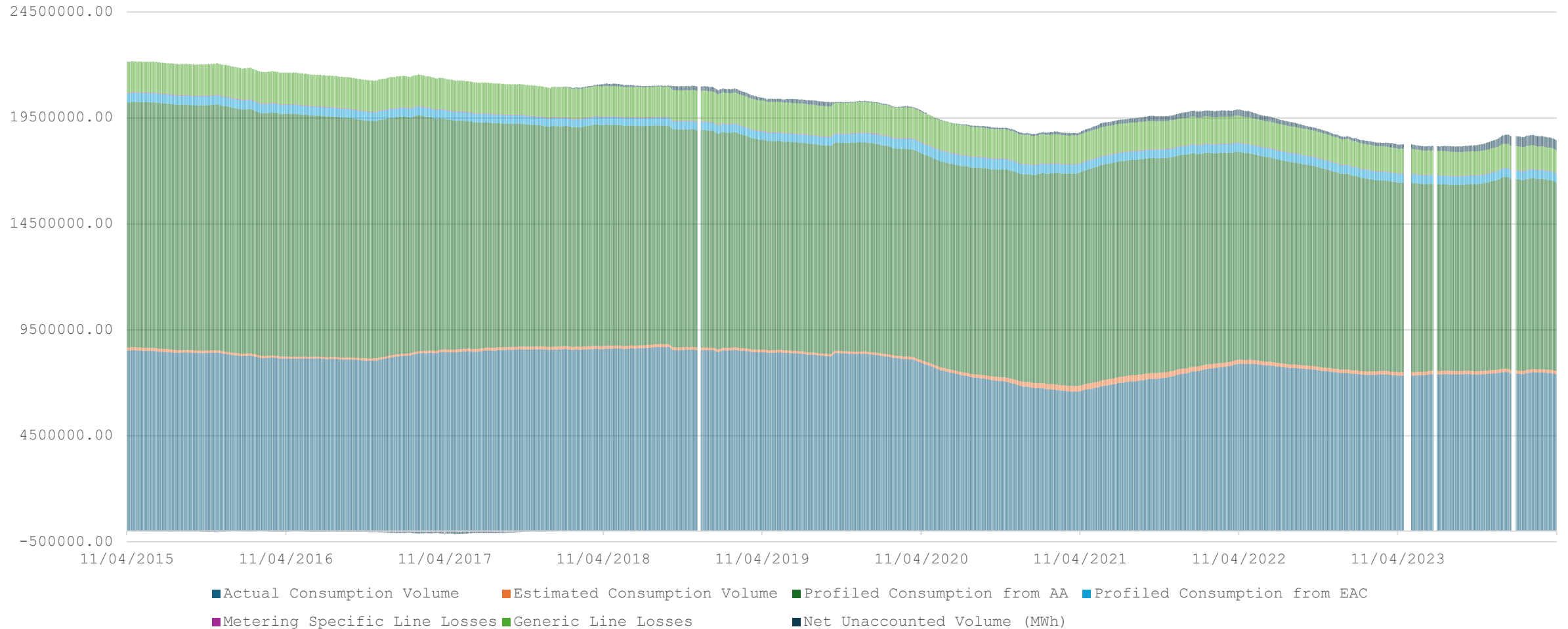


Illustration – Breakdown of Settlement Volumes

Recorded Annualised Settlement Volumes at RF

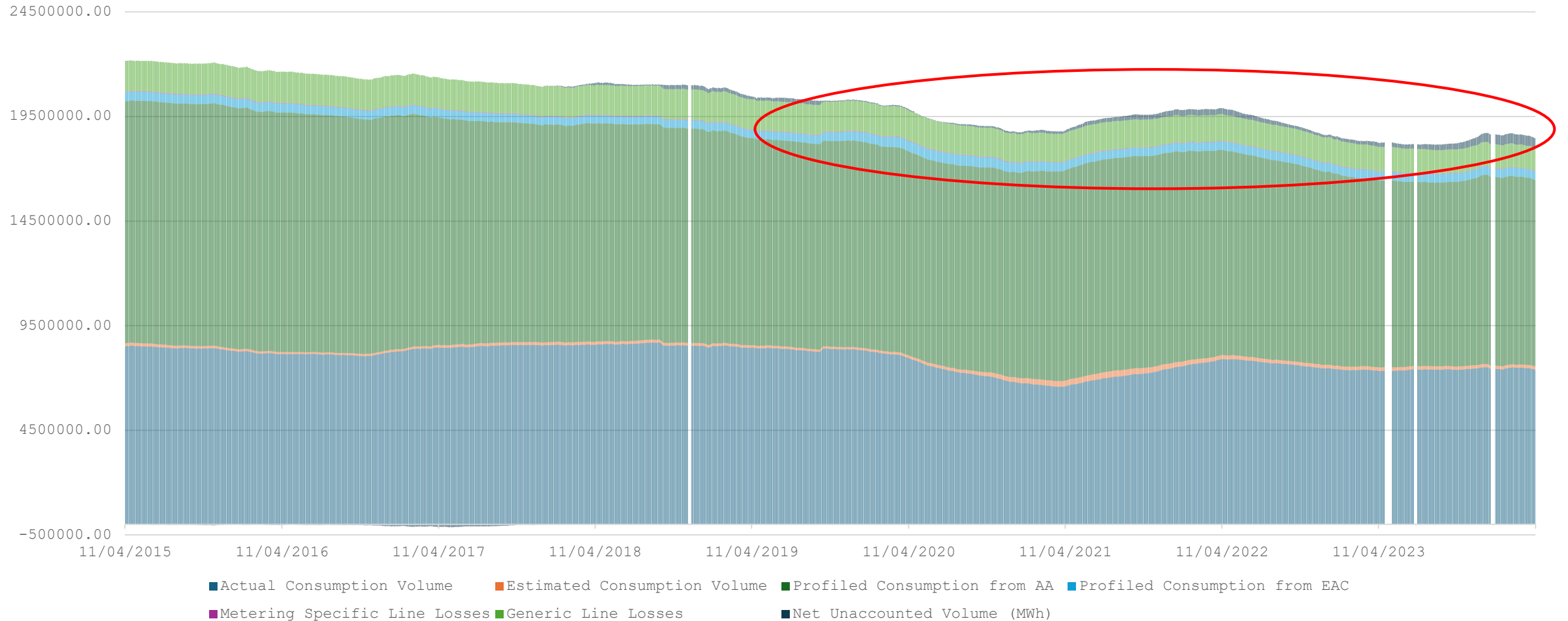
