



NDM Algorithm Performance 2007/08 – Strand 2

Reconciliation Variance Analysis NDM Sample Consumption Analysis

Supporting Document:
Evaluation of Algorithm Performance 200708.pdf

DESC 20th January 2009

Algorithm Performance 2007/08: Strand 2 Analysis

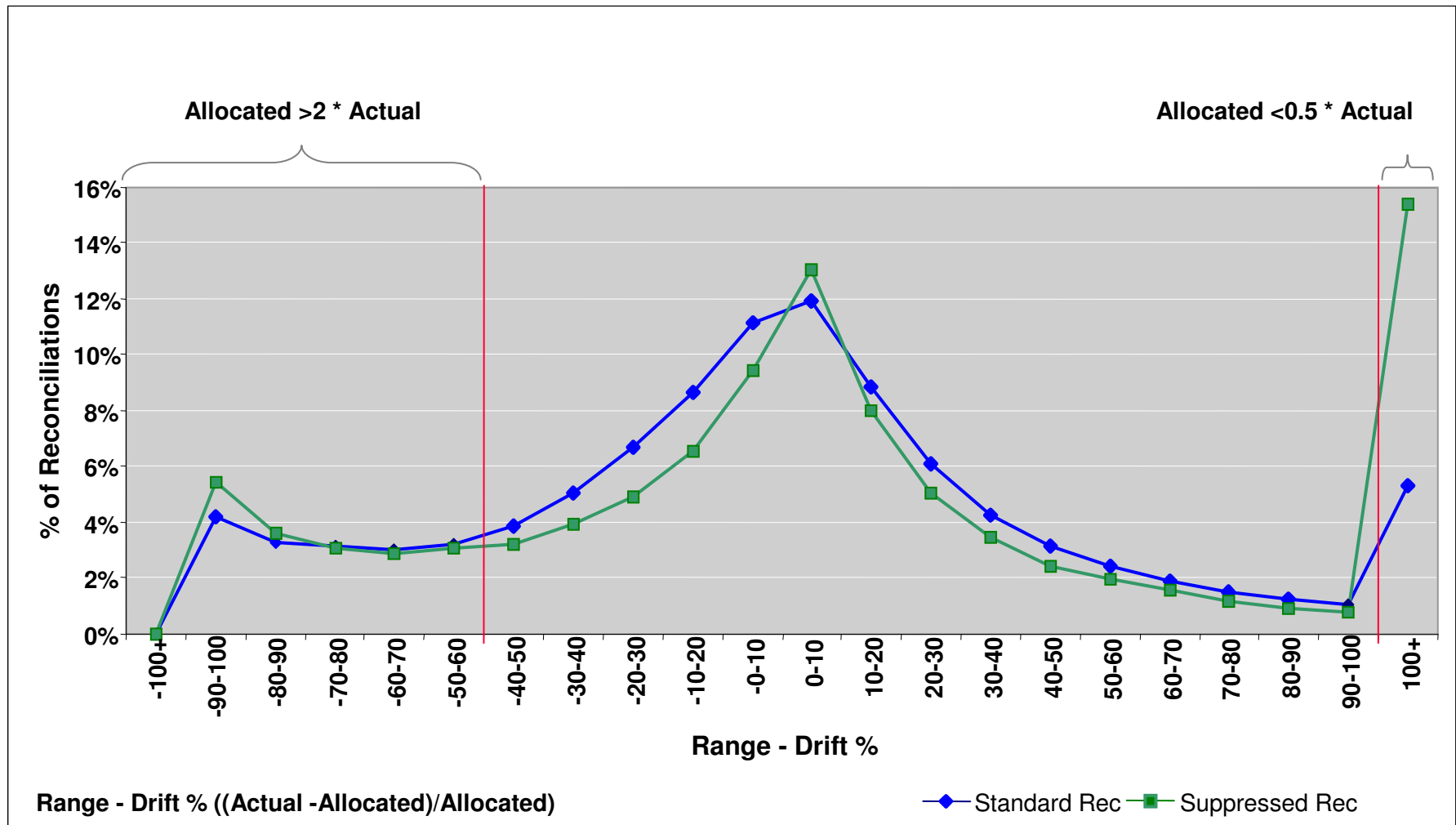
- Strand 1 (**SF and WCF analysis**) presented at Nov DESC
 - SF generally above 1 (closer than 06/07)
 - Negative WCF bias tending to inflate SF's closer to 1
 - Indicated aggregate NDM SND and AQs potentially too high
- Strand 2: **Reconciliation Variance Analysis**
 - Compare allocated demand (derived from algorithms) *with*
 - Actual demand obtained from available reconciliation data
- Strand 2: **Analysis of NDM Sample Consumption**
 - Compare the actual demand from the NDM sample data *with*
 - Allocated demand for the sample
- *Supporting document: detailed explanation with full examples*

