

**LDZ Shrinkage Quantity  
Initial Proposals  
Formula Year 2013/14**

## National Grid LDZ Shrinkage Quantity Initial Proposals - Formula Year 2013/14

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## **National Grid LDZ Shrinkage Quantity Initial Proposal for Formula Year 2013/14**

### **1. Purpose of Proposal**

The purpose of this paper is to present our proposals in respect of National Grid LDZ Shrinkage for the Formula Year 2013/14, as required under Section N of the Uniform Network Code.

Under Section N of the Uniform Network Code, National Grid has an obligation to estimate the LDZ Shrinkage Quantity values for the coming Formula Year and to present these to Users for consultation.

Following representations from Users, a further paper will be issued, by 1 March 2013, in which National Grid will set out its final estimate of its LDZ Shrinkage Quantity values.

For the purposes of this document, 'LDZ' refers to LDZs, as defined by Uniform Network Code, owned by National Grid.

## 2. Summary of Proposal

The LDZ Shrinkage Quantity values, which are set out within Table 1 below, reflect the losses associated with Unaccounted for Gas (leakage & theft of gas) and Own Use Gas (gas used in the operation of the system). Details of how these Quantities have been determined are included in this paper.

Table 1. Proposed LDZ Shrinkage Quantity values for the 2013/14 Formula Year

LDZ	Existing Shrinkage Quantities 2012/13 Formula Year (GWh)				Proposed Shrinkage Quantities 2013/14 Formula Year (GWh)			
	Leakage	OUG	Theft	Total	Leakage	OUG	Theft	Total
Eastern	211	5	9	225	206	5	8	219
East Midlands	297	7	13	317	256	6	11	273
North Thames	322	6	11	339	256	6	10	272
North West	388	8	14	410	350	8	14	371
West Midlands	319	5	9	333	302	5	9	316
<b>National Grid</b>	<b>1,537</b>	<b>32</b>	<b>56</b>	<b>1,625</b>	<b>1,370</b>	<b>29</b>	<b>52</b>	<b>1,451</b>

The calculations that were used to derive the Shrinkage Quantity values and a summary of the underlying information are set out in this proposal.

This year's shrinkage proposal reflects a reduction of 167GWh in estimated leakage compared to the current year, 94GWh of which is associated with the proposed change to the leakage model, outlined in Section 3.1.1.1, the inclusion of which was agreed at the Shrinkage Forum held on Monday 10 December 2012. The remainder of the leakage reduction (73GWh) is associated predominantly with the forecast mains replacement (approximately 50GWh), in addition to a general reduction in assumed operating pressures and improved MEG saturation levels. Over the current price control period, National Grid has made significant investment in pressure management systems, the impact of which has been a year-on-year improvement in operating pressures. In order to reflect this in our leakage projections, we developed a methodology for estimating pressure on a rolling 12 month basis<sup>1</sup> on which to base our shrinkage proposals and this methodology has been used for this year. A further benefit of this methodology is that it reduces the potentially distortional impact on the forecast of an individual warm or cold year; 2011/12 was warmer than average whereas 2010/11 was colder than average. The leakage forecast is, therefore, subject to the relative coldness of the year and the forecast network pressure performance. The impact of any variation between the actual and assumed factors underpinning these Shrinkage Proposals will be picked up in the post year Shrinkage Assessment and Adjustment process in July 2014.

The reductions in Own Use Gas and Theft of Gas are due to lower forecast annual demand levels.

The Daily Shrinkage Quantity values, shown in Table 2 below, will be used as the basis for National Grid's LDZ Shrinkage gas procurement during the Formula Year in question.

<sup>1</sup> Historically, we had based our forecasts on the previous year's outturn pressure performance; however, if we were to continue to adopt this approach, the expected improvements associated with pressure management would not be included in the forecast and this would lead to larger end of year adjustments.

Table 2. Proposed LDZ Daily Shrinkage Quantity Values for 2013/14 Formula Year

<b>LDZ</b>	<b>Daily Shrinkage Quantity (kWh)</b>
Eastern	600,702
East Midlands	748,337
North Thames	744,692
North West	1,017,240
West Midlands	864,449
<b>National Grid</b>	<b>3,975,420</b>

### **3. Component Analysis**

This section of the document presents an analysis of the components of LDZ Shrinkage that make up the estimates for the Formula Year 2013/14 proposal.

