

Review Group 0251
Review of the Determination of Daily
Calorific Values

26th June 2009

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Introduction

How are applicable daily CVs determined?

- ◆ NTS Direct Connections – site specific measurement
- ◆ DN Connected Loads – Flow Weighted Average CV (FWACV) methodology

Calculated within each charging zone in accordance with the Gas (Calculation of Thermal Energy) Regulations 1996 as the lowest of:

- ◆ FWACV across all inputs to the DN charging zone
- ◆ Lowest average CV at any single input to the DN charging zone, plus 1MJ/m³

Protects consumers by effectively capping billable CV at a maximum of 1MJ/m³ above the lowest source of energy into a charging zone

Measured energy - billable energy = unbilled energy (CV shrinkage)

- ◆ NTS SO procures CV shrinkage gas for NTS Shippers

Why Review FWACV?

Potential drivers for increased CV variances in the future

1) Increasing diversity of UK supplies:

- ◆ LNG Importation, marginal UKCS fields, biogas, coal-bed methane, etc.

2) Changing network topography:

- ◆ Historically, UKCS gas flowed North to South, East to West
- ◆ Increased number and variability of supplies to the NTS

Indicated the potential to trigger CV capping, thereby generating higher levels of unbilled energy

Actions for National Grid NTS from the first meeting

Establish the magnitude of the issue from an NTS perspective

Explore future network flow scenarios associated with:

- ◆ potential new sources of gas entering the NTS and/or directly entering DNs;
- ◆ deliveries from existing sub-terminals if all were to adopt the full range of gas quality parameters as set out in the Gas Safety (Management) Regulations 1996 and in Appendix 5 of National Grid NTS's Ten Year Statement;

From the identified future gas network flow scenarios, forecast levels of unbilled energy based on the current rules for calculating daily billable CVs;

Analyse the cost impacts of the future unbilled energy scenarios, in particular, assessing whether any parties may be unduly disadvantaged

Sub-terminals with Legacy CV Parameters

Ofgem's Mod 0236 Decision Letter queried the impact of moving to GS(M)R limits at all NTS System Entry Points (SEPs)

CV is not a GS(M)R parameter but the 10 Year Statement specifies a range of 36.9 to 42.3 MJ/m³

- ◆ Based on minimum GS(M)R wobble number and relative density

		Maximum difference to 10YS range (MJ/m³)
Number of SEPs	30	
SEPs with a CV range narrower than 10YS	8	
SEPs with CV upper limit lower than 10YS	7	1.8
SEPs with CV lower limit higher than 10YS	1	0.4