Reconciliation Variance (RV) 07/08: Actual to Allocated

- Compare actual demand (rec.) to allocated demand (algorithms)
- Use *available* Meter Point rec. data for band 'B' EUCs
 - Data available at time of analysis (non-monthly, smaller EUC may not have been received)
 - No analysis for EUC Band 1 (no rec.)
 - Uses Standard & Suppressed rec.
- Rejection criteria applied prior to analysis to remove inappropriate or erroneous rec. data
 - Negative and zero consumptions, actual to allocated ratio
- Profile comparisons are then compared and categorised as:
 - 'Peaky' - 'Flat' - 'Ok'

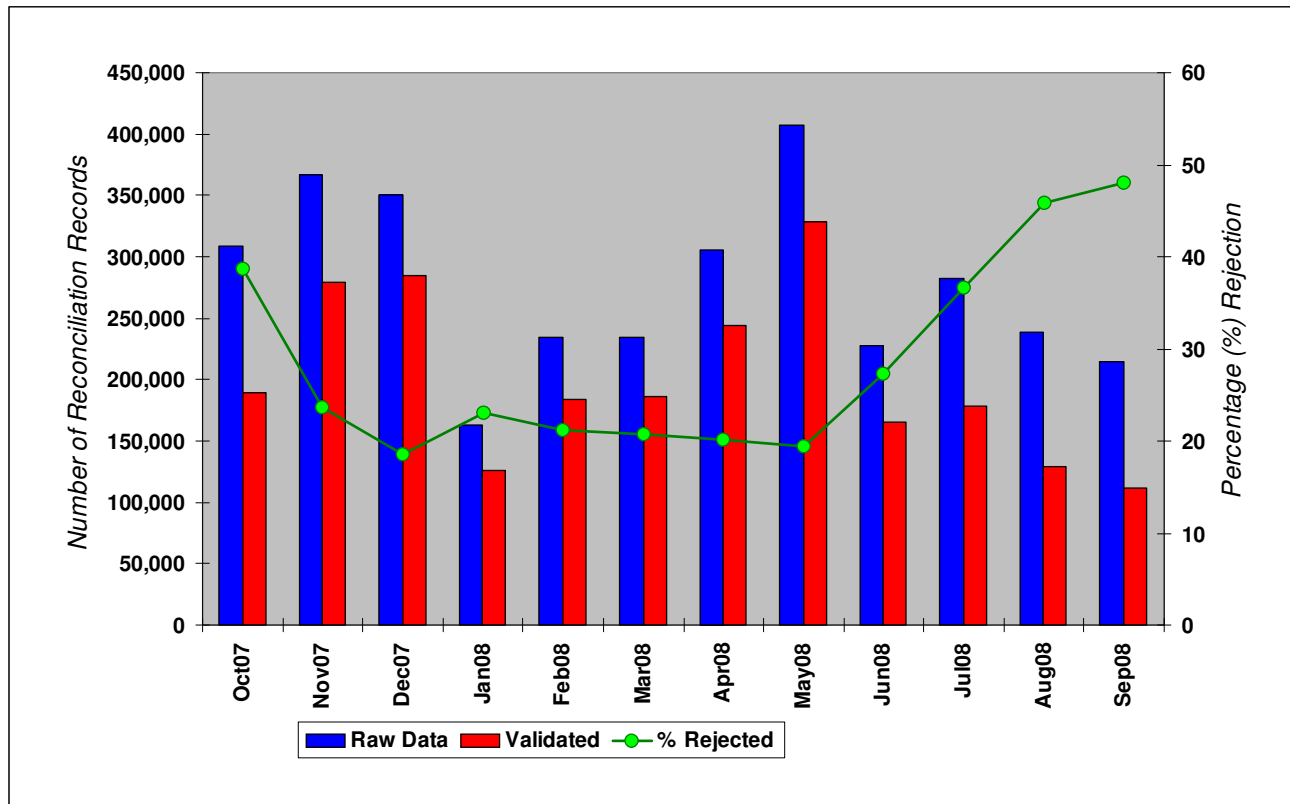
Assessment of Standard and Suppressed Reconciliation

