DESC - 10th Dec 2018

Strand 2 Analysis - UIG

Background

- The implementation of Project Nexus on 1st June 2017 introduced a revised NDM demand formula, meaning some of the previous algorithm performance measures became redundant.
- Discussions took place at DESC meetings during the build up to Nexus implementation, which concluded on the following strands:
  - Strand 1 – Weather Analysis
  - **Strand 2 – Unidentified Gas Analysis**
  - Strand 3 – NDM Daily Demand Analysis
  - Strand 4 – Reconciliation Analysis
- Following Nexus Go-Live, UIG is now the balancing figure in each LDZ for each gas day
- UIG is calculated using the following formula:

  UIG = Total LDZ throughput – Shrinkage – DM measurements – NDM allocation

Objective

- To review Strand 2 – UIG Analysis
- To review the Unidentified Gas levels for Gas Year 2017/18 using statistical measures and visual representations
- Note: The causes of UiG on a daily basis are not considered here and are being investigated as part of the UiG Taskforce

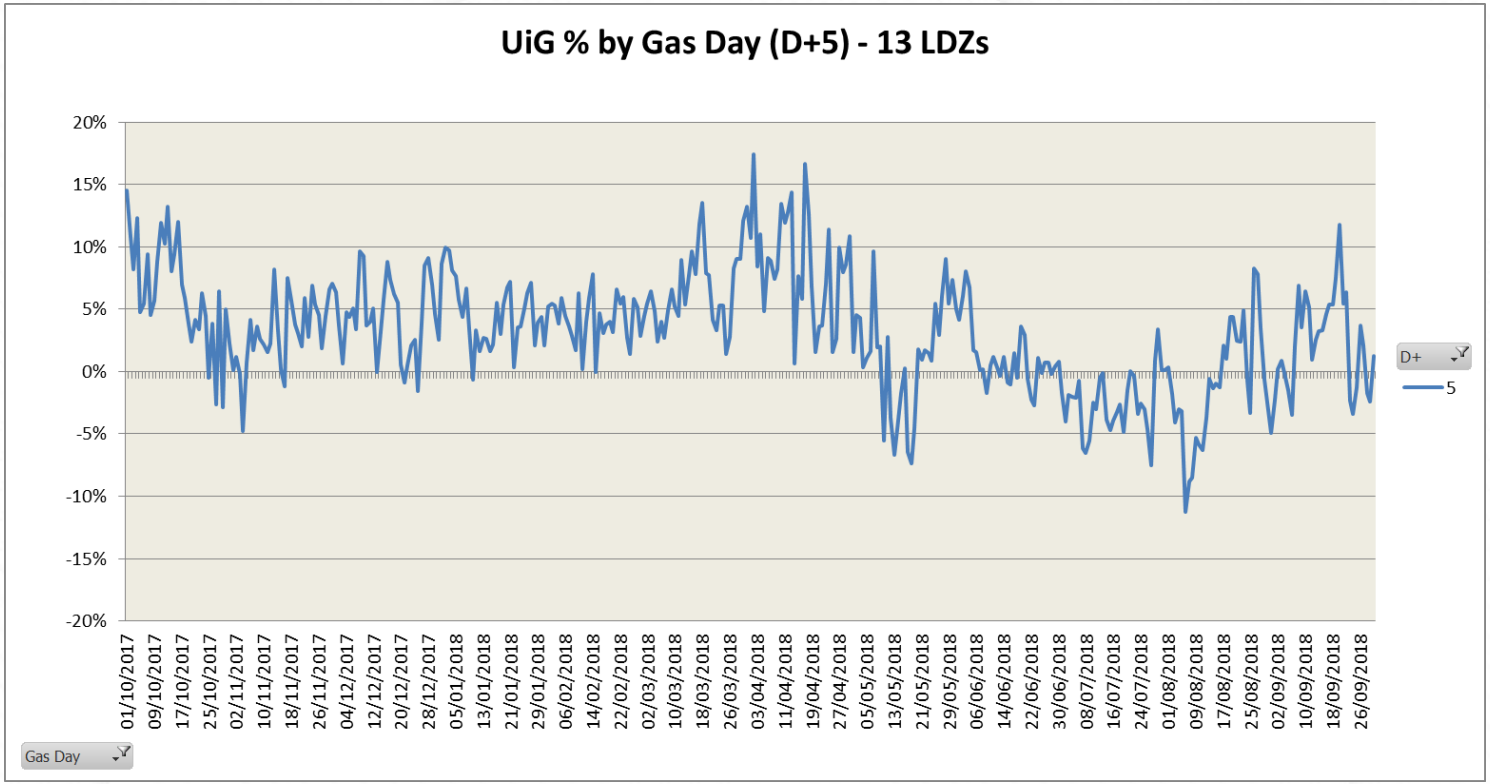
Approach

- To analyse UIG % for gas year 17/18 by seasons:
  - Autumn: Oct ‘17 to Dec ‘17
  - Winter: Jan ‘18 to Mar ‘18
  - Spring: Apr ‘18 to Jun ‘18
  - Summer: Jul ‘18 to Sep ‘18

- To compare the previous gas year’s (June ‘17 to Sep ‘17) UIG values to the same period of the most recent gas year (17/18)

