



Demand Estimation Sub Committee

NDM Algorithm Performance (Gas Year 2018/19)
Strand 2 – UiG Analysis

9th December 2019

Background

- Following the implementation of Project Nexus on 1st June 2017 Unidentified Gas (UiG) is now the balancing figure in each LDZ for each gas day
- UiG is calculated using the following formula:
- $UiG = Total\ LDZ\ throughput - Shrinkage - DM\ measurements - NDM\ allocation$

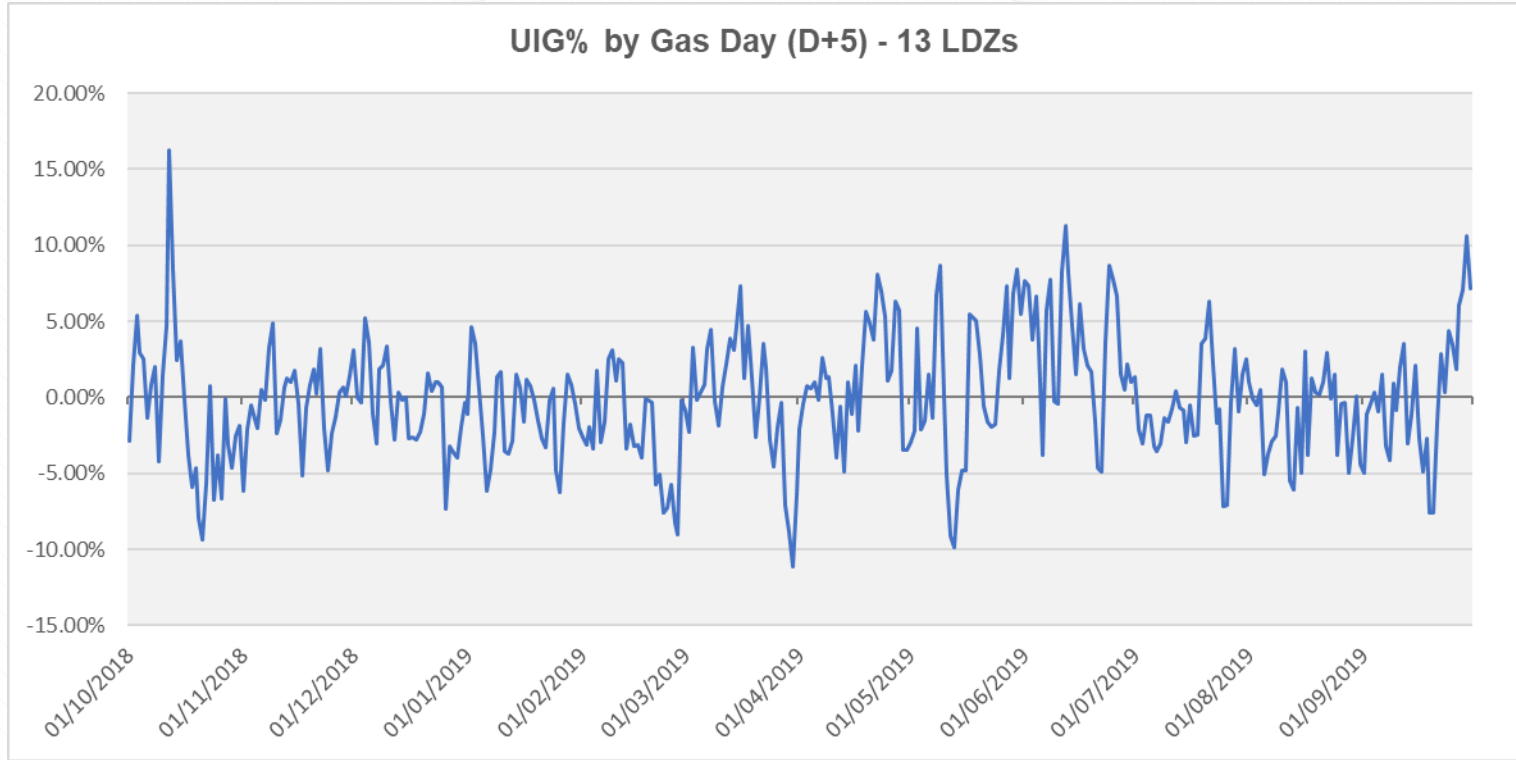
Objective

- Strand 2: To review the Unidentified Gas levels for Gas Year 2018/19 using statistical measures and visual representations.
- The analysis reviews the **observed** UiG levels.
 - Note: In summer of 2018, DESC agreed to the application of 'Uplift factors' to the ALP and DAF for Gas Year 2018/19, in order to impact UiG volatility/levels
- For information, a comparison has been provided of the simulated UiG levels without the Uplift factors applied to the NDM allocation, in addition a comparison showing just a 'DAF Uplift' has also been provided (in line with DESC's decision to apply this for Gas Year 2019/20)
- Note: The causes of UiG on a daily basis are not considered here and continue to be investigated as part of the UiG taskforce, building on work done throughout the most recent gas year.

