



## **Demand Estimation Sub Committee**

Seasonal Normal Review 2020:

8<sup>th</sup> July 2019

# Overview - Milestones

- At the 10<sup>th</sup> December 2018 meeting DESC approved the following high level approach and work plan for performing this analysis - major milestones below:
- **MILESTONE:** DESC to decide whether to consider a revision to the existing **CWV** formula and confirm the template for its 'benchmark' results (1<sup>st</sup> April)
- **MILESTONE:** DESC define proposed **CWV** formula for next period i.e. GY 2020/21 onwards (8<sup>th</sup> July)
- **MILESTONE:** DESC confirm parameters for use in proposed **CWV** formula for Gas Year 2020/21 (7<sup>th</sup> October)
- **MILESTONE:** DESC decide whether to revise existing **SNCWV** (1<sup>st</sup> April)
- **MILESTONE:** DESC confirm revised **SNCWV** values (9<sup>th</sup> December)

# Overview - DESC / TWG meeting Timetable 2019

## High Level View of Seasonal Normal Review in 2019 - Key Checkpoints

PHASE	JAN'19	FEB'19	MAR'19	APR'19	MAY'19	JUN'19	JUL'19	AUG'19	SEP'19	OCT'19	NOV'19	DEC'19
TWG REVIEW CWV and SNCWV												
Update on Seasonal Normal Review (DESC)		11th Feb										
DESC MILESTONE												
DESC to confirm plan to Review CWV and SNCWV Review				1st Apr								
TWG REVIEW OPTIONS FOR CWV FORMULA												
Update on review of CWV formula (TWG)				24th Apr								
Update on review of CWV formula (TWG)					13th May							
Update on review of CWV formula (TWG)						10th Jun						
DESC MILESTONE												
DESC define proposed CWV Formula (DESC)							8th Jul					
TWG COMPLETE CWV OPTIMISATION												
Adhoc Meetings								?	?			
DESC MILESTONE												
DESC confirm parameters in CWV formula (DESC)										7th Oct		
TWG CALCULATE SNCWV												
Adhoc Meetings											?	
DESC MILESTONE												
DESC confirm SNCWV values (DESC)												9th Dec

# Objectives for today

- British Gas to present latest results of their investigations into using additional weather variables in the calculation of CWV, along with a proposal of what the CWV formula will be in October 2020

- DESC to provide feedback and vote on the proposed CWV formula – original milestone below:

**MILESTONE:** DESC define proposed **CWV** formula for next period i.e. GY 2020/21 onwards (8<sup>th</sup> July)

- Once this has been discussed, DESC to also consider the analysis of the current SNCWV

# NEW SLIDE (v2) : DESC Decision – CWV Formula

- Proposed CWV formula definition for 2020/21 onwards:

$$CW_t = I_1 * E_t + (1.0 - I_1) * S_t - I_2 * \max(0, W_t - W_0) * \max(0, T_0 - AT_t) + S_0 * SR_t$$

where  $SR_t$  is measured as the log difference between actual solar observations ( $AS_t$ ) and a seasonal normal ( $SNS_t$ )

where  $S_0$  - is a new parameter for the 'Solar Radiance' effect

Incorporating summer cut-offs, transition and cold weather upturn then gives the final form of the CWV:

$CWV_t = V_1 + q * (V_2 - V_1)$	if $V_2 \leq CW_t$	(summer cut-off)
$CWV_t = V_1 + q * (CW_t - V_1)$	if $V_1 < CW_t < V_2$	(transition)
$CWV_t = CW_t$	if $V_0 \leq CW_t \leq V_1$	(normal)
$CWV_t = CW_t + I_3 * (CW_t - V_0)$	if $V_0 > CW_t$	(cold weather upturn)

- Are DESC happy to approve the above revision to the CWV formula ?