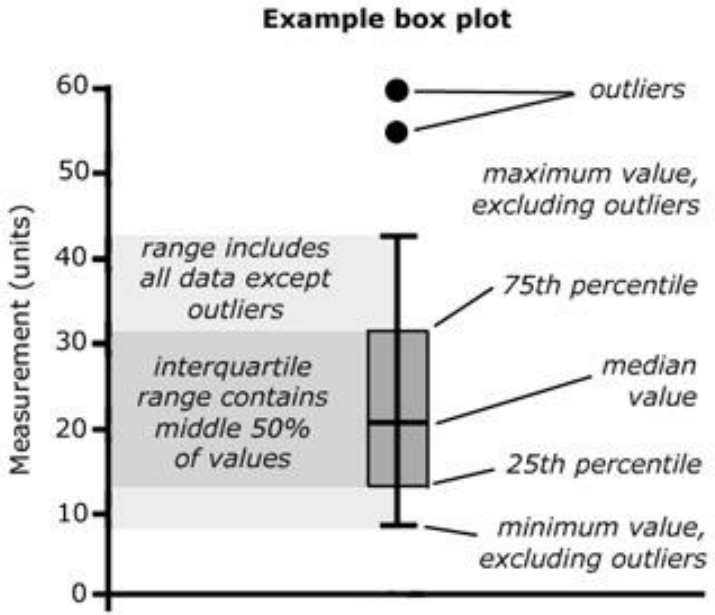
- Use Boxplots and distribution graphs to see how UIG varies by seasons and LDZ.

Daily UIG% - Nationally 17/18



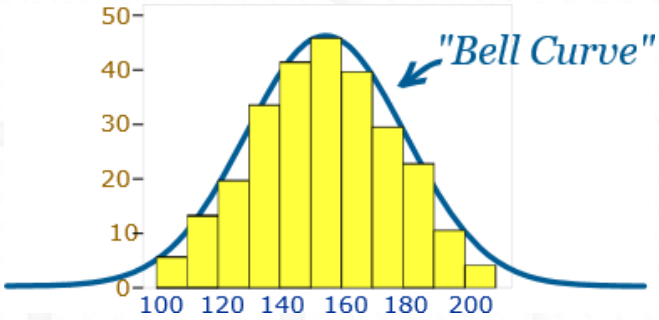
The national average UIG for D+5 is 4.40%

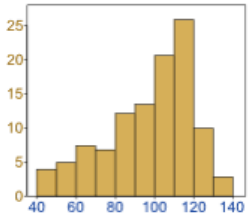
Methods used to assess UIG: Boxplot

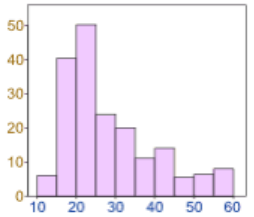


Methods used to assess UIG cont…

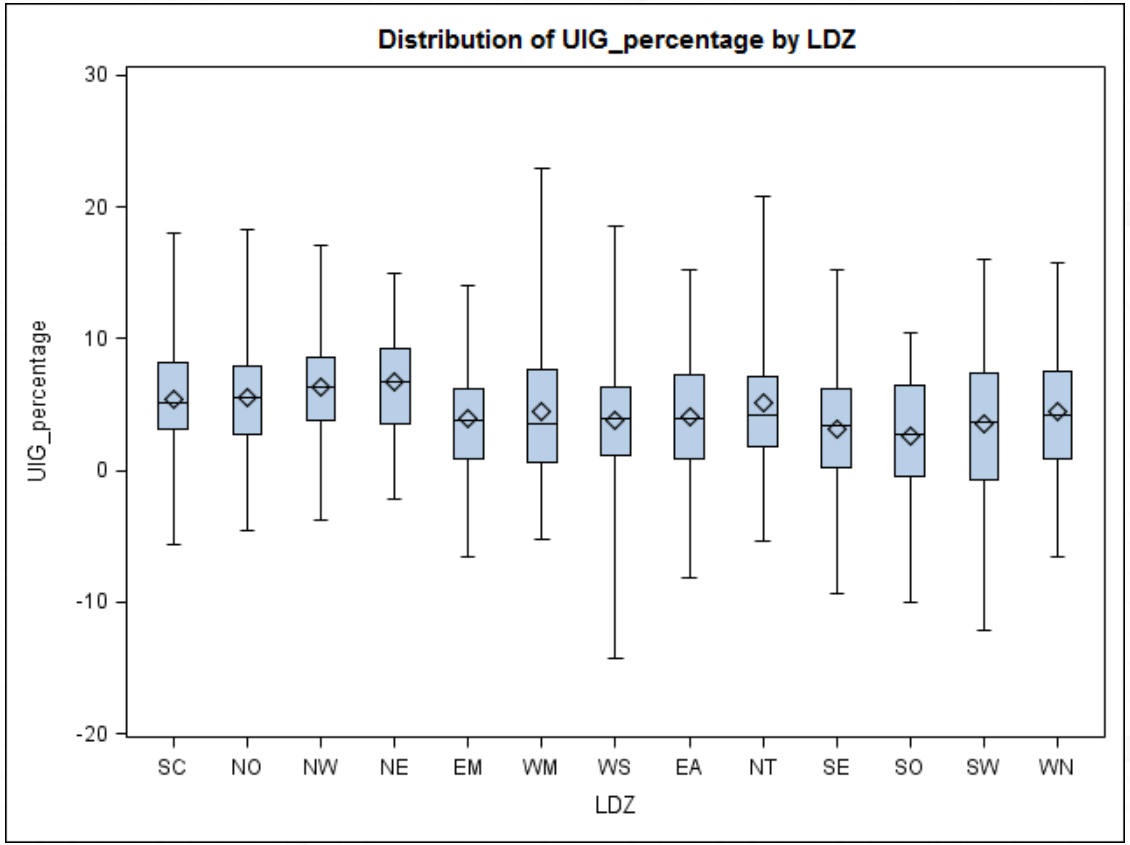
- Assess the distribution (spread) of UIG.
- Data can be spread in different ways:
  - Symmetrical with no bias left or right (normal)
  - Skewed to the left – a greater proportion of the measurements lie to the left of the peak value
  - Skewed to the right – a greater proportion of the measurements lie to the right of the peak value







