CONSULTATION DOCUMENT

NTS Shrinkage Incentive Methodology Statement

5 September 2012

Contents

Executive Summary

Ofgem's Initial Proposal for the NTS Shrinkage Incentive to apply over the RIIO-T1 period from April 2013 to March 2021 (inclusive) comprises an overall cost minimisation scheme whereby a cost target is compared to the actual costs incurred by National Grid Gas (in its role as the NTS System Operator) in order to determine incentive performance.

As the scheme is proposed to operate over a period of 8 years during which the operating environment is likely to change, the proposal advocates development of a 'methodology statement' which would determine a number of parameters which are utilised to calculate the annual overall cost target.

Use of a methodology statement will ensure that the cost target remains effective over the RIIO-T1 period by utilising latest information from which to derive the relevant volume and price parameters.

This consultation document seeks stakeholders' views on the form and content of the proposed shrinkage incentive methodology statement. It is intended to allow stakeholders to understand better Ofgem's initial proposals to implement a methodology statement for the proposed shrinkage incentive and also to seek specific views on the interim arrangements proposed to apply in the first year of the scheme.

All responses will be made available to Ofgem to inform their decision making process with regard to their Final Proposals for the NTS Shrinkage Incentive and the proposed associated methodology statement.

Background

National Grid Gas (NGG) undertakes the role of System Operator (SO) for the high pressure gas National Transmission System (NTS) in Great Britain.

The regulatory framework within which the SO operates is under review in parallel with the ongoing price control reviews for all UK gas and electricity transmission businesses. This will be the first review of the SO activity under the new RIIO regulatory framework model (Revenue = Incentives + Innovation + Outputs) where a new SO incentive framework will be established for an 8 year duration. The review commenced with Ofgem's consultation on its initial views of the incentive principles to apply from April 2013 in June 2011 followed by the publication of a further consultation on principles and policy on the SO Incentives in January 2012.

We published our System Operator External Incentive Plan in May 2012[1]. This set out our proposals for a range of incentives, including shrinkage.

In July 2012 Ofgem published their 'System Operator Incentive Schemes from 2013 Initial Proposals'[2]. Within these proposals Ofgem agreed with National Grid's view that a methodology should be established which defines the means by which a number of the cost target parameters are derived in order to maintain the appropriateness of the overall cost target. Within the initial proposals, Ofgem also considered it "appropriate that NGG consults with stakeholders on its methodology statement prior to the Authority issuing its Final Proposals towards the end of 2012."

In Ofgem's 'System Operator incentive schemes from 2012: initial proposals' appendices, **it considers it appropriate for us to have a shrinkage methodology statement**:

> "5.12. We agree with NGG that it would not be possible to set a target volume for the baseline level of Shrinkage for each of the eight years at the outset of the scheme. We also agree that putting in place an agreed methodology would enable the volume to be calculated on a pre-agreed basis and therefore would overcome this issue. "
>
> "5.13. In order that stakeholders are able to understand how the shrinkage volume target will be calculated for 2013/14, we consider it appropriate that NGG consults with stakeholders on its methodology statement prior to the Authority issuing its Final Proposals towards the end of 2012."

In its initial proposals, Ofgem also considers:

> "…that the methodology **should contain the following detail**:
>
> • UAG: for each quarter the target would be based on the average volume in the previous quarter and this methodology would only be amended if directed by the Authority as a result of new information regarding the drivers of UAG.
>
> • CV Shrinkage: would be based on the current methodology with the same carve outs that currently exist. NGG would consider the effects of

[1] http://www.nationalgrid.com/uk/Gas/soincentives/docs/

[2] http://www.ofgem.gov.uk/Markets/WhlMkts/EffSystemOps/SystOpIncent/Pages/SystOptIncent.aspx

> any new supply source on CV Shrinkage, and if appropriate would request that the Authority directs an update to the methodology to take account of the effect of the new supply source.
>
> • CFU (gas and electric): calculated based on NGG's regression model of CFU vs. actual flows, using historic data. The coefficients from the regression will be updated on an annual rolling basis.
>
> • CFU (review): By May 2016 NGG should consider whether its regression model approach remains fit for purpose and if not develop an alternative approach to be implemented from April 2017. If its regression model is retained for 2017 and beyond, NGG should, as appropriate, keep it under review.
>
> • CFU (electric drive rollout): detail as to how NGG's electric drive replacement programme will be incorporated, including how the resultant reduction in gas CFU, and increased efficiency of compressor usage will be accommodated."

