Demand Estimation Sub Committee

5.0 Seasonal Normal Review 2025

6 March 2024

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- CWV Formula review
  - Data to be used in CWV formula optimisation
- SNCWV review
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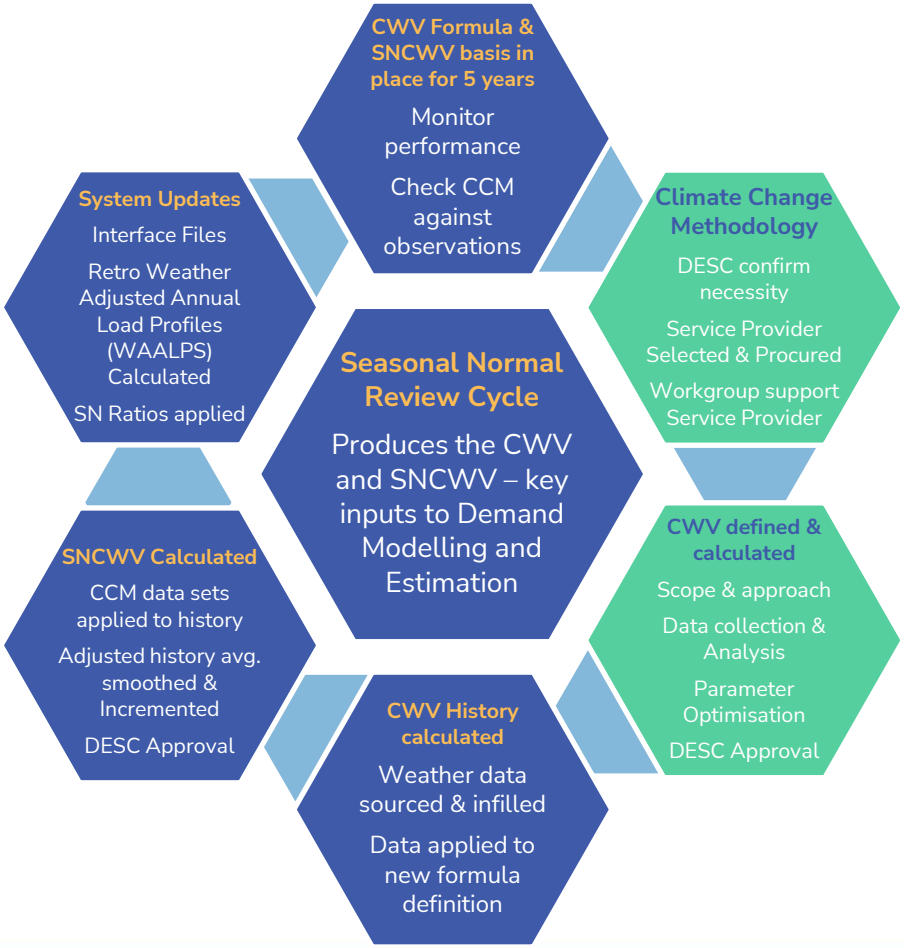
Background

