Demand Estimation Sub Committee (DESC)

CWV Calculation Issues

6th November 2020

Introduction

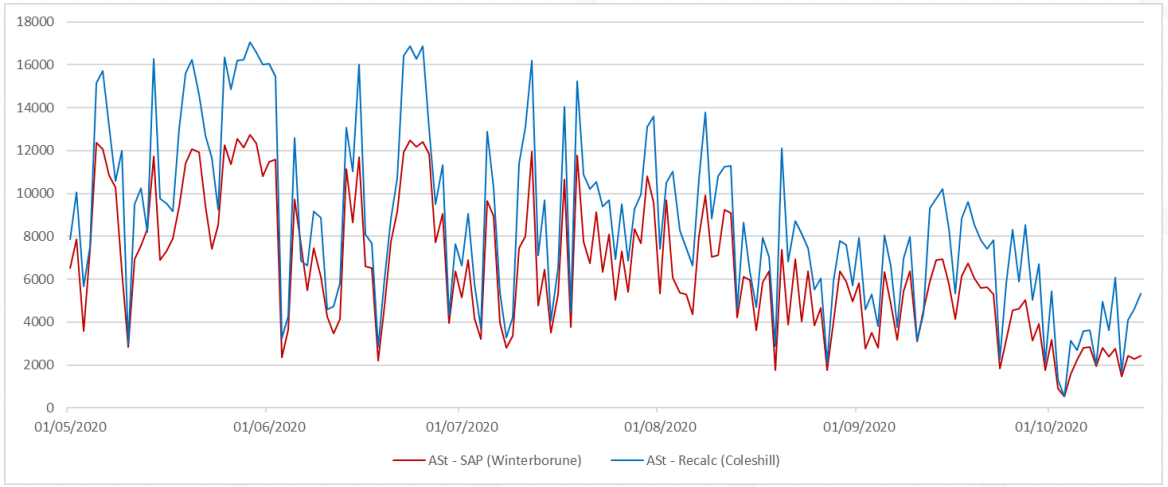
- During October there has been 2 issues identified with the calculation of the Composite Weather Variable (CWV) following errors with the data provided by Xoserve's Weather Services Provider (WSP), these are summarised below:
  - Issue 1: The calculation of the CWV for West Midlands (WM) LDZ incorrectly used Solar Radiation observations from Winterbourne rather than Coleshill. The period impacted was 1st May 2020 to 15th October 2020
  - Issue 2: The calculation of the CWV for ALL LDZ's have not used observations reflecting the recent clock change at the end of October (i.e. used BST instead of GMT). The period impacted was 24th October 2020 to 4th November 2020
- The remainder of the presentation splits into Issue 1 (slides 3-11) and Issue 2 (slides 12-16) with more detail and impacts provided in each section

Issue 1 – Solar Radiation (WM)

- The revised Composite Weather Variable (CWV) formula, agreed as part of Seasonal Normal Review 2020, now includes a Solar Radiation term
- Each LDZ uses its own agreed weather station for Solar Radiation observations and these were used alongside Temperature and Wind Speed when completing the CWV optimisation activity (see LDZ table)
- Following a query from a customer we have identified that the Solar Radiation observations provided to Xoserve by our Weather Services Provider (WSP) for WM LDZ was incorrectly using Winterbourne rather than Coleshill
- The impacted period has been identified as gas days 1st May 2020 to 15th October 2020
- The source data from gas day 16th October 2020 onwards is now using Coleshill weather station

LDZ	Temperature	Windspeed	Solar Radiation
SC	Glasgow Bishopton	Glasgow Bishopton	Glasgow Bishopton
NO	Albemarle Barracks	Albemarle Barracks	Durham Weather Station
NW	Rostherne No 2	Rostherne No 2	Rostherne No 2
NE	Nottingham Watnall	Nottingham Watnall	Nottingham Watnall
EM	Nottingham Watnall	Nottingham Watnall	Nottingham Watnall
WM	Birmingham Winterbourne 2	Coleshill	Coleshill
WN	Rostherne No 2	Rostherne No 2	Rostherne No 2
WS	St. Athan	St. Athan	St. Athan
EA	London Heathrow	London Heathrow	London Heathrow
NT	London Heathrow	London Heathrow	London Heathrow
SE	London Heathrow	London Heathrow	London Heathrow
SO	Southampton Oceanographic Institute	Southampton Oceanographic Institute	Southampton Oceanographic Institute
SW	Yeovilton Weather Station	Yeovilton Weather Station	Yeovilton Weather Station

