3.0 Adhoc Workplan Update

Demand Estimation Sub Committee

06/10/2021

Provided by:

Objective

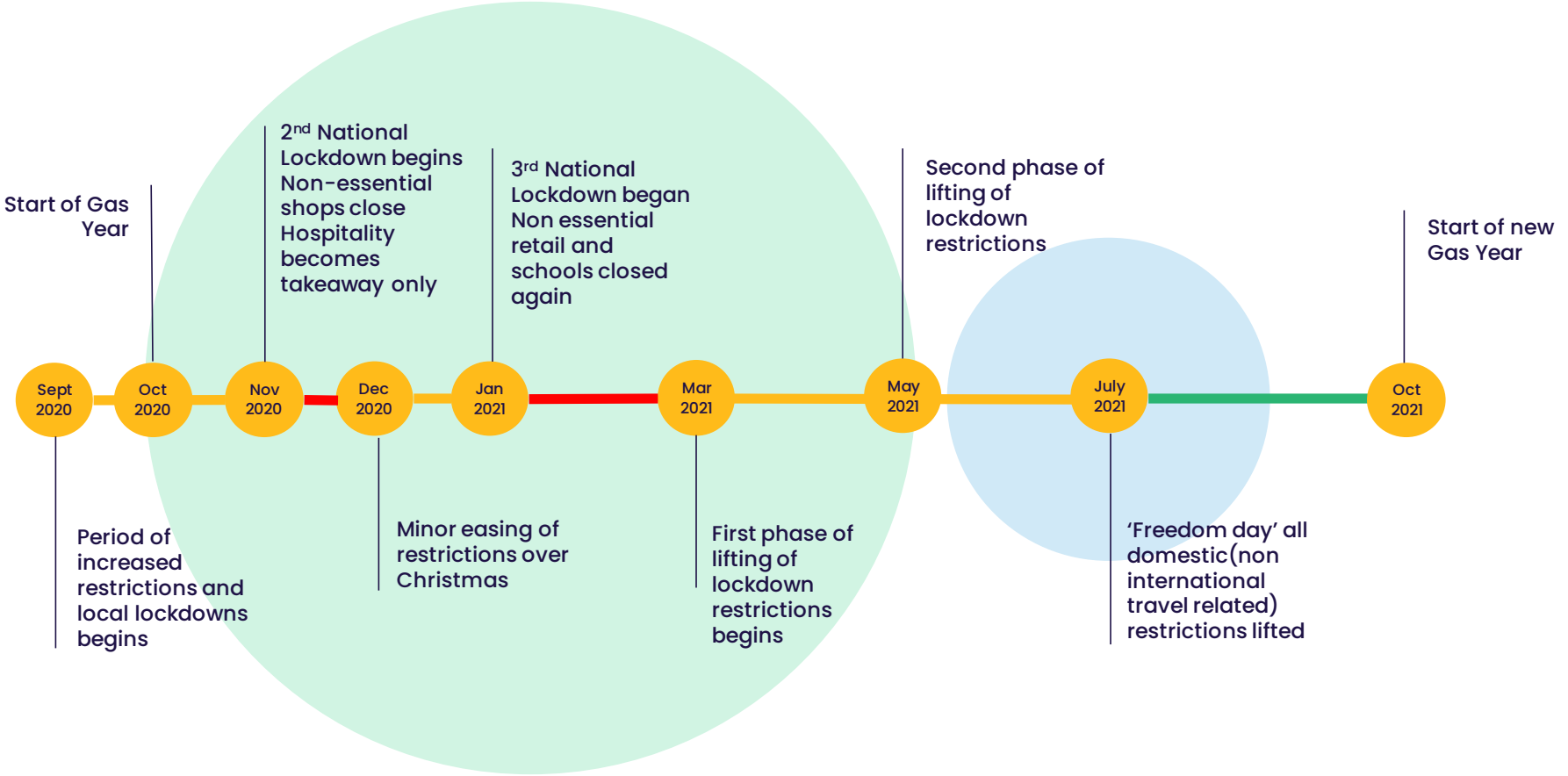
- To review Approach to DESC's Workplan for Autumn 2021 and Winter 2022