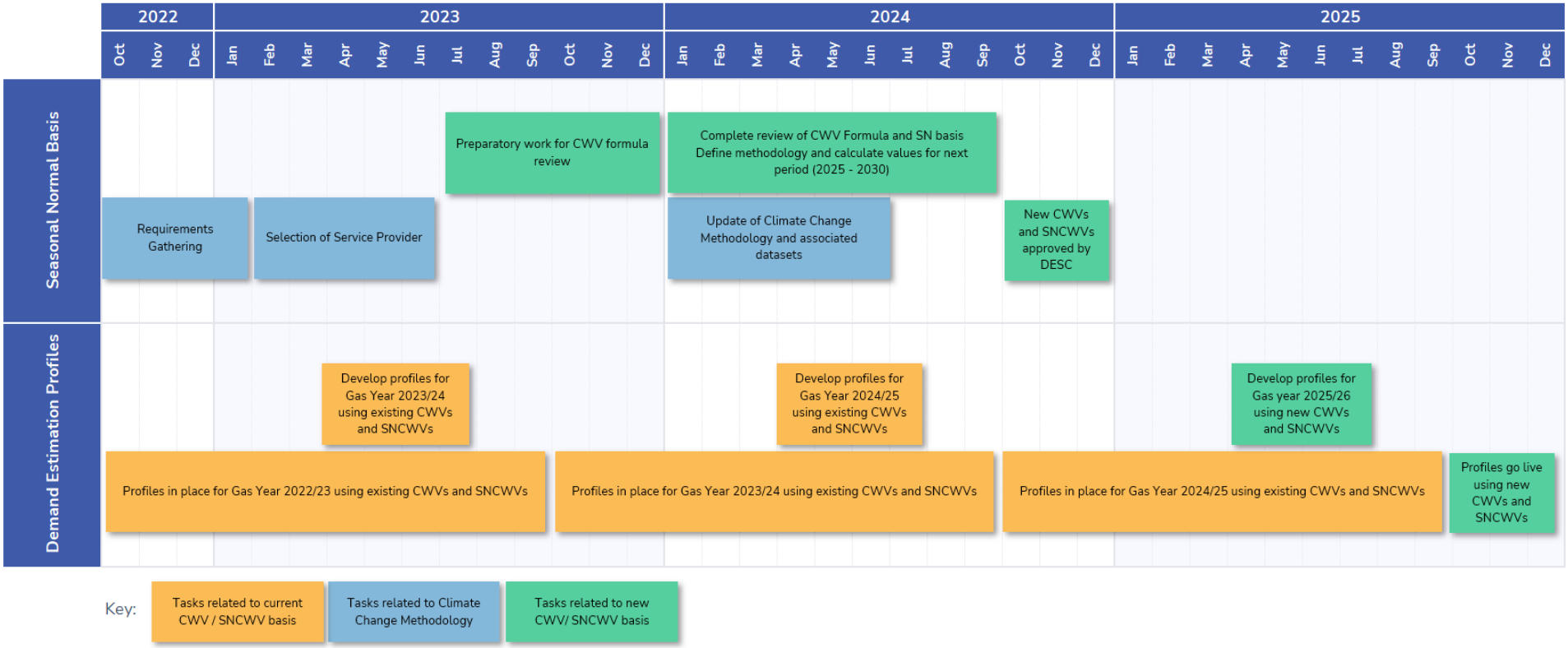
- DESC are responsible for a number of obligations in Section H of UNC, amongst them are the requirements to:
  - Review the Composite Weather Variable (CWV) (H 1.4.3) and
  - Review the Seasonal Normal equivalent referred to as the SNCWV (H 1.5.3)
- Reviews of the CWV formula and Seasonal Normal basis are normally only carried out by DESC every 5 years due to the time taken to perform the review and the need for stability
- The latest DESC review in 2019 derived a new CWV formula and new basis for the Seasonal Normal, which both came into effect from the 01 October 2020
- This means the next Seasonal Normal basis is scheduled to take effect from 01 October 2025 with the detailed analysis performed during 2024

