



Demand Estimation Sub Committee

Impacts of current UNC Modifications to Spring Approach 2018

13th February 2018

Industry Change

- Spring Approach 2018 is required to initiate the process which ultimately delivers a set of Derived Factors for use in Gemini and SAP-ISU for Gas Year 2018/19
- Implementation of UNC Modification 0432 on 1st June 2017 resulted in the introduction of 'Rolling AQ' alongside changes to the NDM Supply Meter Point Demand Formula, which introduced Unidentified Gas as the balancing figure in daily processes such as Nominations and Allocations
- Since then a number of industry discussions have taken place to discuss the impacts of these changes, resulting in various UNC Modifications being raised (0642, 0642a, 0643 and 0644)
- The outcomes from these Modifications will almost certainly have an impact on the production of Derived Factors for Gas Year 2018/19 (and potentially Gas Year 2017/18)

Industry Change – UNC Mods 0642, 0642a, 0643

- The impacts to Spring Approach and calculation of key parameters are considered below
- UNC Mods **0642** and **0643** reintroduces the NDM Algorithm ‘pre-Nexus’:
 - The calculation of the Annual Load Profile (ALP) would remain unchanged
 - The calculation of the Daily Adjustment Factor (DAF) would change and require the output from an aggregate NDM demand model
 - Historically the aggregate NDM demand model has been derived from the most recent 3 Gas Years
 - For Spring 2018 analysis this would be 2014/15, 2015/16 and 2016/17
 - For Gas Year 2016/17 the last 4 months (June to Sep) would be ‘back calculated’ from LDZ – DM – Shrinkage (this would be in line with the previous top-down NDM calculation)
 - The calculation of the Peak Load Factor (PLF) would remain unchanged
 - In addition, the Weather Correction Factor (WCF) formula would change and require the production of ‘Pseudo SNDs’ (process outside the scope of Spring Approach)
- UNC Mod **0642a** would require no changes to the current version of Spring Approach 2018 as there is no proposed change to the existing NDM modelling processes

Modelling Approach Changes – UNC Mod 0644

- This year there are no proposed changes to the EUC modelling methodology, however recent industry discussions about demand modelling (UNC Mod 0644), UiG levels, and the latest algorithm performance results, has placed focus on the suitability of current EUC definitions, e.g.
 - EUC Bands 1 and 2 and the possibility of expanding the number of models derived to represent this significant sector of the EUC population – e.g. domestic, non-domestic, pre-payment etc.
 - Large NDM EUC Bands 5 to 8 – Disproportionate amount of demand models in Large NDM sector compared with Small NDM
- In addition, UNC Mod 0644 suggests the possible use of additional weather data items in the calculation of the CWV in order to improve the ‘fit’ to gas demand
- The above proposals and their impacts to the Spring 2018 modelling work require some consideration

Impacts to Spring Approach 2018

UNC Modification 0644

Current EUC Definitions

- AQ Ranges and no. of Demand Models (33 per LDZ) vs EUC Population (early Jan 2018)

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	WAR Bands W01 to W04	No. of Demand Models	EUC Population
01	0	73,200	x	1	c.23,770,000
02	73,201	293,000	x	1	c.202,000
03	293,001	732,000	✓	5	c.46,000
04	732,001	2,196,000	✓	5	c.19,000
05	2,196,001	5,860,000	✓	5	c.4,500
06	5,860,001	14,650,000	✓	5	c.1,500
07	14,650,001	29,300,000	✓	5	c.500
08	29,300,001	58,600,000	✓	5	c.200
09	58,600,001		x	1	c.10

EUC Definitions - Bands 1 & 2: Domestic & Non-Domestic

- Table below shows the Band 01 and 02 'Domestic' and 'Non-Domestic' splits
- This is based on the 'Market Sector Code' flag on the 'Supply Point Register' (SAP-ISU)