Workplan Items – Autumn/Winter 21/22

- The Adhoc work plan as agreed in July's DESC meeting is as follows:
  - Algorithm Performance for Gas Year 2020/21 (3 Strands of analysis)
  - Modelling Approach 2022 preparations (for Gas Year 2022/23):
    - Holiday Codes Analysis – Investigate model performance from recent periods. Possible split in rules by I&C/Dom/LDZ
    - Focus on Prepayment EUCs (e.g. 01BPD) and their use in 2022/23
    - Finalise Modelling Approach document
  - Support Workgroup 0754R: "Investigate Advanced Analytic Options for improvements to NDM Demand Modelling"
  - Complete upgrades to Demand Estimation Team systems for Handling and Validating sample data submissions (to improve management of growing MOD654S submissions)

Algorithm Performance: Gas Year 2020/21

COVID-19 Impact Timeline – Gas Year 2020/21



Algorithm Performance – Gas Year 2020/21: Approach

- Strand 1 – Weather Analysis – CWV vs SNCWV
  - Summary of Weather experience to provide context behind Strand 2 and 3 results
- Strand 2 – Unidentified Gas (UIG) Analysis
  - Review of UIG volumes/% during Gas Year by Season, including COVID Impacts
  - Investigate possible 'signals' of NDM modelling error
- Strand 3 – NDM Sample Demand Analysis
  - Band 1 Domestic EUC Models less impacted by COVID and so usual scrutiny applied, including modelling performance during holiday periods e.g. First May Bank Holiday
  - For the I&C EUC Models – high level view (i.e. less scrutiny), as results not likely to reveal any clear learning points to improve modelling, due to too much COVID related 'noise' e.g. lockdowns/restrictions
- Timescales:
  - Analysis presented at 14th December DESC Meeting
- Any Recommendations to be fed into Modelling Approach 2022

Modelling Approach 2022: Prepayment EUCs

Background: MOD451AV

- In April 2013 a Modification to UNC was raised by a Shipper who had evidence to suggest that the profile of Pre Payment Meters was 'flatter' (i.e. less weather sensitive) than that of a standard Credit meter.

- The Modification went live in October 2014 and resulted in Offline Financial Adjustments using the new ALPs/DAFs created by the Demand Estimation Team and approved by DESC.

- This process continued until June 2017 when Project Nexus went live and introduced Meter Point reconciliation for all sites.

Background: New EUCs

- In 2018 the Demand Estimation Sub Committee (DESC) proposed to create new EUCs in Bands 1 and 2 to reflect the different consumer categories such as Domestic, I&C and Prepayment.
- Following analysis which showed there was clear differences in the Domestic and I&C consumers and the previous analysis shared as part of MOD451 AV, DESC agreed to create 8 new EUC bands to represent the EUCs in AQ Range 0-293 MWH pa (see Table 1)
- This was achieved by using the additional Supply Point Register items of Market Sector Code, Meter Type and Payment Method
- The new EUC Definitions took effect from October 2019.

