

**LDZ SHRINKAGE ASSESSMENT AND ADJUSTMENT  
FOR 1 APRIL 2010 – 31 MARCH 2011**

**National Grid**

**July 2011**

**Version 1**

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## **LDZ Shrinkage Assessment and Adjustment for the Period 1 April 2010 – 31 March 2011**

### **1 Executive Summary**

The purpose of this document is to present an assessment of LDZ Shrinkage for the period 1 April 2010 to 31 March 2011, in accordance with *Uniform Network Code Section N 3.3.3*.

National Grid's Final LDZ Shrinkage Quantity Proposal for the Formula Year 2010/11, issued 1 March 2010, proposed individual LDZ Shrinkage Quantities equating to a total RDN Shrinkage Quantity of 4,751,357kWh per day. The Final Proposal for the Formula Year 2010/11 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 2010/11 detailed within this document provides, where applicable, reasons for significant variance between the estimated and the assessed LDZ Shrinkage Quantities for the period.

Expressed as energy, the assessment of LDZ Shrinkage for the period 1 April 2010 to 31 March 2011 is 22GWh or approximately 59,867kWh/day higher than the volume of Shrinkage purchased for the Formula Year 2010/11.

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 2010/11 of 1,662GWh for the purposes of the Shrinkage Adjustment, which is 20GWh higher than originally estimated, and 1,667GWh<sup>1</sup> for the purposes of the Environmental Emissions Incentive (LV<sub>t,i</sub> as defined in Special Condition E9 of the Distribution Gas Transporter Licences). 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, which was caused by outturn consumption being slightly higher than that assumed when setting the original shrinkage quantities. Details of this can be found in Section 2.4 Impact of Throughput Assumptions

The assessed Shrinkage leads to a financial adjustment of £355,077.16 debit to National Grid, and therefore credit to RbD Shippers, and an associated credit of £8,231.37 to Shippers for Commodity Charges under the RbD process.

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<sup>1</sup> Calculated using the LDZ specific Baseline CVs and reported net of any applicable caps/collars.

## 2 LDZ Shrinkage Quantity Assessment

### 2.1 Leakage

LDZ specific Shrinkage Quantities for 2010/11 were proposed based on an assessment of leakage for the formula year 2009/10 with anticipated mains replacement being taken into account, leading to a procurement requirement of 4,498,882kWh/day for leakage.

#### 2.1.1 Assessment of 2010/11 Leakage

National Grid applied V1.3 of the Leakage Model to carry out the assessment of leakage for the formula Year 2010/11. No further amendments have been made to the methodologies applied within the leakage model.

LDZ	2010/11 Estimated Leakage (GWh)	2010/11 Assessed Leakage (GWh)	2010/11 Assessed Leakage ( $LV_{t,i}$ ) <sup>2</sup> (GWh)	2010/11 Estimated Leakage (kWh/Day)	2010/11 Assessed Leakage (kWh/Day)
EA	230	228	228	630,079	623,731
EM	312	320	321	854,889	877,885
NT	338	346	346	924,666	948,714
NW	418	424	428	1,144,141	1,162,031
WM	345	344	345	945,106	942,260
National Grid	1,642	1,662	1,667	4,498,882	4,554,621

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

As shown in Table 1, above, the assessment of leakage has resulted in an increase in energy of approximately 20GWh, equivalent to 55,739kWh per day or 1.24%.

### 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 2010/11 Gas Year, no better information (meter readings) or calculation for actual OUG was available; therefore, the proposed factor of 0.011% of consumption, based on the GL Noble Denton model, was used.

<sup>2</sup> This is the leakage estimation used for the purposes of the Environmental Emissions Incentive. It differs from that used for the Shrinkage Adjustment in that it is calculated using the LDZ specific Calorific Values that were used to determine the EE Incentive baselines; the leakage for the Shrinkage Adjustment being calculated using the average actual LDZ specific CVs. In addition, the EE Incentive is subject to a 10% cap and collar regime; the values have been quoted without the application of the cap/collar.

