



## **Demand Estimation Sub Committee**

### **2.0 Review TWG Responses and DESC Representations**

6<sup>th</sup> July 2020

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# 1: Background – Gas Demand Estimation (1)

- Key industry processes require various types of gas demand estimation at NDM Supply Point level. These processes include:
  - Determining Supply Point Capacity
  - Daily Nominations and Allocations i.e. NDM Supply Meter Point Demand Formula
  - Determining Annual Quantities (AQs)
- To achieve this estimation, each NDM Supply Point belongs to an End User Category (EUC)
- EUCs are used to categorise NDM Supply Points in an LDZ and are defined by reference to variables which are maintained in the Supply Point Register
- Each EUC requires an associated Gas Demand Model which represents its gas usage characteristics e.g. weather sensitivity, consumption profile etc.
- Gas Demand Models are mathematical models which provides an estimate of gas demand for each EUC by reference to variables determined by DESC

# 1: Background – Gas Demand Estimation (2)

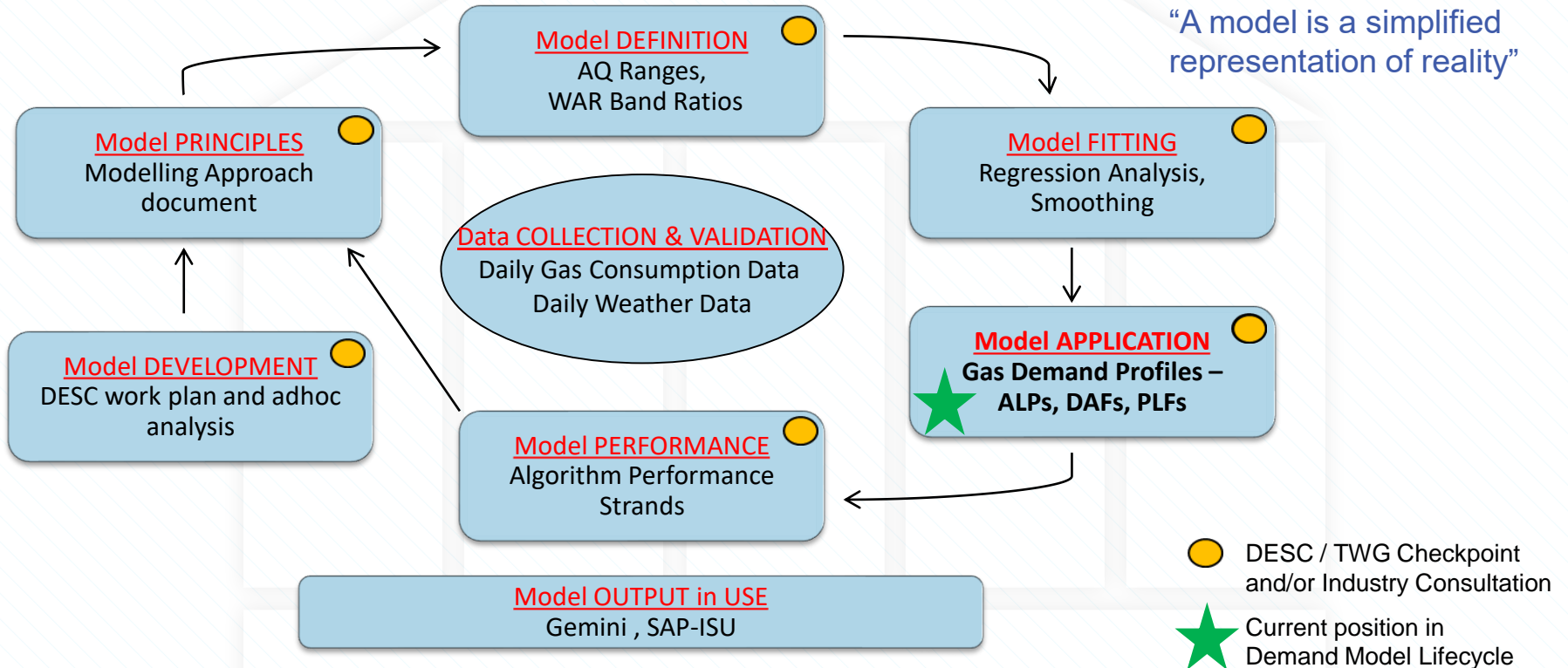
- For each Gas Year, DESC will develop or revise the definitions of the EUCs for the LDZ and the Gas Demand Models for each EUC. The CDSP will then implement these decisions
- The annual process for determining the EUCs and Gas Demand Models for the following gas year begins with the production of a document called the “Modelling Approach”
- The Modelling Approach provides an overview of the proposed EUC definitions and how the modelling shall be performed, including a reference to the Daily Gas Consumption Data required in order to produce the relevant Gas Demand Models
- DESC approved the latest version of the Modelling Approach at its meeting in February
- Section H of UNC and the NDM Demand Estimation Methodology document provides more detail of the Demand Estimation process

# 1: Background - Timescales

- DESC's obligation of producing a set of End User Categories and Gas Demand Models for the next gas year has to be delivered within certain timescales:
  - The Daily Gas Consumption Data collected for analysis must include the most recent Winter period (December to March), meaning full data validation cannot start until early April
  - The Final EUCs and Gas Demand Models must be approved and submitted to the Authority and loaded to CDSP's systems by 15th August
  - In between April and August is when the Daily Gas Consumption Data validation results are reviewed, WAR Band ratios are set, Gas Demand Models are developed and reviewed, Demand Model Smoothing is applied, draft Gas Demand Profiles are produced and reviewed, followed by an industry consultation commencing early June
- The above explains why it is necessary to agree modelling principles and methodologies in February each year, as there is not time in the Spring/Summer to make fundamental modelling decisions and gain agreement from all DESC members

# 1: Background - EUCs and Demand Model Lifecycle

The purpose of the **EUC Demand Model** is to represent the behaviour and reactions of the **EUC Population**



