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**nationalgrid**

# LDZ Shrinkage Assessment and Adjustment

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1 April 2015 - 31 March 2016

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## LDZ Shrinkage Assessment and Adjustment for the Period 1 April 2015 – 31 March 2016

### 1 Executive Summary

The purpose of this document is to present an assessment of LDZ Shrinkage for the period 1 April 2015 to 31 March 2016, in accordance with *Uniform Network Code Section N 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 licence.

National Grid's Final LDZ Shrinkage Quantity Proposal for the Formula Year 2015/16, issued 1 March 2015 proposed individual LDZ Shrinkage Quantities equating to a total annual Shrinkage Quantity of 1334GWh. The Final Proposal for the Formula Year 2015/16 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;
- Operational usage, with a single factor of forecast annual throughput being applied across all LDZs; and
- Gas that is 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 2015/16 detailed within this document provides, where applicable, reasons for significant variance between the estimated and the assessed LDZ Shrinkage Quantities for the period.

The assessment of LDZ Shrinkage for the period 1 April 2015 to 31 March 2016 is 5.2GWh lower than the volume of Shrinkage purchased for the Formula Year 2015/16.

For this year's leakage assessment, National Grid applied v1.4 of the Leakage Model which received approval from Ofgem in September 2014. The leakage assessment resulted in an annual estimated leakage for 2015/16 of 1249.4GWh, which is 0.3% (3.8GWh) lower than originally estimated. LDZ specific values can be found in Table 1.

In addition to the decrease in leakage, there was also a decrease of 1.4GWh in the assessed volumes for Own Use Gas and Theft of Gas. Details of this can be found in Section 2.2 Operational Usage and Section 2.3 Theft of Gas.

The assessed Shrinkage volume is less than the estimated volume therefore we will return monies to the value of £67,991.08 to RbD Shippers and a further amount of £3,280.36 for Commodity Charges.

The Leakage Volume ( $LV_t$ ) and Actual Shrinkage Volume ( $ASV_t$ ) to be used for incentive revenue purposes for 2015/16 are 1,244.8GWh and 1,324.1GWh, respectively; the values for each Distribution Network can be found in Table 11. 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 calorific value assumptions that underpin 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 2015/16 were proposed based on an assessment of leakage for the formula year 2015/16 with anticipated mains replacement being taken into account, leading to an assumed procurement requirement of 1,253.2GWh for leakage.

#### 2.1.1 Assessment of 2015/16 Leakage

National Grid applied V1.4 of the Leakage Model to carry out the assessment of leakage for the Formula Year 2015/16. No further amendments have been made to the methodologies applied within the leakage model.

Table 1 below, shows that assessed leakage varies to the 2015/16 proposals by approximately 3.8GWh.

LDZ	Estimated Leakage (GWh)	Assessed Leakage (GWh)
EA	191.0	196.5
EM	230.4	223.1
NT	226.0	228.9
NW	324.1	324.3
WM	281.6	276.5
National Grid	1,253.2	1,249.4

**Table 1 Estimated and Assessed Leakage Energy by LDZ for 2015/16**

#### 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 our final assessment volume. National Grid 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. The assessed leakage varies to the proposals by approximately 3.8GWh, of this the estimation of the impact of mains replacement (which includes influencing factors such as average system pressure and service relay and transfers) was the largest contributing factor with a difference to forecast of 7.6GWh. AGI leakage increased by 2.8GWh to that forecasted due in part to an increase in offtake numbers associated with the connection of bio-methane plants.

### 2.2 Operational Usage

Operational Usage, also known as Own Use Gas (OUG), 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 pressurisation; this is known as the Joules-Thompson effect.

The volumes procured in 2015/16 in respect of Own Use Gas were based on the application of the standard factor (0.0113% of consumption) to our 2015/16 demand forecast. The actual demand in 2015/16 was marginally lower than seasonal normal, the impact of this is a difference between estimated and assessed leakage volumes of 0.5GWh (shown below).

LDZ	Estimated 2015/16 Consumption (GWh)	2015/16 Actual Consumption (GWh)	Estimated OUG (GWh)	Assessed OUG (GWh)	Adjustment (GWh)
EA	41,925	40,814	4.7	4.6	0.1
EM	53,696	54,623	6.1	6.2	-0.1
NT	51,907	49,414	5.9	5.6	0.3
NW	67,938	65,320	7.7	7.4	0.3
WM	42,447	43,267	4.8	4.9	-0.1
<b>National Grid</b>	<b>257,913</b>	<b>253,438</b>	<b>29.1</b>	<b>28.6</b>	<b>0.5</b>

**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 consumer”.

The volumes procured in 2015/16 in respect of Theft of Gas (ToG) were based on the application of the standard factor (0.02% of consumption) to our 2015/16 demand forecast. The actual demand in 2015/16 was marginally lower than seasonal normal, the impact of this is a difference between estimated and assessed leakage volumes of 0.9GWh (shown below).