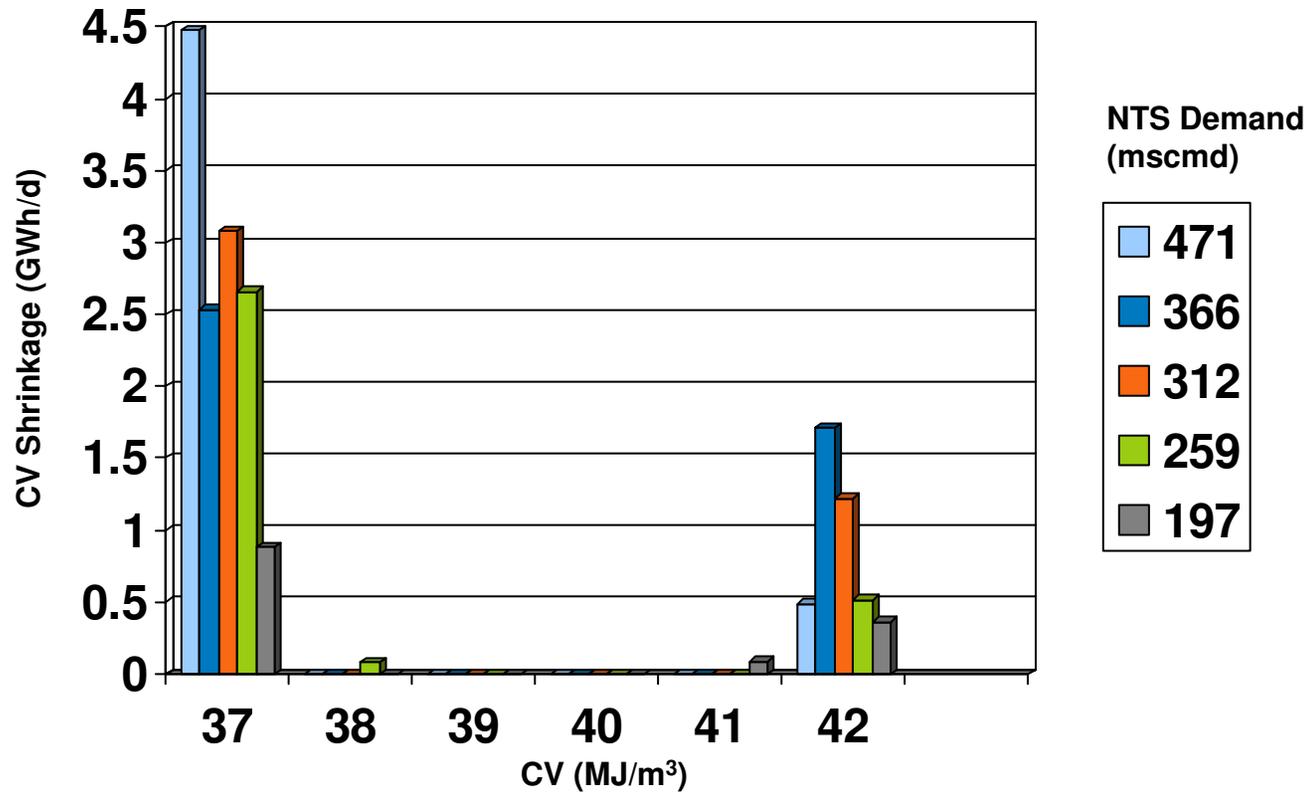
Milford and Teesside Analysis (Dec 2007)

To inform a previous SO Incentives consultation, National