LDZ	Consumption 2010/11 (GWh)	Applied OUG Factor 2008/09	Daily OUG Quantity (kWh)
EA	47,817	0.011%	14,411
EM	67,198		20,251
NT	60,945		18,367
NW	75,390		22,720
WM	50,778		15,303
National Grid	302,129		91,053

**Table 2 Assessment of OUG**

### 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 2010/11 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 2010/11 (GWh)	Applied ToG Factor 2010/11	Daily ToG Quantity (kWh)
EA	47,817	0.020%	26,201
EM	67,198		36,821
NT	60,945		33,394
NW	75,390		41,310
WM	50,778		27,824
National Grid	302,129		165,550

**Table 3 Assessment of ToG**

### 2.4 Impact of Throughput Assumptions

The Shrinkage volumes procured in 2010/11 in respect of Own Use Gas and Theft of Gas were based on the application of the agreed factors (0.031%, combined, of consumption) to the 17-year seasonal normal demand for 2010/11 from the 2009 Demand Statements. However, despite the severe weather in December 2010, the outturn throughput for 2010/11 was only slightly higher than the original assumption<sup>3</sup>. The impact of this is shown in Table 4 below.

LDZ	Est 2010/11 Consumption (2009 Demand Statements) (GWh)	2010/11 Actual Consumption (GWh)	Combined OUG/ToG Factor	Estimated OUG/ ToG (GWh)	Outturn OUG/ToG (GWh)	Adjustment (GWh)
EA	45,783	47,817	0.031%	14	15	1
EM	67,423	67,198		21	21	0
NT	58,448	60,945		18	19	1
NW	74,814	75,390		23	23	0
WM	50,803	50,778		16	16	0
National Grid	297,270	302,129		92	94	2

**Table 4 Assessment of the Impact of Throughput Assumptions**

<sup>3</sup> This is in part due to the Industry using 17-year seasonal normal demand (SND) estimation at the time that the Shrinkage Quantities were set. 17-year SND has subsequently been replaced with the EP2 methodology, which predicts a lower level of seasonal normal demand.

## 2.5 LDZ Specific Shrinkage Quantities

National Grid initially proposed LDZ specific Shrinkage Quantities for the Formula Year 2010/11 in January 2010, 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 2010. The proposed (applied) LDZ Shrinkage Quantities are shown in Table 5, along with the Assessed LDZ specific Shrinkage Quantities for 2010/11 produced in the method detailed within this document.

LDZ	Leakage	OUG	ToG	Assessed Shrinkage Quantities 2010/11	Applied Shrinkage Quantities 2010/11	Difference Between Assessed & Applied Quantities
EA	623,731	14,411	26,201	664,343	668,963	-4,620
EM	877,885	20,251	36,821	934,958	912,152	22,806
NT	948,714	18,367	33,394	1,000,475	974,307	26,168
NW	1,162,031	22,720	41,310	1,226,061	1,207,682	18,379
WM	942,260	15,303	27,824	985,387	988,253	-2,866
National Grid	4,554,621	91,053	165,550	4,811,224	4,751,357	59,867

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

### 2.5.1 Reasons for Differences

The difference between National Grid's estimated and assessed LDZ Shrinkage Quantities is 59,867kWh/day or a 1.3% increase. This is due to an increase in leakage equivalent to 55,739kWh per day and actual throughput being higher than the estimated 17-year seasonal normal leading to higher OUG and ToG equivalent to 4,128kWh/day.

## 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 2010 to 31 March 2011, 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 2010 to 31 March 2011<sup>4</sup>.

<sup>4</sup> See Table 5 LDZ Specific Shrinkage Quantities (kWh/day)

<b>LDZ</b>	<b>LDZ Shrinkage Reconciliation Quantity (kWh/day)</b>
<b>EA</b>	-4,620
<b>EM</b>	22,806
<b>NT</b>	26,168
<b>NW</b>	18,379
<b>WM</b>	-2,866
<b>National Grid</b>	<b>59,867</b>

**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:

$$FA(\pounds) = \sum_{1/10/08}^{31/3/09} S_{LRQ}(kWh) \times SAP(p/kWh)/100$$

Where:

FA (£) = Financial Adjustment

S<sub>LRQ</sub> (kWh) = LDZ Shrinkage Reconciliation Quantity

SAP = Daily System Average Price for the period 1 April 2010 to 31 March 2011

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 2010 to 31 March 2011, calculated on a daily basis in line with the methodology indicated above.

<b>LDZ</b>	<b>LDZ Shrinkage Reconciliation Quantity (kWh/day)</b>	<b>Adjustment Value due to Changes to Shrinkage Quantities</b>
<b>EA</b>	-4,620	-£27,401.22
<b>EM</b>	22,806	£135,262.80
<b>NT</b>	26,168	£155,206.95
<b>NW</b>	18,379	£109,009.96
<b>WM</b>	-2,866	-£17,001.34
<b>National Grid</b>	<b>59,867</b>	<b>£355,077.16</b>

**Table 7 LDZ Shrinkage Reconciliation for the period 1 April 2010 to 31 March 2011**

The overall financial value for the Energy Adjustment, £355,077.16, 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 £355,077.16.

