



Demand Estimation Sub Committee

**NDM Algorithm Performance (Gas Year 2018/19)
Strand 1 Analysis – Weather Analysis**

9th December 2019

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

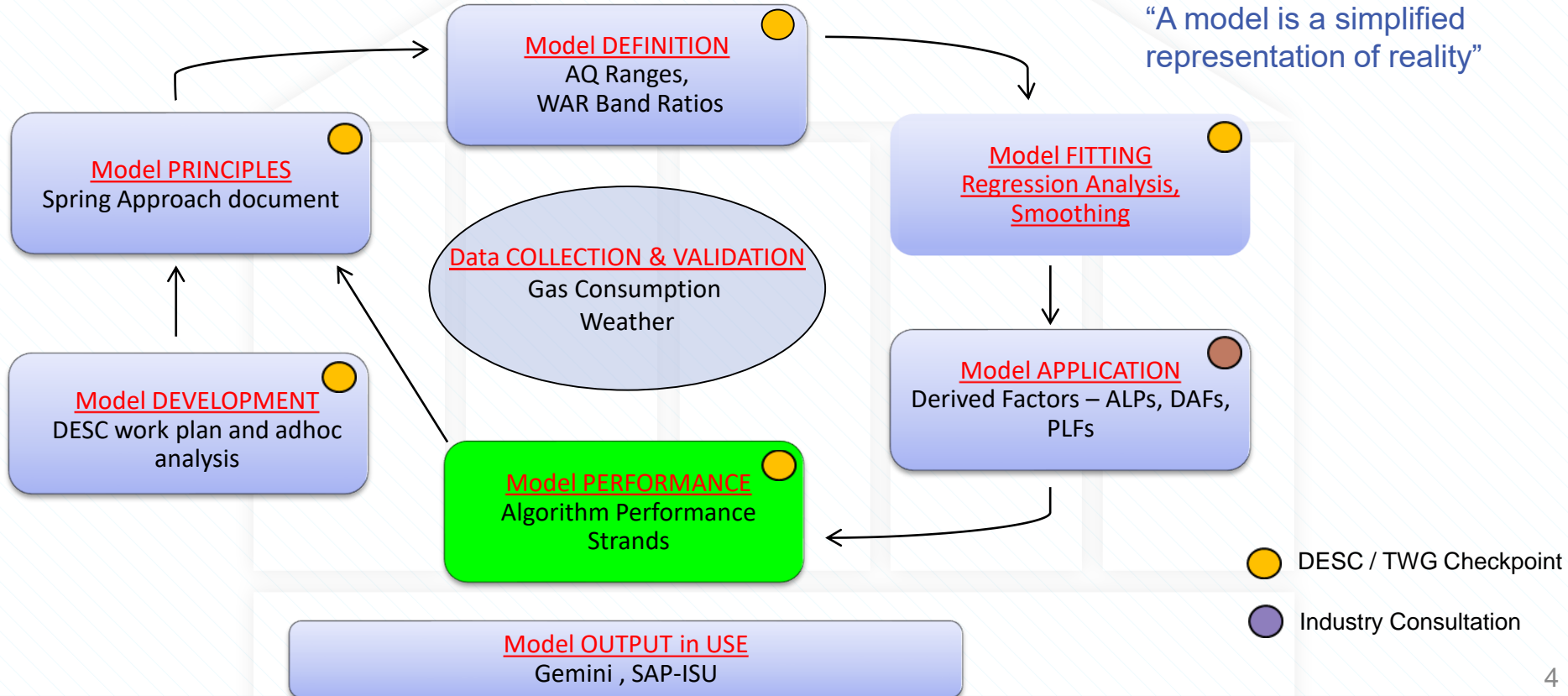
Objective

- Where possible, the aim of each analysis strand is to:
 - Provide statistical measures of performance as well as visual representations
 - Develop a more flexible process for Algorithm Performance, allowing us to adapt the data summaries we analyse and how results are presented
 - Carry out 'regional' and 'year on year' comparisons
- The purpose of Algorithm Performance is to:
 - Provide confidence in the NDM Supply Meter Point Demand formula
 - Identify possible areas of improvement for future demand modelling
- Objective of today's session is to review Strands 1, 2 & 3
- Supporting document containing full examples and commentary for each strand to be published by end of year

