

# Mod 644 UIG Analysis Stage 2

***e-on***

# Introduction

## **Modification 644: Improvements to nomination and reconciliation through the introduction of new EUC bands and improvements in the ALPs and DAFs**

### **Purpose of Modification:**

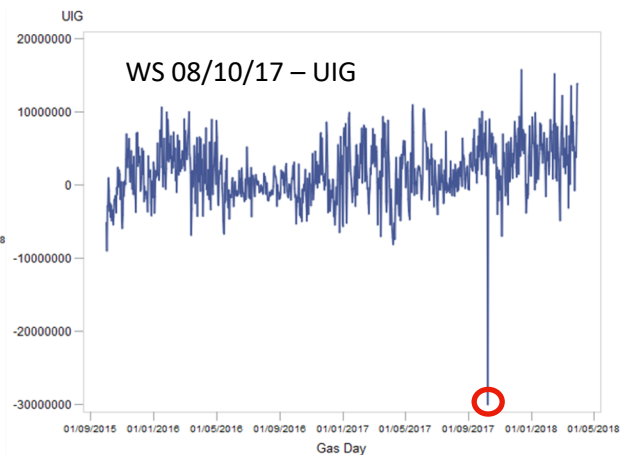
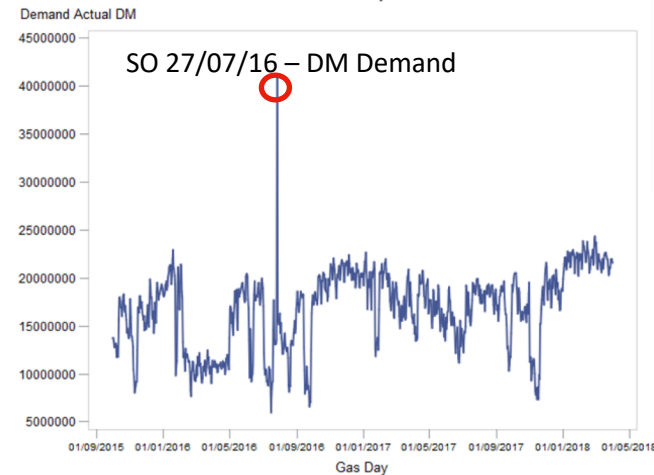
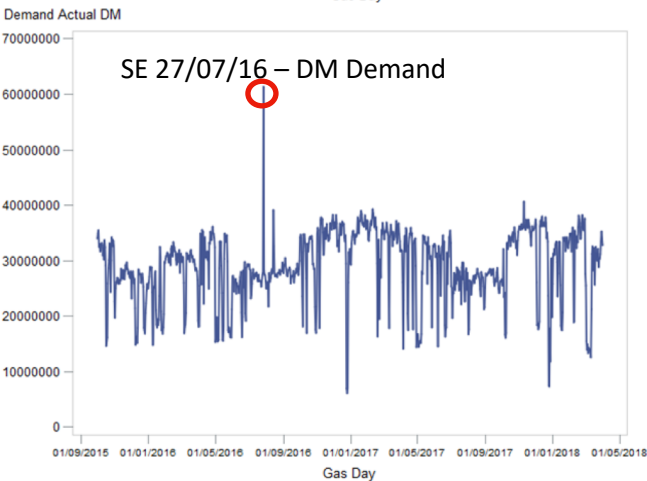
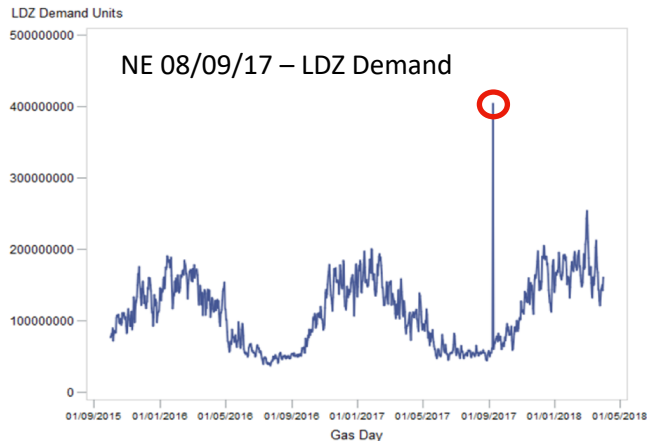
This modification seeks to split the End User Categories (EUC) EUC01B and EUC02B into three and grouping by prepayment, market sector code of industrial and commercial and finally all remaining meter point reference numbers. It also seeks to create parameters to flex the Daily Adjustment Factors (DAFs) and Annual Load Profiles (ALPs) where they reach defined tolerances. These amendments would provide a more accurate profile to that which is in place today and would work towards improved nominations which in turn would reduce reconciliation and UIG.

## Recap Original Results: Adjusting both ALPs and DAFs

**Adjusting both ALPs and DAFs together can produce a reduction in volatility of between 4% and 17% depending on LDZ**

| LDZ | Best ALP Multiplier | Best DAF Multiplier | Change in Standard Deviation |
|-----|---------------------|---------------------|------------------------------|
| EA  | 1.07                | 1.04                | -17.0%                       |
| EM  | 1.06                | 1.05                | -14.3%                       |
| NE  | 1.08                | 1.09                | -4.1%                        |
| NO  | 1.05                | 1.09                | -8.8%                        |
| NT  | 1.02                | 1.04                | -5.2%                        |
| NW  | 1.09                | 1.00                | -16.1%                       |
| SC  | 1.04                | 1.09                | -9.1%                        |
| SE  | 1.02                | 1.06                | -4.5%                        |
| SO  | 1.06                | 1.06                | -14.1%                       |
| SW  | 1.04                | 1.07                | -9.3%                        |
| WM  | 1.04                | 1.02                | -7.9%                        |
| WN  | 1.10                | 1.00                | -15.7%                       |
| WS  | 1.05                | 1.04                | -5.5%                        |

