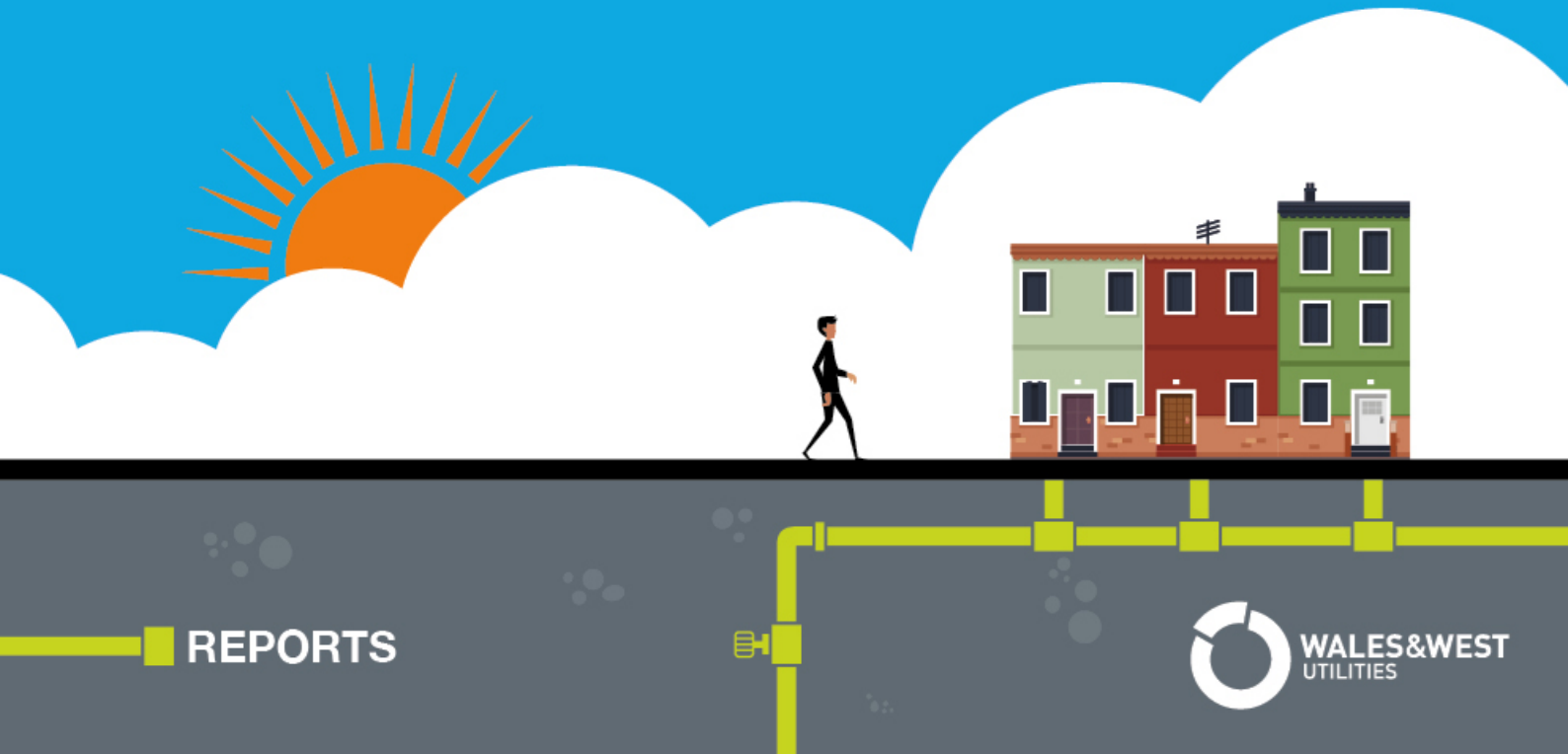
# LDZ SHRINKAGE ASSESSMENT AND ADJUSTMENT FOR 1st APRIL 2021 – 31st MARCH 2022

July 2022



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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 2021 to 31st March 2022, in accordance with Uniform Network Code Section N 3.3.