LDZ	Estimated 2015/16 Consumption (GWh)	2015/16 Actual Consumption (GWh)	Estimated ToG (GWh)	Assessed ToG (GWh)	Adjustment (GWh)
EA	41,925	40,814	8.4	8.2	0.2
EM	53,696	54,623	10.7	10.9	-0.2
NT	51,907	49,414	10.4	9.9	0.5
NW	67,938	65,320	13.6	13.1	0.5
WM	42,447	43,267	8.5	8.7	-0.2
<b>National Grid</b>	<b>257,913</b>	<b>253,438</b>	<b>51.6</b>	<b>50.7</b>	<b>0.9</b>

**Table 3 Assessment of ToG (0.02% of Consumption)**

### 2.4 LDZ Specific Shrinkage Quantities

National Grid initially proposed LDZ specific Shrinkage Quantities for the Formula Year 2015/16 in January 2015, with the same quantities again being included within the Final Proposal. National Grid’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 2015. The proposed (applied) LDZ Shrinkage Quantities are shown in Table 4, below, along with the Assessed LDZ specific Shrinkage Quantities for 2015/16 produced in the method detailed within this document.

LDZ	Leakage	OUG	ToG	Assessed Shrinkage Quantities 2015/16	Applied Shrinkage Quantities 2015/16	Difference Between Assessed & Applied Quantities	Difference (kWh/day)
EA	196.5	4.6	8.2	209.3	204.1	5.2	14,275
EM	223.1	6.2	10.9	240.2	247.2	-7.0	-19,256
NT	228.9	5.6	9.9	244.4	242.3	2.1	5,825
NW	324.3	7.4	13.1	344.7	345.4	-0.6	-1,736
WM	276.5	4.9	8.7	290.1	294.9	-4.9	-13,286
National Grid	1,249.4	28.6	50.7	1,328.7	1,333.9	-5.2	-14,178

**Table 4 LDZ Specific Shrinkage Quantities (GWh)**

#### 2.4.1 Reasons for Differences

The difference between National Grid's estimated and assessed LDZ Shrinkage Quantities is 5.2GWh or a 0.4% decrease. This is predominantly due to a decrease in leakage equivalent to 3.8GWh, primarily influenced by the differences between the estimated and actual (7.6GWh) impact of Mains Replacement activities (which includes other influencing factors such as average system pressure and service relays and transfers), but also influenced by an increase in AGI leakage (2.8GWh) attributable to further bio-methane plant connections. Additionally actual throughput was lower than the estimated seasonal normal leading to lower OUG and ToG equivalent to 1.4GWh.



### 3 LDZ Shrinkage Adjustment

#### 3.1 Introduction

This Section advises Shippers of the Shrinkage Adjustment for National Grid operated LDZs for the period 1 April 2015 to 31 March 2016, as referred to in *Network Code Section N 3.4.1*.

#### 3.2 LDZ Shrinkage Reconciliation Calculations

The LDZ Shrinkage Reconciliation Quantity ( $S_{LRQ}$ ) is calculated as the difference between the Assessed and Procured LDZ Shrinkage Quantities. This reconciliation quantity is the amount that National Grid 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 2015 to 31 March 2016<sup>1</sup>.

LDZ	LDZ Shrinkage Reconciliation Quantity (kWh/day)
EA	14,275
EM	-19,256
NT	5,825
NW	-1,736
WM	-13,286
National Grid	-14,178

Table 5 LDZ Shrinkage Reconciliation Quantity (kWh/day)

#### 3.3 Energy Financial Adjustment

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

$$FA(\pounds) = \sum_{01/04/15}^{31/3/16} S_{LRQ} (kWh) \times SAP(p/kWh) / 100$$

Where:

$FA(\pounds)$  = Financial Adjustment

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

$SAP$  = Daily System Average Price for the period 1 April 2015 to 31 March 2016

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 RbD affected portfolio in each LDZ for each month.

Table 6, below, shows the financial adjustment by LDZ for the period 1 April 2015 to 31 March 2016, calculated on a daily basis in line with the methodology indicated above.

<sup>1</sup> See Table 4 LDZ Specific Shrinkage Quantities (GWh)

LDZ	LDZ Shrinkage Reconciliation Quantity (kWh/day)	Adjustment Value due to Changes to Shrinkage Quantities
EA	14,275	£68,455.16
EM	-19,256	-£92,343.14
NT	5,825	£27,935.56
NW	-1,736	-£8,324.44
WM	-13,286	-£63,714.22
<b>National Grid</b>	<b>-14,178</b>	<b>-£67,991.08</b>

**Table 6 LDZ Shrinkage Reconciliation for the period 1 April 2015 to 31 March 2016**

The assessed Shrinkage volume is less than the estimated volume therefore we will return monies to the value of £67,991.08 to RbD Shippers and a further amount of £3,280.36 for Commodity Charges (see below).



## 4 LDZ Shrinkage Commodity Charge Adjustment

### 4.1 Introduction

This section advises Shippers of the Commodity Charge associated with the National Grid operated LDZ Shrinkage Adjustment for the period 1 April 2015 to 31 March 2016.

### 4.2 Applicable Commodity Charges

Table 7, below, shows the Commodity Charges that applied over the period 1 April 2015 to 31 March 2016.

