Cadent
Your Gas Network

LDZ Shrinkage Quantity Initial Proposals Formula Year 2018/19

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Industry Consultation Document

LDZ Shrinkage Quantity Proposals
Formula Year 2018/19
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Purpose of Proposal

1. The purpose of this paper is to present our proposals in respect of Cadent LDZ Shrinkage for the Formula Year 2018/19, as required under Section N of the Uniform Network Code.

Under Section N of the Uniform Network Code, Cadent 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 2018, in which Cadent will set out its final estimate of its LDZ Shrinkage Quantity values.

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 2018. Responses to this document are encouraged and should be received no later than 1 February 2018. Communication should be directed to Matt Marshall or via the Joint Office (contact details below).

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

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. The current shrinkage volumes are shown for comparison purposes.

Table 1. Proposal 2018/19 LDZ Shrinkage Quantities

	Shrinkage Proposal 2017/18 (GWh)	2017/18 Formula Year Outturn Forecast (GWh)	Proposed Shrinkage Quantities 2018/19 (GWh)
Eastern	206	208	201
East Midlands	228	231	220
North Thames	232	230	219
North West	326	324	309
West Midlands	282	283	272
Cadent	1,273	1,275	1,221

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 54GWh in estimated shrinkage compared to that estimated for the current year end. The main contributing factor to the reduction, approximately 40GWh, is associated with the forecasted low and medium pressure mains replacement activities in 2018/19.

In our Shrinkage Proposals for 2017/18 we described the potential challenges to maintaining system pressures in future years. The usage of internal pipe remediation and mains insertion techniques is becoming more prevalent; this has a positive impact on end user customer experience and reduces disruptive excavation works however it does require a greater system pressures to ensure end user requirements are satisfied. In 2017/18 we forecasted that pressures would remain broadly flat against 2016/17 outturn levels. In future year we plan to optimise each of our networks so that we can maximise emissions reductions whilst also ensuring all customers receive a consistent gas supply. Optimisation of the network will continue for the remainder of the RIIO GD1 period, we expect to progressively reduce system pressures to achieve levels similar to those of 2015/16. This will be realised through the upgrade of automated pressure management software, training, internal engagement and increased focus on areas where over pressurisation has been identified. We have introduced a dedicated team responsible for optimising the most environmentally damaging networks within our geographic regions, the benefits of implementing each of these bespoke strategies is already being realised and for this reason for the 2018/19 proposals, we are forecasting that we will outperform expected 2017/18 pressures by 0.25mb which will give a 8GWh leakage reduction.

We continue to focus on improving saturations of Mono-Ethylene Glycol (MEG) within our low pressure network. Our shrinkage proposal for 2018/19 is calculated using a 35% saturation level which is 6.1% higher than that forecasted for end of year 2016/17 and would return an additional 5GWh leakage reduction. Although the MEG saturation has improved historically as a result of our continued focus in maintaining and maximising the equipment we have available, the removal of assets with lead yarn joints continues to erode the increased saturation benefit. We are also considering as part of our bespoke operating strategies how we can further increase the zone of influence for MEG, which is the length of pipe physically treated.

The remainder of the difference between 2017/18 outturn forecast and 2018/19 shrinkage proposal is attributable to the shrinkage elements: Own Use Gas and Theft of Gas. These

components are calculated as a factor of consumption of which we are forecasting will be lower in 2018/19 than that forecasted for 2017/18.

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 2019.

Table 2. Shrinkage Proposal Accuracy

	2017/18	2016/17	2015/16	2014/15	2013/14
Proposal (GWh)	1,273	1,282	1,334	1,403	1,505
Outturn (GWh)	1,275 *(Forecast)*	1,311	1,329	1,370	1,451
Difference (GWh)	-2	-29	5	33	54
Difference (%)	0.2%	2.3%	0.4%	2.4%	3.6%

The Daily Shrinkage Quantity values, shown in Table 3, will be used as the basis Cadent Gas Ltd.'s LDZ Shrinkage gas procurement during the Formula Year in question.

Table 3. Proposed LDZ Daily Shrinkage Quantity Values for 2018/19 Formula Year

	Daily Shrinkage Quantity (kWh)
Eastern	550,395
East Midlands	602,260
North Thames	600,685
North West	846,408
West Midlands	746,508
Cadent	3,346,255

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 2018/19 proposal. Gas Distribution Networks (GDNs) have an obligation under Special Condition 1F Part E of the Licence to review the Shrinkage and Leakage Model on an annual basis and to consult on the outcome of that review with other DN Operators, gas shippers and other interested parties. The Shrinkage Quantity Proposals are calculated using the methodology contained within the Shrinkage and Leakage Model. The Shrinkage and Leakage Model Review was published on the Joint Office website on 12 October 2017.

