

**LDZ Shrinkage Assessment and Adjustment
1 April 2013 - 31 March 2014**

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LDZ Shrinkage Assessment and Adjustment for the Period 1 April 2013 – 31 March 2014

1 Executive Summary

The purpose of this document is to present an assessment of LDZ Shrinkage for the period 1 April 2013 to 31 March 2014, 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 2013/14, issued 1 March 2013 proposed individual LDZ Shrinkage Quantities equating to a total annual RDN Shrinkage Quantity of 1,451GWh. The Final Proposal for the Formula Year 2013/14 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 applied at LDZ level;
- Operational Usage, with a single factor being applied across all LDZs; and
- National Grid responsible Theft of Gas, with a single factor being applied across all LDZs

The assessment of LDZ Shrinkage for the Formula Year 2013/14 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 2013 to 31 March 2014 is 54GWh higher than the volume of Shrinkage purchased for the Formula Year 2013/14.

For this year's leakage assessment, National Grid applied v1.3 of the Leakage Model. National Grid applied this model in last year's leakage assessment and no further modifications have been made. The leakage assessment resulted in an annual estimated leakage for 2013/14 of 1,422GWh for the purposes of the Shrinkage Adjustment, which is 52GWh higher than originally estimated. LDZ specific values can be found in Table 1.

In addition to the increase in leakage, there was also an increase of 2GWh in the assessed volumes for Own Use Gas and Theft of Gas. Details of this can be found in Section 2.4 Impact of Throughput Assumptions.

The assessed Shrinkage leads to a financial adjustment of £1,194,276.91 debit to National Grid, and therefore credit to RbD Shippers, and an associated credit of £30,812.87 to Shippers for Commodity Charges under the RbD process.

The Leakage Volume (LV_t) and Actual Shrinkage Volume (ASV_t) to be used for incentive revenue purposes for 2013/14 are 1,427GWh and 1,510GWh, respectively; the values for each Distribution Network can be found in Table 12. 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 2013/14 were proposed based on an assessment of leakage for the formula year 2013/14 with anticipated mains replacement being taken into account, leading to a procurement requirement of 1,370GWh for leakage.

2.1.1 Assessment of 2013/14 Leakage

National Grid applied V1.3 of the Leakage Model to carry out the assessment of leakage for the Formula Year 2013/14. No further amendments have been made to the methodologies applied within the leakage model.

Table 1, below, shows that the assessment of leakage has resulted in an increase in energy of approximately 52GWh.

LDZ	Estimated Leakage (GWh)	Assessed Leakage (GWh)
EA	206	220
EM	256	267
NT	256	267
NW	350	366
WM	302	302
National Grid	1,370	1,422

Table 1 Estimated and Assessed Leakage Energy by LDZ for 2013/14

2.1.2 Differences Between Estimated and Assessed Leakage

The main difference between the leakage assessment used for the 2013/14 shrinkage proposals and that used for the assessment is that for the proposal it was assumed that a proposed revision to the leakage model would have been approved by Ofgem before the assessment for the 2013/14 year. However, although the proposed change has been recommended for approval, final approval has not been received in time to use the improved model for the 2013/14 leakage assessment. Therefore, there has been a consequent under procurement of Shrinkage in four of the five LDZs operated by National Grid. The difference in assessed leakage between the two versions of the leakage model is 87GWh. As the difference between the assessed leakage and the estimated leakage is 52GWh, this indicates that there has been a 'real' reduction in leakage of 35GWh. The main reason for this is the estimated leakage on the Low Pressure system, which accounts for approximately 28GWh of the reduction in relation to the original estimation and which has been achieved by reducing the pressure at which the system operates; the original assumptions assume that the pressures will increase year-on-year as the majority of mains replacement is achieved by insertion, thus reducing the capacity of the system and necessitating a greater source pressure. However, in 2013/14, National Grid has managed to reduce pressures via optimisation of its pressure management system and ongoing stabilisation of the supporting IS infrastructure. The other major contributor to estimated leakage reduction is the outturn calorific value of gas, which was approximately 0.4% lower than that assumed and contributed approximately 5GWh.

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 to counter the impact of the Joule-Thompson 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-Thompson 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 2013/14 Gas Year, no better information (meter readings) or calculation for actual OUG was available; therefore, the proposed factor of 0.0113% of consumption, based on the GL Noble Denton model, was used.

LDZ	Consumption 2013/14 (GWh)	OUG Quantity (GWh)
EA	42,585	4.8
EM	56,310	6.4
NT	52,194	5.9
NW	69,415	7.8
WM	45,080	5.1
National Grid	265,584	30.0

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”.