Table 1: EUC Definitions since October 2019

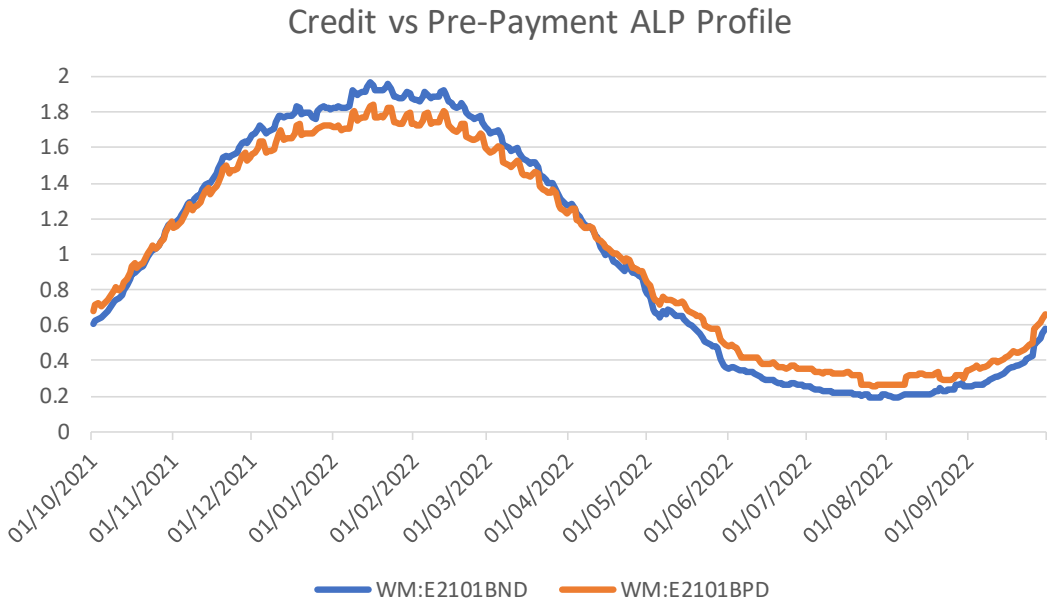
Description	Range	EUC	Supply Point Counts
Band 1 PPM Domestic	0 to 73.2 MWh pa	01BPD	2,089,600
Band 1 PPM I&C		01BPI	3,566
Band 1 Non PPM Domestic		01BND	21,716,333
Band 1 Non PPM I&C		01BNI	560,371
Band 2 PPM Domestic	73.2 to 293 Mwh pa	02BPD	1,905
Band 2 PPM I&C		02BPI	62
Band 2 Non PPM Domestic		02BND	47,997
Band 2 Non PPM I&C		02BNI	151,660

Over 2m Supply Points currently categorised as Domestic Prepayment ("01BPD", "02BPD")

**Supply point counts as of August 2021*

NDM Sample Data: Pre-Payment

- Since the new EUCs took effect in 2019, we have not received enough PPM sample data to use in the Modelling or Algorithm Performance processes.
- Instead, the original data from MOD451AV has been used, however this is approaching 10 years old.
- We are investigating the use of Class 3 Read data submissions for the Prepayment EUC as a possible source - progress with this to be shared at December's DESC meeting
- We need up to date data to ensure that the profiles DESC prepare are **representative** of the latest behaviour patterns in the population, especially with any modelling error finding its way into UIG



EUC	PLF
WM:E2101BND	0.298
WM:E2101BPD	0.335

Example of the current differences between Domestic Prepayment EUC ("01BPD") and Domestic Credit EUC ("01BND") shown in the form of the Annual Load Profile (ALP) and the Peak Load Factor (PLF) for LDZ: WM

Question: Is this still a fair representation ?

Work in Progress:

- To help DESC make decisions on this topic and in the absence of Prepayment sample data we are looking at ways we can assess data available to us to confirm the suitability of the current Prepayment profiles e.g.

- Analysis of reconciliation data, how does 'drift' profile* compare between EUCs

  **drift is the difference between allocated and actual energy*

- Simulation of Demand Attribution using alternative profiles to review UIG levels e.g. is UIG worse as a result of using Credit Meter profiles instead of Prepayment

Possible Options for DESC to consider:

Option 1:
Do nothing and continue using MOD451AV data

Option 2: (Preferred)
Receive enough good/recent Prepayment data to use in the modelling and Algorithm Performance processes

Option 3:
Use the current Credit Meter profiles in the Prepayment EUCs until such time we are able to produce an upto date representative profile

Note:
DESC do not need to decide today but we do want to ensure the Modelling Approach 2022 is clear what should happen if there is insufficient Prepayment data available for Gas Year 2022/23 profiles

We welcome DESC's views on this

Modelling Approach 2022: Holiday Codes Review

Modelling Approach 2022 – Holiday Code Rules: Intro.

