# 2021/22 NDM Algorithms TWG Responses and DESC Representations
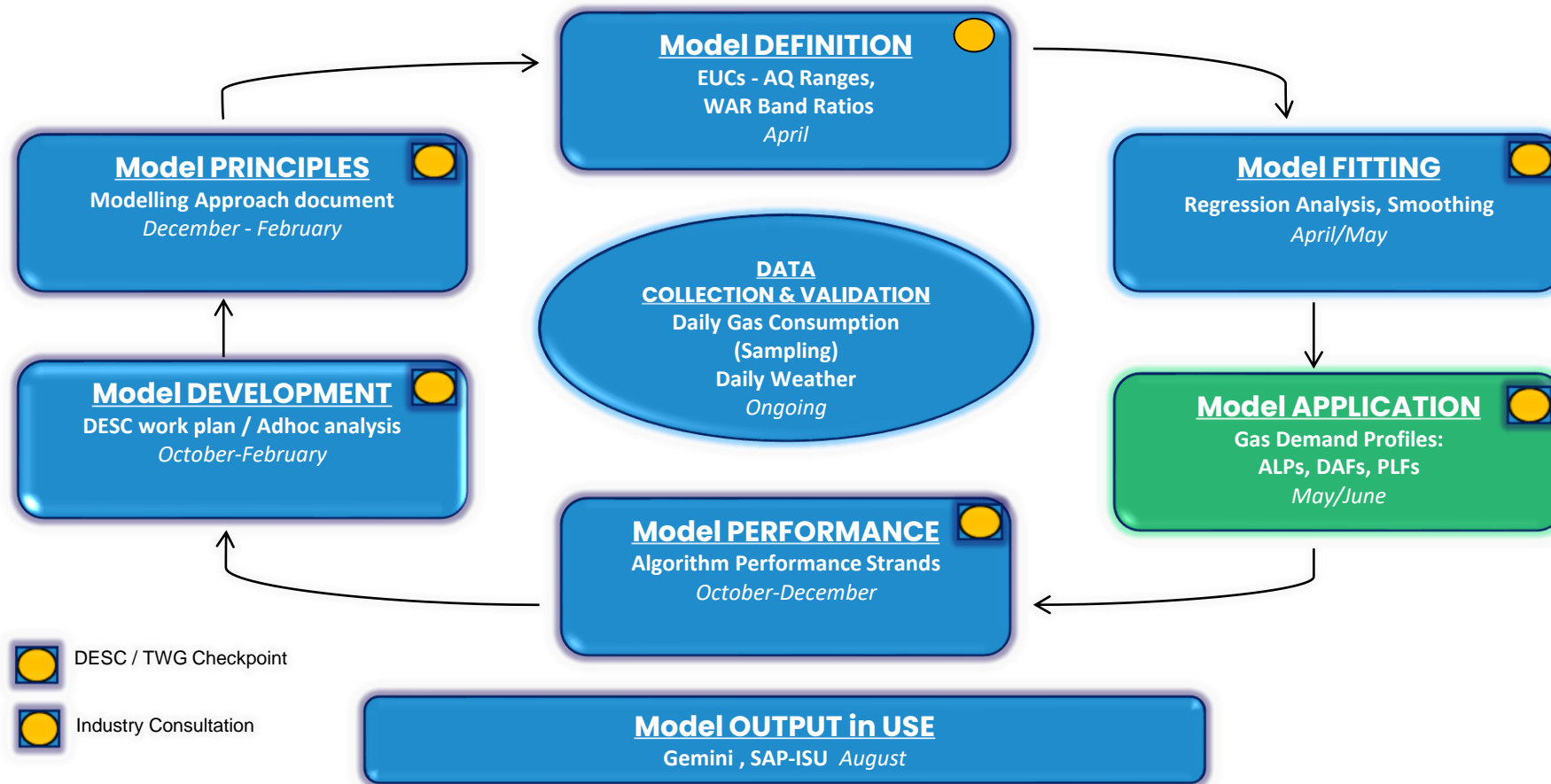
Demand Estimation Sub Committee

07/07/2021

# Contents

# Section 1: Background

# Demand Estimation: Background

- An overview of the Demand Estimation process and output can be found [here](#)

- This presentation relates to the "Model Application" phase of the Demand Model cycle