Grid undertook analysis in December 2007 on potential CV shrinkage costs

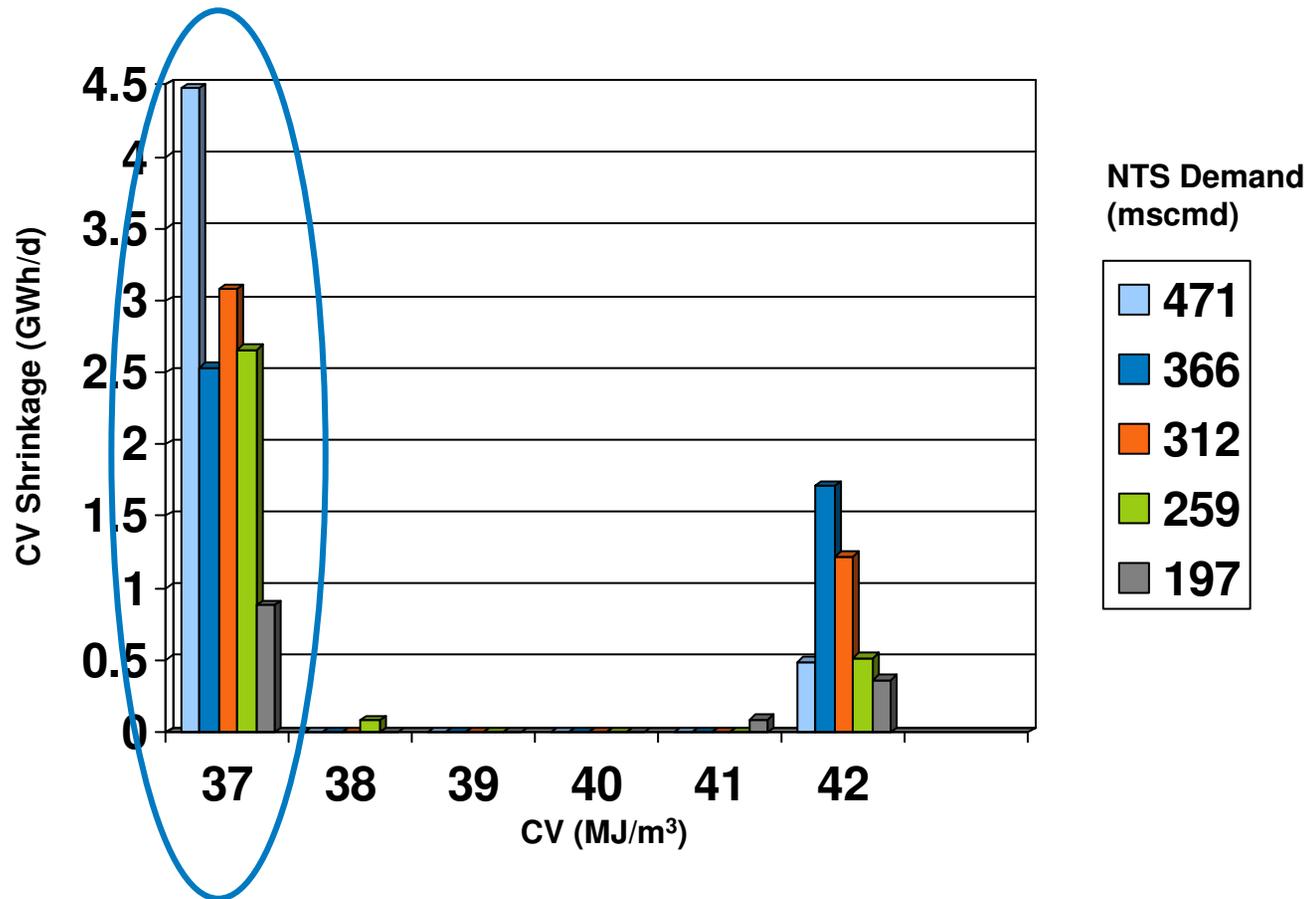
Assumptions:

- ◆ Supplies as per the 2007 TBE scenario “Global LNG”
- ◆ Five demand cases considered: peak winter to summer
- ◆ Each demand case assumed to occur a certain number of times per year to create a crude annual demand profile
- ◆ Demand profile then used to estimate potential costs

Milford Haven Analysis 2007 Results



Milford Haven Analysis 2007 Results



707 GWh/annum @ 30p/th = £7.2M

Milford and Teesside Analysis (Dec 2007)

Results:

- ◆ Potential exposure to CV related shrinkage
- ◆ Considered unlikely to actually occur on a regular basis

New analysis has been focussed on higher probability scenarios derived from updated market intelligence and experience.

New Analysis

The aim of the current analysis was to determine:

- ◆ If there is a consistent bias affecting consumers as a result of the current FWACV arrangements, and
- ◆ Whether CV shrinkage will increase in the future under reasonable scenarios

To this end, the analysis is split into historical and future approaches

Historical Analysis

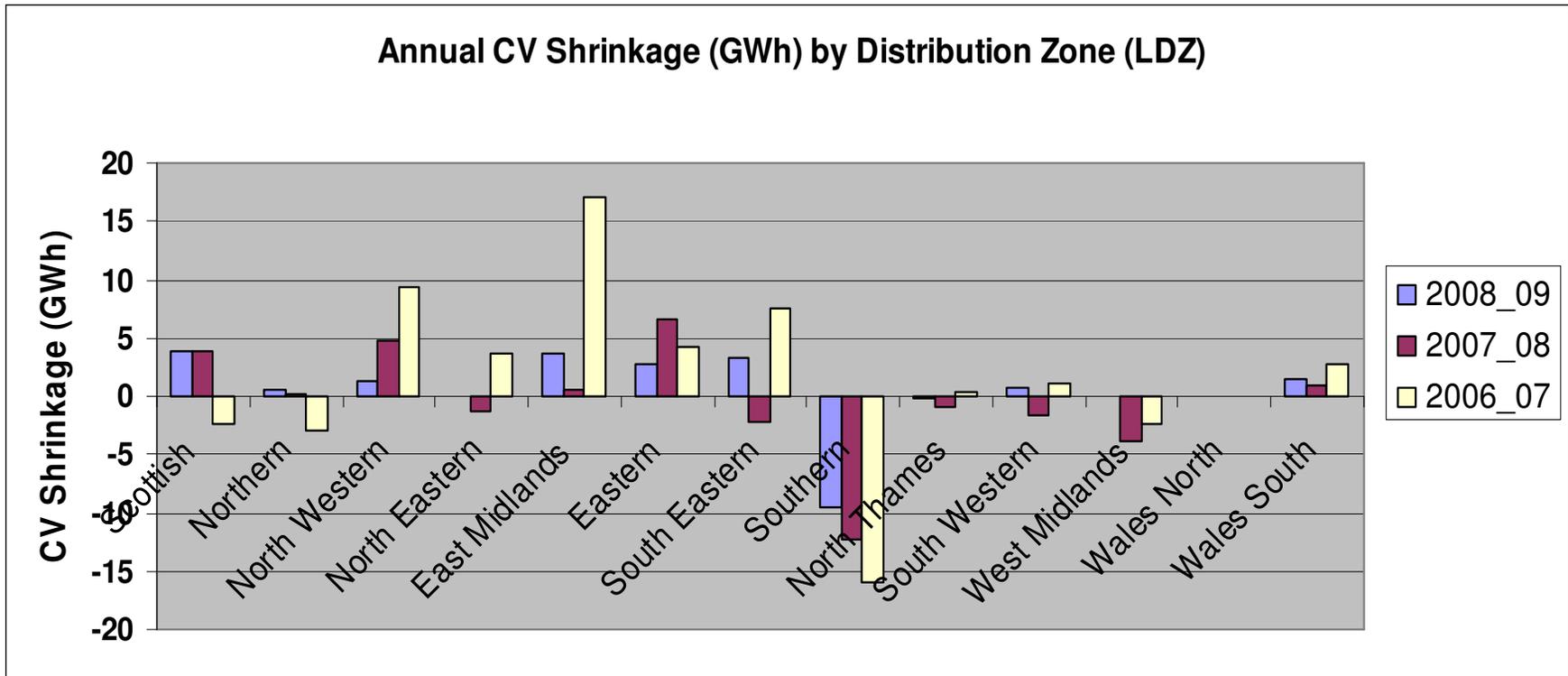
Daily CV Shrinkage data obtained for Gas Years 2006/7, 2007/8 and 2008/9