# Data Cleansing



## New Results: Adjusting both ALPs and DAFs

**Rerunning the original analysis with the cleaned datasets, produces better results, especially for NE**

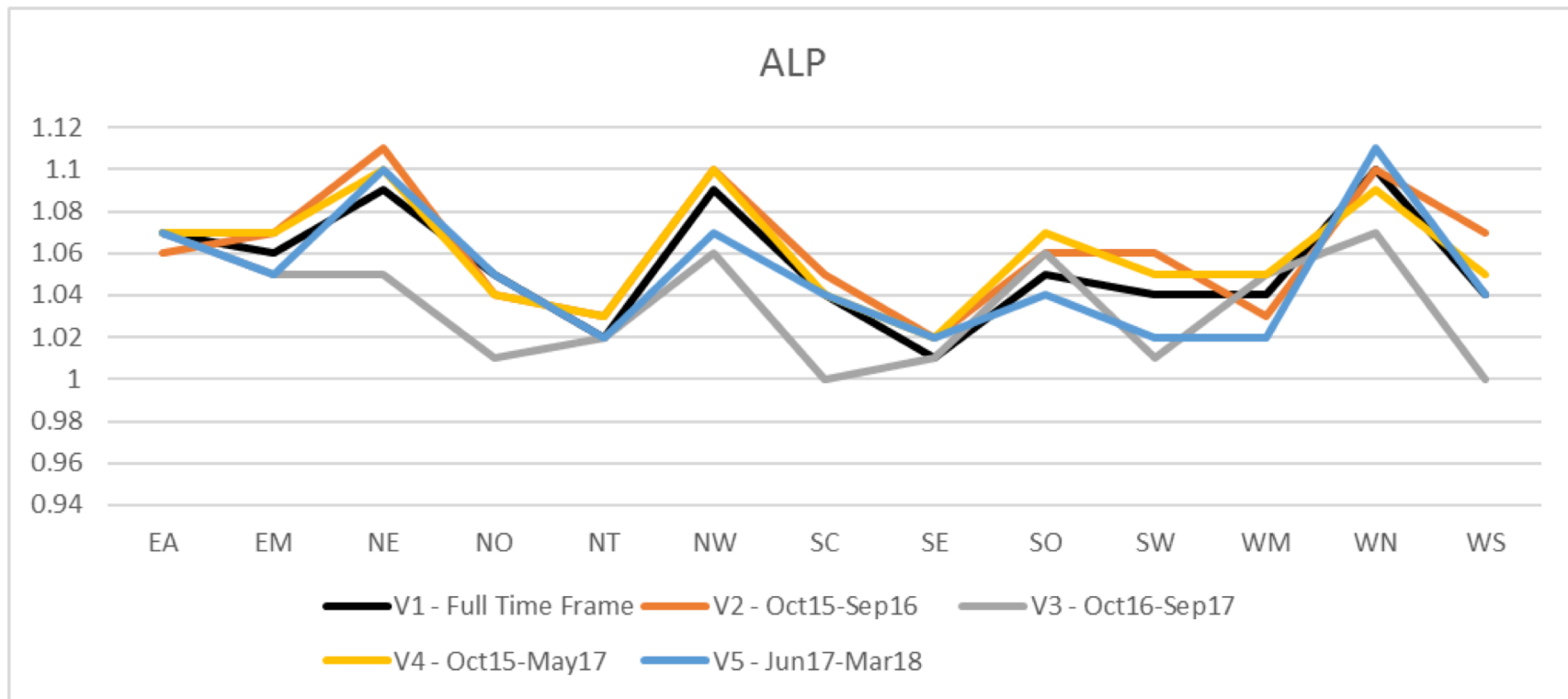
| LDZ | Best ALP Multiplier | Best DAF Multiplier | Change in Standard Deviation |
|-----|---------------------|---------------------|------------------------------|
| EA  | 1.07                | 1.04                | -17.0%                       |
| EM  | 1.06                | 1.05                | -14.3%                       |
| NE  | 1.09 (+0.01)        | 1.07 (+0.02)        | -17.5% (-13.4)               |
| NO  | 1.05 (-)            | 1.09 (-)            | -9.0% (-0.2)                 |
| NT  | 1.02                | 1.04                | -5.2%                        |
| NW  | 1.09                | 1.00                | -16.1%                       |
| SC  | 1.04                | 1.09                | -9.1%                        |
| SE  | 1.01 (-0.01)        | 1.07 (-0.01)        | -4.5%(-)                     |
| SO  | 1.05 (-0.01)        | 1.06 (-)            | -14.1% (-)                   |
| SW  | 1.04                | 1.07                | -9.3%                        |
| WM  | 1.04                | 1.02                | -7.9%                        |
| WN  | 1.10                | 1.00                | -15.7%                       |
| WS  | 1.04 (-0.01)        | 1.05 (+0.01)        | -5.7% (-0.2)                 |