Approach

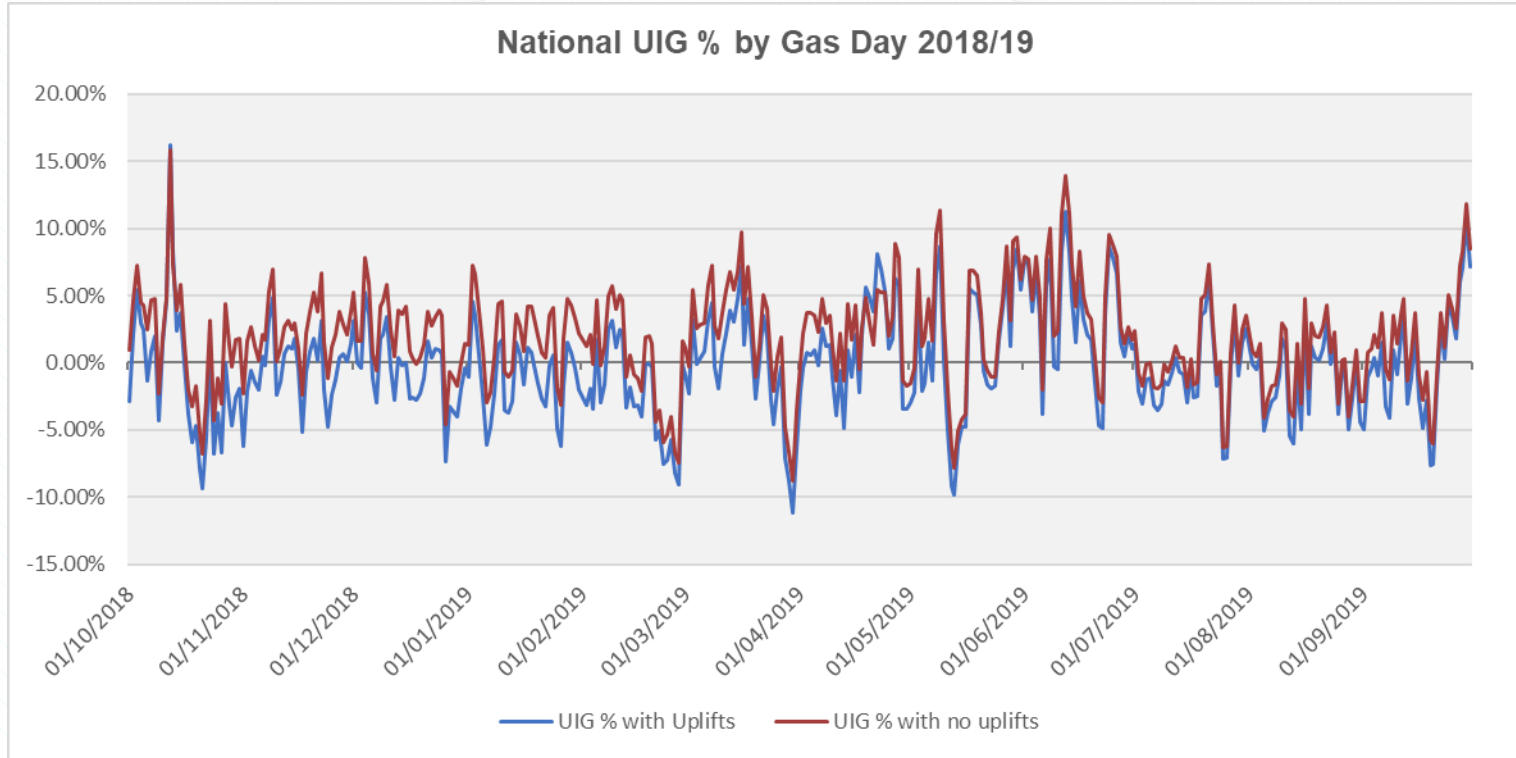
- To analyse UiG % for gas year 18/19 by seasons:
 - Autumn: Oct '18 to Dec '18.
 - Winter: Jan '19 to Mar '19.
 - Spring: Apr '19 to Jun '19.
 - Summer: Jul '19 to Sep'19.
- To compare the UiG values for gas year 2018/19 with the previous gas year of 2017/18
- To compare 2018/19 UiG levels under the following conditions:
 - Observed values (ALP and DAF uplift factors applied)
 - No Uplift factors applied
 - DAF Uplift factors only applied
- Use Boxplots and distribution graphs to measure how UiG varies by Season and LDZ.

Daily UiG% - Nationally 18/19



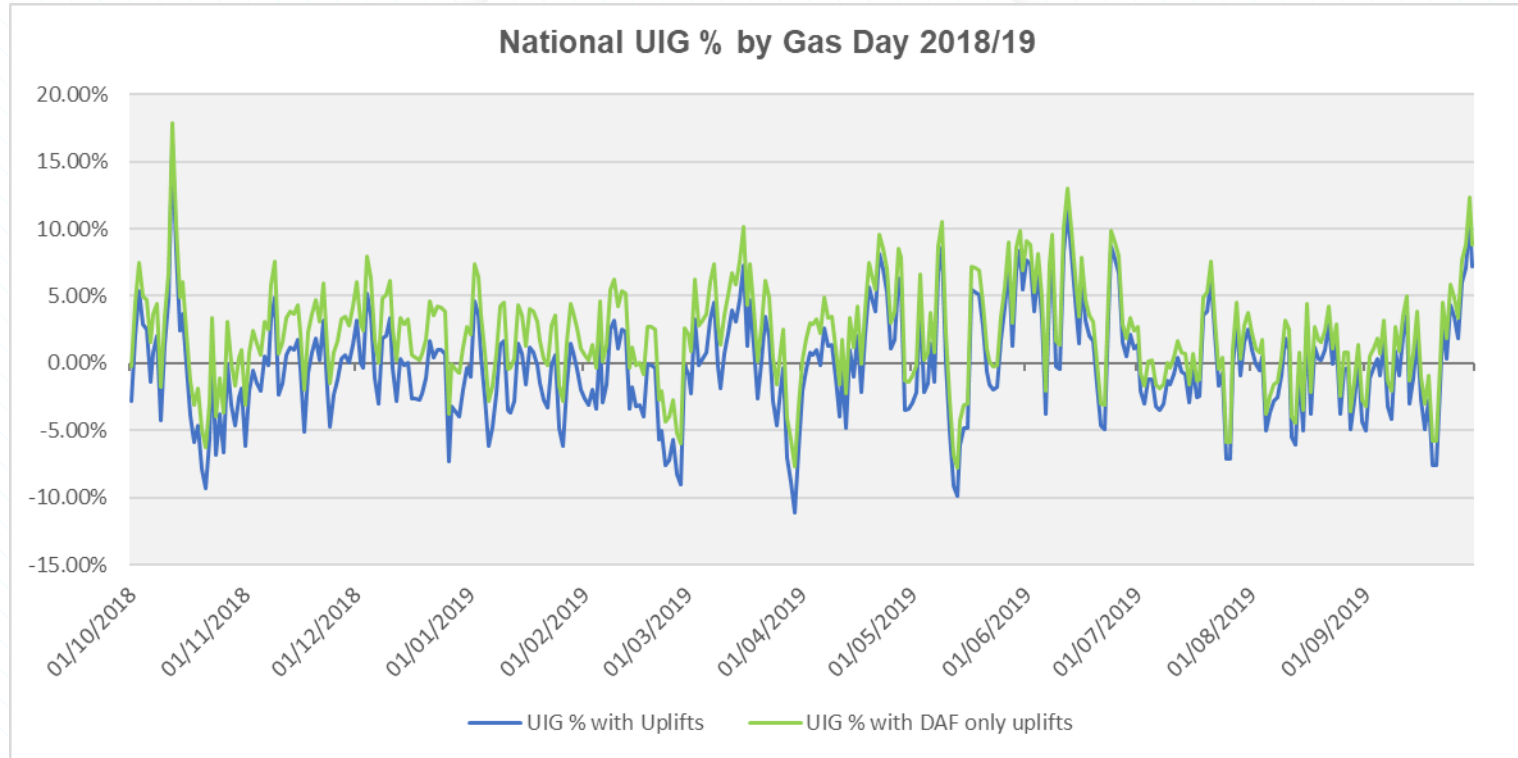
- The national average UiG for D+5 was -0.13%

