



Demand Estimation Sub Committee

4.2 Ad Hoc Work Plan Item 2 - EUC Review

5th October 2022

Recap - Autumn/Winter 22/23 – Ad Hoc Work Plan Item 2 - Proposal

- Review of existing End User Category (EUC) definitions
 - DESC implemented the first set of changes to the EUC definitions 3 years ago (from Gas Year 2019/20), this introduced new categories that uses the Market Sector Code (MSC), Meter Mechanism and Payment Type
 - Domestic Band 1 (0 to 73.2 MWh pa) i.e. “01BND” represents a large proportion of the NDM market. Our proposal is to review the sub bands within this AQ range to check if the profile remains homogenous or are there more distinct profiles existing ? e.g. is there a cooking only band which we are applying a weather sensitive profile too
 - Large NDM (>2,196 MWh pa): Do we need 273 Large NDM EUC models for 12% of the NDM population, when we have 234 for 88% of the NDM population?

Our proposal is to investigate whether a better approach to managing these Large EUCs exists

- Any recommendations from this review would need to prove they are better than existing arrangements e.g. reduced modelling error and improved NDM algorithm performance
- Expect to report at October, December and March DESC meetings.

Where possible any proposed changes / recommendations in place for Spring 2023

Summary of Proposed areas for Investigation

- Band 1 Domestic Cooking only loads (e.g. less weather sensitive)
- Bands 3 and 4 WAR Band Calculations
- Reduce models for Large NDM (suggested starting points)
 - Bands 5-8 WAR Band Calculations
 - Band 9

These are suggested starting points, please let us know if you have any other ideas you would like us to consider. We are happy to discuss after if there is something you would rather not raise in the meeting.



BAND 1 DOMESTIC (01BND)

Band 1 Domestic (01BND)

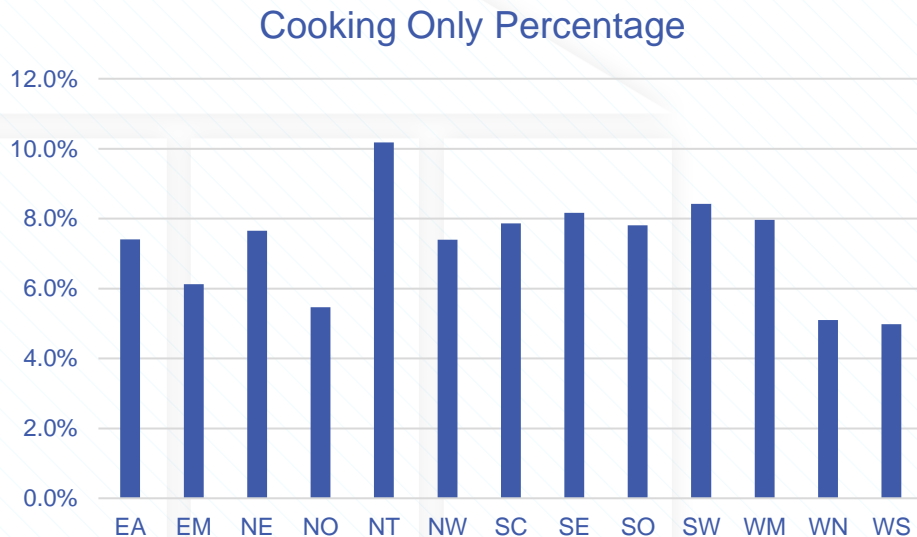
- Band 1 Domestic meters make up 89.7% of the non daily metered (NDM) count and 66.4% of the NDM volume
- Any improvement that can be made to these forecasts will improve the overall forecast accuracy and likely have a positive impact on UIG
- Identifying domestic meters with cooking only loads should improve forecasting accuracy as these will have a flatter consumption profile than average
- The easiest way to do this is using the Winter Annual Ratio (WAR), which is currently only used for higher non-domestic EUCs