(based on reconciliations during April to September 2008)



RV Analysis: Levels of Validation Fall Out

- Criteria: $AQ \leq 3 \text{ kWh}$; $AQ \leq 0$; Actual > 0 and Allocated $> 2 * \text{Actual}$; Actual > 0 and Allocated $< 0.5 * \text{Actual}$

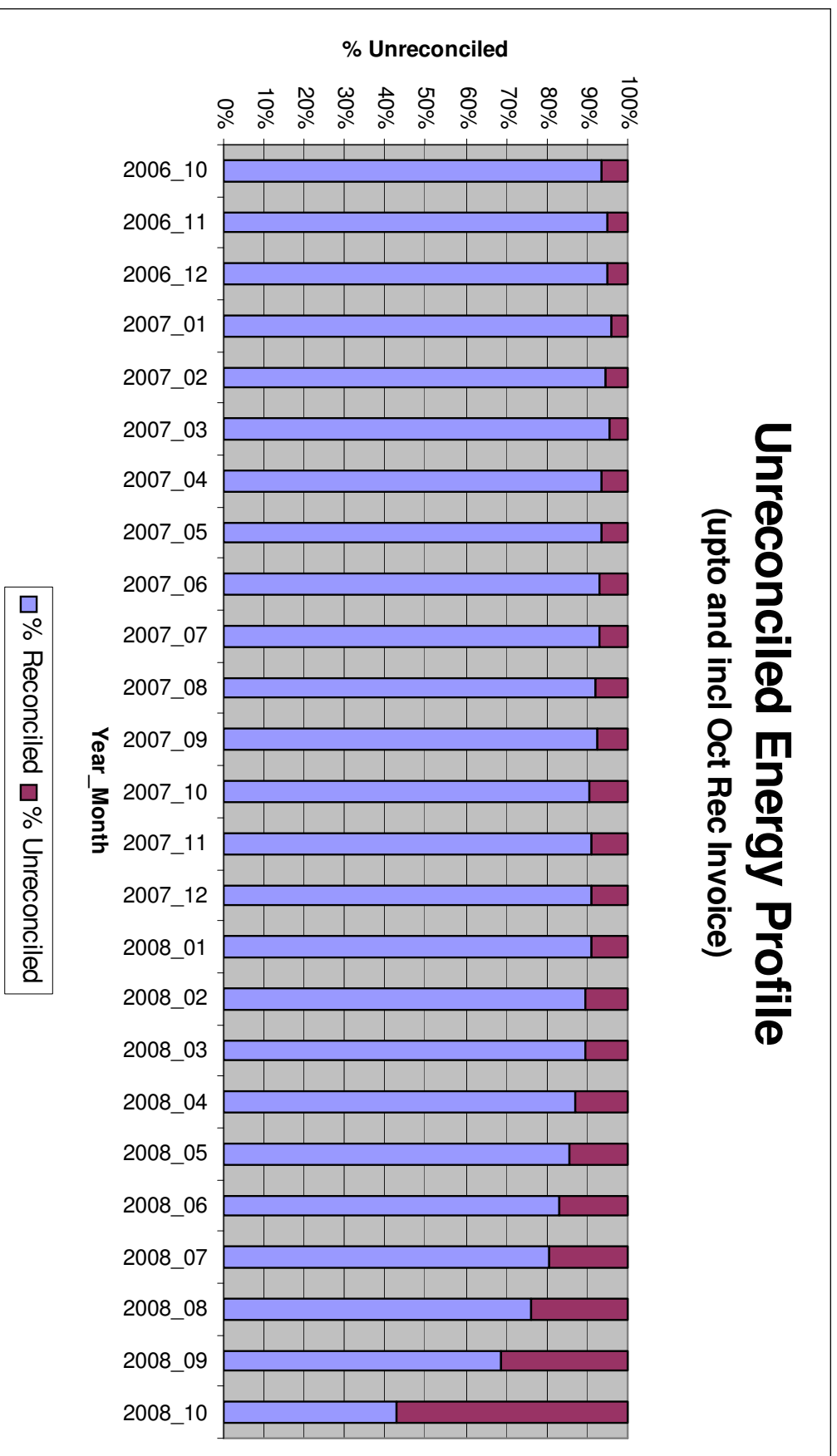


- Rejection rates higher in summer due to smaller consumptions thereby resulting in greater % differences
- Profiles consistent with previous years and post-validation numbers good