Seasonal Normal Review

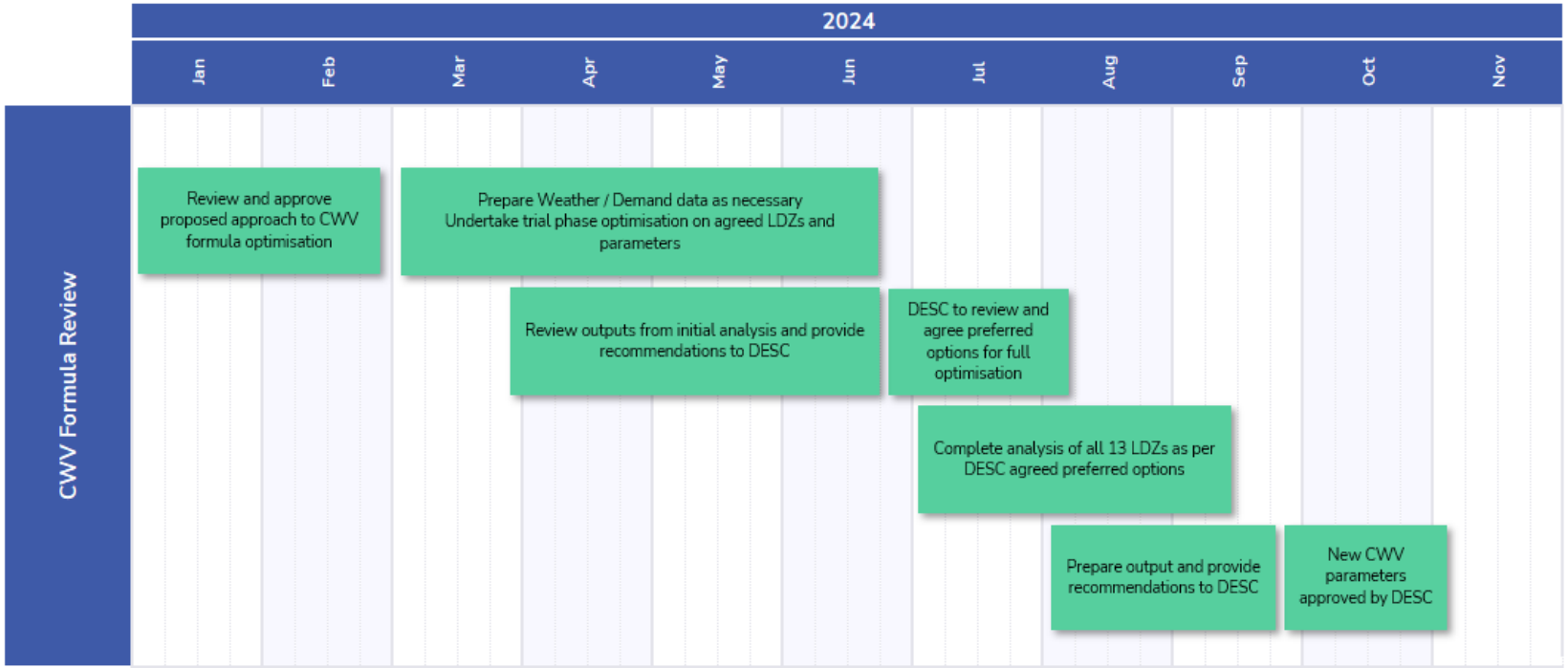


- An overview of the Demand Estimation process and output can be found here
- Composite Weather Variable (CWV) and Seasonal Normal CWV (SNCWV) are key inputs to the Demand estimation process
- Seasonal Normal Review (SNR) cycle, undertaken at minimum once every 5 years, represented in diagram opposite
- This presentation relates to updates on the **Climate Change Methodology (CCM)** and **CWV definition** phase of the SNR cycle

High level Timeline



CWV Optimisation Timeline



- The above outlines the tasks to be undertaking during the trial and productions phases of CWV formula optimisation, with final approval to be sought from DESC at 8 October 2024 meeting

Objectives

- Provide an update on progress with CWV Formula Review / Optimisation
  - Present and discuss findings of CWV vs Demand history for Gas Years 2015/16 to 2022/23

- Provide an update on next steps of Seasonal Normal review including the refresh of the Climate Change Methodology (CCM)