Available Data

- ONS (Office of National Statistics) data on Domestic Heating Types is available at Local Authority level
- Scotland publish the data differently, and a percentage of heating types is only available nationally
- Separately available is a percentage of domestic properties that are not connected to the gas grid
- These, combined with the Local Authority and LDZ postcodes has enabled a calculation of the percentage of domestic properties connected to the grid that do not use mains gas for their heating
- See chart on the following slide

Cooking Only Domestic Meters

- Combining the percentage of mains connected properties, with those that have gas main heating gives an estimated percentage of cooking only load properties
- This estimated percentage of domestic cooking only load properties is shown on the right
- Included in this percentage is likely to be a small number of properties that are gas mains connected but also do not use gas for cooking



Sample Data Information

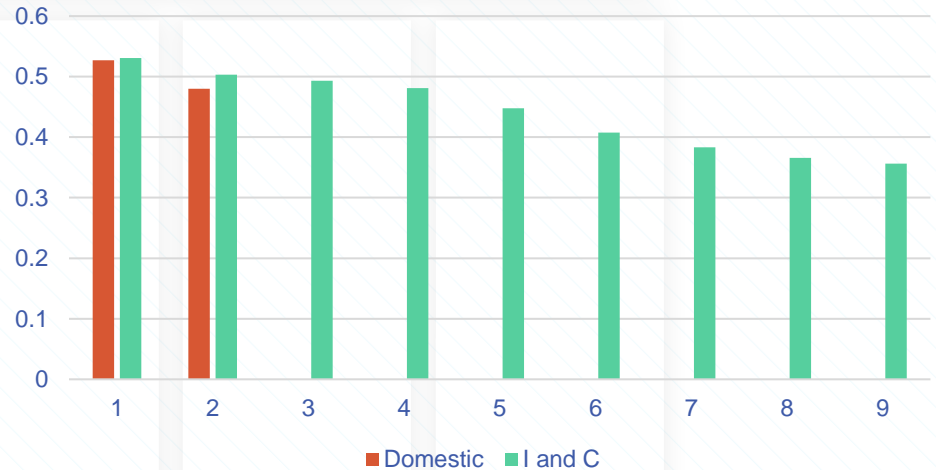
- Sample data information on the following slides is based on the data received in April 2022 for the period 1st March 21 to 31st March 22
- The Winter Annual Ratio was therefore calculated on winter 2021/22
- The sample count for the different bands and market sector code is below
- This exclude Pre-Payment meters

Consumption Band	Domestic	I and C	Total
1	4,918	4,392	9,310
2	187	4,374	4,561
3		3,280	3,280
4		2,876	2,876
5		1,233	1,233
6		502	502
7		218	218
8		156	156
9		196	196
Total	5,105	17,227	22,332

Winter Annual Ratios

- The Winter Annual Ratio is used to provide an indication of the seasonality of a meter's consumption
- Generally meters with a higher consumption have a lower WAR, indicating larger consumption meters have less seasonality
- This value is currently only used for consumption band 3 and above