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	WAR Bands W01 to W04	No. of Demand Models	EUC Population (approx.)	Domestic (approx.)	Non Domestic (approx.)
01	0	73,200	x	1	c.23,770,000	c.23,250,000	c.520,000
02	73,201	293,000	x	1	c.202,000	c.37,000	c.165,000

- The above shows there are approximately:
 - 520,000 Non-Domestic Band 1 sites (bigger than all 32 EUCs combined i.e. Band 2 and above)
 - 37,000 Domestic Band 2 sites
- The Band 1 Non-Domestic sites are being allocated using a demand model / profile based on Domestic only meter points (legacy of RbD requirements)

EUC Definitions - Bands 1 & 2: Pre-Payment

- Table below shows the no. of 'Pre-Payment' sites within Band 01 and 02
- This is based on the 'Meter Mechanism Code' on the 'Supply Point Register' (SAP-ISU)
- Pre-Payment counts are where the code is equal to 'CM'; 'ET'; 'MT'; 'PP'; 'TH'

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	WAR Bands W01 to W04	No. of Demand Models	EUC Population (approx.)	Credit Meters ('CR') (approx.)	Smart Meters ('NS', 'S1', 'S2') (approx.)	Pre-Payment Meters (approx.)
01	0	73,200	x	1	c.23,770,000	c.16,380,000	c.4,610,000	c.2,690,000
02	73,201	293,000	x	1	c.202,000	c.190,500	c. 3,200	c. 630

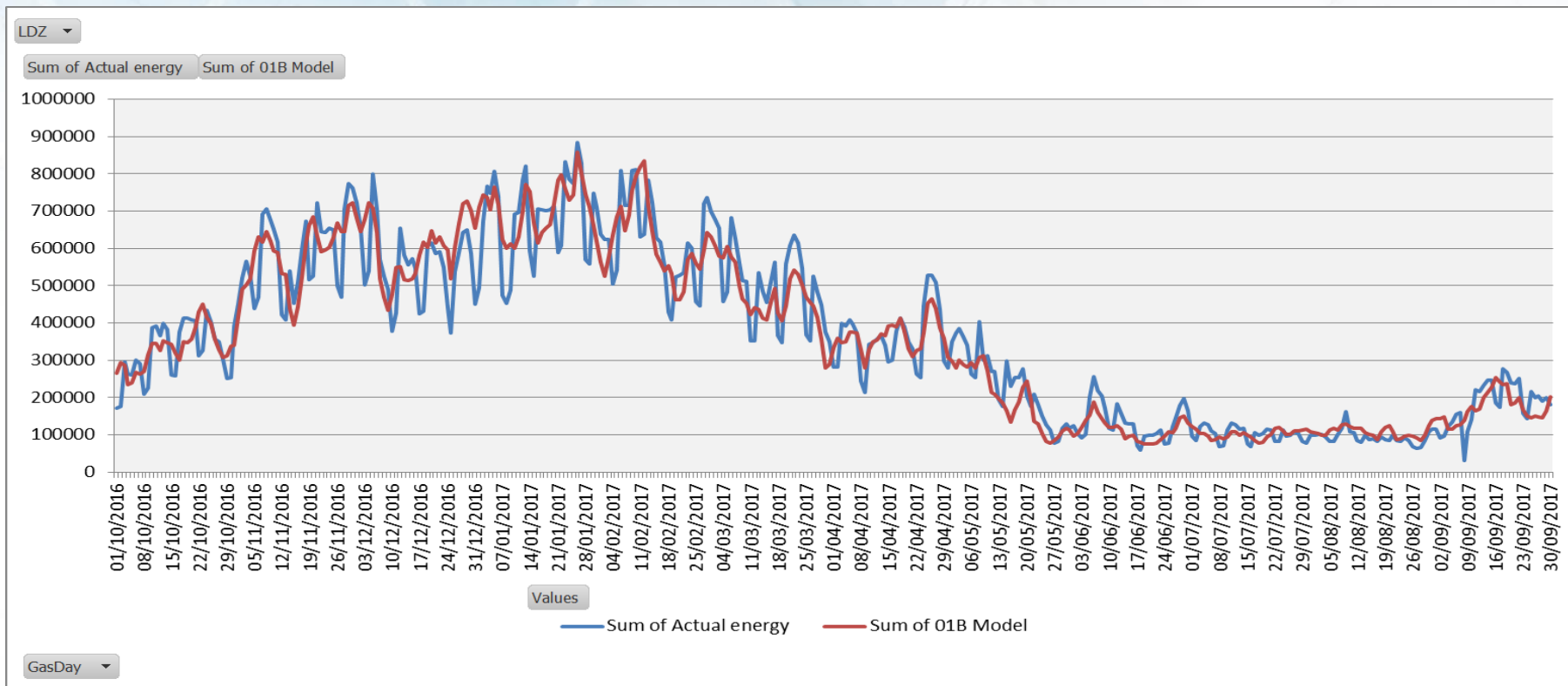
- Note:
 - Counts above are for both Domestic and Non-Domestic sites
 - There are approx. 100,000 sites where the Meter Mechanism Code is blank or 'Unknown'
 - Within the 4.6m 'Smart Meters' categorisation there will be 'Pre-Payment' sites but there is no reliable data item available to report on these