Overview: EUC & Demand Model Lifecycle

The purpose of the **EUC Demand Model** is to represent the behaviour and reactions of the **EUC Population**

“A model is a simplified representation of reality”



NDM Supply Meter Point Demand formula

The revised NDM demand formula (effective from 1st June 2017) is shown below:

$$SPD_t = ((AQ/365) \times ALP_t \times (1 + (DAF_t \times WCF_t)))$$

where:

AQ = Annual Quantity

ALP_t = Annual Load Profile

DAF_t = Daily Adjustment Factor

WCF_t = Weather Correction Factor

Further detail on the above parameters can be found in the 'NDM Demand Estimation Methodology' document

Strand 1 – Weather Analysis

Background:

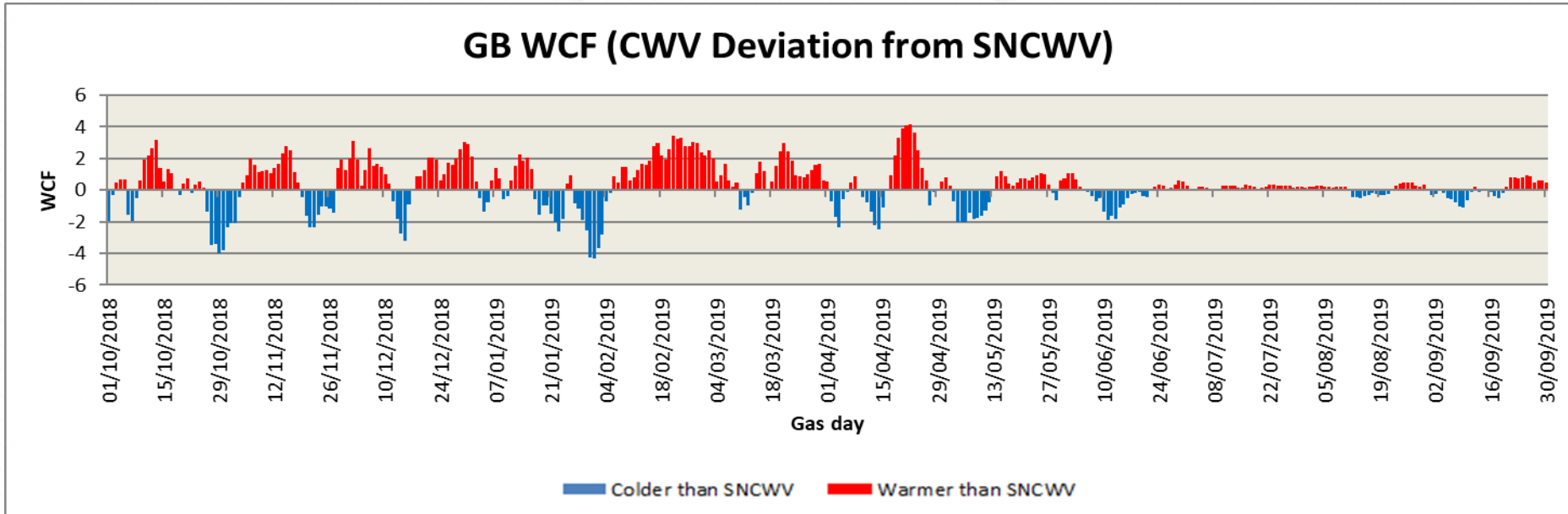
- The observed weather conditions on each day and LDZ (expressed as the CWV) influences the NDM gas demand derived by the allocation formula.