WAR By Consumption Band

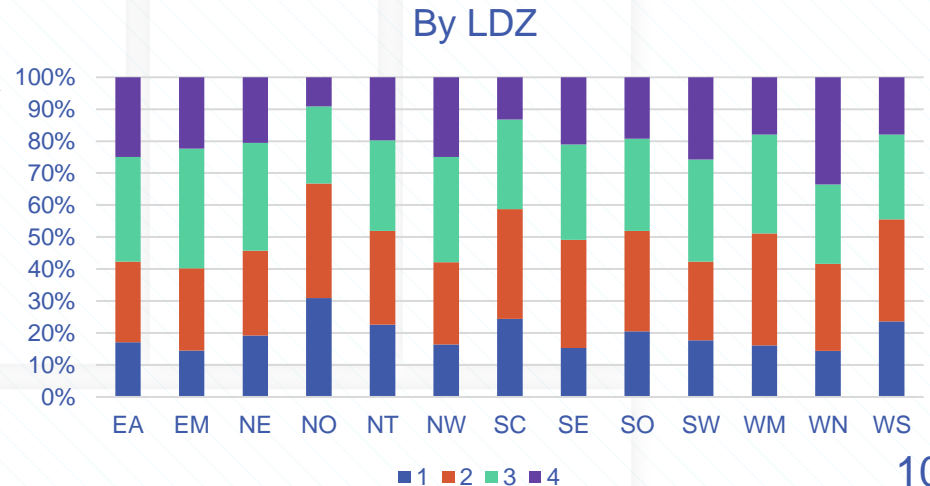


01BND Winter Annual Ratios

- Cooking only meters have a different Winter Annual Ratio (WAR), to those with mains gas heating
- The chart below shows the WAR band split by LDZ when calculated on 01BND as a whole (based on 20%, 30%, 30%, 20%)
- The difference between LDZs is likely to be influenced by the cooking only percentage shown on slide 7 and different seasonal behaviour

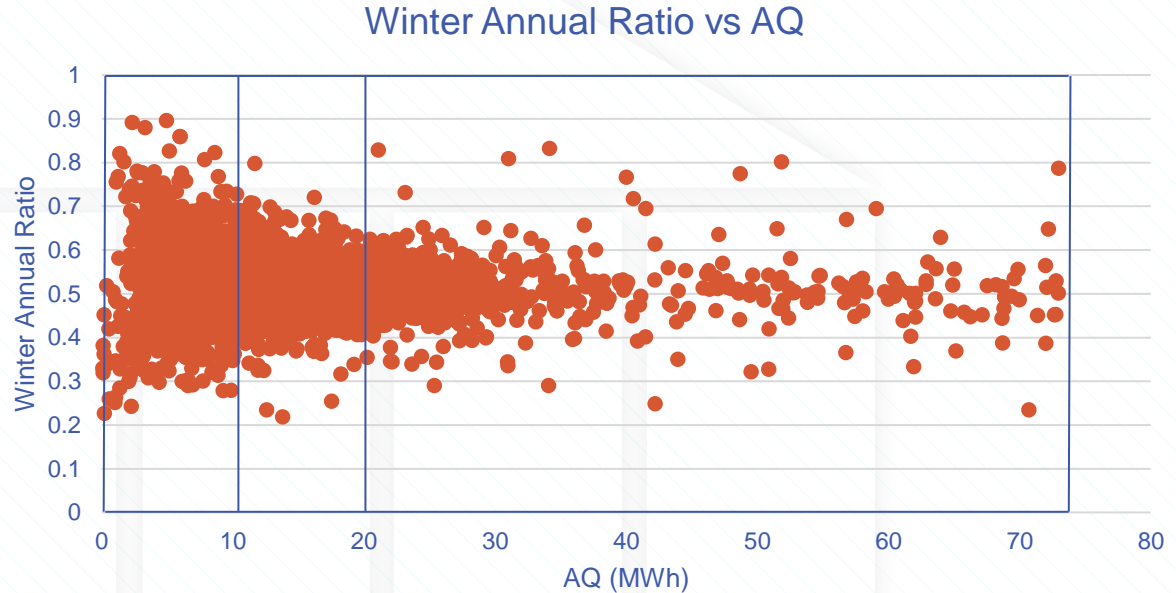
These meters have a high seasonality (purely heating)

These meters would have little to no seasonality (cooking only)



01BND WAR Distribution

- The chart on the right shows the AQ/ WAR relationship for Band 1 Domestic (01BND) Sample meters (c. 4,900)
- Stratification bands are marked
- There is little correlation between AQ and Winter Annual Ratio



- The lower consuming meters have the widest spread of Winter Annual Ratios

Next Steps

- Produce ALPs and DAFs using WAR bands for 01BND and test to see if the modelling results are improved
- Reminder: At this stage the results should be considered exploratory 'blue-sky' analysis. Any potential recommendations would likely to require changes to Uniform Network Code and/or UK Link