# 1: Background - Timetable of Key Checkpoints for 2020

High Level View of Demand Estimation Timetable 2020 - Key Checkpoints

PHASE	JAN'20	FEB'20	MAR'20	APR'20	MAY'20	JUN'20	JUL'20	AUG'20	SEP'20	OCT'20	NOV'20	DEC'20
1. MODEL PRINCIPLES												
Modelling Approach 2020 Approved (DESC)		10th Feb										
2. Data COLLECTION & VALIDATION												
Daily Gas Consumption Data validated (CDSP)				15th Apr								
3. MODEL DEFINITION												
Agree Data Aggregations / WAR Band Limits (TWG)				27th Apr								
4. MODEL FITTING												
Gas Demand EUC Modelling review (TWG)					22nd May							
5. MODEL APPLICATION												
Publication of Draft Gas Demand Profiles (CDSP)						12th Jun						
Gas Demand Profiles Approved for wider industry (TWG/DESC)							6th Jul					
Final Approval of Gas Demand Profiles (DESC)							22nd Jul					
6. MODEL OUTPUT IN USE												
SAP-ISU and Gemini updated (CDSP)								15th Aug				
7. MODEL DEVELOPMENT												
Adhoc Work-plan approved (DESC)							22nd Jul			5th Oct		
8. MODEL PERFORMANCE												
Strands 1 to 3 reviewed (DESC)												7th Dec

## 2: Objectives of Meeting

- The final objective of the “Model Application” phase is for TWG, DESC and the industry to review the Derived Factors – ALPs, DAFs and PLFs in order to approve final versions to be used in Gemini and SAP-ISU for the new Gas Year
- Objective of today’s meeting is to:
  - For TWG and DESC members to consider and review all representations raised and the responses provided by the CDSP
  - To gain TWG and DESC support for proposals prior to submitting for wider industry review



# 3: Summary of Modelling Progress to date

- Data Aggregations and WAR Band thresholds for latest single year models agreed at April TWG meeting (27<sup>th</sup>)
- Single year modelling approved at May TWG meeting (22<sup>nd</sup>)
- Model smoothing process followed in second half of May along with production of draft Derived Factors (published for review 12<sup>th</sup> June)
  - Smoothed model outcomes summarised on slides 10 and 11
- Note: All modelling / output parameters have been produced using new formula/definitions of the Composite Weather Variable (CWV) and the new basis for Seasonal Normal weather (SNCWV) which become effective from 1<sup>st</sup> October 2020
  - Any comparisons to last year's GY19/20 demand profiles are not on the same basis

### 3: Smoothed Model Outcomes: Small NDM

	2020	2019
Straight Models	47	90
Cut-Off Only	12	27
Summer Reductions Only	161	103
No Slope	0	0
Cut-Off and Reductions	14	14
Total Number of EUCs	234	234

- Small NDM represents approx. 88% of current NDM AQ

### 3: Smoothed Model Outcomes: Large NDM

	2020	2019
Straight Models	153	177
Cut-Off Only	6	16
Summer Reductions Only	72	52
No Slope	33	20
Cut-Off and Reductions	9	8
Total Number of EUCs	273	273

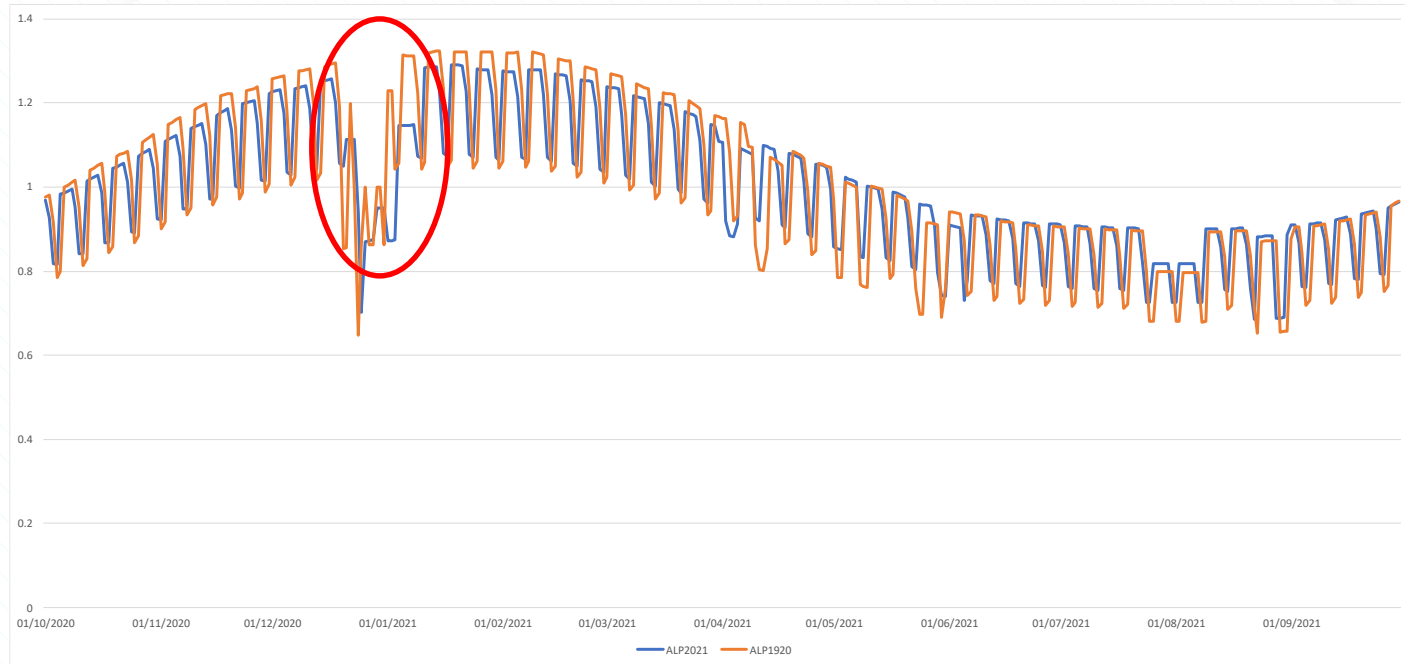
- Large NDM represents approx. 12% of current NDM AQ