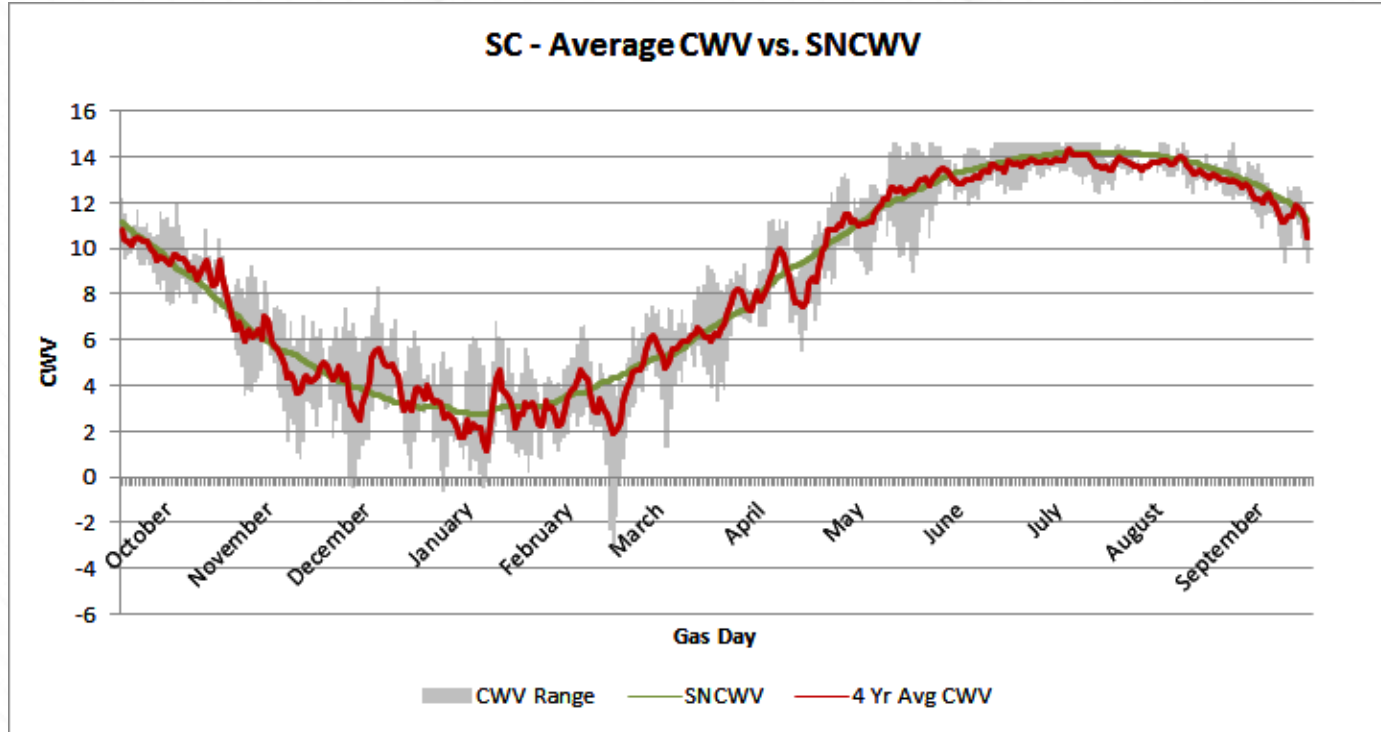
# Seasonal Normal Basis

- The SNCWV is a parameter which represents a typical daily view of weather. Demand models use the SNCWV and are expressed on this basis. The SNCWV provides a benchmark to compare to actual weather experienced (CWV), also referred to as the Weather Correction Factor (WCF)
- UNC Section H 1.4.6 allows DESC the opportunity to utilise the output from the “Climate Change Methodology” (CCM)
- During 2013/2014 DESC engaged with the Met Office to deliver a CCM including a series of weather variable predictions (upto 2025) which were used in the derivation of the current SNCWV values

# Review of SNCWV

- The current SNCWV was calculated and approved in Q4 2014 and became effective on 1<sup>st</sup> October 2015
- Since the calculation we have 4 complete gas years to compare to, namely 2014/15 to 2017/18. Degree Day (DD) analysis has been used. Reminder the formula for DD is Threshold [20]– CWV (a larger DD value indicates colder weather)
- The assessment investigates the ‘levels’ and ‘shape’ of the current SNCWV. LDZ’s SC, EM, WN, and NT have been included in this presentation
- The same analysis has been included for all LDZ’s in the accompanying appendix document also published

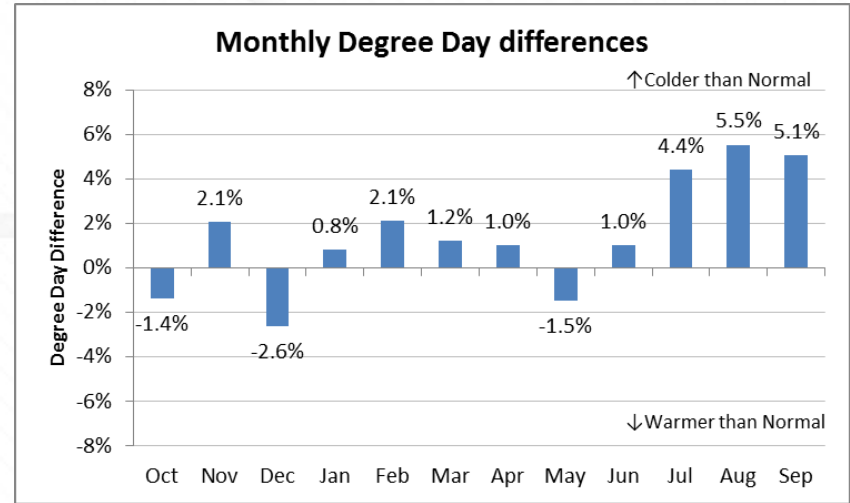
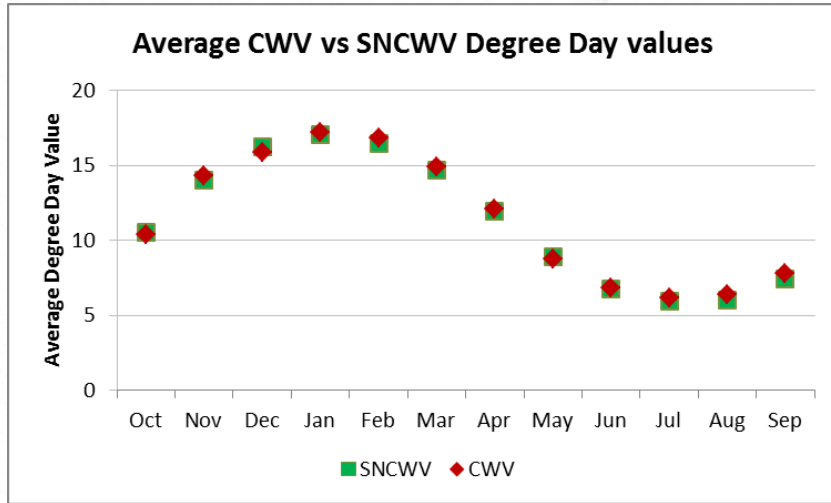
# Review of SNCWV (SC)



- Comparison of the range and average daily value of Composite Weather Variable (CWV) values for previous 4 complete gas years vs the Seasonal Normal Composite Weather Variable (SNCWV)

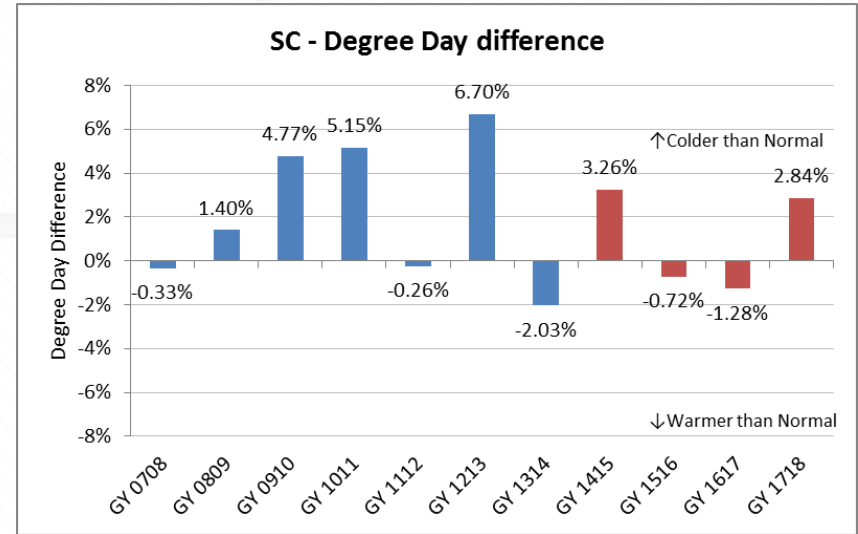
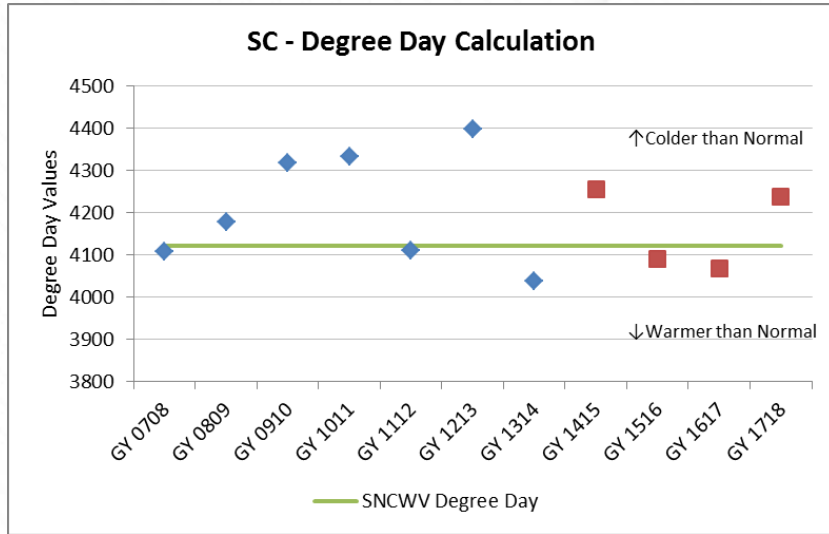