RV Analysis: Unreconciled Energy Profile

Unreconciled Energy Profile

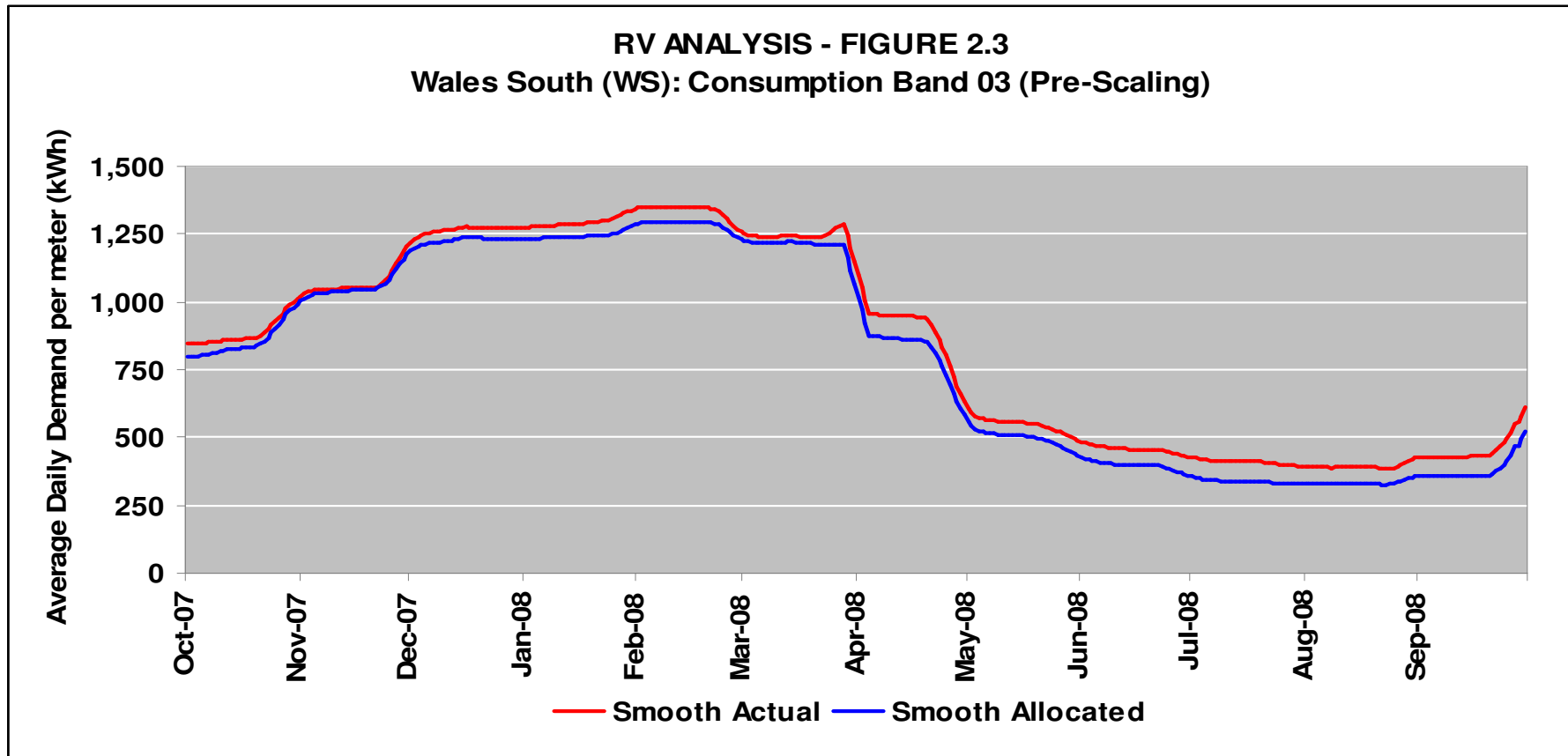
(upto and incl Oct Rec Invoice)