# 4: DESC/TWG Comments and Xoserve Responses

- Email sent on 12<sup>th</sup> June asked TWG representatives and DESC members for feedback by no later than close of play 26<sup>th</sup> June in order to prepare for today's meeting
- Feedback has been received from 2 parties
- Summary of Representation topics to be covered below:
  - Topic 1: Christmas period ALP behaviour – E.On / Npower
  - Topic 2: May Whitsun week ALP behaviour – E.On / Npower
  - Topic 3: Flatter ALP profiles for some EUCs – E.On
  - Topic 4: General summer holiday ALP behaviour – E.On
  - Topic 5: General less sensitive DAF in Summer – E.On

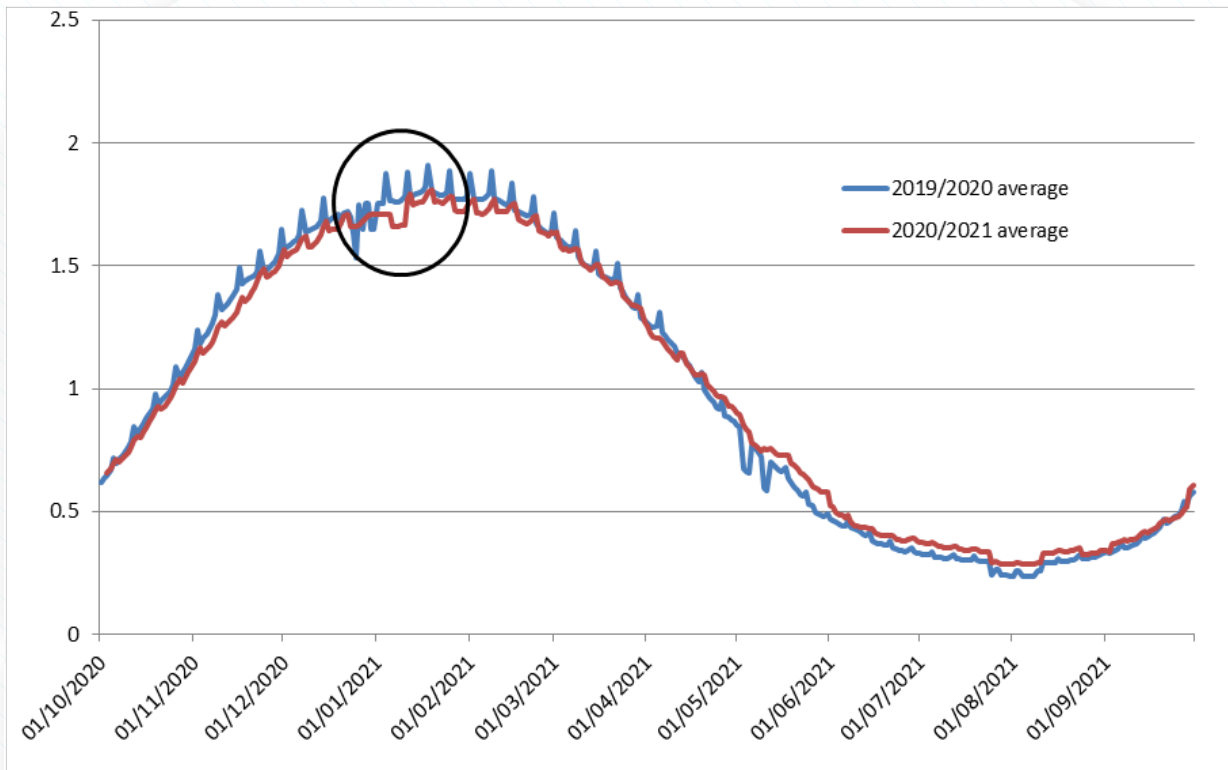
# 4: Topic 1 - Christmas period ALP behaviour

- E.On comments: “All profiles have a different shape over Christmas which we assume is due to the way Christmas falls this year, however the first week in January also has a drop (after all the bank holidays and Christmas period) is there a reason for this? I have graphed EA:E08B as an example below but this appears to be the case for all profiles. [red circle]”



# 4: Topic 1 - Christmas period ALP behaviour

- Npower comments: “*First week of January much lower in latest profiles – why is this?*”
- Chart provided for 01BPD



# 4: Topic 1 - Christmas period ALP behaviour

- The change in ALP shape during first week of January is due to the application of current holiday code rules, as per 'Modelling Approach 2020' document, extract below:

**Christmas/New Year (Holiday codes 1, 2, 3, 4, and 5)**

Holiday period starts on the Monday before 25th December (but if 25th December falls on a Monday, Tuesday or Wednesday, starts on the Friday before 25th December) and ends on the first Friday on or after the second New Year bank holiday in Scotland.

**Holiday code 1:**

25th December

**Holiday code 2:**

26th December, January 1st and any remaining bank holidays (except second Scotland New Year bank holiday) and any other Saturdays and Sundays in the period

**Holiday code 3:**

Any remaining Mondays to Fridays between 24th December and day before second Scotland New Year bank holiday inclusive

**Holiday code 4:**

Remaining days before 24th December

**Holiday code 5:**

Remaining days (will always include second Scotland New Year bank holiday)

- Holiday Code 5 is being used during w/c 4<sup>th</sup> Jan (file 'WKHOLDEF20.txt' provides the view of all holiday code rules applied to Gas Year 2020/21)

# 4: Topic 1 - Christmas period ALP behaviour

- In applying these rules, the holiday period extends to Friday 8<sup>th</sup> January 2021 due to bank holiday in Scotland falling on Monday 4<sup>th</sup> January (see below)
- We have also provided last years Christmas holiday period to show the application of the rules can move from one year to the next

## Christmas 2019

Date	2019												2020											
	Thu 19/12	Fri 20/12	Sat 21/12	Sun 22/12	Mon 23/12	Tue 24/12	Wed 25/12	Thu 26/12	Fri 27/12	Sat 28/12	Sun 29/12	Mon 30/12	Tue 31/12	Wed 01/01	Thu 02/01	Fri 03/01	Sat 04/01	Sun 05/01	Mon 06/01	Tue 07/01	Wed 08/01	Thu 09/01	Fri 10/01	Sat 11/01
Wk Code	0	1	2	3	0	0	0	0	1	2	3	0	0	0	0	1	2	3	0	0	0	0	1	2
Hol Code	0	4	2	2	4	3	1	2	3	2	2	3	3	2	5	5	0	0	0	0	0	0	0	0