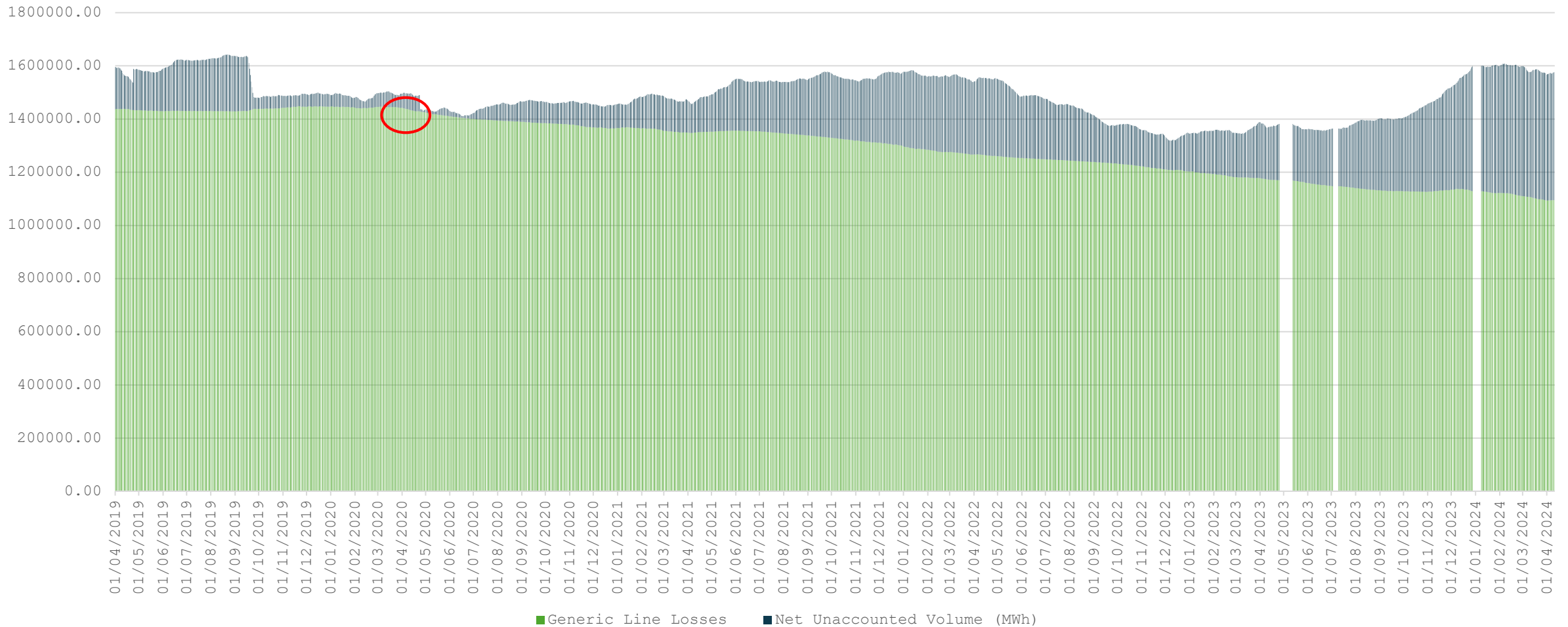


Illustration – Generic Line Losses and Unaccounted Volume

Recorded Annualised Settlement Volumes at RF



(How) could these be linked?