# Review of SNCWV 'Shape' (SC)



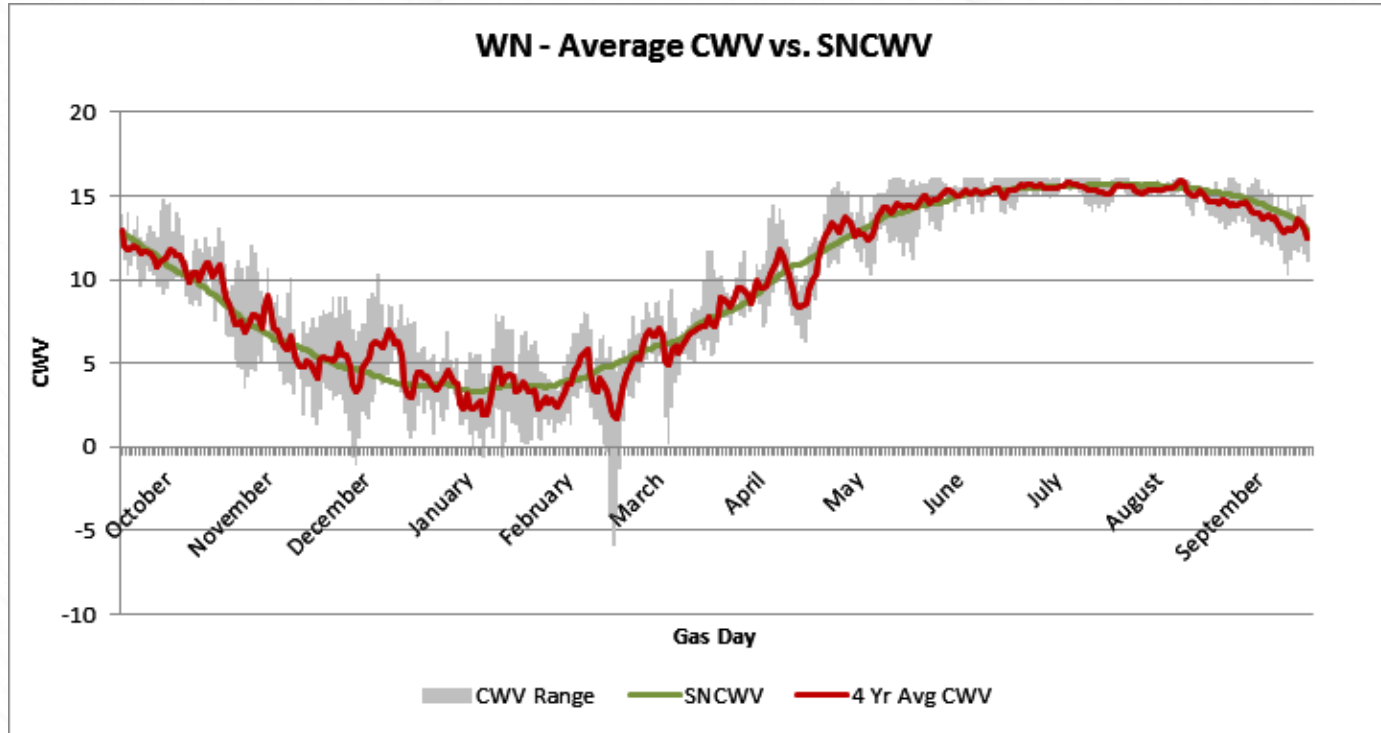
- Comparison of average CWV Degree Day values by month for past 4 complete gas years compared to SNCWV equivalent
- Monthly Degree Day % difference by month (+ values indicate where CWV was Colder than SNCWV)
- Observed CWV was colder than Seasonal Normal in 9 of 12 months for SC