## Christmas 2020

Date	2020													2021										
	Thu 17/12	Fri 18/12	Sat 19/12	Sun 20/12	Mon 21/12	Tue 22/12	Wed 23/12	Thu 24/12	Fri 25/12	Sat 26/12	Sun 27/12	Mon 28/12	Tue 29/12	Wed 30/12	Thu 31/12	Fri 01/01	Sat 02/01	Sun 03/01	Mon 04/01	Tue 05/01	Wed 06/01	Thu 07/01	Fri 08/01	Sat 09/01
Wk Code	0	1	2	3	0	0	0	0	1	2	3	0	0	0	0	1	2	3	0	0	0	0	1	2
Hol Code	0	0	0	0	4	4	4	3	1	2	2	2	3	3	3	2	2	2	5	5	5	5	5	0



# 4: Topic 1 - Christmas period ALP behaviour

- Holiday Code Rules – General Points:
- The application of Holiday codes is always a sensitive area of the modelling due to the limited number of days available to train the models. Holiday periods which move about such as Christmas and Easter are even harder to model for
- The current holiday code rules were last reviewed in 2011 and DESC's adhoc work plan\* includes a work item to review their 'appropriateness' (\*due to be reviewed on 22<sup>nd</sup> July)
- The new modelling system has been designed to allow the application of LDZ specific holiday rules, although it still requires a definition that can be applied in any given year (e.g. on the 3 training years and the target year(s))
- Each year, as part of the Modelling Approach review, would it be beneficial to include how the current holiday codes are applied to the target Gas Year to ensure DESC are happy before the modelling begins ?

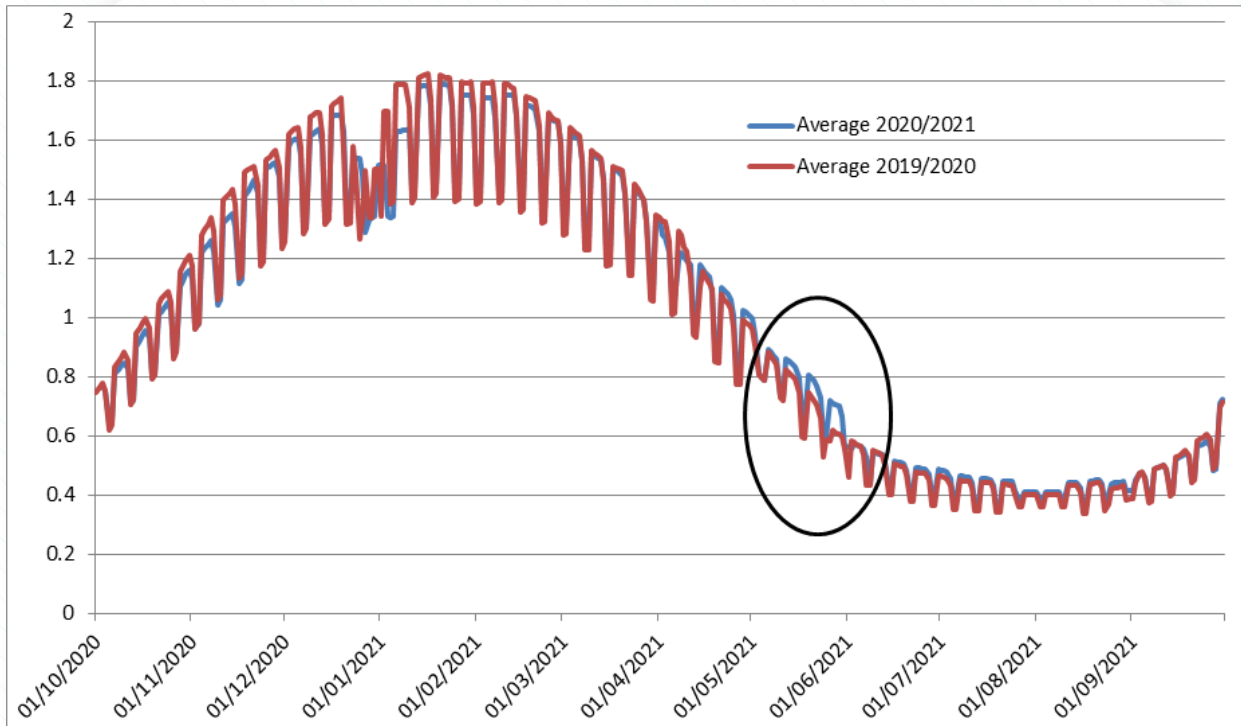
# 4: Topic 2 - May Whitsun week ALP behaviour

- E.On comments: “Seeing an increase in consumption at the end of May for some EUCs, is this related to how the bank holiday falls with school holidays? I have graphed EA:E01BNI as an example below. [red circle]”



# 4: Topic 2 - May Whitsun week ALP behaviour

- Npower comments: “The end of May holiday - Whitsun week seems to have much more of a pronounced holiday effect in the 2019/20 profiles - is this due to it coinciding with the Bank holiday this year?”
- Chart provided for 02BNI



## 4: Topic 2 - May Whitsun week ALP behaviour

- Observations raised for Whitsun period are also due to the application of current holiday code rules and the movement in the Whitsun Bank Holiday
- The 'Modelling Approach 2020' document defines this holiday period as follows:

**Spring Bank Holiday (Holiday codes 11 and 12)**

From Sunday immediately preceding bank holiday, for a week.