#### **3.1 Leakage**

Leakage represents the largest component of the LDZ Shrinkage Quantity. Leakage is estimated using the agreed leakage model, which is controlled under Special Condition E9 of the GDN Licences. Under Special Condition E9 (7), Distribution Networks have the obligation to annually review the leakage model to ensure that it meets the obligations, specified under section 4, of:

- (a) the accurate calculation and reporting of gas leakage from each of the LDZs operated by the licensee; and
- (b) being consistent with, and where reasonably practicable, identical to Leakage Models used by other DN Operators.

Any proposed modifications to the leakage model would be subject to consultation with the industry, be independently assessed and submitted to Ofgem for approval.

DNs also have an obligation by 31 July each year to assess and publish the leakage volume for the previous financial year; the latest approved model is used for this assessment.

In February 2012, National Grid consulted on a proposal to update the service leakage calculation; details of this can be found in Section 3.1.1.1 below. These proposals reflect the impact of this modification, as agreed at the Shrinkage Forum held 10 December 2012.

For the purpose of analysis, leakage may be conveniently split into three categories:

- Distribution Mains (including service pipes),
- Above Ground Installations (AGIs) and
- Other losses

Distribution mains and services leakage is a feature of normal system operation.

AGI leakage includes the routine venting of control equipment.

Other losses include gas lost as a result of interference damage and broken mains. These losses are caused by specific events and are not continuous.

#### **3.1.1 Distribution Mains (and Services) Leakage**

The leakage of gas from the Distribution Mains system, which includes service pipe leakage, is calculated by combining the results of the 2002/03 National Leakage Test programme with the following network<sup>2</sup> specific information:

<sup>2</sup> Network in this context relates to physically interconnected pipe systems, not National Grid's regionally based administrative structure.

- Pipe asset data<sup>3</sup>
- Annual average system pressure in each network
- Measured concentration of Monoethylene Glycol (MEG) joint treatment chemical in the gas
- Annual metallic service replacement

Leakage is calculated by multiplying the annual average mains pressure in each network by the Main and Service Pipe Leakage Factors determined by the 2002/03 National Leakage Test programme and the relative lengths of mains / numbers of services in each network. Where applicable, i.e. cast iron mains only, the Pipe Leakage Factors are adjusted to take into account the measured concentration of MEG.

Information relating to the National Leakage Test programme, the application of the results to calculate leakage and the external validation of the results has already been shared with Users and Ofgem; consequently, it is not proposed to include additional details in this paper.

A detailed comparison of changes in low-pressure leakage from last year's proposal is included in Appendix 1.

As part of National Grid's endeavour to reduce greenhouse gas emissions, real-time estimation of leakage management performance, ASP and MEG, has been introduced; this keeps the focus on the emissions issue and enables any potential problems to be identified and addressed quickly. The output of this monitoring of ASP and MEG performance has been used as the basis for these proposals.

There has been, and will continue to be, significant replacement of iron mains, in line with National Grid's mains replacement policy. These proposals assume an estimated amount of mains replacement applicable for the 2013/14 leakage assessment; equating to approximately 3800km of iron main from April 2012, i.e. approximately 1900km per annum.

Table 3, below, shows the Low Pressure leakage on an LDZ basis; the leakage values quoted include the impact of the leakage model modification outlined in Section 3.1.1.1:

Table 3. Estimated LDZ Low Pressure Leakage for 2013/14 Formula Year

LDZ	Low Pressure Leakage	
	Tonnes <sup>4</sup>	GWh
Eastern	10,278	154
East Midlands	11,573	174
North Thames	13,307	199
North West	19,281	288
West Midlands	16,070	241
<b>National Grid</b>	<b>70,510</b>	<b>1,055</b>

<sup>3</sup> Actual asset data as at 31 March 2012 adjusted for completed and planned iron replacement to 31 March 2014.

<sup>4</sup> Leakage figures in Tonnes are provided for information; it is not used in respect of Shrinkage Quantity calculations. Conversion to Tonnes is based on a gas density of 0.73kg/m<sup>3</sup>.