Objective:

- Share information on the observed weather conditions for Gas Year 2018/19
- Identify periods of unusual weather throughout the Gas Year which may help give context to further strands of analysis

Note: In order to derive charts/summaries depicting a national view, 'GB CWV' and 'GB SNCWV' values have been derived using weightings based on LDZ throughput over the five year period 2009 to 2013

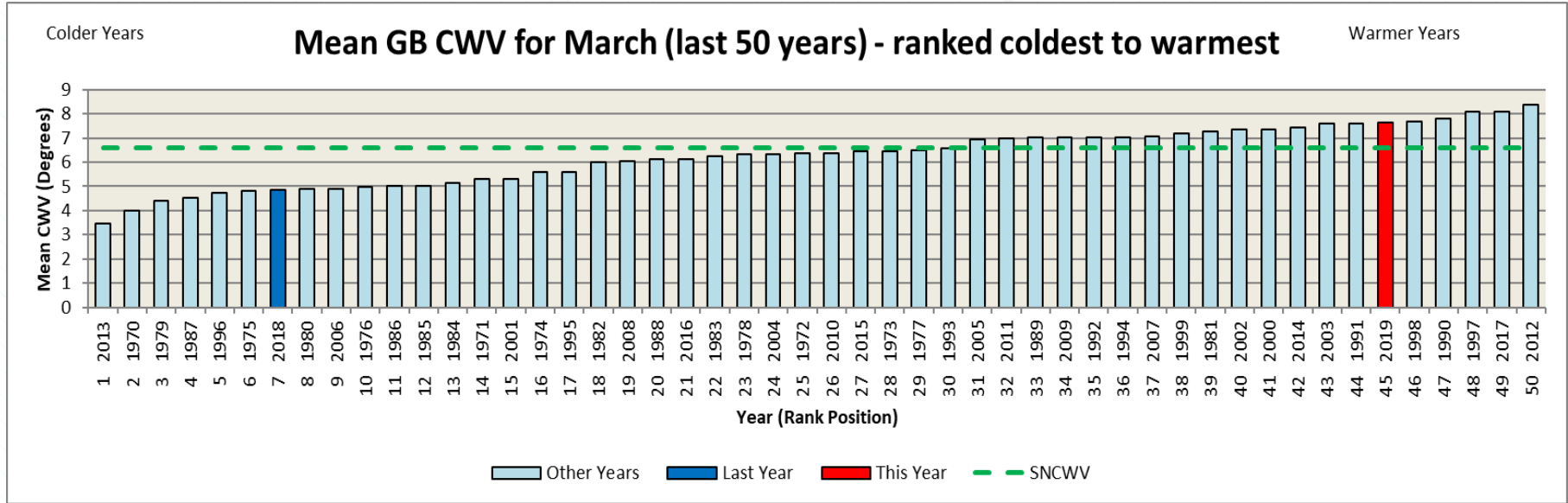
Strand 1 – Weather Analysis: Daily Observations



- Chart shows daily comparisons of CWV vs SNCWV throughout Gas Year 2018/19
- Generally warmer than normal throughout the year
- Table shows min and max deviation of CWV from SNCWV by month