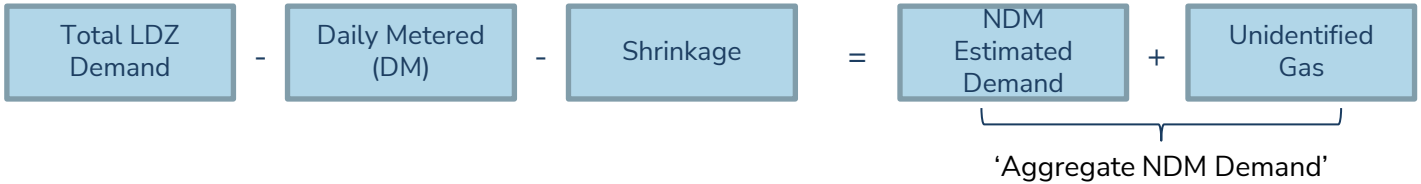
CWV Formula Review - Updates

- The draft 'Approach to review of CWV formula' document was discussed at January's DESC meeting – no further comments were received following the meeting. (DESC Action 0101)

- Now the approach to the CWV formula review has been agreed, the next step is to confirm the data history to use in optimising the parameters for the new CWV definitions

- In order to assess the performance of the CWV in each Gas year, the R^2 value has been calculated. R^2 is a statistical measure which determines the proportion of variance in the dependent variable (Aggregate NDM Demand) which can be explained by the independent variable (CWV)

- As a reminder, Aggregate NDM Demand is calculated as below:



CWV Formula Review - Updates

- The agreed approach is that all ‘Monday to Thursday non-Holiday’ Gas Days from Gas Years 2015/16 to 2022/23 inclusive are used in the derivation of the new CWV parameters, the following slides will discuss the individual years and any caveats to the above.

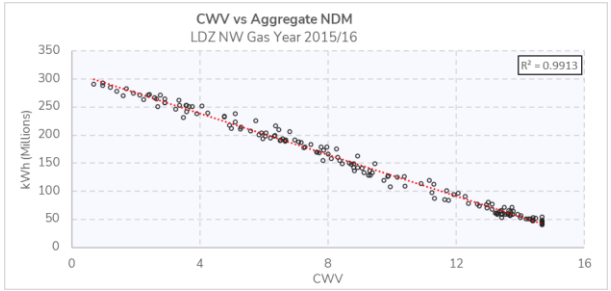
- The relationship of CWV vs Aggregate NDM Demand for Gas Years 2015/16 to 2022/23 has been reviewed in order to confirm if we are happy to use the data and/or remove any data which is not reliable

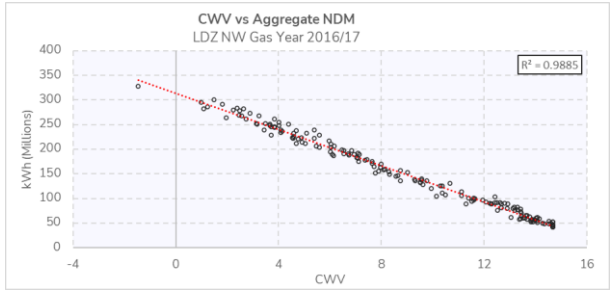
- The data used in the optimisation is a key input used to define the CWV parameters, therefore it is important that there is sufficient history to reduce any bias from individual years, while being recent enough to reflect current consumer reactions to variation in weather.

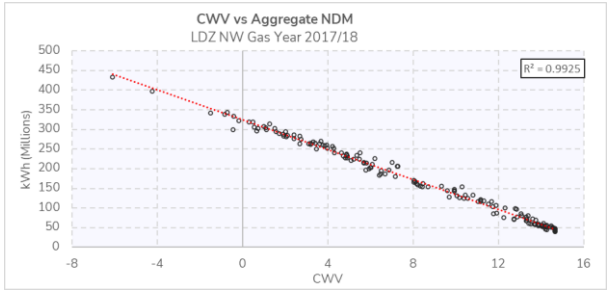
- Note: It may be necessary to look at further data (i.e. earlier years) when deriving parameters such as ‘Cold weather upturn’ to ensure sufficient extreme cold weather is included.

