LDZ Energy Loss
Final Estimates
Financial Year 2014/15

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1 LDZ Energy Loss Proposals for Formula Year 2014/15

1.1 Purpose of Proposal

The purpose of this paper is to present Wales & West Utilities' proposals in respect of LDZ Energy Loss for the Formula Year 2014/15 as required under section N of the Uniform Network Code.

In section N of UNC, the Transporter has an obligation to set the LDZ Energy Loss to provide for the gas that is used by each of its LDZs or lost from its systems.

Unless upon the application of any User, made no later than 15 March 2014, the Authority give Condition A11(18) Disapproval, the estimated LDZ Shrinkage Quantities detailed in this document will be become the WWU LDZ Shrinkage Quantities for the Formula Year 2014/15.

Please note the estimates in this paper are based on an "updated" Shrinkage and Leakage model (version 1.4), this was discussed and agreed with the other networks and shippers at the Shrinkage Forum that was held via teleconference on the 19th February 2014. This version of the shrinkage and leakage model is yet to gain industry approval. The comparative values generated via the current approved version of the Shrinkage and Leakage model (version 1.3) are included in Appendix A for information only.

1.2 Summary of Proposal

The LDZ Energy Loss, which is set out in the following table, reflects the losses associated with leakage, theft of gas and gas used in the operation of the system. Details of how these factors have been determined are included in this paper. The structure of the paper follows the format of a UNC Modification Report.

Fugitive emissions of gas have been calculated on an LDZ basis. Theft of gas, and gas used in the operation of the system, has been calculated using previous defined methodology. The calculations used to derive the Energy Loss and a summary of the underlying information are set out in this proposal.

The Energy Loss is to be used as the basis for WWUs' LDZ shrinkage gas procurement during the 2014/15 Formula Year.

LDZ	Proposed Energy Loss (GWh)	Proposed Energy Loss Factor 2014/15 (Note)
Wales North	53.0	0.813
Wales South	126.3	0.425
South West	230.6	0.784
Total	**409.9**	**0.628**

Note: The Energy Loss shown in the table are expressed as a percentage of forecast LDZ consumption.

1.3 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 2014/15 proposal.

1.3.1 Leakage

Leakage represents the largest component of the LDZ Energy Loss.

For the purpose of analysis, leakage is split into three categories which are:

- Distribution Mains (including service pipes);
- Above Ground Installations (AGI's); and,
- Other losses.

Distribution mains and service 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 not continuous; they are caused by specific events.

1.3.2 Distribution Mains (and Services) Leakage

The leakage of gas from the Distribution mains system (which includes service pipe leakage) is calculated by applying the results of the 2002/3 National Leakage Testing programme to the following network[1] specific information:

- Projected (Formula year end 2014/15) records of pipe asset;
- The annual average system pressure in each network[1] for financial year 2012/13; and,
- The measured concentration of Monoethylene Glycol (MEG) joint treatment chemical in the gas.
- Where applicable (i.e. cast iron mains only) the Pipe Leakage Factors are adjusted to take into account the measured concentration of MEG.

[1] Network in this context relates to physical interconnected pipe systems, not administrative structure.

The table below shows the Low Pressure leakage on an LDZ basis

LDZ	Low Pressure Leakage
	GWh
Wales North	24.50
Wales South	83.82
South West	169.91
Total	**278.22**

The table below shows the Medium Pressure leakage on an LDZ basis

LDZ	Medium Pressure Leakage
	GWh
Wales North	3.40
Wales South	9.86
South West	20.23
Total	**33.49**

1.3.2.1 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 previous 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 on the 19th February 2014 that DNs would use this updated model for the 2014/15 Shrinkage Proposals.

1.3.3 AGI Emissions

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

The table below shows AGI Leakage on an LDZ basis

LDZ	AGI Emissions[2]
	GWh
Wales North	22.97
Wales South	23.24
South West	30.28
Total	**76.49**

1.3.4 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 broken mains and damages are used in conjunction with calculations on the amount of gas lost through each type of incident to derive the total amount of gas lost as a result of these events. (For the purpose of this paper the numbers of events in 2012/13 have been used for the analysis).

The table below shows the amount of gas lost as a result of other losses for the WWU LDZs.