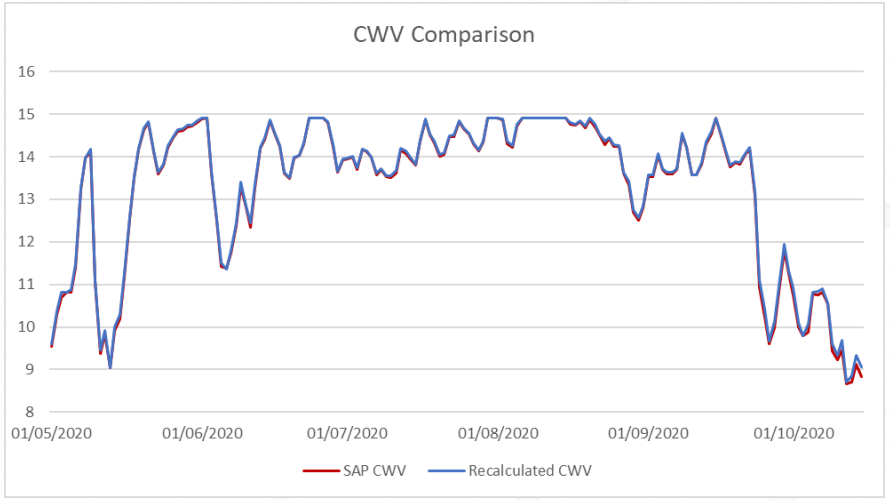
Daily weighted Solar Radiation (AS_t)

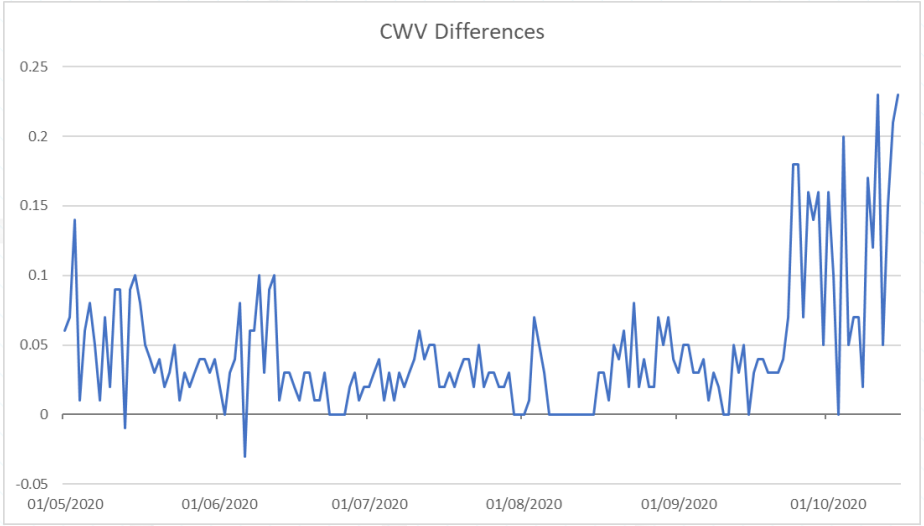


Gas Month	Average Daily ASt difference
May-20	+ 2863
Jun-20	+ 2039
Jul-20	+ 2223
Aug-20	+ 2048
Sep-20	+ 1940
Oct-20	+ 1118

- Daily Solar Radiation values should have been higher for almost all gas days in period 1st May 2020 to 15th October 2020
- Despite being close geographically, the two stations show different characteristics in their solar observations. This may be attributed to the characteristics of the weather stations, for example partial shading at Winterbourne