Daily UiG% - Nationally 18/19



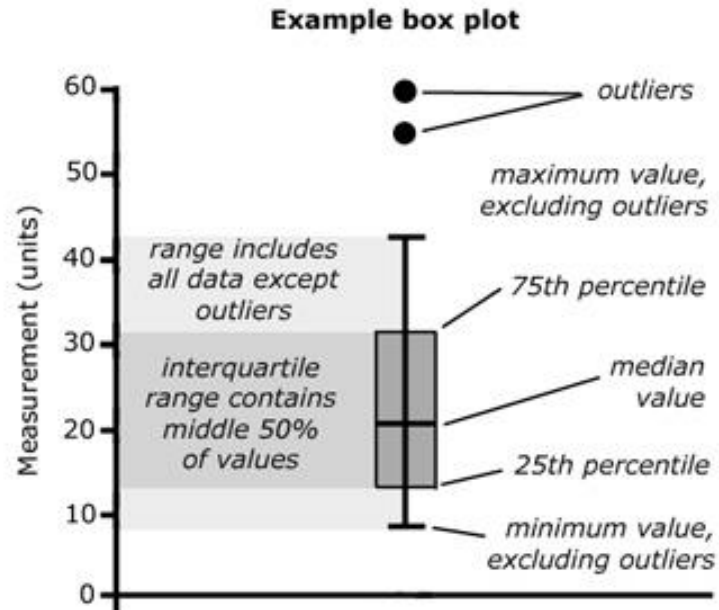
- The national average UIG with no Uplifts was 1.91%.

Daily UiG% - Nationally 18/19



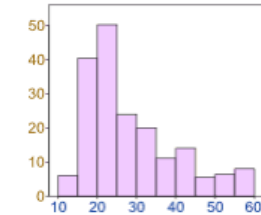
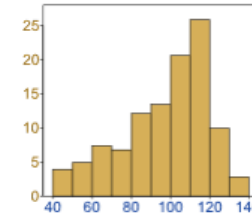
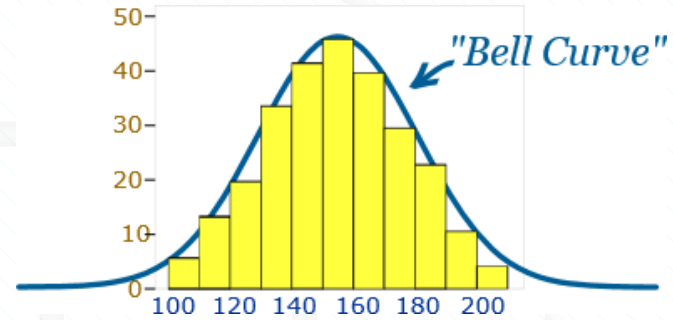
- The national average UiG with DAF only Uplifts was 2.16%.

Methods used to assess UiG: Boxplot

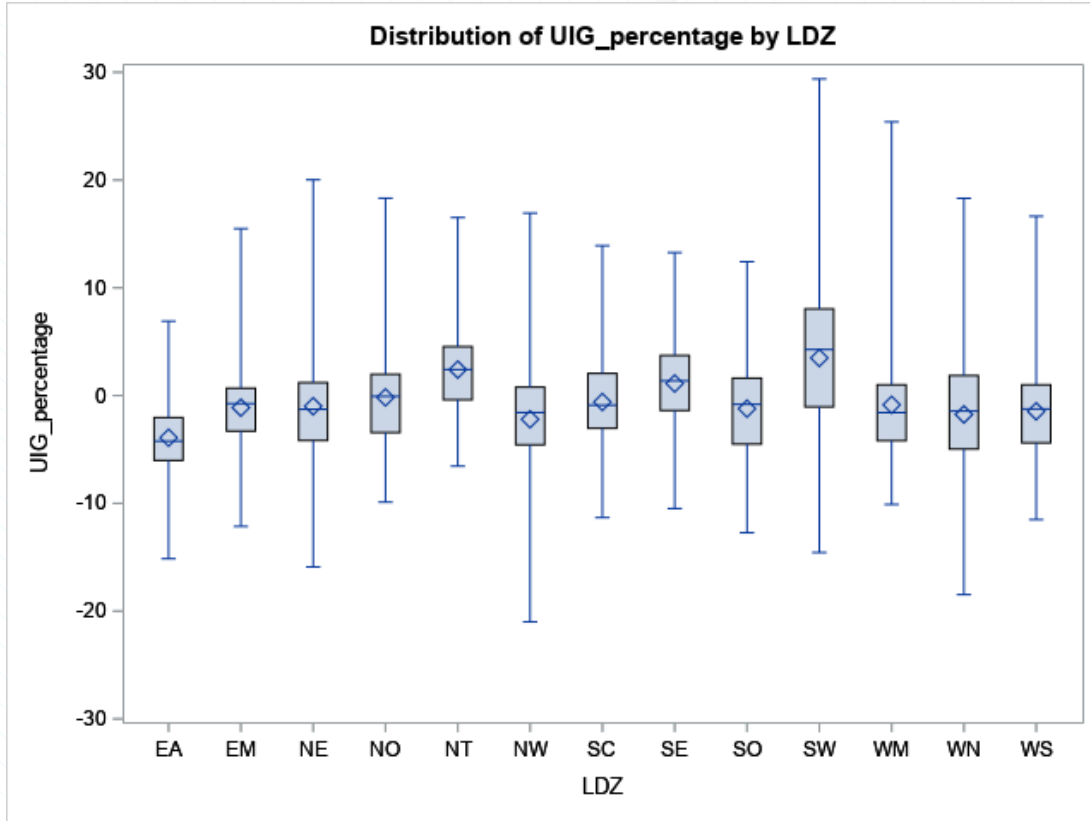


Methods used to assess UiG cont...

- 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 2018/19



The mean is denoted by a ◇.

