



delivered by  correla

Demand Estimation Sub Committee

3.0 Seasonal Normal Review 2025

5 July 2023

Contents

- Overview, Timetable, Background, and Objectives
- Climate Change Methodology
- Composite Weather Variable (CWV) Formula review

2.0 Review DESC Representations

OVERVIEW, TIMETABLE, BACKGROUND, AND OBJECTIVES

Overview



- An overview of the Demand Estimation process and output can be found [here](#)
- Annual modelling cycle of activities are represented in diagram opposite
- This presentation relates to the “Seasonal Normal Review” which sits outside of the annual cycle of work – reviewed every 5 years
- The Output from the Seasonal Normal Review process is a key input to the annual Demand Modeling cycle

CDSP / DESC Obligations and Timetable: October 2022 to September 2023

Milestone	UNC H Ref	2022			2023								
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DESC Membership confirmed	1.12	✓											
NDM Sampling: Data Collection and Validation	1.6	✓						✓					
NDM Algorithm Performance for Gas Year 2021/22	1.8			✓								✓	
DESC Adhoc Workplan	1.7	✓		✓			✓						
DESC Modelling Approach – EUCs and Demand Models	1.7			✓			✓						
Single Year EUC Demand Modelling	1.7								✓				
Model Smoothing and Draft Gas Demand Profiles	1.7									✓			
Industry Consultation	1.8									✓	✓		
Gas Demand Profiles finalised and Core systems updated	1.9											✓	
Climate Change Methodology progressed (SN Review 2025)	1.4			✓			✓		✓		✓		

Note: Timetable above represents DESC Gas Year. Seasonal Normal Review 2025 Milestones will continue for next two DESC Annual cycles as per Timetable on slide 13

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. This would mean the next Seasonal Normal basis is scheduled to take effect from 1st October 2025
- DESC have the option of using a 'Climate Change Methodology' (CCM) to adjust historical weather data when deriving the Seasonal Normal basis – (H 1.4.6)
- In 2012, following a tender process, DESC procured a Climate Change Methodology (CCM) document and associated datasets from the Met Office.
- The latest DESC review derived a new CWV formula and new basis for the Seasonal Normal, which both came into effect from the 1st October 2020
- Adjustments were performed on historic Temperature data to remove the effects of climate change, while still preserving year on year variability for the Seasonal Normal calculation

Objectives

- Provide an update on Action ref 0102
 - Xoserve (MP) to confirm “Seasonal Normal Review 2025 - Climate Change Methodology” (added for clarity) Governance route, timelines, and dependencies for the procurement of a Service Provider.

- Agree next steps in procurement of a Climate Change Methodology (CCM)

Vote
Required

- Provide an update on Composite Weather Variable (CWV) formula review

3.0 Seasonal Normal Review 2025

CLIMATE CHANGE METHODOLOGY

DESC Action 0102: Update

- Action Ref 0102: *“Xoserve (MP) to confirm ‘Seasonal Normal Review 2025 - Climate Change Methodology’ (added for clarity) Governance route, timelines, and dependencies for the procurement of a Service Provider.”*
- The current Climate Change Methodology (CCM) and datasets (previously procured in 2012/13) provided 10 years ‘cover’ and requires ‘topping up’ to support future Seasonal Normal Reviews
- DESC confirmed on [5th October 2022](#) it wished to use the output from a CCM for the next Seasonal Normal Review. Note: The CDSP would be the contracting party in any external procurement of a new / updated CCM
- Over the past few months, the CDSP has engaged with the Met Office (as the previous CCM provider) to seek its views on DESC’s Technical Requirements (agreed earlier this year) in order to support the CDSP make an informed decision on how best to proceed
- The Met Office were asked to provide a response on the best option to take forward:
 - Option 1: Update **existing** methodology and data **or**
 - Option 2: Creation of **new** methodology and data