- As Generic Line Loss volumes decrease, unaccounted volumes (and therefore GCFs) increase
 - **Hypothesis** – unaccounted volumes (and therefore GCFs) in the this GSP Group have risen *because* Generic Line Losses are too low (i.e. recorded losses are lower than the “true” losses)
- Correlation is not causation
- Needed to investigate if and how this could happen

What could go wrong?

2 possibilities:

- Error in the calculation or application of Line Losses
 - Very low probability due to (mature and long-standing) LLF Audit process
 - All historic Audit Findings reviewed – no evidence that this had happened
- Error in the data used for the calculation

How LLFs and GCFs work (sort of)

LLFs are **calculated** using data from **[period x]** by:

- Subtracting [some data] from GSP Group Take for [period x], with the remainder **assumed** to the “True” Line Loss Volumes for that period
- Dividing the SVA Metered Volumes for [period x] by the sum of SVA Metered Volumes and “True” Line Loss Volumes

The resulting LLFs are then **applied in [period y]** to produce Calculated Line Loss volumes by:

- Dividing the sum of the SVA Metered Volumes for [period y] by the LLF calculated from the data for [period x]
- Subtracting the sum of the SVA Metered Volumes for [period y] from the result

GCFs for [period y] are **calculated** by:

- Dividing GSP Group Take for [period y] by the sum of SVA Metered Volumes and Calculated Line Loss volumes for [period y]

Worked Example – GSP Group _Q

Period X

- GSPGT = 10MWh
- [some data] = 9MWh
- SVA Metered Volumes = 8MWh
- LLF = $[8/(8+(10-9))]=$ **0.889**

Period Y

- GSPGT = 10MWh
- SVA Metered Volumes = 8MWh
- Calculated Line Loss Volumes = $[(8/0.889)-8]=$ **1**
- GCF = $[10/(8+1)]=$ **1.111.**

Worked Example – GSP Group _Q

Period X

- GSPGT = ~~10MWh~~ 11MWh
- [some data] = 9MWh
- SVA Metered Volumes = 8MWh
- LLF = $[8/(8+(10-9))]=$ **0.889**

Period Y

- GSPGT = 10MWh
- SVA Metered Volumes = 8MWh
- Calculated Line Loss Volumes = $[(8/0.889)-8]=$ **1**
- GCF = $[10/(8+1)]=$ **1.111**

Worked Example – GSP Group _Q

Period X

- GSPGT = 11MWh
- [some data] = 9MWh
- SVA Metered Volumes = 8MWh
- LLF = $[8/(8+(11-9))]=0.8$

Period Y

- GSPGT = 10MWh
- SVA Metered Volumes = 8MWh
- Calculated Line Loss Volumes = $[(8/0.8)-8]=2$
- GCF = $[10/(8+2)]=1$

Conclusions from Worked Example

- If GSPGT is under-reported, this may lead to Calculated Line Loss volumes that are lower than the “true” volume
- This would result in higher GCFs
- **This would be the case even if there is *at present* no error in current Settlement data**
- A historic error in the affected GSP Group had caused GSPGT to be under-reported
- Still very difficult to 100% prove this was the cause, but currently most plausible theory

Is this a Settlement Error?

- In short, **no**
- BSCP128.3.1: *“LDSOs shall utilise Settlement data from a Settlement Run at R3 or greater and from a complete 12-month period, for calculating Generic LLFs. The 12-month period to be used shall be the BSC Year 3 years prior to the BSC Year for which the LLFs are being calculated.”*
- If Generic LLFs are determined in accordance with Section K and BSCP128, the Code does **not** permit these to be retrospectively changed if the Settlement data is subsequently found to be incorrect
- Provisions aim to determine *acceptable values to be used in Settlement calculations* rather than “true” volume of energy loss
- Corrective mechanism for any difference between Generic Line Loss volumes and true line losses is GCF – hence greater GCF weightings for NHH and domestic volumes and (especially) Generic Line Losses
- *In general*, true volume incorrectly omitted from Generic Line Losses is “moved” into GCF more-or-less proportionately

Areas for Discussion

- Is the methodology for calculating Line Losses still appropriate?
 - How might it be revised?
 - Do we need further Assurance to make sure losses are calculated and applied in line with the methodology?
- Are GCFs the most appropriate mechanism to correct for assumptions, abstractions and errors in Line Loss volumes?
 - In general?
 - In particular?
 - Changes to GCFs for MHHS will be included in future workgroup
- Do we need further Assurance that the data that goes *in* to the LLF calculation is correct?
 - Assurance of Settlement Accuracy will be included in future workgroup

Areas for Discussion

- Is [some data] the *right* data?
- Do we agree that GCF apportions unallocated volume fairly?
- How can we have confidence GSPGT is accurate?

07

AOB

Any Other Business

Next Steps

- The summary notes will be shared within 5 WD of this meeting
- The next meeting will be scheduled in August, subject to member's availability

Thank you