# Review of SNCWV 'Levels' (SC)



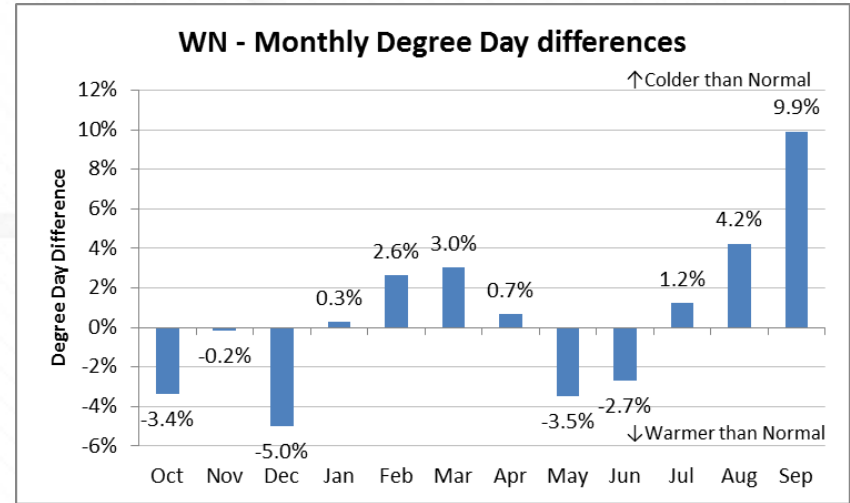
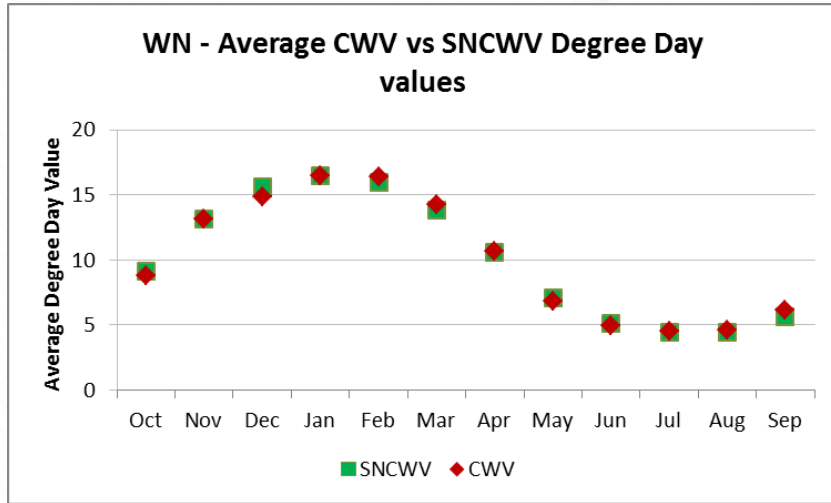
- Charts show a degree day calculation for each of the previous 10 gas years
- The degree day calculation for the recent 4 complete gas year's daily average values indicates that SC was approximately 1.02% colder than Seasonal Normal

# Review of SNCWV (WN)



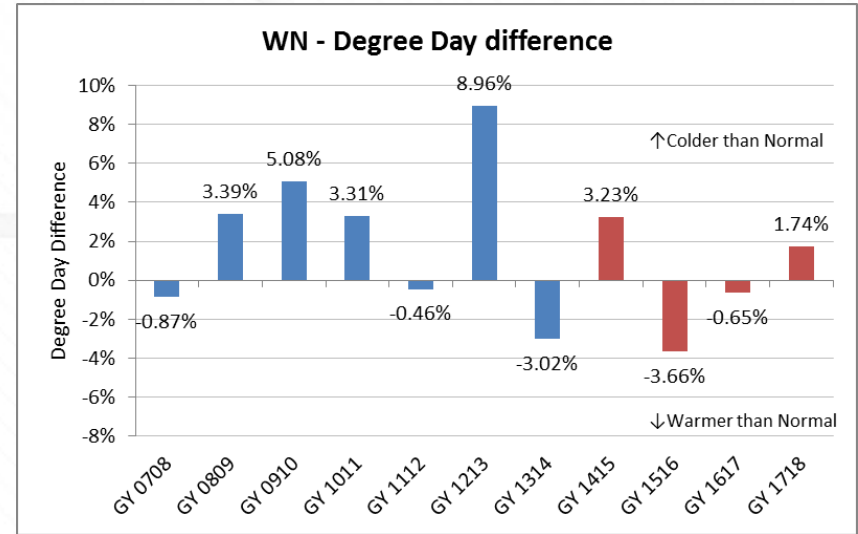
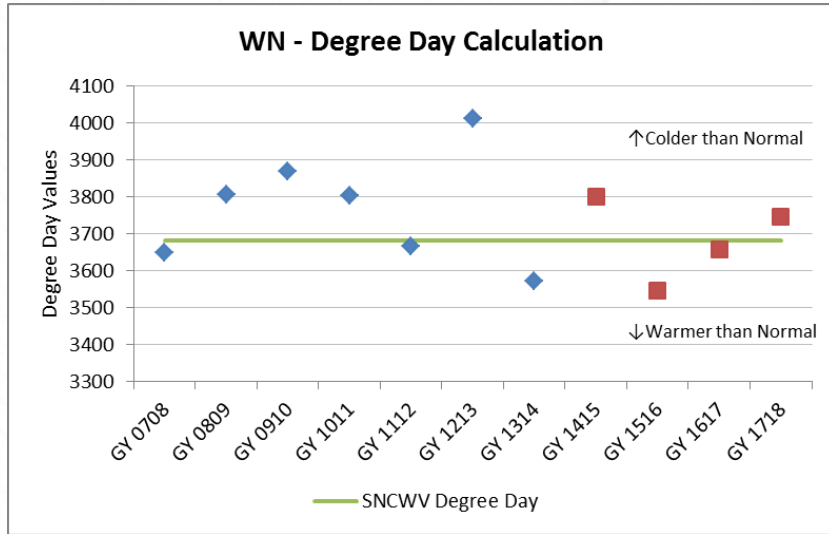
- Comparison of the range and average daily value of Composite Weather Variable (CWV) values for previous 4 complete gas years vs the Seasonal Normal Composite Weather Variable (SNCWV)