**Holiday code 11:**

Spring bank holiday; Saturdays and Sundays in period above

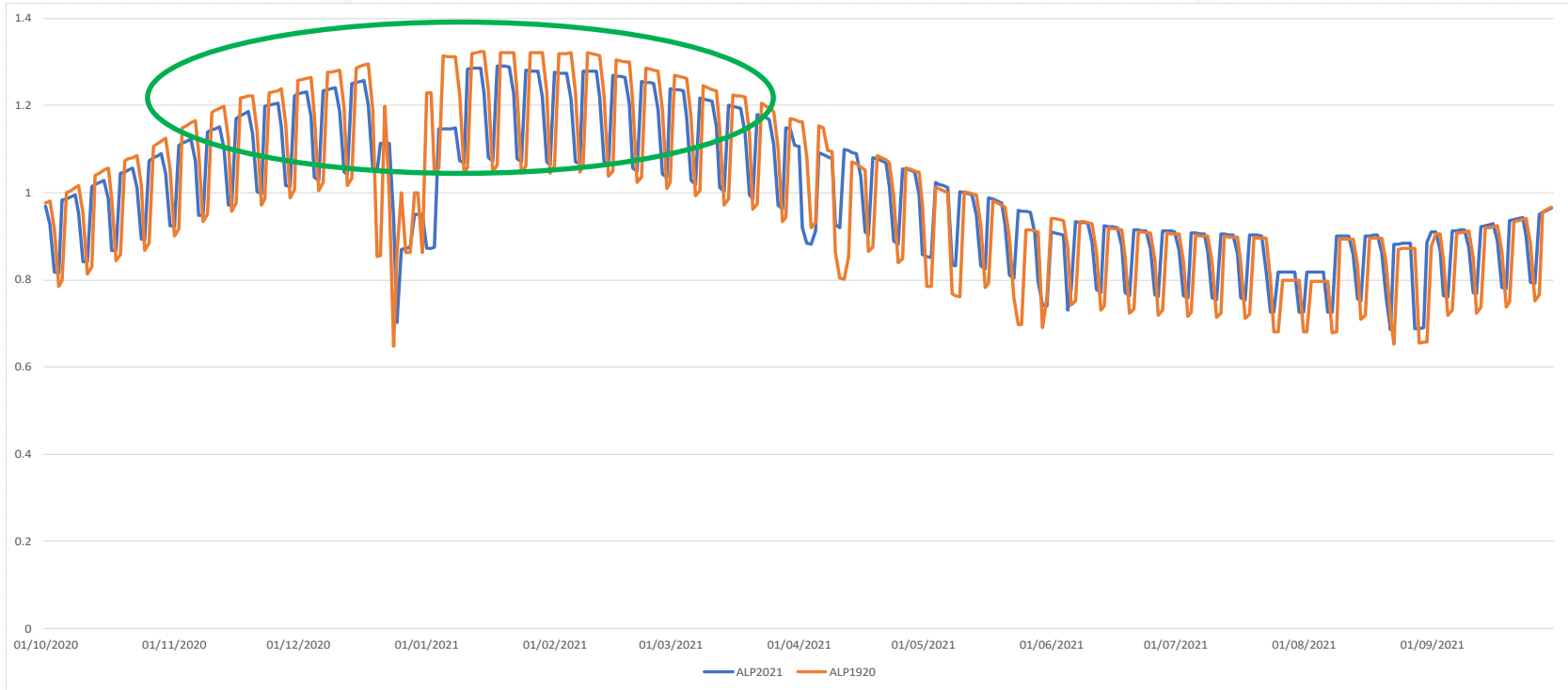
**Holiday code 12:**

All other days in period above.

- In applying these rules, the holiday period for GY2020/21 is a week later compared to GY2019/20
  - Gas Year 2019/20: 24<sup>th</sup> May to 30<sup>th</sup> May 2020 (as stated in file 'WKHOLDEF19.txt')
  - Gas Year 2020/21: 30<sup>th</sup> May to 5<sup>th</sup> June 2021 (as stated in file 'WKHOLDEF20.txt')
- Files 'EUCHOL20S.txt' and 'EUCHOL20L.txt' contain the Holiday Factors for each of the Holiday Codes and confirms a reduction for Holiday Codes 11 and 12

# 4: Topic 3 – Flatter ALP Profiles for some EUCs

- E.On comments: “Also seeing a decrease in weekday consumption over the winter period for some EUCs I have graphed EA:E08B as an example. [green circle]”



# 4: Topic 3 – Flatter ALP Profiles for some EUCs

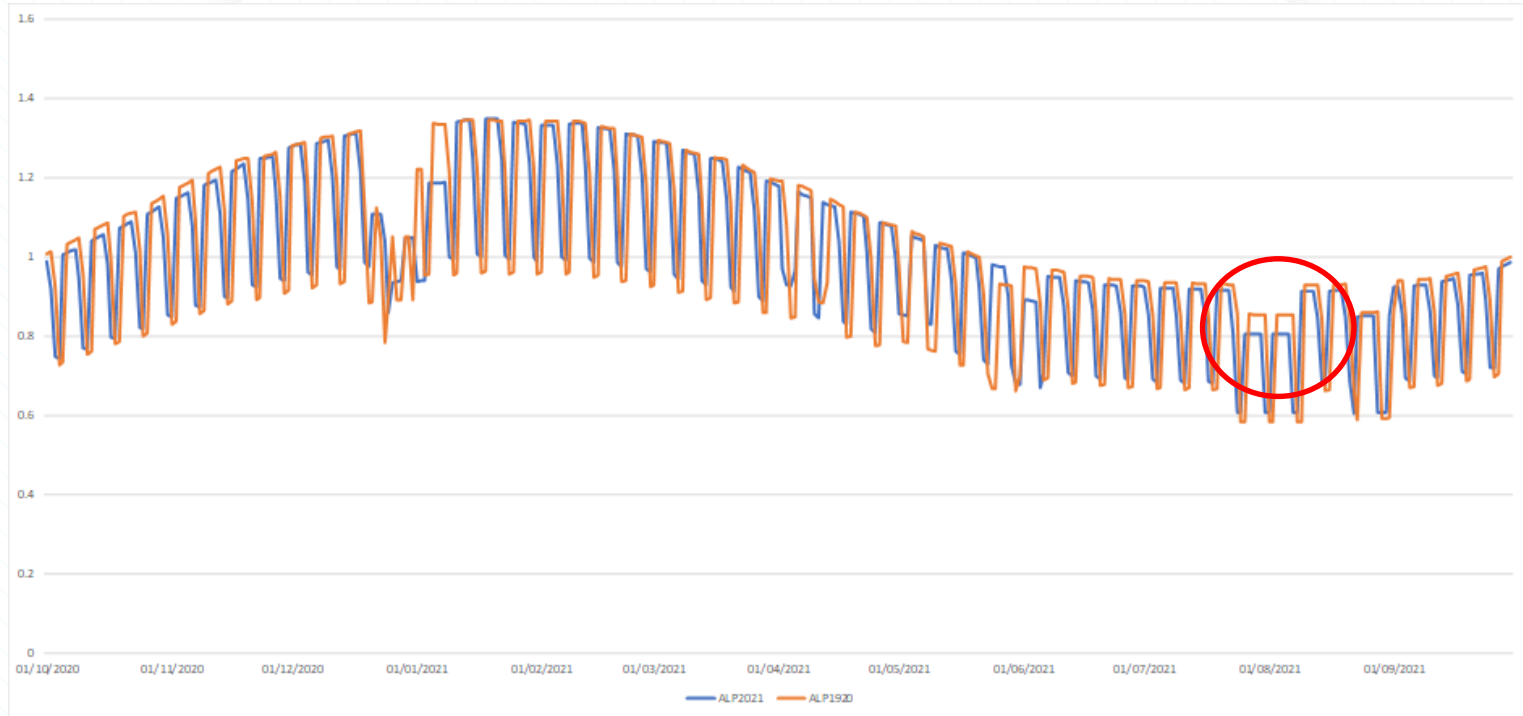
- EUC EA:E08B is a ‘flatter’ model (i.e. less weather sensitive) when compared to the 19/20 version
- The CWV intercept is an indicator of a demand model’s weather sensitivity, below we have provided the values for the 3 individual years and the smoothed model