BANDS 3 AND 4 WAR BANDS

Background

- Historically, for WAR band EUCs in the consumption range 293-2196 MWh p.a. (bands 03 and 04) forecasts were based on the overall range, to enable analysis by individual LDZ instead of LDZ groupings
- In recent years however we have had sufficient data to model these WAR bands separately by LDZ in all but 2 areas (WN and WS)
 - Sample counts from Spring 2022 are shown below
 - Combining 03 and 04 still results in insufficient sample data for WN (for WAR Bands 01 and 04)

Sample Count	03B	04B
SC	354	322
NO	207	181
NW	338	264
NE	200	257
EM	299	210
WM	273	254
WN	44	38
WS	96	100
EA	300	235
NT	337	278
SE	351	314
SO	272	269
SW	234	179



20% Sample Count	03 and 04	03	04
SC	135	71	64
NO	77	41	36
NW	121	68	53
NE	91	40	51
EM	102	60	42
WM	106	55	51
WN	17	9	8
WS	39	19	20
EA	107	60	47
NT	123	67	56
SE	133	70	63
SO	108	54	54
SW	83	47	36

Next Steps

- The proposal for the 23/24 Modelling approach is to base the forecasts on the separate consumption bands by LDZ where possible
- As with other bands where data sample data is insufficient the LDZs can be combined with a close neighbour for modelling

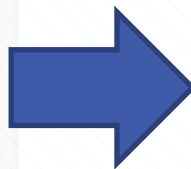


BANDS 5-8 WAR BANDS

WAR Band Forecast Background

- Whilst there are generally enough sample meters for modelling the bucket bands (e.g. 06B), once this sample is split into WAR bands, in most cases there are insufficient sample meters for forecasting purposes
- The table on the right shows 20% of the sample, reflecting the smallest samples in the 20%, 30%, 30%, 20% WAR band aim

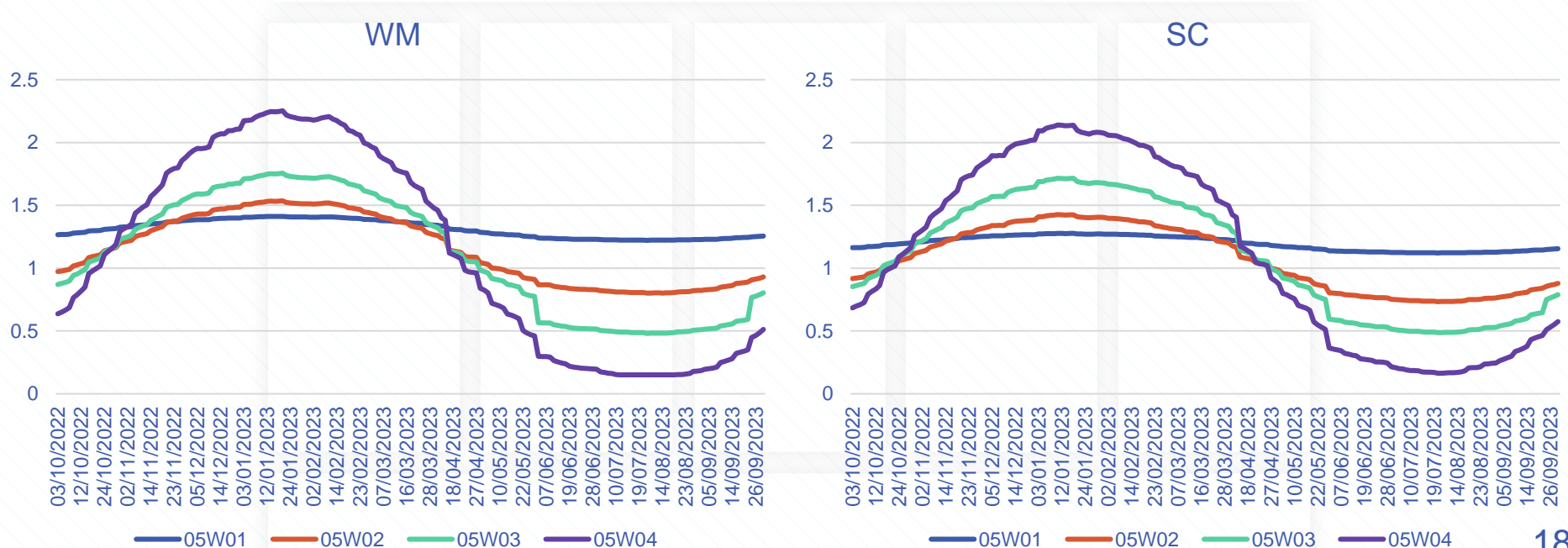
Sample Count	05B	06B	07B & 08B
SC	216	79	45
NO	94	40	40
NW	111	53	47
NE	104	48	39
EM	85	55	57
WM	108	38	37
WN	16	2	3
WS	28	18	13
EA	75	32	21
NT	122	32	15
SE	119	30	27
SO	100	46	13
SW	59	31	17