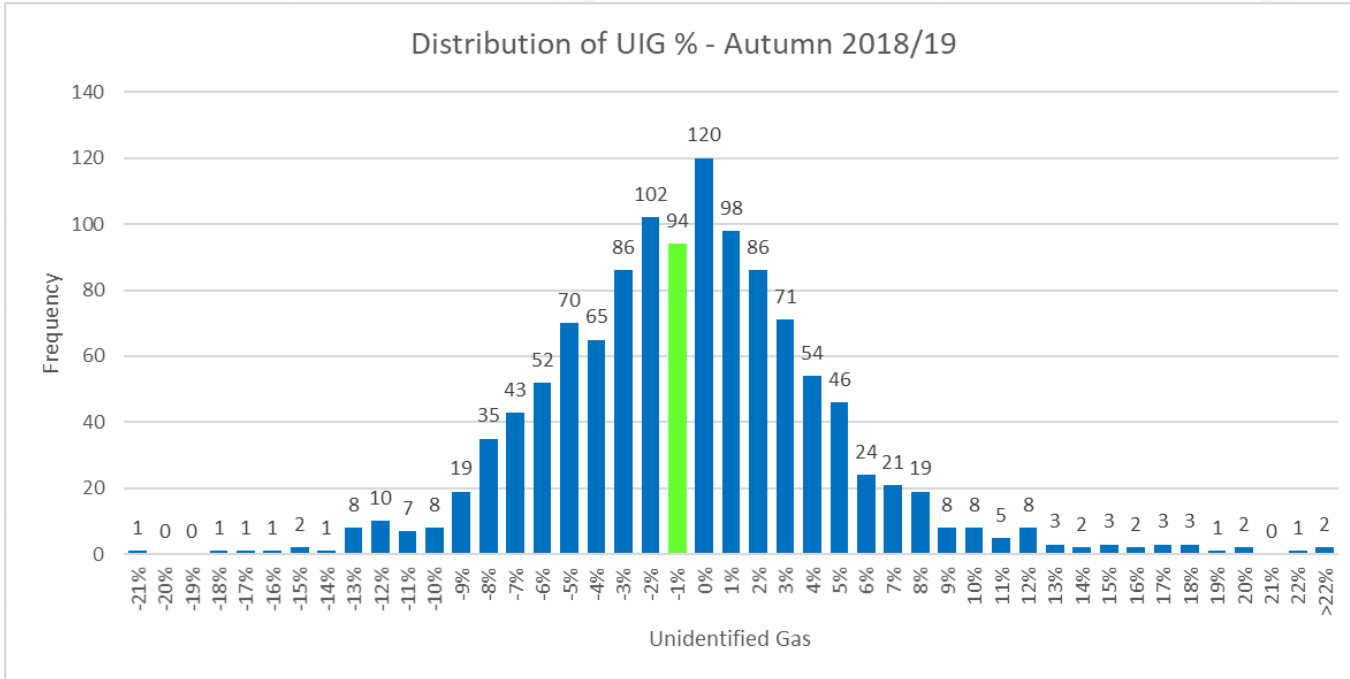
Average UIG by LDZ

SC	NO	NW	NE	EM	WM
-0.60%	-0.17%	-2.20%	-1.00%	-1.13%	-0.86%

WS	EA	NT	SE	SO	SW	WN
-1.46%	-3.91%	2.41%	1.12%	-1.22%	3.49%	-1.75%

- Mean UiG values during Autumn range from -3.91% in EA to 3.49% in SW.
- The Mean and median UiG values are fairly similar in most LDZs. NW, SW and WM show the most variation.
- WM UiG values appear to be slightly skewed to the left.

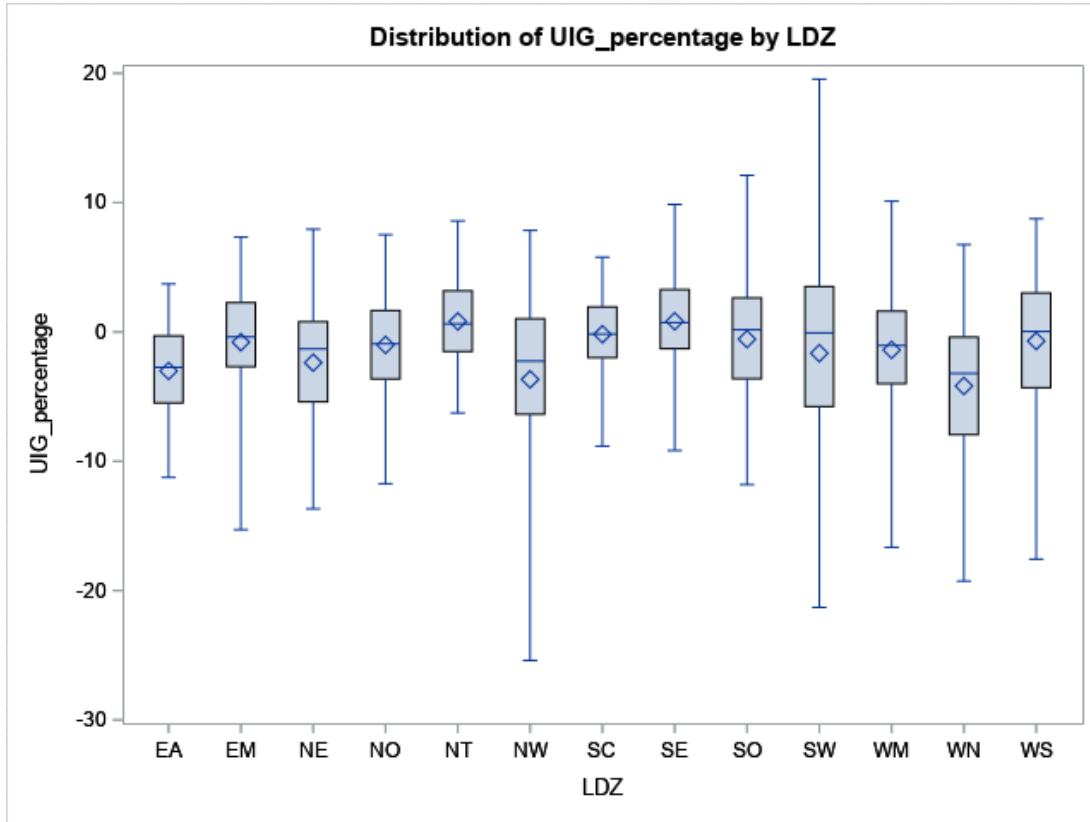
Distribution of UiG Autumn 2018/19



*Median UiG value highlighted in green

- The average UiG across all LDZs during Autumn is -0.56%.
- 95% of UiG values are between -12% and 10%.
- Data appears to be normally distributed.

UiG Analysis Winter 2018/19



The mean is denoted by a \diamond .