RV Analysis Methodology

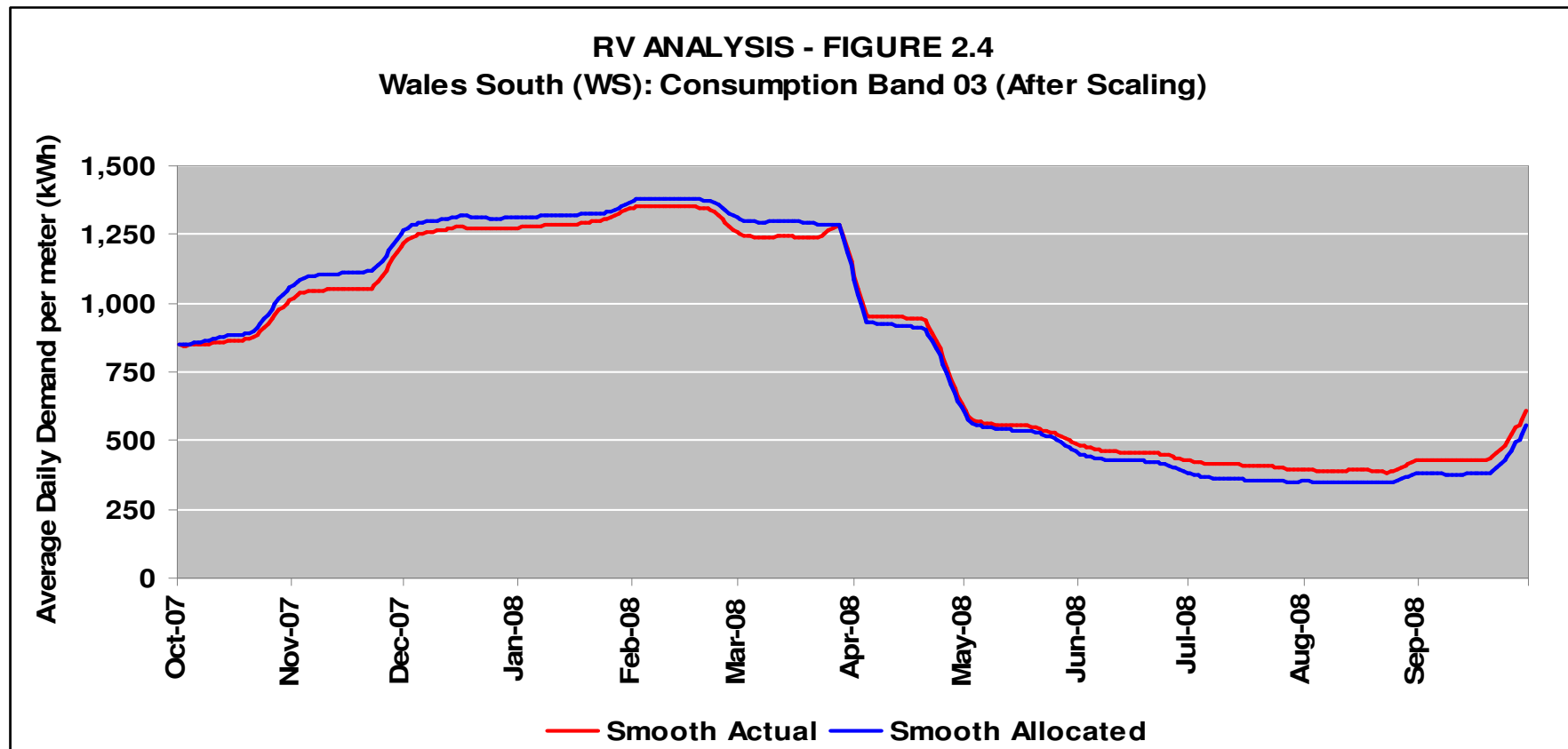
- Following removal of rejected reconciliations, for each meter point:
 - Reconciled energy is identified
 - Allocated Energy calculated
 - Values are then applied evenly to each day of the reconciliation period
 - Average for each of the meter points in the specific EUC is calculated
- Profile is 'scaled'
 - Level of allocated demand (based on AQ) = actual demand (actual)
- Scaling allows profile comparisons and analysis of algorithm performance
 - Without scaling analysis would primarily highlight differences in demand levels (affected by other factors)