# Demand Estimation: Timetable - 2021

| High Level View of Demand Estimation Timetable 2021 – Key Checkpoints | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| PHASE | JAN'21 | FEB'21 | MAR'21 | APR'21 | MAY'21 | JUN'21 | JUL'21 | AUG'21 | SEP'21 | OCT'21 | NOV'21 | DEC'21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. MODEL PRINCIPLES** | | | | | | | | | | | | |
| Modelling Approach 2021 Approved (DESC) | | 24-Feb | | | | | | | | | | |
| **2. Data COLLECTION & VALIDATION** | | | | | | | | | | | | |
| Daily Gas Consumption Data validated (CDSP) | | | | 15-Apr | | | | | | | | |
| **3. MODEL DEFINITION** | | | | | | | | | | | | |
| Agree Data Aggregations / WAR Band Limits (TWG) | | | | 28-Apr | | | | | | | | |
| **4. MODEL FITTING** | | | | | | | | | | | | |
| Gas Demand EUC Modelling review (TWG) | | | | | 24-May | | | | | | | |
| **5. MODEL APPLICATION** | | | | | | | | | | | | |
| Publication of Draft Gas Demand Profiles (CDSP) | | | | | | 04-Jun | | | | | | |
| Gas Demand Profiles Approved for wider industry (TWG/DESC) | | | | | | | 07-Jul | | | | | |
| Final Approval of Gas Demand Profiles (DESC) | | | | | | | 21-Jul | | | | | |
| **6. MODEL OUTPUT IN USE** | | | | | | | | | | | | |
| SAP-ISU and Gemini updated (CDSP) | | | | | | | | 15-Aug | | | | |
| **7. MODEL DEVELOPMENT** | | | | | | | | | | | | |
| Adhoc Work-plan approved (DESC) | | | | | | | 21-Jul | | | 06-Oct | | |
| **8. MODEL PERFORMANCE** | | | | | | | | | | | | |
| NDM Algorithm Performance - Strands 1 to 3 reviewed (DESC) | | | | | | | | | | | | 14-Dec |

# Section 2: Objectives

# Objectives of Meeting

The final objective of the "Model Application" phase is for TWG, DESC and the wider 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

Objectives of today's meeting are:

- 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 approvals prior to submitting for wider industry review

# Section 3:

# Summary of Modelling progress to date

# Summary of Modelling progress to date

- EUC Demand modelling runs (including any data aggregations) and WAR Band thresholds for latest single year models agreed at April TWG meeting(28$^{th}$)

- Single year modelling approved following May TWG meeting (24$^{th}$) . DESC approved the use of 2020/21 analysis data for the Band 1 Domestic Non-Prepayment EUC (01BND) only. All other single year modelling results were discarded due to the impacts of COVID-19

- Model smoothing process followed following May TWG meetings, along with production of draft Derived Factors (Published for review 10$^{th}$ June)
  - Smoothed model outcomes summarised on slides 10 and 11

- All Modelling/ Output parameters have been produced using the new formula/ definition of the Composite Weather Variable (CWV) and the new basis for seasonal normal weather (SNCWV) which became effective from 1$^{st}$ October 2020.
  - This is the second year in which the new CWV definition has been used for demand modelling, therefore demand profiles are only directly comparable to gas year 2020/21, as previous years will not be on the same basis

# Smoothed Model Outcomes – Small NDM

| | 2021 | 2020 |
|---|---|---|
| Straight Models | 50 | 47 |
| Cut-Off only | 12 | 12 |
| Summer Reductions Only | 158 | 161 |
| No Slope | 0 | 0 |
| Cut-Off and Reductions | 14 | 14 |
| Total Number of EUCs | 234 | 234 |

• **Changes are only to 01BND, following DESC decision not to use the 20/21 Analysis year data for other Small NDM EUCs.**

# Smoothed Model Outcomes – Large NDM

| | 2021 | 2020 |
|---|---|---|
| Straight Models | 153 | 153 |
| Cut-Off only | 6 | 6 |
| Summer Reductions Only | 72 | 72 |
| No Slope | 33 | 33 |
| Cut-Off and Reductions | 9 | 9 |
| Total Number of EUCs | 273 | 273 |

- **Unchanged following DESC decision not to use the 20/21 Analysis year data for Large NDM.**

# Section 4:
# DESC/TWG Comments and Correla Responses

# DESC/TWG Comments and Correla Responses

- Email sent on 10th June asked TWG representatives and DESC members for feedback by no later than close of play 25th 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: 01BND DAF behaviour – British Gas

  - Topic 2: Early May Bank Holiday period ALP behaviour – E.ON

  - Topic 3: Christmas Bank Holiday period ALP behaviour – E.ON

# Topic 1 : 01BND DAF comparison

**British Gas comment:**

*"There looks to be larger than expected changes in DAFS for 01BND with varying degrees of difference. Changes in LDZs EM, NE, and SW are particularly obvious"*

***Demand Estimation Team response:***

Smoothed Model Characteristics

• Differences are expected and observed in the ALP profiles across all EUCs. When using the same underlying models, these differences can be attributed to 'Day of the week' effects and changes in holiday dates from one year to the next

• DAF values are adjustments based on weather, as such the profiles are identical for all EUCs which have used the same contributing models as the previous year (i.e. all EUCs excl. 01BND)

• Models for EUC band 01BND are the only ones to use data from analysis period 2020/21. This means that the analysis period 2017/18 will have dropped out of the contributing individual years and been 'replaced' by analysis period 2020/21, which will have an impact on the underlying smoothed models.