# Review of SNCWV 'Shape' (WN)



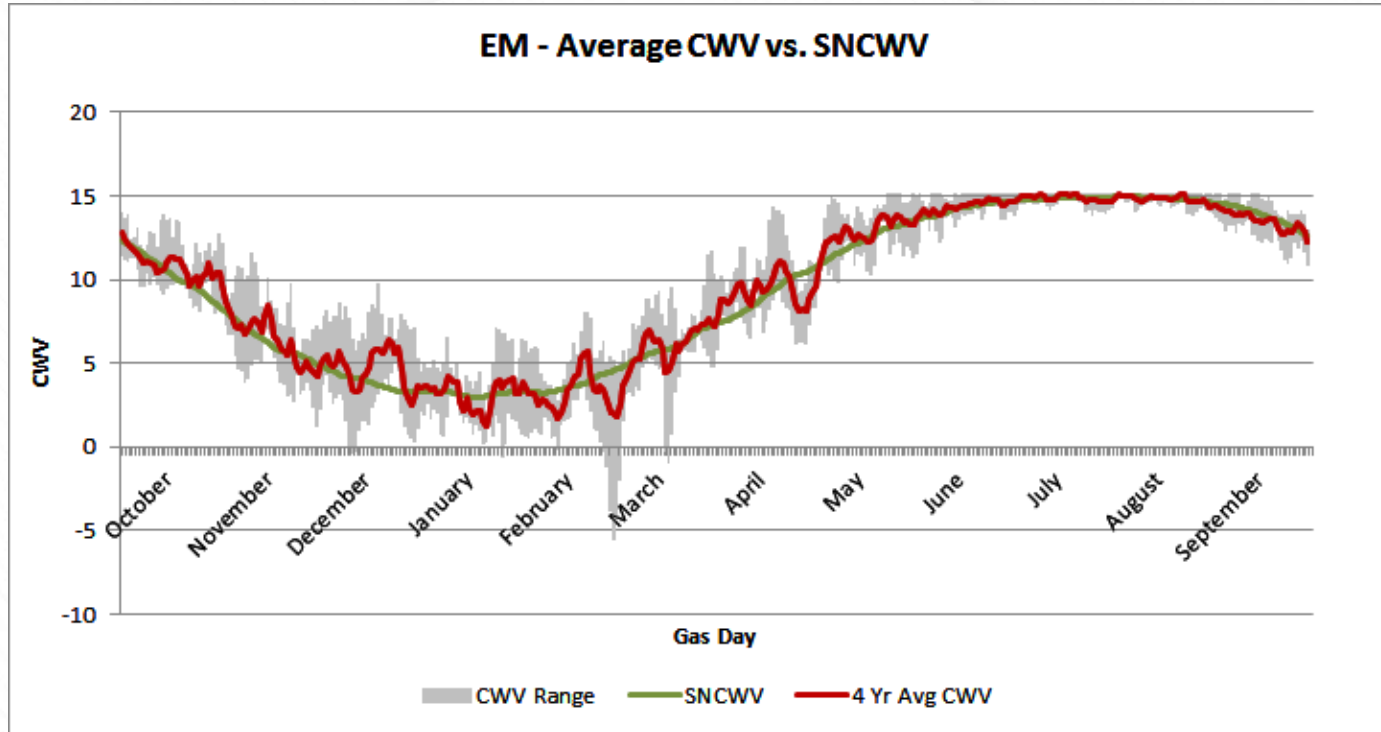
- Comparison of average CWV Degree Day values by month for past 4 complete gas years compared to SNCWV equivalent
- Monthly Degree Day % difference by month (+ values indicate where CWV was Colder than SNCWV)
- 9.9% difference in September is an average CWV Degree Day value of 6.15, compared to Seasonal normal equivalent of 5.60. This is caused by 3 of 4 measured Gas Years being colder than normal

# Review of SNCWV 'Levels' (WN)



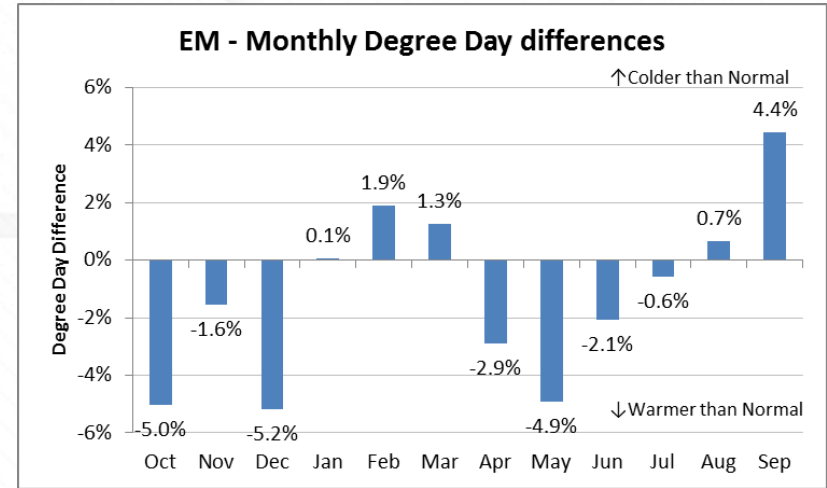
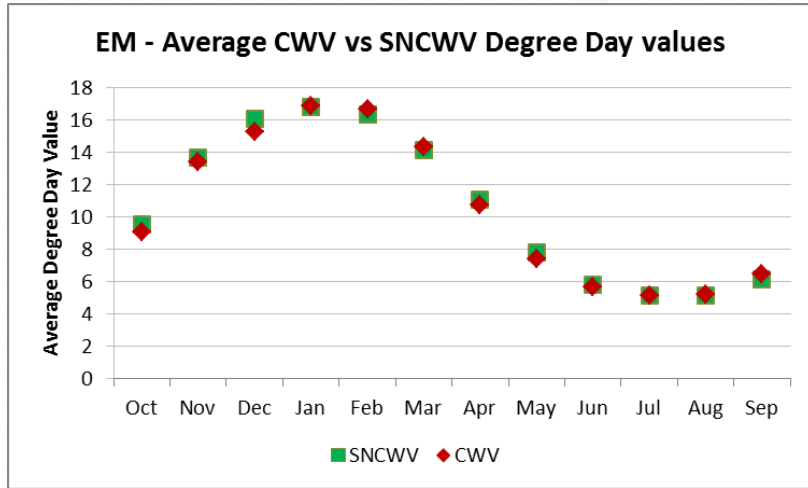
- Charts show a degree day calculation for each of the previous 10 gas years
- The degree day calculation for the recent 4 complete gas year's daily average values indicates that WN was approximately 0.17% colder than Seasonal Normal