WS: Consumption Band 03 (Pre-Scaling) RV Analysis – Allocated to Actual



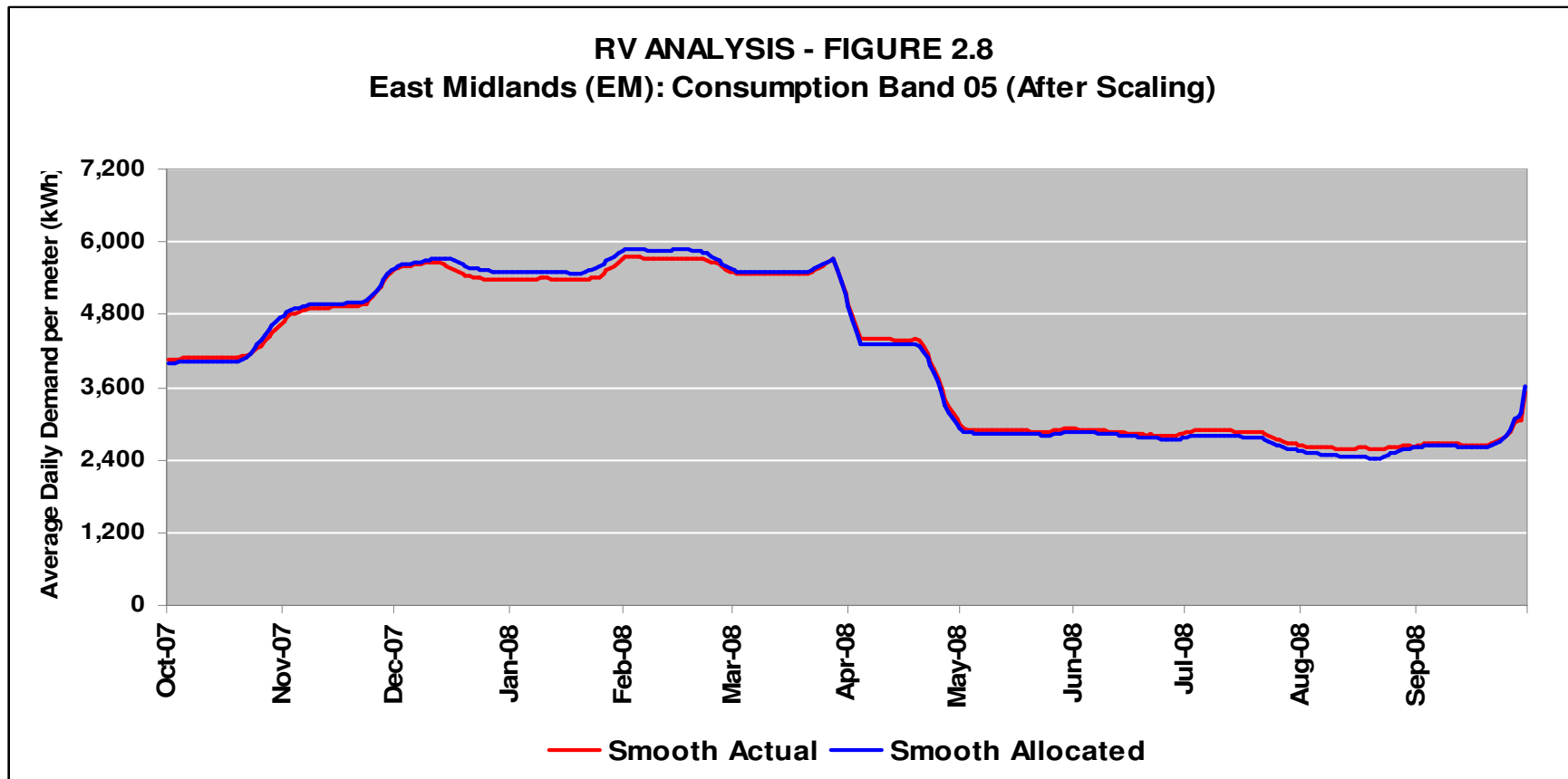
- Chart examples available for all EUC Bands (B) and a cross section of LDZs
- 1st chart highlights where scaling has not occurred and profile of demand through the year
- Following scaling.....

