Unidentified Gas

Awareness, Causes and Mitigations

20th October 2017

Housekeeping

- Fire Alarm – 12:00 midday

- Fire Procedure

- Breaks

- Feedback Forms

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INTRODUCTION

Sian Baldwin
Xoserve CEO

Agenda

- Introductions
- Objectives of the Day
- Overview of Unidentified Gas – Calculation and Sharing
- Levels/Trends Since Project Nexus Go-Live
- Known Causes of UIG
- Update on Actions/Investigations to Date
- Future Plans
- Industry Views on Causes and Prioritisation
- Conclusions/Next Steps

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Objectives for the Day

- Raise industry to a common level of knowledge on UIG and causes
- Share information on known causes and likely impacts
- Share results of work to date to resolve/analyse UIG causes
- Gain further industry insights in the causes and impacts of UIG
- Gain industry support/prioritisation for next steps

Problem Statement

Based on industry engagement and analysis conducted to date, this is Xoserve's understanding of the current UIG issues

Volatility

- The level of UIG is highly volatile on a day by day basis
- There is volatility between nominations and allocations
- There are differing levels of impact across different LDZs and EUCs

Level

- The overall level of UIG is higher than initially expected post Nexus Go-Live

Predictability

- The calculated UIG values are not predictable
- Based on the analysis to date, there is no obvious recurring pattern or trend

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Shippers have reported multiple areas where UIG variation is being observed. These are shown in the diagram below. Known causes are discussed later in this presentation along with actions the industry can take to reduce UIG Level and volatility.
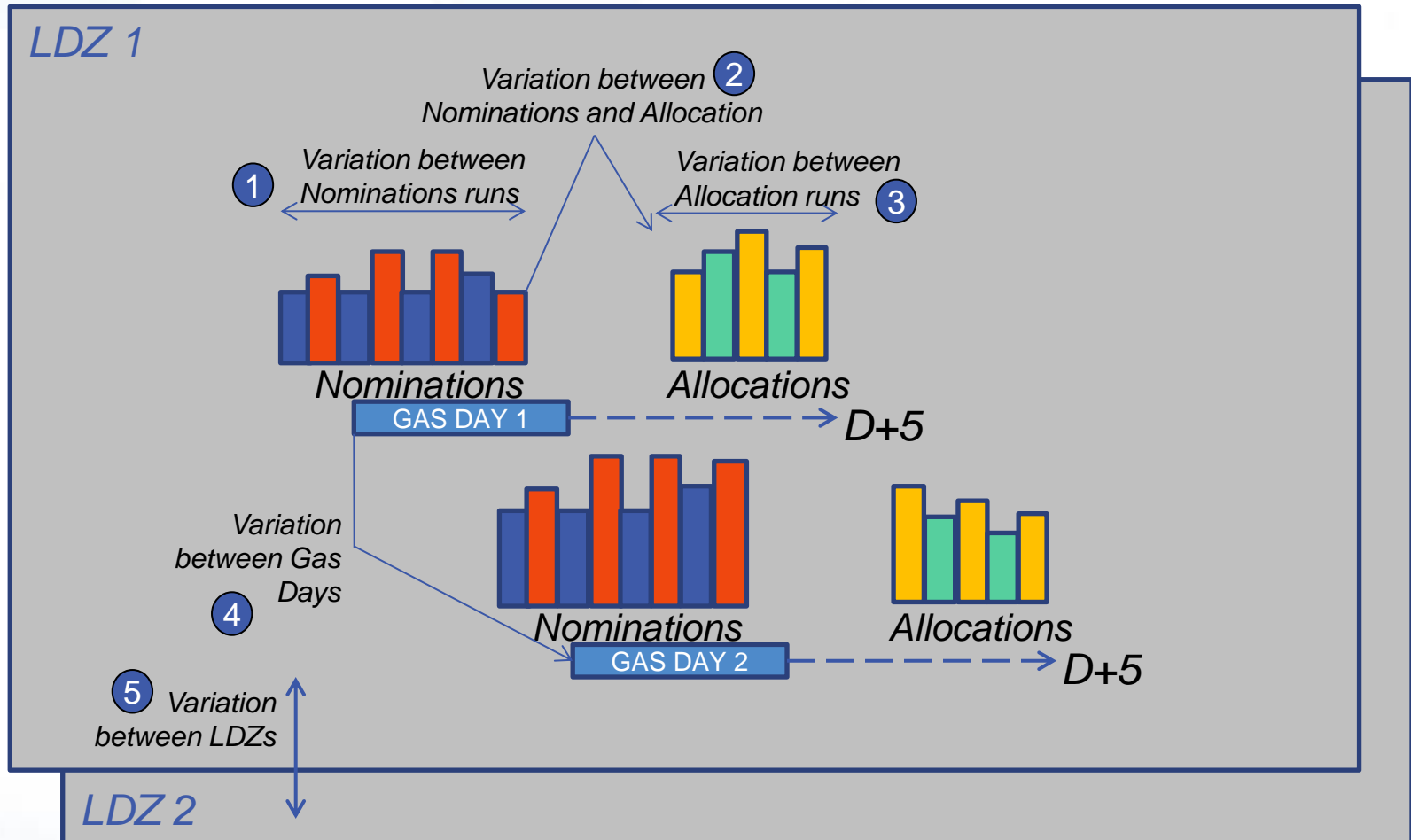
Overview of Unidentified Gas – Calculation and Sharing

Background to the Project Nexus Changes

Key requirement – Universal individual Meter Point Reconciliation

- Output from an industry consultation exercise during 2008-09

Previous Reconciliation by Difference (RbD) arrangements removed by industry Mod

- Inappropriate to smear all Reconciliation energy into the Smaller Supply Point (SSP) market if those meters are all being individually reconciled

New treatment required for reconciliation energy

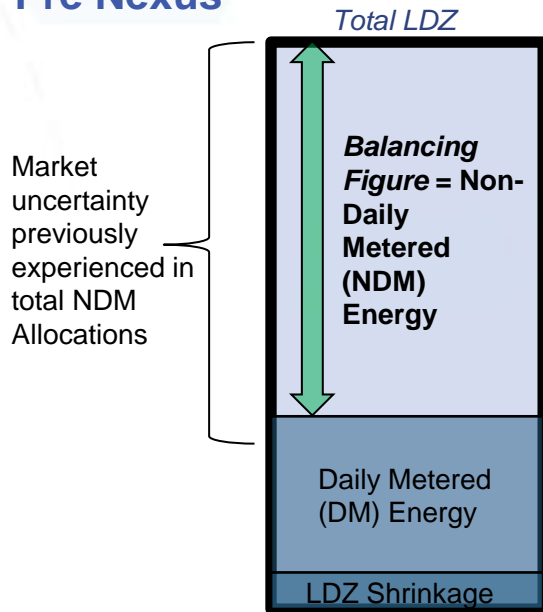- Need to apply to a wider population – not just to SSP (AQ <73,200)

Need to derive UIG at point of Allocation

- Not just allocated into a sub-set of the market and then moved post-Reconciliation
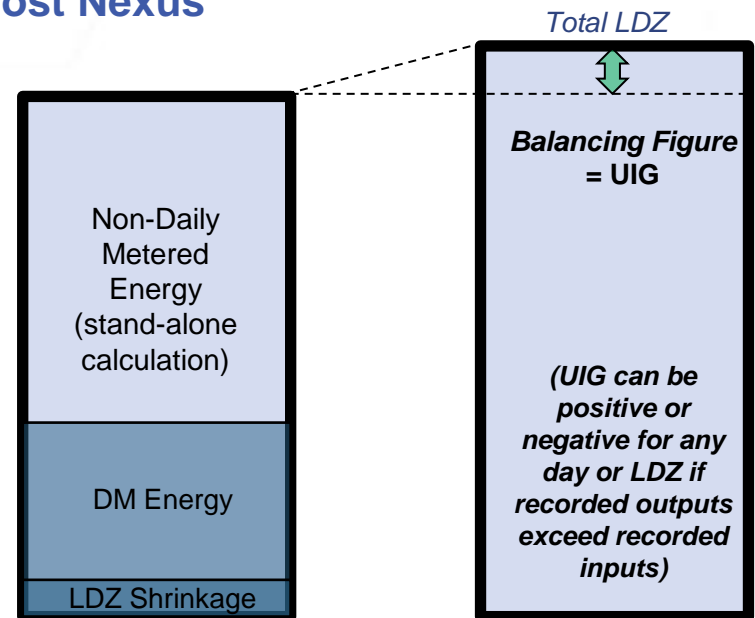
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Daily Gas Allocation has changed to support Universal Meter Point Reconciliation – UIG is now the balancing figure in each Local Distribution Zone (LDZ) each day.

Pre Nexus

Total LDZ

Market uncertainty previously experienced in total NDM Allocations

***Balancing Figure* = Non-Daily Metered (NDM) Energy**

Daily Metered (DM) Energy

LDZ Shrinkage

- Same formula used for Nominations/Allocations
- NDM Energy was the balancing figure (Smaller Supply Point + Larger Supply Point)
- Errors in reads/estimates impacted NDM energy
- Volatility was proportionally lower, as part of a larger number (NDM is c 50 to 60% of each LDZ)

Post Nexus

Total LDZ

Non-Daily Metered Energy (stand-alone calculation)

DM Energy

LDZ Shrinkage

Balancing Figure = UIG

(UIG can be positive or negative for any day or LDZ if recorded outputs exceed recorded inputs)

- Same formula used for Nominations and Allocations
- UIG is now the balancing figure each day
- Volatility is focused in a smaller value and is more visible
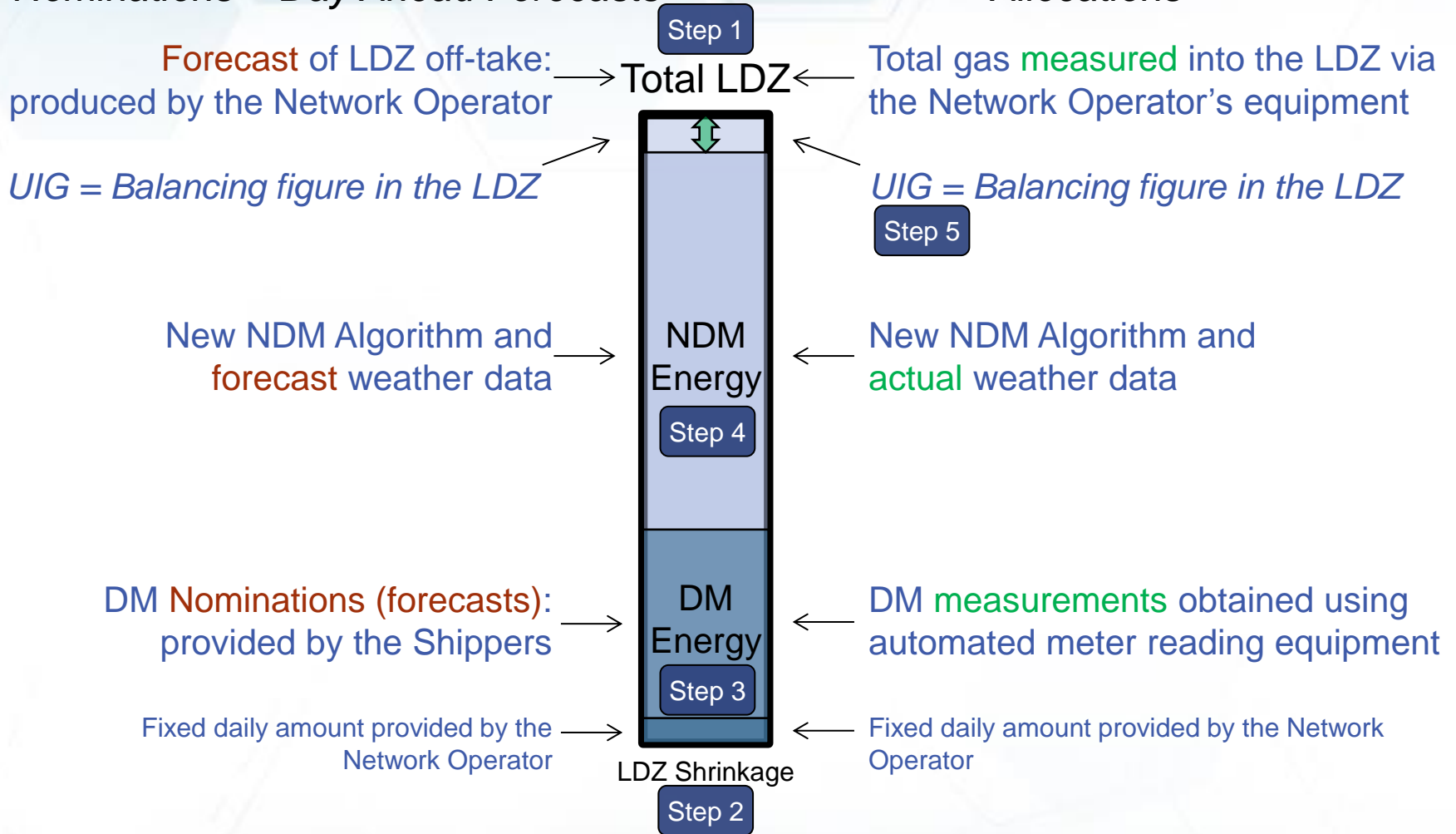- New and existing data items explained on later slide

