

Shrinkage Assessment & Adjustment

1 April 2022 – 31 March 2023

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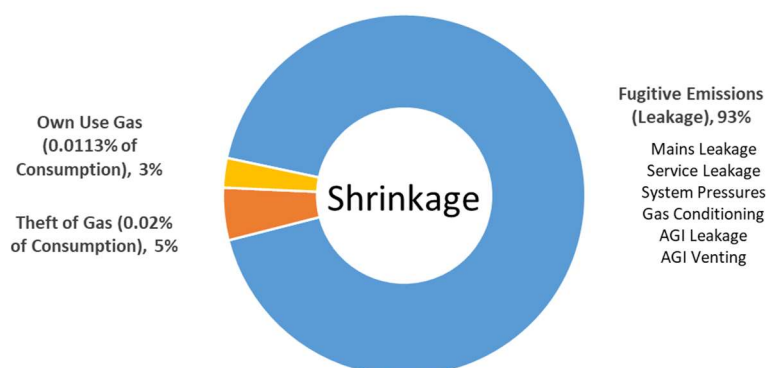
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1. Executive Summary

This document presents an assessment of LDZ Shrinkage for the period 1 April 2022 – 31 March 2023, in accordance with Uniform Network Code Section N 3.3. In addition, this report provides notification of the Actual Leakage Volumes and Actual Shrinkage Volumes as required by Special Condition 4.4 Part C of the Gas Transporter licence.

Cadent's Final LDZ Shrinkage Quantity Proposal for the Formula Year 2022/23, issued 24 February 2022, proposed individual LDZ Shrinkage Quantities equating to a total annual Shrinkage Quantity of 1,059.3 GWh. The Final Proposal for the Formula Year 2021/22 was not subject to Standard Special Condition A11 (18) disapproval and, as a result, the proposed LDZ Shrinkage Quantities were applied in accordance with Uniform Network Code Section N 3.1.8.

LDZ Shrinkage Quantities are comprised of three main components:



- Leakage, with individual quantities being calculated at LDZ level;
- Own Use Gas, with a single factor of forecast annual throughput being applied across all LDZs; and
- Theft of Gas, which is gas stolen upstream of the meter with a single factor of forecast annual throughput being applied across all LDZs.

The assessment of LDZ Shrinkage for the Formula Year 2022/23 detailed within the document provides, where applicable, the reasons for any significant variance between the estimated and the assessed LDZ Shrinkage Quantities for the period.

The assessment of LDZ Shrinkage (1,045.8 GWh) is 13.6 GWh (1.3%) lower than the volume of Shrinkage purchased. The leakage assessment resulted in

calculated leakage volume of 969.4 GWh, which is 7.5 GWh (0.8%) lower than originally estimated.

In addition to a decrease in leakage there was a decrease of 6.1 GWh in the assessed volumes for Own Use Gas and Theft of Gas.

The assessed Shrinkage volume is lower than the estimated volume, we will therefore recover monies to the value of £859,187.73 from Shippers and a further amount of £5,120.22 for Commodity Charges.

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2. Shrinkage Quantity Assessment

2.1 Leakage

The 2022/23 LDZ shrinkage quantity proposals were based on an assessment of leakage, with the anticipated mains replacement being taken into account. This led to an assumed procurement of 976.9GWh of leakage.

2.1.1 Assessment of 2022/23 Leakage

Cadent applied v1.4 of the Leakage Model to carry out the assessment of leakage. Table 1 below shows that assessed leakage varies to the 2022/23 proposals by 7.5 GWh.

| | ESTIMATED LEAKAGE (GWh) | ASSESSED LEAKAGE (GWh) | DIFFERENCE (GWh) |
|---------------|-------------------------|------------------------|------------------|
| EAST ANGLIA | 166.7 | 167.0 | 0.3 |
| EAST MIDLANDS | 172.0 | 174.3 | 2.3 |
| NORTH LONDON | 174.3 | 169.2 | -5.1 |
| NORTH WEST | 239.2 | 236.7 | -2.5 |
| WEST MIDLANDS | 224.6 | 222.2 | -2.4 |
| CADENT | 976.9 | 969.4 | -7.5 |

Table 1. Estimated and Assessed Leakage Energy by LDZ for 2022/23

2.1.2 Differences between Estimated and Assessed Leakage

The estimation of leakage is based on reasoned forecast expectations for each of the components that determine final assessment volumes. Cadent are committed to ensuring that the forecast is as accurate as possible, this is beneficial to our customers because it reduces the size of two year lagged financial true ups against allowed levels of cost.

