

LDZ Energy Loss Initial Proposals

Formula year 2020/21

December 2019



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1 LDZ Energy Loss Proposals for Formula Year 2020/21

Purpose of Proposal

This paper presents the Energy Loss through transportation as proposed by Wales & West Utilities (WWU) from the respective Local Distribution Zones (LDZ) for the Formula year 2020/21. This paper will describe the Energy Losses from the various factors within each LDZ detailing the Energy Losses associated to each component. This proposal will form the basis for WWU's LDZ Shrinkage Gas procurement during the 2020/21 formula year.

Users (defined as Distribution Network operators, gas shippers and other interested parties) are encouraged to provide feedback on this paper, feedback is to be provided to WWU by the 1st of February 2020. Taking into consideration any representations from Users, WWU will publish a final report by the 1st of March 2020.

Summary of Proposal

The LDZ Energy Loss reflects the losses associated with leakage, theft of gas and gas used in the operation of the system. Details of how these quantities have been determined are provided later in this paper.

Please note the values contained within this document have been rounded to an appropriate level of accuracy. This may cause immaterial discrepancies between the totals presented within this document and the summation of their constituent parts, however each individual figure is correct in its rounded form.

Fugitive emissions of gas (leakage and venting) have been estimated using forecast mains and asset populations as at 31st March 2020. WWU has considered Own Use Gas (OUG) and Theft of Gas (ToG) and propose using the same factor as previous years. The Energy Loss for 2020/21 is estimated at 0.52% of total demand through the WWU system.



Figure 1: Breakdown of Energy Loss by LDZ

2 Component Analysis

WWU's Energy Loss proposals are forecasted by calculating the forecasted Shrinkage for the respective Formula Year. The below diagram provides a high level breakdown of Shrinkage gas with values forecasted for 2020/21.



Figure 2: Breakdown of Shrinkage

Leakage

LP Mains Leakage represents the largest component of the total LDZ Energy loss at 54.7%. A component breakdown of Leakage with the percentage impact each one has is illustrated below.

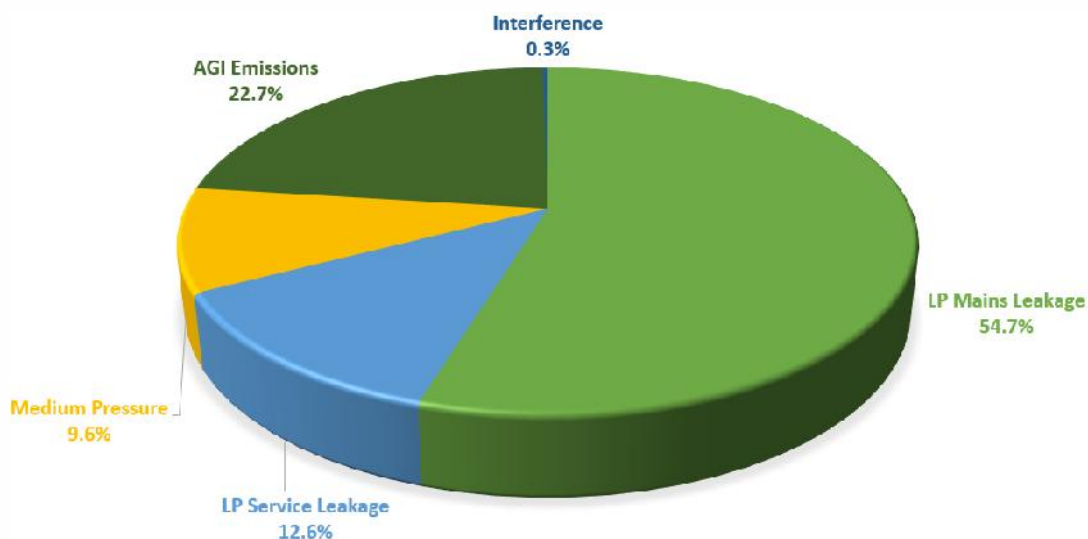


Figure 3: Components of Leakage

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

-)] Distribution Mains which is a feature of normal system operation (LP Mains Leakage, LP Service Leakage and MP Leakage)
-)] Above Ground Installations (AGI's) emissions which includes the routine venting of control equipment.
-)] Interference which include gas lost as a result of interference damage and broken mains. These losses are not continuous; they are caused by specific events.

The table below shows the total amount of predicted leakage for Formula Year 2020/21 split by LDZ with the leakage expressed in GWh

LDZ	Distribution Mains			AGI Emissions	Interference	Total Leakage
	LP Mains Leakage	LP Service Leakage	Medium Pressure			
WN	13.8	2.9	3.1	20.6	0.1	40.5
WS	44.4	13.6	9.4	22.5	0.2	90.1
SW	117.3	23.9	18.4	29.8	0.6	190.0
Total	175.5	40.4	30.9	72.9	0.9	320.6

Low Pressure

The Pipe leakage of gas from the Distribution mains system including service pipe leakage is calculated by applying the results of the National Leakage Testing (NLT) programme to the following network¹ specific information:

-) Projected (Formula year end 2020/21) view of pipe asset;
-) The forecast annual average system pressure in each network¹.

AGI Emissions

The figure for leakage from AGI has been calculated by applying the results of the NLT to the projected AGI population at formula year end 2020/21

Medium Pressure

Medium Pressure leakage has been calculated by applying the results of the NLT to the projected Medium Pressure population at formula year end 2020/21

Interference

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.