• Changes in the underlying parameters has also meant 3 LDZs (EM, NE, and SE) have moved from being 'Summer reduction' models for gas year 2020/21 to 'No summer reduction' models for 2021/22. Criteria for Summer Reduction is described in the Modelling Approach [here](#) (pg.17)

• The following slides show examples in the movements of DAF profiles for LDZs SW and EM

# Topic 1 : 01BND DAF comparison – LDZ SW

- The individual year CWV intercept for analysis year 17/18 (16.09) no longer contributes to the smoothed model and has been 'replaced' by the single year CWV intercept for 20/21 (16.88), as a result the smoothed CWV intercept has risen from 16.36 to 16.62

- A rise in the CWV intercept indicates decreased weather sensitivity, hence the DAF values for 2021/22 have decreased in magnitude, as observed in the graph below

### DAF Comparison 2020/21 vs 2021/22 - LDZ SW



Legend: 2020/21 DAF, 2021/22 DAF
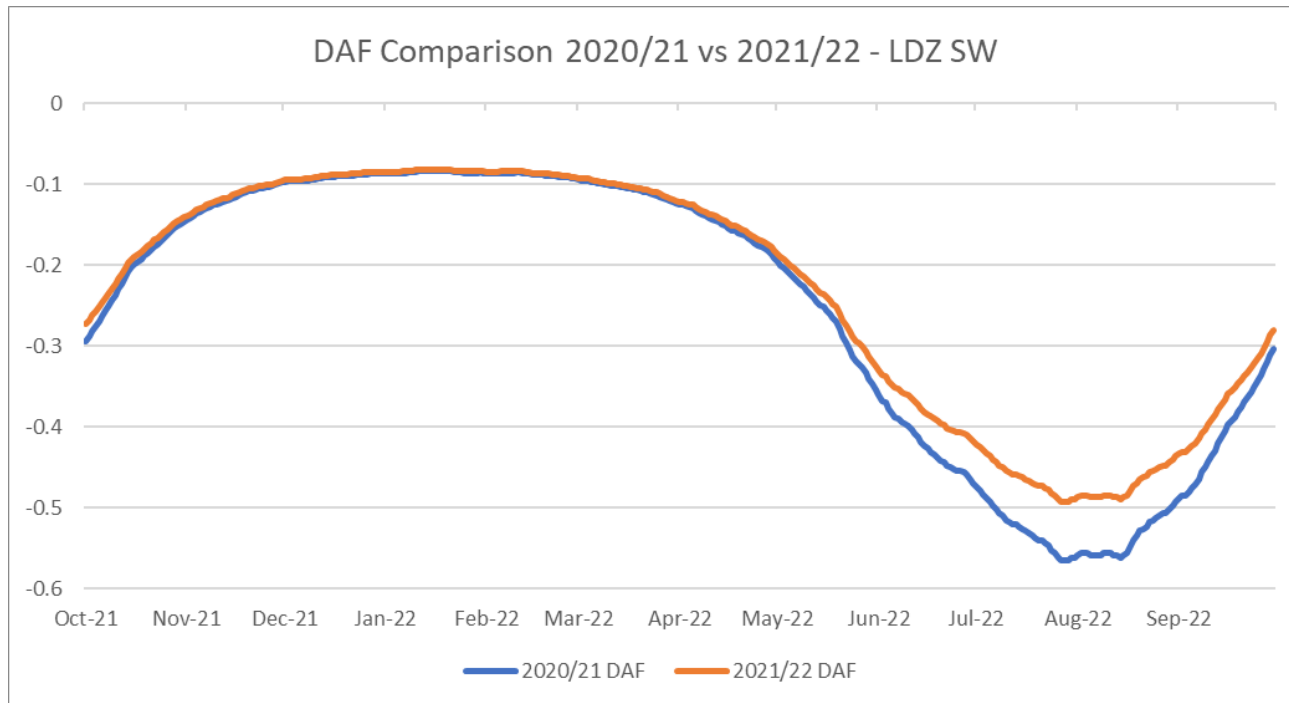
| LDZ SW | Smoothed Model | |
|---|---|---|
| **Analysis Year** | **2020/21** | **2021/22** |
| 17/18 | 16.09 | – |
| 18/19 | 16.20 | 16.20 |
| 19/20 | 16.80 | 16.80 |
| 20/21 | – | 16.88 |
| **Smoothed Intercept** | **16.36** | **16.62** |