2.2 Own Use Gas

Own Use Gas is gas used within the LDZ for such purposes as pre-heater fuel and for other minor operational purposes. Pre-heating is required to counter the impact of gas freezing during depressurisation.

Own Use Gas volumes procured in 2022/23 were based on the application of the standard factor (0.0113% of consumption) to our 2022/23 demand forecast. The actual demand in 2022/23 was lower than that used for the forecast calculation, the impact of this is a difference between estimated and assessed volumes of 2.2 GWh.



| | ESTIMATED CONSUMPTION (GWh) | ACTUAL CONSUMPTION (GWh) | ESTIMATED OUG (GWh) | ASSESSED OUG (GWh) | ADJUSTMENT (GWh) |
|---------------|-----------------------------|--------------------------|---------------------|--------------------|------------------|
| EAST ANGLIA | 42,369.0 | 39,693.5 | 4.8 | 4.5 | -0.3 |
| EAST MIDLANDS | 57,246.9 | 53,166.0 | 6.5 | 6.0 | -0.5 |
| NORTH LONDON | 50,310.3 | 47,027.0 | 5.7 | 5.3 | -0.4 |
| NORTH WEST | 68,220.6 | 62,126.6 | 7.7 | 7.0 | -0.7 |
| WEST MIDLANDS | 45,206.5 | 41,965.7 | 5.1 | 4.7 | -0.4 |
| CADENT | 263,353.4 | 243,978.8 | 29.8 | 27.6 | -2.2 |

Table 2. Assessment of OUG (0.0113% of Consumption)

2.3 Theft of Gas

Uniform Network Code Section N1.4.2 states that “LDZ Shrinkage shall include gas lost through theft either upstream of the customer control valve or downstream where there is no shipper serving the gas customer”.

The volumes procured in 2022/23 in respect of Theft of Gas (TOG) were based on the application of the standard factor (0.02% of consumption) to our 2022/23 demand forecast. The impact of the difference in demand between estimated and assessed gives a volume difference of 3.9 GWh.

| | ESTIMATED CONSUMPTION (GWh) | ACTUAL CONSUMPTION (GWh) | ESTIMATED TOG (GWh) | ASSESSED TOG (GWh) | ADJUSTMENT (GWh) |
|---------------|-----------------------------|--------------------------|---------------------|--------------------|------------------|
| EAST ANGLIA | 42,369.0 | 39,693.5 | 8.5 | 7.9 | -0.5 |
| EAST MIDLANDS | 57,246.9 | 53,166.0 | 11.4 | 10.6 | -0.8 |
| NORTH LONDON | 50,310.3 | 47,027.0 | 10.1 | 9.4 | -0.7 |
| NORTH WEST | 68,220.6 | 62,126.6 | 13.6 | 12.4 | -1.2 |
| WEST MIDLANDS | 45,206.5 | 41,965.7 | 9.0 | 8.4 | -0.6 |
| CADENT | 263,353.4 | 243,978.8 | 52.7 | 48.8 | -3.9 |

Table 3. Assessment of TOG (0.02% of Consumption)

2.4 LDZ Specific Shrinkage Quantities

Cadent initially proposed LDZ specific Shrinkage Quantities for the formula year 2022/23 in December 2021. The volume of gas estimated to be lost remained the same for the Final Proposals published in February 2022. Cadent's proposal was not subject to Ofgem disapproval under Standard Special Condition A11 (18), with the proposed LDZ specific Shrinkage Quantities being applied with effect from the 1 April 2021. The applied LDZ Shrinkage Quantities are shown in table 4 below, along with the Assessed LDZ specific Shrinkage Quantities.