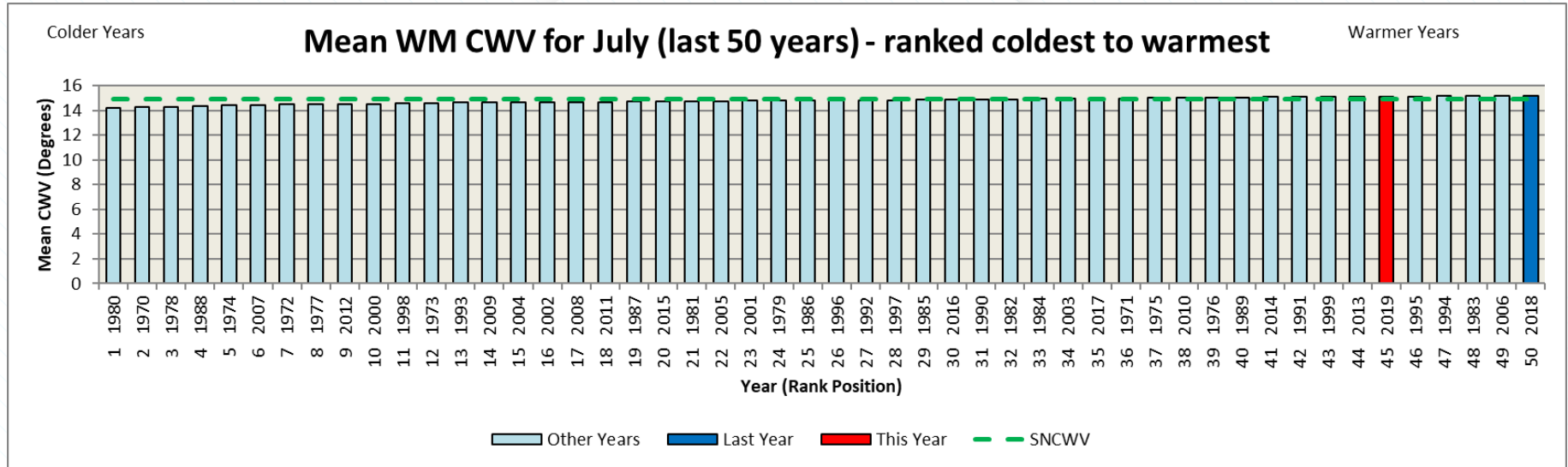
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Max	+3.18	+2.8	+3.13	+2.22	+3.46	+2.97	+4.15	+1.18	+1.08	+0.31	+0.45	+0.91
Min	-3.99	-2.35	-3.21	-4.28	-4.32	-1.27	-2.52	-2.04	-1.88	0.00	-0.54	-1.08

Strand 1 – Weather Analysis: Monthly Assessment



- Chart shows national monthly CWV assessment over past 50 years for March
- March 2019 was much warmer than the current seasonal normal overall
- Majority of individual days were warmer than normal
- Ranked as 6th warmest March over the past 50 years

Strand 1 – Weather Analysis: Monthly Assessment



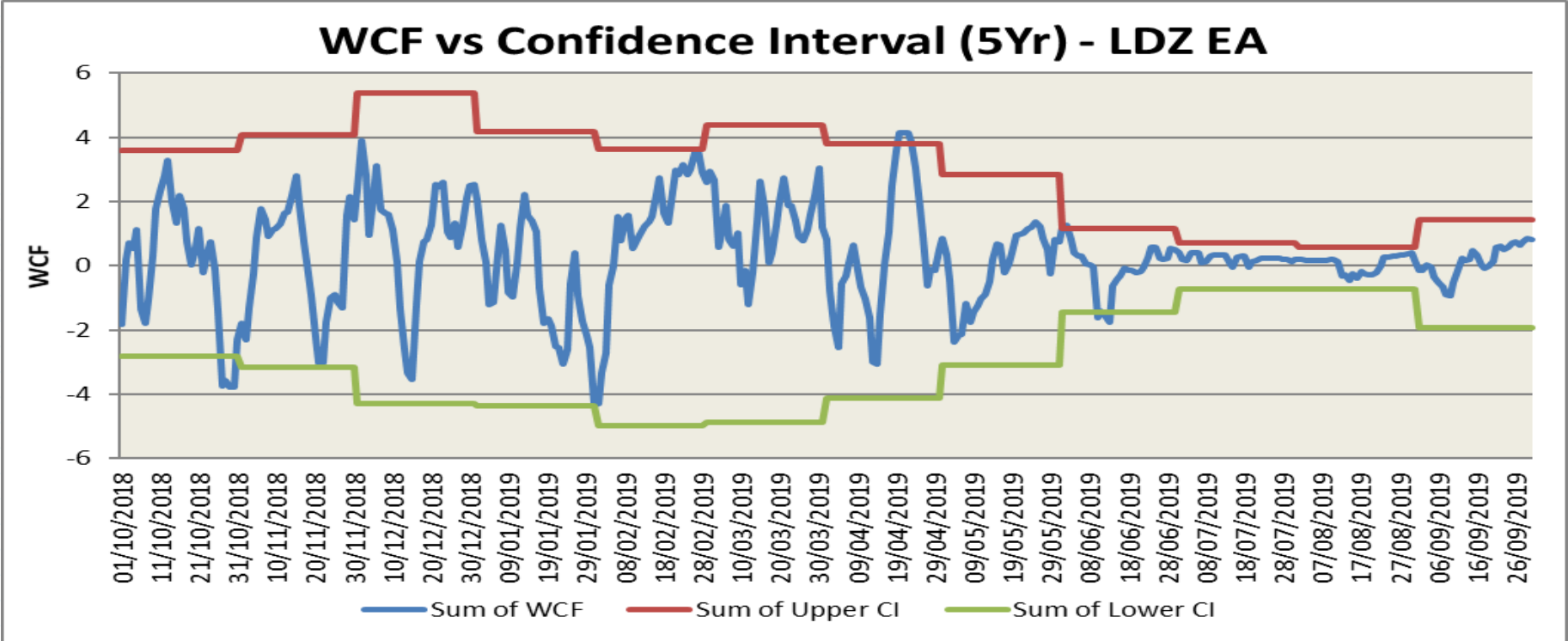
- Chart shows national monthly CWV assessment over past 50 years for July
- July 2019 was consistently warmer than the current seasonal normal
- On 25th July, 38.7 °C set a new UK temperature record
- Ranked as 6th warmest July over the past 50 years