# Topic 1 : 01BND DAF comparison – LDZ EM

- The individual year CWV intercept for analysis year 17/18 (16.88) no longer contributes to the smoothed model and has been 'replaced' by the single year CWV intercept for 20/21 (16.09) as a result the smoothed CWV intercept has fallen from 16.21 to 15.87

- A decrease in the CWV intercept indicates increased weather sensitivity, hence the DAF values for 2021/22 have increased in magnitude, as observed in the graph below

- The smoothed model for EM has also moved from being a 'Summer Reduction' model for 20/21 to a 'No Summer-reduction' for 21/22 which explains larger variance during summer months



DAF Comparison 2020/21 vs 2021/22 - LDZ EM
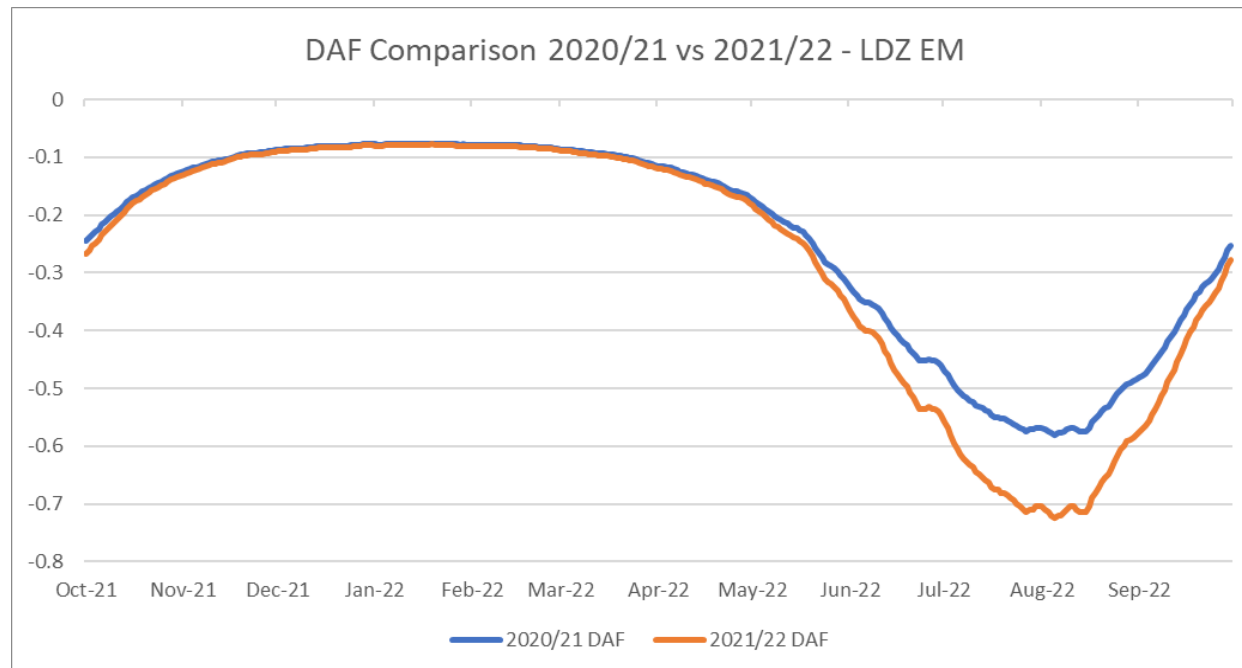
| LDZ EM | Smoothed Model | |
|---|---|---|
| Analysis Year | 2020/21 | 2021/22 |
| 17/18 | 16.88 | – |
| 18/19 | 15.80 | 15.80 |
| 19/20 | 15.72 | 15.72 |
| 20/21 | – | 16.09 |
| Smoothed Intercept | 16.21 | 15.87 |

# Topic 2: May bank holiday ALP Behaviour and UIG

**E.ON comment [condensed]:**
*"On the ALPs the profile drops after the 1st bank holiday in May across most LDZs and profiles (at differing degrees but always a drop). In this period [MAY '21] we saw quite a jump up of UIG across the industry, so does it correctly reflect the profile?"*

**Demand Estimation Team Response:**

- The change In ALP shape around the first bank holiday in May is due to the application of current Holiday code rules, as per <u>'Modelling Approach  2021' document</u> (Page 15)