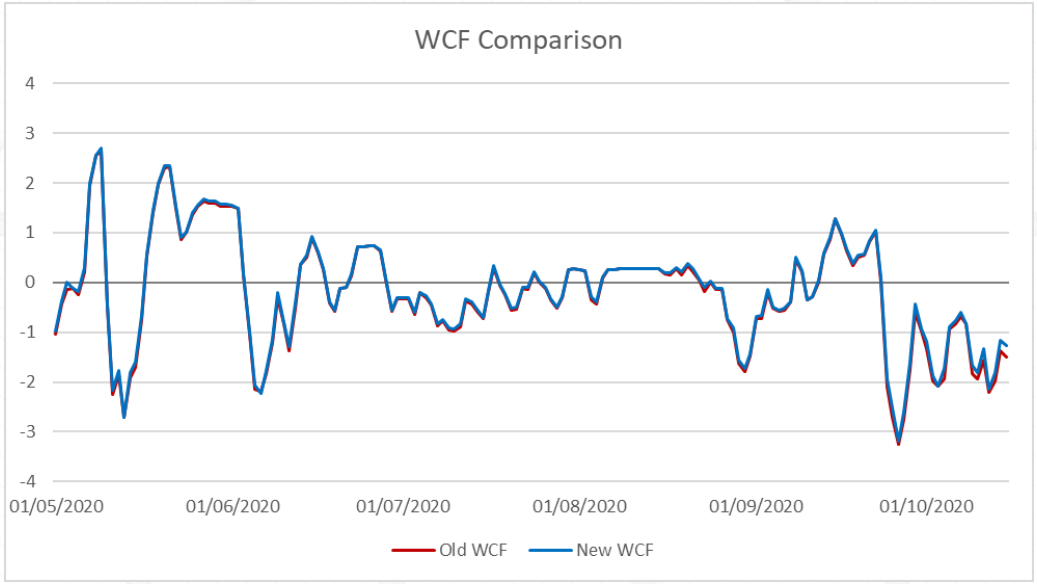
Composite Weather Variable (CWV) Comparison





- For the majority of gas days, CWV's should have been warmer
- Throughout summer months, differences in the CWV values are generally very small
- As seen during seasonal normal review process, the Solar term tends to have a larger effect on CWV during months Oct to Jan, hence differences in CWV values are larger for affected gas days in October (despite differences in Actual solar being smaller)

Weather Correction Factor (WCF) Comparison



- Differences in WCF values mirror the differences seen in CWV's
- Reminder: WCF = CWV – SNCWV
- As revised CWVs are generally warmer this means revised WCF is either less negative or more positive over the period

What are the impacts ?

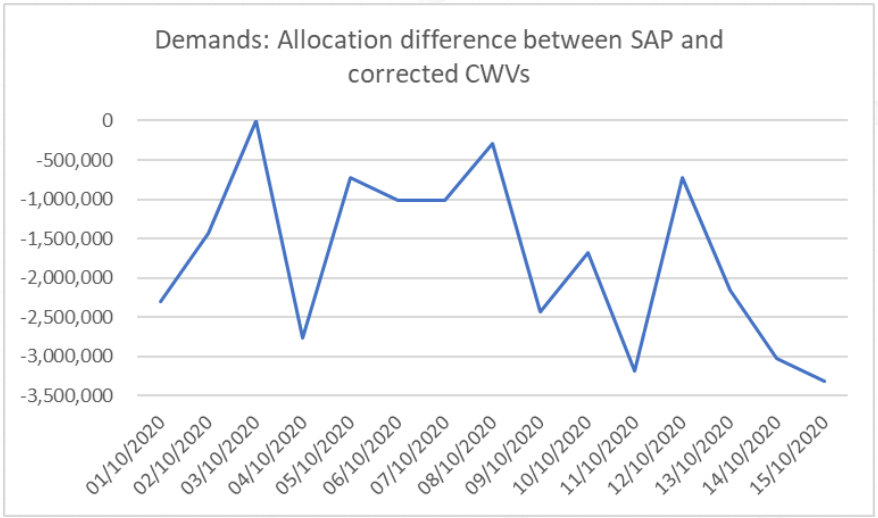
- CWVs calculated in UK Link for WM LDZ have used incorrect Solar Radiation data for gas days 1st October 2020 to 15th October 2020.