# Next Steps as discussed in the DESC meeting on 1<sup>st</sup> May

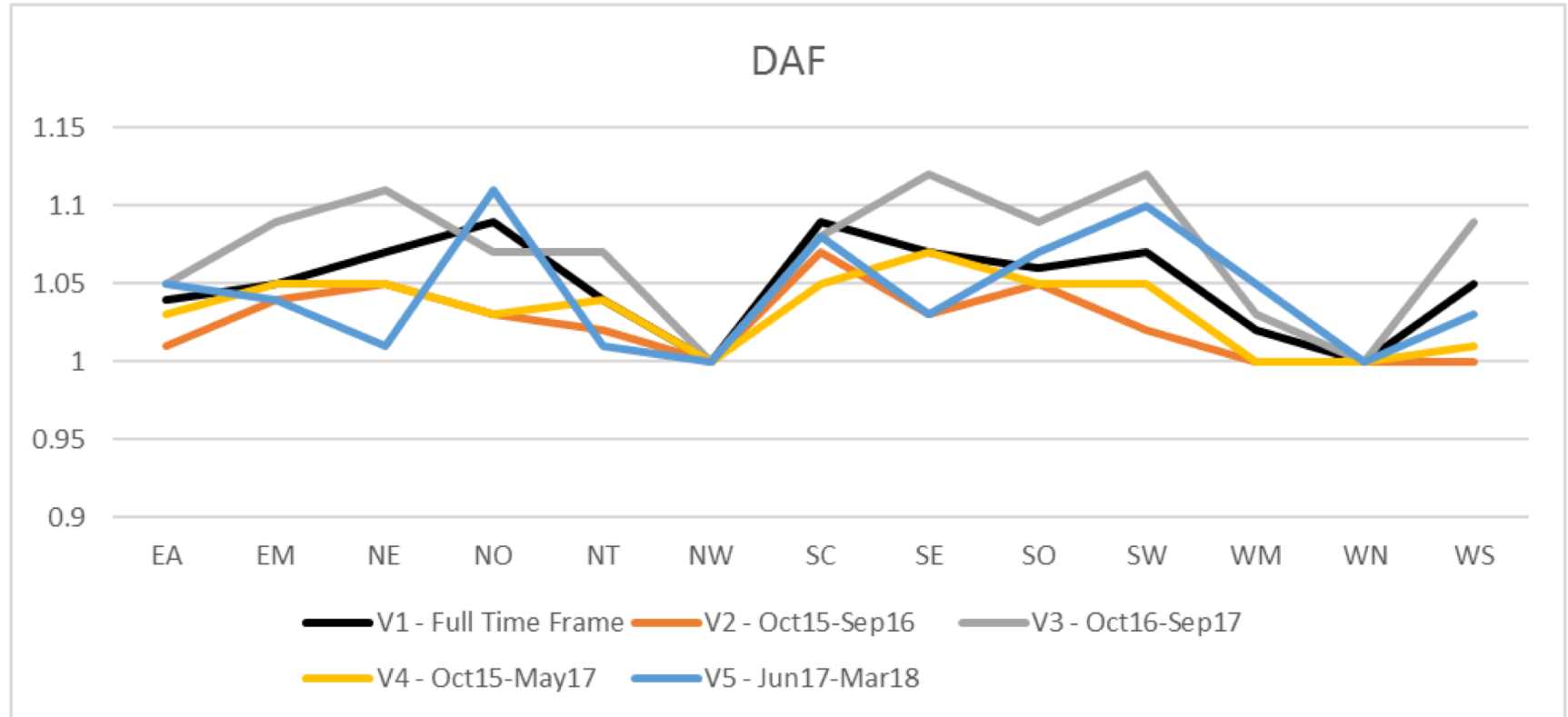
## Recommendations for next steps:

- Supplementary information on the original analysis:
  - How do the suggested multipliers change across different gas years
  - How do the suggested multipliers across winter and summer months
  - What improvement can be found by using a separate training and validation time period.
- An investigation into Reconciliation data since Nexus to see if this supports the new multipliers
- Xoserve provide the current year's sample data with some extra details to enable analysis of how the ALP and DAF adjustments would affect allocation over the past two sample datasets