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 1F of the GDN Licences. Under paragraph 1F.17 Distribution Networks have the obligation to annually review the leakage model to ensure that it meets the obligation, specified under paragraph 1F.13, of:

(a) the accurate calculation and reporting of gas shrinkage and leakage from each of the LDZs operated by the licensee; and

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.

For the purpose of analysis, leakage may be 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 specific information:

- Pipe asset data
- Annual average system pressure (ASP) in each network
- Measured concentration of Mono-Ethylene 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.

There has been, and will continue to be, significant replacement of iron mains, in line with Cadent Gas Ltd.'s mains replacement policy. These proposals assume an estimated amount of mains replacement applicable for the 2018/19 leakage assessment; equating to approximately 3,870km of iron main from April 2017.

Table 4. Estimated LDZ Low Pressure Leakage for 2018/19 Formula Year

	Low Pressure Leakage	
	Tonnes	GWh
Eastern	8,938	134
East Midlands	8,025	121
North Thames	10,119	152
North West	15,156	228
West Midlands	13,318	200
Cadent	55,557	834

Table 5 below, shows the estimated Medium Pressure leakage on an LDZ basis:

Table 5. Estimated LDZ Medium Pressure Leakage for 2018/19 Formula Year

	Medium Pressure Leakage	
	Tonnes	GWh
Eastern	999	15
East Midlands	2,742	41
North Thames	1,355	20
North West	974	15
West Midlands	1,317	20
Cadent	7,387	111

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. The asset profile determined as part of the 2016/17 final assessment is deemed reflective of future years and so used for the purpose of forecasting 2018/19 estimates. Table 6, shows the estimated AGI leakage and venting on an LDZ basis:

Table 6. Estimated AGI Emissions for 2018/19 Formula Year

	AGI Emissions (includes leakage and routine equipment venting)	
	Tonnes	GWh
Eastern	2,542	38
East Midlands	2,594	39
North Thames	2,006	30
North West	2,990	45
West Midlands	2,547	38
Cadent	12,678	190

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'.

To forecast the impact of this component is difficult due to the uncertain nature and the uncontrolled external influences, for the purposes of the 2018/19 estimate the quantities used are an average of those recorded in 2013/14 – 2016/17. Table 7 below shows the amount of gas lost because of other losses on a LDZ basis, which is proposed as the estimate for 2018/19:

Table 7. Estimated 2018/19 Other Losses

	Other Losses	
	Tonnes	GWh
Eastern	42	0.6
East Midlands	63	0.9
North Thames	43	0.6
North West	64	1.0
West Midlands	46	0.7
Cadent	257	3.9

3.1.4. Leakage Reduction Initiatives

We are proud of our achievements in reducing harmful emissions, in RIIO-GD1 so far, shrinkage reduction volumes of 280 GWh (19%) against opening baselines are forecasted to be achieved.

In the first six years of RIIO-GD1 our forecast predicts that all our networks will surpass emission reduction targets. These reductions reflect our commitment to reducing emissions and the benefits seen from investment and focus being placed predominantly in system pressure optimisation and our commitment to improving MEG saturations.

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. We have described in this document our customer focussed approach to optimising the networks we operate in, both with the use of unintrusive mains insertion techniques and also the optimisation of system pressures to ensure customers in the extremities of the networks are receiving a consistent gas supply.

In future, we anticipate the delivery of a number of initiatives that should further reduce overall shrinkage quantities, these include:

- Continuing to upgrade and improve our automated pressure management equipment which will enable improved monitoring, recording and control of system pressures.
- Delivery of network Operating Strategies designed to maximise leakage reduction in priority, high impact, areas.
- Understand the correlation between leakage on medium pressure systems and the correlation of system pressure and review the findings with a view to proposing a modification to the leakage calculation methodology.
- Continue studying the equipment we operate at our Above Ground Installations that vent routinely as part of its operation with the intention to raise a modification to the leakage calculation methodology. This would allow the benefit of replacement of non-venting equipment to be predicted, which could stimulate an investment programme, depending on whether such investment was cost justified.
- Review of the Own Use Gas calculation, moving to an activity based calculation from a factor of demand would allow more targeted replacement of preheating equipment to be reflected within the model.

