



## Demand Estimation Sub Committee

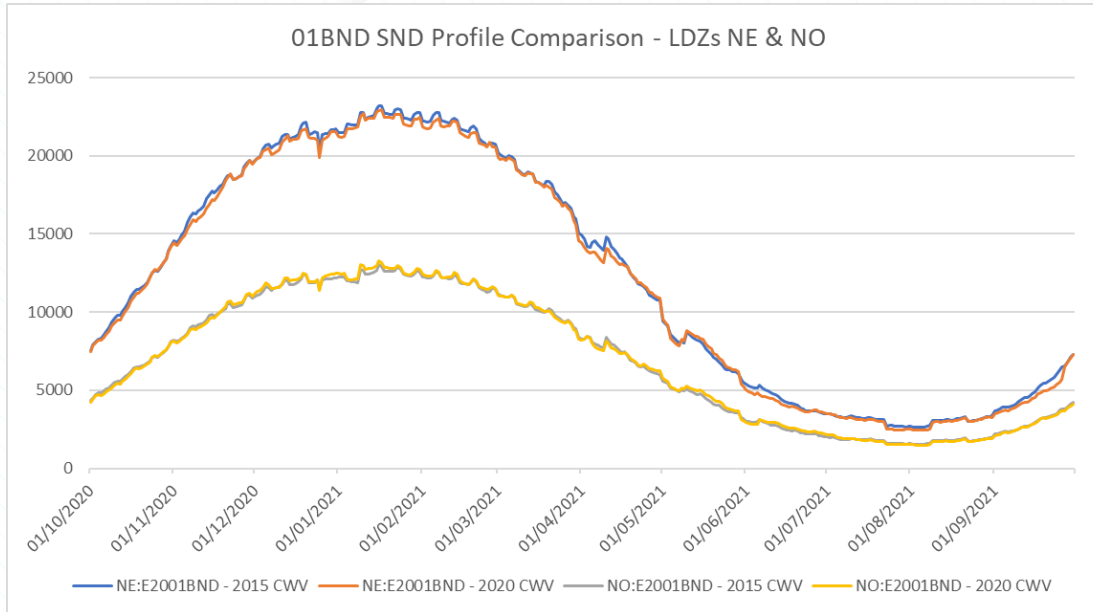
### Update on DESC action 0702

*“CDSP to investigate into possible reasons why Northern EUC ratios tend to be greater than 1 and other LDZs are not.”*

22<sup>nd</sup> July 2020

# SND Profiles

- 'EUC Ratios' are calculated as the ratio of the  $\sum \text{SND}_t$  (Seasonal Normal demand for day t) from the new Demand model with the  $\sum \text{SND}_t$  from the existing Demand model, as discussed at DESC meeting on 06<sup>th</sup> July 2020



- The difference in SND Values between CWV versions for EUCs NE:E2001BND and NO:E2001BND can be seen.
- New SND values in NE:E2001BND are generally lower (orange line vs blue) hence a <1 EUC Ratio of 0.984
- New SND values in NO:E2001BND are generally higher (yellow line vs grey) hence a >1 EUC ratio of 1.005

# Seasonal Normal Demands

- As presented at DESC meeting on 07<sup>th</sup> July 2020, the formula for calculating the SND value for a given gas day is :

$$SND_t = P_t * (C_1 + C_2 * SNCWV_t)$$

Where:

- $P_t$  is a multiplicative factor set to 1 for non-holiday Monday to Thursday and potentially a different value on Friday to Sunday or Holiday days.
  - $C_1$  is the constant from the non-holiday Monday to Thursday regression of daily demand against CWV
  - $C_2$  is the Slope of this regression line, which represents the weather sensitivity of demand for non-holiday Mondays to Thursdays.
- To produce SND values, three individual year models (1718, 1819, & 1920) have been restated to obtain revised values for  $C_1$ ,  $C_2$ ,  $P_t$  (Weekend, and Holiday factors) for each year. These parameters have then been smoothed prior to being used in the calculation of the SND. Demand behaviours on these restated gas days, as well as the changes to the CWV and SNCWV basis all contribute to the calculation of the SND and the subsequent EUC factors.