# Review of SNCWV (EM)



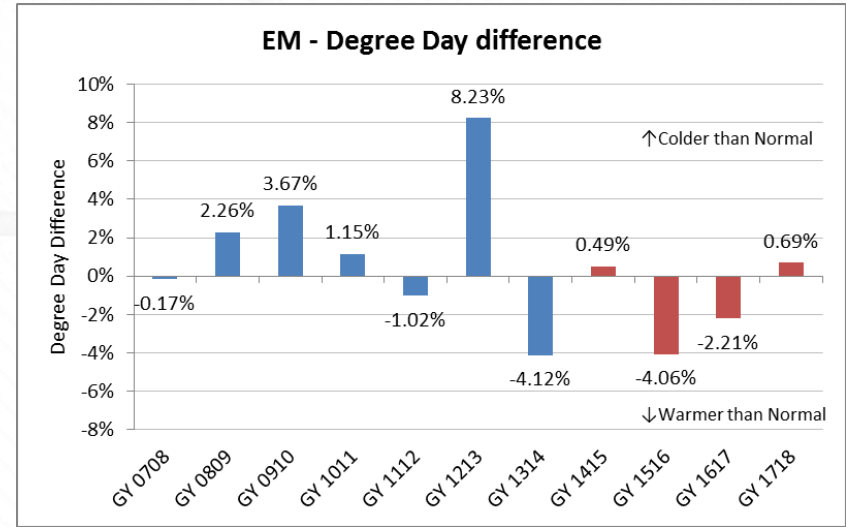
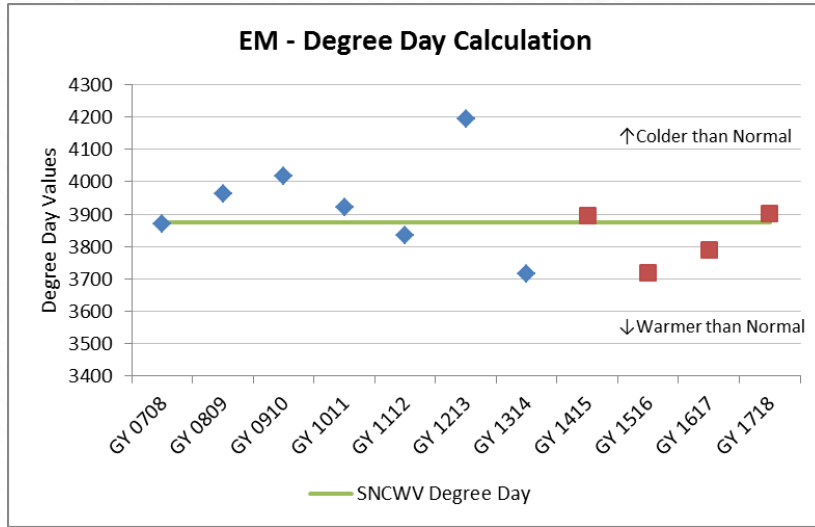
- Comparison of the range and average daily value of Composite Weather Variable (CWV) values for previous 4 complete gas years vs the Seasonal Normal Composite Weather Variable (SNCWV)

# Review of SNCWV 'Shape' (EM)



- Comparison of average CWV Degree Day values by month for past 4 complete gas years compared to SNCWV equivalent
- Monthly Degree Day % difference by month (+ values indicate where CWV was Colder than SNCWV)
- Oct to Dec and Apr to Jul were measured as being Warmer than Seasonal Normal

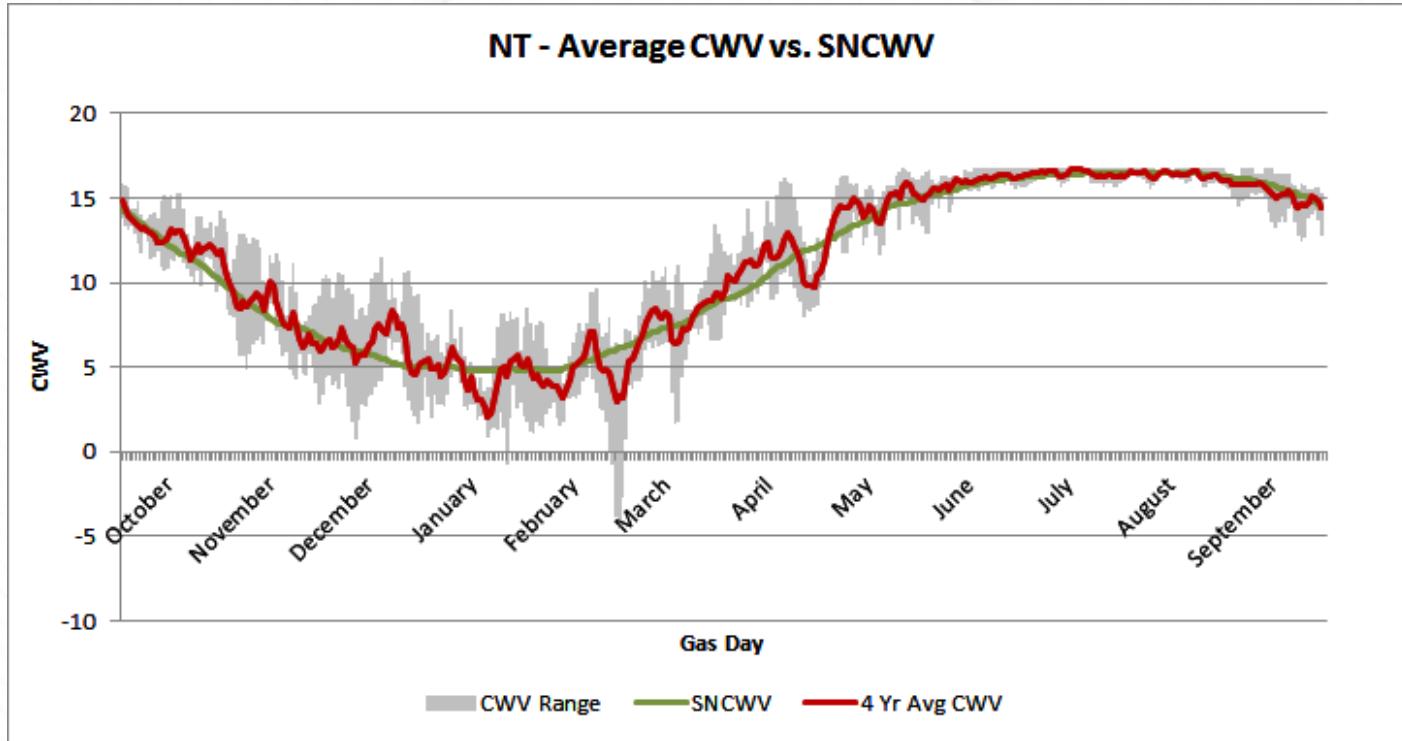
# Review of SNCWV 'Levels' (EM)



- Charts show a degree day calculation for each of the previous 10 gas years
- The degree day calculation for the recent 4 complete gas year's daily average values indicates that EM was approximately 1.27% warmer than Seasonal Normal