EUC	CWV Intercept (Individual Year)				CWV Intercept (Smoothed)
	1617	1718	1819	1920	
EA:E1908B	38.52	48.91	36.94	-	40.83
EA:E2008B	-	48.19	36.47	46.93	43.18

- The CWV intercept for EA:E08B was 40.83 for 19/20 and 43.18 for 20/21
- The increase in intercept confirms a less weather sensitive model for 20/21 – this is due to the 19/20 model replacing the 16/17 model. Note: The reason the 17/18 and 18/19 CWV intercepts are not the same is because they are on a different weather basis
- In addition, the smoothed weekend factors for EA:E08B show a bigger reduction in 19/20 compared with 20/21, which also contributes to why the overall profile looks flatter for the latest year (weekend factors are available in file EUCWK20L.txt)

# 4: Topic 4 – General summer holiday ALP behaviour

- E.On comments: “Seeing a decrease in consumption for two “shut down” weeks in summer for some EUCs, is this related to newer shut down information expected? I have graphed EA:E04W01 as an example below. [red circle]”



# 4: Topic 4 – General summer holiday ALP behaviour

- The 'Modelling Approach 2020' document defines the general summer holiday period as:

**General Summer Holiday (Holiday codes 13 and 14)**

17 days from first Friday on or after 19th July.

**Holiday code 13:**

Saturdays and Sundays in period above.

**Holiday code 14:**

All other days in period above.

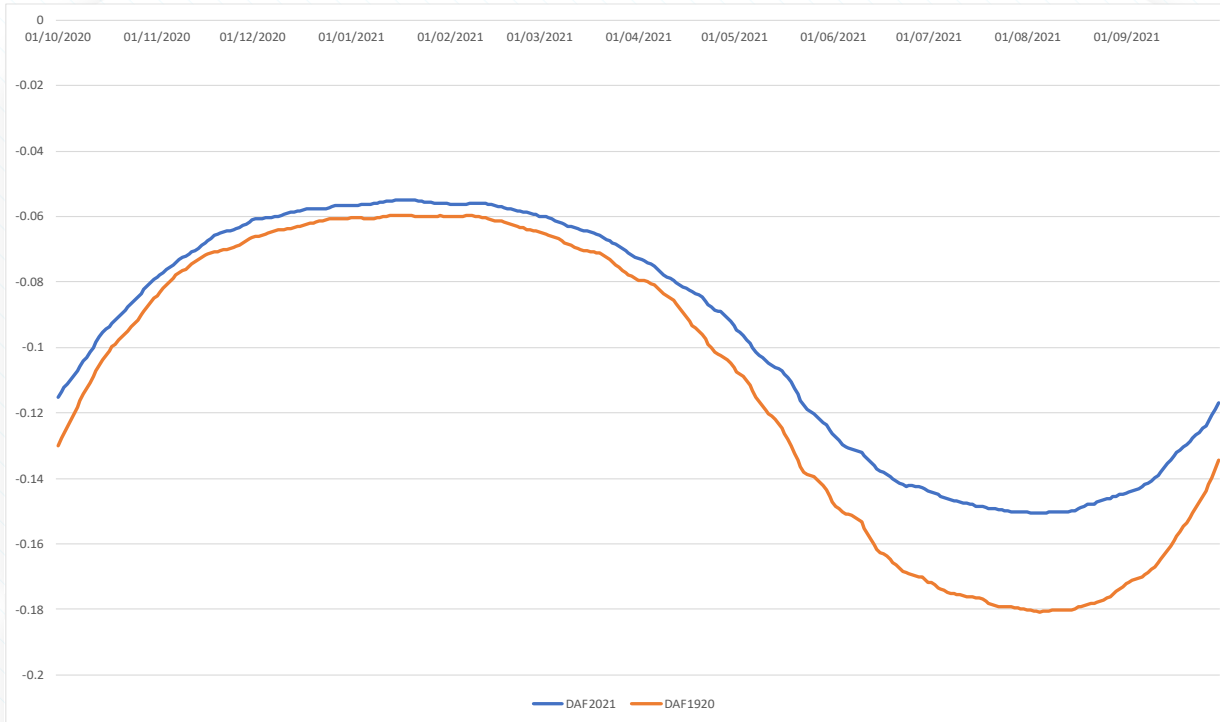
Attribute	EA:04W01	
Holiday	Holiday Factor	
Code	E19	E20
13	0.629	0.666
14	0.920	0.881

- File 'WKHOLDEF20.txt' shows Holidays Codes 13 & 14 apply from 23<sup>rd</sup> July to 8<sup>th</sup> August 2021 (the period covered by this rep)
- The file 'EUCHOL20S.txt' shows that for EA:E04W01, Holiday Code 14, which covers the week days in this period, has more of a reduction than last year and this explains the effects observed in this particular ALP. Holiday Code 13 has less of a reduction which is why the weekend profile does not 'drop' as much as last year
- As with all Holiday Factors, the smoothed model results represent the average of the 3 contributing years