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LDZ Gas Allocation Process

Step 1
- Determine total Gas used in LDZ

Step 2
- Deduct Fixed Shrinkage Quantity

Step 3
- Calculate DM measurements/ estimates

Step 6
- Share out UIG using Weighting Factors

Step 5
- Calculate UIG – Balancing Figure

Step 4
- Calculate NDM Energy – using Allocation formula

Step 7
- Reconcile meter points and UIG

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Nominations – Day Ahead Forecasts   *Allocations*

Step 1

Forecast of LDZ off-take: produced by the Network Operator → **Total LDZ** ← Total gas measured into the LDZ via the Network Operator's equipment

UIG = Balancing figure in the LDZ → | ← *UIG = Balancing figure in the LDZ*

Step 5

New NDM Algorithm and forecast weather data → **NDM Energy** ← New NDM Algorithm and actual weather data

Step 4

DM Nominations (forecasts): provided by the Shippers → **DM Energy** ← DM measurements obtained using automated meter reading equipment

Step 3

Fixed daily amount provided by the Network Operator → | ← Fixed daily amount provided by the Network Operator

LDZ Shrinkage

Step 2

NDM Algorithm uses AQ (Annual Quantity) plus NDM Parameters (ALPs and DAFs) and Actual and Seasonal Normal Weather data

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What Changed

What Didn't Change

- UIG is now the balancing figure each day
- Rolling AQ Calc now runs every month
- Errors in reads/estimates now impact UIG, not NDM energy
- New NDM Algorithm uses actual weather
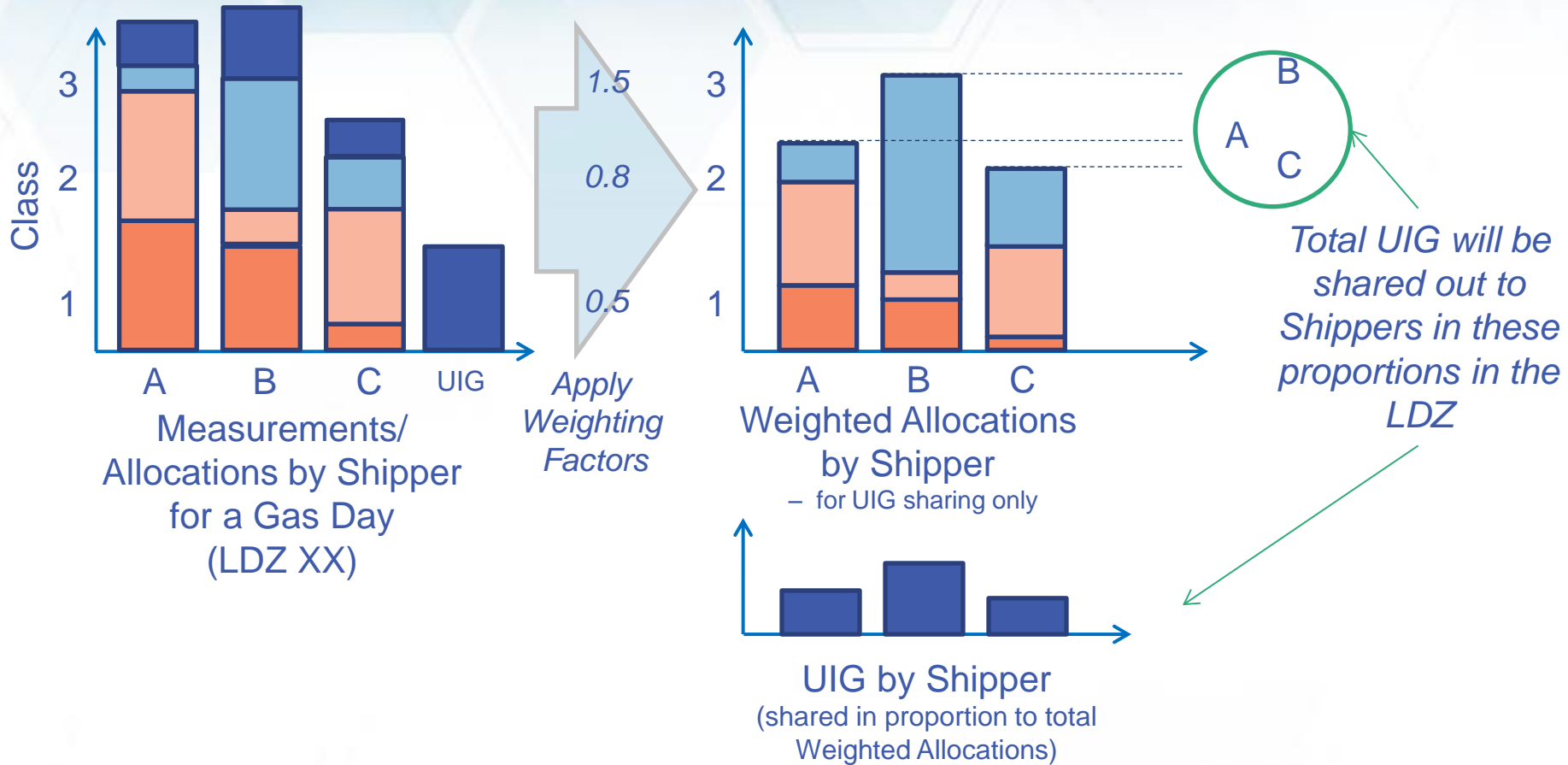- All meter points are now subject to meter point reconciliation

- How the Gas is measured into the LDZ and reported into Xoserve systems
- Nominations/Allocations still use the same formula as each other
- Sample sites used to develop the NDM profiles haven't changed
- Daily NDM Shrinkage figure hasn't changed

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Comparison of the NDM Algorithms

Pre-Nexus	Component	Post-Nexus
Annual AQ Review process	AQ/365 – *average daily consumption*	Rolling AQ – recalculates each month – if a new read has been loaded
Derived from a sample of meter points, three-year smoothed model	Annual Load Profile – *profile of consumption under seasonal normal conditions*	No change to the ALPs post-Nexus
Compared Actual and Seasonal Normal NDM Demand – *positive = colder*	Weather Correction Factor – *calculated at LDZ level*	Compares Actual minus Seasonal Normal Weather – *negative = colder*
Derived from a sample of meter points, three-year smoothed model, expressed as relative to LDZ weather sensitivity	Daily Adjustment Factor – *measure of the EUCs sensitivity to changes in weather*	Derived from a sample of meter points, three-year smoothed model, expressed as percentage of demand **lost** for each degree increase in weather (CWV)
Scaled NDM allocation to equal total NDM energy	Scaling Factor – *calculated at LDZ level*	Not required – NDM energy is not the balancing figure any more

How UIG is Shared Out

- So far we have only shown the calculation of total UIG

- UIG is shared out in each LDZ based on Weighted Daily Throughput

- Same Weighting Factors applied in all LDZs

- Factors only share out UIG – they don't determine the levels

- Relative levels of the individual factors determine the sharing

- Initial post Go-Live Factors were set by a UNC Mod
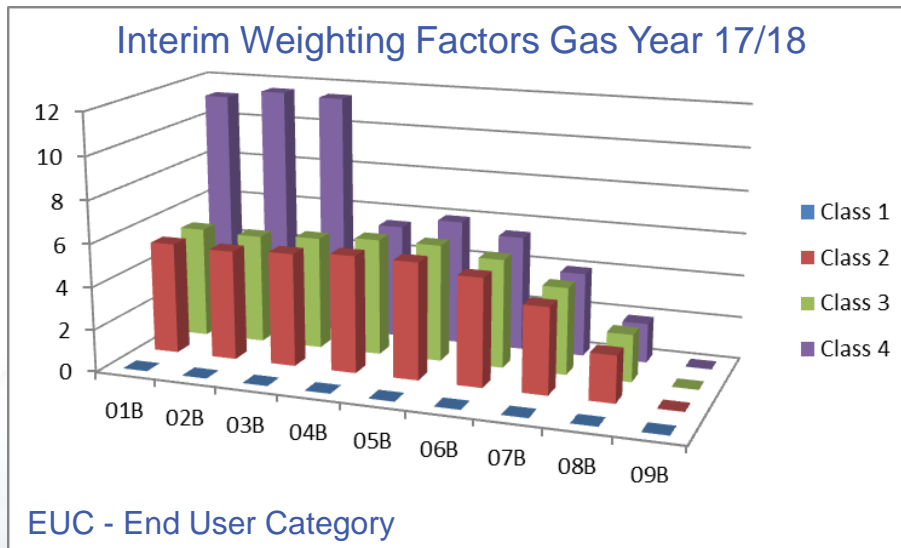
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Weighting Factor Example

Measurements/
Allocations by Shipper
for a Gas Day
(LDZ XX)

*Apply
Weighting
Factors*

1.5

0.8

0.5

Weighted Allocations
by Shipper
– for UIG sharing only

UIG by Shipper
(shared in proportion to total
Weighted Allocations)

*Total UIG will be
shared out to
Shippers in these
proportions in the
LDZ*

Notes:

- UIG Weighting Factors are only used for sharing out UIG – they don't determine the level of daily UIG
- Weighting factors are multipliers and do not need to add up to any fixed value
- Above diagrams are for illustration only and not accurate or to scale