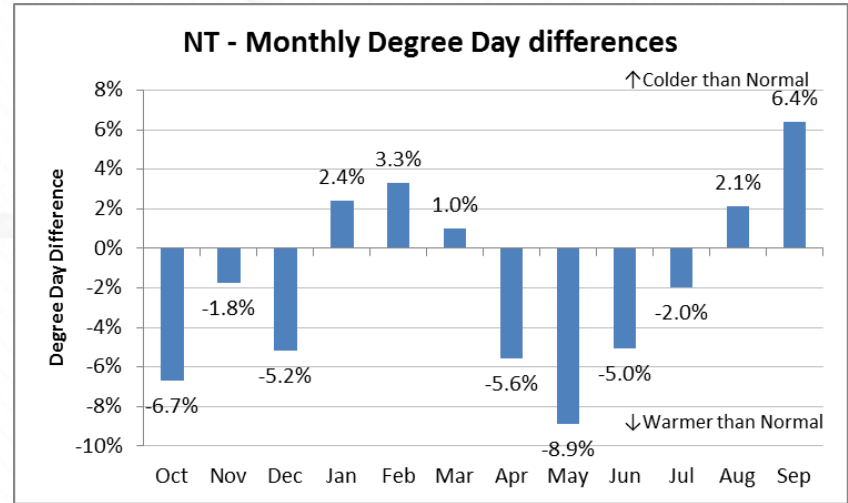
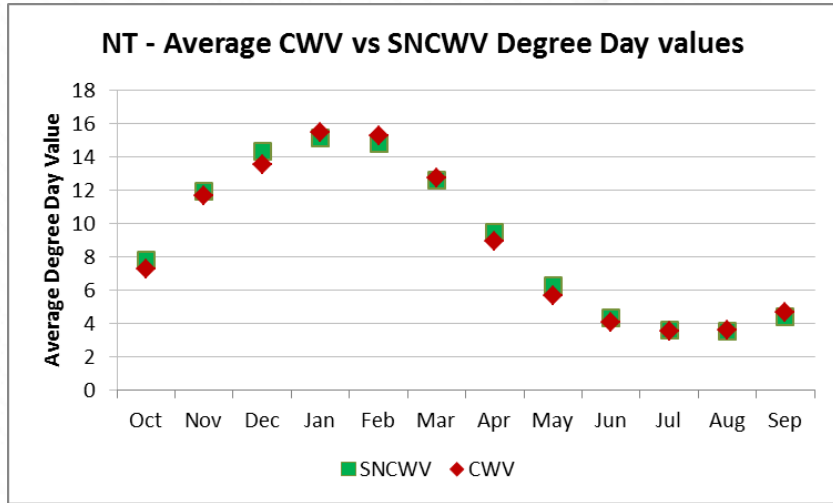


# Review of SNCWV (NT)



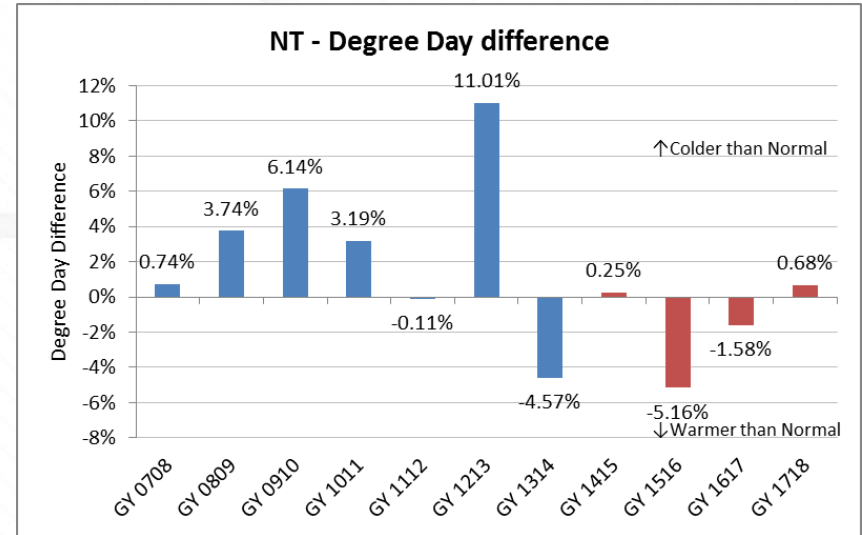
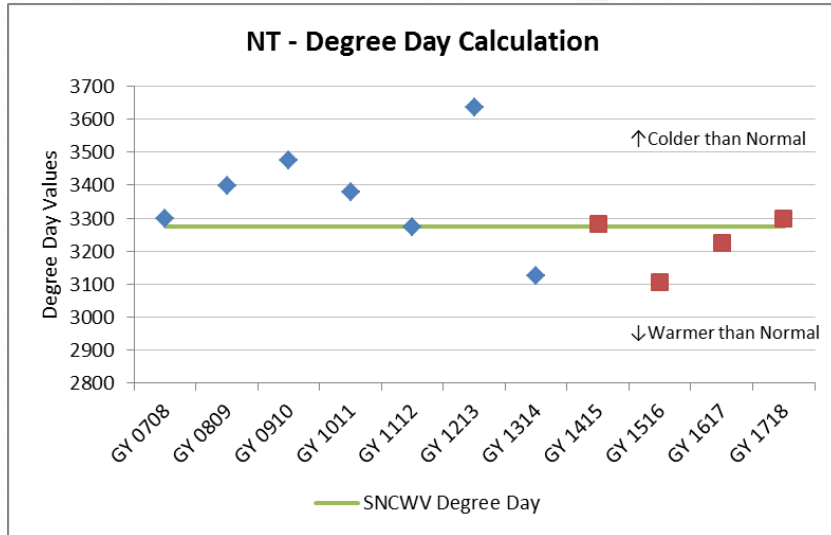
- Comparison of the range and average daily value of Composite Weather Variable (CWV) values for previous 4 complete gas years vs the Seasonal Normal Composite Weather Variable (SNCWV)

# Review of SNCWV 'Shape' (NT)



- Comparison of average CWV Degree Day values by month for past 4 complete gas years compared to SNCWV equivalent
- Monthly Degree Day % difference by month (+ values indicate where CWV was Colder than SNCWV)
- Similar to EM, during Oct to Dec and Apr to Jul CWV is measured as being warmer than normal


# Review of SNCWV 'Levels' (NT)



- Charts show a degree day calculation for each of the previous 10 gas years
- The degree day calculation for the recent 4 complete gas year's daily average values indicates that NT was approximately 1.45% warmer than Seasonal Normal