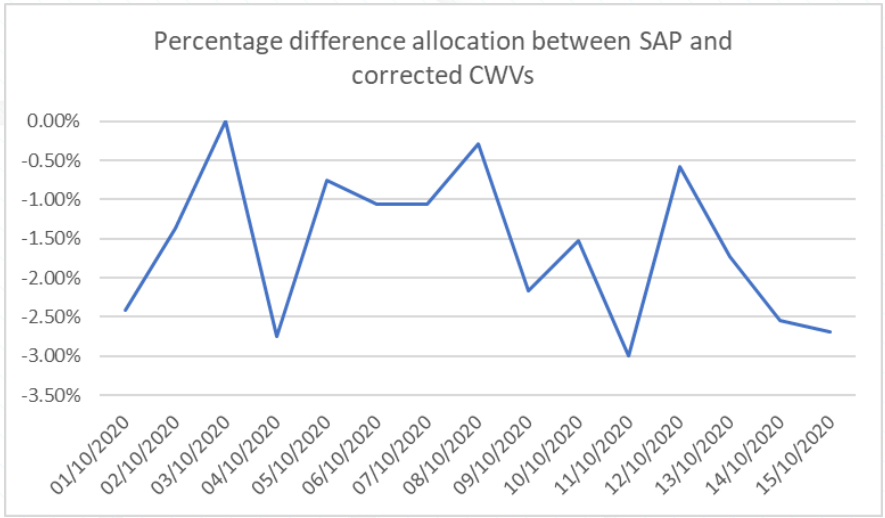
- CWVs are used by Gemini and UK Link:
  - **Gemini** uses CWV in calculation of NDM Nominations and Allocations (WCF)
  - UIG is balancing figure in demand attribution so will be impacted too (equal and opposite)

  - **UK Link** uses CWV in the calculation of AQs and Read Estimation (WAALPs), as this is a Seasonal Normal Review year, there was a requirement to calculate the new version of the historical CWVs 'off-line' as UK Link was required to calculate on the current basis until 1st October 2020. The impacts to WAALPs covers the period 1st May 2020 to 15th October 2020
  - September and October AQ calculations for WM LDZ will have used less accurate WAALPs

- This impacts LDZ WM ONLY

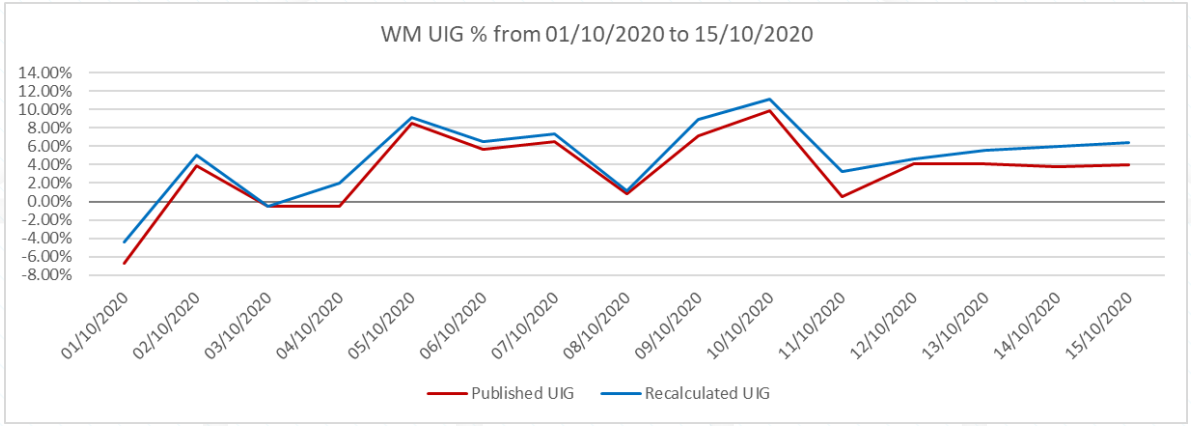
Total NDM Allocation for WM: Original vs Recalculation