Interim Weighting Factors

- Initial post Go-Live Factors were set by a UNC Mod
- Only shared out UIG to Class 3 and 4 – slightly more weighting for EUCs 2-9
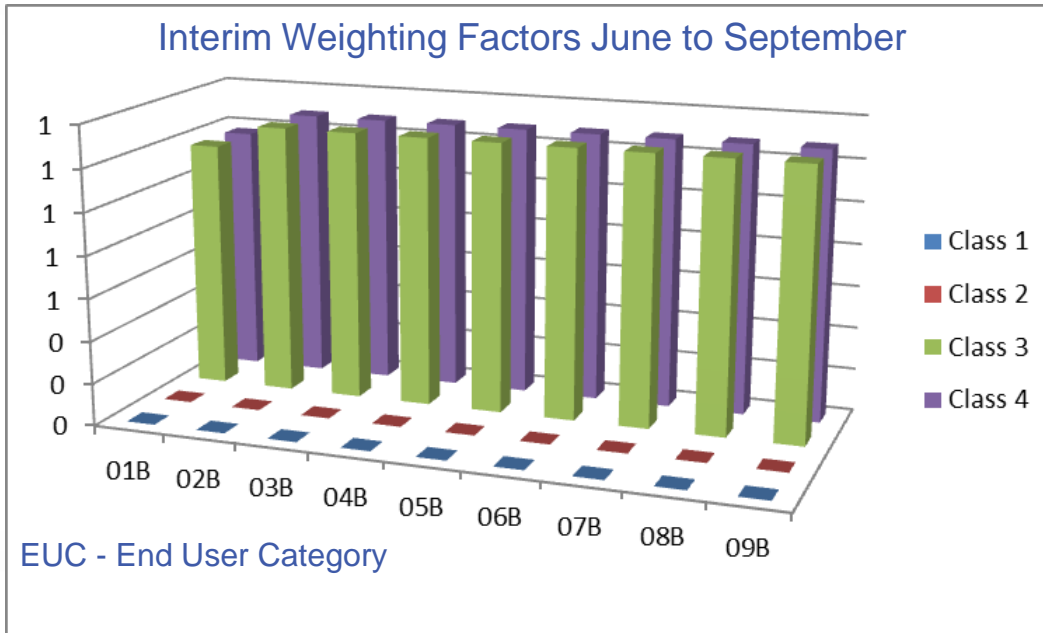
Interim Weighting Factors June to September

EUC - End User Category

Graph shows the relative size of the weighting factors, not the UIG allocations

Weighting Factors for Gas Year 2017/18

- An independent expert has determined Weighting Factors for the new Gas Year

- Expert undertook detailed analysis and industry consultation

- New Factors will give a very small weighting to Class 1 and EUC 9 sites – c. 1/1000th of the Class 4/EUC 1 weighting

- Also gives weighting to Class 2 sites – similar weightings to Class 3

- Weighting Factors are generally much higher – comparative size is relevant, not absolute size

- Independent expert will review the Factors for each Gas Year

Interim Weighting Factors Gas Year 17/18

Legend: Class 1, Class 2, Class 3, Class 4

Categories: 01B, 02B, 03B, 04B, 05B, 06B, 07B, 08B, 09B

EUC - End User Category

See Joint Office website, industry information, DN Info, AUGE Post-Nexus

Graph shows the relative size of the weighting factors, not the UIG allocations

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How the Gas is Paid for Post-Nexus

This slide summarises changes in how the gas is paid for following the Nexus implementation. UIG charging is now more transparent and fixed quantities have been removed. Shippers now need to procure UIG as part of their daily total system allocation.

Pre Nexus
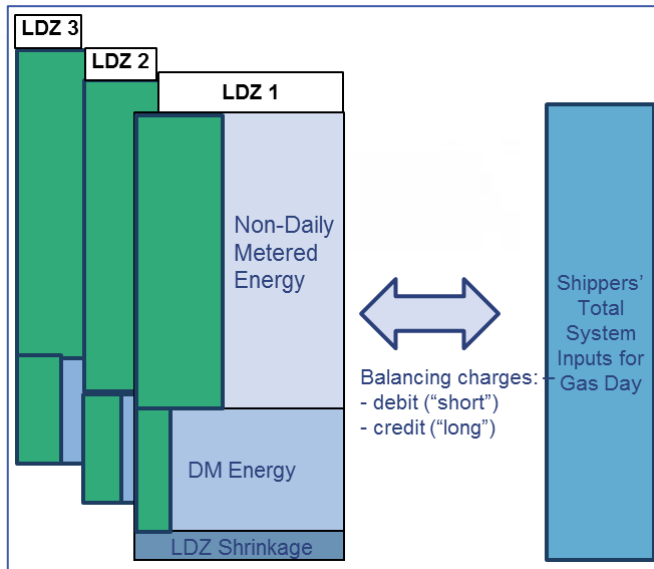
- Estimated amount of UIG was billed monthly in arrears via Adhoc invoice (debits to LSP and credits to SSP)
- A fixed monthly quantity for LSP sites which Shippers could account for.
- Shippers only procured for NDM and DM volumes

Post Nexus
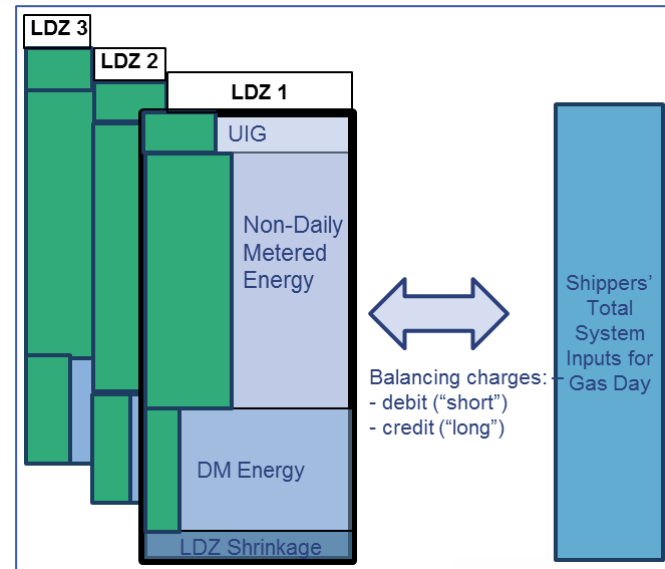
- UIG now included in daily Energy Balancing position, not on a separate invoice
- Energy Balancing compares total Allocations including UIG to Total Shipper inputs – national level only
- Scheduling Charges only apply to DM Nominations – not to NDM and UIG Nominations

Individual Shipper's Allocation (share of UIG, plus NDM and DM Energy)

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Unidentified Gas is subject to reconciliation via the Amendment Invoice, as the equal and opposite of the meter point reconciliations processed on the same invoice.

Source of Reconciliation

Treatment

Total LDZ

LDZ measurement errors →

UIG

NDM reconciliation to actual meter reads – *all categories incl SSP and CSEP* →

NDM Energy

DM resynchs and reconciliations (e.g. actual following estimates) →

DM Energy
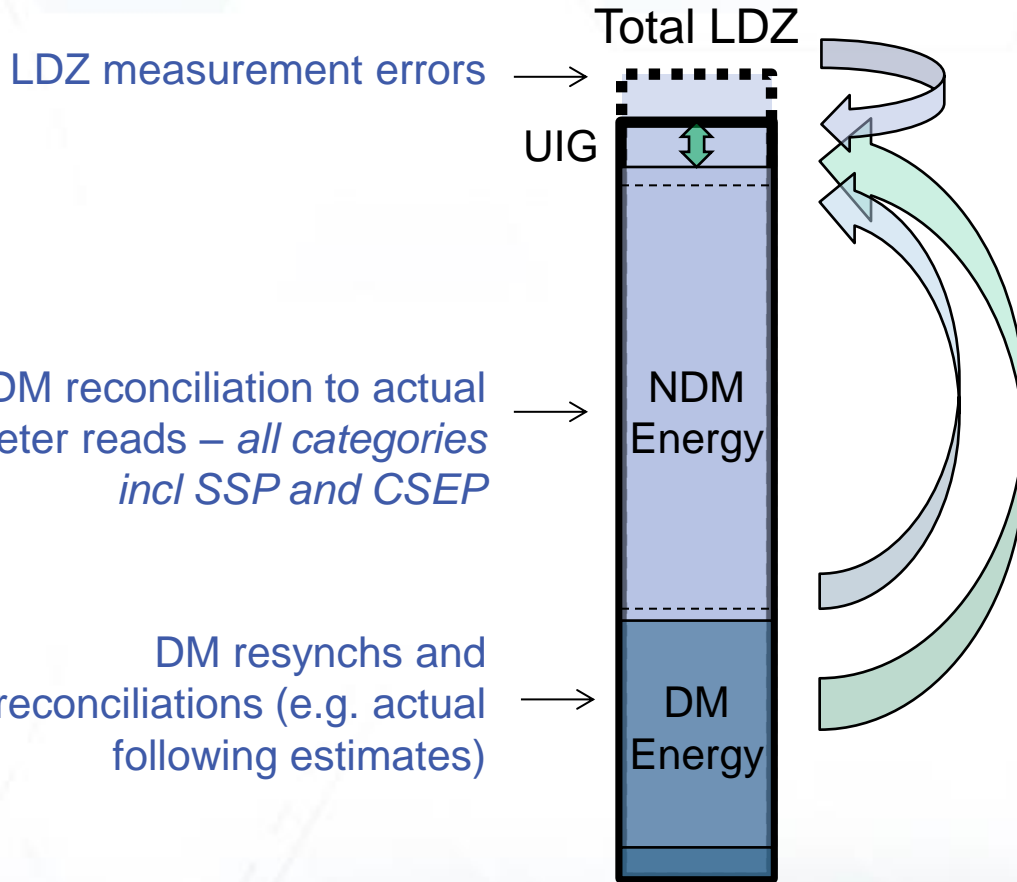
- Opposite entry of all primary DM and NDM recs is an adjustment to UIG in the LDZ

- Change in UIG shared out in proportion to latest measurements/ estimates (i.e. post-rec)

- Same UIG weighting factors as at D+5

- Shared out over last 12 months of updated allocations

- Share of UIG rec for the month appears on same Amendment invoice – energy charge only – issued at Month+18 business days

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Causes and Levels of UIG

The diagram below shows known variable factors contributing to UIG levels and volatility.