Strand 1 – Weather Analysis: Confidence Intervals Analysis

- Confidence Interval analysis has been performed on observed WCF values during Gas Year 2018/19
- The confidence intervals were calculated for each month and LDZ based on 5 years of history (Gas Years 2011/12, 2012/13, 2013/14, 2014/15 & 2015/16)
- An observation is considered unusual if it is far away from the mean
- The 95% CI was calculated by using the mean and standard deviation for the 5 years and we can use these intervals to identify when the WCF is regarded as unusual

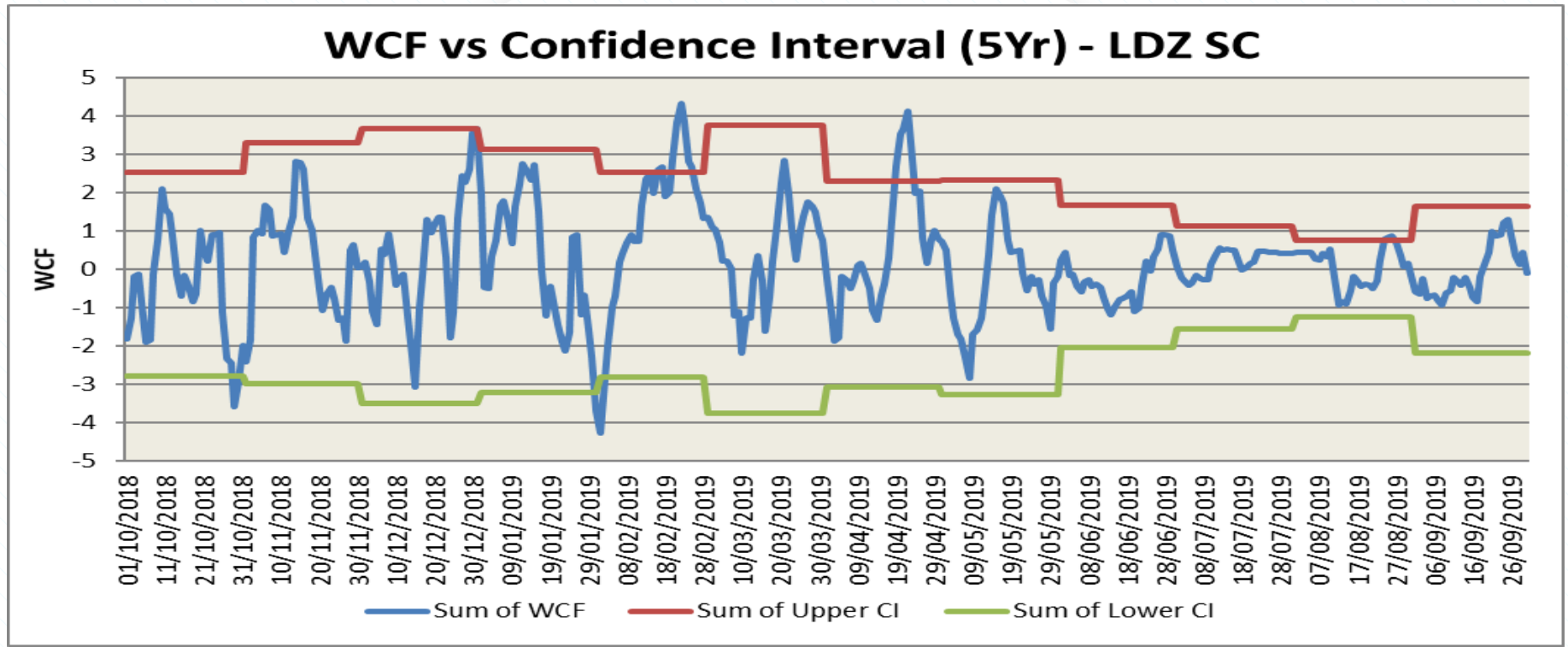
Strand 1 – Weather Analysis: Confidence Intervals Analysis

