

# SGN

## LDZ Shrinkage

## Assessment and Adjustment

## For 1 April 2017 - 31 March 2018

July 2018



# SGN

Your gas. Our network.

# Contents

|   |          |
|---|----------|
| <b>1 Executive Summary .....</b>                        | <b>3</b> |
| <b>2 LDZ Shrinkage Quantity Assessment .....</b>        | <b>3</b> |
| 2.1 Assessment of 2017/18 Leakage .....                 | 3        |
| 2.2 Operational Usage .....                             | 4        |
| 2.3 Theft of Gas .....                                  | 5        |
| 2.4 LDZ Specific Shrinkage Quantities .....             | 5        |
| <b>3 LDZ Specific Shrinkage Adjustment .....</b>        | <b>6</b> |
| 3.1 Introduction .....                                  | 6        |
| 3.2 LDZ Shrinkage Reconciliation Calculations .....     | 6        |
| 3.3 Financial Adjustment .....                          | 7        |
| <b>4 LDZ Shrinkage Commodity Charge Adjustment.....</b> | <b>8</b> |
| 4.1 Introduction .....                                  | 8        |
| 4.2 Commodity Charges .....                             | 8        |
| 4.3 LDZ Shrinkage Reconciliation Quantities.....        | 8        |
| 4.4 Financial Adjustment .....                          | 9        |

# LDZ Shrinkage Assessment and Adjustment for the Period 1 April 2017 – 31 March 2018

## 1 Executive Summary

The purpose of this document is to present an assessment of LDZ Shrinkage for the period 1 April 2017 to 31 March 2018, in accordance with Uniform Network Code Section N 3.3.3, in addition to providing notification of the leakage and shrinkage volumes to be used for incentive purposes as required by Special Condition 1F.14 of the Gas Transporter License.

In accordance with Uniform Network Code Section N3.3.3 the following information provides an assessment of shrinkage for Scotland, Thurso, Wick, Campbeltown, Oban, Stranraer, South, and South East LDZs. SGNs Final LDZ Shrinkage Proposals for the Formula Year 2017/18 were 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 applied at LDZ level;
- Operational Usage with a single factor being applied across all LDZs; and
- Transporter responsible Theft of Gas with a single factor being applied across all LDZs

The assessment of LDZ Shrinkage for the Formula Year 2017/18 detailed within this document provides, where applicable, reasons for significant variance between the estimated and the assessed LDZ Shrinkage Quantities for the period.

For the 2017/18 shrinkage assessment, SGN has applied V1.4, which has been approved for use. The assessment for the purposes of the 2017/18 shrinkage adjustment has resulted in annual shrinkage for 2017/18 of **714.3 GWh**, which is **10.5 GWh** higher than estimated.

The Leakage Volume (LVt) and Actual Shrinkage Volume (ASVt) to be used for incentive revenue purposes for 2017/18 are 668.7 GWh (LVt) and 714.5 GWh (ASVt). The values relating to each specific LDZ can be found in Table 1. The values used for incentive revenue purposes differ from those used to calculate the Shrinkage Adjustment for UNC purposes because they are calculated using the same calorific value assumptions underpinning the incentive baseline targets, thus avoiding potential windfall gains or losses arising from variations in outturn calorific value.

## 2 LDZ Shrinkage Quantity Assessment

### 2.1 Leakage

LDZ specific Shrinkage Quantities for 2017/18 were proposed based on an assessment of leakage for the formula year 2015/16. SGN applied V1.4 of the Leakage Model to carry out the assessment of leakage for the formula Year 2017/18. No further amendments have been made to the methodologies applied within the leakage model.

| LDZ         | Baseline CV                             |                                      |                                 |                                     | Actual CV                      |                                    |
|-------------|---|--------------------------------------|---------------------------------|-------------------------------------|--------------------------------|------------------------------------|
|             | 2017/18 Assessed Shrinkage - ASVt (GWh) | 2017/18 Assessed Leakage - LVt (GWh) | 2017/18 Estimated Leakage (GWh) | 2017/18 Estimated Leakage (kWh/Day) | 2017/18 Assessed Leakage (GWh) | 2017/18 Assessed Leakage (kWh/Day) |
| South       | 212.0                                   | 199.7                                | 195.6                           | 535,820                             | 200.3                          | 548,741                            |
| South East  | 309.6                                   | 291.6                                | 288.9                           | 791,430                             | 293.0                          | 802,862                            |
| Scotland    | 191.8                                   | 176.3                                | 176.0                           | 482,094                             | 174.1                          | 476,971                            |
| Campbeltown | 0.2                                     | 0.2                                  | 0.2                             | 463                                 | 0.2                            | 469                                |
| Oban        | 0.3                                     | 0.3                                  | 0.3                             | 897                                 | 0.3                            | 868                                |
| Stranraer   | 0.3                                     | 0.3                                  | 0.3                             | 693                                 | 0.2                            | 667                                |
| Thurso      | 0.1                                     | 0.1                                  | 0.1                             | 359                                 | 0.1                            | 351                                |
| Wick        | 0.2                                     | 0.1                                  | 0.1                             | 403                                 | 0.1                            | 398                                |
| SGN Total   | 714.5                                   | 668.7                                | 661.4                           | 1,812,159                           | 668.4                          | 1,831,329                          |