20% of Sample	W01 and W04 Approximate Sample Point Count by Consumption Band		
	05	06	07 & 08
SC	43	16	9
NO	19	8	8
NW	22	11	9
NE	21	10	8
EM	17	11	11
WM	22	8	7
WN	3	0	1
WS	6	4	3
EA	15	6	4
NT	24	6	3
SE	24	6	5
SO	20	9	3
SW	12	6	3

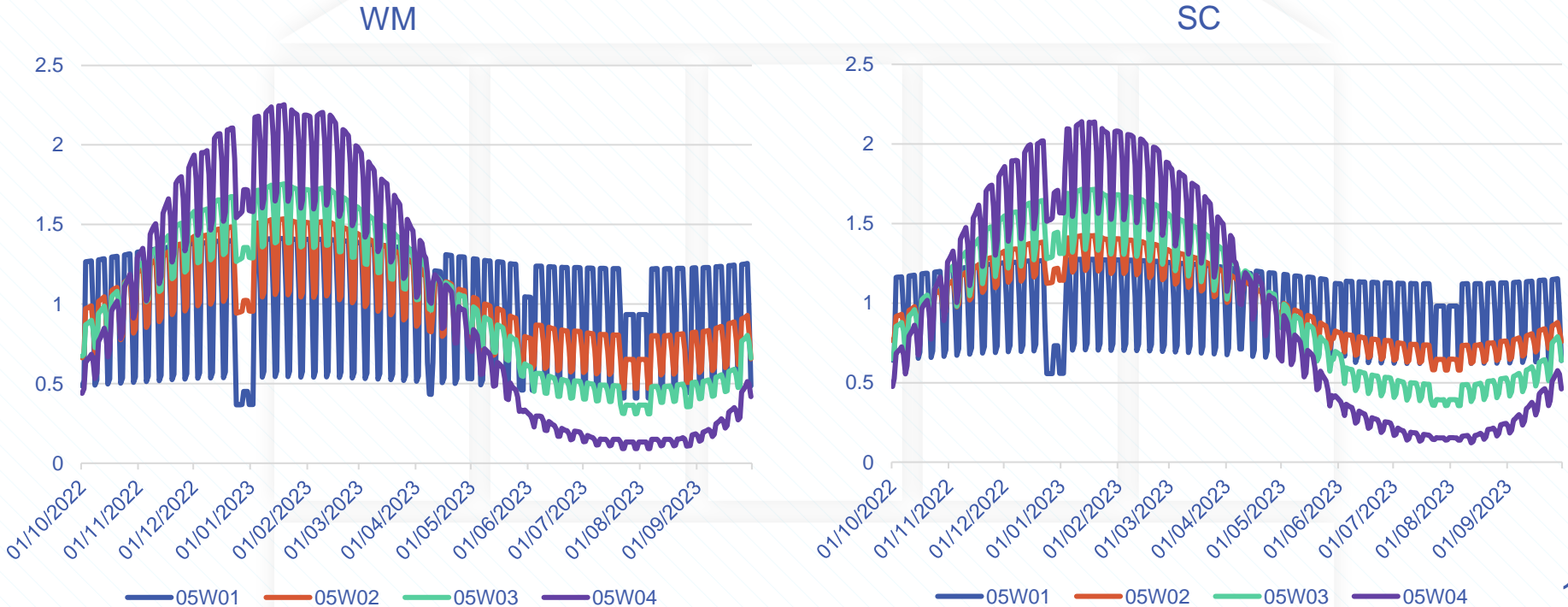
05 W01-04 Annual Load Profiles

- Profiles are similar for different LDZs (these areas were modelled separately), however there is a difference in 'peakiness'
- Charts show non-holiday Monday to Thursdays only (full ALPs on next slide)



05 W01-04 Profiles

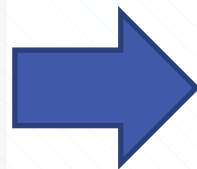
- Profiles are similar for different LDZs (these areas were modelled separately)
- The main differences are weekday and holiday factors



WAR Band Forecast Background

- Bands 7 and 8 are grouped for all models, but the other large NDM bands are not grouped
- Grouping all large EUCs for WAR Band modelling provides a larger sample dataset for each LDZ

20% of Sample	05W01, 04	06W01, 04	07W01, 04 & 08W01, 04
SC	43	16	9
NO	19	8	8
NW	22	11	9
NE	21	10	8
EM	17	11	11
WM	22	8	7
WN	3	0	1
WS	6	4	3
EA	15	6	4
NT	24	6	3
SE	24	6	5
SO	20	9	3
SW	12	6	3



20% of Sample	W01 and W04 Sample Count
	05-08
SC	68
NO	35
NW	42
NE	39
EM	39
WM	37
WN	4
WS	13
EA	25
NT	33
SE	35
SO	32
SW	21

Next Steps

- Create WAR Band profiles based on the combined data of bands 5-8
 - The WAR Band boundaries will be recalculated to reflect the change in data
- This will be tested and the results presented back to DESC in December

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BAND 9

Band 9 Background

- Meters with an AQ over 58.6 million kWh (band 8 upper threshold) should be daily metered