Example chart of LDZ where most number of WCF values fall within the confidence intervals



Strand 1 – Weather Analysis: Confidence Intervals Analysis

Example chart of LDZ where least number of WCF values fall within the confidence intervals



Strand 1 – Weather Analysis: Confidence Intervals Analysis

Percentage of WCF values within the confidence interval for each LDZ/Month combination

Key: < 95%

Month	SC	NO	NW / WN	NE	EM	WM	WS	EA	NT	SE	SO	SW
Oct'18	94%	90%	84%	84%	84%	87%	84%	87%	87%	87%	87%	84%
Nov'18	100%	100%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%
Dec'18	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Jan'19	97%	100%	97%	97%	97%	97%	97%	100%	97%	97%	97%	97%
Feb'19	64%	64%	75%	68%	71%	96%	96%	100%	100%	100%	100%	96%
Mar'19	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Apr'19	83%	90%	83%	90%	90%	83%	83%	87%	87%	87%	83%	83%
May'19	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Jun'19	100%	97%	90%	87%	87%	83%	87%	83%	83%	83%	90%	87%
Jul'19	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Aug'19	90%	100%	100%	100%	100%	100%	97%	100%	100%	100%	100%	100%
Sep'19	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Strand 1 – Weather Analysis: Conclusions

- Overall, the observed weather during Gas Year 2018/19 when compared to current seasonal normal is as follows:
 - Quarter 1 (Oct'18 to Dec'18) was generally warmer
 - Quarter 2 (Jan'19 to Mar'19) was generally warmer
 - Quarter 3 (Apr'19 to Jun'19) was generally similar to seasonal normal
 - Quarter 4 (Jul'19 to Sep'19) was generally warmer
- The stand out periods of unusual weather were:
 - March'19 – 6th warmest March in 50 years
 - July'19 – On 25th July, 38.7 °C at Cambridge Botanic Garden set a new UK temperature record
 - Top 5 colder than normal days: 1st Feb 19, 31st Jan 19, 29th Oct 18, 30th Oct 18 and 2nd Feb 19
 - Top 5 warmer than normal days: 22nd Apr 19, 21st Apr 19, 20th Apr 19, 23rd Apr 19 and 21st Feb 19
- When interpreting the various strands of Algorithm Performance, it is relevant to recall the weather conditions that prevailed during the gas year being analysed