<u>First Bank Holiday in May (Holiday codes 9 and 10)</u>

From Saturday immediately preceding bank holiday, for 9 days in total. (Holiday runs from Saturday to Sunday).
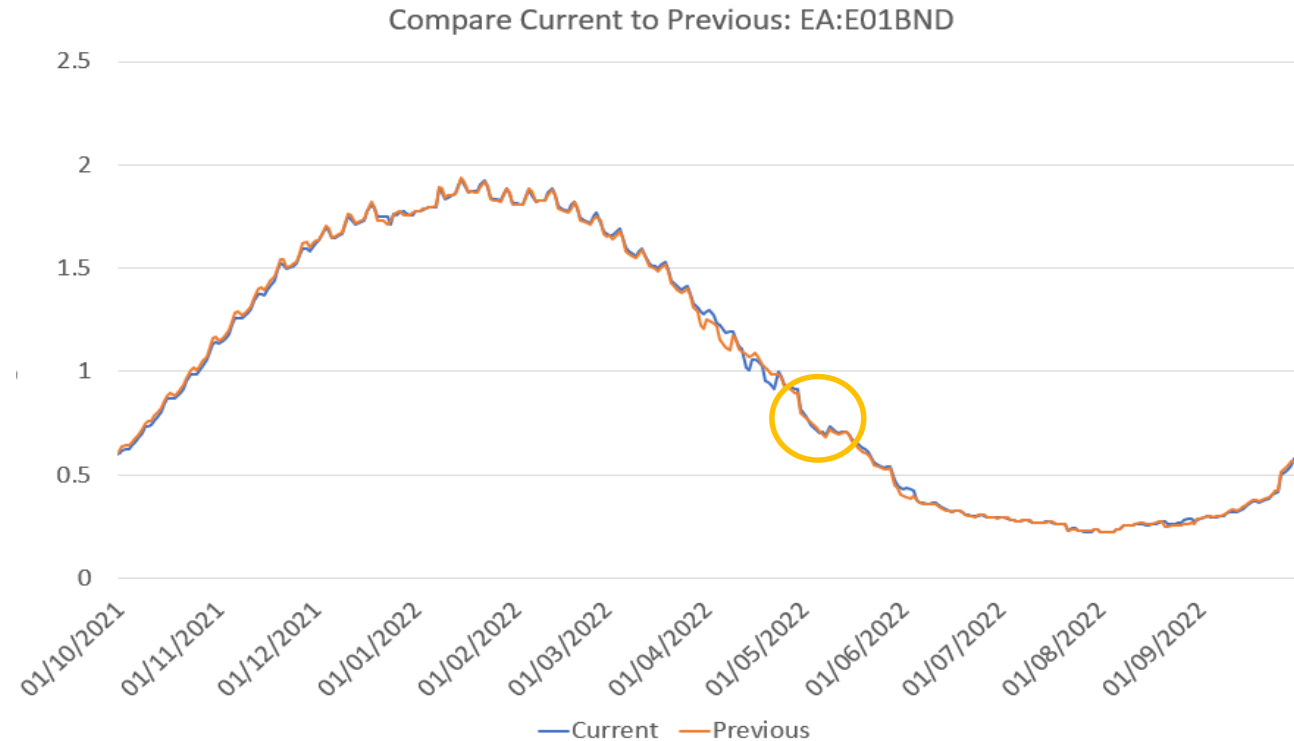
**Holiday code 9:**
First bank holiday in May; Saturdays and Sundays in period above.
Note Friday 8th May 2020 (VE Bank Holiday) will be treated as Holiday Code 9 as per DESC agreement

**Holiday code 10:**
All other days in period above.

Compare Current to Previous: EA:E01BND

# Topic 2: May bank holiday ALP Behaviour and UIG

- 2021 showed significant UIG following the May bank holiday, however, with changes to consumer behaviour due to COVID-19 and extreme weather it is unclear at the moment if the holiday rules need reviewing.