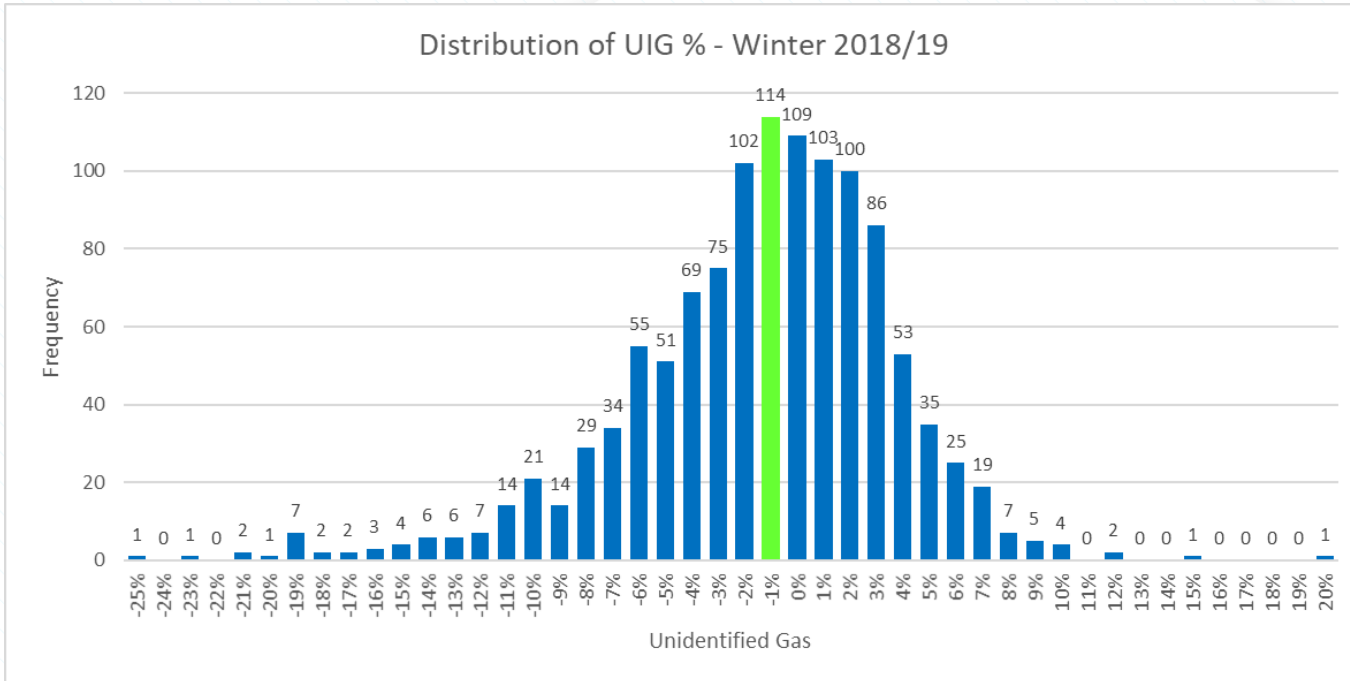
Average UIG by LDZ

SC	NO	NW	NE	EM	WM
-0.19%	-1.01%	-3.67%	-2.38%	-0.80%	-1.39%

WS	EA	NT	SE	SO	SW	WN
-0.70%	-3.02%	0.81%	0.82%	-0.56%	-1.65%	-4.18%

- SC had the lowest (absolute) mean UiG value at -0.19%.
- Differences in mean and median values can be most noticed in LDZs NE, NW, and WN.
- LDZs EM and NW appear to show slightly skewed distributions.

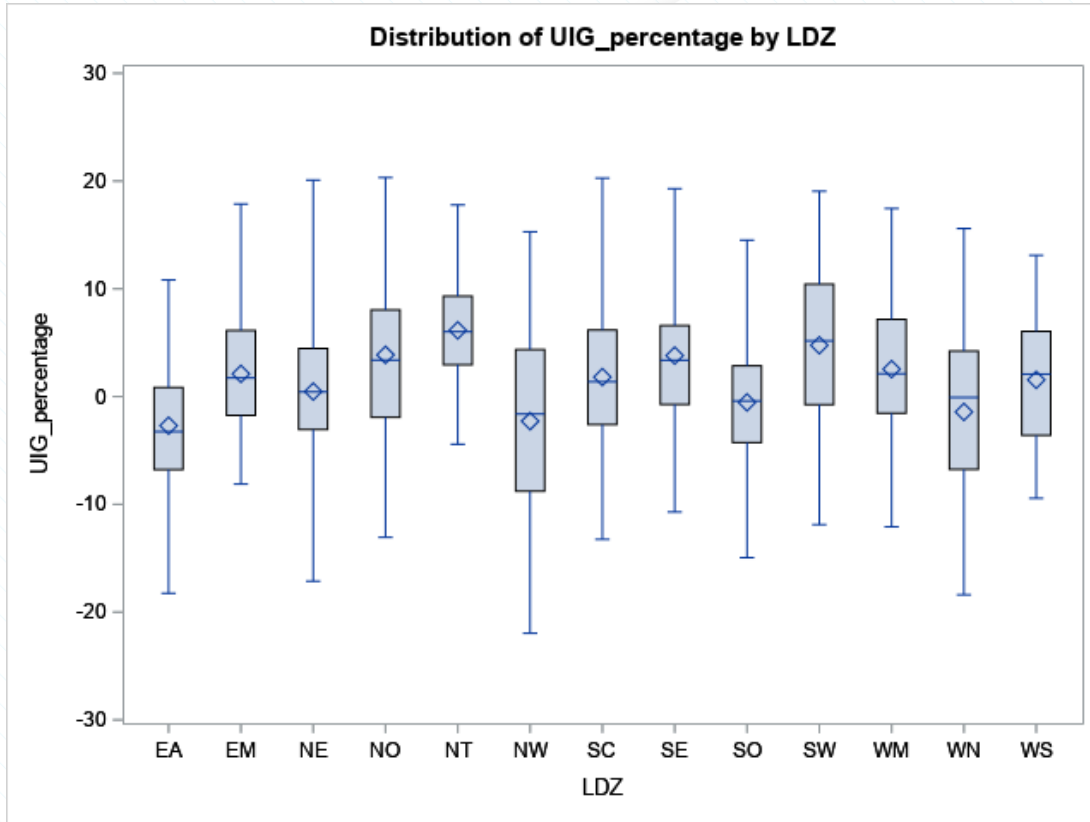
Distribution of UiG Winter 2018/19



*Median UIG value highlighted in green

- The average UiG across all LDZs during Winter is - 1.38%.
- 95% of UiG values are between -11% and 9%.
- Data appears to be normally distributed.

UiG Analysis Spring 2018/19



The mean is denoted by a ◇.