Regarding the first year of the RIIO period, in section 5.13 Ofgem states:

> "This consultation will also need to explain how NGG proposes that the methodology is applied to its forecast of volumes for 2013/14."

This consultation is aimed at meeting Ofgem's requests and seeks stakeholders' views on whether the form and content of the proposed methodology statement is the most appropriate way to determine the calculations for setting certain parameters used within the shrinkage scheme.

National Grid's Proposal

The principles of the proposed shrinkage incentive scheme methodology statement are as per Ofgem's Initial Proposals, plus parameters for swing cost where appropriate. The proposed methodology statement is included as an addendum to this consultation. It is assumed that the licence will be amended to include requirements for us to publish a shrinkage methodology statement, the values of which will be subject to an annual independent compliance audit.

The sections of the proposed methodology statement are detailed below.

Baseline Volumes

The values calculated by following the methodology will be published on National Grid's website within a 'Shrinkage Incentive Ex-Ante Baseline Values' statement. A template for this is shown in Appendix A.

Specific new and amended incentive parameters will need to be set out in the licence following Final Proposals. To ensure consistency and reduce ambiguity, these should be referenced within the methodology statement either at the same time as the licence drafting or shortly afterwards.

Baseline volumes should be published shortly after they are calculated prior to each reference period.

A comparison of baseline values and outturn values will be made available to stakeholders through National Grid's usual data publication channels.

Unaccounted for Gas

UAG volume calculations will be based on quarterly (three calendar month) historic rolling average consistent with Ofgem's initial proposals.

Calorific Value Shrinkage

CV Shrinkage is based on the current methodology with the same carve outs that currently exist. National Grid will consider the effects of any new supply source on CV Shrinkage, and if appropriate would request that the Authority directs an update to the methodology to take account of the effect of the new supply source.

Compressor Fuel Use

CFU (gas and electricity) is calculated based on National Grid's regression model of CFU against actual flows, using historic data. The regression model is very similar to that used to set the CFU target for 2012/13. The coefficients from the regression will be updated on an annual rolling basis.

The methodology statement includes an obligation for National Grid to consider whether its regression model approach remains fit for purpose and if not develop an alternative approach to be implemented from April 2017.

Our electric drive replacement programme does not have a significant effect on the overall efficiency of compressor fuel use. The energy used by an electric compressor to move a certain quantity of gas will be about one third of that of a gas compressor, but the commodity cost will be similar because the per-unit cost of the electricity will be approximately three times that of gas.

For simplicity and clarity, all four CFU and Calorific Value Shrinkage quarterly baseline volumes will be calculated once, prior to the start of the first reference period and not recalculated during the year. UAG baseline volumes will be calculated in advance of each reference period. The timeline is set out in Appendix B.

In addition to baseline volumes for CFU, efficiency volumes are also calculated by following the methodology statement. For simplicity and clarity we are not evaluating the CFU efficiency volume separately by gas and electricity, instead opting to use only gas prices to turn efficiency performance into an incentive cost.

Swing Costs

The swing volumes are based on variance of outturn volumes from quarterly average volumes. Ofgem proposes to remove swing cost by using more prompt reference price for the adjusting trade. We consider removing swing cost will only be appropriate if the adjusting volume relates to the balancing period, ie daily outturn for gas and half-hourly for electricity.

Interim Arrangements for 2013/14

It is expected that Ofgem's Final Proposals, including the methodology statement, for the shrinkage incentive scheme will become effective from 1 April 2013. One of the principles of the proposed scheme is that there will be a baseline target volume of shrinkage gas which is set in the preceding year. The baseline target for the first year of the new incentive scheme (2013/14) would need to be set during 2012/13, which is before the new incentive scheme and methodology have become effective. Due to this conflict in timescales, interim arrangements for the shrinkage incentive have been proposed for 2013/14.

The baseline volumes and swing costs for 2013/14 have been calculated on the basis of the proposed methodology statement. The calculations for these values have been set out in Appendix C. The values have also been set out in the form of the proposed Shrinkage Incentive Ex-Ante Baseline Values Statement in the addendum to this consultation.

Questions for Consultation

1. Do you consider the form of the proposed methodology statement in the Addendum to be fit for purpose for the derivation of shrinkage incentive scheme parameters over an eight year period?

2. Do you consider the steps set out in the proposed methodology statement in the Addendum to give enough detail, clarity and transparency?

3. The proposed form of the calculated values is shown in Appendix A (NTS Shrinkage Incentive Ex-Ante Baseline Values Statement) and its publication route and timescales are given in 'National Grid's Proposals – Baseline Volumes'. Do you consider the form of the statement and arrangements for its publication to be clear and appropriate?