Wales & West Utilities' (WWU) Final LDZ Shrinkage Quantity Proposal for the Formula Year 2021/22, published on the 19th February 2021[1], proposed individual LDZ Shrinkage Quantities equating to a total Distribution Network Shrinkage Quantity of 916,071 kWh per day. The Final LDZ Shrinkage 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.

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.

This year's shrinkage assessment calculates that WWU estimated and procured 38,457 kWh/day more gas than actually required. This comprised:

| Calculation of Shrinkage | Shrinkage | = | Leakage | + | Own Use Gas | + | Theft of Gas |
|---|---|---|---|---|---|---|---|
| WWU proposed volumes as at 19th February 2021 for the regulatory year 2021/22 | 916,071 kWh/day | = | 863,146 kWh/day | + | 19,107 kWh/day | + | 33,818 kWh/day |
| WWU final volumes as at 14th July 2022 for the regulatory year 2021/22 | 877,614 kWh/day | = | 828,544 kWh/day | + | 17,715 kWh/day | + | 31,355 kWh/day |
| Difference between final and proposed volumes | -38,457 kWh/day | = | -34,603 kWh/day | + | -1,392 kWh/day | + | -2,463 kWh/day |
| Calculation of Shrinkage procurement | WWU are in credit | = | £757,296.42 from Shippers | | | | |

The Shrinkage Quantities procured by WWU were therefore greater than required. The excess would have contributed to reducing Unidentified Gas.

[1] https://www.gasgovernance.co.uk/shrinkage/21-22final

# 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 2021/22 were proposed based on an assessment of leakage for the formula year 2021/22 with anticipated mains replacement being taken into account, leading to a procurement requirement of 315.05 GWh.

WWU applied V1.4 of the Leakage Model to carry out the assessment of leakage for the formula Year 2021/22. No further amendments have been made to the methodologies applied within the leakage model.

**Table 1 Estimated and Assessed Leakage Energy by LDZ**

| LDZ | 2021/22 Estimated Leakage (GWh) | 2021/22 Assessed Leakage (GWh) | 2021/22 Estimated Leakage (kWh/Day) | 2021/22 Assessed Leakage (kWh/Day) |
|---|---|---|---|---|
| **WN** | 41.95 | 40.14 | 114,924 | 109,963 |
| **WS** | 88.82 | 82.70 | 243,335 | 226,565 |
| **SW** | 184.28 | 179.59 | 504,888 | 492,015 |
| **WWU** | **315.05** | **302.42** | **863,146** | **828,544** |

The total assessed Leakage of 302.42 GWh (Table 1) represents a decrease in energy of approximately 12.6 GWh when compared to the estimate of 315.05 GWh. This is equivalent to 34,603 kWh per day or 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[2] 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 effect and gas volume, calorific value, pressure and temperature data. The currently accepted 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 2021/22 Formula Year, the proposed factor of 0.0113% of throughput, based on the GL Noble Denton model, was used.

2 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.

**Table 2 Assessment of Own Use Gas**

| LDZ | Throughput | OUG Factor | Daily OUG Quantity |
|---|---|---|---|
| | (GWh) | | (kWh) |
| WN | 6,577 | 0.0113% | 2,036 |
| WS | 21,021 | | 6,508 |
| SW | 29,624 | | 9,171 |
| WWU | 57,222 | | 17,715 |

## 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%[3] of throughput over the gas year was applied.

**Table 3 Assessment of Theft of Gas**

| LDZ | Throughput | ToG Factor | Daily ToG Quantity |
|---|---|---|---|
| | (GWh) | | (kWh) |
| WN | 6,577 | 0.02% | 3,604 |
| WS | 21,021 | | 11,519 |
| SW | 29,624 | | 16,232 |
| WWU | 57,222 | | 31,355 |