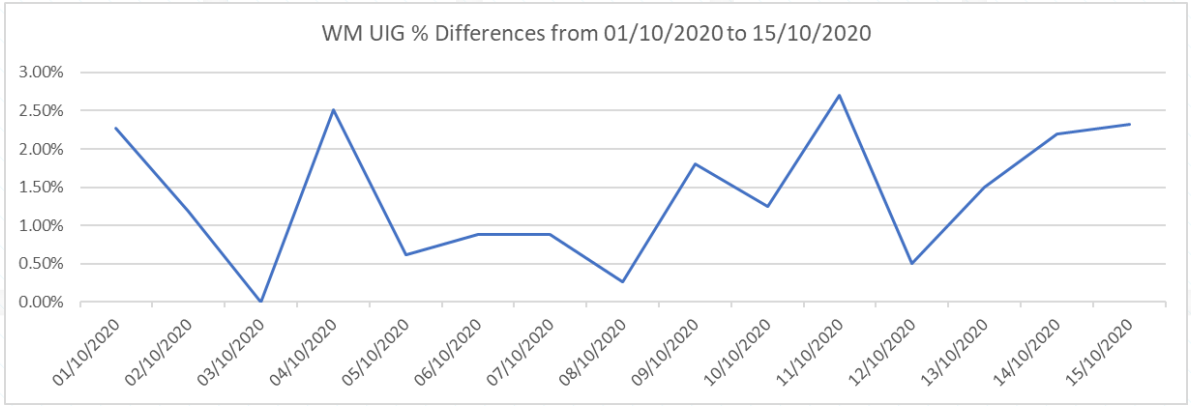




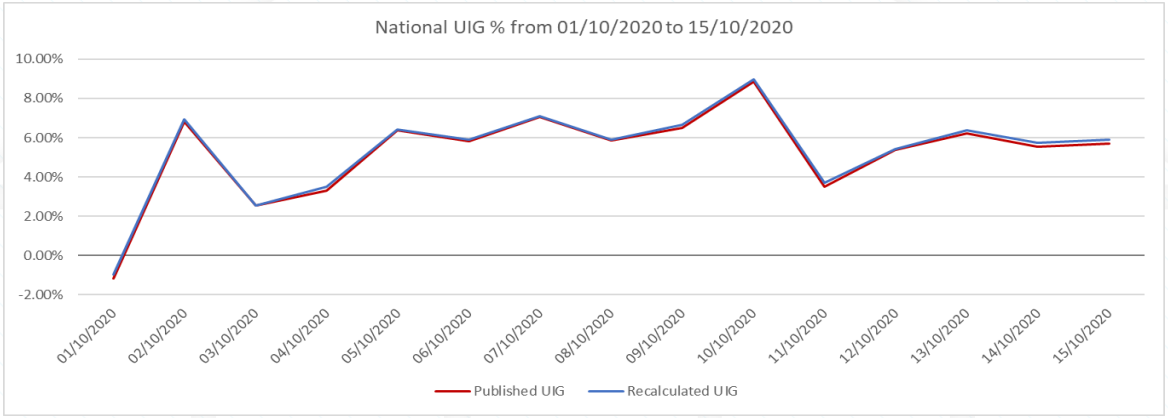
- Due to CWV values being lower than they should have, Less NDM demand in WM would have been estimated for almost all gas days using the revised CWVs (opposite effect will be seen in UIG)