| | APPLIED QUANTITIES (GWh) | ASSESSED QUANTITIES (GWh) | DIFFERENCE (GWh) | DIFFERENCE (kWh/day) |
|---------------|--------------------------|---------------------------|------------------|----------------------|
| EAST ANGLIA | 180.0 | 179.5 | -0.5 | -1,455 |
| EAST MIDLANDS | 190.0 | 190.9 | 1.0 | 2,665 |
| NORTH LONDON | 190.0 | 183.9 | -6.2 | -16,890 |
| NORTH WEST | 260.6 | 256.2 | -4.4 | -12,045 |
| WEST MIDLANDS | 238.8 | 235.3 | -3.4 | -9,411 |
| CADENT | 1,059.3 | 1,045.8 | -13.6 | -37,136 |

Table 4. LDZ Specific Shrinkage Quantities (GWh)

2.4.1 Reasons for Differences

The difference between Cadent's forecast projection and the actual outturn volumes are small (1.3%). Demand decreased significantly below the typical levels we would expect for the year, this is due to the volatility in gas prices and the cost of living impacts changing consumer usage profiles, this impacted Own Use Gas and Theft of Gas. The difference to the Leakage Volumes is due to differences in forecast assumptions against actual performance in the areas of Mains Replacement, Average System Pressures and MEG Treatment. System Pressures were better than our estimates, we forecasted using conservative estimates which would than offset any negative performance from factors outside of our control (for example bad weather over winter periods which cannot be forecasted with certainty).

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3. Shrinkage Adjustment

3.1 Introduction

This section advises Shippers of the Shrinkage Adjustment for Cadent operated LDZs for the period 1 April 2022 to 31 March 2023, as referred to in Network Code Section N3.4.1.

3.2 LDZ Shrinkage Reconciliation Calculations

The LDZ Shrinkage Reconciliation Quantity (SLRQ) is calculated as the difference between the Assessed and Procured LDZ Shrinkage Quantities. This reconciliation quantity is the amount that Cadent has over or under procured.

Therefore, for each LDZ:

$$S_{LRQ} = (S_{LAQ} - S_{LPQ})$$

Where S_{LRQ} = Reconciliation LDZ specific Daily Shrinkage Quantity (kWh)
 S_{LAQ} = Assessed LDZ specific Daily Shrinkage Quantity (kWh)
 S_{LPQ} = Procured LDZ specific Daily Shrinkage Quantity (kWh)

Table 5 below, shows the LDZ Reconciliation Quantities for the Shrinkage Adjustment for the period 1 April 2022 to 31 March 2023.

| | LDZ RECONCILIATION QUANTITY (kWh/day) |
|---------------|---------------------------------------|
| EAST ANGLIA | -1,455 |
| EAST MIDLANDS | 2,665 |
| NORTH LONDON | -16,890 |
| NORTH WEST | -12,045 |
| WEST MIDLANDS | -9,411 |
| CADENT | -37,136 |

Table 5. LDZ Shrinkage Reconciliation Quantity (kWh/day)

3.3 Energy Financial Adjustment

The Financial Adjustment (FA) due to Cadent for Energy (cost of the gas) is calculated as shown below:

$$FA(\pounds) = \sum_{01/04/22}^{31/03/23} S_{LRQ}(kWh) \times SAP(p/kWh) / 100$$

Where $FA(\pounds)$ = Financial Adjustment

$S_{LRQ}(kWh)$ = LDZ Shrinkage Reconciliation Quantity

SAP = Daily System Average Price for the period

The allocation of any charge or credit to Shippers resulting from the Adjustment process is achieved by calculating the energy adjustment on a daily basis, multiplying this by the daily system average price, summing this by LDZ by month and apportioning this by the relevant Shipper affected portfolio in each LDZ for each month.