## Suggested Multiplier by Gas Year and Pre/Post Nexus

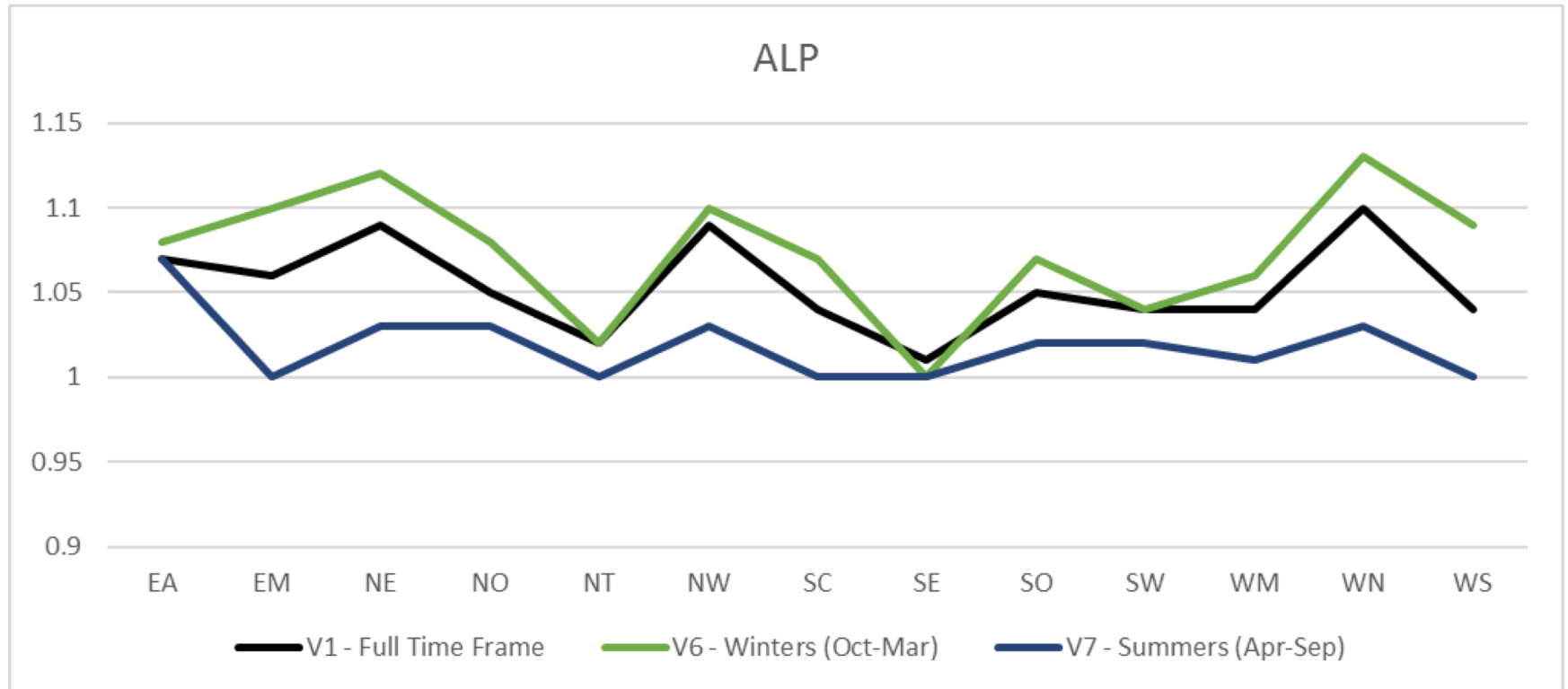


## Suggested Multiplier by Gas Year and Pre/Post Nexus

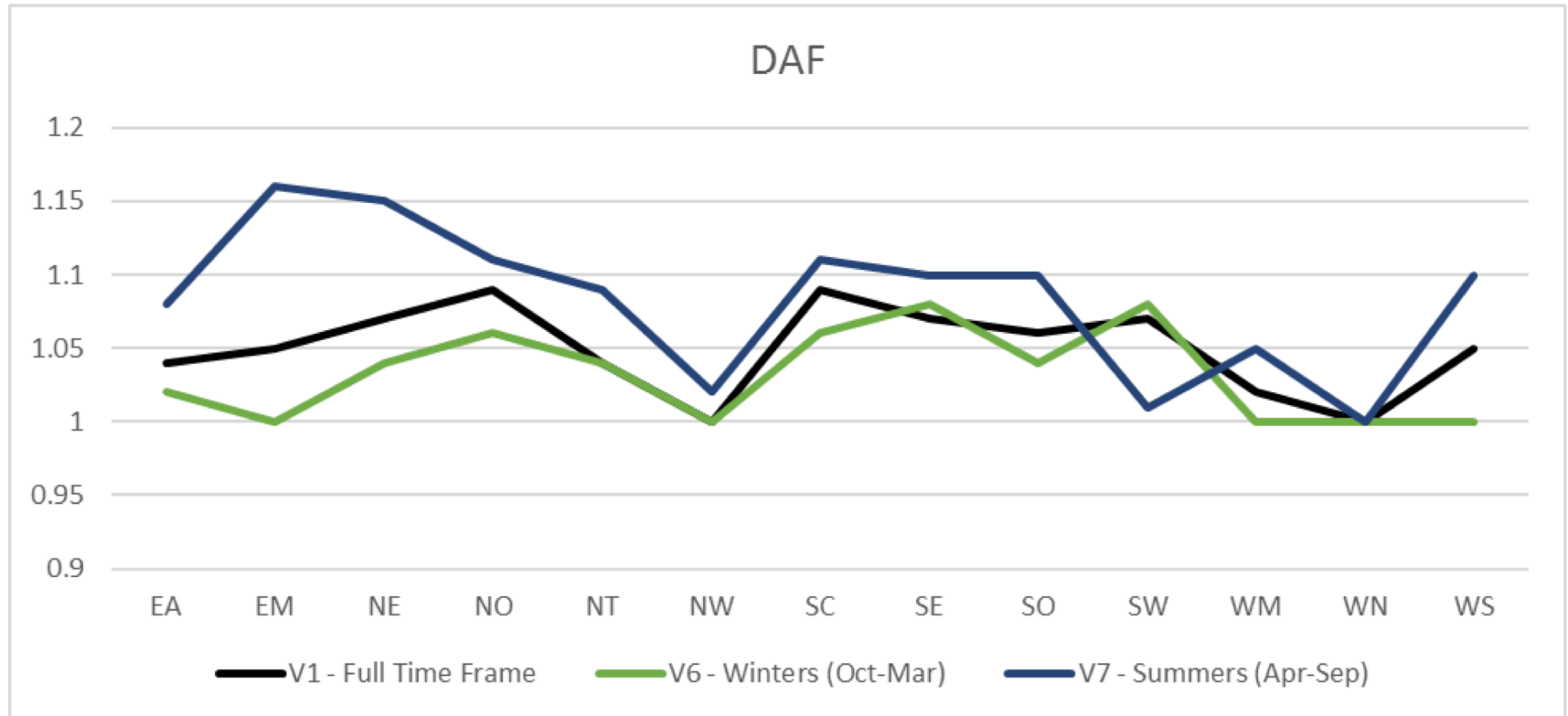




## Suggested Multiplier by Season (all years)

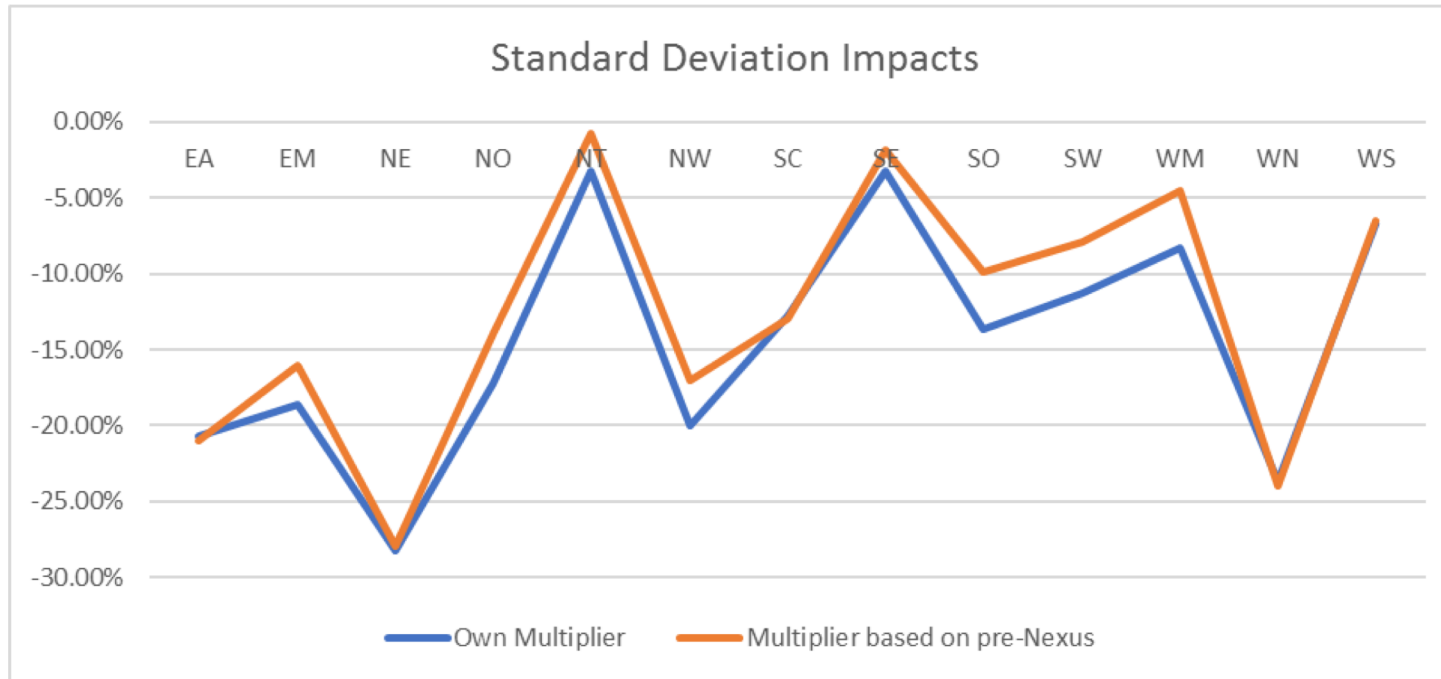


## Suggested Multiplier by Season (all years)



# Volatility Improvements using out-of-sample tests

Below shows the change in standard deviation for post-Nexus (Jun17-Mar18) when multipliers are used based on data from that period (Own Multiplier) and from pre-Nexus (Oct15-May17)



## Sample data: AQ Proportion by EUC compared to National

| EUC   | 16/17  | 17/18  |
|-------|--------|--------|
| 01B   | 0.01%  | 0.05%  |
| 02B   | 1.02%  | 3.47%  |
| 03W01 | 4.90%  | 8.05%  |
| 03W02 | 4.58%  | 8.56%  |
| 03W03 | 6.87%  | 12.68% |
| 03W04 | 8.40%  | 23.17% |
| 04W01 | 16.31% | 10.62% |
| 04W02 | 20.51% | 16.67% |
| 04W03 | 23.87% | 31.13% |
| 04W04 | 26.90% | 69.21% |
| 05W01 | 0.03%  | 0.03%  |
| 05W02 | 0.05%  | 0.05%  |
| 05W03 | 0.05%  | 0.05%  |