WS: Consumption Band 03 (After Scaling) RV Analysis – Allocated to Actual



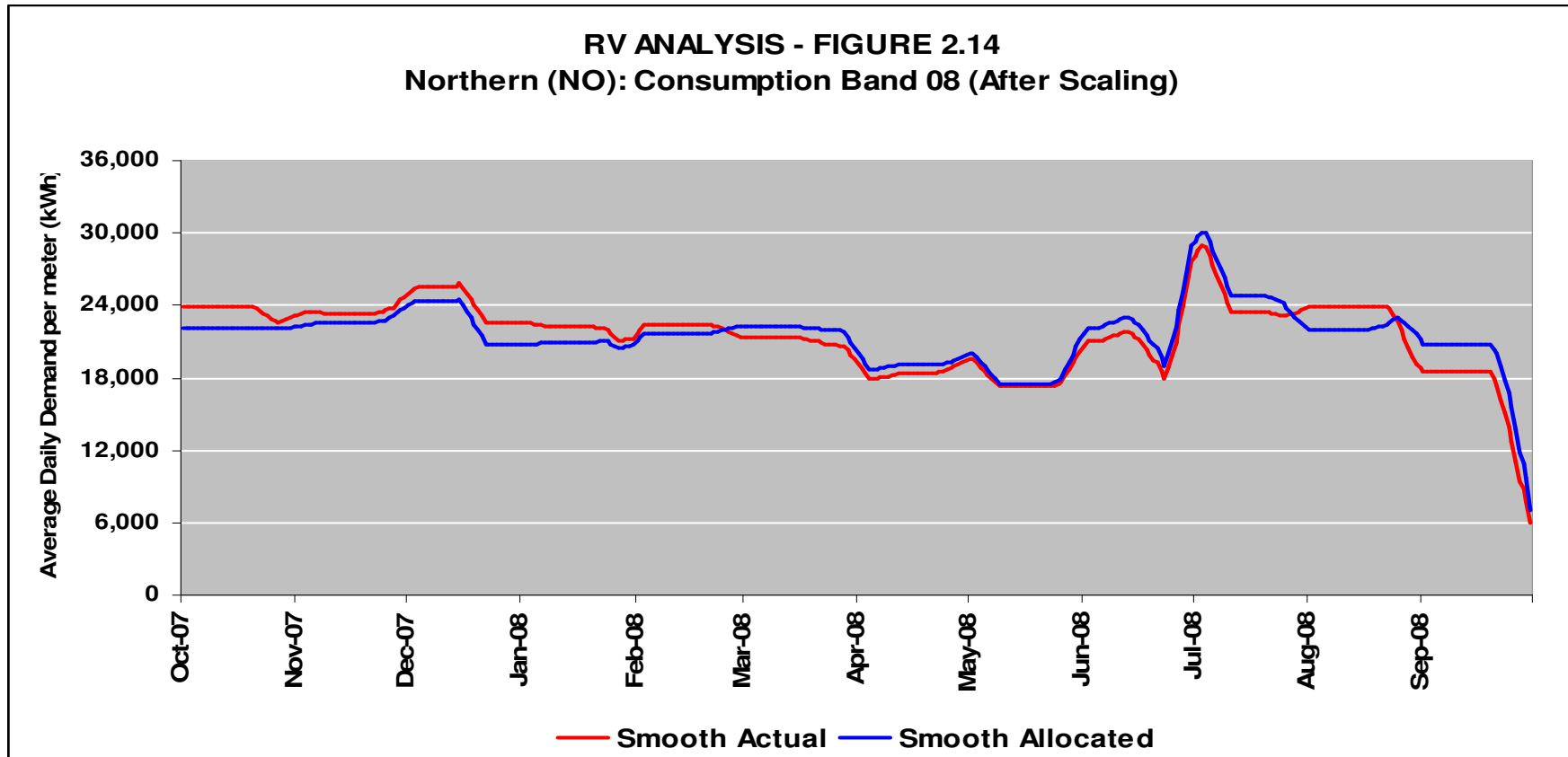
- Analysis allows comparison of the profiles rather than demand levels
- Indicates an over allocation in the Winter & under allocation in the summer
- **‘Peaky’ allocated profile:** Winter over, Summer under (predominant profile)