Table 4, below, shows the estimated Medium Pressure leakage on an LDZ basis:

Table 4. Estimated LDZ Medium Pressure Leakage for 2013/14 Formula Year

LDZ	Medium Pressure Leakage	
	Tonnes	GWh
Eastern	988	15
East Midlands	2,816	42
North Thames	1,563	23
North West	1,110	17
West Midlands	1,476	22
<b>National Grid</b>	<b>7,952</b>	<b>119</b>

### 3.1.1.1 Leakage Model Modification

In February 2012, National Grid proposed a modification to the leakage model to better reflect the impact of low pressure service replacement. The original leakage model contained service population assumptions dating back to the early 1990s and there was no mechanism built in for updating these assumptions to reflect actual service replacement. In 2008, the leakage model was updated to enable the impact of replacement of metallic services to be included; however, this modification did not correct for historic service replacement and did not capture the impact of service leakage reduction associated with transferring plastic services from the old metallic main to the new plastic main. The leakage model modification proposed in February 2012 sought to address both of these issues. The outcome of the consultation was that, although there was general agreement that the proposed modification would provide a more accurate assessment of service leakage, it was decided that for commercial reasons the modification would not be implemented within the current GDPCR1 price control period.

It is anticipated that the proposed modification will be implemented within the first year of the new RIIO-GD1 price control period and, as such, it was agreed at the Shrinkage Forum held 10 December 2012 that DNs would include an estimate of the impact of the modification within the 2013/14 Shrinkage Proposals.

Full details of the National Grid Consultation<sup>5</sup> can be found on the Joint Office website at <http://www.gasgovernance.co.uk/sf/leakage>.

Table 5, below, shows the estimated impact for 2013/14 of the proposed changes to the leakage model:

Table 5. Estimated impact of proposed leakage model change for 2013/14 Formula Year

LDZ	2010/11 – Service Leakage (GWh)			Impact of taking account of service transfers (GWh)			Combined Impact (GWh)
	Current Model	Revised Model	Change	2011/12	2012/13	2013/14	2013/14
EA	47.2	35.2	-12.0	-0.3	-0.6	-0.9	-12.9
EM	69.7	45.3	-24.4	-0.4	-0.8	-1.2	-25.6
NT	75.1	43.8	-31.4	-0.2	-0.4	-0.6	-32.0
NW	78.1	60.8	-17.3	-0.4	-0.8	-1.2	-18.5
WM	57.2	53.6	-3.6	-0.3	-0.6	-0.9	-4.5
<b>Total</b>	<b>327.3</b>	<b>238.7</b>	<b>-88.7</b>	<b>-1.6</b>	<b>-3.2</b>	<b>-4.8</b>	<b>-93.5</b>

<sup>5</sup> Leakage Model Modification Consultation No. 2

Table 5, above, indicates an adjustment of 88.7GWh to correct for historic service replacement and 4.8GWh to take account of service transfers from 2010/11 giving a total impact of 93.5GWh for National Grid's LDZs for 2013/14.

### 3.1.2 AGI Leakage and Venting

The figures for leakage from Above Ground Installations have been taken from the findings of the 2003 Above Ground Installation Leakage Test programme.

Information relating to the programme was shared with Users and Ofgem at the Shrinkage Forums held in 2003; consequently, it is not proposed to include significant detail in this paper.

Table 6, below, shows the estimated AGI leakage and venting on an LDZ basis:

Table 6. Estimated AGI Emissions for 2013/14 Formula Year

LDZ	AGI Emissions <sup>6</sup>	
	Tonnes	GWh
Eastern	2,504	37
East Midlands	2,590	39
North Thames	2,161	32
North West	3,025	45
West Midlands	2,582	39
<b>National Grid</b>	<b>12,862</b>	<b>193</b>

### 3.1.3 Other Losses

Gas may be lost from LDZ equipment as a result of specific events, namely broken mains and interference damage to plant, in addition to ongoing leakage. These losses are known collectively as 'other losses'.

Statistics in respect of the number of routine broken mains and damages are used in conjunction with calculations of the amount of gas lost through each type of incident to derive the total amount of gas lost from these events. (For the purpose of this paper, the number of events in 2011/12 has been used for the analysis together with emergency personnel response times.)