KEY

Changed post Go-Live

Under analysis

Unchanged

Level of Xoserve Control

Controller

Influencer

No Control

Day-on-day Variability

Low variability — High variability

Erroneous weather data

DM Measurement errors

Inaccurate AQs

CSEP/LDZ mapping

Shipperless/ Unregistered

Unexpected weather reactions

Shrinkage Error

Consumer Theft

LDZ Offtake errors

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Causes of UIG
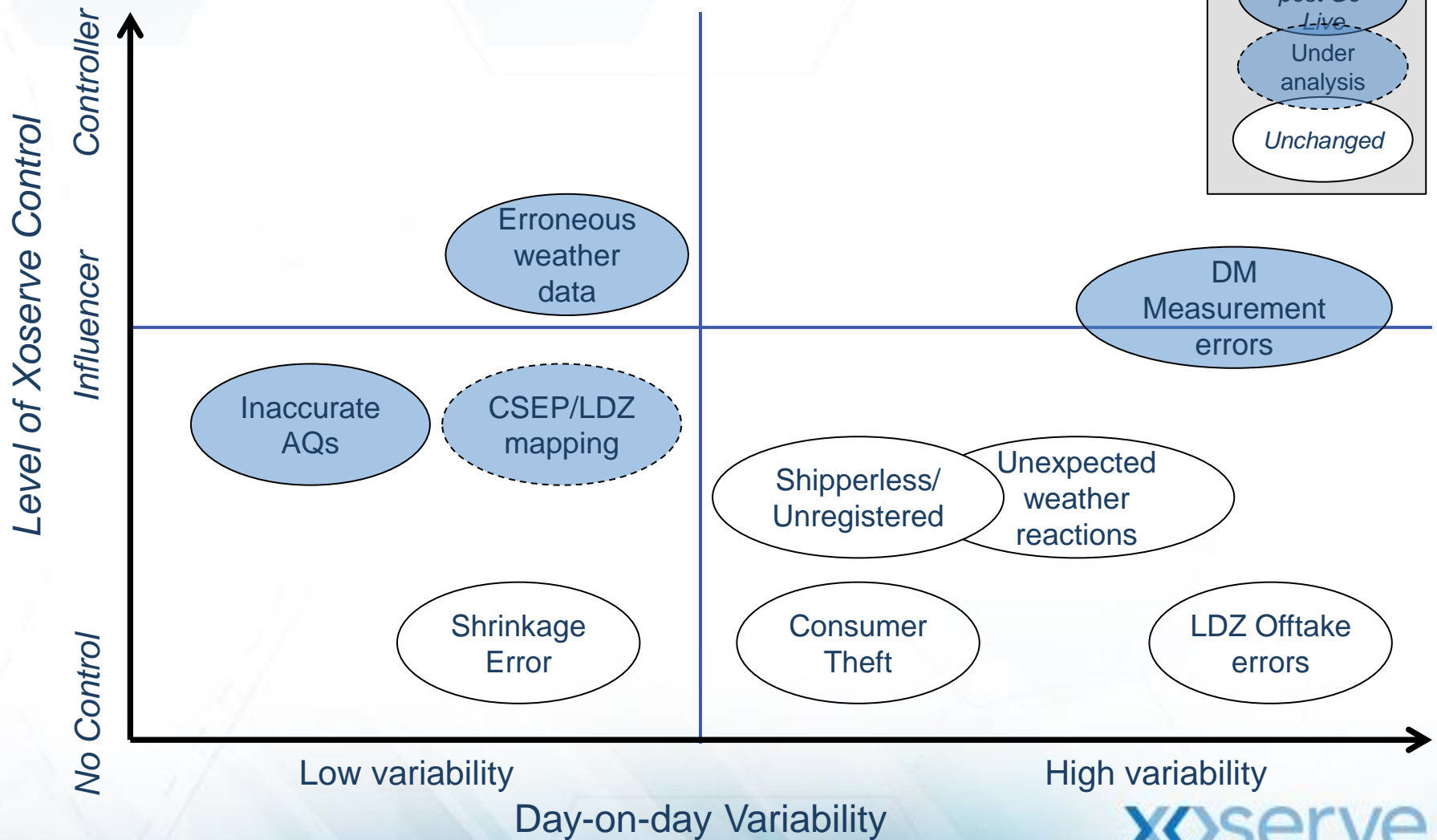
What We Know

- Xoserve can see four values in each LDZ each day
    - Total LDZ, Total DM, Total NDM, Shrinkage
- Xoserve can see total UIG for each LDZ
- We know that the gas is being consumed in the LDZ – system is balanced every day – but not by which sites
- We can see the meter reads for all DM sites – whether accepted or rejected
- We can simulate levels of pre-Nexus UIG

What We Don't Know

- We don't know whether the NDM AQs are correct
- We don't know whether the large NDM sites are in the correct EUC
- We don't know how much gas every NDM site used
- We don't know whether the DM meter asset set-up is correct
- We don't know which causes make up the total UIG each day

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Simulation of UIG for the Whole Gas Year

- UIG was not previously calculated each day – it was included within NDM Allocation
- Simulation of UIG levels for pre-Nexus days shows significant volatility
  - Uses actual LDZ inputs, DM allocations, NDM AQ and actual weather

Daily UIG % - Nationally 2016/17
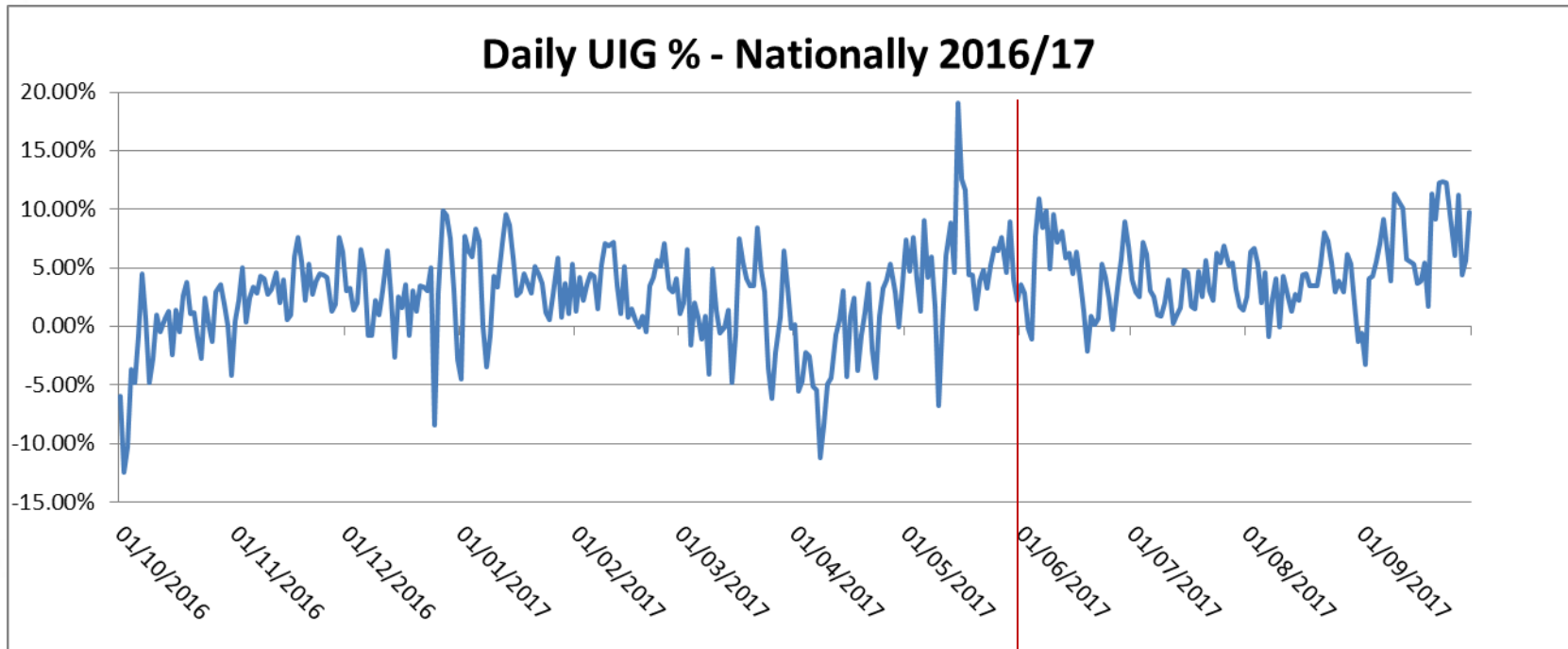
1st June 2017

Xoserve Actions on New/Changed UIG Causes

UIG Cause	Description of issue	High level action plan/progress

DM Measurement errors **Step 3**	• Impact of use of estimates for DM sites which are not reflective of actual consumption	• Delivering individual DM Read rejection rectification plans alongside industry participants
		   • 73 outstanding out of original meter points (Phase 1)
		   • 29 outstanding out of further meter points since Go-Live (Phase 2)

Inaccurate AQs **Step 4**	• AQs of 1 • Erroneously low AQs due to negative consumption history	• Change implemented to prevent new erroneous AQs of 1 • Propose correction of existing erroneous AQs of 1 • Analysis of AQs affected by historic negative consumption, identify resolution plan
Erroneous weather data **Step 4**	• Impact of errors/delays in daily weather files on NDM Allocation	• Timely receipt of weather files now monitored daily, transitional issues now resolved
CSEP/LDZ mapping **Step 4**	• CSEPs mapped to incorrect LDZ for migration	• New issue – under investigation

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DM Issue Reduction Progress

Over 50% of AQ has been resolved for Phase 1 and 2 DM sites. However, no material improvement seen in UIG levels or volatility. Xoserve continues to work with the industry to find ways to accelerate resolution of remaining sites.
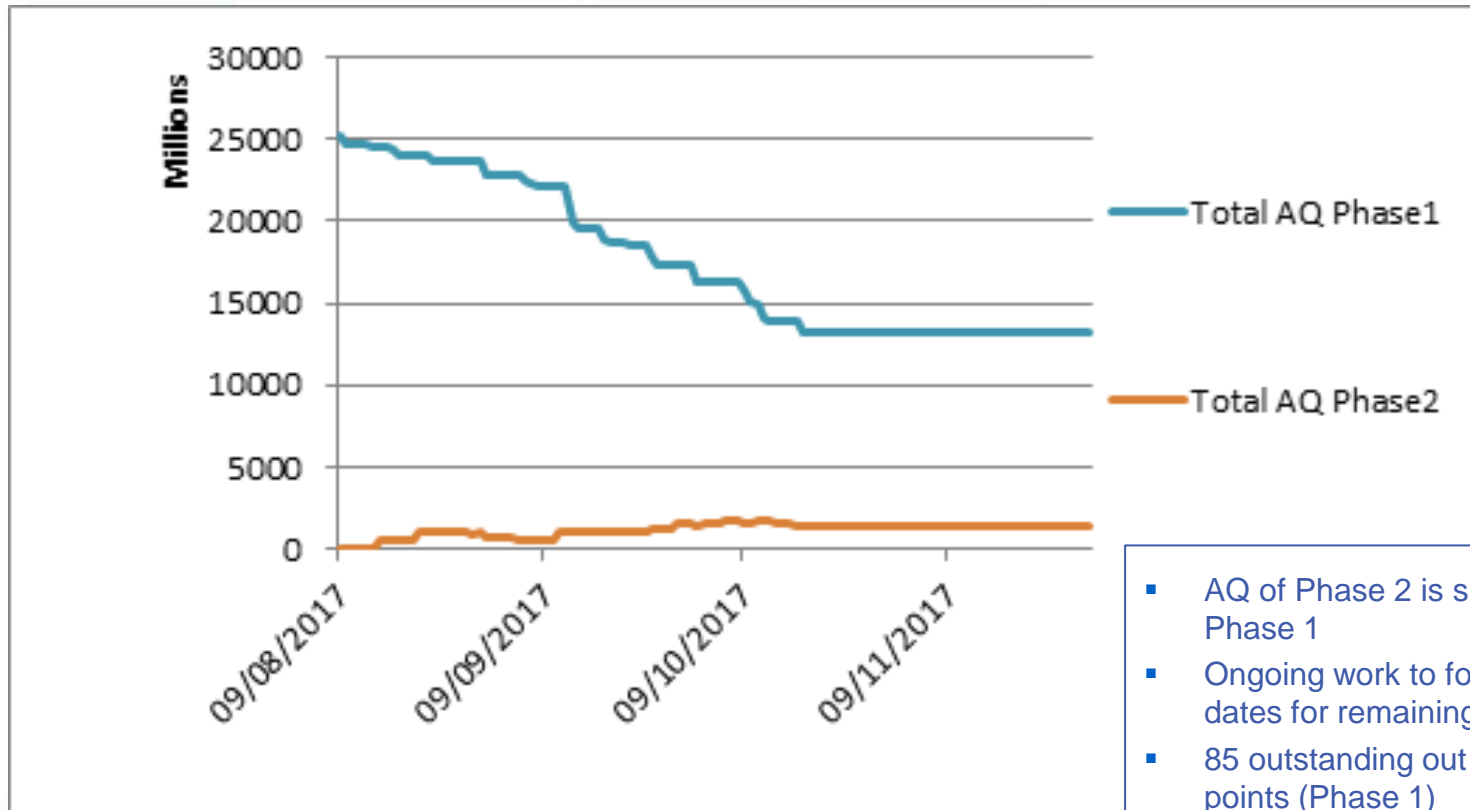