UIG Analysis Autumn 2017/18



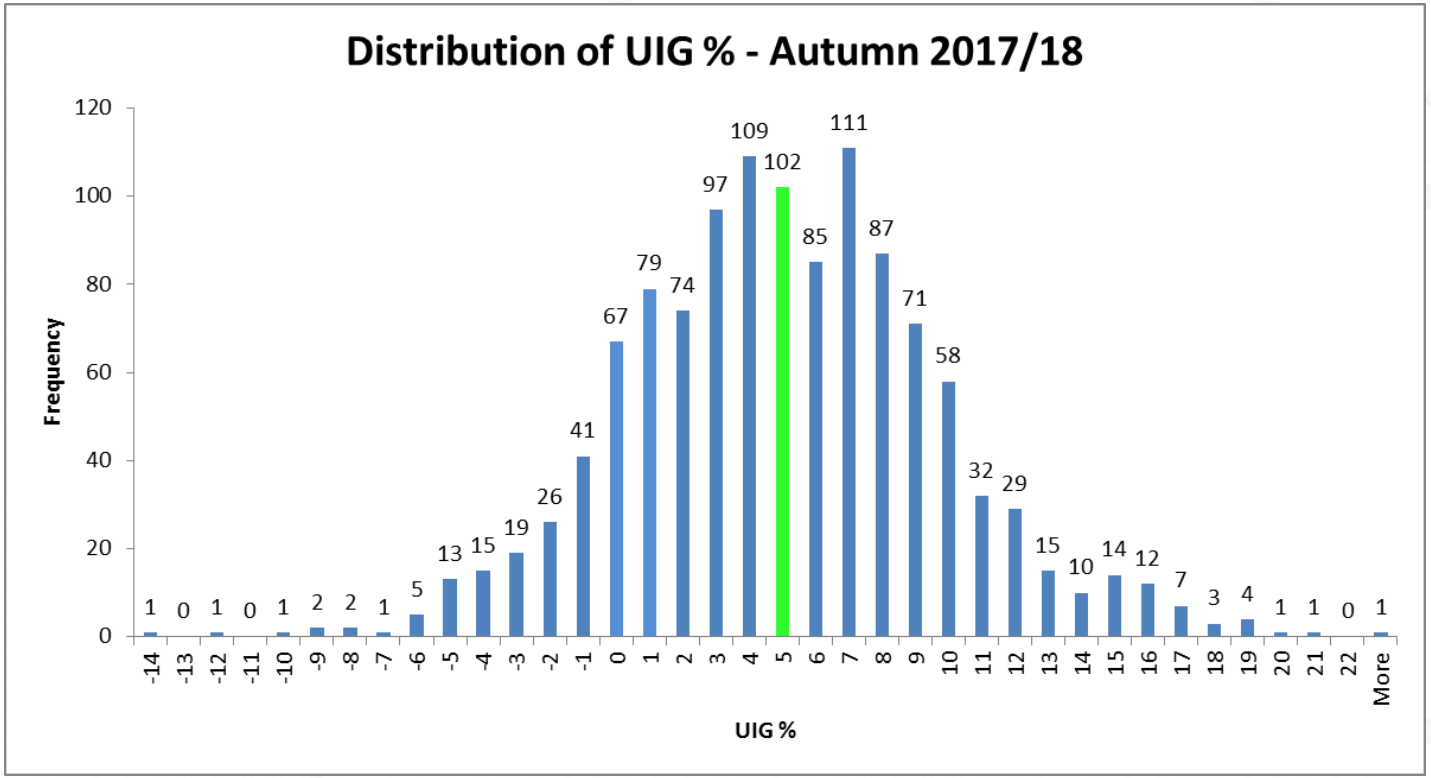
Average UIG % by LDZ						
SC	NO	NW	NE	EM	WM	
5.4	5.6	6.4	6.7	3.9	4.5	
WS	EA	NT	SE	SO	SW	WN
3.8	4.1	5.1	3.1	2.7	3.6	4.4

The majority of LDZs are displaying a normal distribution with fairly consistent spreads. The Mean and Median appear to be similar for most LDZs (apart from WM and NT)

WM UIG values appear to be slightly skewed to the left.

The mean is denoted by a ◊.