| 05W04 | 0.06%  | 0.06%  |
| 06W01 | 0.06%  | 0.06%  |
| 06W02 | 0.08%  | 0.08%  |
| 06W03 | 0.08%  | 0.08%  |
| 06W04 | 0.11%  | 0.11%  |
| 07W01 | 0.27%  | 0.27%  |
| 07W02 | 0.26%  | 0.26%  |
| 07W03 | 0.24%  | 0.24%  |
| 07W04 | 0.42%  | 0.42%  |

So that the sample data can be looked at as an aggregate of EUCs without this showing a very different proportion of EUCs than nationally, the sample data has been multiplied by a factor to correct its proportion.

For example, in an EUC and LDZ where the sample data AQ is 1% of the national AQ for that EUC LDZ combination, the data has been multiplied by 100 before summarising.

It should be noted that while, E01B makes up ~75% of national AQ, of the samples the E01B AQ only makes up 1-2% of the Sample AQ.

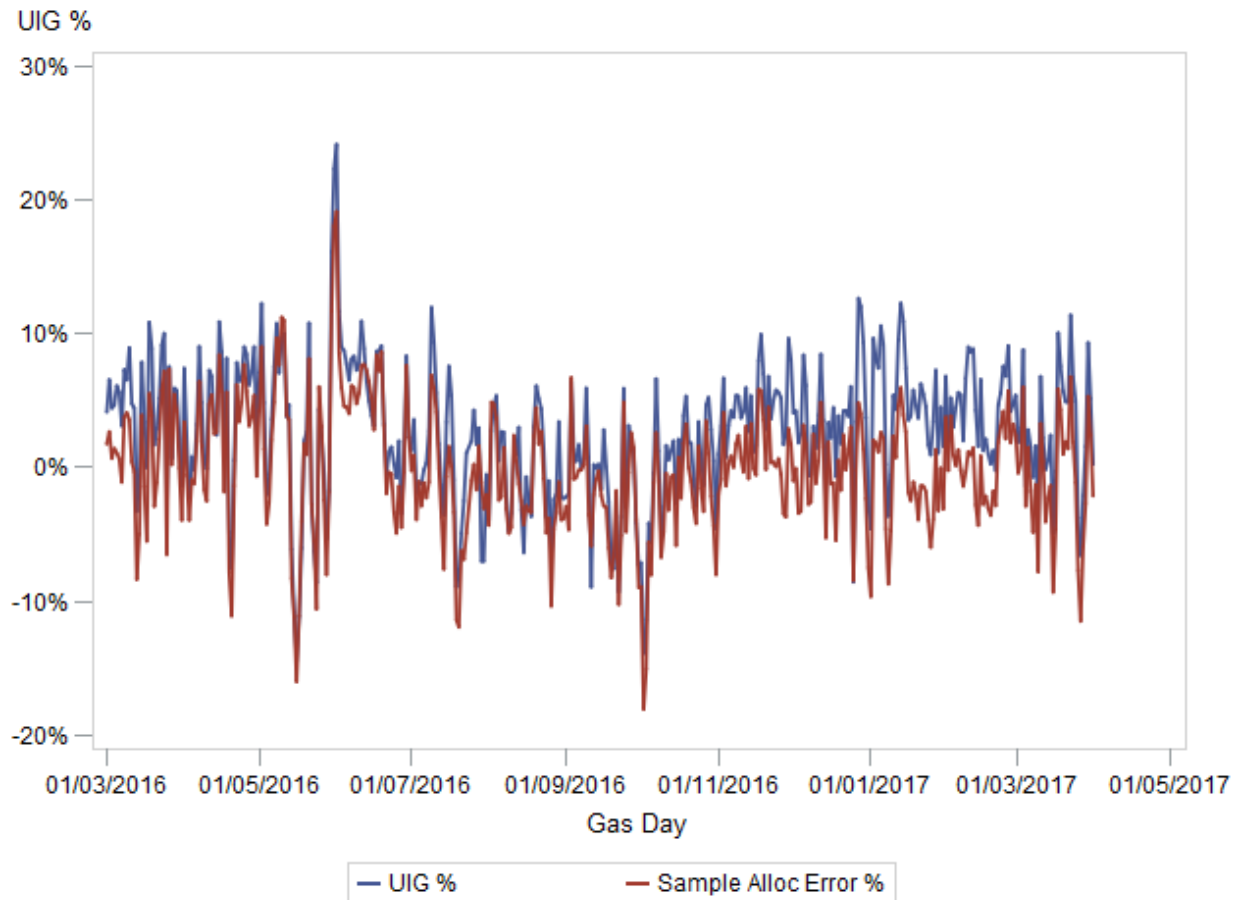
## Sample data: 2016/17 Allocation Error Compared to UIG

Comparing:

- National UIG as a percentage of national NDM allocation
- Sample Allocation error as a percentage of NDM allocation

Therefore, both lines are directly comparable.