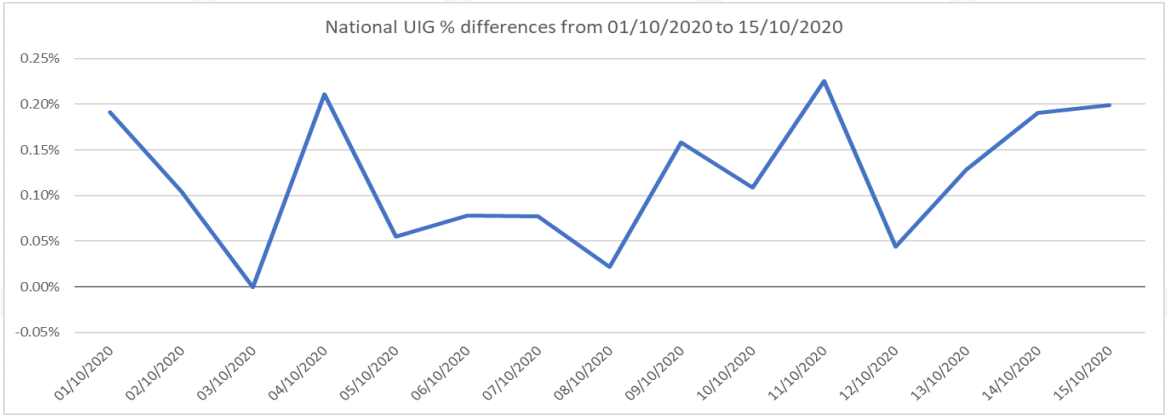
Unidentified Gas (UIG) for WM: Original vs Recalculation





UIG for National: Original vs Recalculation





AQ Impacts

Cumulative WAALP values for period 01/05/2020 to 15/10/2020

EUC	Sum of SAP WAALP	Sum of Corr WAALP	Difference
WM:E2001BND	66.335843	65.310057	-1.55%
WM:E2001BNI	69.846464	69.04795	-1.14%
WM:E2001BPD	79.963001	79.144387	-1.02%
WM:E2001BPI	69.846464	69.04795	-1.14%
WM:E2002BND	92.969611	92.372766	-0.64%
WM:E2002BNI	91.495306	90.810605	-0.75%
WM:E2002BPD	79.963001	79.144387	-1.02%
WM:E2002BPI	91.495306	90.810605	-0.75%
WM:E2003B	99.043847	98.362738	-0.69%
WM:E2003W01	147.750983	147.526215	-0.15%
WM:E2003W02	111.963886	111.474398	-0.44%
WM:E2003W03	81.336571	80.595987	-0.91%
WM:E2003W04	45.611776	44.609899	-2.20%
WM:E2004B	96.87244	96.204382	-0.69%
WM:E2004W01	147.750983	147.526215	-0.15%
WM:E2004W02	111.963886	111.474398	-0.44%
WM:E2004W03	81.336571	80.595987	-0.91%
WM:E2004W04	45.611776	44.609899	-2.20%
WM:E2005B	112.588265	112.071854	-0.46%
WM:E2005W01	160.132887	160.029069	-0.06%
WM:E2005W02	129.929132	129.514864	-0.32%
WM:E2005W03	97.317403	96.700922	-0.63%
WM:E2005W04	55.34406	54.416104	-1.68%

EUC	Sum of SAP WAALP	Sum of Corr WAALP	Difference
WM:E2006B	130.483201	130.067961	-0.32%
WM:E2006W01	171.308395	171.308395	0.00%
WM:E2006W02	154.030298	153.865258	-0.11%
WM:E2006W03	121.492613	120.986054	-0.42%
WM:E2006W04	66.409142	65.583593	-1.24%
WM:E2007B	139.620599	139.301751	-0.23%
WM:E2007W01	170.769242	170.769242	0.00%
WM:E2007W02	161.715056	161.632543	-0.05%
WM:E2007W03	145.621956	145.369454	-0.17%
WM:E2007W04	96.515764	95.853424	-0.69%
WM:E2008B	139.620599	139.301751	-0.23%
WM:E2008W01	170.76924	170.76924	0.00%
WM:E2008W02	161.715056	161.632543	-0.05%
WM:E2008W03	145.621956	145.369454	-0.17%
WM:E2008W04	96.515764	95.853424	-0.69%
WM:E2009B	150.381546	150.18671	-0.13%