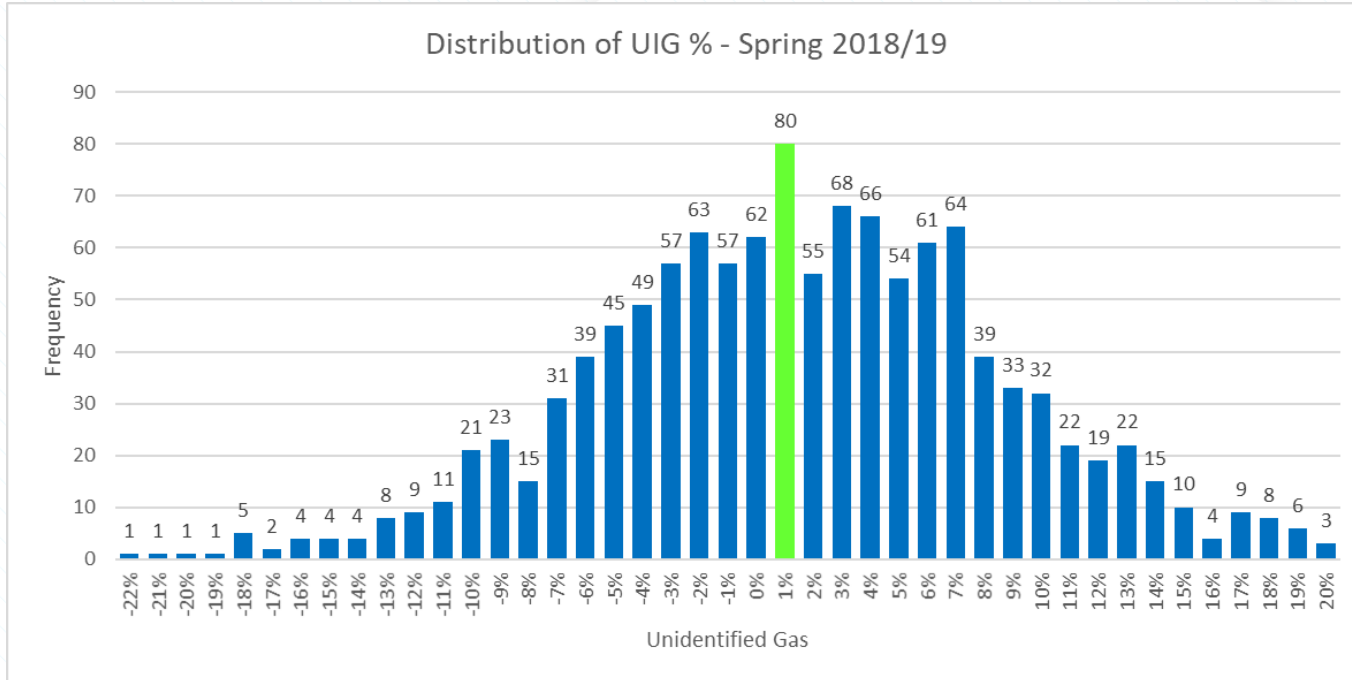
Average UIG by LDZ

SC	NO	NW	NE	EM	WM
1.81%	3.87%	-2.29%	0.46%	2.10%	2.54%

WS	EA	NT	SE	SO	SW	WN
1.55%	-2.69%	6.14%	3.81%	-0.54%	4.77%	-1.42%

- The majority of LDZs are displaying a normal distribution with consistent spreads. LDZ EM appears to be the most skewed distribution.
- Mean and median UiG values were fairly similar in all LDZs during Spring.

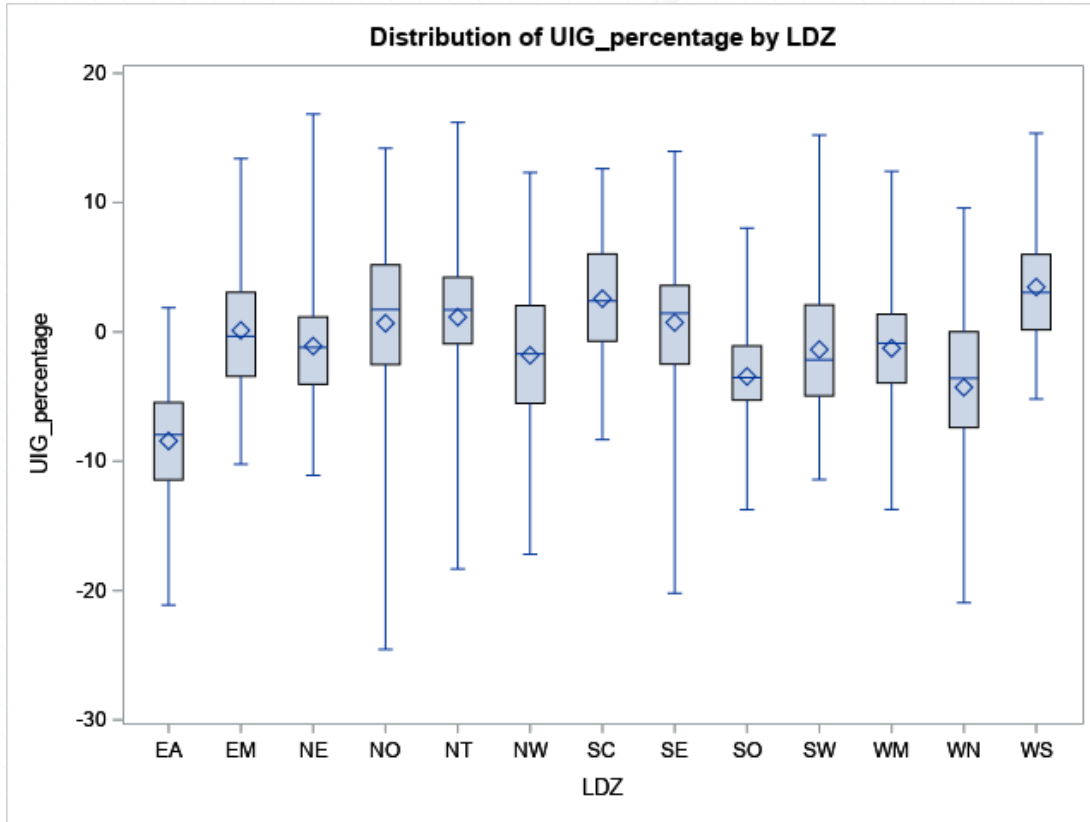
Distribution of UiG Spring 2018/19



*Median UIG value highlighted in green

- The average UiG across all LDZs during Spring was 1.55%.
- 95% of UiG values are between -13% and 16%.
- Data appears to be normally distributed.

UiG Analysis Summer 2018/19



The mean is denoted by a ◇.