- The current Modelling Approach includes a set of rules for determining holiday periods which are then used to calculate Holiday Factors for each of the EUC demand models
  - Appendix 5 of the Modelling Approach document provides the detail of the current Holiday Code Rules

- In summary there are rules for the following periods:

  - Christmas/New Year
  - Easter (example below)
    - Easter Period:
      Start: Wednesday before Good Friday; End: Friday after Good Friday
    - Easter Codes:
      Code 4 - Easter Saturday/Sunday, Code 5 – Good Friday/Easter Monday, Code 6 – All other days
  - First May Bank Holiday
  - Late May Bank Holiday
  - Summer Holiday
  - August Bank Holiday

- The current Holiday Code rules have been in place since 2011 and so are overdue a review

- In recent year's there have been questions raised in DESC's representations on the draft profiles about the suitability/appropriateness of the holiday periods within the ALPs/DAFs, e.g. length of period for Christmas/New Year and/or First May Bank Holiday

Modelling Approach 2022 – Holiday Codes: Background

- EUC demand models are derived from sample data using regression analysis
- Regression coefficients (C1 and C2) are derived from sample demands for Mondays to Thursdays
- In some EUC demand models a reduction in demand is observed during holiday periods compared with the non-holiday Monday to Thursday demand
- In these cases it is necessary to carry out modelling of holiday effects by excluding holiday days from the regression
- A multiplicative factor for the days assigned in each holiday period is calculated
- Holiday factors are calculated from the NDM sample data and therefore cannot be specified in advance of the modelling analysis in the Spring, however rules for defining holiday periods can be reviewed

Modelling Approach 2022 – Holiday Code Review: Scope

- The review of holiday codes will examine holidays and utilise existing model results
- There are currently 16 holiday codes in use which should be sufficient for all scenarios
- When determining the scope we need to be aware of time/resource constraints which means analysis needs to be focused on the main issues as DESC sees them
- It is not intended that the Summer Reduction period from late May to late September will change in this review, as this would unduly complicate the analysis
- The analysis will look to use data and models back from 2016/17 to 2019/20 – these years are the only ones for which models are available using the new CWVs and SN basis
- Two main proposed objectives of analysis:
    - Identify days within or neighbouring existing holiday periods which may need to be reclassified as holidays or non-holidays and reallocate the holiday codes for each period if necessary
    - Review whether it is still appropriate to exclude holiday days within regression analysis for the "domestic" EUC models (e.g. "01BND")

Modelling Approach 2022 – Holiday Code Review: Approach

- Approach:
  - Review holiday periods performance (modelling error) using actual demand from sample for recent Gas Years (2017/18, 2018/19 and 2019/20). Review Domestic and I&C models across all LDZs
  - Assess alternative periods using Demand Modelling inputs (2016/17 to 2019/20) via an appropriate methodology e.g. ANOVA ("Analysis of Variance")
  - Provide recommendations on Holiday Codes, including any changes amongst EUCs/LDZs

- Feedback today from DESC will help shape the scope of the analysis. Considering each of the existing holiday periods :
  - Which holiday periods do DESC particularly think should be reviewed?
  - Which days do DESC members think should be considered for inclusion in a revised definition of the period?
  - Within the preferred definition of the period above, which (if any) reallocations of the current holiday codes should be considered?
  - Any suggestion should be expressed in a way that can be applied to any given past or future year

Modelling Approach 2022 – Holiday Code Review: Summary

- It is likely that modelling error will be more 'volatile' during holiday events due to the more varied/inconsistent behaviour and fewer data points available to train the models on

- However, there may be improvements that can be made to the rules in terms of

  - Holiday period definition
  - Definition of holiday codes within period
  - Application (or not) of holidays to demand models (LDZ, EUC)

- The recent upgrade to the Demand Estimation modelling system does provide more flexibility in terms of how holidays are handled across LDZs and EUCs, however one key principle remains, within an EUC/LDZ we need to ensure the holiday code rule definition can be applied to any year i.e. for training and target years

- Timescales:

  - Analysis presented at 14th December DESC Meeting

  - Follow up work Dec-Feb with conclusions needed in time for 3rd March DESC Meeting when Modelling Approach discussions will need to be finalised and approved by DESC

Sample Handling System

Sample Handling System Update

- For Algorithm Performance this year we will be using our new system that has been built to handle the increase sample numbers

- What does that mean for you?

  - File naming and structure must meet the file format or will be rejected back
  - We will be performing checks on a much more regular basis so any observations will be fed back more frequently
  - We will have access to greater level and detail of reporting which will be shared with DESC and the Shippers eligible for sample data submissions
  - We have identified potential areas of improvement with the current validation rules, once these have been tested further updates will be provided.

Thank you