

# LDZ SHRINKAGE ASSESSMENT AND ADJUSTMENT FOR 1st APRIL 2023 – 31st MARCH 2024

Version 0.2  
July 2024



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## 1. Executive Summary

The purpose of this document is to present our assessment of LDZ Shrinkage for the period 1st April 2023 to 31st March 2024, in accordance with Uniform Network Code Section N 3.3.

Wales & West Utilities' (WWU) Final LDZ Shrinkage Quantity Proposal for the Formula Year 2023/24, published on the 28<sup>th</sup> February 2023, proposed individual LDZ Shrinkage Quantities equating to a total Distribution Network Shrinkage Quantity of 841,365 kWh per day. The Final LDZ Shrinkage Proposal for the Formula Year 2022/23 was not subject to Standard Special Condition A11 (18) disapproval. For Formula Year 2022/23, Wales & West Utilities (WWU) procured individual LDZ Shrinkage Quantities equating to a total Distribution Network Shrinkage Quantity of 857,303 kWh per day.

This year's shrinkage assessment calculates that WWU procured 44,148 kWh/day more gas than required.

Please note the values contained within this document have been rounded to an appropriate level of accuracy. This may cause immaterial discrepancies between the totals presented within this document and the summation of their constituent parts, however each individual figure is correct in its rounded form.

|  |                   |   |                           |   |                |   |                |
|--|-------------------|---|---------------------------|---|----------------|---|----------------|
| Calculation of Shrinkage   | Shrinkage         | = | Leakage                   | + | Own Use Gas    | + | Theft of Gas   |
| WWU procured volumes for the regulatory year 2023/24                               | 857,303 kWh/day   | = | 803,222 kWh/day           | + | 19,524 kWh/day | + | 34,556 kWh/day |
| WWU final volumes as at 31 <sup>st</sup> July 2024 for the regulatory year 2023/24 | 813,155 kWh/day   | = | 771,095 kWh/day           | + | 15,184 kWh/day | + | 26,875 kWh/day |
| Difference between final and procured volumes                                      | -44,148 kWh/day   | = | -32,127 kWh/day           | + | -4,340 kWh/day | + | -7,681 kWh/day |
| Calculation of Shrinkage procurement   | WWU are in credit | = | £465,166.59 from Shippers |   |                |   |                |

## 2. LDZ Shrinkage Quantity Assessment

LDZ Shrinkage Quantities are comprised of three main components:

- **Leakage**, with individual quantities being applied at LDZ level;
- **Own Use Gas (OUG)**, with a consistent percentage factor of the total throughput being applied across all LDZs; and
- **Theft of Gas (TOG)**, with a consistent percentage factor of the total throughput being applied across all LDZs.

### 2.1 Leakage

LDZ specific Shrinkage Quantities for 2023/24 procured 293.98 GWh of leakage. WWU applied V1.4 of the Leakage Model to carry out the assessment of leakage for the formula Year 2023/24. No further amendments have been made to the methodologies applied within the leakage model.

*Table 1 2023/24 Estimated and Assessed Leakage Energy by LDZ*

| LDZ | 2023/24 Procured Leakage (GWh) | 2023/24                | 2023/24                    | 2023/24                    |
|-----|--------------------------------|------------------------|----------------------------|----------------------------|
|     |                                | Assessed Leakage (GWh) | Procured Leakage (kWh/Day) | Assessed Leakage (kWh/Day) |
| WN  | 39.42                          | 38.80                  | 107,716                    | 106,009                    |
| WS  | 80.48                          | 77.47                  | 219,902                    | 211,678                    |
| SW  | 174.07                         | 165.95                 | 475,604                    | 453,408                    |
| WWU | 293.98                         | 282.22                 | 803,222                    | 771,095                    |

The total assessed Leakage of 282.22 GWh (Table 1) represents a decrease in energy of approximately 11.8 GWh when compared to the procured quantity of 293.98 GWh. This is equivalent to 32,127 kWh per day or a difference of 4%.

## 2.2 Operational Usage

Own Use Gas is gas used within the LDZ for such purposes as pre-heater fuel to counter the impact of the Joule-Thomson effect and for other minor operational purposes.

Pre-heater fuel is the largest component of OUG and has always been determined using the output from a model that utilises the thermodynamic principles of the Joule-Thomson<sup>1</sup> effect and gas volume, calorific value, pressure and temperature data. The current factor is based on a model developed by GL Noble Denton, which has been shared with the User community through the Shrinkage Forum.

For the purposes of assessment in respect of the 2023/24 Formula Year, the proposed factor of 0.0113% of throughput, based on the GL Noble Denton model, was used.

*Table 2 Assessment of Own Use Gas*

| LDZ | Consumption | Applied OUG Factor | Daily OUG Quantity |
|-----|-------------|--------------------|--------------------|
|     | (GWh)       |                    | (kWh)              |
| WN  | 5,586       | 0.0113%            | 1,725              |
| WS  | 18,485      |                    | 5,707              |
| SW  | 25,111      |                    | 7,753              |
| WWU | 49,181      |                    | 15,184             |

<sup>1</sup> Natural gas is a compressible fluid, as the pressure of the gas is reduced at pressure reduction stations it undergoes isenthalpic expansion causing the gas to cool.

## 2.3 Theft of Gas

Uniform Network Code Section N1.3.2 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 consumer.

A national factor of 0.02%<sup>2</sup> of throughput over the gas year was applied.