Data is aggregated by LDZ and shows the net end of year position

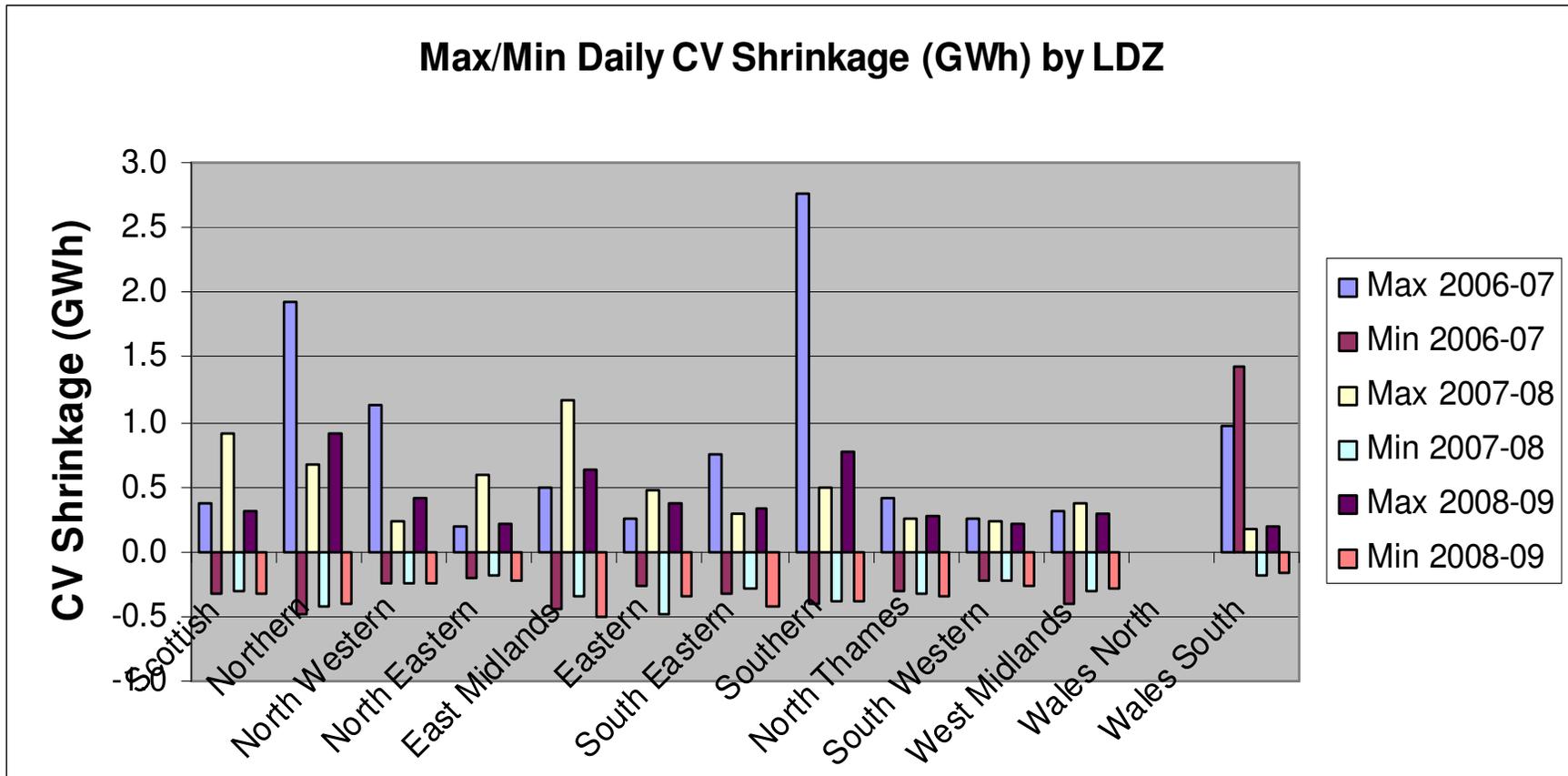
- ◆ Net positive = billed energy is lower than delivered energy
- ◆ Net negative = billed energy is higher than delivered energy

Maximum and minimum daily values are also shown

Historical Annual CV Shrinkage



Historical Maximum and Minimum Daily Values



Historical Analysis - Results

Positive and negative CV shrinkage events balance out over the year for most DNs

Southern LDZ customers have experienced a net negative CV shrinkage position

The year on year reduction in annual CV shrinkage highlights the close communication between the DN and National Control Centres

In recent history, the FWACV regime has resulted in relatively minimal divergence between billed energy and delivered energy

Future Analysis

Conducted using National Grid's Graphical Falcon simulation tool

Considered Formula Years 2010 to 2015, as beyond this the uncertainties in supply and demand forecasts, network topography and the commercial environment have too great an impact on the results