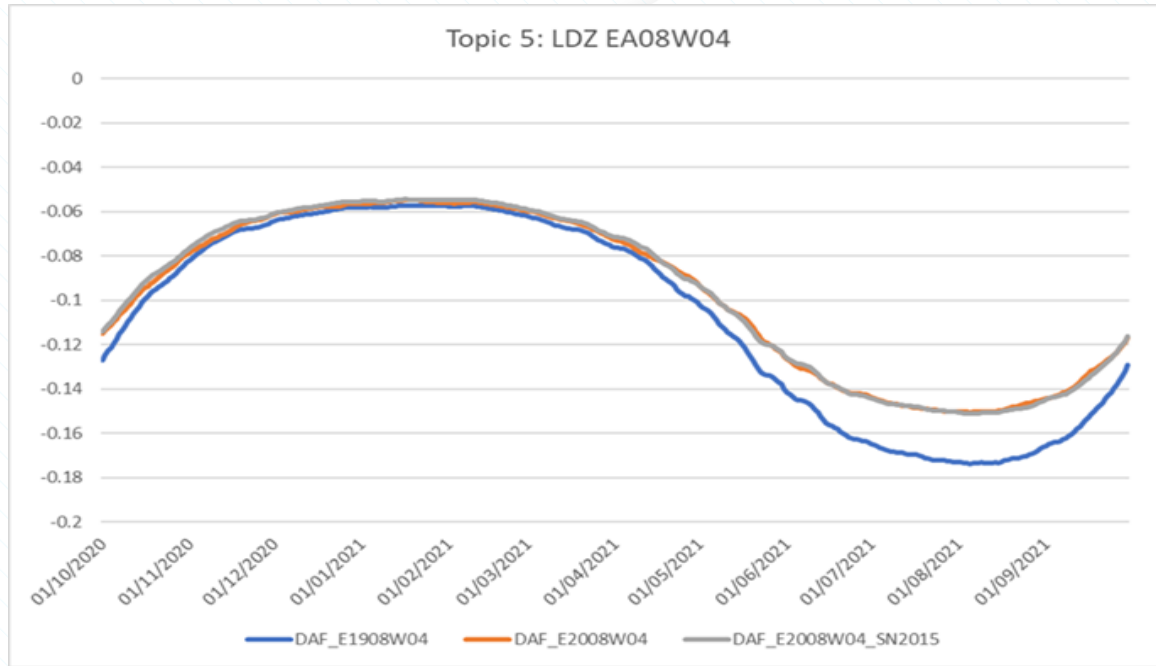


# 4: Topic 5 - General less sensitive DAF in Summer

- E.On comments: “DAFs have seen a general increase in summer (closer to zero so less sensitive) I assume this is due to most of the weather sensitivity now being captured in the new CWV?”
- Chart provided for 08W04 (appears to be LDZ EA ?)



# 4: Topic 5 - General less sensitive DAF in Summer



- The chart confirms the change in weather sensitivity in the DAF for this EUC is not related to the new CWV formula / definitions.

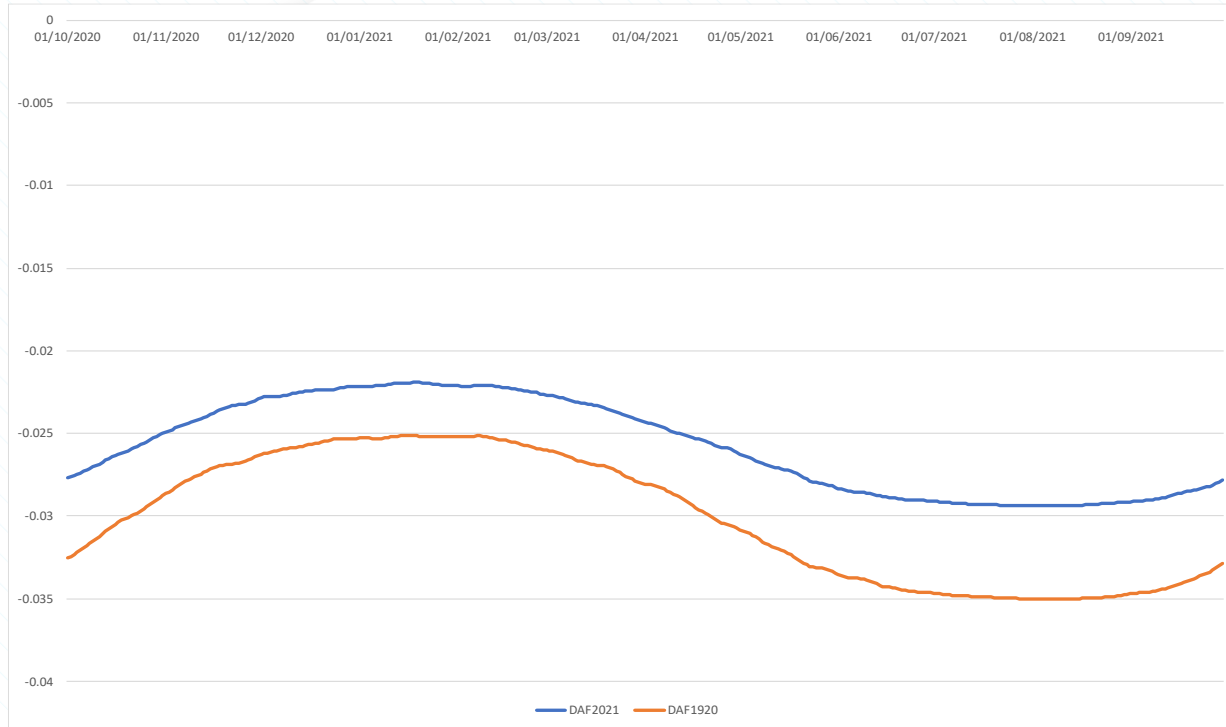
The orange and grey lines represent this years demand model using the current and new CWV definitions which are both less sensitive than last years 19/20 equivalent model

EUC	CWV Intercept (Individual Year)				CWV Intercept (Smoothed)
	1617	1718	1819	1920	
EA:E1908W04	21.01	21.06	25	-	22.21
EA:E2008W04	-	20.99	25.09	23.47	23.06