DESC Action 0102: Met Office Response Summary

- The Met Office have provided assurance that the current methodology is still relevant, and based on how the information will be utilised their proposal favours the “update” approach as they do not believe any perceivable benefit would be gained from the creation of new methodology
- The approach would make use of the latest UK Climate projections “[UKCP18](#)” combined with more appropriate statistical techniques
- The work would be completed in a number of stages over c. a 6-month period:
 - Data extraction (e.g., observations and UKCP18 probabilistic projections)
 - Historical adjustment (e.g., interpolate monthly projections, remove historical trends from observations and extract hourly anomalies)
 - Future hourly climatology (e.g., compute climatology and uplifts)
 - Uncertainty quantification (e.g., using resampling techniques)
 - Report write up
- The data outputs will be as prescribed in the [DESC Technical Requirements v1.0](#) document and be accompanied by a written report detailing the methodology, which will undergo quality assurance
- The proposal would focus on current weather stations, with a future option to produce additional datasets for new stations in the event of a weather station closure

DESC Action 0102: CDSP view on Met Office Response

- Option 1: Update **existing** methodology and data

Procurement approach: via direct award to Met Office as incumbent

- Met Office are Subject Matter Experts and own latest UK Climate Projections data (“UKCP18”)
- Builds on consistency of previous approach / data which has proven to be robust during the Seasonal Normal 2015 and 2020 calculations
- Met Office have indicated it could schedule this work in during first half of 2024 meaning DESC would be able to meet it’s Seasonal Normal Review 2025 milestones timetable
- Costs are estimated to be c.75% less than Option 2 (not including Tender process costs)

- Option 2: Creation of **new** methodology and data

Procurement approach: via competitive tender process

- Met Office view is that extra costs, time and effort associated with seeking a more ‘scientifically elegant’ answer would not be justified (for the purpose DESC wish to use the data for)
- Timings associated with procurement process (Request For Quotation, Tender, Selection) and developing new methodology is likely to delay the Seasonal Normal Review 2025 calculations
- Costs expected to be significantly higher given procurement costs and need to procure UKCP18 data

DESC Action 0102: Recommendation

Option 1: Update existing methodology and data

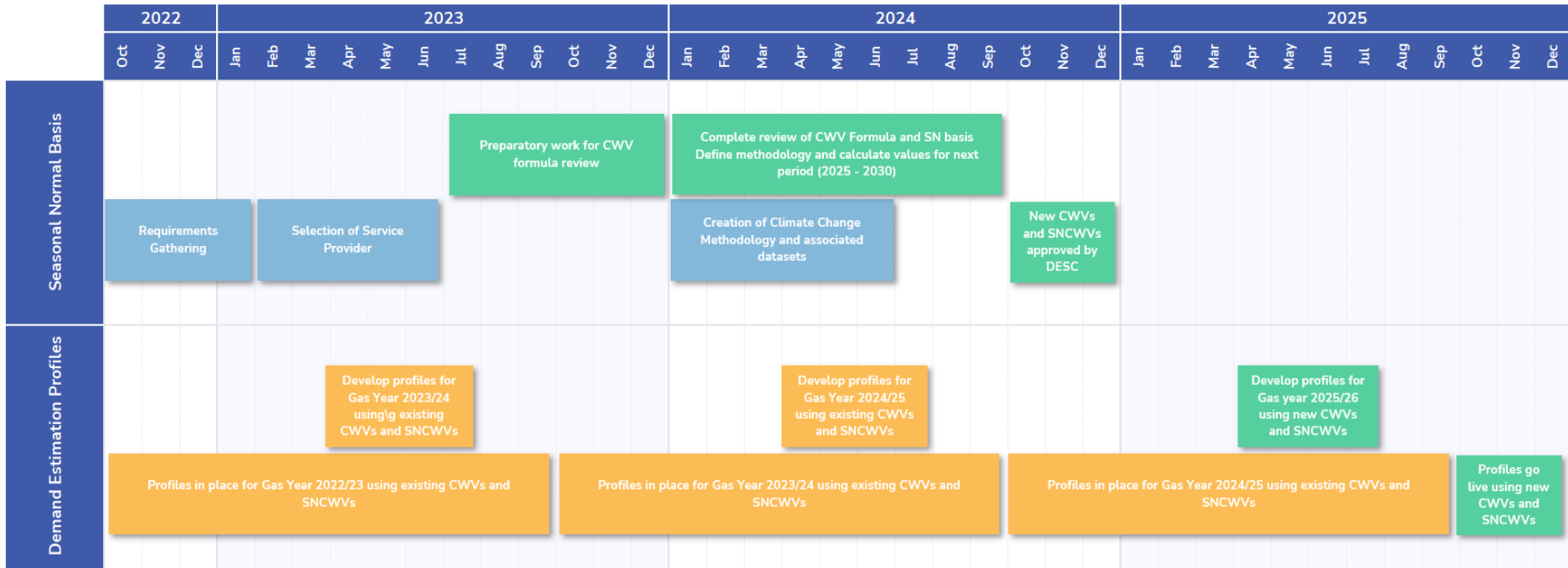
- + Most cost effective option
- + Available to be produced by June 2024, ensuring no delays to approval of new CWV and SNCWV basis
- + Access to key UKCP18 data
- + Minimal additional time commitment from DESC to complete procurement process
- May not yield the 'perfect' scientific answer taking into account error and uncertainty