- The Band 9 profiles are temporary and are only used whilst meter changes are taking place
- There were 14 NDM meters in Band 9 at the beginning of August with an average AQ of 65 Million kWh
- Currently when modelling we use any sample data received with an AQ greater than the band 8 upper threshold
- For 2022/23 gas year modelling 197 Sample meters were used, 196 of which were class 1 and 2 (i.e. Daily Metered)

Suggestion

- Do not calculate any profiles for band 9, use the profiles for band 8 default profiles (i.e. 'bucket' band '08B')
 - Band 8 profiles are calculated using sample data for bands 7 and 8 due to lack of data
- These would retain more regional integrity as band 8 profiles tend to be calculated on 1 or 2 LDZs rather than nationally



SUMMARY

Summary

- The following changes will be tested and results presented back to DESC in December
 1. Band 1 Domestic Cooking only loads (e.g. non weather sensitive)
 2. Bands 3 and 4 WAR Band Calculations
 3. Bands 5-8 WAR Band Calculations
 4. Band 9 Models derived from Band 8
- With DESC approval, items 2-4 could be implemented for the 2023/24 Gas Year, however as mentioned item 1 will require significant changes to EUCs, and would have a longer lead time



ACTION 0704

How can you help?

- The more quality sample data we get the easier it is for us to forecast accurately, and test our forecasts
- Ideally we would have two full sets of sample data for all EUC and LDZ combinations
 - One for the analysis year (for forecasting)
 - One for the gas year (for testing the accuracy of the forecast)
- In ideal circumstances, these would comprise of completely different meters