When WAALPs > 365 – Colder than SN
When WAALPs < 365 – Warmer than SN

- This is not a full year, however negative difference in WAALPs means for 01B for example, the AQ would be 1.55% understated if read period was exactly 01/05/2020 to 15/10/2020 (worst case).
- In reality, understatement will be ‘watered down’ for most

Issue 2 – Clock Change

- Following a query from a customer we have identified that the weather data provided to Xoserve by our Weather Services Provider (WSP), since the clock change from British Summer time (BST) to Greenwich Mean Time (GMT) on Sunday 25th October, had incorrectly still been adjusted for British Summer Time

- The impacted period covers gas days 24th October 2020 to 4th November 2020
  - 24th October is marginally impacted due to the clock change happening in the final hours of the gas day
  - 25th October to 2nd November are the most impacted gas days as they were originally calculated with incorrect Weather
  - 3rd and 4th November are impacted by the lasting effect of the Effective Temperature being incorrect, despite using correct weather for the gas day

Original CWV Values

Gas Day	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
24/10/2020	7.69	7.31	8.13	8.46	8.73	8.8	8.91	10.27	12.3	12.17	11.76	12.34	10.33
25/10/2020	7.45	7.69	7.99	8.3	8.52	8.19	8.72	9.95	10.87	10.63	10.68	11.11	10.23
26/10/2020	7.85	7.24	7.76	7.63	7.85	7.99	8.55	10.08	10.1	9.86	9.92	10.85	9.65
27/10/2020	6.95	6.49	7.29	7.18	7.34	7.5	8.1	9.76	9.75	9.49	9.43	10.69	9.67
28/10/2020	6.96	6.65	7.4	6.98	7.23	7.42	8.13	9.28	9.66	9.4	9.31	10.64	9.38
29/10/2020	7.38	7.13	8.15	7.95	8.21	8.63	8.95	10.2	10.88	10.7	10.2	11.45	10.31
30/10/2020	7.48	7.63	8.93	9.74	9.98	10.54	9.62	10.89	12.37	12.2	11.96	12.2	11.73
31/10/2020	7.51	7.86	9.19	9.27	9.68	9.99	9.98	10.89	12.1	11.95	11.52	12.25	10.72
01/11/2020	7.67	8.02	9.45	10.12	10.64	10.7	10.27	11.48	12.82	12.65	12.33	12.77	11.57
02/11/2020	7.25	7.28	8.75	9.27	9.73	9.9	9.44	10.33	12.49	12.37	11.79	12.37	10.6
03/11/2020	6.14	5.81	6.73	7.1	7.37	7.57	7.41	8.82	9.51	9.2	9.53	9.79	8.48
04/11/2020	6.75	6.21	6.32	6.76	6.93	6.92	6.92	8.39	8.32	7.99	8.35	8.74	7.18

Recalculated CWV Values

Gas Day	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
24/10/2020	7.69	7.32	8.1	8.48	8.74	8.79	8.89	10.26	12.29	12.16	11.76	12.36	10.32
25/10/2020	7.58	7.54	7.79	8.08	8.33	8.11	8.55	9.89	10.71	10.46	10.51	11.25	10.2
26/10/2020	7.88	7.21	7.69	7.67	7.88	8.02	8.46	9.95	9.96	9.71	9.75	10.89	9.65
27/10/2020	6.96	6.55	7.13	7.17	7.35	7.53	7.95	9.81	9.79	9.53	9.47	10.8	9.82
28/10/2020	6.98	6.56	7.34	7.16	7.39	7.47	8.06	9.41	9.71	9.45	9.3	10.6	9.63
29/10/2020	7.76	7.28	8.29	8.11	8.43	8.89	9.07	10.29	11.06	10.92	10.39	11.46	10.59
30/10/2020	7.3	7.5	8.93	9.82	10.04	10.56	9.62	11.03	12.45	12.28	12.05	12.25	11.55
31/10/2020	7.65	7.82	8.92	9.22	9.58	9.61	9.74	10.72	12.05	11.86	11.54	12.14	10.89
01/11/2020	7.64	8.23	9.29	10.22	10.74	10.8	10.1	11.67	13.07	12.91	12.61	12.95	11.52
02/11/2020	7.31	7.32	8.21	9.06	9.56	9.88	8.96	10.33	12.44	12.28	11.83	12.4	10.63
03/11/2020	6.17	5.81	6.62	7.08	7.35	7.55	7.3	8.73	9.49	9.17	9.51	9.79	8.47
04/11/2020	6.76	6.22	6.27	6.75	6.92	6.91	6.87	8.34	8.31	7.98	8.34	8.74	7.18