Distribution of UIG – Autumn 2017/18



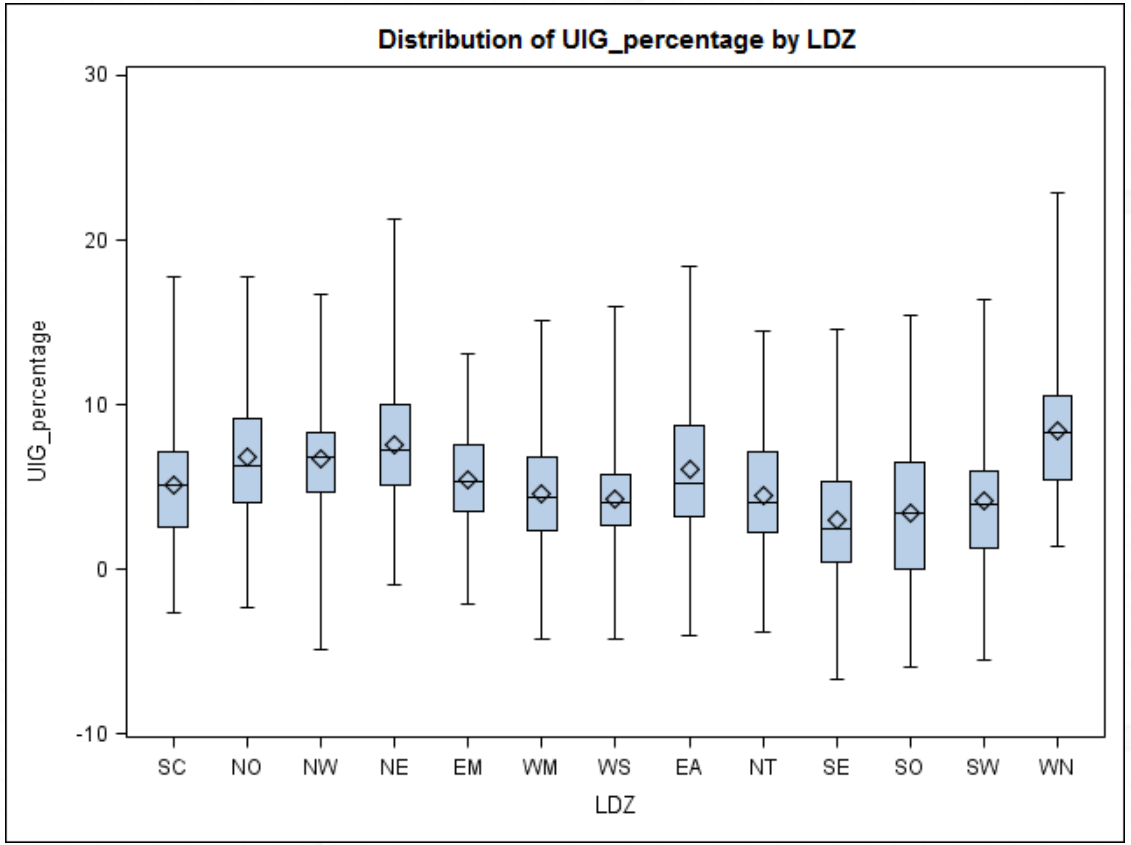
The average daily percentage UIG is 4.54%

95% of UIG values in the autumn are between -5% and 15%

Data displays a normal distribution

** Average UIG is highlighted in green*

UIG Analysis Winter 2017/18



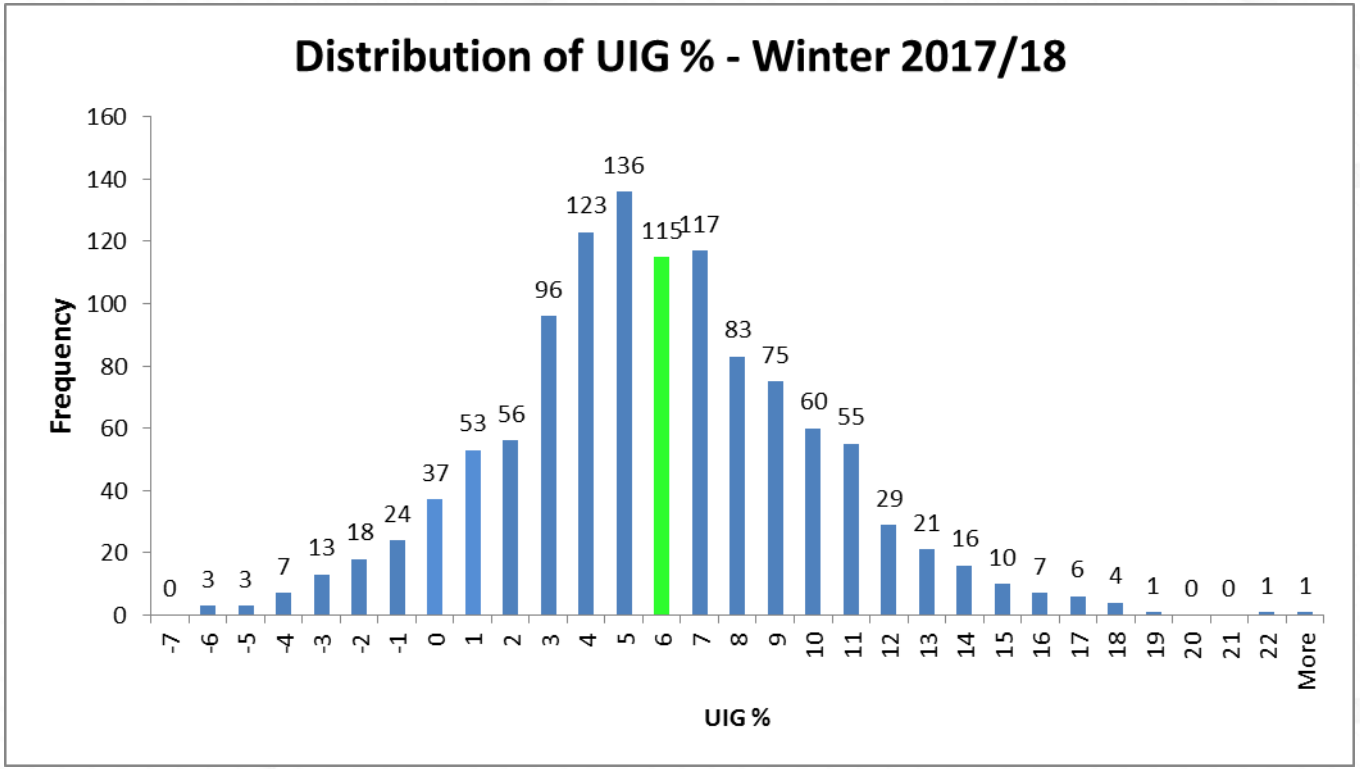
Average UIG % by LDZ						
SC	NO	NW	NE	EM	WM	
5.1	6.8	6.7	7.5	5.4	4.6	
WS	EA	NT	SE	SO	SW	WN
4.3	6.0	4.5	3.0	3.4	4.1	8.4

The majority of LDZs are displaying a normal distribution with fairly consistent spreads. The Mean and Median appear to be similar for most LDZs (apart from EA, NT and SE)

EA, NT and SE UIG values also appear to be slightly skewed to the left.