Estimated and assessed leakage quantities for each LDZ are shown in Table 1;

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

As shown in Table 1, above the assessment of leakage has resulted in a increase in energy of 7.3 GWh.

## 2.2 Operational Usage

Operational Usage is gas, also known as Own Use Gas (OUG), used within the LDZ for such purposes as pre-heater fuel to counter the impact of the Joule-Thompson effect and for other minor operational purposes, e.g. venting.

Pre-heater fuel is the largest component of OUG and it is determined using the output from a model that utilises the thermodynamic principles of the Joule-Thompson effect and LDZ throughput, calorific value, pressure and temperature data. The OUG factor applied for 2017/18 is 0.0113% which was determined from Advantica's 2006 review of their OUG model.

**Table 2: Assessment of Own Use Gas**

| LDZ         | Consumption 2017/18 (GWh) | Applied OUG Factor 2017/18 | Daily OUG Quantity (kWh) |
|-------------|---------------------------|----------------------------|--------------------------|
| South       | 39,151                    | 0.0113%                    | 12,121                   |
| South East  | 57,724                    |                            | 17,871                   |
| Scotland    | 49,366                    |                            | 15,283                   |
| Campbeltown | 42                        |                            | 13                       |
| Oban        | 37                        |                            | 12                       |
| Stranraer   | 157                       |                            | 49                       |
| Thurso      | 56                        |                            | 17                       |
| Wick        | 52                        |                            | 16                       |
| SGN Total   | 146,585                   |                            | 45,381                   |

The assessment of OUG has resulted in a increase in energy of **1.3 GWh** for the 2017/18 Final Proposal position. This is due to an increase consumption.

## 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. Unidentified theft was estimated to be 0.0200% of throughput for 2017/18.

**Table 3: Assessment of Theft of Gas**

| LDZ         | Consumption 2017/18 (GWh) | Applied ToG Factor 2017/18 | Daily ToG Quantity (kWh) |
|-------------|---------------------------|----------------------------|--------------------------|
| South       | 39,151                    | 0.0200%                    | 21,453                   |
| South East  | 57,724                    |                            | 31,630                   |
| Scotland    | 49,366                    |                            | 27,050                   |
| Campbeltown | 42                        |                            | 23                       |
| Oban        | 37                        |                            | 20                       |
| Stranraer   | 157                       |                            | 86                       |
| Thurso      | 56                        |                            | 31                       |
| Wick        | 52                        |                            | 29                       |
| SGN Total   | 146,585                   |                            | 80,321                   |

The assessment of TOG has resulted in an increase in energy of **2.3 GWh** for the 2017/18 Final Proposal position. This is due to an increase consumption.

The quantification of the level of theft and proportion attributable to Transporters is under review – both in the Shrinkage Gas Forum and Theft of Gas Forum.

## 2.4 LDZ Specific Shrinkage Quantities

Scotia Gas Networks made their final LDZ specific Shrinkage Quantities proposal for the Formula Year 2017/18 in February 2017. Scotia Gas Network's proposal was not subject to Ofgem disapproval under Licence Condition A11 (18) disapproval, with the proposed LDZ specific Shrinkage Quantities being applied with effect from the 1 April 2017. The proposed/applied LDZ Shrinkage Quantities are shown in Table 4 below, along with the assessed LDZ specific Shrinkage Quantities for 2017/18 produced in the method detailed within this document.