- We will gain a better understanding of the appropriateness of the holiday code rules during this period when we are able to collect and validate the sample data for Gas Year 2020/21 which will be reviewed as part of Strand 3 of NDM Algorithm Performance. As part of this analysis we can provide extra focus on the holiday periods. One possible option going forwards could be to differentiate holiday code rules between Domestic and Non-Domestic EUCs.
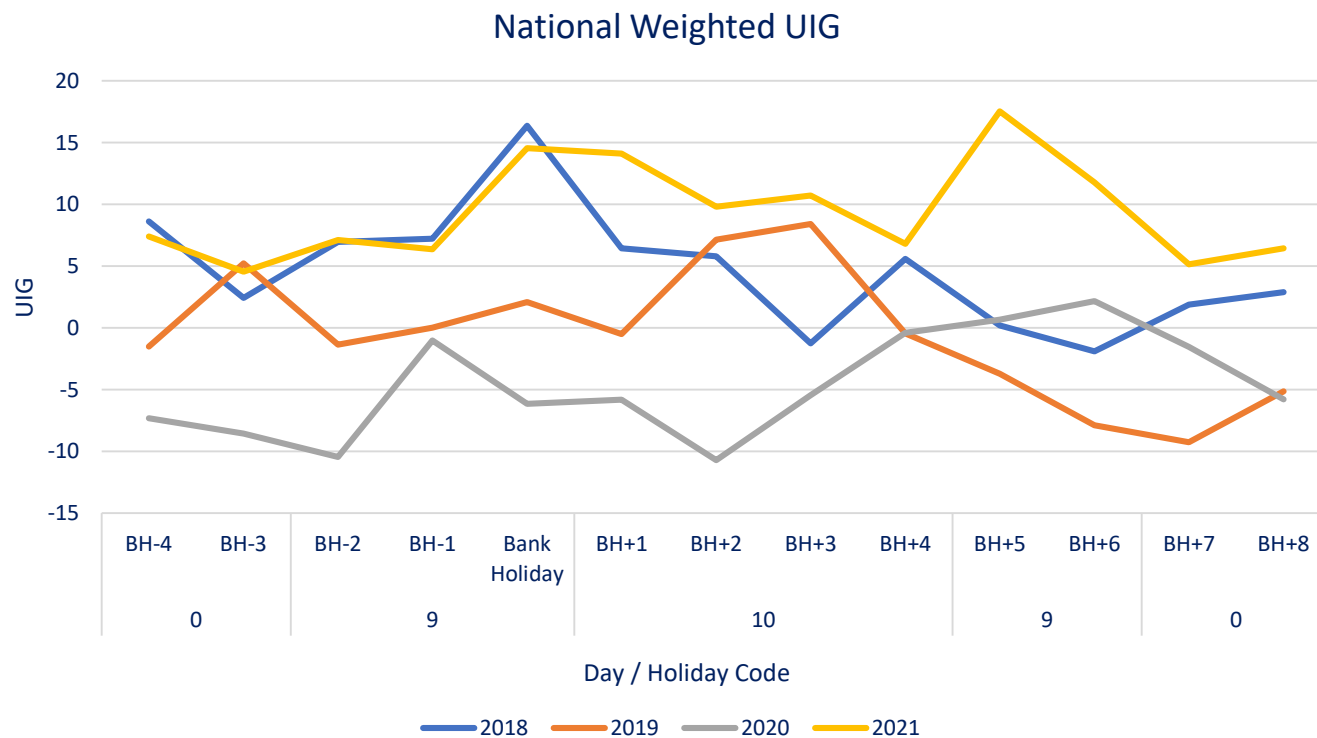
- During the May bank holiday period there was a low pressure system which brought extended cold and wet weather. This combined with the models including a holiday period reduction meant the models may not have reacted sufficiently - as above, algorithm performance analysis will help understand this.



National Weighted UIG



National Weighted CWV
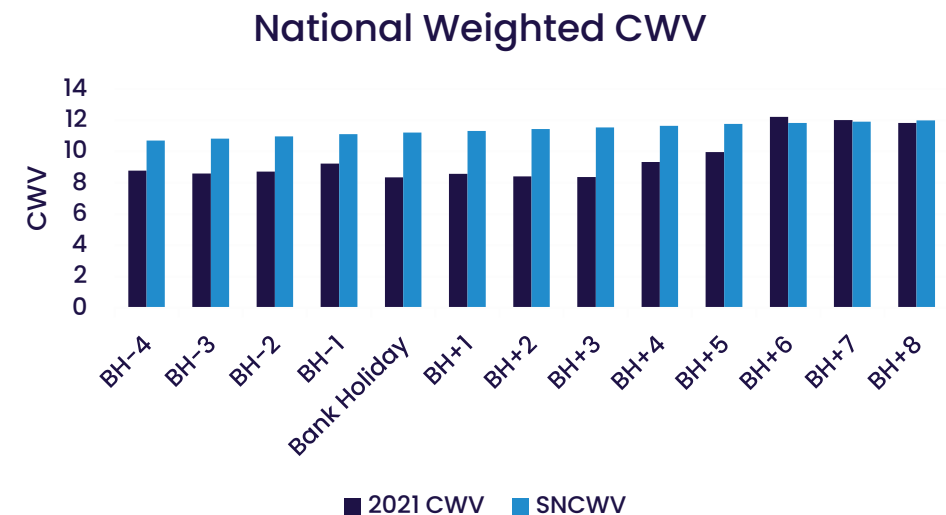
# Topic 3: Christmas Period ALP behaviour