CDSP Recommendation

Option 2: Creation of new methodology and data

- + Fresh approach from wider range of potential service providers
- Stakeholder Engagement Panel support required to support tender process
- Potential service providers wholly reliant on Met Office base data, which could impact their ability to meet delivery requirements
- Costs are likely to be 4 x higher
- Additional cost & time implications outweigh benefits.

DESC Action 0102: High Level Timeline



Key:

Tasks related to current CWV / SNCWV basis

Tasks related to Climate Change Methodology

Tasks related to new CWV/ SNCWV basis

3.0 Seasonal Normal Review 2025

CWV FORMULA REVIEW

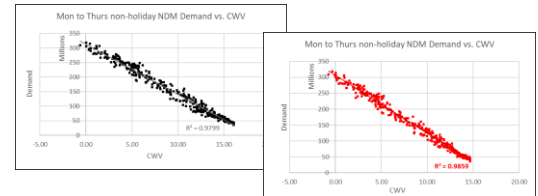
Composite Weather Variable (CWV) Formula

- Alongside the Seasonal Normal Review, DESC have the option to review the CWV formula, this was last performed in 2019 and below is a reminder of the CWV Formula implemented 1st October 2020

$$CWV_t = I_1 * E_t + (1.0 - I_1) * S_t - I_2 * \text{Max}(0, W_t - W_0) * \text{Max}(0, T_0 - AT_t) + S_0 * SR_t + P_0 * P_t$$

$CWV_t = V1 + q * (V2 - V1)$	if $V_2 \leq CWV_t$	(summer cut-off)
$CWV_t = V1 + q * (CWV_t - V1)$	if $V_1 < CWV_t < V2$	(transition)
$CWV_t = CWV_t$	if $V_0 \leq CWV_t \leq V1$	(normal)
$CWV_t = CWV_t + I3 * (CWV_t - V0)$	if $V_0 > CWV_t$	(cold weather upturn)

- The latest change to the CWV formula introduced Solar Radiation as an active component after it was found that inducing Solar created a better relationship between CWV and demand



- There is a basic Precipitation term included in the formula, and UK Link is collecting precipitation data for all LDZs, however the effect is nullified and does not contribute to the final CWV value
- The following slides present options for the scope of the CWV formula review, a decision will be requested by DESC at the next meeting (19th July)

CWV Formula Review: Parameter Optimisation

- Reminder of the parameters currently included in the CWV formula:
- These parameters were last refreshed in 2019 in parallel with Solar radiation being introduced to the formula

LDZ	γ	I_1	I_2	I_3	V_0	V_1	V_2	q	W_0	T_0	S_0
SC	0.505	0.680	0.011	0.000	1.053	12.590	16.402	0.509	-2.992	15.476	0.507
NO	0.492	0.646	0.008	0.126	5.000	12.005	15.779	0.438	-0.894	16.657	0.950
NW	0.498	0.646	0.009	0.315	2.694	12.775	16.466	0.513	-5.000	21.312	0.802
NE	0.459	0.672	0.009	0.083	-1.261	12.924	16.679	0.446	-1.652	21.596	0.568
EM	0.480	0.689	0.010	0.138	-1.344	13.008	16.897	0.424	-2.417	17.377	0.698
WM	0.471	0.692	0.010	0.163	4.385	13.392	17.480	0.368	-3.619	17.569	0.678
WN	0.482	0.618	0.009	0.324	3.773	13.477	16.987	0.445	-3.926	18.249	0.679
WS	0.543	0.657	0.008	0.079	1.797	13.826	17.186	0.384	-1.910	17.068	0.776
EA	0.460	0.723	0.015	0.109	-0.235	15.131	18.885	0.368	-0.477	12.650	0.635
NT	0.473	0.715	0.015	0.066	4.898	15.029	19.184	0.429	-3.811	12.833	0.695
SE	0.484	0.772	0.006	0.266	1.335	13.996	18.523	0.375	-0.721	21.613	0.566
SO	0.438	0.692	0.015	0.405	0.141	14.745	18.715	0.345	-2.076	11.978	0.559
SW	0.448	0.623	0.008	0.258	3.476	13.254	17.898	0.337	0.705	21.707	0.801