In addition to the routine events in 2011/12, there were 25 gas release events where the total gas released was greater than 500kg. For these, the specific volume released, where calculated, was used. In total for National Grid, the energy loss resulting from these events was 0.2 GWh. Table 7 below shows the amount of gas lost because of other losses on a LDZ basis, which is proposed as the estimate for 2013/14:

<sup>6</sup> Includes leakage and routine equipment venting

Table 7. 2011/12 (and estimated 2013/14) Interference Damage

LDZ	Interference Damage	
	Tonnes	GWh
Eastern	29	0.4
East Midlands	51	0.8
North Thames	32	0.5
North West	51	0.8
West Midlands	37	0.5
<b>National Grid</b>	<b>199</b>	<b>3.0</b>

### 3.1.4 Leakage Reduction Initiatives

National Grid recognises that climate change is possibly one of the greatest challenges facing society in the 21<sup>st</sup> century. Natural Gas is composed primarily of Methane, which as a Greenhouse Gas is twenty-one times worse than carbon dioxide. National Grid has a climate change strategy that targets an 80% reduction in greenhouse gas emissions by 2050.

There are a number of initiatives being employed across the Company to achieve this aim, one of which has had a direct impact on the leakage from low pressure gas distribution systems. Leakage from low pressure gas distribution systems contributes approximately 80% of all gas distribution leakage and the major controllable influence on this is the pressure at which the systems operate. Replacing old metallic pipe with plastic pipe will help reduce emissions; however, in order to achieve this in the most economic way, mains insertion techniques are used where possible and the impact of this is to drive operating pressures upwards. National Grid embarked upon a programme of installing pressure profiling equipment, with the aim of lowering average system operating pressures. In addition to installing additional pressure management equipment, National Grid has also upgraded its pressure control management system, which will enable improved monitoring, recording and reporting of system pressures.

Historically, there has been minimal change in Average System Pressures (ASP) from year-to-year; typically ASP had been in the order of 30mbarg. However, with the increased focus on pressure management, the installation of profiling equipment and system upgrade there has been a significant reduction in average system pressure in National Grid's mixed material networks. The calculated ASP in 2007/08 was 29.3mbarg and the forecast ASP for 2013/14, and that used for these proposals, is 27.4mbarg, representing a 6.5% reduction in ASP. The benefits of this investment have been seen in reduced leakage volumes over the last couple of years. It must be noted that we would expect diminishing returns in pressure reductions as we hit the lower bound of operating pressures<sup>7</sup>; however, our historic and indeed further investment will help to maintain these lower pressures.

### 3.1.5 Total Leakage

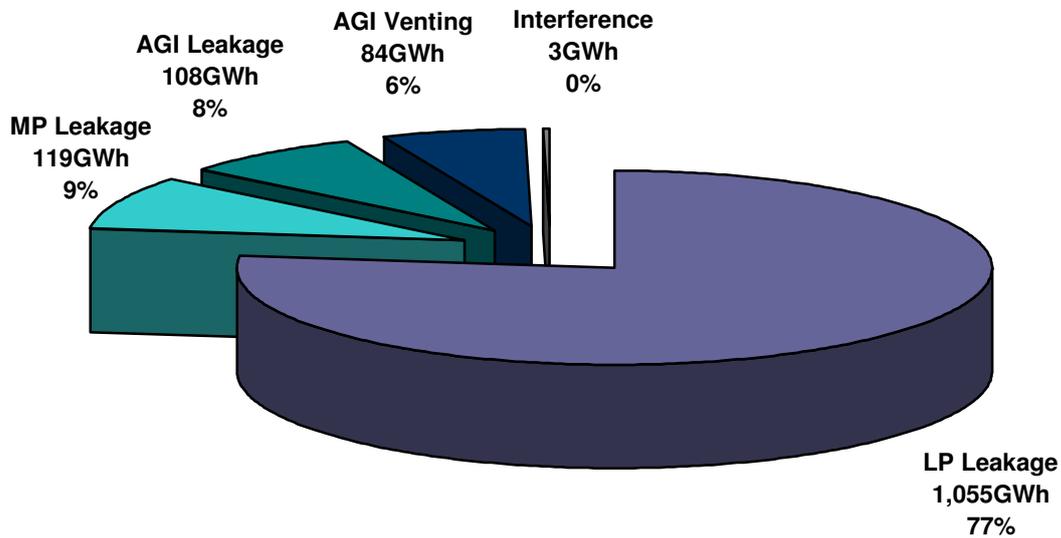
Table 8 below shows the total amount of estimated leakage for Formula Year 2013/14 on an LDZ basis with the leakage expressed in Tonnes, GWh and as a flat daily Quantity in kWh.