In respect of the 2013/14 Gas Year, a National Factor of 0.02% of throughput, equating to a deemed Transporter responsibility of 6.67% of assumed theft, was applied.

LDZ	Consumption 2013/14 (GWh)	ToG Quantity (GWh)
EA	42,585	8.5
EM	56,310	11.3
NT	52,194	10.4
NW	69,415	13.9
WM	45,080	9.0
National Grid	265,584	53.1

Table 3 Assessment of ToG (0.02% of Consumption)

2.4 Impact of Throughput Assumptions

The Shrinkage volumes procured in 2013/14 in respect of Own Use Gas and Theft of Gas were based on the application of the agreed factors (0.0313%, combined, of consumption) to the EP2 seasonal normal demand for 2013/14 from the 2012 Demand Statements. The actual demand in 2013/14 was higher than seasonal normal. The effect of this is shown in Table 4, below.

LDZ	Est 2013/14 Consumption (2012 Demand Statements) (GWh)	2013/14 Actual Consumption (GWh)	Estimated OUG/ ToG (GWh)	Assessed OUG/ToG (GWh)	Adjustment (GWh)
EA	41,051	42,585	12.8	13.3	-0.5
EM	54,916	56,310	17.2	17.6	-0.4
NT	51,738	52,194	16.2	16.3	-0.1
NW	68,215	69,415	21.4	21.7	-0.4
WM	43,439	45,080	13.6	14.1	-0.5
National Grid	259,358	265,584	81.2	83.1	-1.9

Table 4 Assessment of the Impact of Throughput Assumptions

2.5 LDZ Specific Shrinkage Quantities

National Grid initially proposed LDZ specific Shrinkage Quantities for the Formula Year 2013/14 in January 2013, 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 2013. The proposed (applied) LDZ Shrinkage Quantities are shown in Table 5, below, along with the Assessed LDZ specific Shrinkage Quantities for 2013/14 produced in the method detailed within this document.

LDZ	Leakage	OUG	ToG	Assessed Shrinkage Quantities 2013/14	Applied Shrinkage Quantities 2013/14	Difference Between Assessed & Applied Quantities	Difference (kWh/day)
EA	220.1	4.8	8.5	233	219	14	38,892
EM	267.1	6.4	11.3	285	273	12	31,866
NT	266.7	5.9	10.4	283	272	11	30,686
NW	366.1	7.8	13.9	388	371	17	45,247
WM	302.2	5.1	9.0	316	316	1	2,120
National Grid	1422.2	30.0	53.1	1,505	1,451	54	148,809

Table 5 LDZ Specific Shrinkage Quantities (GWh)

2.5.1 Reasons for Differences

The difference between National Grid's estimated and assessed LDZ Shrinkage Quantities is 54GWh or a 3.7% increase. This is due to an increase in leakage equivalent to 52GWh in addition to actual throughput being higher than the estimated EP2 seasonal normal leading to higher OUG and ToG equivalent to 2GWh.

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 2013 to 31 March 2014, 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 2.0.

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 6, below, shows the LDZ Reconciliation Quantities for the Shrinkage Adjustment for the period 1 April 2013 to 31 March 2014¹.

LDZ	LDZ Shrinkage Reconciliation Quantity (kWh/day)
EA	38,892
EM	31,866
NT	30,686
NW	45,247
WM	2,120
National Grid	148,809

Table 6 LDZ Shrinkage Reconciliation Quantity (kWh/day)

3.3 Financial Adjustment

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

$$FA(\pounds) = \sum_{01/04/13}^{31/3/14} S_{LRQ} (kWh) \times SAP(p / kWh) / 100$$

Where:

$FA(\pounds)$ = Financial Adjustment

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

SAP = Daily System Average Price for the period 1 April 2013 to 31 March 2014

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 RbD affected portfolio in each LDZ for each month.

Table 7, below, shows the financial adjustment by LDZ for the period 1 April 2013 to 31 March 2014, calculated on a daily basis in line with the methodology indicated above.

¹ See Table 5 LDZ Specific Shrinkage Quantities (GWh)

LDZ	LDZ Shrinkage Reconciliation Quantity (kWh/day)	Adjustment Value due to Changes to Shrinkage Quantities
EA	38,892	£312,127.14
EM	31,866	£255,740.15
NT	30,686	£246,268.16
NW	45,247	£363,129.16
WM	2,120	£17,012.30
National Grid	148,809	£1,194,276.91

Table 7 LDZ Shrinkage Reconciliation for the period 1 April 2013 to 31 March 2014

The overall financial value for the Energy Adjustment, £1,194,276.91, is therefore a debit to National Grid. Under the rules of Reconciliation by Difference, this is an adjustment of equal and opposite value to Domestic Shippers, i.e. a credit of £1,194,276.91.