## 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 2010 to 31 March 2011. 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 2010 to 31 March 2011.

Commodity		Period of Application		
		01/04/10 to 30/09/10	01/10/10 to 31/01/11	01/02/11 to 31/03/11
NTS Commodity		0.0196	0.0192	0.0051
LDZ System Commodity Charge	EA	0.0187	0.0187	0.0187
	EM	0.0187	0.0187	0.0187
	NT	0.0216	0.0216	0.0216
	NW	0.0212	0.0212	0.0212
	WM	0.0231	0.0221	0.0221

**Table 8 Applicable Commodity Charges 1 April 2010 to 31 March 2011**

### 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	01/04/10 to 30/09/10	01/10/10 to 31/01/11	01/02/11 to 31/03/11
EA	-1,686,269	-845,445	-568,250	-272,575
EM	8,324,066	4,173,436	2,805,096	1,345,534
NT	9,551,427	4,788,798	3,218,700	1,543,929
NW	6,708,467	3,363,423	2,260,662	1,084,382
WM	-1,046,262	-524,564	-352,576	-169,122
<b>National Grid</b>	<b>21,851,429</b>	<b>10,955,648</b>	<b>7,363,632</b>	<b>3,532,149</b>

**Table 9 LDZ Shrinkage Reconciliation Quantities**

### 4.4 Financial Adjustment

The Financial Adjustment (FA) due for Commodity Charge reconciliation is calculated, as a sum for each LDZ, as shown below:

$$\sum_{EA}^{WM} FA_{cc}(\pounds) = \sum_{1/4/10}^{30/9/10} LRQ(kWh) \times CC_1(\pounds / kWh) + \sum_{1/10/10}^{31/1/11} LRQ(kWh) \times CC_2(\pounds / kWh) + \sum_{1/2/11}^{31/3/11} LRQ(kWh) \times CC_3(\pounds / kWh)$$

Where:

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

$LRQ(kWh)$  = LDZ Shrinkage Reconciliation Quantity

$CC_1(\pounds/kWh)$  = Commodity Charge applicable to the period 1 April 2010 to 30 September 2010



CC<sub>2</sub> (£/kWh) = Commodity Charge applicable to the period 1 October 2010 to 31 January 2011

CC<sub>3</sub> (£/kWh) = Commodity Charge applicable to the period 1 February 2011 to 31 March 2011

Table 10 below, shows the financial adjustment, calculated on a daily basis in line with the methodology indicated above.

<b>Transportation Charges</b>							
<b>LDZ</b>	<b>Pricing Period</b>			<b>Pricing Period</b>			<b>Assessment Period</b>
	<b>01/04/10 to 30/09/10</b>	<b>01/10/10 to 31/01/11</b>	<b>01/02/11 to 31/03/11</b>	<b>01/04/10 to 30/09/10</b>	<b>01/10/10 to 31/01/11</b>	<b>01/02/11 to 31/03/11</b>	<b>01/04/10 to 31/03/11</b>
	<b>Total Volume (kWh)</b>	<b>Total Volume (kWh)</b>	<b>Total Volume (kWh)</b>	<b>Total Adjustment</b>	<b>Total Adjustment</b>	<b>Total Adjustment</b>	<b>Total Adjustment</b>
<b>EA</b>	-845,445	-568,250	-272,575	-£323.81	-£215.37	-£64.87	-£604.04
<b>EM</b>	4,173,436	2,805,096	1,345,534	£1,598.43	£1,063.13	£320.24	£2,981.79
<b>NT</b>	4,788,798	3,218,700	1,543,929	£1,972.98	£1,313.23	£412.23	£3,698.44
<b>NW</b>	3,363,423	2,260,662	1,084,382	£1,372.28	£913.31	£285.19	£2,570.78
<b>WM</b>	-524,564	-352,576	-169,122	-£223.99	-£145.61	-£46.00	-£415.60
<b>National Grid</b>	<b>10,955,648</b>	<b>7,363,632</b>	<b>3,532,149</b>	<b>£4,395.89</b>	<b>£2,928.69</b>	<b>£906.78</b>	<b>£8,231.37</b>

**Table 10 Financial Adjustment by LDZ for the period 1 October 2010 to 31 March 2011**

The overall financial value for the Commodity Charge Adjustment is therefore £8,231.37, a credit to Domestic Shippers under the RbD process.