Additional Algorithm Performance: Band 1 Non-Domestics

- Strand 3 of Algorithm Performance used a significant amount of extra sites following a request for additional third party data
- This included Smart Pre-Payment sites which, as expected, displayed a ‘flatter’ profile than the current 01B profile - see December 2017 Strand 3 (3rd party data) presentation for full results
- The additional 3rd party data also included approx. 4,000 Non-Domestic Band 1 sites, analysis of this data has been performed to support the ongoing discussions – the data has been compared to 1) the current 01B profile and 2) the current 02B profile
- Table below displays the number of 3rd party sample supply points available for analysis

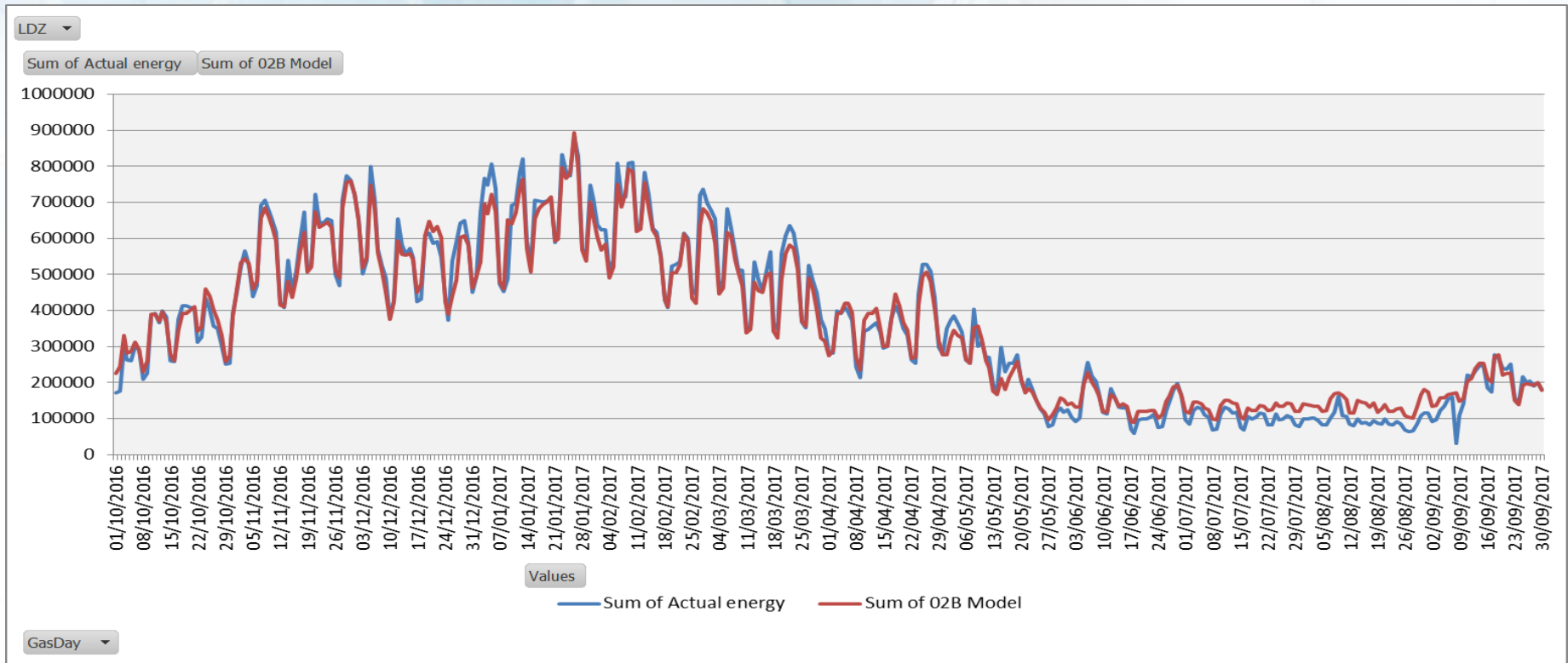
SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
115	741	443	257	343	296	119	361	173	415	306	224	166