Table 6 below, shows the financial adjustment by LDZ for the period 1 April 2022 to 31 March 2023, calculated on a daily basis in line with the methodology indicated above.

| | LDZ SHRINKAGE DAILY RECONCILIATION QUANTITY (kWh) | ADJUSTMENT VALUE DUE TO CHANGES TO SHRINKAGE QUANTITIES |
|---------------|---|---|
| EAST ANGLIA | -1,455 | -£33,661.78 |
| EAST MIDLANDS | 2,665 | £61,663.48 |
| NORTH LONDON | -16,890 | -£390,778.69 |
| NORTH WEST | -12,045 | -£278,673.89 |
| WEST MIDLANDS | -9,411 | -£217,736.85 |
| CADENT | -37,136 | -£859,187.73 |

Table 6. LDZ Shrinkage Reconciliation for the period 1 April 2022 to 31 March 2023

The assessed Shrinkage volume is lower than the estimated volume therefore we will recover monies to the value of £859,187.73 from Shippers and a further amount of £5,120.22 for Commodity Charges.

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4. Shrinkage Commodity Charge

4.1 Introduction

This section advises Shippers of the Commodity Charge associated with the Cadent operated LDZ Shrinkage Adjustment for the period 1 April 2022 to 31 March 2023.

4.2 Applicable Commodity Charges

Table 7 below, shows the Commodity Charges that applied over the period 1 April 2022 to 31 March 2023.

| | | PERIOD OF APPLICATION | |
|--|---------------|--------------------------|--------------------------|
| | | 01/04/2022 to 30/09/2022 | 01/10/2022 to 31/03/2023 |
| LDZ SYSTEM COMMODITY CHARGE (p/kWh) | EAST ANGLIA | 0.0320 | 0.0320 |
| | EAST MIDLANDS | 0.0320 | 0.0320 |
| | NORTH LONDON | 0.0392 | 0.0392 |
| | NORTH WEST | 0.0358 | 0.0358 |
| | WEST MIDLANDS | 0.0370 | 0.0370 |

Table 7. Applicable Commodity Charges 1 April 2022 to 31 March 2023



4.3 LDZ Shrinkage Reconciliation Quantities

Table 8 below, shows the total LDZ Shrinkage Reconciliation Quantities (LRQ) for each LDZ for each period of differing Commodity Charge.

| | TOTAL OVER PERIOD | 01/04/2022 to 30/09/2022 | 01/10/2022 to 31/03/2023 |
|---------------|-------------------|--------------------------|--------------------------|
| EAST ANGLIA | -531,056 | -266,256 | -264,801 |
| EAST MIDLANDS | 972,818 | 487,742 | 485,076 |
| NORTH LONDON | -6,165,018 | -3,090,954 | -3,074,064 |
| NORTH WEST | -4,396,426 | -2,204,235 | -2,192,190 |
| WEST MIDLANDS | -3,435,068 | -1,722,240 | -1,712,829 |
| CADENT | -13,554,750 | -6,795,943 | -6,758,807 |

Table 8. LDZ Shrinkage Reconciliation Quantities (kWh)

4.4 Financial Adjustment

The financial adjustment (FA) due for Commodity Charge reconciliation is calculated as a sum for each LDZ, as shown below.

$$\sum_{EA}^{WM} FA_{cc}(\pounds) = \sum_{01/04/22}^{30/09/22} LRQ(kWh) \times CC_1(\pounds / kWh) + \sum_{01/10/22}^{31/03/23} LRQ(kWh) \times CC_2(\pounds / kWh)$$

Where: $FA_{cc}(\pounds)$ = Financial Adjustment associated with the Commodity Charge

$LRQ(kWh)$ = LDZ Shrinkage Reconciliation Quantity

$CC_1(\pounds/kWh)$ = Commodity Charge applicable to the period 1 April 2022 to 30 September 2022

$CC_2(\pounds/kWh)$ = Commodity Charge applicable to the period 1 October 2022 to 31 March 2023