**Table 4: LDZ Specific Shrinkage Quantities (kWh/day)**

| LDZ         | Leakage   | OUG    | ToG    | Assessed Shrinkage Quantities 2017/18 | Applied Shrinkage Quantities 2017/18 | Difference Between Assessed & Applied Quantities (kWh/day) |
|-------------|-----------|--------|--------|---------------------------------------|--------------------------------------|--|
| South       | 548,741   | 12,121 | 21,453 | 582,315                               | 566,919                              | 15,396   |
| South East  | 802,862   | 17,871 | 31,630 | 852,362                               | 834,655                              | 17,707   |
| Scotland    | 476,971   | 15,283 | 27,050 | 519,305                               | 523,586                              | -4,281   |
| Campbeltown | 469       | 13     | 23     | 505                                   | 487                                  | 18   |
| Oban        | 868       | 12     | 20     | 900                                   | 921                                  | -21  |
| Stranraer   | 667       | 49     | 86     | 802                                   | 792                                  | 10   |
| Thurso      | 351       | 17     | 31     | 399                                   | 393                                  | 6  |
| Wick        | 398       | 16     | 29     | 443                                   | 435                                  | 8  |
| SGN Total   | 1,831,329 | 45,381 | 80,321 | 1,957,030                             | 1,928,188                            | 28,842   |

The difference between Scotia Gas Network's estimated and assessed LDZ Shrinkage Quantities is 28,842Wh per day, as shown in Table 4.

## 3 LDZ Shrinkage Adjustment

### 3.1 Introduction

This document advises Shippers of the Shrinkage Adjustment for Scotia Gas Networks operated LDZs for the period 1 April 2016 to 31 March 2017, as referred to in the *Uniform Network Code* Section N 3.4.1. The Shrinkage Adjustments have been calculated in accordance with the LDZ Shrinkage Adjustments Methodology Version 2.0.

### 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 Scotia Gas Networks has over or under procured.

Therefore, for each LDZ;

$$\begin{array}{ccccc} \text{LDZ Shrinkage} & & \text{Assessed LDZ} & & \text{Procured LDZ} \\ \text{Reconciliation Quantity} & = & \text{Shrinkage Quantity} & - & \text{Shrinkage} \\ \text{(SLRQ)} & & \text{(SLAQ)} & & \text{Quantity (SLPQ)} \end{array}$$

Table 5 below shows the LDZ Reconciliation Quantities for the Shrinkage Adjustment for the period 1 April 2017 to 31 March 2018.

| LDZ         | LDZ Shrinkage Reconciliation Quantity (kWh/day) |
|-------------|---|
| South       | 15,396  |
| South East  | 17,707  |
| Scotland    | -4,281  |
| Campbeltown | 18  |
| Oban        | -21   |
| Stranraer   | 10  |
| Thurso      | 6   |
| Wick        | 8   |
| SGN Total   | 28,842  |

### 3.3 Financial Adjustment

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

$$FA(£) = \sum_{1/4/16}^{31/3/17} SLRQ(kWh) \times SAP(p/kWh) / 100$$

Where:

FA (£) = Financial Adjustment

SLRQ (kWh) = LDZ Shrinkage Reconciliation Quantity

SAP = Daily System Average Price for the period 1 April 2017 to 31 March 2018

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 6, below, shows the financial adjustment by LDZ for the period 1 April 2017 to 31 March 2018, calculated on a daily basis in line with the methodology indicated above.**

The overall financial value for the Energy Adjustment of £172,596.45 is therefore identified as a debit to SGN and a credit to Shippers.

| LDZ              | LDZ Shrinkage Reconciliation Quantity (kWh/day) | Adjustment Value due to Changes to Shrinkage Quantities |
|------------------|---|---|
| South            | 15,396  | £92,131.05  |
| South East       | 17,707  | £105,964.68   |
| Scotland         | -4,281  | -£25,620.14   |
| Campbeltown      | 18  | £107.36   |
| Oban             | -21   | -£126.36  |
| Stranraer        | 10  | £59.42  |
| Thurso           | 6   | £33.32  |
| Wick             | 8   | £47.12  |
| <b>SGN Total</b> | <b>28,842</b>                                   | <b>£172,596.45</b>                                      |

## 4 LDZ Commodity Charge Adjustment

### 4.1 Introduction

This section advises Shippers of the Commodity Charge associated with the Scotia Gas Networks operated LDZ Shrinkage Adjustment for the period 1 April 2017 to 31 March 2018.