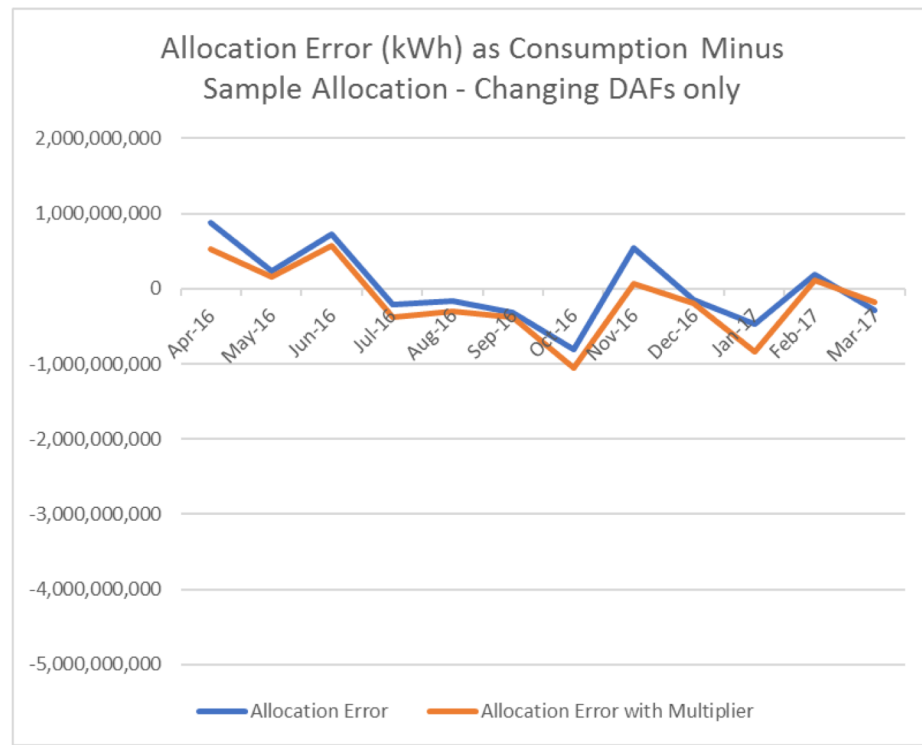
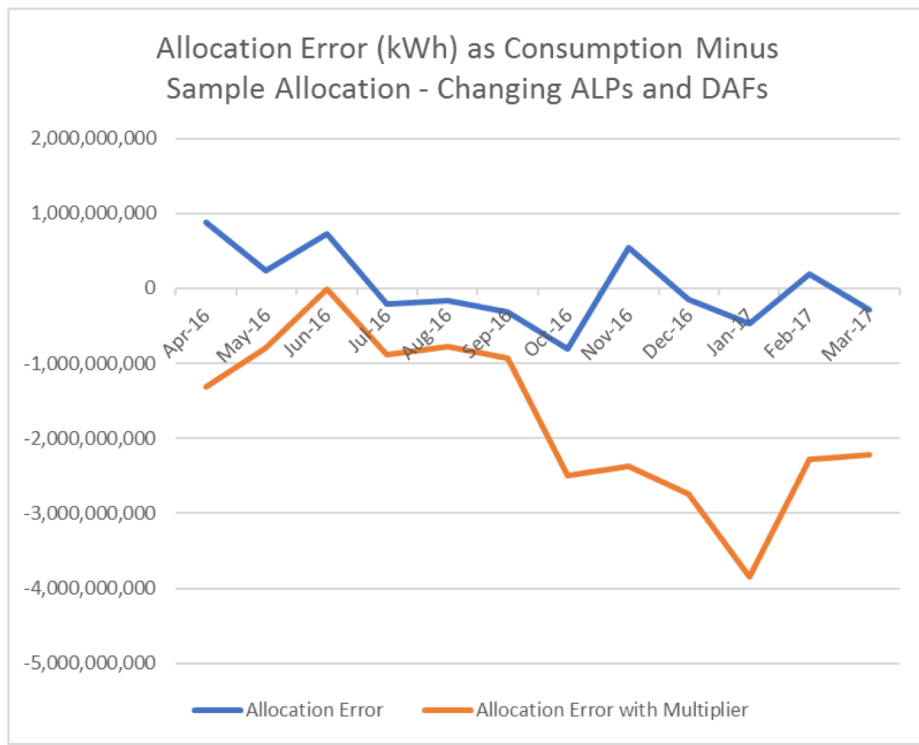
They show that UIG is positive over this year so national allocation must be too low. The sample allocation however, does not show the same bias.



| Variable             | Mean  | Std Dev |
|----------------------|-------|---------|
| UIG %                | 2.8%  | 5.1%    |
| Sample Alloc Error % | -0.1% | 4.8%    |

## Sample data: 2016/17 Allocation Error with Multipliers

Applying the multipliers derived as the 'best' from the national level data to the latest set of sample data, does not provide the same benefit as when applied to the national data. The multipliers to generally reduce the proxy UIG volume, but because the sample data does not show the same bias as UIG.