4. Are the interim arrangements for 2013/14 clear and appropriate?

Please send your responses to SOIncentives@nationalgrid.com by 3 October 2012.

If you would like to discuss any detail of this consultation please contact us using the email above or the following contact details:

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APPENDIX A - Draft NTS Shrinkage Incentive Ex-Ante Baseline Values Statement for [example for 2014/15]

This document will be updated and published five times for 2014/15:

- **June 2013** (initial publication)
  - Swing costs
  - Baseline volumes for Q2 2014
    - Summation of UAG, CFU and CV shrinkage
  - CFU baseline volumes for other quarters
  - CV shrinkage volumes for other quarters

- **September 2013** (update)
  - Baseline volumes for Q3 2014

- **December 2013** (update)
  - Baseline volumes for Q4 2014

- **March 2014** (update)
  - Baseline volumes for Q1 2015

- **May 2014** (update)
  - Adjusted target volume
    - CFU adjusted target volume
    - CV shrinkage adjusted target volume

A separate document will exist for each incentive year.

BASELINE VOLUMES - CFU

STEP 1
The relationship between flow at the St Fergus ASEP and total CFU, using data from 2006/7 to 2012/13 inclusive, is:

(A) Total CFU = e^{xxx}

[Show graph of annual CFU v daily average St Fergus flows]

STEP 2
The forecast flow at the St Fergus ASEP for 2014/15 is:

(B) X mcm

Inserting the forecast flow at St Fergus ASEP into equation (A) gives a total CFU baseline volume of:

(C) X GWh

STEP 3
The quarterly CFU volumes for 2012/13 were:

	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	TOTAL
Gwh	X	x	X	x	x

%	x	x	X	x	100

Applying the above quarterly percentages to the total CFU baseline volume (C) gives the following quarterly CFU baseline volumes for 2014/15:

	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	TOTAL
GWh	X	x	X	x	x

STEP 4
Applying the prevailing view of electric compressor replacement, along with historical information of the split between gas and electric compressor usage, gives the following split of quarterly CFU baseline volumes between electricity and gas for 2014/15:

	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	TOTAL
Gas GWh	x	x	X	x	x
Elec GWh	X	x	X	x	x

BASELINE VOLUMES - CALORIFIC VALUE SHRINKAGE
The quarterly CV shrinkage baseline volumes for 2014/15 are as follows:

	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	TOTAL
GWh	X	x	X	x	x

BASELINE VOLUMES – UNACCOUNTED FOR GAS
The quarterly UAG baseline volumes for 2014/15 are as follows:

	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	TOTAL
GWh	X	x	X	x	x

ENERGY EFFICIENCY VOLUMES – COMPRESSOR FUEL USE
The annual CFU energy efficiency adjustment volumes for 2014/15 are as follows:

	TOTAL
Target	X
Outturn	x
Adjustment	x

ENERGY EFFICIENCY VOLUMES – CALORIFIC VALUE SHRINKAGE
The CV shrinkage energy efficiency adjustment volumes for 2014/15 are as follows:

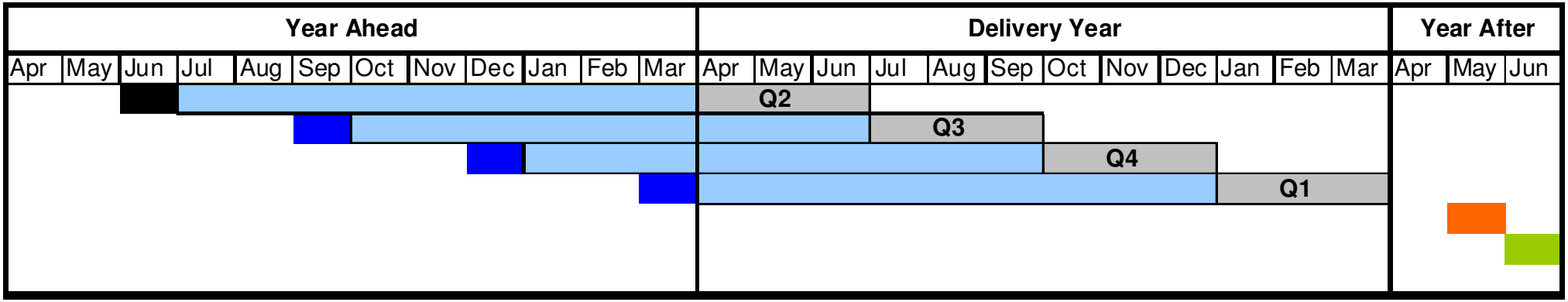
	TOTAL
Target	X
Outturn	x
Adjustment	x

SWING COST

The gas swing cost for 2014/15 is: xx

The electricity swing cost for 2014/15 is: xx

APPENDIX B – TIMELINE



Calculate and publish baseline volume for Q2 and CFU & CV shrinkage for other quarters