Commodity		Period of Application	
		01/04/2015 to 30/09/2015	01/10/2015 to 31/03/2016
NTS SO Commodity		0.0169	0.0148
NTS TO Exit Commodity		0.0198	0.0209
LDZ System Commodity Charge	EA	0.0253	0.0253
	EM	0.0253	0.0253
	NT	0.0292	0.0292
	NW	0.0279	0.0279
	WM	0.0285	0.0285

**Table 7 Applicable Commodity Charges 1 April 2015 to 31 March 2016**

### 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.

LDZ	Total over Period	01/04/2015 to 30/09/2015	01/10/2015 to 31/03/2016
EA	5,224,666	2,612,333	2,612,333
EM	-7,047,855	-3,523,928	-3,523,928
NT	2,132,110	1,066,055	1,066,055
NW	-635,342	-317,671	-317,671
WM	-4,862,826	-2,431,413	-2,431,413
<b>National Grid</b>	<b>-5,189,246</b>	<b>-2,594,623</b>	<b>-2,594,623</b>

**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:

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

Where:

$FA_{cc} (£)$  = Financial Adjustment associated with the Commodity Charge

$LRQ (kWh)$  = LDZ Shrinkage Reconciliation Quantity

$CC_1 (£/kWh)$  = Commodity Charge applicable to the period 1 April 2015 to 30 September 2015

$CC_2 (£/kWh)$  = Commodity Charge applicable to the period 1 October 2015 to 31 March 2016

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

Transportation Charges					
LDZ	Total Volume (kWh)		Total Adjustment		Assessment Period
	Pricing Period		Pricing Period		
	01/04/2015 to 30/09/2015	01/10/2015 to 31/03/2016	01/04/2015 to 30/09/2015	01/10/2015 to 31/03/2016	1 April 2015 to 31 March 2016
EA	2,612,333	2,612,333	£1,619.65	£1,593.52	£3,213.17
EM	-3,523,928	-3,523,928	-£2,184.84	-£2,149.60	-£4,334.43
NT	1,066,055	1,066,055	£702.53	£691.87	£1,394.40
NW	-317,671	-317,671	-£205.22	-£202.04	-£407.23
WM	-2,431,413	-2,431,413	-£1,585.28	-£1,560.97	-£3,146.25
National Grid	-2,594,623	-2,594,623	-£1,653.15	-£1,627.21	-£3,280.36

**Table 9 Financial Adjustment by LDZ for the period 1 April 2015 to 31 March 2016**

The overall financial value for the Commodity Charge Adjustment is therefore £3,280.36, a return of monies to Domestic Shippers under the RbD process.

## 5 Leakage Volume ( $LV_t$ ) and Actual Shrinkage Volume ( $ASV_t$ )

### 5.1 Introduction

This section provides the  $LV_t$  and  $ASV_t$  values to be used for revenue incentive calculations.

Special Condition 1F.14 of the Gas Transporter licence requires that “The Licensee must, by 31 July in each Formula Year, make publicly available and provide to the Authority a report that sets out the actual Leakage volume ( $LV_{t,i}$ ) and actual Shrinkage volumes ( $ASV_{t,i}$ ) as calculated in accordance with the Shrinkage and Leakage Model for each Distribution Network for the preceding Formula Year.”

Shrinkage and Leakage volumes used for incentive purposes are calculated using the same calorific value assumptions used to determine the Shrinkage and Leakage Incentive volume allowances provided in Appendix 2 and Appendix 3 of Special Condition 1F.14 of the Gas Transporter licence, respectively. This is to avoid potential windfall gains or losses arising as a result of outturn calorific values, which are out of the control of the GDNs, being different from those underpinning the incentive targets.

### 5.2 $LV_t$ and $ASV_t$ for the 2015/16 formula year

Table 10 below provides the  $LV_t$  and  $ASV_t$  values for the 2015/16 formula year by LDZ and indicates the calorific value assumptions used to calculate these.

LDZ	Leakage Volume ( $LV_t$ )	OUG	ToG	Actual Shrinkage Volume ( $ASV_t$ )	Assumed Calorific Value ( $MJ/m^3$ )
EA	197.0	4.6	8.2	209.8	39.41
EM	222.5	6.2	10.9	239.6	39.48
NT	228.6	5.6	9.9	244.1	39.35
NW	320.4	7.4	13.1	340.8	39.20
WM	276.3	4.9	8.7	289.8	39.30
<b>National Grid</b>	<b>1,244.8</b>	<b>28.6</b>	<b>50.7</b>	<b>1,324.1</b>	

Table 10 2015/16 LDZ  $LV_t$  and  $ASV_t$  (GWh)

Table 11 below provides the  $LV_t$  and  $ASV_t$  values for the 2015/16 formula year by Network.

LDZ	Leakage Volume ( $LV_t$ )	Actual Shrinkage Volume ( $ASV_t$ )
East of England	419.5	449.4
London	228.6	244.1
North West	320.4	340.8
West Midlands	276.3	289.8
<b>National Grid</b>	<b>1,244.8</b>	<b>1,324.1</b>

Table 11 2015/16 Network  $LV_t$  and  $ASV_t$  (GWh)