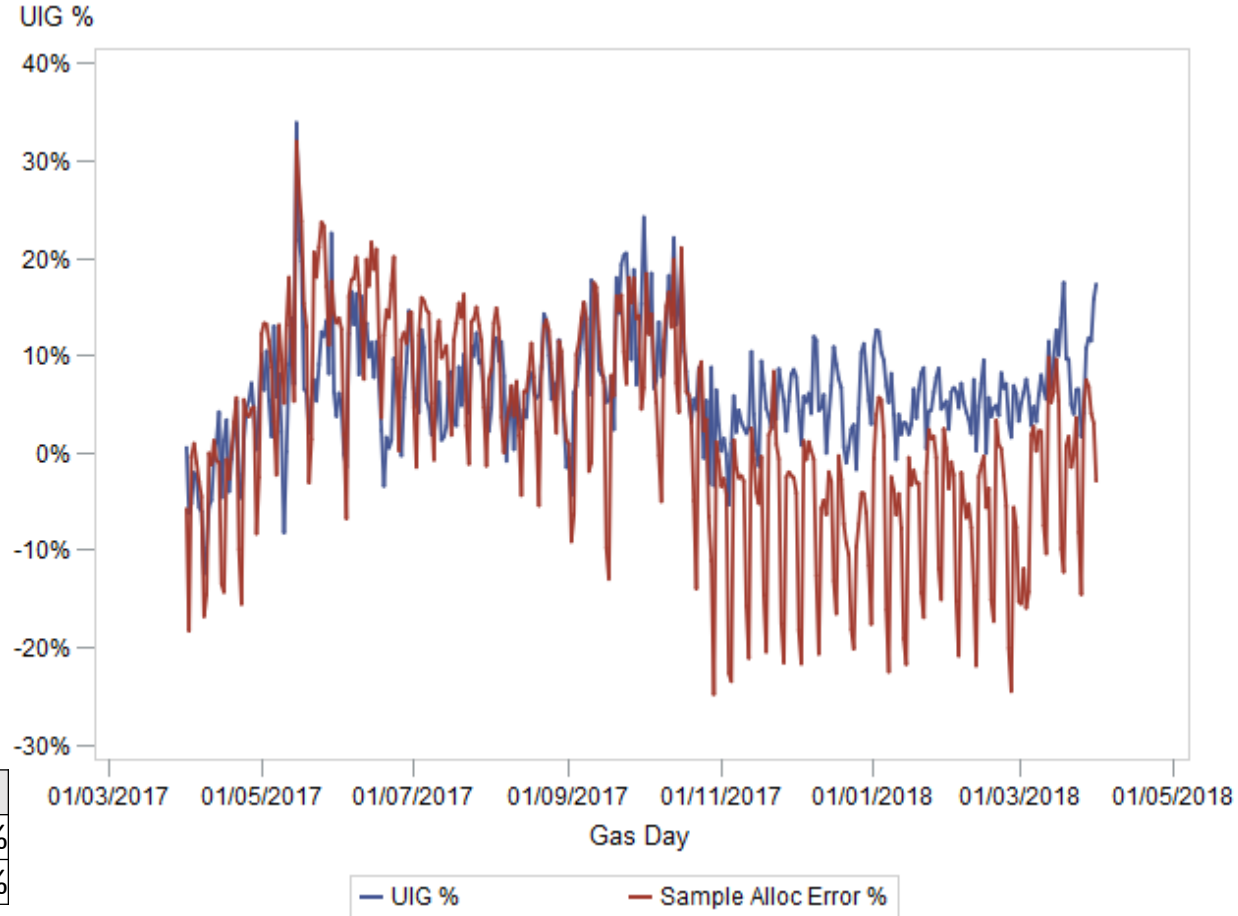
## Sample data: 2017/18 Allocation Error Compared to UIG

Comparing:

- National UIG as a percentage of national NDM allocation
- Sample Allocation error as a percentage of NDM allocation

Therefore, both lines are directly comparable.

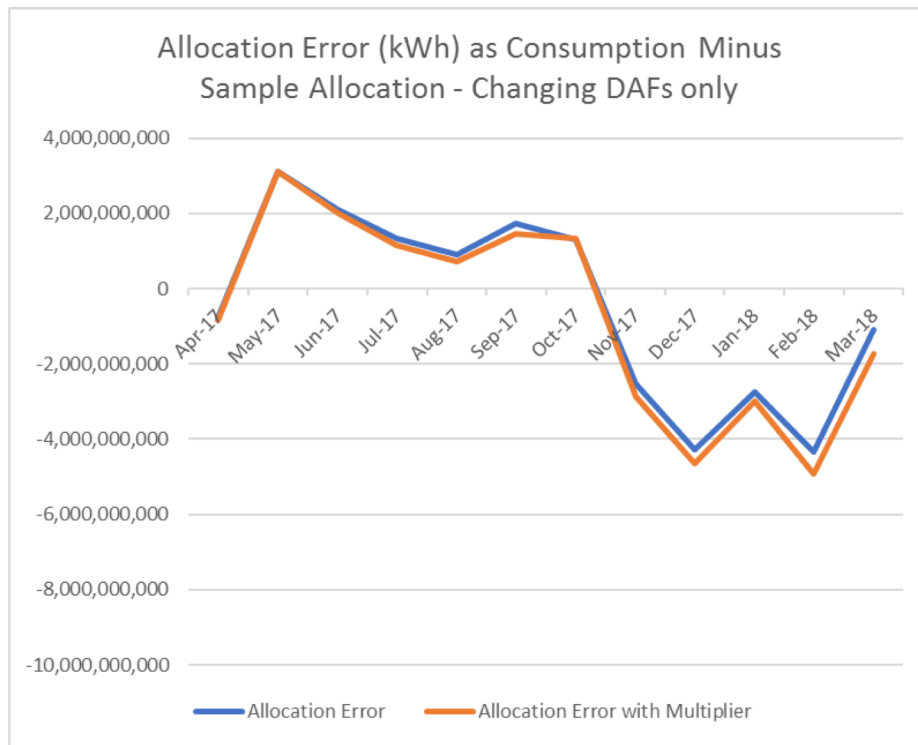
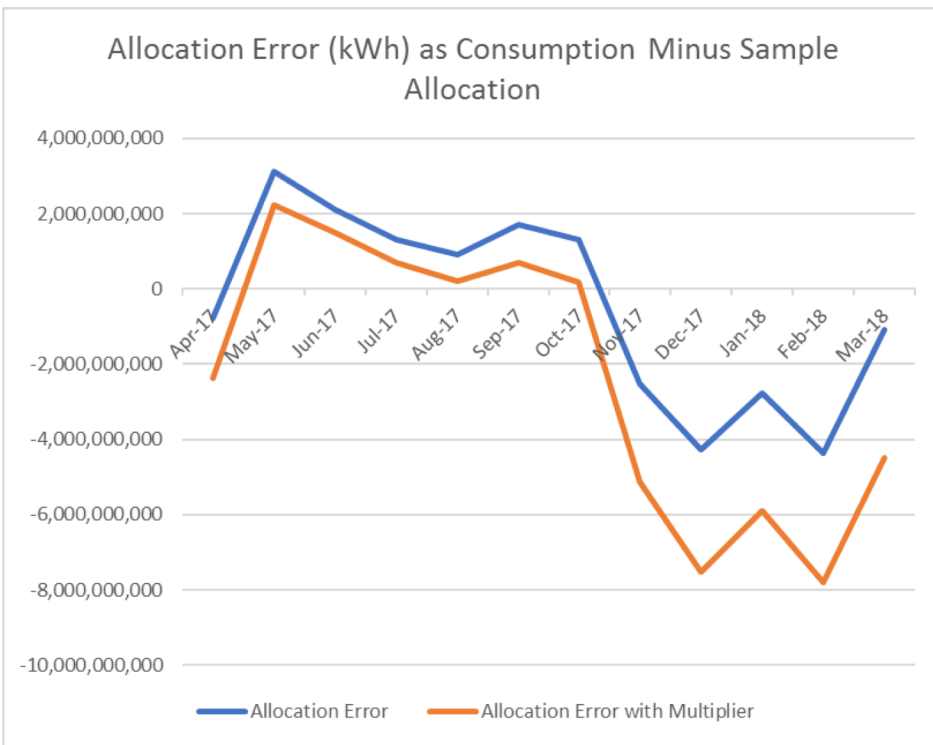
They show that UIG is positive over this year so national allocation must be too low. This is the same case over summer months for the sample allocation, but over winter the sample allocation is instead much too high.