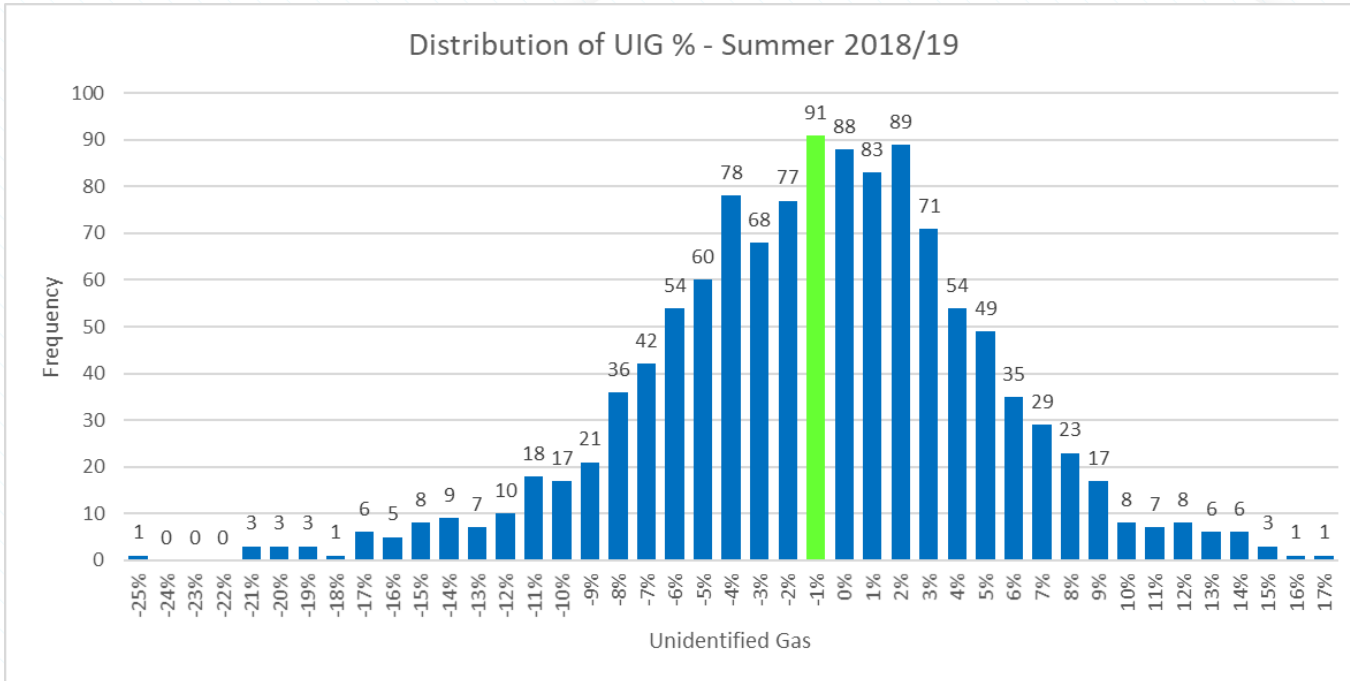
Average UIG by LDZ

SC	NO	NW	NE	EM	WM
2.56%	0.67%	-1.81%	-1.10%	0.11%	-1.27%

WS	EA	NT	SE	SO	SW	WN
3.47%	-8.43%	1.14%	0.73%	-3.44%	-1.36%	-4.29%

- EA's mean UiG value is considerably lower than most LDZs.
- EM had the lowest (absolute) mean UiG value at 0.11%.
- LDZs EM, NE, and SW appears to show slight left skews in their respective distributions.

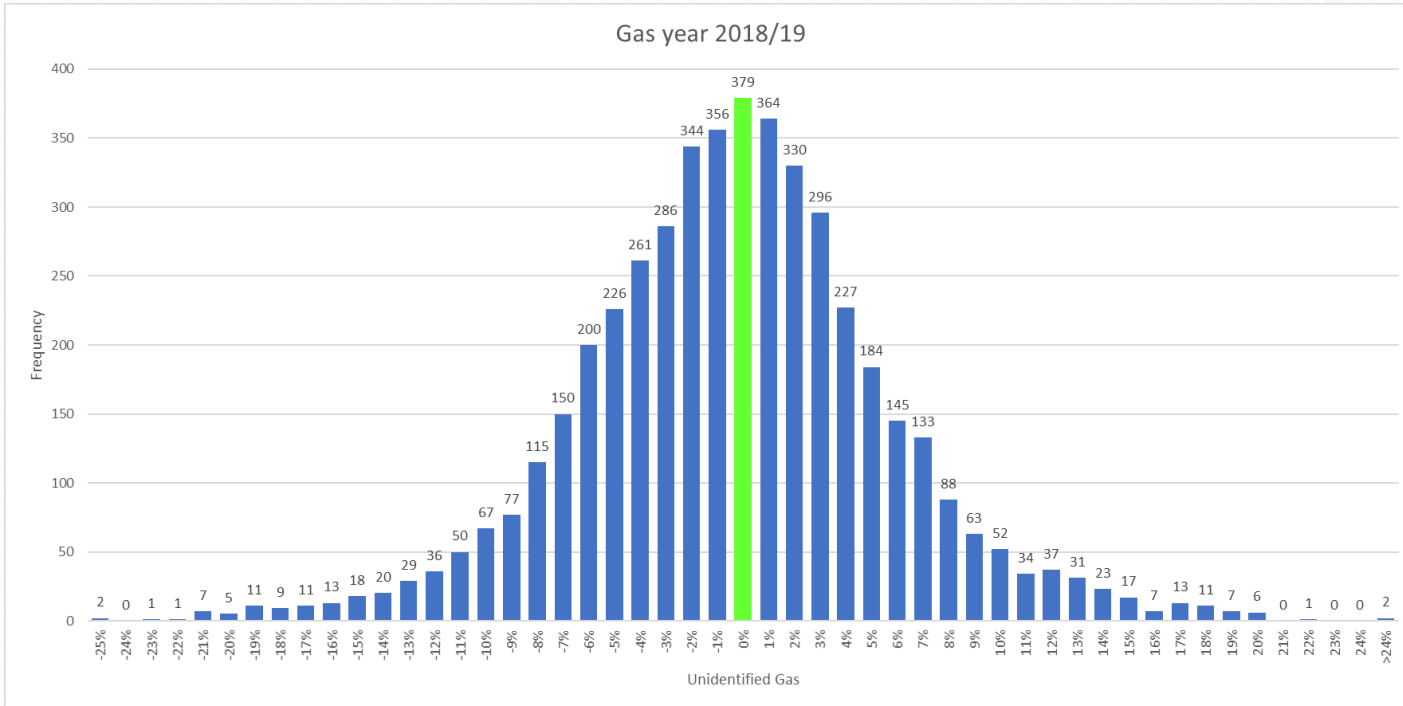
Distribution of UiG Summer 2018/19



*Median UIG value highlighted in green

- The average UiG across all LDZs during Summer was -1.00%.
- 95% of UiG values lie between -14% and 12%.
- Data appears to be normally distributed.