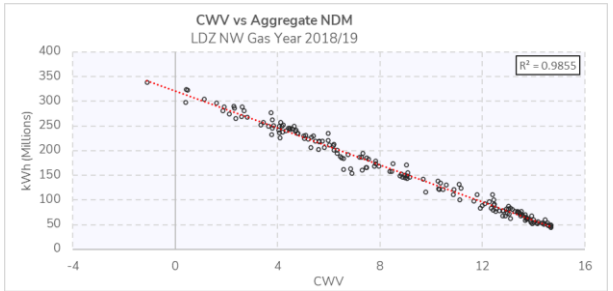
- The following slide shows this data for LDZ ‘NW’ as an example

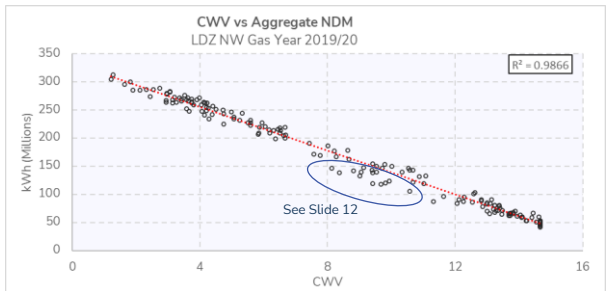
LDZ NW CWV vs Aggregate NDM Demand Gas Years 2015/16 to 2022/23