# Review of SNCWV shape - All LDZ's

LDZ	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
EA	-6.64%	-1.74%	-4.99%	2.49%	3.33%	0.90%	-5.51%	-8.77%	-4.74%	-1.73%	1.94%	6.20%
EM	-5.04%	-1.56%	-5.17%	0.07%	1.88%	1.26%	-2.91%	-4.91%	-2.07%	-0.57%	0.67%	4.43%
NE	-5.09%	-1.58%	-5.05%	0.05%	1.82%	1.17%	-3.12%	-5.27%	-2.75%	-0.98%	1.75%	5.84%
NO	-4.82%	-0.42%	-4.71%	-1.44%	0.80%	-0.92%	-2.22%	-5.10%	-1.66%	1.19%	0.93%	2.86%
NT	-6.72%	-1.76%	-5.18%	2.38%	3.32%	1.01%	-5.56%	-8.88%	-5.05%	-1.96%	2.12%	6.40%
NW	-3.39%	-0.18%	-5.02%	0.29%	2.64%	3.02%	0.65%	-3.48%	-2.70%	1.24%	4.24%	9.91%
SC	-1.38%	2.06%	-2.64%	0.83%	2.13%	1.24%	1.02%	-1.45%	1.04%	4.42%	5.54%	5.08%
SE	-6.61%	-1.74%	-5.15%	2.20%	3.17%	1.05%	-5.43%	-8.65%	-4.66%	-1.51%	1.50%	5.83%
SO	-5.66%	-2.30%	-6.16%	0.60%	2.72%	1.56%	-3.62%	-7.04%	-3.58%	-0.97%	1.10%	4.07%
SW	-3.77%	-1.23%	-4.73%	0.80%	3.69%	2.68%	-3.85%	-5.60%	-2.39%	0.10%	2.45%	4.97%
WM	-4.84%	-1.28%	-4.96%	1.33%	2.76%	2.50%	-2.44%	-4.69%	-2.49%	-0.32%	2.01%	5.87%
WN	-3.39%	-0.18%	-5.02%	0.29%	2.64%	3.02%	0.65%	-3.48%	-2.70%	1.24%	4.24%	9.91%
WS	-5.81%	-2.61%	-5.79%	-0.31%	3.34%	3.07%	-2.30%	-4.47%	-4.17%	0.14%	4.21%	4.64%

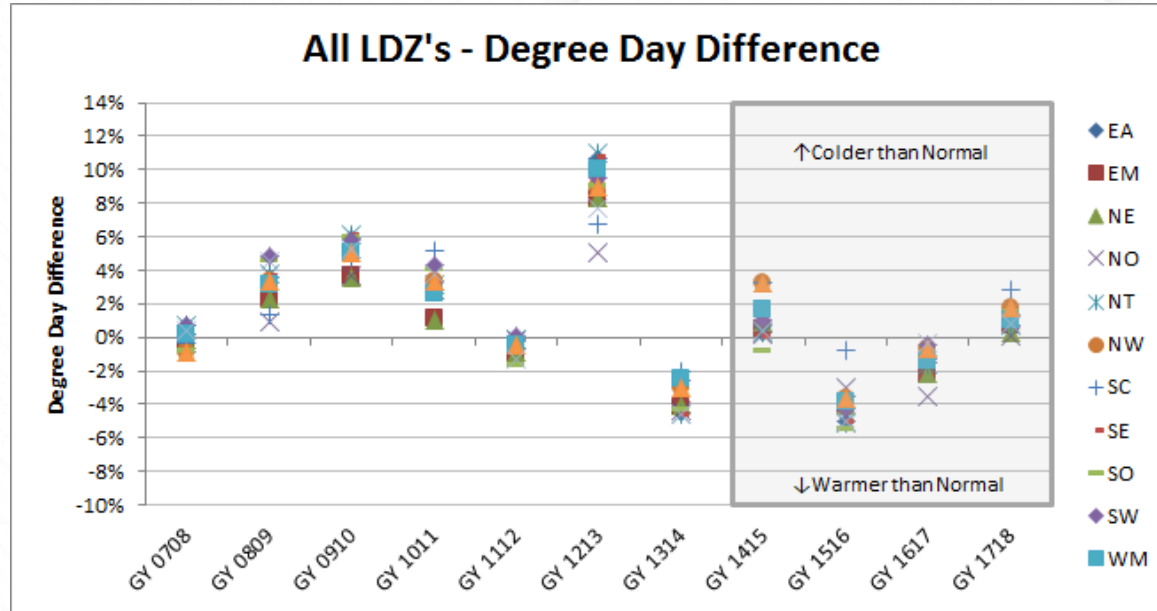


Warmer than normal

Colder than normal

- National view of average CWV Degree Day values by month for past 4 complete gas years compared to SNCWV equivalent
- Orange highlights where observed CWV was warmer than SNCWV, with blue being colder

# Review of SNCWV levels - All LDZ's



LDZ	Degree Day difference
EA	1.38% Warmer
EM	1.27% Warmer
NE	1.28% Warmer
NO	1.57% Warmer
NT	1.45% Warmer
NW	0.17% Cooler
SC	1.02% Cooler
SE	1.45% Warmer
SO	1.59% Warmer
SW	0.61% Warmer
WM	0.62% Warmer
WN	0.17% Cooler
WS	1.05% Warmer
<b>All LDZ's</b>	<b>0.81% Warmer</b>

- Chart shows the Degree Day difference for all LDZ's for previous 10 complete gas years
- All LDZ's can be seen to follow a similar trend. Degree day difference is based on previous 4 gas years and indicates the observed CWV was approximately 0.81% warmer than SNCWV

# Conclusions

- Overall the Seasonal Normal CWV appears to have been a good indication/benchmark of average weather as the results show a close fit to observed CWV in terms of level and shape for majority of LDZ's
- On a monthly basis October to December and April to June have been warmer than Seasonal normal, with the reverse being true of January to March and August to September. July is closest to normal, with 6 LDZ being colder, and 7 being warmer than normal
- In the event DESC use the Climate Change Methodology (CCM) output (but moved on 5 years) for setting the SNCWV from October 2020, the analysis appears to support this decision

# UPDATED (v2): Next Steps

- CWV Formula Review:
  - Respond to any actions, issues raised today with CWV formula
  - Based on agreed formula, optimise the coefficients for all LDZs , publish final values and present to TWG/DESC in Q3 2019
- Setting SNCWV:
  - Engage with Met Office to gain an upto date view of the **provisional decision made by DESC in 2017 to continue with** Climate Change Methodology (CCM) output produced in 2014
  - Prepare a draft approach for deriving the SNCWV in Q4 2019