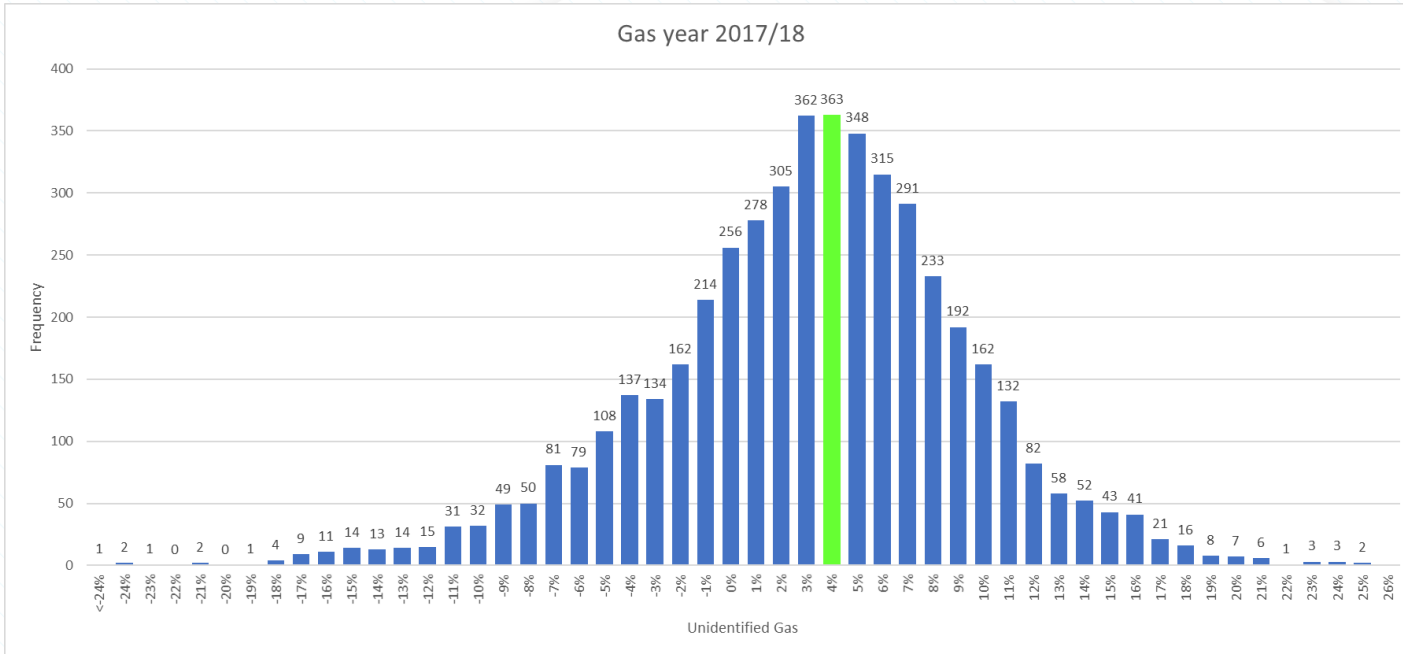
UiG Oct 2018 to Sep 2019



*Median UIG value highlighted in green

- The average UiG across all LDZs for gas year 2018/19 was -0.35%.
- 95% of UiG values lie between -13% and +13%
- Data appears to be normally distributed and centred above 0%.

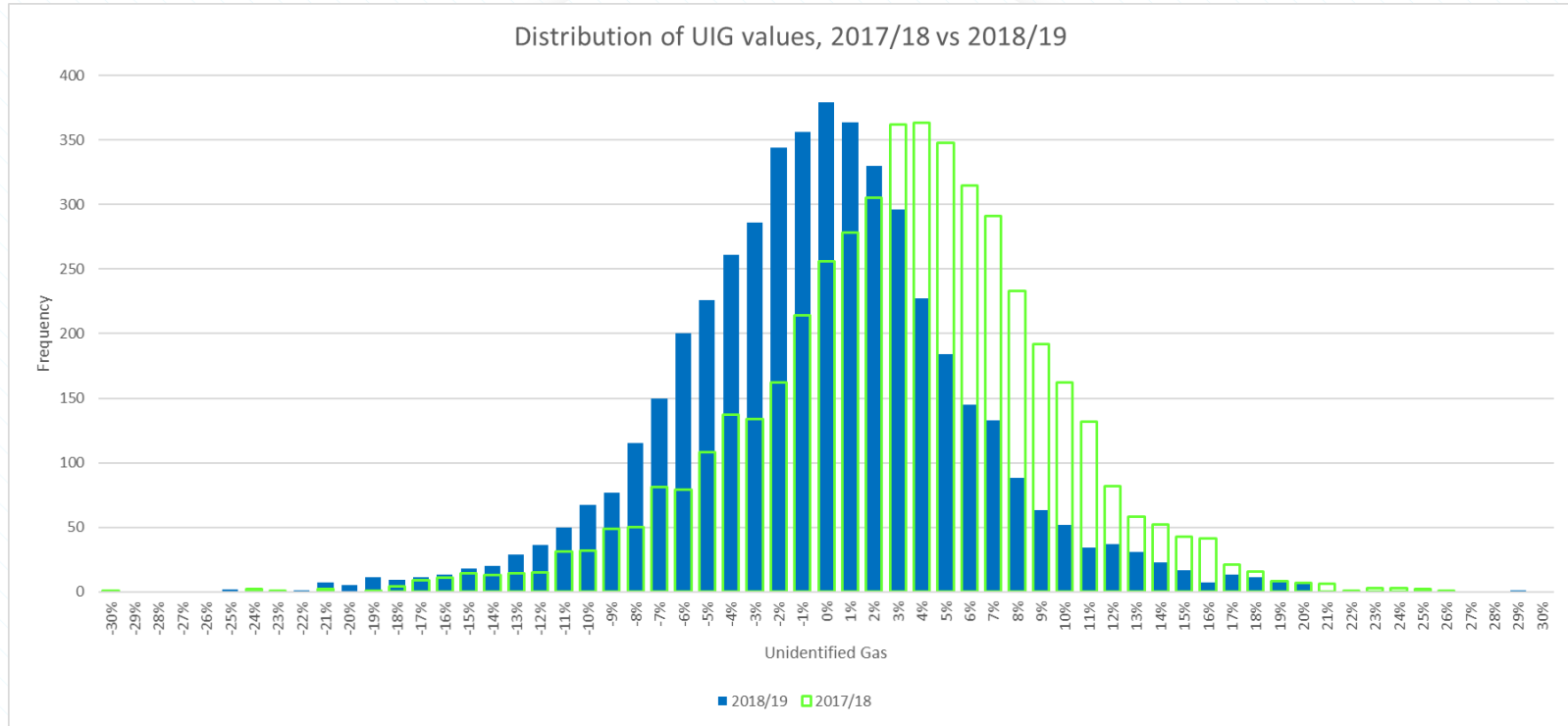
UiG Oct 2017 to Sep 2018



- The average UiG across all LDZs for gas year 2017/18 was 3.13%.
- 95% of UiG values lie between -9% and 16%.
- Data appears to be normally distributed and centred above 4%.

*Median UIG value highlighted in green

UiG 2017/18 vs 2018/19



- Plotted on the same graph, both gas years 2017/18 and 2018/19 appear to show similar distributions, with 2018/19 being centred closer to 0%.

Conclusions

- Average UiG has reduced since gas year 2017/18, moving from a national average (at D+5) of 4.40% to -0.13% (assisted by use of Uplift factors)
- The distribution of UiG does not appear to have changed much since the previous gas year, suggesting that the range of UiG has not decreased.
- Autumn: The National average UiG was -0.53%.
LDZ NO had the smallest average UiG at -0.17%, SW had the largest average at 3.49%.
- Winter: The National average UiG was -1.16%.
LDZ SC had the smallest average UiG at -0.19%, WN had the largest average at -4.18%.
- Spring: The National average UiG was -1.80%.
LDZ NE had the smallest average UiG at 0.46%, NT had the largest average at 6.14%.
- Summer: The National average UiG was -0.61%.
LDZ EM had the smallest average UiG at 0.11%, EA had the largest average at -8.43%.
- Overall all seasons appeared to be normally distributed.