<sup>7</sup> There are practical limitations associated with the pressure profiling methodology employed that limit the achievable pressure reduction such that we continue to meet our statutory system minimum pressure obligations.

Table 8. Estimated 2013/14 Formula Year LDZ Leakage Summary

LDZ	Leakage		
	Tonnes per annum	GWh per annum	kWh per day
Eastern	13,799	206	565,500
East Midlands	17,030	256	701,245
North Thames	17,063	256	700,325
North West	23,467	350	958,742
West Midlands	20,165	302	827,199
<b>National Grid</b>	<b>91,523</b>	<b>1,370</b>	<b>3,753,011</b>

The diagram below illustrates the relative proportions of the various elements that make up the leakage estimation for the 2013/14 Shrinkage proposals.



### 3.2 Own Use Gas

Own Use Gas is treated as a consolidated Quantity, calculated as a factor of seasonal normal annual LDZ consumption, to be procured on a flat daily basis.

In line with this methodology, National Grid proposes to apply a fixed LDZ Specific daily Quantity for OUG equivalent to 0.0113% of seasonal normal LDZ consumption. This factor represents the estimated National average (to four decimal places as a percentage) that was determined by Advantica in 2002 and has been applied since the 2005/06 Gas Year.

The estimated 2013/14 Own Use Gas Quantity values are shown in Table 9 below.

Table 9. Estimated 2013/14 LDZ OUG Quantity Values

<b>LDZ</b>	<b>Seasonal Normal LDZ Consumption</b>	<b>OUG GWh per annum</b>	<b>OUG kWh per day</b>
Eastern	41,051	5	12,709
East Midlands	54,916	6	17,001
North Thames	51,738	6	16,017
North West	68,215	8	21,119
West Midlands	43,439	5	13,448
<b>National Grid</b>	<b>259,358</b>	<b>29</b>	<b>80,294</b>

### 3.3 Theft of Gas

UNC Section N 1.3.2 states that LDZ Shrinkage shall include, and National Grid is therefore responsible for, gas illegally taken upstream of the customer control valve and downstream where there is no shipper contract with the end-user.

Historically, unidentified theft has been assumed to be 0.3% of LDZ Consumption.

As with Own Use Gas, Theft of Gas is treated as a consolidated Quantity calculated as a factor of seasonal normal annual LDZ consumption to be procured on a flat daily basis.

The responsibility for Theft of Gas is split between Gas Transporters and Shippers. In recent years, Transporter Responsible Theft has been deemed 0.02% of LDZ Consumption. For 2013/14, National Grid proposes to retain a Theft of Gas factor equal to 0.02%. Table 10 below shows the estimated 2013/14 Theft of Gas Quantity Values:

Table 10. Estimated 2013/14 LDZ Theft of Gas Quantity Values

<b>LDZ</b>	<b>Seasonal Normal LDZ Consumption</b>	<b>ToG GWh per annum</b>	<b>ToG kWh per day</b>
Eastern	41,051	8	22,493
East Midlands	54,916	11	30,091
North Thames	51,738	10	28,350
North West	68,215	14	37,378
West Midlands	43,439	9	23,802
<b>National Grid</b>	<b>259,358</b>	<b>52</b>	<b>142,115</b>

There has recently been significant work carried out in respect of Theft of Gas on an industry wide basis. National Grid has been assessing the impact this may have and the implications for shrinkage. If there is sufficient evidence that could warrant further proposals, we will bring this forward with Ofgem and our customers at the earliest opportunity in 2013/14.