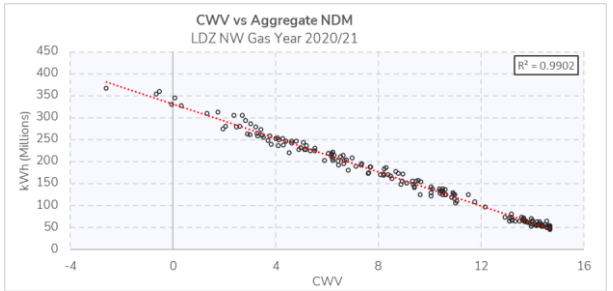


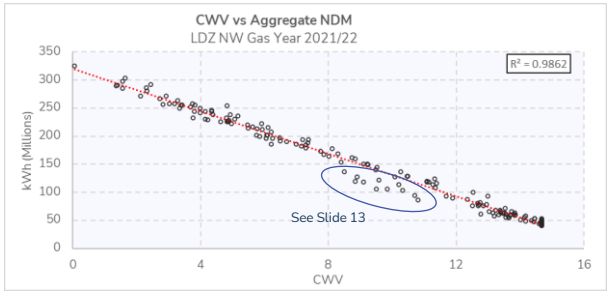


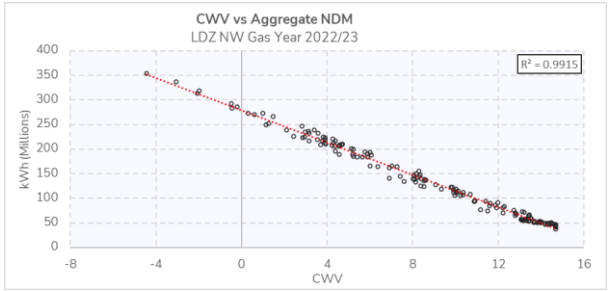








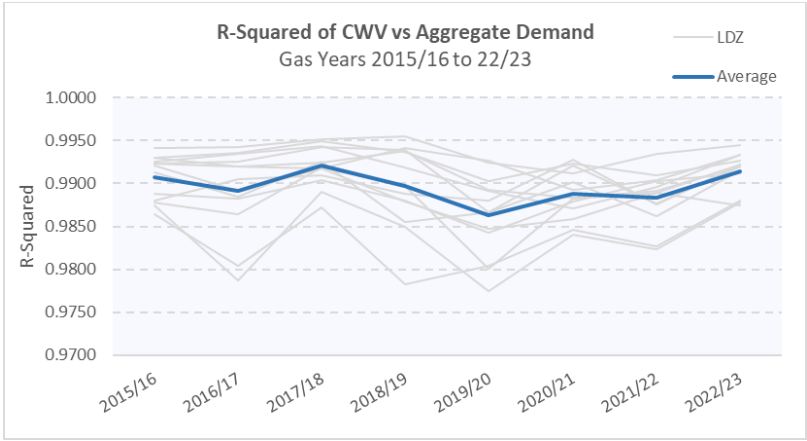




Note: All charts represent Monday to Thursday non-holiday Gas Days

All LDZs CWV vs Aggregate NDM Demand Gas Years 2015/16 to 2022/23

LDZ	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
EA	0.9923	0.9920	0.9924	0.9938	0.9893	0.9883	0.9892	0.9921
EM	0.9923	0.9925	0.9943	0.9939	0.9866	0.9921	0.9877	0.9920
NE	0.9878	0.9864	0.9919	0.9897	0.9801	0.9882	0.9889	0.9874
NO	0.9888	0.9882	0.9904	0.9880	0.9843	0.9879	0.9903	0.9912
NT	0.9941	0.9942	0.9952	0.9955	0.9924	0.9912	0.9935	0.9945
NW	0.9913	0.9885	0.9925	0.9855	0.9866	0.9902	0.9862	0.9915
SC	0.9880	0.9905	0.9910	0.9888	0.9880	0.9928	0.9876	0.9922
SE	0.9930	0.9920	0.9918	0.9941	0.9927	0.9893	0.9904	0.9933
SO	0.9925	0.9935	0.9944	0.9919	0.9891	0.9871	0.9896	0.9934
SW	0.9921	0.9891	0.9917	0.9879	0.9847	0.9858	0.9889	0.9922
WM	0.9930	0.9936	0.9949	0.9937	0.9903	0.9923	0.9910	0.9927
WN	0.9864	0.9804	0.9872	0.9782	0.9804	0.9846	0.9827	0.9880
WS	0.9874	0.9787	0.9890	0.9850	0.9775	0.9840	0.9823	0.9878
Average	0.9907	0.9892	0.9921	0.9897	0.9863	0.9888	0.9883	0.9914



Note: colour scale is independent for each LDZ, green cell representing LDZs highest performing Gas Year

- The coefficient of determination (R^2) between CWV and Aggregate NDM Demand remains high for all LDZs across the period 2015/16 to 2022/23. CWV continues to maintain an excellent relationship to aggregate NDM demand since optimisation was completed 5 years ago
- A slight decrease in performance can be observed for some LDZs across Gas Year 2019/20, and to a lesser extent Gas Years 2020/21 and 2021/22.

Outliers - Gas Year 2019/20

Fig. 1:

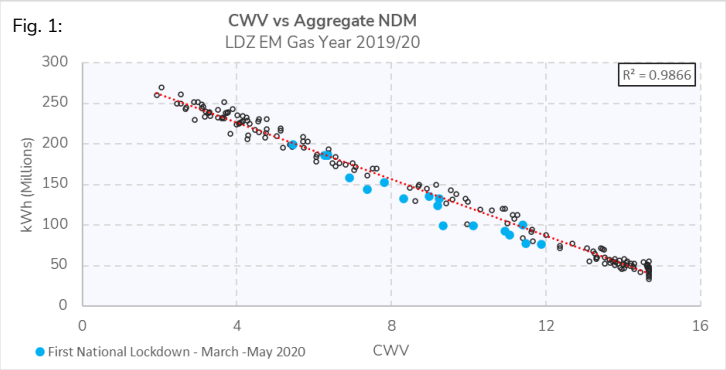
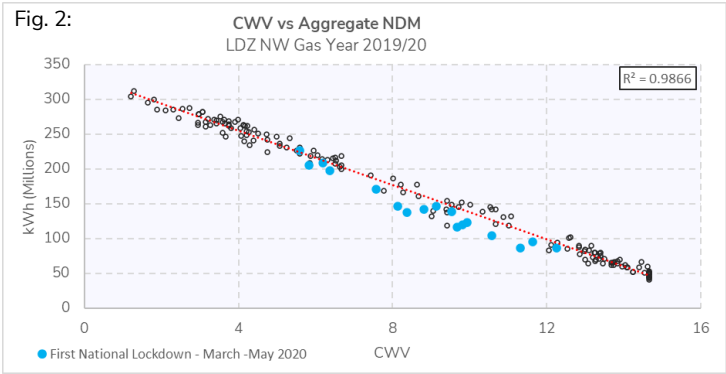