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 2013 to 31 March 2014. The Commodity Charge Adjustments have been calculated in accordance with the LDZ Shrinkage Adjustments Methodology Version 2.0.

4.2 Applicable Commodity Charges

Table 8, below, shows the Commodity Charges that applied over the period 1 April 2013 to 31 March 2014.

Commodity		Period of Application		
		01/04/2013 to 30/09/2013	01/10/2013 to 31/01/2014	01/02/2014 to 31/03/2014
NTS SO Commodity		0.0176	0.0251	0.0173
NTS TO Exit Commodity		0.0112	0.0117	0.0117
LDZ System Commodity Charge	EA	0.0239	0.0239	0.0239
	EM	0.0239	0.0239	0.0239
	NT	0.0274	0.0274	0.0274
	NW	0.0256	0.0256	0.0256
	WM	0.0283	0.0283	0.0283

Table 8 Applicable Commodity Charges 1 April 2013 to 31 March 2014

4.3 LDZ Shrinkage Reconciliation Quantities

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

LDZ	Total over Period	01/04/2013 to 30/09/2013	01/10/2013 to 31/01/2014	01/02/2014 to 31/03/2014
EA	14,195,462	7,117,177	4,783,676	2,294,609
EM	11,630,996	5,831,431	3,919,486	1,880,079
NT	11,200,213	5,615,449	3,774,318	1,810,445
NW	16,515,021	8,280,134	5,565,336	2,669,551
WM	773,715	387,917	260,731	125,066
National Grid	54,315,407	27,232,108	18,303,548	8,779,751

Table 9 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:

$$\sum_{EA}^{WM} FA_{cc} (£) = \sum_{01/04/13}^{30/09/13} LRQ(kWh) \times CC_1 (£ / kWh) + \sum_{01/10/13}^{31/01/14} LRQ(kWh) \times CC_2 (£ / kWh) + \sum_{01/02/14}^{31/03/14} LRQ(kWh) \times CC_3 (£ / kWh)$$

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 2013 to 30 September 2013

CC_2 (£/kWh) = Commodity Charge applicable to the period 1 October 2013 to 31 January 2014

CC_3 (£/kWh) = Commodity Charge applicable to the period 1 February 2014 to 31 March 2014

Table 10, 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			1 April 2013 to 31 March 2014
	01/04/2013 to 30/09/2013	01/10/2013 to 31/01/2014	01/02/2014 to 31/03/2014	01/04/2013 to 30/09/2013	01/10/2013 to 31/01/2014	01/02/2014 to 31/03/2014	
EA	7,117,177	4,783,676	2,294,609	£3,750.75	£2,903.69	£1,213.85	£7,868.29
EM	5,831,431	3,919,486	1,880,079	£3,073.16	£2,379.13	£994.56	£6,446.85
NT	5,615,449	3,774,318	1,810,445	£3,155.88	£2,423.11	£1,021.09	£6,600.09
NW	8,280,134	5,565,336	2,669,551	£4,504.39	£3,472.77	£1,457.58	£9,434.74
WM	387,917	260,731	125,066	£221.50	£169.74	£71.66	£462.90
National Grid	27,232,108	18,303,548	8,779,751	£14,705.69	£11,348.44	£4,758.74	£30,812.87

Table 10 Financial Adjustment by LDZ for the period 1 April 2013 to 31 March 2014

The overall financial value for the Commodity Charge Adjustment is therefore £30,812.87, a credit 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 2013/14 formula year

Table 11 below provides the LV_t and ASV_t values for the 2013/14 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	222	5	9	235	39.41
EM	269	6	11	286	39.48
NT	269	6	10	285	39.35
NW	365	8	14	387	39.20
WM	303	5	9	317	39.30
National Grid	1,427	30	53	1,510	

Table 11 2013/14 LDZ LV_t and ASV_t (GWh)

Table 12 below provides the LV_t and ASV_t values for the 2013/14 formula year by Network.

LDZ	Leakage Volume (LV_t)	Actual Shrinkage Volume (ASV_t)
East of England	491	522
London	269	285
North West	365	387
West Midlands	303	317
National Grid	1,427	1,510

Table 12 2013/14 Network LV_t and ASV_t (GWh)