### 3.4 LDZ Shrinkage Quantity Summary

Table 11 below shows the proposed LDZ Shrinkage Quantity Values for the Formula Year 2013/14 in GWh per annum:

Table 11. Estimated 2013/14 LDZ Shrinkage Quantity Values

LDZ	Leakage (GWh)	OUG (GWh)	Theft (GWh)	Total (GWh)
Eastern	206	5	8	219
East Midlands	256	6	11	273
North Thames	256	6	10	272
North West	350	8	14	371
West Midlands	302	5	9	316
<b>National Grid</b>	<b>1,370</b>	<b>29</b>	<b>52</b>	<b>1,451</b>

The diagram below illustrates the relative proportions of the individual elements that make up the 2013/14 Shrinkage Quantity proposals.

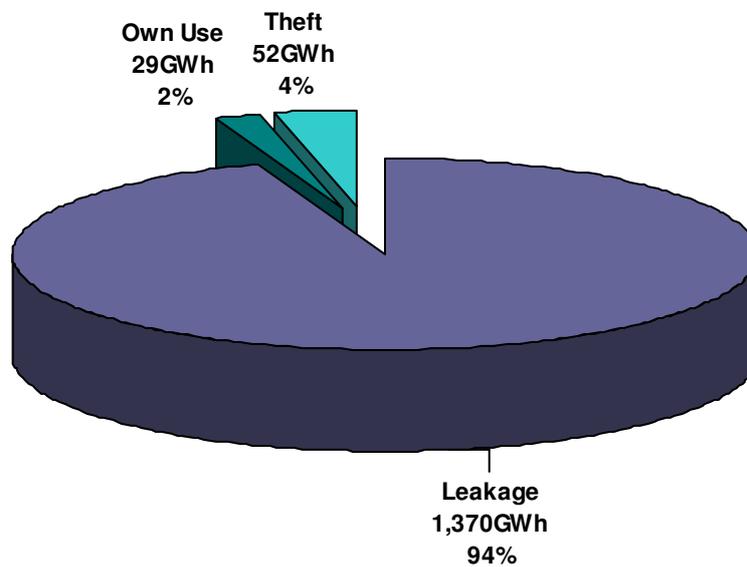


Table 12 below shows the estimated Daily Shrinkage Quantity values applicable for the 2013/14 Formula Year in kWh per day:

Table 12. Estimated 2013/14 LDZ Daily Shrinkage Quantity Values

LDZ	Leakage (KWh)	OUG (KWh)	Theft (KWh)	Total (KWh)
Eastern	565,500	12,709	22,493	600,702
East Midlands	701,245	17,001	30,091	748,337
North Thames	700,325	16,017	28,350	744,692
North West	958,742	21,119	37,378	1,017,240
West Midlands	827,199	13,448	23,802	864,449
<b>National Grid</b>	<b>3,753,011</b>	<b>80,294</b>	<b>142,115</b>	<b>3,975,420</b>

**4. Extent to which the Proposal would better facilitate the relevant objectives**

This proposal provides an accurate estimate of LDZ Shrinkage Quantity values for the Formula Year 2013/14. As a result, the gas usage and loss in transportation within the LDZs will be reflective of actual conditions. This in turn facilitates the achievement of efficient and economic operation of the system through effective targeting of costs.

It will also lead to better targeting of costs to Users through the RbD process and this is consistent with securing effective competition.

**5. The implications for National Grid of implementing the Proposal**

- a) **Implications for the operation of the System:**  
We are not aware of any such implications that would result from implementing this proposal.
- b) **Development and capital cost and operating cost implications:**  
The proposed LDZ Shrinkage Quantity values lead to a fair allocation of operating costs between LDZ systems.
- c) **Extent to which it is appropriate for National Grid to recover the costs, and proposal for the most appropriate way for National Grid to recover the costs:**  
It is appropriate for each LDZ to incur a share of the overall Shrinkage Energy dependent upon the actual shrinkage in that LDZ.
- d) **Analysis of the consequences (if any) this proposal would have on price regulation**  
None identified.

**6. The implications of implementing the Proposal for Users**

This proposal improves the equability and accuracy of cost targeting across all Users.