LDZ	Other Losses GWh
Wales North	0.06
Wales South	0.19
South West	0.81
Total	**1.06**

1.3.5 Total Leakage

The table below shows the total amount of predicted leakage for Formula Year 2014/15 on an LDZ basis with the leakage expressed in GWh and as a percentage of forecast LDZ consumption.

LDZ	Leakage	
	GWh	Leakage as a % of Consumption
Wales North	50.92	0.758
Wales South	117.11	0.401
South West	221.23	0.739
Total / Weighted Average	**389.26**	**0.591**

[2] Includes leakage and routine equipment venting

1.4 Own Use Gas

Natural gas is a compressible fluid; as a direct result of this property, it experiences a drop in temperature when it undergoes an isenthalpic expansion. When gas has its pressure reduced (at an NTS offtake or Local Transmission System PRI) the gas on the downstream side of the pressure reduction apparatus is colder than the gas on the upstream side. To avoid the gas leaving a site at below freezing point of water, and causing damage to the downstream pipeline, pre-heating may be applied. Pre-heating is only needed to maintain gas above 0 deg C and if the gas enters the site at a sufficiently high temperature, e.g. during the summer, or if the pressure reduction is small, then pre-heating may not be required).

Pre-heating requires a small proportion of the gas passing through the site to fuel the pre-heating equipment. The amount of fuel required for pre-heating is estimated by applying industry standard thermodynamic equations, LDZ throughput and system pressures together with assumptions about the efficiency of the pre-heating equipment.

Routine venting of gas by control equipment at AGIs could also be said to be Own Use Gas, however for the purpose of this paper it is included within AGI leakage.

In future years, WWU intends to use actual, metered gas consumed for AGI pre-heating rather than a calculated factor. Metering equipment is installed at a number of sites although this will require validation and in some cases replacement. However until this information has been collated WWU propose to apply the factor of 0.011% to its LDZ consumption following studies carried out by Advantica and reported to the Shrinkage Forum.

For the Formula Year 2014/15 the factor for Own Use Gas is proposed as 0.011% of LDZ consumption.

1.5 Theft of Gas

UNC Section N 1.3.2 states that LDZ Shrinkage shall include, and WWU 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.

There is a current consensus agreement that unidentified theft is assumed to be 0.2% of LDZ consumption, of which 10% is deemed to be Transporters responsibility, resulting in a theft of gas factor of 0.02%.

WWU propose that the Theft of Gas factor be set at 0.02% for the Formula Year 2014/15.

1.6 LDZ Energy Loss Summary

The proposed LDZ Energy Loss for the Formula Year 2014/15 is presented in the following table.

1.6.1 LDZ Shrinkage Quantity Summary

The proposed LDZ Shrinkage Quantities for the Formula Year 2014/15 are presented in the following table.

LDZ	Leakage (GWh)	Own Use Gas (GWh)	Theft of Gas (GWh)	Proposed Shrinkage Quantity 2014/15 (GWh)
Wales North	50.92	0.76	1.34	53.0
Wales South	117.11	3.30	5.85	126.3
South West	221.23	3.38	5.99	230.6
Total	**389.26**	**7.45**	**13.18**	**409.9**

1.6.2 LDZ Shrinkage Factor Summary

The proposed LDZ Shrinkage Quantities for the Formula Year 2014/15 are presented in the following table.

LDZ	Leakage (%)	Own Use Gas (%)	Theft of Gas (%)	Proposed Shrinkage Factor 2014/15 (%)
Wales North	0.758%	0.0113%	0.020%	0.789%
Wales South	0.401%	0.0113%	0.020%	0.432%
South West	0.739%	0.0113%	0.020%	0.770%
Weighted Average	**0.591%**	**0.0113%**	**0.020%**	**0.622%**

Note: All factors are expressed as percentages of forecast LDZ consumption.

1.7 Detailed Analysis

1.7.1 Leakage

In May 2003, Advantica, on behalf of Transco, completed an extensive programme of Leakage Tests. The results of the leakage testing programmes have been used in conjunction with our mains and other plant records, measurements of MEG concentration and system pressures to derive total leakage by LDZ. The nature of theses tests and their findings were described in previous proposals, and will not be included in this paper.

1.7.2 Own Use Gas

The 2014/15 proposals utilise the methodology applied in previous years and incorporating the conclusions of studies carried out by Advantica, whereby Own Use Gas is indicated as being 0.011% of LDZ consumption.