- AQ of Phase 2 is significantly lower than Phase 1
- Ongoing work to forecast completion dates for remaining sites
- 85 outstanding out of original 238 meter points (Phase 1)
- 40 outstanding out of a further 74 meter points (Phase 2) (data as of 10/10/17)

- Phase 1 = original dataset
- Phase 2 = new issues identified post Go-Live

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National View UIG% - after considering DM Adjustments
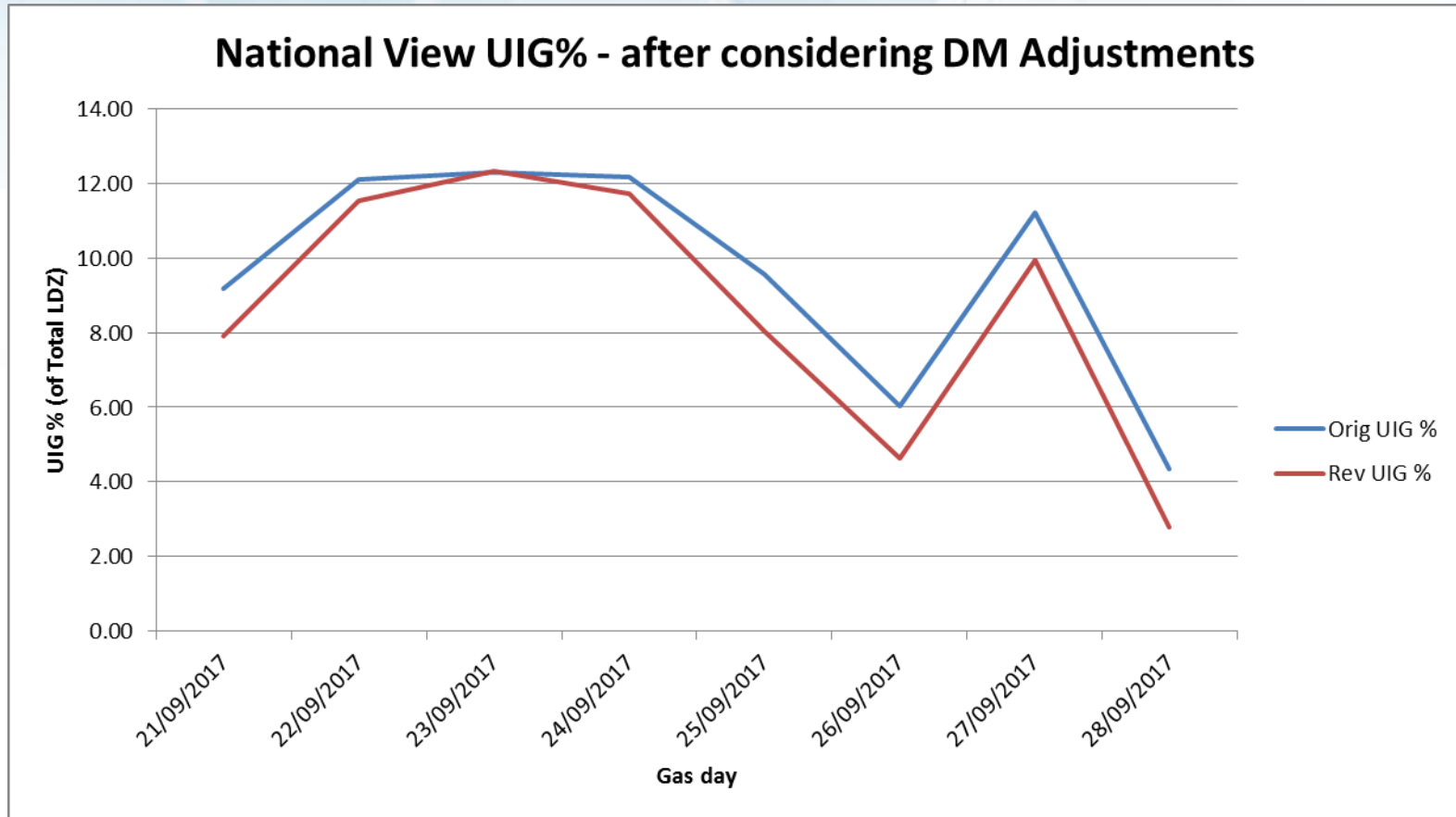
- Xoserve analysed impacts on large sample of current pot – assessment carried out for seven Gas Days (Thursday to Wednesday)
- Not all sites could be assessed – lack of agreement on asset set-up
- National picture suggests a reduction of UIG if DM errors were fixed – based on those seven days – LDZ picture is more mixed – next slide ..

DM Estimate Impact (2 LDZs)

Change in UIG % after DM adjustments for LDZ : SC
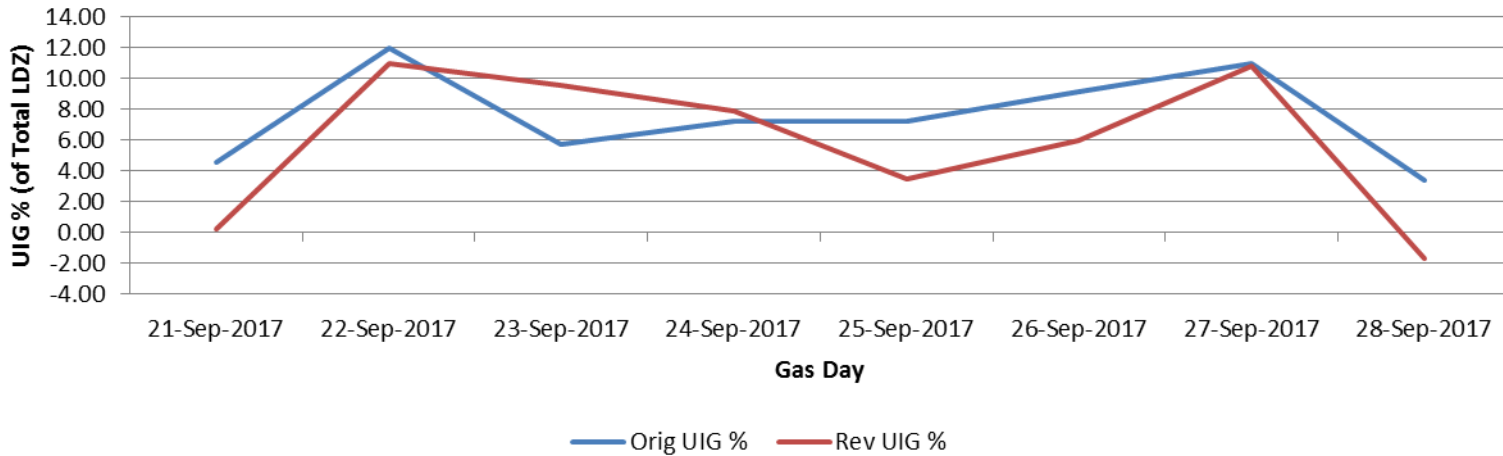
Change in UIG % after DM adjustments for LDZ : NW
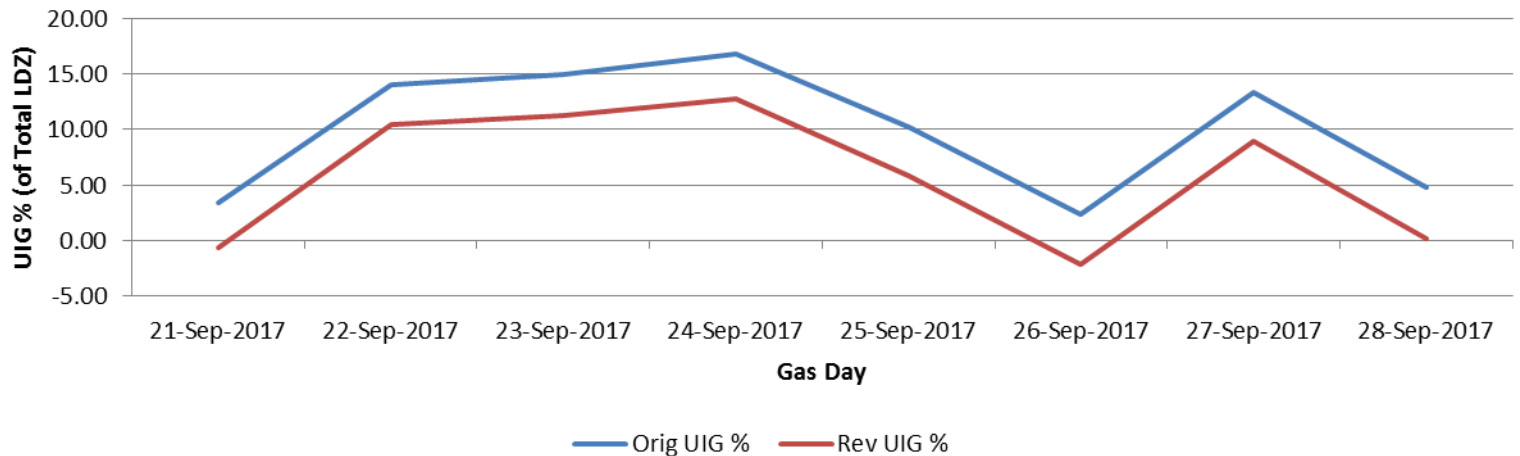
Outstanding DM AQ v LDZ Total

- Outstanding DM sites have been analysed by LDZ by AQ to identify potential patterns of behaviour and impacts on UIG
- No obvious correlation between outstanding AQ and LDZ UIG levels