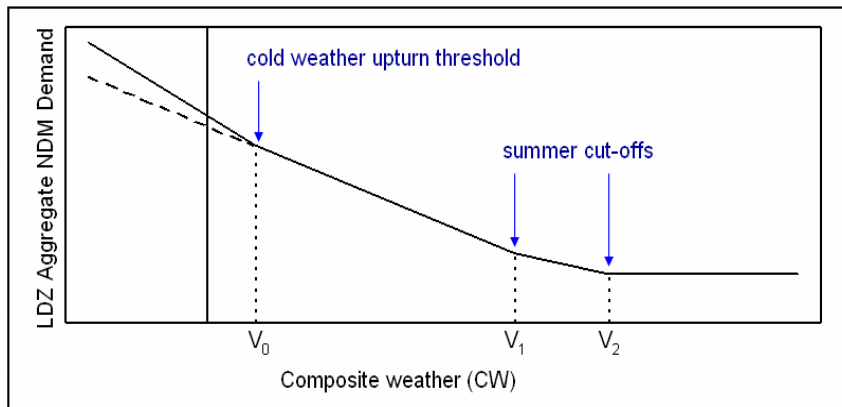
# CWV Characteristics

- Changes to the underlying characteristics of the CWVs will have an impact on the 'constant' and 'slope' of the regression analysis performed on the CWV vs Daily Demand. These values feed into the calculation of the SND values.
- As presented at DESC meeting on [09<sup>th</sup> December 2019](#), LDZ NO saw a large increase in it's Cold weather upturn threshold parameter (V0) which lead to an large increase in the percentage of days falling within the 'Cold Weather upturn' transition phase in historic data when compared with other LDZs. This trend has continued during the EUC gas Demand Modelling period.
- Reminder of changes to Threshold values for LDZ NO:

CWV Formula	Cold Weather Sensitivity (I3)	Cold Weather Upturn Threshold (V0)	Lower Warm Weather Cut-Off (V1)	Upper Warm Weather Cut-Off (V2)	Slope Relating to Warm Weather Cut-Off (q)
2015	0.15	3	13	16	0.46
2020	0.126	5.000	12.005	15.779	0.438

# CWV Characteristics

## Reminder of relationship between CW and LDZ aggregate NDM Demand



## Number of days falling within each transition period historically (using adjusted weather history).

Phase	2015 CWV Formula	2020 CWV Formula
Summer cut-off	4.58%	4.86%
Transition	22.80%	25.26%
Normal	57.94%	38.96%
Cold weather upturn	14.68%	30.92%

- The cold weather upturn is the point at which the relationship between CW and demand no longer fits the linear regression under normal conditions, and a modification is performed on the CW to retain linearity in the subsequent CWV.
- The change in NO's parameters means that this point is being reached far more often, as now CW's up to the value of 5.00 will fall in the cold weather upturn threshold, whereas previously only CW's up to the value of 3.00 were considered.
- Historically, under seasonal normal conditions, this has led to more than twice as many days falling within the Cold Weather upturn threshold.

# Conclusion

- Due to the nature of the SND calculation, it is difficult to pinpoint exactly what causes the observed trend of Northern (NO) LDZ exhibiting EUC ratios  $> 1.000$
- Some of this trend may be explained by the changing of the CWV parameters which in turn modify the underlying structure of the CWV
- The cold weather upturn threshold appears to have an influence on LDZ NO's CWV more than any other which could explain some of the variation in the EUC ratios
- Some of the differences in the CWV characteristics are mitigated with similar changes in the SNCWV, hence why the majority of values still fall very close to a value of 1.000