Calculate and publish baseline volume for relevant quarter (UAG added to already published CFU and CV shrinkage values)

Reference Period

Delivery Quarter

Calculate adjusted target volume (using efficiency targets for CFU and CV shrinkage)

Audit all calculated/published baseline volumes

APPENDIX C - Interim Arrangements for 2013/14

This appendix provides details of proposed transitional arrangements for 2013/14. For simplicity we have proposed to set the forward shrinkage baseline volumes and swing costs for the whole of the year. This will allow Ofgem and other stakeholders to consider the proposals without the uncertainty and complication of the values being calculated while the Initial Proposals are still being consulted upon. The basis and details of how the values have been calculated are set out below. A summary of the values is also given within the proposed statement set out in the Addendum to this document. This is in the form of the proposed NTS Shrinkage Incentive Ex-Ante Baseline Values Statement to aid understanding of how this is intended to be used.

Ofgem consider there should be no retrospective change to the Gas Cost Reference Price (GCRP) defined in licence for 2013/14. We propose GCRP, excluding uplift, is applied to the gas forward baseline volumes.

The licence is silent on Electricity Cost Reference Price (ECRP) for 2013/14. We consider forward procurement delivers appropriate price risk management for customers and propose a 9 month forward reference period is applied to electricity baseline volumes as detailed in our business plan.

The forward baseline volume targets represent the best available forecast of efficient volume outturn as at the time of forward procurement. Recognising uncertainty and volatility of volumes over a forecast horizon the RIIO proposals benchmark the 'adjusting trade' at market prices if and when volume variances become evident. With no methodology statement implemented the 2013/14 baseline volumes and swing costs will be based on prevailing forecast. These forecasts reflect the analysis/models that support the proposed methodology statement.

The proposed methodology statement and review process recognises that some targets will evolve with market conditions and forecasts are updated to ensure the baseline volumes best reflect efficient outturn (minimal adjusting trades). For the 2013/14 year there will be no update of forward baseline volumes and will remain fixed at the initial forecast level.

The proposed methodology statement also defines the calculation of efficiency volumes. This approach is considered appropriate for calculating 2013/14 efficiency volumes.

2013/14 Forward Baseline Volumes

Compressor Fuel Use (Gas and Electricity)
The 2013/14 forward baseline volumes for CFU are as follows:

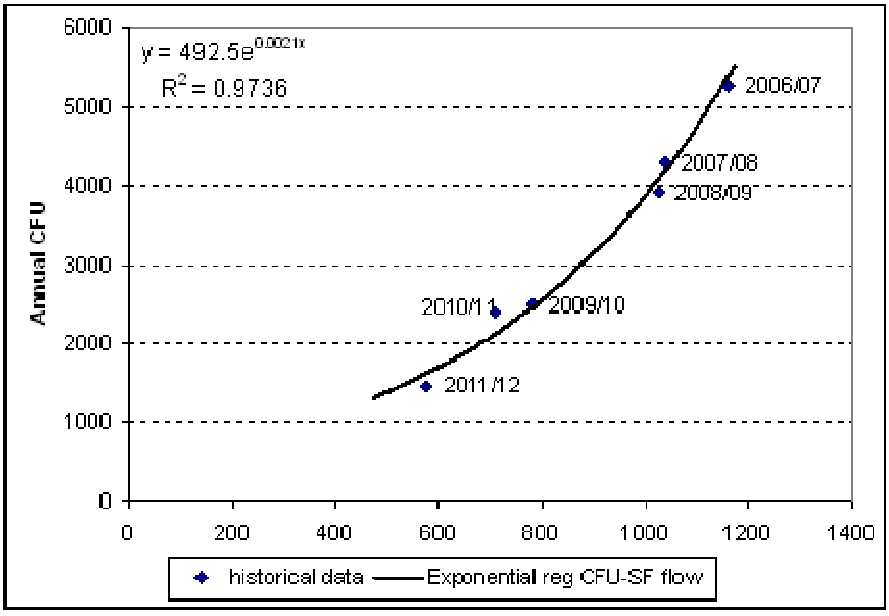
	National CFU	OUG	ECE
FY 2013/14	1911	490	474
2013_Q2	487	81	135
2013_Q3	299	29	90
2013_Q4	524	147	126
2014_Q1	602	232	123
all in GWh			

These have been calculated using the steps within the proposed methodology as follows:

Step 1: Identify Relationship Between CFU and St Fergus Flow
This analysis is undertaken using standard excel functionality to identify the exponential least error fit of annual CFU and daily average St Fergus flows.