Updated post-meeting
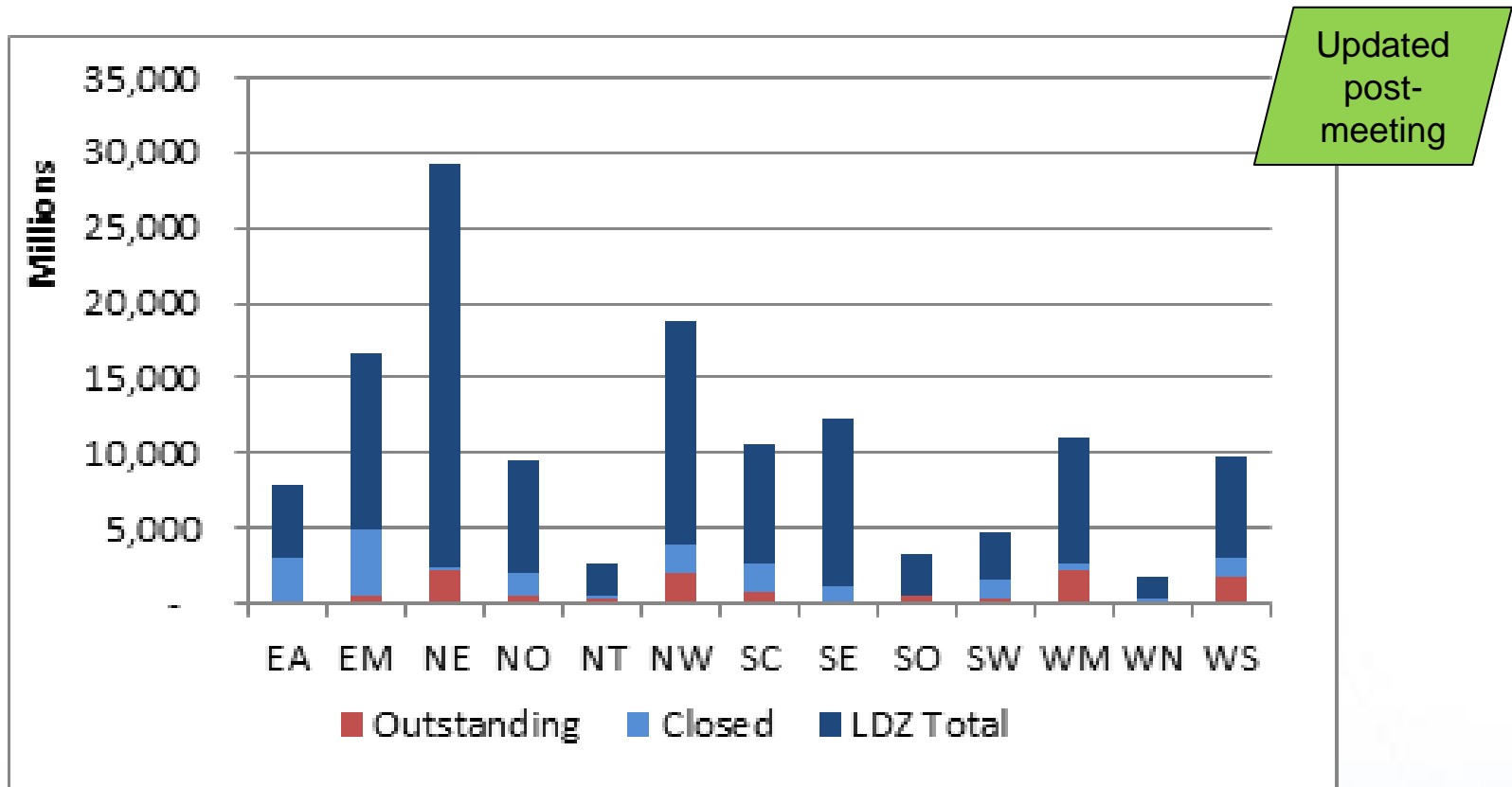
Accelerated Resolution Options – DM Read Issues

- The table below outlines three options for accelerating the resolution of DM read issues or improving the accuracy of the consumption values used for allocation

Option	Status	Next Steps
Input asset details directly to UK Link to replicate RGMA flow	• Agreed with some industry parties	• Progress updates • Obtain agreement from remaining parties
Input D-7 Estimates directly to Gemini	• Proposal distributed to impacting industry parties • Limited response to date • PAC want to ratify proposal prior to further action	• Document approach and present to PAC for ratification in Nov 17 • Following ratification support Shippers in confirming consumptions
Xoserve to support DMSPs in carrying out Consumption adjustments	• Under investigation	• Understand process feasibility • Understand resource requirement to support

- All of these options are reliant on continued engagement and collaboration from industry parties to confirm data updates that Xoserve can apply.
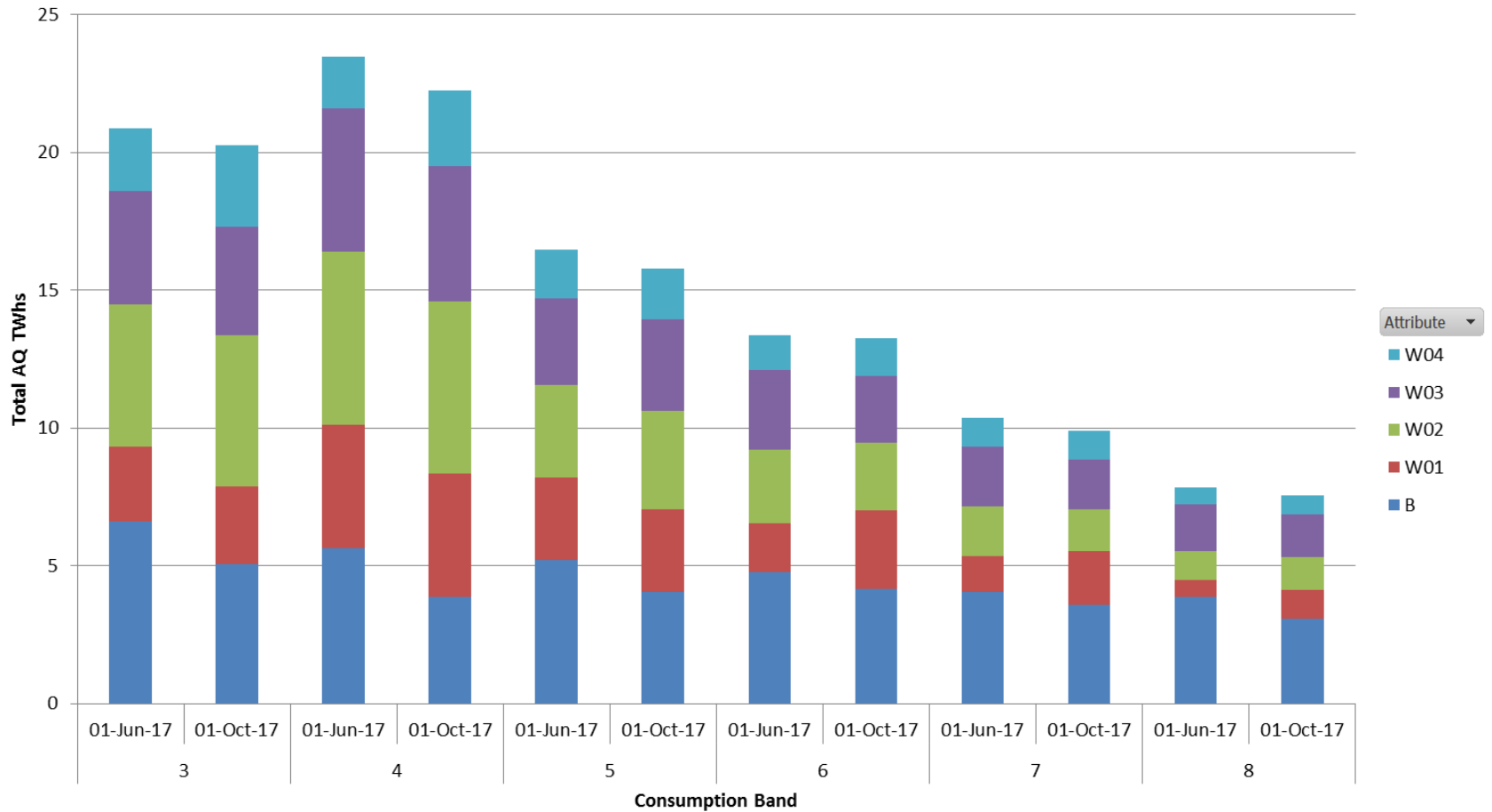
Analysis to Date – NDM Allocations

(Step 4)

NDM AQ Movements Since Go-Live

Monthly Movement in Total NDM AQ

Sum of SumOfAQ

-0.84%   -1.07%   +0.83%   +0.14%

GasDay
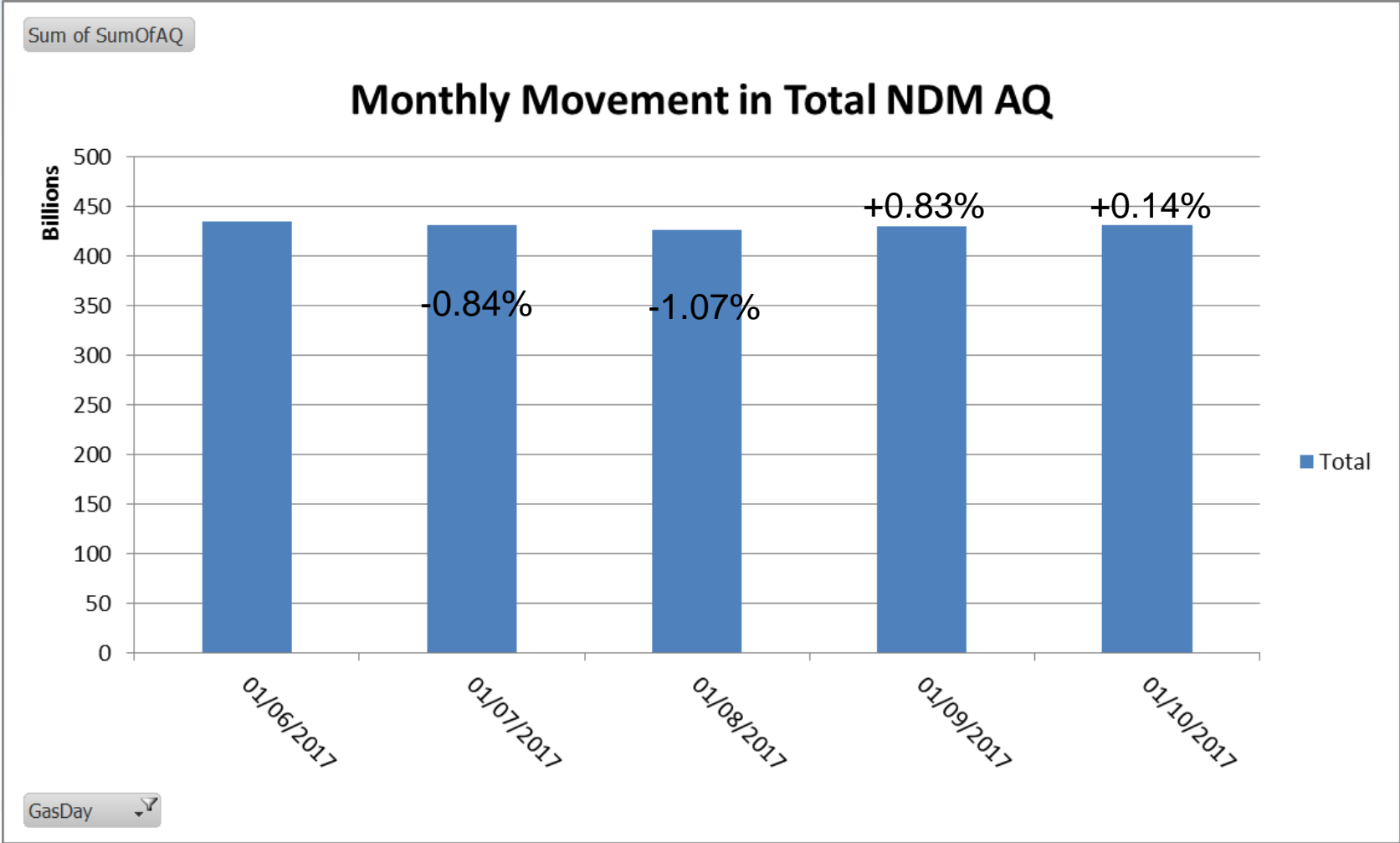
Net movement -0.95%
(i.e. reduction)

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Class 3 / 4 Total AQs spilt by Consumption Band (3-8) by Attribute

Step 4

Improving position but still over 25% of AQ in the "Bucket Band"
All sites in Band 4 and above should have daily reading equipment,
so should have a winter consumption.