**7. Analysis of any advantages or disadvantages of implementation of the Proposal**

- **Advantages:** Better reflective of the actual system usage and losses with improved cost targeting.
- **Disadvantages:** National Grid is not aware of any disadvantages.

**8. Summary of the representations (to the extent that the import of those representations are not reflected elsewhere in the Proposal)**

This paper outlines our Initial Proposals. We appreciate hearing the views of Ofgem and Users; these views will help inform our Final Proposals, which are due to be published on 1 March 2013.

Users wishing to discuss any matter can do so either in private or at the Shrinkage Forum scheduled for 15 January 2013.

It would be appreciated if Users could let us have any feedback that they would like to share with us before 1 February 2013<sup>8</sup> to enable us to better respond to any concerns.

**9. Programme of works required as a consequence of implementing the Proposal**

It will be necessary to obtain approval from Ofgem for the implementation of proposed change to the leakage model. It is expected that this will be carried out in Summer 2013.

GEMINI will need to be updated with the new LDZ Daily Shrinkage Quantity values.

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<sup>8</sup> Due to the pressure of time, it will be difficult to respond to any points that might be raised during February because the Uniform Network Code requires National Grid to publish its proposals on 1 March.

**10. Proposed implementation timetable (inc timetable for any necessary information system changes)**

Following publication of our Final Proposals, Users will have until 15 March 2013 to request that Ofgem issue a Standard Special Condition A11 (18) disapproval of this proposal; this provision is in the Uniform Network Code Section N 3.1.8.

If no disapproval notice is issued beforehand, it will be our intention to implement revised LDZ Daily Shrinkage Quantity values from 06:00 hrs on 1 April 2013.

**11. Recommendation concerning the implementation of the Proposal**

We recommend the proposed LDZ Daily Shrinkage Quantity values be implemented with effect from 06:00 hrs on 1 April 2013.

**12. National Grid's Proposal**

This report contains our Initial Proposals for the LDZ Daily Shrinkage Quantity values for the Formula Year 2013/14.

## **Appendix 1: LP Leakage Analysis 2012 to 2013 proposals by LDZ**

This section of the document provides a comparison of the estimated levels of LP pipe and service leakage by LDZ; LP Leakage accounts for approximately 80% of total leakage.

Details of leakage in energy quantity, annual Average System Pressures (ASP) and Monoethylene Glycol (MEG) levels are presented for 2013/14 with 2012/13 estimates for comparison purposes. The levels quoted are only those attributable to low pressure mains and service leakage; MEG Levels relate to the length weighted average saturation in low pressure networks where MEG is used.

National Grid has introduced real-time estimation of leakage management performance, ASP and MEG, in its endeavour to reduce greenhouse gas emissions; this keeps the focus on the emissions and enables the identification and resolution of any potential issues. These proposals utilise the output of this monitoring of ASP and MEG performance.

We have supplied specific information relating to the average pressure experienced by networks that contain metallic pipes, which excludes the all-PE networks that often operate at higher pressures but have very low leakage because of their superior performance. This should enable Users to better compare the effective operating pressures of the different LDZs.

One notable difference in this year's proposal is the treatment of the Outer Metropolitan area of London. Historically, this has been included within the North Thames LDZ leakage estimate to keep it aligned with the shrinkage revenue allowances. However, in the RIIO price control consultation, the Outer Met has been considered correctly in Eastern LDZ's shrinkage revenue allowances and, therefore, now needs to be included within the proposed shrinkage volumes for Eastern LDZ.

### **A1.1 Eastern LDZ**

**Table A1.1 Eastern LDZ**

	<b>2012 Proposal</b>	<b>Model Modification</b>	<b>Outer Met Impact</b>	<b>2013 Proposal</b>
Leakage (GWh)	156	-12.9	+16.0	154
Annual Average System Pressure (mbar)	30.2		-0.5	29.1
ASP (All-PE systems excluded) (mbar)	29.0		-0.3	27.9
MEG Saturation Level	0%		+39%	39%

In comparison to last year's anticipated leakage performance, there is an anticipated decrease of 1.1mbar (0.6mbar excluding Outer Met) in overall ASP for Eastern LDZ and a 1.1mbar (0.8mbar excluding Outer Met) decrease in ASP for mixed material networks. The impact of the inclusion of the leakage model modification results in a 12.9GWh reduction in leakage. The transferral of the Outer Met to Eastern LDZ results in a 16.0GWh increase in leakage due to the additional mains; however, its inclusion reduces the overall LDZ average pressures, as indicated in the table above and means that we are now reporting a level of MEG saturation for Eastern LDZ. This, together with anticipated mains replacement, is expected to deliver a comparative leakage reduction of 5.0GWh.