Band 1: Non-Domestics using 01B Model



- Aggregate position for all LDZs using current 01B model – impacts of weekend reduction not tracked by the current 01B profile

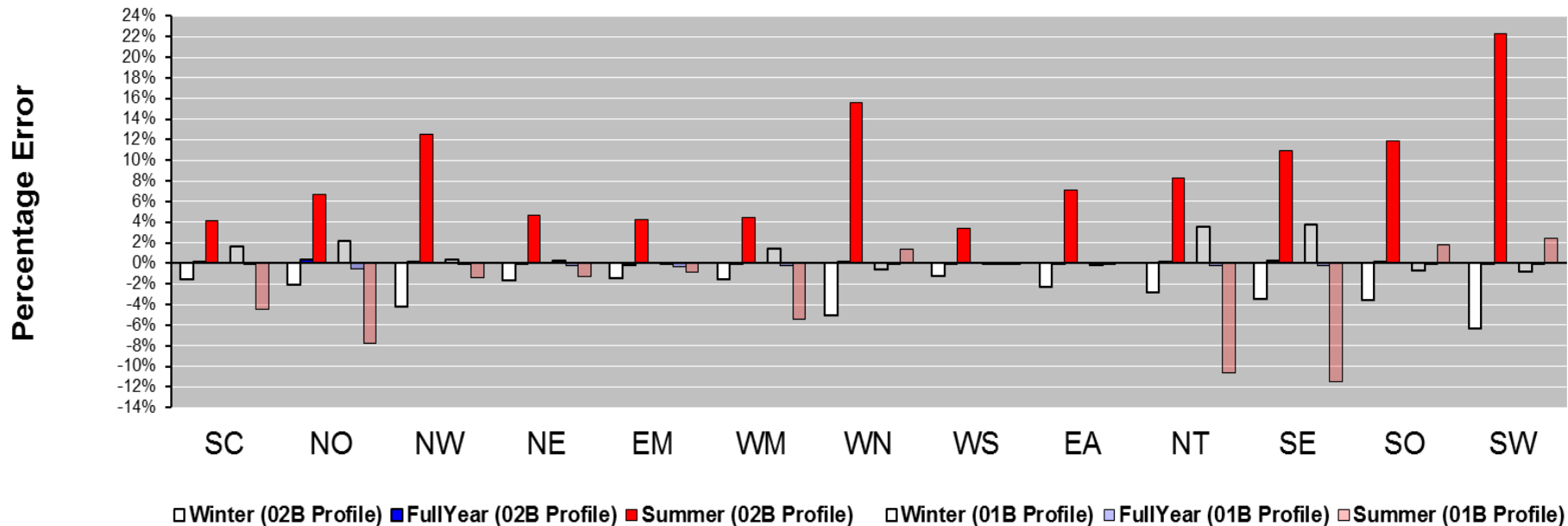
Band 1: Non-Domestics using 02B Model



- Aggregate position for all LDZs using current 02B model – better tracking of actual but over allocation in summer evident