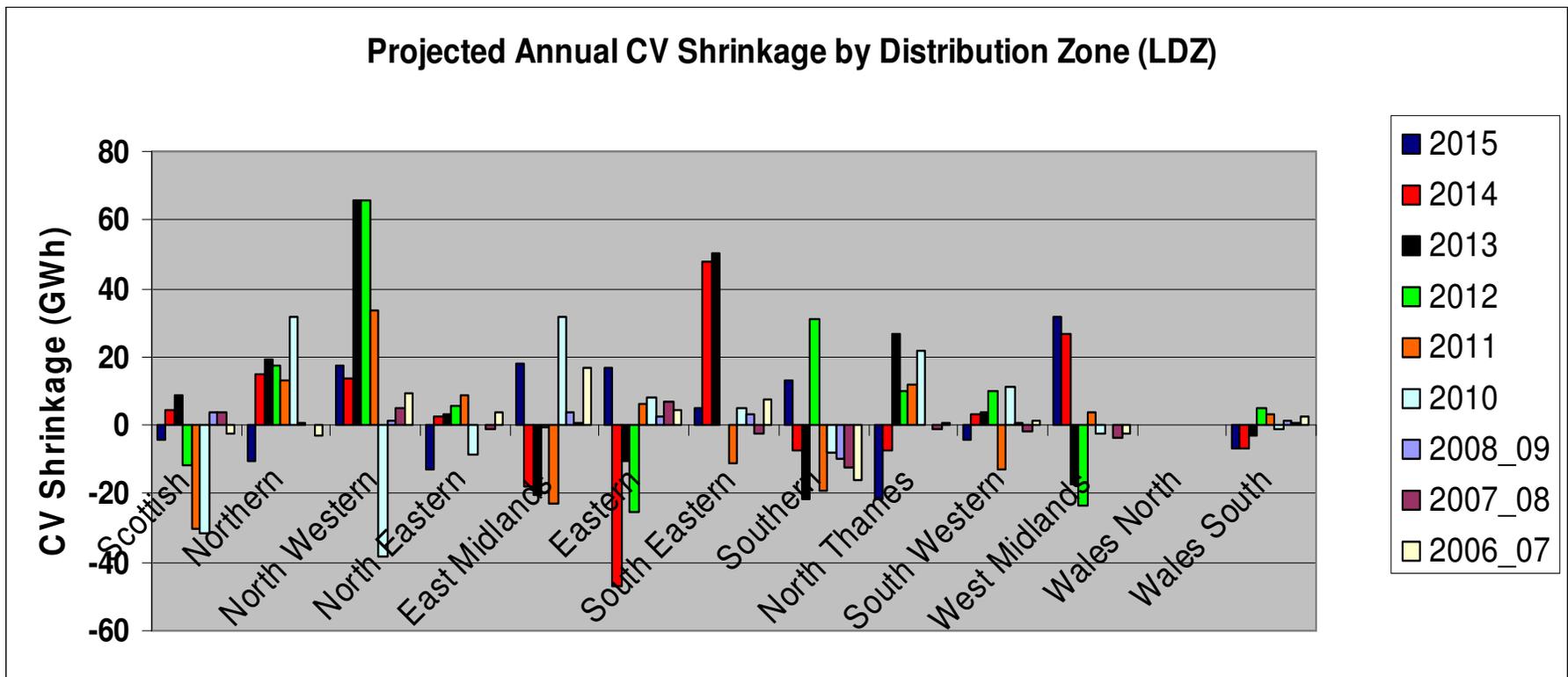
Supplies for each year assumed to be as per the 2008 TBE Base Case

LNG supplies assumed to input at a CV of 40MJ/m³ based on experience to date and expectations