## A1.2 East Midlands LDZ

**Table A1.2 East Midlands LDZ**

	<b>2012 Proposal</b>	<b>Model Modification</b>	<b>2013 Proposal</b>
Leakage (GWh)	214	-25.6	174
Annual Average System Pressure (mbar)	31.8		31.4
ASP (All-PE systems excluded) (mbar)	30.0		29.4
MEG Saturation Level	28%		26%

In comparison to last years anticipated leakage performance, there is an anticipated decrease of 0.4mbar in overall ASP for East Midlands LDZ, a 0.6mbar decrease in ASP for mixed material networks and 2% decrease in MEG Saturations. The impact of the inclusion of the leakage model modification results in a 25.6GWh reduction in leakage. This, together with anticipated mains replacement, is expected to deliver a comparative leakage reduction of 14.4GWh.

## A1.3 North Thames LDZ

**Table A1.3 North Thames LDZ**

	<b>2012 Proposal</b>	<b>Model Modification</b>	<b>Outer Met Impact</b>	<b>2013 Proposal</b>
Leakage (GWh)	263	-32.0	-16.0	199
Annual Average System Pressure (mbar)	25.6		+0.01	25.3
ASP (All-PE systems excluded) (mbar)	25.6		+0.01	25.3
MEG Saturation Level	12%		-0.05%	18%

In comparison to last years anticipated leakage performance, there is an anticipated decrease of 0.3mbar in ASP for North Thames and a 6% increase in MEG Saturation. The impact of the inclusion of the leakage model modification results in a 32.0GWh reduction in leakage and the transferral of the Outer Met to Eastern LDZ results in a further 16.0GWh leakage reduction. This, together with anticipated mains replacement, is expected to deliver a comparative leakage reduction of 16.0GWh.

#### A1.4 North West LDZ

Table A1.4 North West LDZ

	2012 Proposal	Model Modification	2013 Proposal
Leakage (GWh)	322	-18.5	288
Annual Average System Pressure (mbar)	27.9		28.2
ASP (All-PE systems excluded) (mbar)	27.5		27.6
MEG Saturation Level	18%		28%

In comparison to last years anticipated leakage performance, there is an anticipated increase of 0.3mbar in overall ASP for North West, a 0.1mbar decrease in ASP for mixed material networks and a 10% increase in MEG saturation. The impact of the inclusion of the leakage model modification results in a 18.5GWh reduction in leakage. This, together with anticipated mains replacement, is expected to deliver a comparative leakage reduction of 15.5GWh.

#### A1.5 West Midlands LDZ

Table A1.5 West Midlands LDZ

	2012 Proposal	Model Modification	2013 Proposal
Leakage (GWh)	255	-4.5	241
Annual Average System Pressure (mbar)	28.9		28.8
ASP (All-PE systems excluded) (mbar)	26.3		26.3
MEG Saturation Level	27%		33%

In comparison to last years anticipated leakage performance, there is an anticipated decrease of 0.1mbar in overall ASP for West Midlands and a 6% increase in MEG saturation. The impact of the inclusion of the leakage model modification results in a 4.5GWh reduction in leakage. This, together with anticipated mains replacement, is expected to deliver a comparative leakage reduction of 9.5GWh.

**Appendix 2: Assumed Daily Weighted Average Calorific Values (CVs)**

The table below shows the Calorific Values applied for these proposals; however, the actual daily average CV values over the period will be used for the assessment of the 2013/14 Formula Year:

**Table A2.1 Assumed Calorific Values**

<b>LDZ</b>	<b>Average Calorific Values (MJ/m<sup>3</sup>)</b>
Eastern	39.31
East Midlands	39.50
North Thames	39.37
North West	39.19
West Midlands	39.35