Historical data

FY	Sum of National CFU (GWh)	Average of St. Fergus (GWh) flow
2006/07	5272	1160
2007/08	4287	1036
2008/09	3898	1024
2009/10	2495	781
2010/11	2397	706
2011/12	1462	577



The relationship is as follows:

CFU (GWh) = 492.5 * exp $^{0.002062 * \text{Daily Average St Fergus Flow}}$

where Daily Average St Fergus Flow is the mean average daily flow for each of the years from 2006/7 to 2011/12 inclusive.

Step 2: Calculate the Annual CFU Baseline Volume

y=c*exp^(b*x)	
B	0.002061992
C	492.4994417

x is average St. Fergus flow from 10-year statement

2011	
Gas year 2012/13	679
Gas year 2013/14	636
Financial Year	
2013/14	658
	=0.5*gasyear 2012/13+0.5*gasyear 2013/14

y (total CFU 2013/14)	1911
	=492.49*EXP(0.00206*658)

Step 3: Calculate Ratios of Quarterly Outturn to Annual Outturn

Year	quarter	Sum of National CFU (GWh)	% quarter CFU / Total CFU
2012	Q1	460	31%
2011	Q2	373	25%
2011	Q3	228	16%
2011	Q4	401	27%
2011/12 Total		1462	100%

Applying these ratios to the calculated annual CFU forward baseline volume:

Forecast	**National CFU**	**SF flow (GWh/day)**
FY 2013/14	**1911**	**658**
2013_Q2	487	
2013_Q3	299	
2013_Q4	524	
2014_Q1	602	
all in GWh		

Step 4: Split Quarterly CFU Forward Baseline Volumes by OUG and ECE

	National CFU	OUG	ECE gas equivalent	ECE
FY 2013/14	1911	490	1421	474
2013_Q2	487	81	406	135
2013_Q3	299	29	269	90
2013_Q4	524	147	377	126
2014_Q1	602	232	369	123
all in GWh				

UAG

For the transitional 2013/14 year the fixed baseline volume would be based on the daily average data over the Quarter Mar-12 to May-12. The daily average is 8.51 GWh/d, giving the following UAG forward baseline volumes:

Q213 774 GWh
Q313 783 GWh
Q413 783 GWh
Q114 766 GWh

CV Shrinkage

The proposed methodology statement details network analysis to calculate baseline forecast CV shrinkage volumes. This network analysis has been completed and FWACV results shown in the table below

Year	CV Shrinkage (GWh)
2013/14	102.87
2014/15	98.23
2015/16	113.87
2016/17	98.45
2017/18	104.29
2018/19	115.27
2019/20	112.49

For the transitional year 2013/14, we propose an annual forward baseline target of 102.87 GWh, split evenly over the four quarters as follows:

Q213 25.7 GWh
Q313 25.7 GWh
Q413 25.7 GWh
Q114 25.7 GWh

2013/14 Swing Costs

Gas swing Cost
Based on the average swing duration curve (2010/11 and 2011/12) and published prices for Rough storage service:

- 15.06 GWh SBU would be required to service the max swing withdrawal.
- The current market price for Rough is 29.05p/SBU (Centrica Storage Ltd website 18-June-12)
- A single cycle would require 719 GWh in injection and withdrawal at 0.021p/kWh and 0.007p/KWh respectively (Centrica Storage Ltd published charges – May 12 contract)
- Gas swing cost for 2013/14 of £4.53m

Electricity Swing Cost
For 2013/14 the electricity swing cost will be £2.3m based on:

- Compressor stations expected to be electric drive operational (RIIO-T1 plan)
- Half-hourly variances (swing volume) from the quarterly average outturn for the previous two full incentive years (Apr-10 to Mar-12)
- Half-hourly electricity cashout prices for the last 8 years (Apr-04 to Mar-12)
- Calculated net swing cost for 16 scenarios (16 combinations of two years of swing volume and eight years of cashout prices)
- 2013/14 electricity swing cost (£2.3m) is equal to the average cost for the 16 scenarios