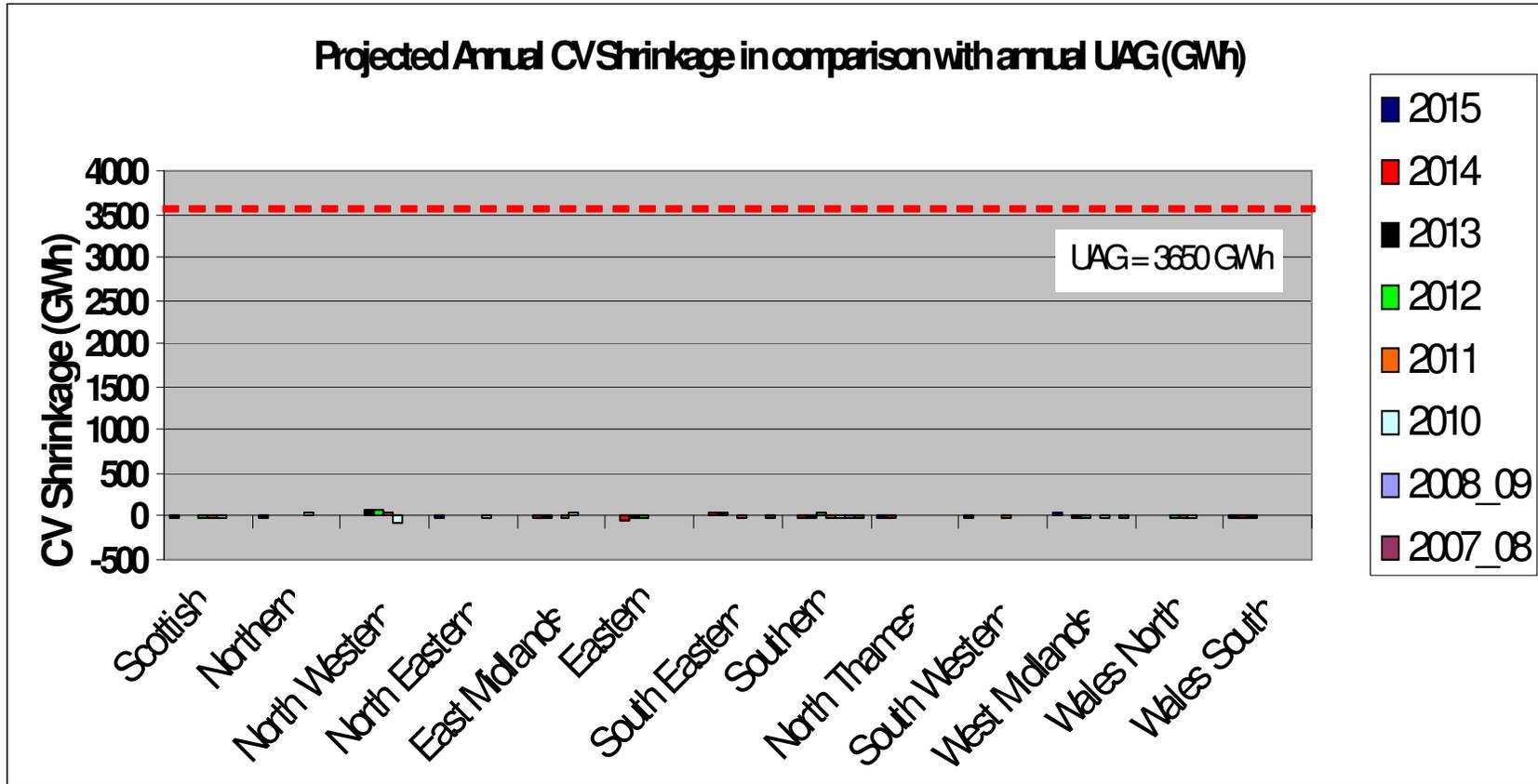
Five demand levels were analysed from the standard 10 Year Statement demand curve

Results are at LDZ level and show net end of year position

Estimated Annual CV Shrinkage from 2010 to 2015



Annual CV Shrinkage compared with 2008 UAG Data



Future Analysis - Results

Overall, annual CV shrinkage levels are estimated to be higher than those seen in recent history

North West LDZ has a consistent positive CV shrinkage position

Introduction of new LNG imports in South Wales does not appear to impact on shrinkage in South Wales or West Midlands

The effects of communication between DN and NTS control rooms cannot be modelled, and therefore these results are likely to be higher than may actually occur.

Estimated Cost Comparison

Historical costs were calculated using the traded weighted average price for shrinkage procurement in that year

Future costs were calculated using current SAP ~28p/th

Year	Annual CV Shrinkage (GWh)	Annual Estimated Cost (£k)
2006_07	22.673	417.2
2007_08	-5.254	(77.2)
2008_09	7.733	165.5
2010	20.506	195.9
2011	-15.205	(145.3)
2012	84.514	807.4
2013	105.099	1004.1
2014	26.967	257.6
2015	42.434	405.4