Note - P_0 not included as set to zero for all LDZs:

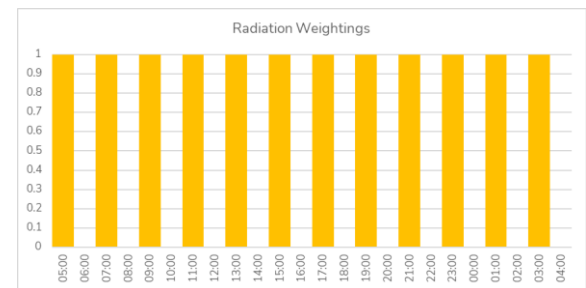
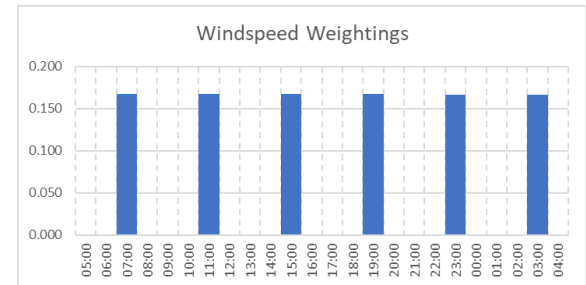
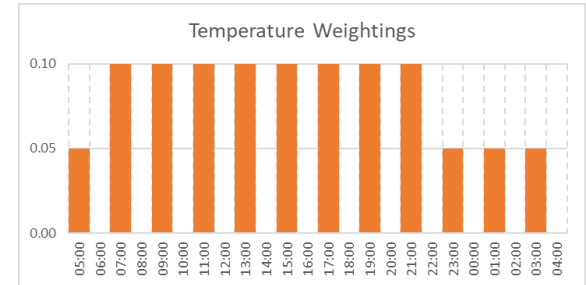
- DESC members from British Gas performed the latest Parameter optimisation using Microsoft Excel 'Solver' functionality. This remains an option however it is likely more powerful options using software such as SAS would deliver more optimal results.
- Re-optimisation of current parameters would require potential development of new methodology and would likely require c. 6 months to complete

CWV Formula Review: New Weather Variables

- Alongside re-optimising the existing parameters, DESC have the option to introduce new weather variables into the CWV formula
- This would most likely need to be 'in addition to' a parameter review, rather than 'instead of' and would require considerably more effort/ time than optimisation alone
- As it already exists in the formula, precipitation would be the obvious route to explore, however no analysis has been performed so far on historic Precipitation data
- We would welcome any insight from DESC members who analyse 'precipitation to demand' relationship and believe the CWV could be enhanced

CWV Formula Review: Weather Data Weightings

- Within the CWV formula, weightings are applied to Temperature, Windspeed, and Solar Radiation weather data to produce a daily average view of each variable
- Weightings are designed to match expected consumption patterns throughout the Gas Day, i.e. Temperature at night is weighted less
- Temperature and Windspeed weightings were not reviewed as part of the previous Seasonal normal cycle, which introduced Solar radiation
- As they relate to demand usage, hourly data may be needed to review Weightings, which is not currently available to the CDSP



CWV Formula Review: Recap

- Recap: DESC have the following options when reviewing the CWV formula
 - Do nothing, i.e. Leave formula as is
 - Parameter Optimisation
 - Additional Variable e.g. Precipitation
 - Review of Weightings
 - Combination of the above
- Parameter Optimisation alone is a considerable piece of work, any insight or analysis DESC members are able to offer would be highly appreciated
- DESC will be formally engaged at its meeting on 19th July to confirm what it would like the scope of the CWV formula to cover.

Next Steps



Seasonal Normal Review update timeline

Engage Met Office
on outcome of DESC
vote

Mid July 2023

DESC asked to
confirm scope of
CWV Formula
review

19th July 2023

Begin preparatory
work for CWV
Formula review

August 2023
onwards