**E.ON Comments:**
*"In January we see a dip until around the 7th, do we expect the holiday effect to last this far out?"*

**Demand Estimation Team Response:**

- The change In ALP shape during the first week of January is due to the application of current Holiday code rules, as per <u>'Modelling Approach  2021' document</u> (Page 14)



Compare Current to Previous: EA:E01BND
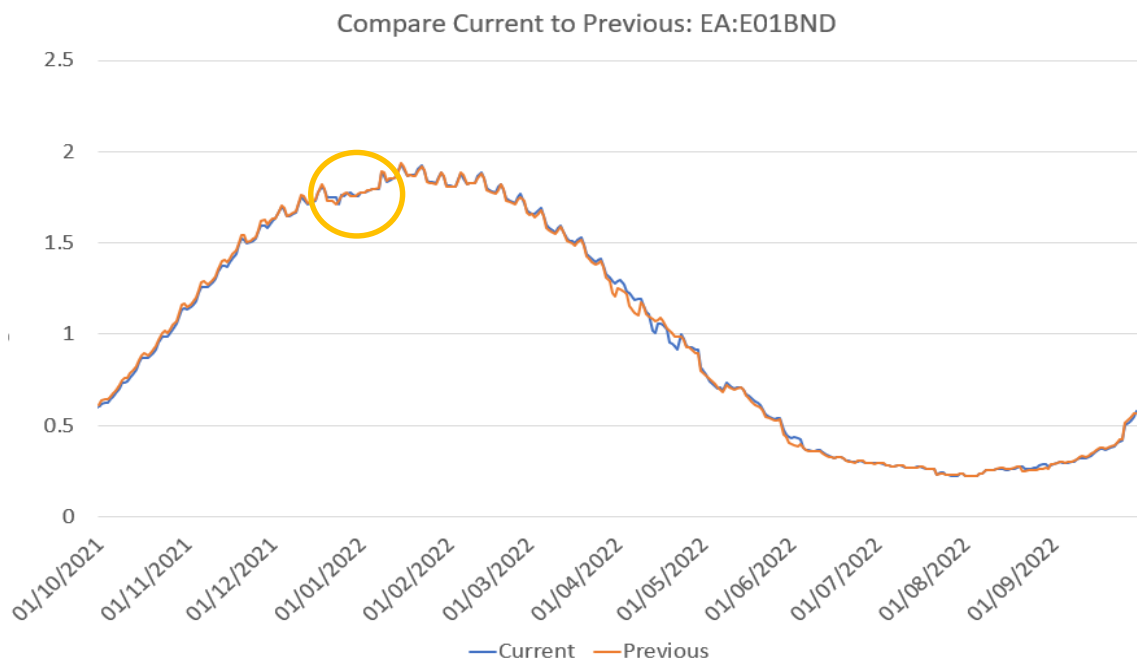
<u>**Christmas/New Year (Holiday codes 1, 2, 3, 4, and 5)**</u>
Holiday period starts on the Monday before 25th December (but if 25th December falls on a Monday, Tuesday or Wednesday, starts on the Friday before 25th December) and ends on the first Friday on or after the second New Year bank holiday in Scotland.

<u>**Holiday code 1**</u>: 25th December

<u>**Holiday code 2:**</u> 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

<u>**Holiday code 3:**</u> Any remaining Mondays to Fridays between 24th December and day before second Scotland New Year bank holiday inclusive

<u>**Holiday code 4:**</u> Remaining days before 24th December

<u>**Holiday code 5**</u>: Remaining days (will always include second Scotland New Year bank holiday)

# Topic 3: Christmas Period ALP behaviour

- The following table shows the Christmas holiday codes and how they are used in training the model (2018-2020) and also how it is applied in calculating derived factors for Gas Year 2021/22 (2021)