| Variable             | Mean | Std Dev |
|----------------------|------|---------|
| UIG %                | 6.5% | 5.7%    |
| Sample Alloc Error % | 2.1% | 11.0%   |

## Sample data: 2017/18 Allocation Error with Multipliers

Applying the multipliers derived as the 'best' from the national level data to the latest set of sample data, does not provide the same benefit as when applied to the national data. The multipliers to generally reduce the proxy UIG volume, but because the sample data does not show the same bias as UIG.

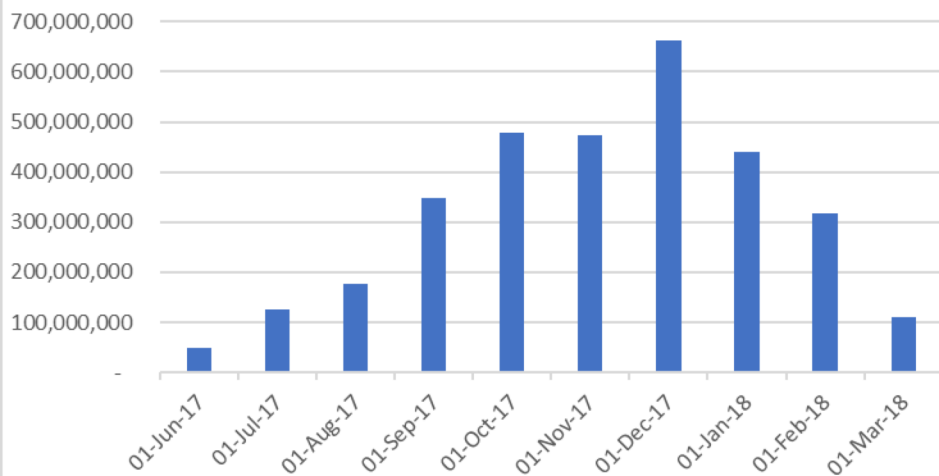




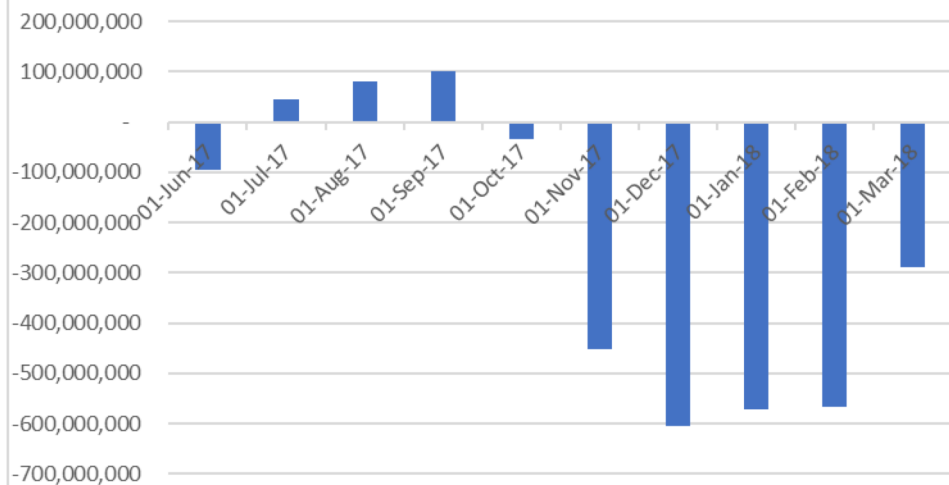
## Rec Data: Reconciliation volumes since Nexus go-live

Reconciliation volumes showed a different pattern for E01 and the other EUCs. As shown below, E01B meters are nationally not being allocated enough volume across the board, while the other EUCs are generally being allocated too much. There is also a strong seasonal shape to the reconciliation volumes for E02B+, but the shape should be fixed through the regular ALP creation process.

E01B Cat 4 Rec by Supply Month (kWh)



E02B+ Cat 4 Rec by Supply Month (kWh)



# Proposal

- For E01B, the new DAF multipliers, and the separate summer and winter ALP multipliers should be applied.
  - The need to increase the level of E01B is supported by the Reconciliation data, and the total national level UIG is clearly positively biased and because E01B makes up ~75% of the volume, it is a good assumption that this EUC follows the same pattern as the total NDM.
- For E02B+ only the DAF multipliers should be applied
  - It is not clear from the rec data that these have the same bias, and any shape issue should be resolved through the usual ALP and DAF derivation process.