Table 9 below, shows the financial adjustment, calculated on a daily basis in line with the methodology indicated above.

| TRANSPORTATION CHARGES | | | | | |
|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------|
| | TOTAL VOLUME (kWh) | | TOTAL ADJUSTMENT | | ASSESSMENT PERIOD |
| | PRICING PERIOD | | PRICING PERIOD | | |
| | 01/04/2022 to 30/09/2022 | 01/10/2022 to 31/03/2023 | 01/04/2022 to 30/09/2023 | 01/10/2022 to 31/03/2023 | |
| EAST ANGLIA | -266,256 | -264,801 | -£85.20 | -£84.74 | -£169.94 |
| EAST MIDLANDS | 487,742 | 485,076 | £156.08 | £155.22 | £311.30 |
| NORTH LONDON | -3,090,954 | -3,074,064 | -£1,211.65 | -£1,205.03 | -£2,416.69 |
| NORTH WEST | -2,204,235 | -2,192,190 | -£789.12 | -£784.80 | -£1,573.92 |
| WEST MIDLANDS | -1,722,240 | -1,712,829 | -£637.23 | -£633.75 | -£1,270.98 |
| CADENT | -6,795,943 | -6,758,807 | -£2,567.12 | -£2,553.10 | -£5,120.22 |

Table 9. Financial Adjustment by LDZ for the period 1 April 2022 to 31 March 2023

The overall financial value for the Commodity Charge Adjustment is therefore £5,120.22, a recovery of monies from Domestic Shippers.

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5. Actual Leakage Volume and Actual Shrinkage Volume

5.1 Introduction

This section provides the Actual Leakage Volumes and Actual Shrinkage Volumes.

Special Condition 4.4 Part C of the Gas Transporter licence requires that:

The licensee must, by 31 July in each Regulatory Year, make publicly available and provide to the Authority a report that sets out:

- a) *Actual Leakage Volumes; and*
- b) *Actual Shrinkage Volumes as calculated in accordance with the Shrinkage and Leakage Model for each Distribution Network for the preceding Regulatory Year.*

5.2. Actual Leakage Volumes and Actual Shrinkage Volumes for the 2022/23 Formula Year

Table 10 provides the Actual Leakage Volume and Actual Shrinkage Volume for the 2022/23 formula year by LDZ and indicates the calorific value assumptions used to calculate these.

| | ACTUAL LEAKAGE VOLUME | OUG | TOG | ACTUAL SHRINKAGE VOLUME | ASSUMED CALORIFIC VALUE (MJ/m ³) |
|---------------|-----------------------|------|------|-------------------------|--|
| EAST ANGLIA | 167.0 | 4.5 | 7.9 | 179.5 | 39.4 |
| EAST MIDLANDS | 174.3 | 6.0 | 10.6 | 190.9 | 39.5 |
| NORTH LONDON | 169.2 | 5.3 | 9.4 | 183.9 | 39.4 |
| NORTH WEST | 236.7 | 7.0 | 12.4 | 256.2 | 40.0 |
| WEST MIDLANDS | 222.2 | 4.7 | 8.4 | 235.3 | 39.4 |
| CADENT | 969.4 | 27.6 | 48.8 | 1,045.8 | 39.5 |

Table 10. 2022/23 Actual Leakage and Actual Shrinkage volumes (GWh)

Table 11 below provides the Actual Leakage Volume and Actual Shrinkage Volume for the 2022/23 formula year by Network.

| | ACTUAL LEAKAGE VOLUME | ACTUAL SHRINKAGE VOLUME |
|-----------------|-----------------------|-------------------------|
| EAST of ENGLAND | 341.3 | 370.4 |
| NORTH LONDON | 169.2 | 183.9 |
| NORTH WEST | 236.7 | 256.2 |
| WEST MIDLANDS | 222.2 | 235.3 |
| CADENT | 969.4 | 1,045.8 |

Table 11. 2022/23 Actual Leakage and Actual Shrinkage volumes (GWh)