### 4.2 Commodity Charges

The following Commodity Charges (£/kWh) applied over the period 1 April 2017 to 31 March 2018.

| Commodity                   | Period of Application |                      |
|-----------------------------|-----------------------|----------------------|
|                             | 01/04/17 to 30/09/17  | 01/10/17 to 31/03/18 |
| NTS Commodity (=TO+SO)      | 0.000339              | 0.000341             |
| LDZ System Commodity Charge | 0.000288              | 0.000288             |

Table 7: Scotland LDZ Commodity Charges for the 2017/18 period

| Commodity                   | Period of Application |                      |
|-----------------------------|-----------------------|----------------------|
|                             | 01/04/17 to 30/09/17  | 01/10/17 to 31/03/18 |
| NTS Commodity (=TO+SO)      | 0.000339              | 0.000341             |
| LDZ System Commodity Charge | 0.000330              | 0.000330             |

Table 8: Southern LDZ Commodity Charges for the 2017/18 period

### 4.3 LDZ Shrinkage Reconciliation Quantities

Table 9 below shows the LDZ Shrinkage Reconciliation Quantities (LRQ) for each LDZ for each period of differing Commodity Charges.

Table 9: LDZ Shrinkage Reconciliation Quantities kWh

| LDZ         | Total over Period | 01/04/17 to 30/09/17 | 01/10/17 to 31/03/18 |
|-------------|-------------------|----------------------|----------------------|
| South       | 5,619,456         | 2,817,426            | 2,802,030            |
| South East  | 6,463,226         | 3,240,467            | 3,222,759            |
| Scotland    | -1,562,679        | -783,480.1           | -779,198.8           |
| Campbeltown | 6,548             | 3,283.2              | 3,265.2              |
| Oban        | -7,707            | -3,864.0             | -3,842.9             |
| Stranraer   | 3,624             | 1,817.0              | 1,807.1              |
| Thurso      | 2,032             | 1,019.0              | 1,013.4              |
| Wick        | 2,874             | 1,440.8              | 1,432.9              |
| SGN Total   | 10,527,375        | 5,278,108.4          | 5,249,266.2          |



## 4.4 Financial Adjustment

### Scotia Gas Networks

The Financial Adjustment (FA) due to Scotia Gas Networks for Commodity Charge reconciliation is calculated as shown below;

$$FA_{cc} (£) = \sum_{01/04/15}^{30/09/15} LRQ(kWh) \times CC_1 (£/kWh) + \sum_{1/10/15}^{31/03/16} LRQ(kWh) \times CC_2 (£/kWh)$$

Where:

$FA_{cc} (£)$  = Financial Adjustment associated with the SGN LDZ and Customer Commodity Charges

$LRQ (kWh)$  = LDZ Shrinkage Reconciliation Quantity

$CC_1 (£/kWh)$  = SGN LDZ and Customer Commodity Charges applicable to the period 1 April 2017 to 30 September 2017

$CC_2 (£/kWh)$  = SGN LDZ and Customer Commodity Charge applicable to the period 1 October 2017 to 31 March 2018

**Table 10: Financial Adjustment due to Scotia Gas Networks by LDZ for the period 1 April 2017 to 31 March 2018**

| Transportation Charges - Scotia Gas Networks |                      |                      |                      |                      |                      |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| LDZ  | Pricing Period       |                      | Pricing Period       |                      | Assessment Period    |
|  | 01/04/17 to 30/09/17 | 01/10/17 to 31/03/18 | 01/04/17 to 30/09/17 | 01/10/17 to 31/03/18 | 01/04/17 to 31/03/18 |
|  | Total Volume (kWh)   | Total Volume (kWh)   | Total Adjustment     | Total Adjustment     | Total Adjustment     |
| South  | 2,817,426            | 2,802,030            | £1,884.86            | £1,880.16            | £3,765.02            |
| South East                                   | 3,240,467            | 3,222,759            | £2,167.87            | £2,162.47            | £4,330.34            |
| Scotland                                     | -783,480             | -779,199             | -£491.24             | -£490.12             | -£981.36             |
| Campbeltown                                  | 3,283                | 3,265                | £2.06                | £2.05                | £4.11                |
| Oban   | -3,864               | -3,843               | -£2.42               | -£2.42               | -£4.84               |
| Stranraer                                    | 1,817                | 1,807                | £1.14                | £1.14                | £2.28                |
| Thurso                                       | 1,019                | 1,013                | £0.64                | £0.64                | £1.28                |
| Wick   | 1,441                | 1,433                | £0.90                | £0.90                | £1.80                |
| SGN Total                                    | 5,278,108            | 5,249,266            | £3,563.81            | £3,554.83            | £7,118.64            |

The overall financial value for the LDZ and Commodity Charge Adjustment is £7,118.64 positive and therefore identified as a debit to SGN and a credit to Shippers.