Band 1: Non-Domestics Results by LDZ

Non Domestic vs Model (Band 01 and Band 02 profiles)



- 02B Model over allocates in Summer and under allocates in the Winter
- Over year as a whole 11 of 13 LDZs have a smaller error using 02B profile

Band 1: Non-Domestics Analysis Summary

- Results confirm that Non-Domestic sites in Band 01 do not fit well to the current 01B profile
- The results are mixed when using the Band 02 profile, although over allocation occurs in the summer, the day of the week results are much better, especially at weekends – nationally the % errors for Saturday reduces from 29% to 4% over allocation and Sunday from 30% to 4.5% over allocation
- Analysis was performed on Domestic sites within Band 2 (i.e. using an 01B and 02B profile) which revealed a mix bag of results, however this was done using a much smaller dataset - c.12 sites per LDZ
- There are clearly distinct customer groups within the current EUC Bands 1 and 2 which could benefit from a more suitable consumption profile
- The following slides consider the possible modelling options for Spring 2018 which could start to address this area

Possible EUC Definitions (based on UNC MOD 0644 refs)

- Table below represents how new EUC definitions could look based on proposals in UNC Modification 0644

EUC Band	Proposed EUC	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	WAR Bands W01 to W04	No. of Demand Models	Domestic (Credit, Smart, Unknown)	Domestic (Pre-Payment)	Non-Domestic (All Mtr Mech. Codes)
01	EUC01I	0	73,200	x	1	-	-	c. 520,000
01	EUC01P	0	73,200	x	1	-	c.2,690,000	-
01	EUC01B	0	73,200	x	1	c. 20,560,000	-	-
02	EUC02I	73,201	293,000	x	1	-	-	c.165,000
02	EUC02P	73,201	293,000	x	1	-	c.500	-
02	EUC02B	73,201	293,000	x	1	c.36,500	-	-

Latest validated sample no.'s for EUC 01 and 02

- Table below displays the number of 'Xoserve managed' and 'Transporter managed' supply points available from the latest Autumn Algorithm performance analysis (Gas Year 2016/17)

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	Domestic Sites	Non-Domestic Sites	Pre-Payment Sites
01	0	73,200	2,338	517	0
02	73,201	293,000	138	1,372	0

- The above provides an indication of what may be available for Spring 2018 modelling when considering our usual data stream sources
- Based on this there would be insufficient no.s to build models for the new EUC definitions
- Potentially these numbers could be enhanced with the addition of third party data (as happened for the recent Algorithm performance analysis)

Possible options for EUCs Bands 1 & 2 – ‘Quick Win’

- Option 1: Use existing data models, structures and datasets, e.g.
- EUC Band 01
 - Domestic (“EUC01B”) – Use demand model based on domestic only meter points (as-is)
 - Non-Domestic (“EUC01I”) – Use “EUC02I” demand model
 - Pre-Payment (“EUC01P”) - No quick win available for this proposed EUC ?
- EUC Band 02
 - Domestic (“EUC02B”) – Use “EUC01B” demand model
 - Non-Domestic (“EUC02I”) - Use demand model based on non-domestic only meter points (as-is includes some domestic meter points)
 - Pre-Payment (“EUC02P”) – No quick win available for this proposed EUC ?
- The above would be minimal modelling change as Xoserve do not require any additional data, however profiles not likely to be as accurate as those created from ‘real’ sample sites which have appropriate characteristics