Latest View of UIG Volatility – % of Total LDZ

- Despite resolution of 64% of original DM Rejection Pot, volatility has increased in September and October
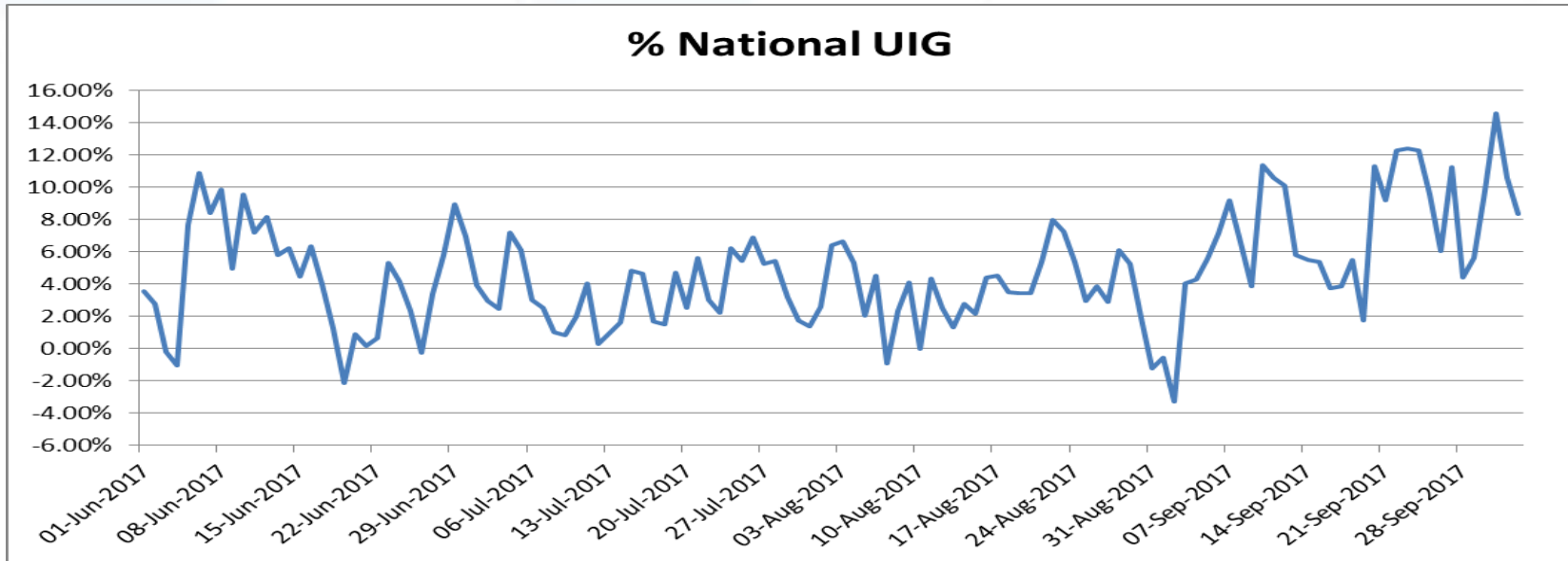

- Based on our analysis to date, we believe that fixing the current known issues will NOT eradicate all the volatility of UIG value

- DM issue may remove c. 1% of UIG levels

- AQs of 1 may contribute c 0.5% to UIG levels

- NDM AQs have reduced by 0.95% since Go-Live – Rolling AQ is therefore not a material cause of UIG levels
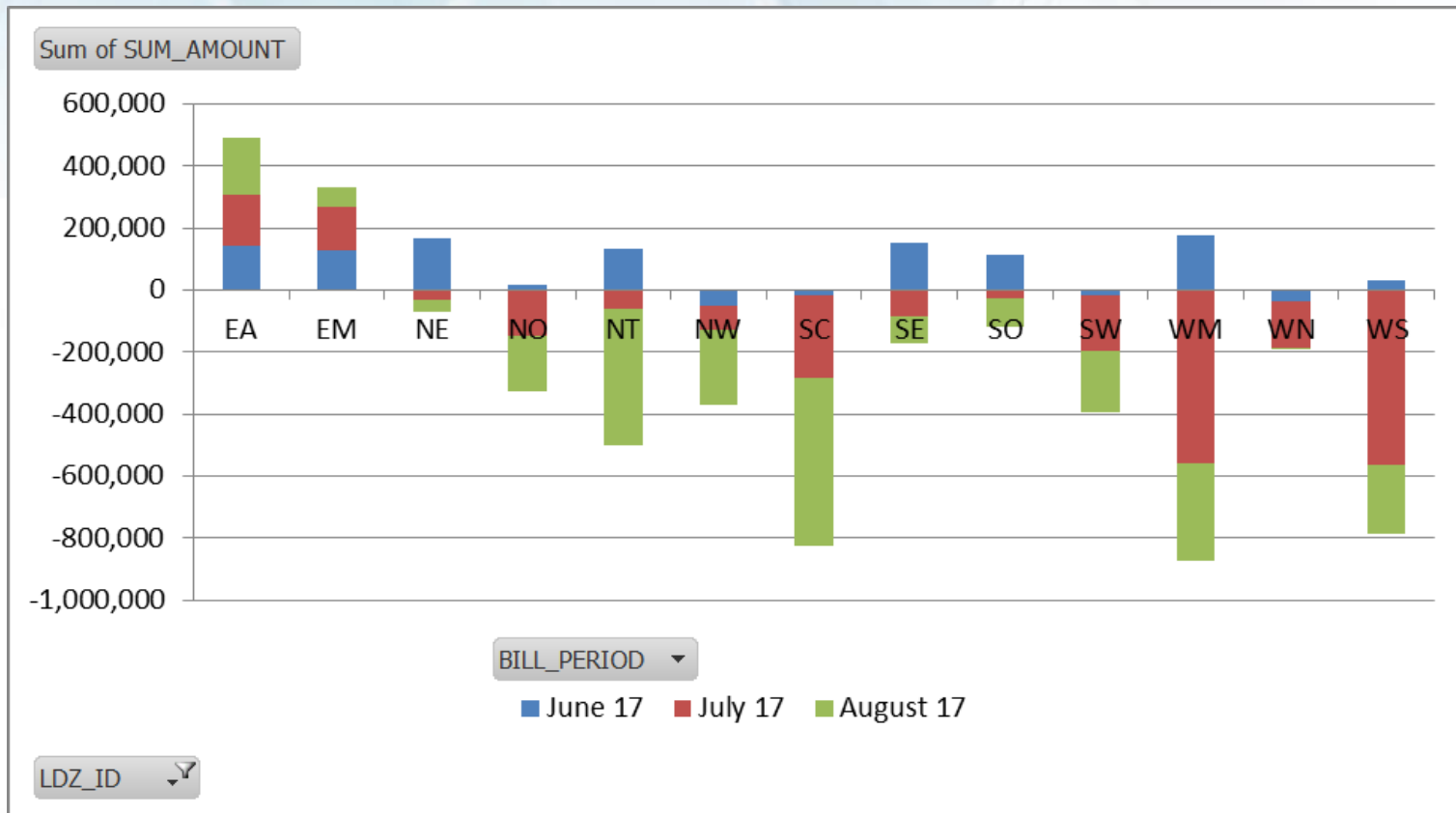
Total Allocation by Gas Day

Closed Out Allocation by Gas Day - LDZ (All)
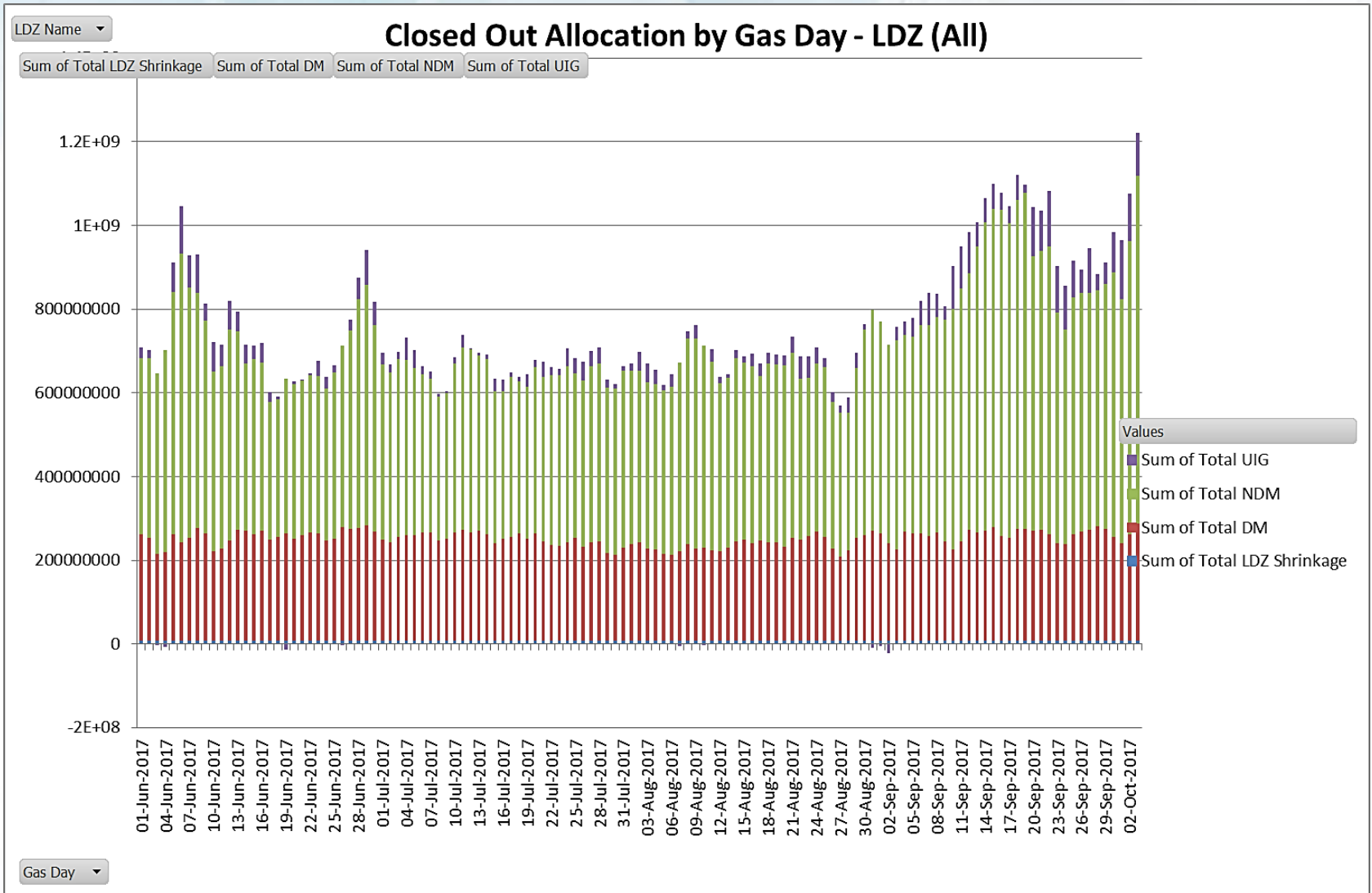
Variation in DMs is evident, NDM algorithm is taking up much of the daily movement – but not all of it
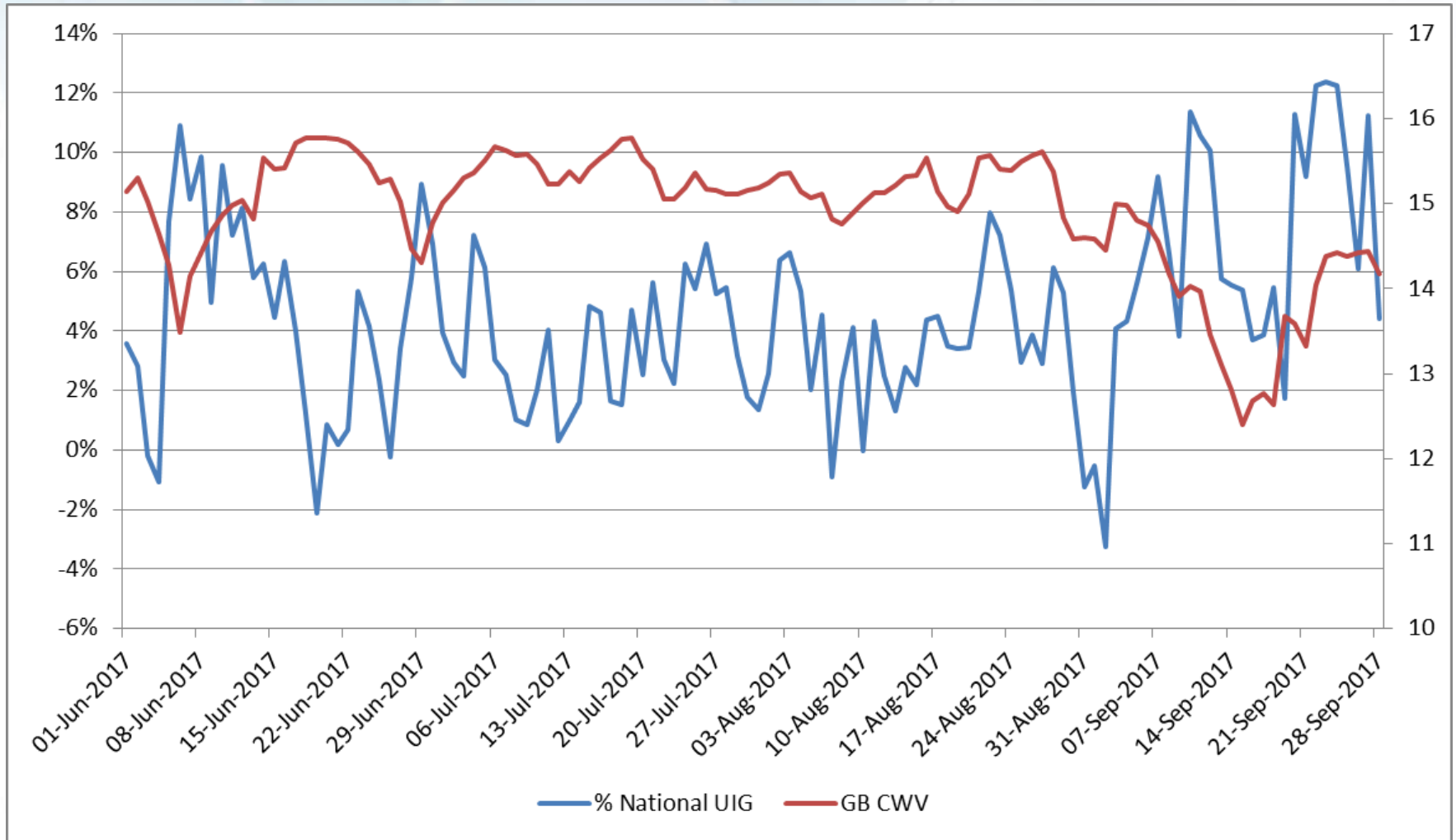
No strong relationship between UIG and weather
(Composite Weather Variable)