CWV Differences

Gas Day	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
24/10/2020	0.00	0.01	-0.03	0.02	0.01	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.02	-0.01
25/10/2020	0.13	-0.15	-0.20	-0.22	-0.19	-0.08	-0.17	-0.06	-0.16	-0.17	-0.17	0.14	-0.03
26/10/2020	0.03	-0.03	-0.07	0.04	0.03	0.03	-0.09	-0.13	-0.14	-0.15	-0.17	0.04	0.00
27/10/2020	0.01	0.06	-0.16	-0.01	0.01	0.03	-0.15	0.05	0.04	0.04	0.04	0.11	0.15
28/10/2020	0.02	-0.09	-0.06	0.18	0.16	0.05	-0.07	0.13	0.05	0.05	-0.01	-0.04	0.25
29/10/2020	0.38	0.15	0.14	0.16	0.22	0.26	0.12	0.09	0.18	0.22	0.19	0.01	0.28
30/10/2020	-0.18	-0.13	0.00	0.08	0.06	0.02	0.00	0.14	0.08	0.08	0.09	0.05	-0.18
31/10/2020	0.14	-0.04	-0.27	-0.05	-0.10	-0.38	-0.24	-0.17	-0.05	-0.09	0.02	-0.11	0.17
01/11/2020	-0.03	0.21	-0.16	0.10	0.10	0.10	-0.17	0.19	0.25	0.26	0.28	0.18	-0.05
02/11/2020	0.06	0.04	-0.54	-0.21	-0.17	-0.02	-0.48	0.00	-0.05	-0.09	0.04	0.03	0.03
03/11/2020	0.03	0.00	-0.11	-0.02	-0.02	-0.02	-0.11	-0.09	-0.02	-0.03	-0.02	0.00	-0.01
04/11/2020	0.01	0.01	-0.05	-0.01	-0.01	-0.01	-0.05	-0.05	-0.01	-0.01	-0.01	0.00	0.00

CWV Should have been Cooler

CWV Should have been Warmer

- E.g. CWV value for SC on gas day 25/10/2020 should have been 0.13 warmer than originally published
- Where CWV's should have been cooler, weather sensitive EUC's will have been under allocated, with the opposite effect when CWV's should have been warmer

What are the impacts ?

- CWVs calculated in UK Link for ALL LDZs have used incorrect ‘BST data’ for gas days 24th October 2020 to 4th November 2020.

- CWVs are used by Gemini and UK Link:
  - **Gemini** uses CWV in calculation of NDM Nominations and Allocations (WCF)
  - UIG is balancing figure in demand attribution so will be impacted too (equal and opposite)

  - **UK Link** uses CWV in the calculation of AQs and Read Estimation (WAALPs)
  - WAALPs will be updated using the revised CWV values in time for the November AQ calculation meaning no AQs have been calculated using reads covering the impacted period

Action Taken – Issue 1 and 2

- Updated historic WAALPs using revised CWV values to ensure AQs calculated in November (and ongoing) are correct
- No action required for Allocations and UIG in Gemini, this will be addressed through meter point reconciliation
- CWV publication – leave National Grid Data Item Explorer ‘as-is’ - this reflects the values used in Nominations and Allocations
- Publish revised CWV values on secure area – Folder 18.NDM Profiling and Capacity Estimation Algorithms / 2020-21 Gas Year / 5.Seasonal Normal 2020
- Use revised CWVs in NDM Algorithm Performance Strand 3 analysis (“Retro”) and future EUC demand modelling