The mean is denoted by a ◊.

Distribution of UIG – Winter 2017/18



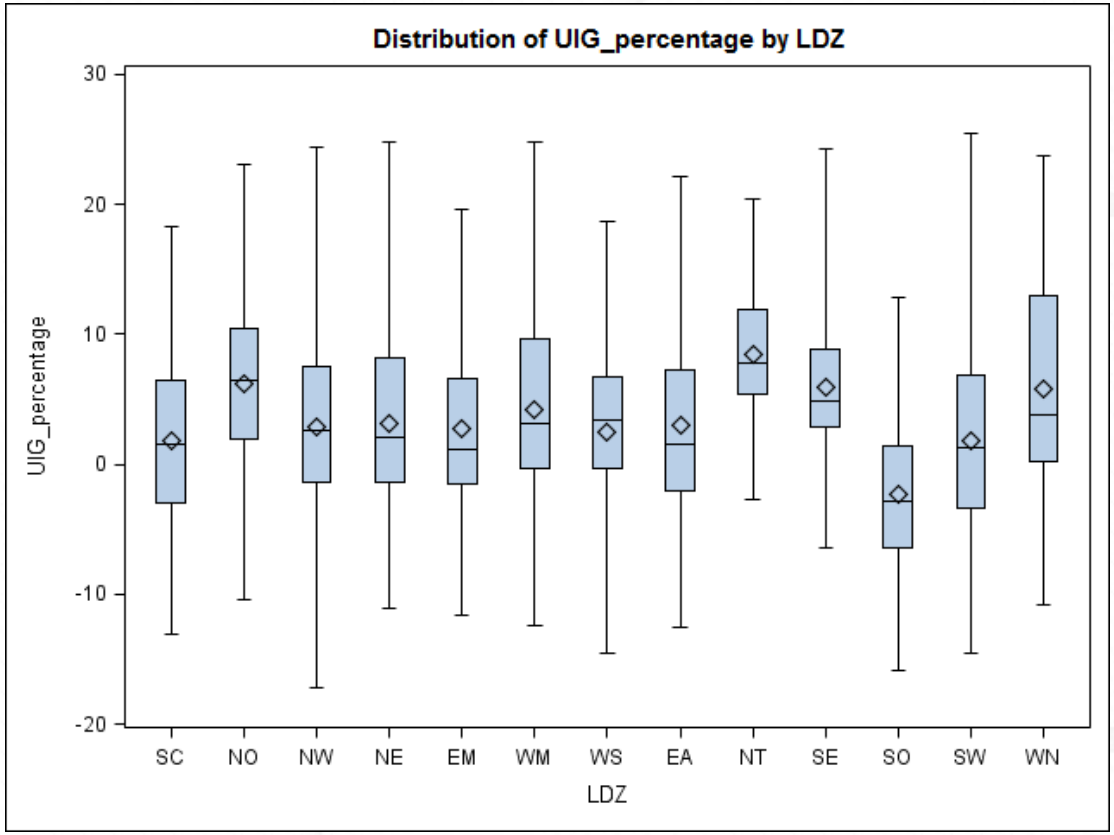
** Average UIG is highlighted in green*

The average UIG is 5.33%

95% of UIG values in the Winter are between -3% and 14%

Data displays a normal distribution

UIG Analysis Spring 2017/18



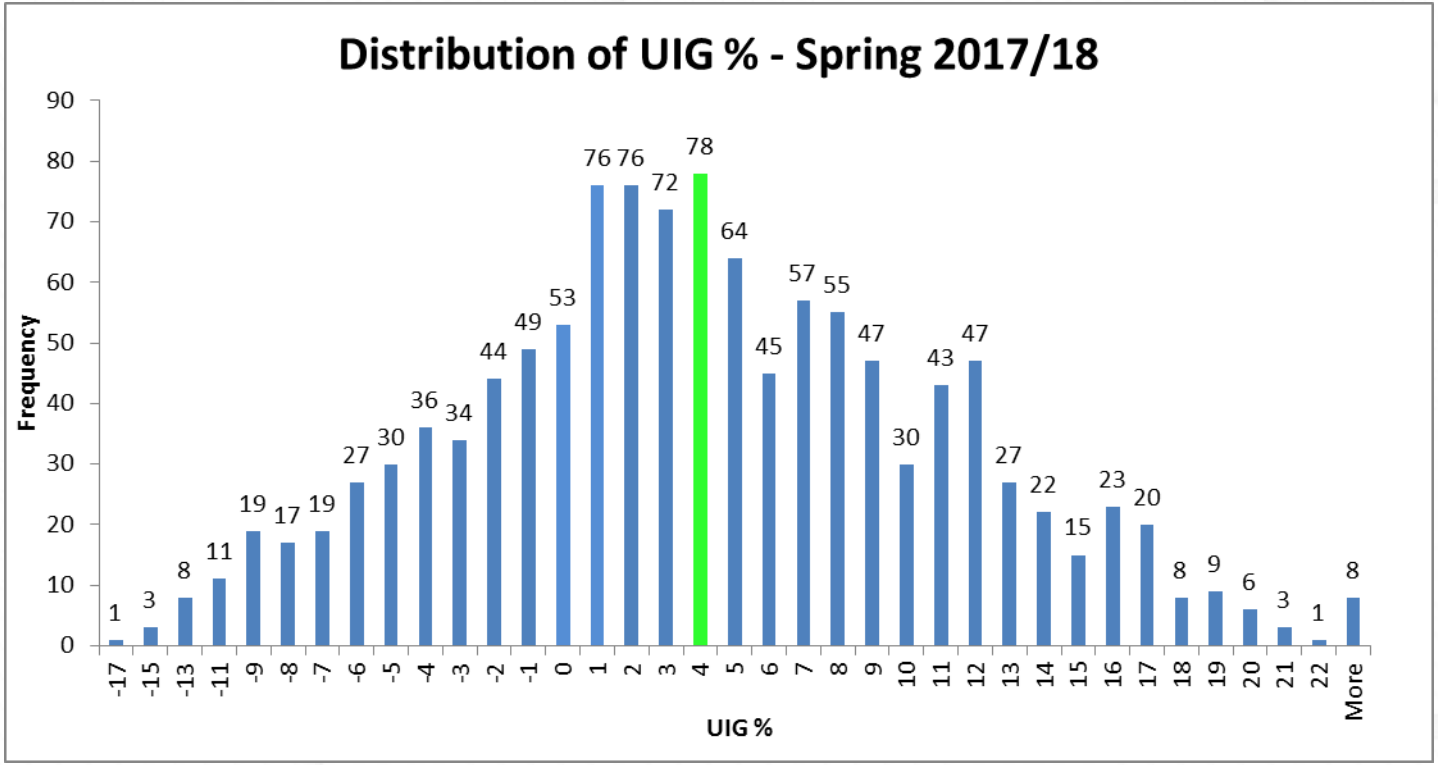
Average UIG % by LDZ						
SC	NO	NW	NE	EM	WM	
1.8	6.2	2.9	3.1	2.8	4.3	
WS	EA	NT	SE	SO	SW	WN
2.4	3.0	8.5	6.0	-2.3	1.9	5.8