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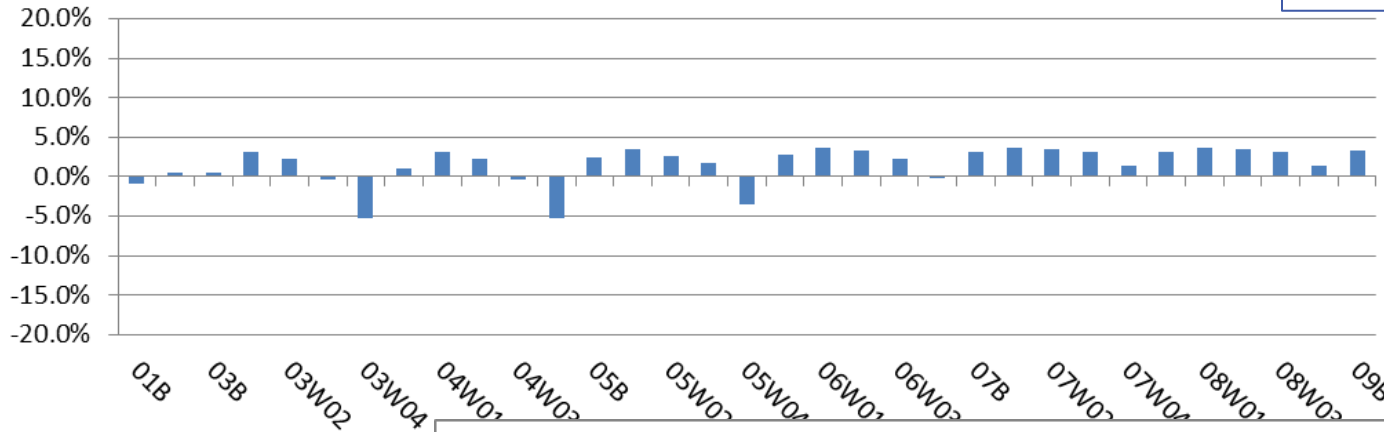# UIG Reconciliation by Billing Month to Date

- Total UIG reconciliation since June:

Billing Month	kWh	UIG Rec £ (i.e. GRE)
June	77m	900k
July	-148m	-1.8m
August	-162m	--2.3m

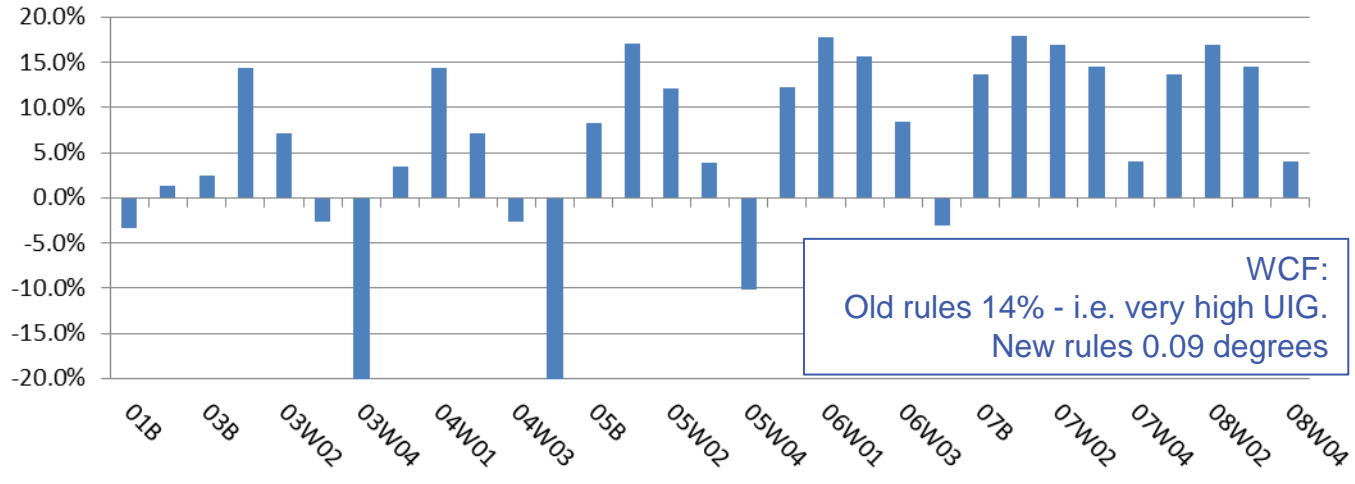*Represents net refund of c. 9% of total UIG for the same period*

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% Change Demand in total
(Old v New Allocation incl UIG - NW LDZ 04/06/17)

Weather Correction Factor (WCF):
Old rules 1% - i.e. low UIG
New rules 0.13 degrees

% Change Demand in total
(Old v New Allocation incl. UIG - SC LDZ 10/06/17)

WCF:
Old rules 14% - i.e. very high UIG.
New rules 0.09 degrees

The higher the level of UIG the bigger the swings in Allocation – impact depends on each Shipper's portfolio mix

Data for 3 Gas Days and all LDZs available on Xoserve Sharepoint site

UIG PROJECT EXECUTIVE SUMMARY

OVERALL

Four streams of work are in progress. A detailed delivery plan has been established and control mechanisms are in place to manage the workload and deliver timely MI. Attended DSC Contract Managers Committee, UNCC and a UIG awareness day is planned for 20th October. Overall movement on known issues is progressing well, more detailed work on underlying causes is required. A number of UNC modifications are under review.

DM Read Rejections	Good progress has been made in resolving the DM read rejections with 73 currently outstanding in phase 1 and 29 in phase 2. 2 new queries have been identified this week. Additional resources allocated to RGMA activities is increasing productivity. Top 10 by AQ have been issued to Ofgem. Detailed burndown monitoring is in place and reviewed daily, plan on track.
Erroneous AQs	Change Request has been approved and changes implemented prior to October rolling AQ, which avoided 62,118 new erroneous AQs being generated. 169,688 erroneous AQs of 1 exist and we are formulating a plan for correcting these back to previous AQ. Two options have been communicated to UNCC and UNCC have agreed 1st November in principle. A firm decision will be made by 23rd October.
CSEP / LDZ Mapping	Analysis has identified some CSEP's are potentially in the incorrect LDZ, initially the volume is anticipated to be in the region of 116 connections, equating to 90m kWh's. The impact and validity of this is currently being determined.
Analyse cause of volatility	Investigation has commenced on what is required from a security perspective to accommodate external organisations to assist analysis. Review Group proposal is being discussed at UNCC, following which a scope of work will be determined.

DM Reads

Erroneous AQs

CSEP/LDZ

Causes

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Additional Areas of Focus
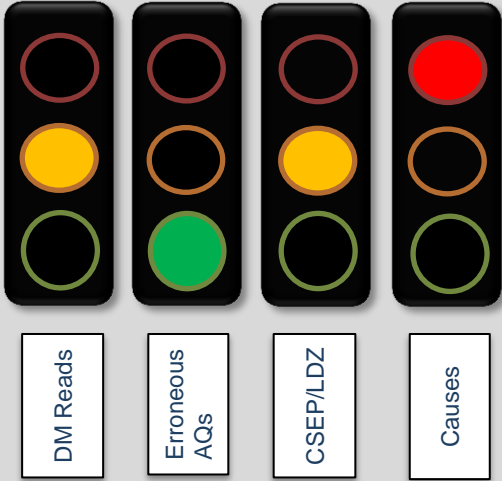
- There are a number of activities that the industry can undertake to reduce the impact of UIG including:
  - Shippers
    - Reviewing accuracy of AQs and adjusting where required
    - Promptly registering shipperless sites
    - Supplying regular accurate monthly reads for NDM meter points
    - Timely notification of meter asset exchanges/updates
    - Supplying accurate DM Nominations, as early as possible each day
    - Using the Class 2 product for larger NDM LSP sites where appropriate
    - Supporting NDM Demand Estimation modelling by providing additional sample data to Xoserve, especially for small LSP market
    - Continuing to be diligent in managing consumer theft of gas
  - GTs
    - Review accuracy of LDZ offtake equipment to minimise errors
  - DMSPs
    - Support site set-up investigations, including timely site visits
  - Xoserve – support for analysis and reporting/education
- Are the above mandatory or voluntary? Should that change?
- Are more incentives required?

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If fixing the current known issues will NOT eradicate all the volatility of UIG value or significantly reduce the levels …

How can the industry manage this differently?

How can Xoserve support the industry?

15 minute discussion by table, followed by summary of top three recommendations back to the room.

Summary and Next Steps

Thank you for attending

Have a safe journey home