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 2018/19 have been used for the analysis, considered the most relevant to the current period.

¹ Network in this context relates to physical interconnected pipe systems, not administrative structure.
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Own Use Gas

In order to ensure the continued safe and reliable operation of the gas network, some gas is utilised through activities associated with the routine daily operation of the network; this gas is termed as Own Use Gas (OUG). Further detail on what constitutes OUG and the necessity of its use is discussed below.

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°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 gas 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 is included within AGI Emissions.

We are continuing to investigate the results of low carbon preheating trials which will allow us to determine if they can be used as a basis to revising the OUG calculation. Until this project has been concluded, WWU propose to apply the factor of 0.0113% to its LDZ consumption following studies carried out by Advantica and reported to the Shrinkage Forum.

For the Formula Year 2020/21 the factor for Own Use Gas is proposed as 0.0113% of LDZ consumption, this equates to 7.5 GWh.

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 emergency control valve (ECV) and downstream where there is no shipper contract with the end-user.

There is a current consensus agreement that Transporter responsible Theft of Gas is 0.02% of overall consumption.

GDNs propose that the Theft of Gas factor be set at 0.02% for the Formula Year 2020/21, equating to 13.2 GWh for the WWU network.

3 LDZ Energy Loss Summary

The proposed LDZ Energy Loss for the Formula Year 2020/21 is presented in the following table.

LDZ	Leakage (GWh)	Own Use Gas (GWh)	Theft of Gas (GWh)	Proposed Shrinkage Quantity 2020/21 (GWh)
WN	40.5	0.7	1.2	42.4
WS	90.1	3.4	5.9	99.4
SW	190.0	3.4	6.0	199.4
Total	320.6	7.5	13.2	341.2

Detailed Analysis

Leakage

In May 2003, Advantica – on behalf of Transco – completed an extensive programme of Leakage Tests. These tests were undertaken at the request of users. Before commencing the testing programme, users were invited to help Transco scope the project. Subsequently users were updated in respect of progress and had the opportunity to witness one of the tests. The test which were carried out is the largest scale leakage tests completed worldwide.

Altogether 849 sets of test results were obtained. The full test results were presented to users on the 10th of June 2003. Users have subsequently received a report, written by Advantica, detailing the programme and its findings.

To ensure that the testing programme was effective, Stone and Websters (a firm of consulting engineers) were asked to investigate the planned methodology. They found that both the proposed testing process and the equipment were fit for purpose. A copy of their report has previously been circulated.

Dr Shirley Coleman from the Industrial Statistics Research Unit of Newcastle University was also invited to comment upon and discuss with users the proposed sample plan. It was concluded that the proposed sample was likely to produce the results that were required.

In addition to testing distribution mains, Transco also tested above ground LDZ assets. The AGI testing programme was introduced during the March 2003 Shrinkage Forum. Subsequently users had the opportunity to question Dr Peter Russell - who led the work - and to visit a test in progress. To ensure the integrity of the testing programme Nottingham University (Environment Science Department) examined the testing procedure and Dr Coleman commented upon the results prior to their being used in the Final Proposals in respect of the 2003/04 Formula Year.

We still believe that the test programmes are relevant and provide a firm basis for assessing the leakage from both the distribution mains and AGIs; consequently, WWU has utilised the information as the basis for these proposals.

The results of the leakage testing programmes have been used in conjunction with our mains and other asset records, and system pressures to derive total leakage by LDZ.

Own Use Gas

The 2020/21 proposals utilise the methodology applied in previous years and incorporates the conclusions of studies carried out by Advantica, whereby Own Use Gas is indicated as being 0.0113% of LDZ consumption.

Theft of Gas

The responsibility for Theft of Gas is split between Gas Transporters and Shippers where Transporter responsible theft has been deemed 0.02% of LDZ consumption. Transporter responsible theft is assessed as theft upstream of the ECV and downstream where there is no supplier contract present. Shipper responsible theft is considered to be theft on site with a registered system user downstream of the ECV.

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

This proposal provides a robust estimate of LDZ Energy Loss for the Formula Year 2020/21. 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.

5 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 has been prepared without Pressure and Temperature correction) leads 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 dependent upon the actual shrinkage in that LDZ.

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

Shrinkage gas is a very small component of Unidentified Gas (UIG) and therefore would have an impact on the allocation of UIG.

6 The implications of implementing the Proposal for Users

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

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

Advantages: Representation of the actual system usage and losses relevant to current network composition.

Disadvantages: Purchasing shrinkage gas on a flat daily profile throughout the year may cause some very minor inconsistencies on UIG. During summer where gas demand is lower, Shrinkage gas would make up a greater proportion of UIG whilst during the winter, the proportion would be smaller.

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 that are due to be published no later than 1st March 2020.

It would be appreciated if users could let us have any feedback that they would like to share with us by 1st of February 2020 in order for views to be considered prior to the notification of our LDZ Energy Loss final estimates.

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

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

10 Proposed implementation timetable (including timetable for any necessary information system changes)

When WWU publish its final proposals, users have until 15th March 2020 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 05:00 hrs on 1st April 2020.

11 Recommendation concerning the implementation of the Proposal

We recommend the proposed LDZ Energy Loss be implemented with effect from 05:00 hrs on 1st April 2020.

12 Wales & West Utilities Proposal

This report contains our proposal for the LDZ Energy Loss for the Formula Year 2020/21. Feedback should be provided to the following person;

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