Possible options for EUCs Bands 1 & 2 – New Models

- Option 2: Create new EUC demand models – requires NEW series of daily demand data
- EUC Band 01
 - Non-Domestic (“EUC01I”) – Non-Domestic Band 1 sites required, ideally upto 3 years history
 - Pre-Payment (“EUC01P”) – Domestic Pre-Payment Band 1 sites required, upto 3 years history
- EUC Band 02
 - Domestic (“EUC02B”) – Domestic Band 2 sites required, ideally upto 3 years history
 - Pre-Payment (“EUC02P”) – Non-Domestic Pre-Payment Band 1 sites required, ideally upto 3 years history (assuming DESC believe profile is needed – population only c.500 ?)
- SMART PPM data may be only daily data available which may not be an exact equivalent and no direct benefit to the provider ?

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	Domestic Sites	Non-Domestic Sites	Pre-Payment Sites
01	0	73,200	2,338	517	0
02	73,201	293,000	138	1,372	0

Spring Approach 2018 – Options for EUCs Bands 1 & 2

- As discussed with DESC previously, the current modelling system which creates the EUC Demand Models and Derived Factors has some inflexibilities which are being addressed via an internal project to replace the processes and systems Xoserve use.
- From a Demand Estimation process perspective, options 1 or 2 could be possible for the Spring 2018 modelling, however there are other **major** considerations...
- **Systems:**
For example will SAP-ISU system be able to assign EUC for Bands 1 and 2 using additional data items e.g. Market Sector Code Flag (as well as the usual LDZ and AQ) in time for Autumn 2018 ? Testing also required of Gemini file flows and processes ?
- **Industry:**
Are industry parties ready and able to cope with a change to the EUC definition 'line-up' bearing in mind they have been the same for 20 years ?
- Outcomes of discussion on UNC Modification 0644 will hopefully provide answers to the above 'Systems' and 'Industry' points ?

Modelling Approach Changes – UNC MOD 0644

- Xoserve suggests the other areas raised in recent industry discussions are added to DESC's Adhoc Work Plan for further analysis, justification below:
- Discussions around EUC Bands 7 and 8 have taken place, however perhaps better to perform a general review of Large NDM EUC definitions and their appropriateness prior to making changes ? Note: Bands 7 and 8 currently modelled together anyway
- The introduction of new weather items in the calculation of the CWV (UNC MOD 0644) would be a significant change to implement in readiness for Gas Year 2018/19 as it requires system changes and data feeds to be established once parameters within the CWV formula have been optimised
- CWV optimisation, which involves a thorough review of existing formula weightings, is scheduled for DESC's work plan in 2019. In readiness for this it would be useful to first analyse how other weather data items relate to gas demand and whether a relationship exists, and if so how they could be incorporated into the CWV calculation ?

Spring Approach 2018 – DESC Thoughts

- In anticipation of one or more UNC Modifications being implemented, DESC / Xoserve need to plan to prepare to run different approaches in parallel ? Points to consider:
- Changes to DAF
 - Recommend producing 2 sets of DAFs until industry decision made on whether the NDM Algorithm will revert to historic method within the overall Demand Attribution process ? This will mean the re-introduction of an aggregate NDM demand model (NDM demand data ‘derived’ for Jun’17 - Sep ’17)
- Changes to EUC Band 1 and 2 definitions
 - Do DESC want to plan and prepare for additional EUCs for Bands 1 and 2 for Gas Year 18/19 ?
 - If so decision needed on which option (1 or 2) DESC would like CDSP to pursue ? Other options ?
 - Option 2 ‘New Models’ require an agreement on how data streams will be sourced and how model smoothing shall be applied ?
- Clearly the approach to Spring 2018 modelling needs to be flexible during this years process and mindful that it is subject to wider industry decisions e.g. systems and/or industry not ready to implement proposed EUC changes for 2018/19