Future Analysis - Biogas

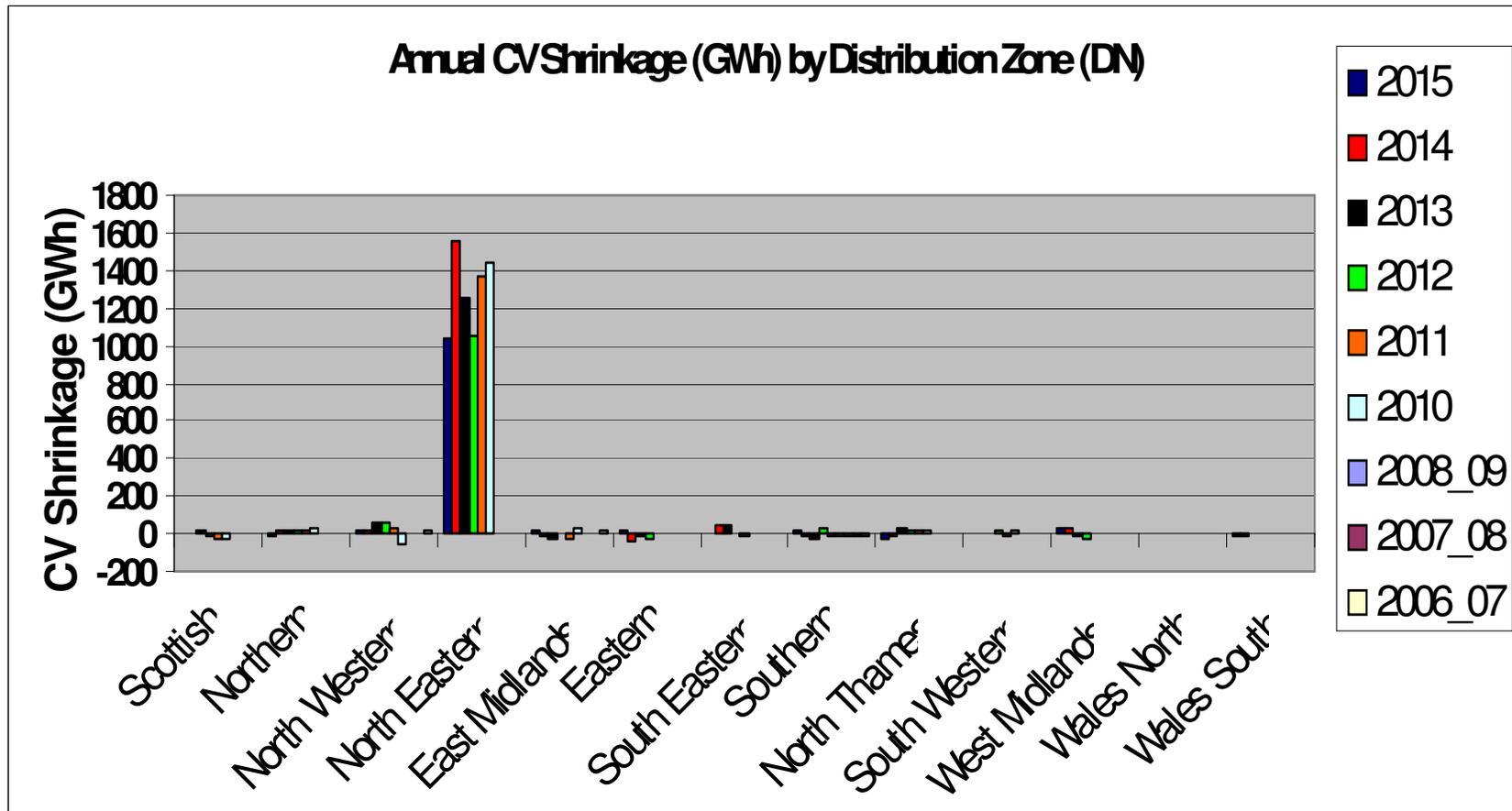
Further analysis assessed the effect of a biogas facility embedded in a DN

The hypothetical site was situated in the North Eastern LDZ as this had a low forecast CV shrinkage

Assumed flow = 12,000m³/d

Assumed CV = 37MJ/m³

Potential Impact of Biogas Supply in North Eastern LDZ



Costs at current SAP ~28p/th range from £10m to £14.7m per annum

Future Analysis - Biogas

Annual CV Shrinkage increased to ~1,500GWh from North Eastern LDZ

Similar results were obtained for Southern and Western LDZs

If numerous geographically diverse biogas sites were to be commissioned under the current commercial arrangements, annual CV shrinkage levels are expected to grow

Conclusions

Within the confines of the parameters considered by this analysis:

An increase in number and variability of supplies to the NTS is not currently anticipated to increase CV shrinkage by a commercially significant amount – welcome views

- ◆ CV shrinkage forecast to remain low relative to overall shrinkage
- ◆ From an NTS perspective, FWACV calculation is working well

The introduction of biogas facilities embedded with an LDZ could have a commercially significant impact upon costs of CV shrinkage associated with the FWACV calculation