The medians and means appear to differ more in the majority of LDZs for the Spring.

More LDZs appear to have skewed distributions when compared to the results for Autumn and Winter.

The mean is denoted by a ◊.

Distribution of UIG – Spring 2017/18



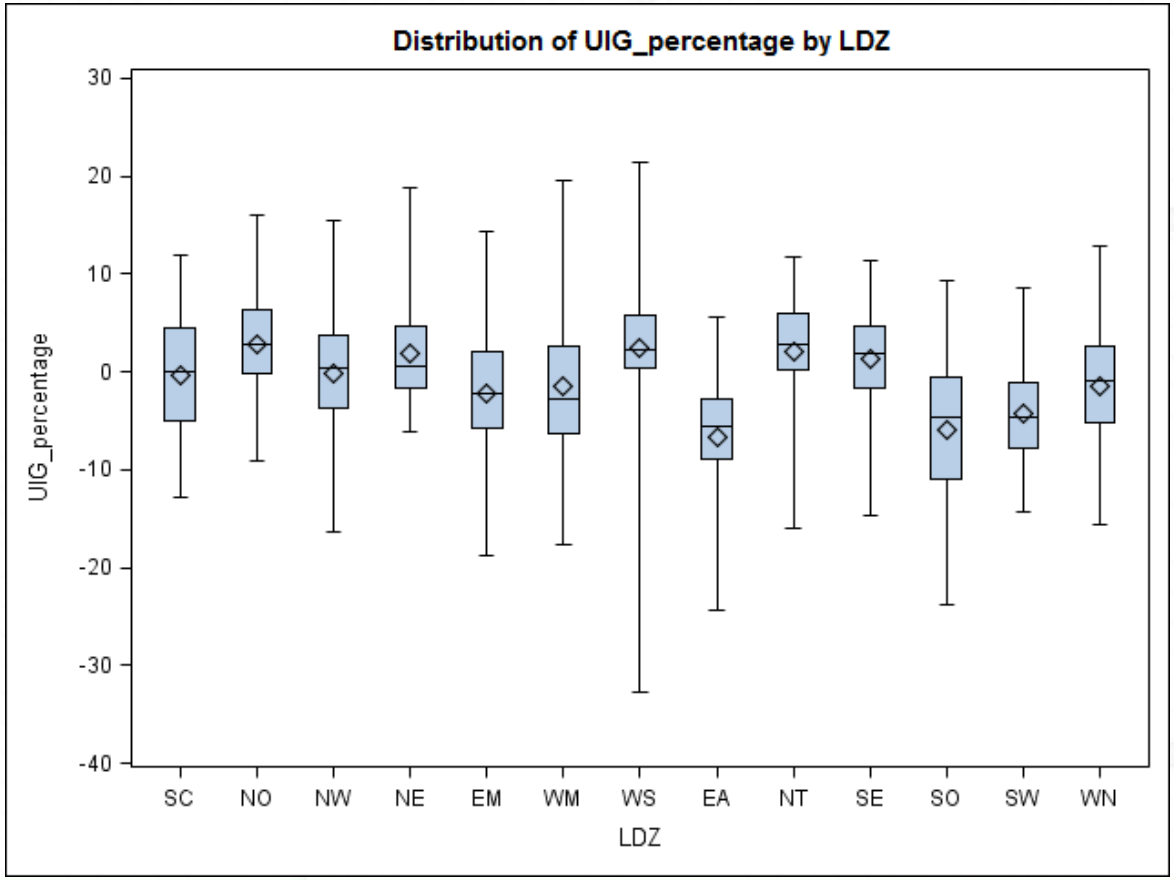
The average UIG is 3.55%

95% of UIG values in the Spring are between -10% and 14%

Data displays a normal distribution

** Average UIG is highlighted in green*

UIG Analysis Summer 2017/18



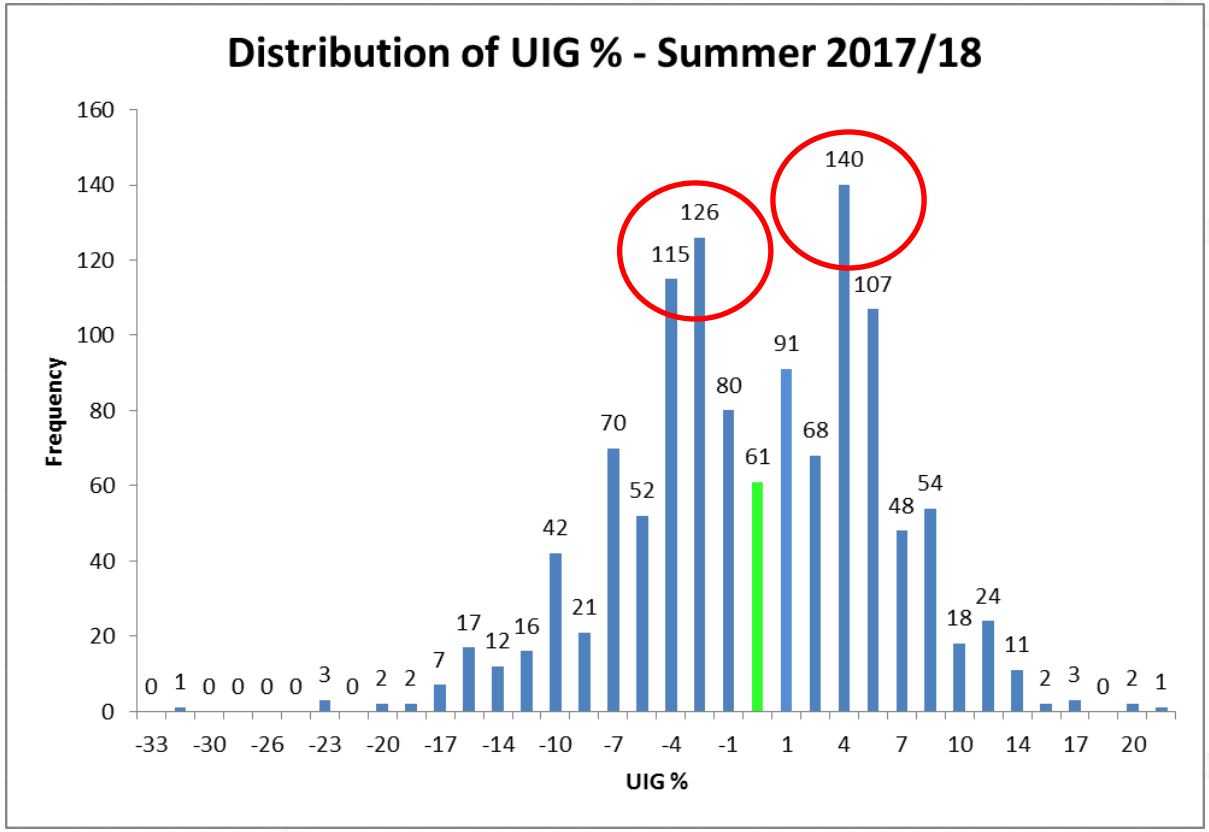
Average UIG % by LDZ						
EA	EM	NE	NO	NT	NW	
-6.6	-2.2	2.0	2.8	2.1	-0.1	
SC	SE	SO	SW	WM	WN	WS
-0.4	1.3	-5.9	-4.2	-1.5	-1.4	2.5

The medians and means appear to differ for quite a few LDZs for the Summer.

SO, WS and NE also appear to have skewed distributions.

The mean is denoted by a ◊.