- The table shows how the latest individual year (19/20) has replaced a more weather sensitive year (16/17) resulting in an overall less weather sensitive DAF

# 4: Topic 5 - General less sensitive DAF in Summer

- E.On comments: “Also E09b is now less weather sensitive as an EUC?”
- Chart provided for 09B



# 4: Topic 5 - General less sensitive DAF in Summer

## Band 09B

- The differences observed in the DAF are very small but overall, we agree, chart confirms models for 09B are less weather sensitive
- Models for the 09B EUC tend to have much more variability in the sample composition year on year
- CWV intercepts for the 16/17 model from last year's smoothed model are more weather sensitive than this year's replacement 19/20 model and so this explains the differences observed in this year's overall smoothed model

## 5: Modelling Rework (1 of 3)

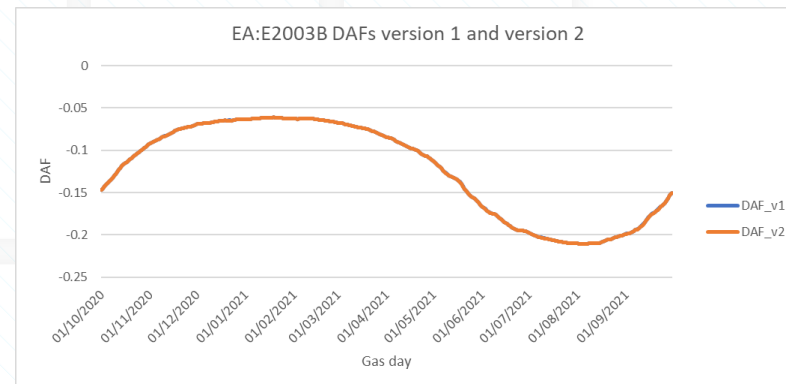
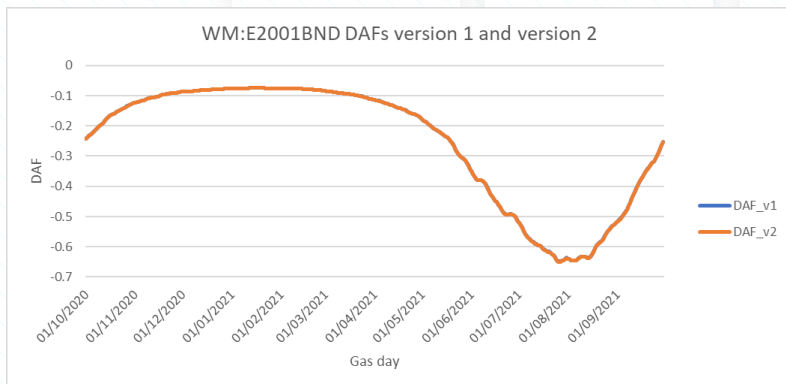
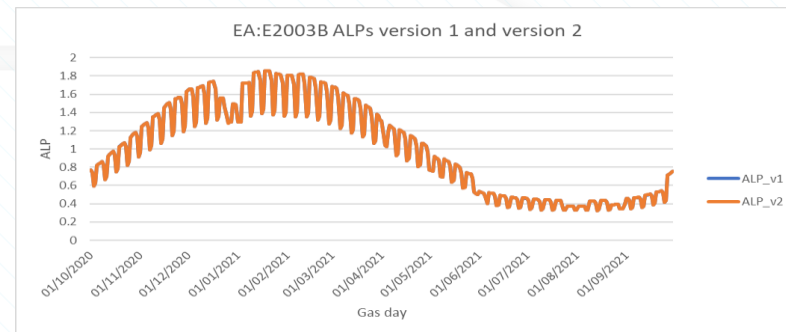
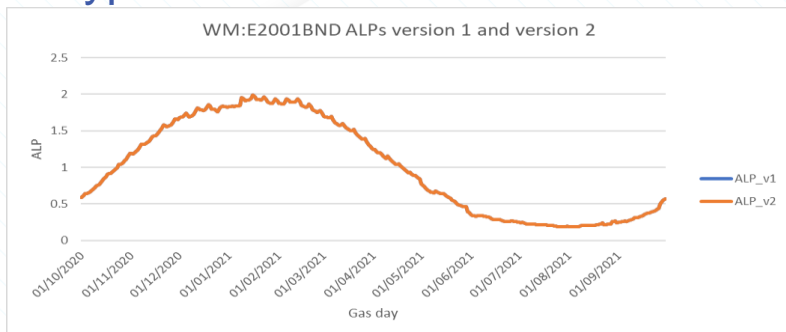
- Following a query we received from British Gas regarding the published CWV values for May 2020 (using the new formula/definitions), we noticed an issue with the off-line calculation of CWVs
- This unfortunately impacted some of the gas days in the modelling analysis period (29<sup>th</sup> February 2020 up to 31<sup>st</sup> March 2020)
- The differences in the CWV for the modelling period were minor but as a result of the discrepancy we have re-run the single year EUC Demand Modelling for the latest year and Model Smoothing

## 5: Modelling Rework (2 of 3)

- As expected (given this was 1 month out of 36) the differences in the modelling results are not significant and crucially the underlying characteristics of the smoothed EUC demand models remain unchanged
- Checks have been carried out by the team on the revised Gas Demand Profiles (ALPs, DAFs and PLFs) and the differences observed are negligible, meaning the version 1 output is effectively the same in terms of model shape and sensitivity
- Assuming DESC are happy to move to the next phase, which is the wider industry consultation, the latest version of the draft profiles will be republished this week

# 5: Modelling Rework (3 of 3)

- We have provided an example of the Version 1 and 2 ALPs and DAFs for EUC's WM:E2001BND and EA:E2003B to show how the differences are negligible. This is typical across all the EUCs.



# 6: Conclusions and Next Steps

## Conclusions

- Are DESC happy to approve the smoothed EUC demand models for wider industry review (ahead of finalising the profiles)?
- If not, need to confirm actions required to progress, ahead of wider industry consultation period (5 day window)

## Next Steps

- w/c 13<sup>th</sup> July the wider industry consultation of 5 business days on the draft profiles will commence
- The DESC meeting on 22<sup>nd</sup> July will consider any further comments received with the aim of finalising the profiles for Gas Year 2020/21 at the meeting