3 Agreed via the Shrinkage Forum

## 2.4 Impact of Throughput Assumptions

The Shrinkage volumes procured in 2021/22 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 | Estimated throughput (GWh) | Actual throughput (GWh) | Combined OUG/ToG Factor | Estimated OUG/ToG (GWh) | Outturn OUG/ToG (GWh) | Adjustment (GWh) |
|---|---|---|---|---|---|---|
| **WN** | 6,398 | 6,577 | 0.0313% | 2.0 | 2.1 | 0.06 |
| **WS** | 23,250 | 21,021 | | 7.3 | 6.6 | -0.70 |
| **SW** | 32,069 | 29,624 | | 10.0 | 9.3 | -0.77 |
| **WWU** | **61,717** | **57,222** | | **19.3** | **17.9** | **-1.41** |

## 2.5 LDZ Specific Shrinkage Quantities

WWU proposed final LDZ specific Shrinkage Quantities for the Formula Year 2021/22 in February 2021. The WWU 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 1st April 2021. The proposed (estimated) LDZ Shrinkage Quantities are shown in Table 5, along with the Assessed LDZ specific Shrinkage Quantities for 2021/22 produced in the method detailed within this document.

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

| LDZ | Leakage | OUG | ToG | Assessed Shrinkage Quantities 2021/22 | Estimated Shrinkage Quantities 2021/22 | Difference Between Assessed & Estimated Quantities |
|---|---|---|---|---|---|---|
| **WN** | 109,963 | 2,036 | 3,604 | 115,604 | 120,411 | -4,807 |
| **WS** | 226,565 | 6,508 | 11,519 | 244,592 | 263,272 | -18,680 |
| **SW** | 492,015 | 9,171 | 16,232 | 517,418 | 532,388 | -14,970 |
| **WWU** | **828,544** | **17,715** | **31,355** | **877,614** | **916,071** | **-38,457** |

### 2.5.1 Reasons for Differences

The difference between WWU's estimated and assessed LDZ Shrinkage Quantities is 38,457 kWh/day or a 4.2% decrease. This is due to milder weather causing lower than expected system pressures and throughput.

# 3. LDZ Shrinkage Adjustment

## 3.1 Introduction

This Section advises Shippers of the Shrinkage Adjustment for WWU operated LDZs for the period 1st April 2021 to 31st March 2022, 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 using a lower 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:

$$S_{LRQ} = \left(S_{LAQ} - S_{LPQ}\right)$$

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 6, shows the LDZ Reconciliation Quantities for the Shrinkage Adjustment for the period 1st April 2021 to 31st March 2022.

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

| LDZ | LDZ Shrinkage Reconciliation Quantity (kWh/day) |
|---|---|
| WN | - 4,807 |
| WS | - 18,680 |
| SW | - 14,970 |
| **WWU** | **- 38,457** |

## 3.3 Financial Adjustment

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

$$FA(£) = \sum_{01/04/21}^{31/03/22} S_{LRQ}(kWh) \times SAP(p/kWh)/100$$

Where:

FA (£) = Financial Adjustment

SLRQ (kWh) = LDZ Shrinkage Reconciliation Quantity

SAP = Daily System Average Price for the period 1st April 2021 to 31st March 2022

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, summating 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 2021 to 31st March 2022, calculated on a daily basis in line with the methodology indicated above.

**Table 7 LDZ Shrinkage Reconciliation for the period 1st April 2021 to 31st March 2022**

| LDZ | LDZ Shrinkage Reconciliation Quantity (kWh/day) | Adjustment Value due to Changes to Shrinkage Quantities |
|---|---|---|
| **WN** | -4,807 | -£94,667.13 |
| **WS** | -18,680 | -£367,846.49 |
| **SW** | -14,970 | -£294,782.80 |
| **WWU** | -38,457 | -£757,296.42 |

The overall financial value for the Energy Adjustment, £757,296.42 is therefore a debit to Shippers.