1.7.3 Theft of Gas

As a result of previous discussions at The Shrinkage Forum, it was concluded that 0.2% of LDZ consumption would be used as the overall level of theft until better information becomes available.

Transco statistics confirm the 90:10 – Shipper: Transporter split in responsibility for theft of gas. We believe that it is appropriate that WWU should assume responsibility for Theft of Gas equal to 0.02% of LDZ consumption

1.8 Extent to which the Proposal would better facilitate the relevant objectives

This proposal provides an accurate estimate of LDZ Energy Loss for the Formula Year 2014/15. 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 accurate targeting of costs to Users through the Reconciliation by Difference process and this is consistent with securing effective competition.

1.9 The implications for Wales & West Utilities of implementing the Proposal including:

a) Implications for 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 Energy Loss (which have been prepared without Pressure and Temperature correction) lead to a fair allocation of operating costs between LDZ systems.

c) Extent to which it is appropriate for Wales & West Utilities to recover the costs, and proposal for the most appropriate way for Wales & West Utilities to recover the costs:

It is appropriate for each LDZ to incur a share of the overall Shrinkage Energy cost dependant upon the actual shrinkage in that LDZ.

d) Analysis of the consequences (if any) this proposal would have on price regulation

We are not aware of any such implications that would result from implementing this proposal.

1.10 The implications of implementing the Proposal for Users

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

1.11 Analysis of any advantages or disadvantages on implementation of the Proposal

- **Advantages:** Good representation of the actual system usage and losses leading to improved cost targeting.
- **Disadvantages:** WWU are not aware of any disadvantages.

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

No representations were received that directly related to the LDZ Shrinkage Estimates that WWU published on 1 January 2014.

1.13 Programme of works required as a consequence of implementing the Proposal

The only required modification is to the LDZ Energy Loss values entered into AT Link.

1.14 Proposed implementation timetable (including timetable for any necessary information system changes

Users have until 15th March 2014 to request that Ofgem issues a Standard Special Condition A11 (18) disapproval of this proposal. This provision is in the UNC Section N 3.1.8.

If no disapproval notice is issued beforehand, it will be our intention to implement revised LDZ Energy Loss from 06:00 hrs on 1st April 2014.

1.15 Recommendation concerning the implementation of the Proposal

We recommend the proposed LDZ Energy Loss be implemented with effect from 06:00 hrs on 1st April 2014.

1.16 Wales & West Utilities Proposal

This report contains our proposal for the LDZ Energy Loss for the Formula Year 2014/15.

2 Appendix A – Comparative Figures from Shrinkage and Leakage Model ver. 1.3

Below are copies of the tables, as included above, with values from the 1.3 version of the shrinkage and leakage model for comparative purposes. Tables not included below remain the same for in models.

Summary figures

LDZ	Proposed Energy Loss (GWh)	Proposed Energy Loss Factor 2014/15 (Note)
Wales North	54.7	0.813
Wales South	124.3	0.425
South West	234.6	0.784
Total	**413.6**	**0.628**

Low Pressure Leakage

LDZ	Low Pressure Leakage
	GWh
Wales North	26.15
Wales South	81.87
South West	173.91
Total	**281.93**

Total Leakage

LDZ	Leakage	
	GWh	Leakage as a % of Consumption
Wales North	52.57	0.782
Wales South	115.16	0.394
South West	225.23	0.752
Total / Weighted Average	**392.96**	**0.596**

LDZ Shrinkage Quantity Summary

LDZ	Leakage (GWh)	Own Use Gas (GWh)	Theft of Gas (GWh)	Proposed Shrinkage Quantity 2014/15 (GWh)
Wales North	52.57	0.76	1.34	54.7
Wales South	115.16	3.30	5.85	124.3
South West	225.23	3.38	5.99	234.6
Total	**392.96**	**7.45**	**13.18**	**413.6**

LDZ Shrinkage Factor Summary

LDZ	Leakage (%)	Own Use Gas (%)	Theft of Gas (%)	Proposed Shrinkage Factor 2014/15 (%)
Wales North	0.782%	0.0113%	0.020%	0.813%
Wales South	0.394%	0.0113%	0.020%	0.425%
South West	0.752%	0.0113%	0.020%	0.784%
Weighted Average	**0.596%**	**0.0113%**	**0.020%**	**0.628%**