Distribution of UIG – Summer 2017/18



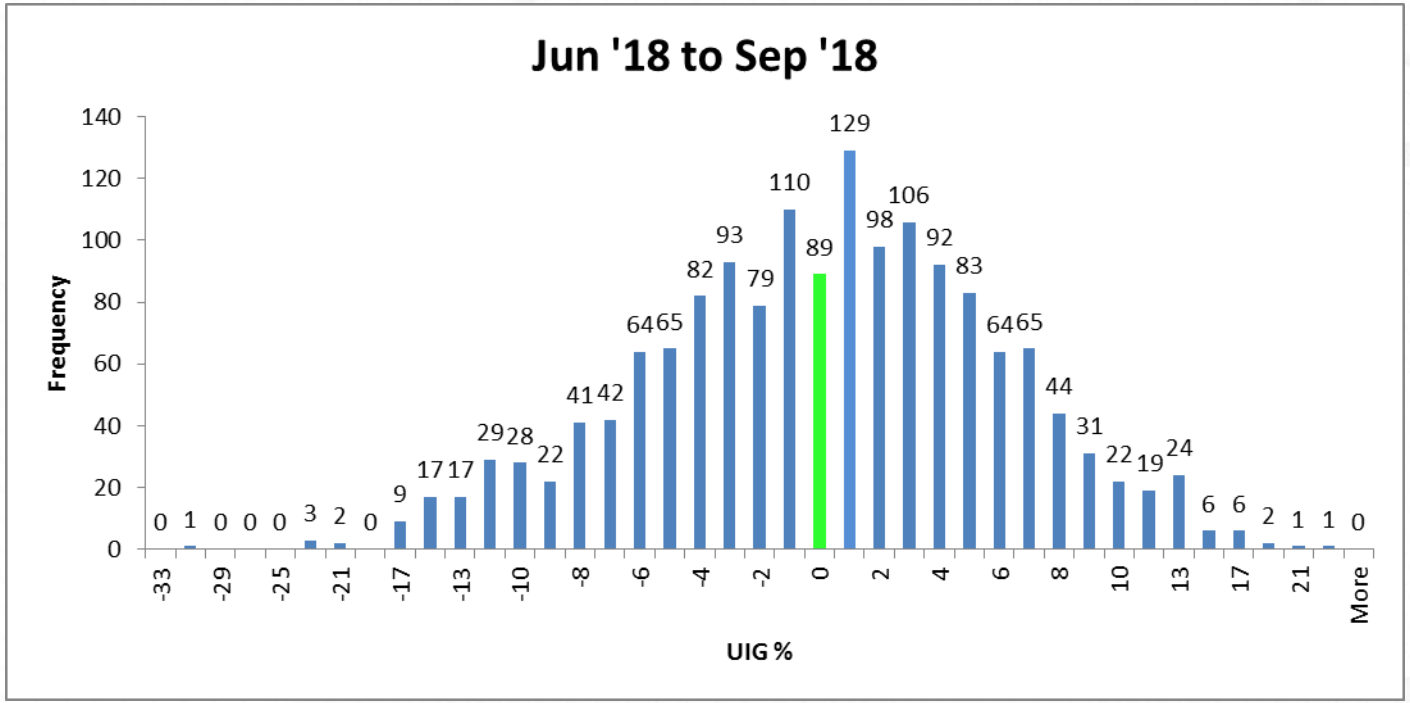
** Average UIG is highlighted in green*

The average UIG is -0.87%

95% of UIG values in the Summer are between -15% and 11%

Data appears to display 2 peaks and does not appear to be normally distributed.

UIG June to Sep 2018



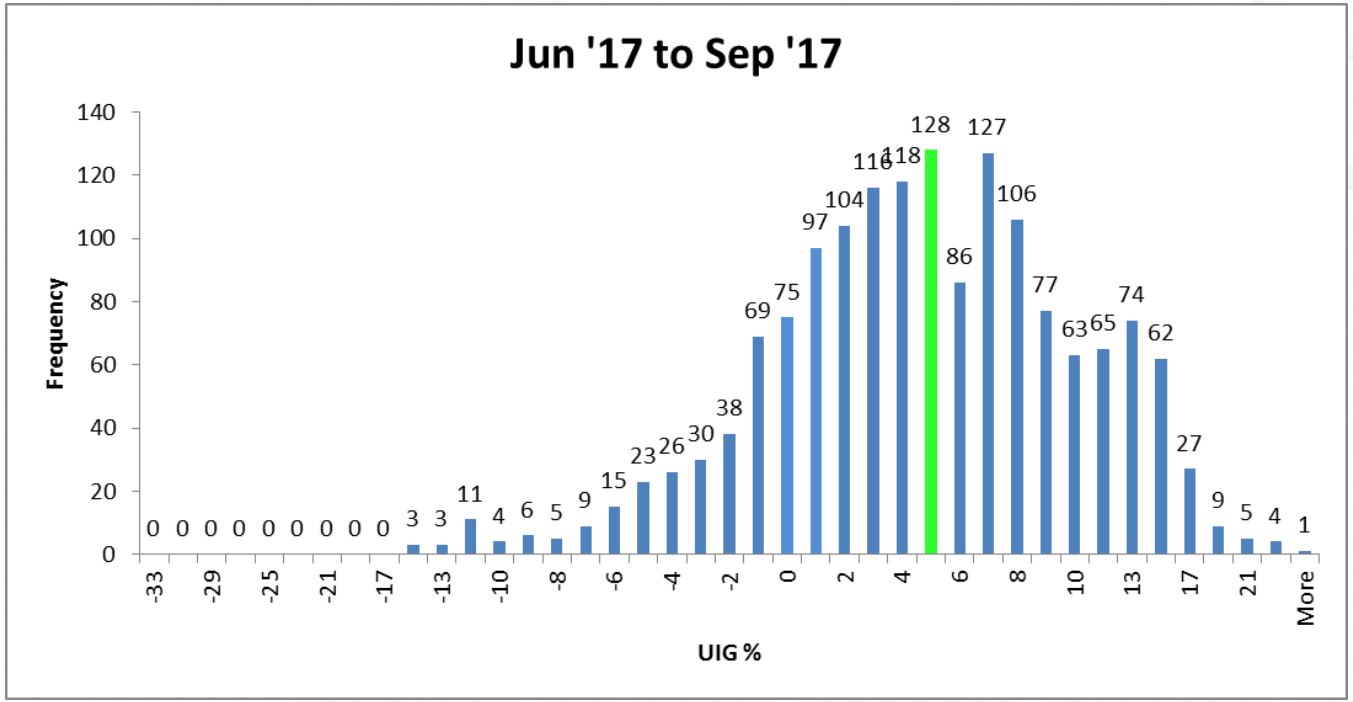
The average UIG is -0.45%

95% of UIG values in are between -14% and 11%

Data displays a normal distribution

** Average UIG is highlighted in green*

UIG June to Sep 2017



The average UIG is 4.39%

95% of UIG values are between -7% and 15%

The data is skewed to the left in comparison to the latest year which is displaying a normal distribution.
UIG was a lot bigger last summer due to DM issues which meant DM was under recorded and UIG was therefore bigger.

** Average UIG is highlighted in green*

Conclusions

- Average UIG has been positive in most cases with a national average (at D+5) of 4.40%
- Autumn: The national average UIG was 4.54%. LDZ SO had the smallest average UIG = 2.7% and NW had the largest average UIG = 6.4%. Overall, data appeared to be normally distributed.
- Winter: The national average UIG was 5.33%. LDZ SE had the smallest average UIG = 3.0% and WN had the largest average UIG = 8.4%. Overall, data appeared to be normally distributed.
- Spring: The national average UIG was 3.55%. LDZ SW had the smallest average UIG = 1.9% and NT had the largest average UIG = 8.5%. Overall, data appeared to be normally distributed.
- Summer: The national average UIG was -0.87%. LDZ NW had the smallest average UIG = -0.1% and EA had the largest average UIG = -6.6%. Overall, data does not appear to be normally distributed.
- UIG taskforce continues to investigate reasons for current UIG volatility and levels and of course any improvements DESC make to the NDM demand models can assist with this objective.