*Table 3 Assessment of Theft of Gas*

| LDZ | Consumption | Applied ToG Factor | Daily ToG Quantity |
|-----|-------------|--------------------|--------------------|
|     | (GWh)       |                    | (kWh)              |
| WN  | 5,586       | 0.02%              | 3,052              |
| WS  | 18,485      |                    | 10,101             |
| SW  | 25,111      |                    | 13,722             |
| WWU | 49,181      |                    | 26,875             |

## 2.4 Impact of Throughput Assumptions

The Shrinkage volumes procured in 2023/24 in respect of OUG and ToG were based on the application of the agreed factors (0.0313%, combined, of throughput) to the seasonal normal demand.

*Table 4 Assessment of the impact of throughput assumptions*

| LDZ | Est Consumption (GWh) | Actual Consumption (GWh) | Combined OUG/ToG Factor | Estimated OUG/ToG (GWh) | Outturn OUG/ToG (GWh) | Adjustment (GWh) |
|-----|-----------------------|--------------------------|-------------------------|-------------------------|-----------------------|------------------|
| WN  | 6,594                 | 5,586                    | 0.0313%                 | 2.1                     | 1.7                   | -0.32            |
| WS  | 26,186                | 18,485                   |                         | 8.2                     | 5.8                   | -2.41            |
| SW  | 30,458                | 25,111                   |                         | 9.5                     | 7.9                   | -1.67            |
| WWU | 63,238                | 49,181                   |                         | 19.8                    | 15.4                  | -4.40            |

<sup>2</sup> Agreed via the Shrinkage Forum

## 2.5 LDZ Specific Shrinkage Quantities

WWU proposed final LDZ specific Shrinkage Quantities for the Formula Year 2023/24 in February 2023. The WWU proposal was not subject to Ofgem disapproval under Standard Special Condition A11 (18). The procured LDZ Shrinkage Quantities are shown in Table 5, along with the Assessed LDZ specific Shrinkage Quantities for 2023/24 produced in the method detailed within this document.

*Table 5 LDZ Specific Shrinkage Quantities (kWh/day)*

| LDZ        | Leakage | OUG    | ToG    | Assessed Shrinkage Quantities 2023/24 | Procured Shrinkage Quantities 2023/24 | Difference Between Assessed & Applied Quantities |
|------------|---------|--------|--------|---------------------------------------|---------------------------------------|--|
| <b>WN</b>  | 106,009 | 1,725  | 3,052  | 110,786                               | 113,355                               | -2,569   |
| <b>WS</b>  | 211,678 | 5,707  | 10,101 | 227,486                               | 242,296                               | -14,810  |
| <b>SW</b>  | 453,408 | 7,753  | 13,722 | 474,882                               | 501,652                               | -26,770  |
| <b>WWU</b> | 771,095 | 15,184 | 26,875 | 813,155                               | 857,303                               | -44,148  |

### 2.5.1 Reasons for Differences

The difference between WWU's estimated and assessed LDZ Shrinkage Quantities is 44,148kWh/day or a 5.1% decrease. This was a result of lower than forecast system pressures due to a focus on optimising network operation. Gas throughput was lower than anticipated as a power station had indicated a reconnection to the gas network in late 2023 which contributed to a higher throughput estimate.

### 3. LDZ Shrinkage Adjustment

#### 3.1 LDZ Shrinkage Adjustment Introduction

This Section advises Shippers of the Shrinkage Adjustment for WWU operated LDZs for the period 1st April 2023 to 31st March 2024, as referred to in Network Code Section N 3.4.1. The Shrinkage Adjustments have been calculated in accordance with the LDZ Shrinkage Adjustments Methodology Version 3.1.

The Shrinkage Adjustments are due because WWU procured a greater quantity of Shrinkage gas than required, after accounting for a lower assessed volume of Shrinkage gas than had been forecast.

#### 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 (SLPQ). This reconciliation quantity is the amount that WWU has over or under procured.

Therefore, for each LDZ:

$$\text{SLRQ} = \text{SLAQ} - \text{SLPQ}$$

Where SLRQ = Reconciliation LDZ specific Daily Shrinkage Quantity (kWh)  
 SLAQ = Assessed LDZ specific Daily Shrinkage Quantity (kWh)  
 SLPQ = Procured LDZ specific Daily Shrinkage Quantity (kWh)

Table 6 shows the LDZ Reconciliation Quantities for the Shrinkage Adjustment for the period 1st April 2023 to 31st March 2024.

*Table 6 LDZ Shrinkage Reconciliation Quantity (kWh/day)*

| LDZ | LDZ Shrinkage Reconciliation Quantity (kWh/day) |
|-----|---|
| WN  | - 2,569   |
| WS  | - 14,810  |
| SW  | - 26,770  |
| WWU | - 44,148  |



### 3.3 Financial Adjustment

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

$$FA(\pounds) = \sum_{01/04/23}^{31/03/24} S_{LRQ} (kWh) \times SAP(p / kWh) / 100$$

Where:

FA (£) = Financial Adjustment

SLRQ (kWh) = LDZ Shrinkage Reconciliation Quantity

SAP = Daily System Average Price for the period 1st April 2023 to 31st March 2024

The allocation of any debit 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 7, shows the financial adjustment by LDZ for the period 1st April 2023 to 31st March 2024, calculated on a daily basis in line with the methodology indicated above.

*Table 7 LDZ Shrinkage Reconciliation*

| LDZ | LDZ Shrinkage Reconciliation Quantity (kWh/day) | Adjustment Value due to Changes to Shrinkage Quantities |
|-----|---|---|
| WN  | -2,569  | £-27,067.62   |
| WS  | -14,810   | £-156,041.37  |
| SW  | -26,770   | £-282,057.60  |
| WWU | -44,148   | £-465,166.59  |

The overall financial value for the Energy Adjustment, £465,166.59 is therefore a debit to Shippers.