3.1.5. Total Leakage

Table 8 demonstrates the total amount of estimated leakage for Formula Year 2018/19 on an LDZ basis with the leakage expressed in GWh.

Table 8. Estimated 2018/19 Formula Year LDZ Leakage Summary

	Leakage (GWh per annum)
Eastern	187
East Midlands	202
North Thames	203
North West	288
West Midlands	258
Cadent	1,139

3.2. Own Use Gas

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

In line with this methodology, Cadent Gas Ltd proposes to apply a fixed LDZ Specific daily quantity for OUG equivalent to 0.0113% of annual LDZ consumption. This factor represents the estimated national average that was determined by Advantica in 2002.

The estimated 2018/19 Own Use Gas quantity values are shown Table 9.

Table 9. Estimated 2018/19 LDZ OUG Quantity Values

	Forecast LDZ Consumption GWh/annum	OUG GWh/annum	OUG kWh/day
Eastern	42,906	5	13,283
East Midlands	56,792	6	17,582
North Thames	52,192	6	16,158
North West	65,920	7	20,408
West Midlands	44,997	5	13,931
Cadent	262,806	30	81,362

3.3. Theft of Gas

UNC Section N 1.3.2 states that LDZ Shrinkage shall include, and Cadent Gas Ltd 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.

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

The responsibility for Theft of Gas is split between Gas Transporters and Shippers. Transporter Responsible Theft has been deemed 0.02% of LDZ Consumption. Table 10 overleaf, shows the estimated 2018/19 Theft of Gas Quantity Values:

Table 10. Estimated 2018/19 LDZ Theft of Gas Quantity Values

	Forecast LDZ Consumption GWh/annum	ToG GWh/annum	ToG kWh/day
Eastern	42,906	9	23,510
East Midlands	56,792	11	31,119
North Thames	52,192	10	28,598
North West	65,920	13	36,120
West Midlands	44,997	9	24,656
Cadent	262,806	53	144,003

3.4. LDZ Shrinkage Quantity Summary

Table 11 shows the proposed LDZ Shrinkage Quantity Values for the Formula Year 2018/19 in GWh per annum:

Table 11. Estimated 2018/19 LDZ Shrinkage Quantity Values

	Leakage (GWh)	OUG (GWh)	Theft (GWh)	Total (GWh)
Eastern	187	5	9	201
East Midlands	202	6	11	220
North Thames	203	6	10	219
North West	288	7	13	309
West Midlands	258	5	9	272
Cadent	1,139	30	53	1,221

Table 12 shows the estimated Daily Shrinkage Quantity values applicable for the 2018/19 Formula Year in kWh per day:

Table 12. Estimated 2018/19 LDZ Daily Shrinkage Quantity Values

	Daily Shrinkage Quantities (kWh)
Eastern	550,395
East Midlands	602,260
North Thames	600,685
North West	846,408
West Midlands	746,508
Cadent	3,346,255

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

This proposal provides a robust estimate of LDZ Shrinkage Quantity values for the Formula Year 2018/19. 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, as Cadent Gas Ltd will be incentivised to identify opportunities to reduce Shrinkage in future years. 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 Cadent Gas Ltd of implementing the Proposal

(a) Implications for the operation of the system:
We are not aware of any implications for system operation resuling from implementation of 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 Cadent Gas Ltd to recover the costs, and proposal for the most appropriate way for Cadent Gas Ltd to recover the costs:
It is appropriate for each LDZ to incur a share of the overall Shrinkage Energy dependant upon the actual shrinkage in that LDZ.

(d) Analysis of the consequences (if any) this proposal would have on price regulation:
The proposal is consistent with the establishment and operation of Distribution Network specific transportation charging formula.

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: Good representation of the actual system usage and losses leading to improved cost targetting.

Disadvantages: Cadent Gas Ltd is not aware of any disadvantages.

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 2018. Responses to this document are encouraged and should be received no later than 1 February 2018. Communication should be directed to Matt Marshall or via the Joint Office (contact details below).

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8. Programme of works required as a consequence of implementing the Proposal

The only required modification is the input of LDZ Daily Shrinkage Quantity values into GEMINI.

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

Following pulbication of our Final Proposals, Users will have until 15 March 2018 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 05:00 hrs on 1 April 2018.

10. Recommendation concerning the implementation of the Proposal

We recomment the proposed LDZ Daily Shrinkage Quantity values be implemented with effect from 05:00 hrs on 1 April 2018.

11. Cadent Gas Ltd.'s Proposal

This report contains our initial Proposals for the LDZ Daily Shrinkage Quantity values for the Formula Year 2018/19.