| | Training Periods | | | | | Target Year | |
|---|---|---|---|---|---|---|---|
| **Christmas 2018** | | **Christmas 2019** | | **Christmas 2020** | | **Christmas 2021** | |
| Date | Hol Code | Date | Hol Code | Date | Hol Code | Date | Hol Code |
| Tue 18/12/2018 | | Wed 18/12/2019 | | Fri 18/12/2020 | | Sat 18/12/2021 | |
| Wed 19/12/2018 | | Thu 19/12/2019 | | Sat 19/12/2020 | | Sun 19/12/2021 | |
| Thu 20/12/2018 | | Fri 20/12/2019 | 4 | Sun 20/12/2020 | | Mon 20/12/2021 | 4 |
| Fri 21/12/2018 | 4 | Sat 21/12/2019 | 2 | Mon 21/12/2020 | 4 | Tue 21/12/2021 | 4 |
| Sat 22/12/2018 | 2 | Sun 22/12/2019 | 2 | Tue 22/12/2020 | 4 | Wed 22/12/2021 | 4 |
| Sun 23/12/2018 | 2 | Mon 23/12/2019 | 4 | Wed 23/12/2020 | 4 | Thu 23/12/2021 | 4 |
| Mon 24/12/2018 | 3 | Tue 24/12/2019 | 3 | Thu 24/12/2020 | 3 | Fri 24/12/2021 | 3 |
| Tue 25/12/2018 | 1 | Wed 25/12/2019 | 1 | Fri 25/12/2020 | 1 | Sat 25/12/2021 | 1 |
| Wed 26/12/2018 | 2 | Thu 26/12/2019 | 2 | Sat 26/12/2020 | 2 | Sun 26/12/2021 | 2 |
| Thu 27/12/2018 | 3 | Fri 27/12/2019 | 3 | Sun 27/12/2020 | 2 | Mon 27/12/2021 | 2 |
| Fri 28/12/2018 | 3 | Sat 28/12/2019 | 2 | Mon 28/12/2020 | 2 | Tue 28/12/2021 | 2 |
| Sat 29/12/2018 | 2 | Sun 29/12/2019 | 2 | Tue 29/12/2020 | 3 | Wed 29/12/2021 | 3 |
| Sun 30/12/2018 | 2 | Mon 30/12/2019 | 3 | Wed 30/12/2020 | 3 | Thu 30/12/2021 | 3 |
| Mon 31/12/2018 | 3 | Tue 31/12/2019 | 3 | Thu 31/12/2020 | 3 | Fri 31/12/2021 | 3 |
| Tue 01/01/2019 | 2 | Wed 01/01/2020 | 2 | Fri 01/01/2021 | 2 | Sat 01/01/2022 | 2 |
| Wed 02/01/2019 | 5 | Thu 02/01/2020 | 5 | Sat 02/01/2021 | 2 | Sun 02/01/2022 | 2 |
| Thu 03/01/2019 | 5 | Fri 03/01/2020 | 5 | Sun 03/01/2021 | 2 | Mon 03/01/2022 | 2 |
| Fri 04/01/2019 | 5 | Sat 04/01/2020 | | Mon 04/01/2021 | 5 | Tue 04/01/2022 | 5 |
| Sat 05/01/2019 | | Sun 05/01/2020 | | Tue 05/01/2021 | 5 | Wed 05/01/2022 | 5 |
| Sun 06/01/2019 | | Mon 06/01/2020 | | Wed 06/01/2021 | 5 | Thu 06/01/2022 | 5 |
| Mon 07/01/2019 | | Tue 07/01/2020 | | Thu 07/01/2021 | 5 | Fri 07/01/2022 | 5 |
| Tue 08/01/2019 | | Wed 08/01/2020 | | Fri 08/01/2021 | 5 | Sat 08/01/2022 | |
| Wed 09/01/2019 | | Thu 09/01/2020 | | Sat 09/01/2021 | | Sun 09/01/2022 | |
| Thu 10/01/2019 | | Fri 10/01/2020 | | Sun 10/01/2021 | | Mon 10/01/2022 | |

- The holiday period is similar in length to that applied in 2020/21, however begins and ends 1 day earlier.

- Due to New years day falling on a Saturday, the holiday period runs until Friday 7th January 2022

- The start and end dates for holiday periods, particularly Christmas, are difficult to define with certainty.

  Do DESC have any insight based on observed data? Are there noticeable differences between Domestic and I&C?

# Section 5: Conclusions and Next Steps

# Conclusions

• Minimal DESC/TWG feedback this year which is perhaps not surprising given the 'roll-forward' of the majority of smoothed EUC Demand Models

• Comments received have focused on some of the holiday periods which can be explored in greater detail during Strand 3 of NDM Algorithm Performance (December DESC).  In advance of this we welcome any feedback from DESC on existing holiday code rules which can be fed into the 2022 Modelling Approach

• Are DESC happy to approve the smoothed EUC demand models and profiles for wider industry review (as currently published)?

• If not, need to confirm actions and revised timescales required to progress, ahead of wider industry consultation period (5 day window)

# Next Steps

Pending DESC Approval today:

- w/c 12th July, the wider industry consultation of 5 business days on the draft profiles will commence

- The DESC meeting on 21st July will consider any further comments received with the aim of finalising the profiles for Gas Year 2021/22 at the meeting

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