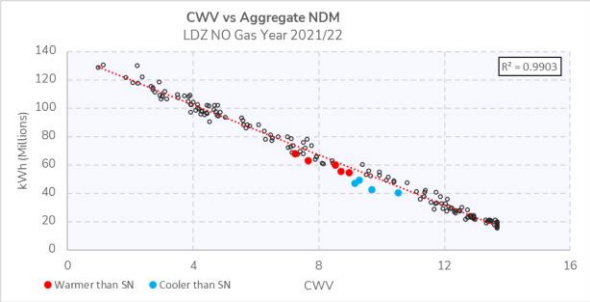
Fig. 2:

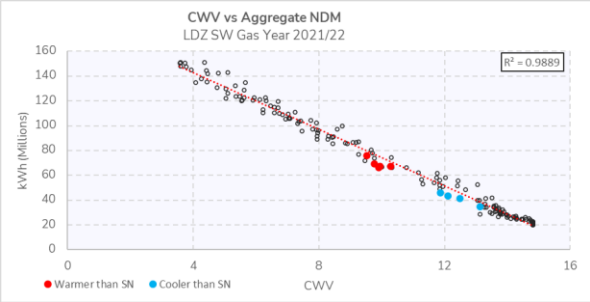


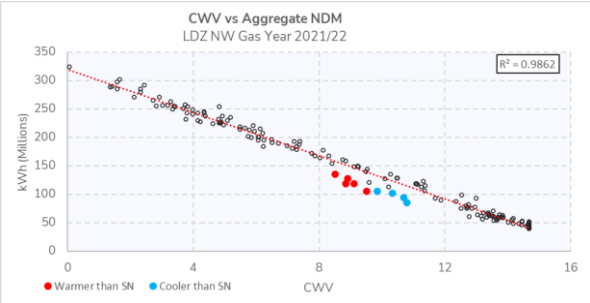
- The marginal decrease in performance for Gas Year 2019/20 is thought to be attributed to the initial reaction of Covid-19 National Lockdowns
- Fig.1 and Fig.2 (left) highlight the first Lockdown period of 24/03/2020 to 10/05/2020 (total 17 Mon-Thurs Non-holiday Gas Days) in blue, these points show some deviation from the trendline
- This pattern is not as prominent in all LDZs, such as LDZ SE which has maintained a high R^2 for Gas Year 2019/20, however R^2 value is improved in all LDZs once Gas Days within this period have been removed

- Due to the exceptional nature of these events, it is recommended that these dates are not considered for parameter optimisation (total 17 Gas Days)

Outliers - Gas Year 2021/22







- Large Negative UIG was observed across most LDZs during Gas Year 2021/22 due to the reduction in consumption and subsequent overallocation of NDM energy, driven by the large increase in Gas Prices
- While the relationship between CWV and Demand remained strong, in some cases where weather was much cooler or warmer than seasonal normal, some clusters of outliers were observed
- While extreme weather is important to consider when optimising the parameters, it is thought that the reaction to these extremes was exacerbated by increased gas prices. It is therefore recommended that the following Gas Days are not considered:

LDZ	Gas Days	Reason
All	22/03/2022 – 29/03/2022	Reaction to warm weather during price change
All	26/09/2022 – 29/09/2022	Reaction to cold weather during price change

Optimisation Data - Conclusions

- It is recommended that optimisation of the CWV parameters is performed using all Monday-Thursday non-holiday Gas Days from Gas Years 2015/16 to 2022/23 with the following exceptions:

- The following data will not be used due to Metering/Allocation issues in closed out data: (Further Details)

	LDZ	Gas Days(s)	Reason
–	EM	21/04/2022 -04/07/2022 incl.	LDZ Input Meter Error*
–	SC	19/10/2022	DM Energy Miscalculation

*Data may be available for inclusion once correction factor is applied to incorrect LDZ inputs

- The following dates will not be considered due to external factors: (pending previous slides)

	LDZ	Gas Days(s)	Reason
–	All	24/03/2020 to 10/05/2020	First covid-19 National lockdown
–	All	22/03/2022 to 29/03/2022 26/09/2022 to 29/09/2022	Reactions to extreme weather during ‘gas price crisis’

- It may be necessary to introduce additional Gas Years to ensure sufficient cold weather data is available to derive appropriate parameters relating to the ‘Cold weather Upturn’

- The ‘Trial’ phase of optimisation, performed on 3 LDZs to test and confirm the approach, is proposed to be performed on LDZ’s SE, NW, and SC to cover a wide geographical area

- Do DESC have any comments on the proposed use of Gas Years/ Trial LDZs for optimisation?

Update on Climate Change Methodology (CCM)

DESC Technical Workgroup (TWG) had an initial meeting with Met Office on 5 February 2024 where the high level approach and progress to date was discussed. Key updates below

- Met Office suggested that there may be a potential need to adjust historic Solar Radiation for Climate change due to an upward trend over time(Fig.1), previously only Temperature has been adjusted (Fig.2)

Fig.1

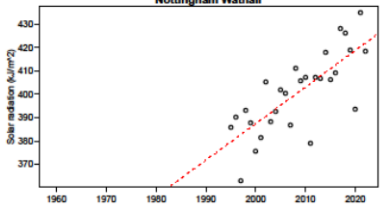
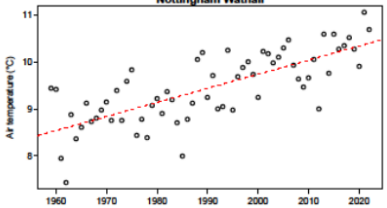


Fig.2

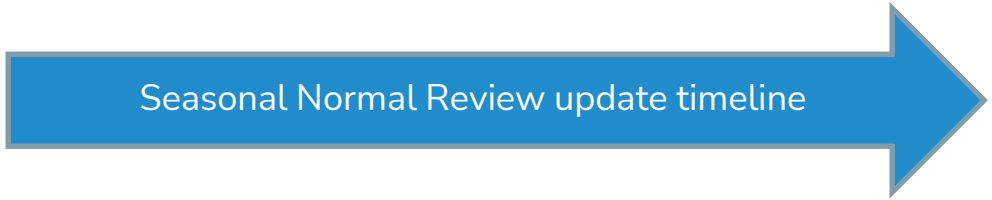


Note: above is based on preliminary data and adjustments are yet to be finalised

- Met Office have validated Gas Industry Weather history against their historic records and are now proceeding with refresh of the CCM

- Met Office are on track to deliver by end of Q2 2024 – further progress meetings to be scheduled in Q1/Q2

Next Steps



Perform preliminary analysis of CWV transition phases and present to DESC

March - April 2024

Begin Trial optimization phase for chosen LDZs

Q1/Q2 2024

DESC TWG to work with Met Office to produce refreshed CCM

Q1/Q2 2024