EM: Consumption Band 05 (After Scaling) RV Analysis – Allocated to Actual



- **'Ok' allocated profile:** allocated is similar to actual

NO: Consumption Band 8 (After Scaling) RV Analysis – Allocated to Actual



- Indicates an under allocation in the Winter & over allocation in the summer
- **'Flat' allocated profile:** Winter under, Summer over
- Better representation of all LDZs for all EUCs is shown in Table 2.1...

RV Categorisation : LDZ / EUC Profile & Error Levels

Gas Year 2007/08

EUC Band		SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	↑	↑	↑	↑	-	↑	↑↑	↑	↑	↑	↑	↑	↑
03	B	↑	↑	↑	↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑
04	B	↑	↑	-	-	↑	-	↑↑	-	-	-	↑	-	-
05	B	-	-	↑	↑	-	-	↑	↑	↑	-	-	-	-
06	B	-	-	-	↓	↓	-	-	↑	-	-	↓	-	-
07	B	↑	↓	↑	↓	↑	-	-	-	↑↑	-	↓	↓	-
08	B	-	↓	-	-	↓	↑	-	-	-	↓	↓	↑	↓
09	B	↑↑	-	-	-	-	↑	-	-	-	-	-	-	-

Ok / Good	-	5% Level	↑	Too Peaky	10 % Level	↑↑	Too Peaky
No Data (<2)	-		↓	Too Flat		↓	Too Flat

- ‘% level’ = average difference of allocated to actual over the winter and summer differences (measures ‘peakiness’)
- 2007/08: ‘Peaky’ profile 42%, ‘Ok’ Profile 30%, ‘Flat’ 12%, No data for analysis 16%
- 2006/07: ‘Peaky’ profile 49%, ‘Ok’ profile 33%, ‘Flat’ 5%, No data for analysis 13%
- Profiles more ‘Peaky’

RV Categorisation : Annual Scaling

Gas Year 2007/08

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	1.02	1.03	1.04	1.01	1.03	1.03	0.98	1.03	1.03	1.03	1.03	1.02	1.05
03	B	1.04	1.04	1.05	1.03	1.04	1.04	1.00	1.06	1.06	1.04	1.06	1.04	1.05
04	B	1.03	1.06	1.06	1.04	1.05	1.05	1.03	1.09	1.05	1.04	1.07	1.05	1.07
05	B	1.02	1.06	1.06	1.01	1.04	1.06	1.01	1.07	1.06	1.05	1.06	1.04	1.05
06	B	1.02	1.06	1.03	1.02	1.07	1.00	1.00	1.02	1.06	1.04	1.06	1.05	1.11
07	B	1.05	1.05	1.04	0.94	1.06	1.05		0.89	1.07	0.97	1.06	1.03	1.09
08	B		0.92	0.99		0.94	1.01				0.74	0.99	0.95	0.98
09	B	1.07					0.94							

- Scaling values used to normalise calculated AQ to actual consumptions
 - (Pink) indicates uplift of allocated to actual consumptions: AQs to low 07/08
 - SF & WCF analysis: Indicated NDM AQs were too high (and AQ reduction post AQ Review)
- However RV analysis:
 - Not reflective of whole population (excludes Band 01B)
 - Proportion of data discarded to allow profile analysis
 - All reconciliation data for gas year not yet available (more so this year)
- Therefore useful for profile comparison rather than determination of AQ trends

RV Analysis Conclusions

- RV analysis highlights a ‘peaky’ trend of:
 - Over Allocation – Winter
 - Under Allocation – Summer
- 2007/08 saw 42% of profiles defined as ‘peaky’ (more in 06/07):
 - Levels of rec. rejected similar to previous years
 - Available rec. for analysis incomplete, particularly Bands 2/3 (non-monthly read meters)
 - Analysis is revised in Spring 2009 - more data will be available
 - AQs continue to reduce each year
- BUT – analysis not necessarily representative of population
 - Consider with SF and WCF analysis *and*
 - Consider NDM Sample data...

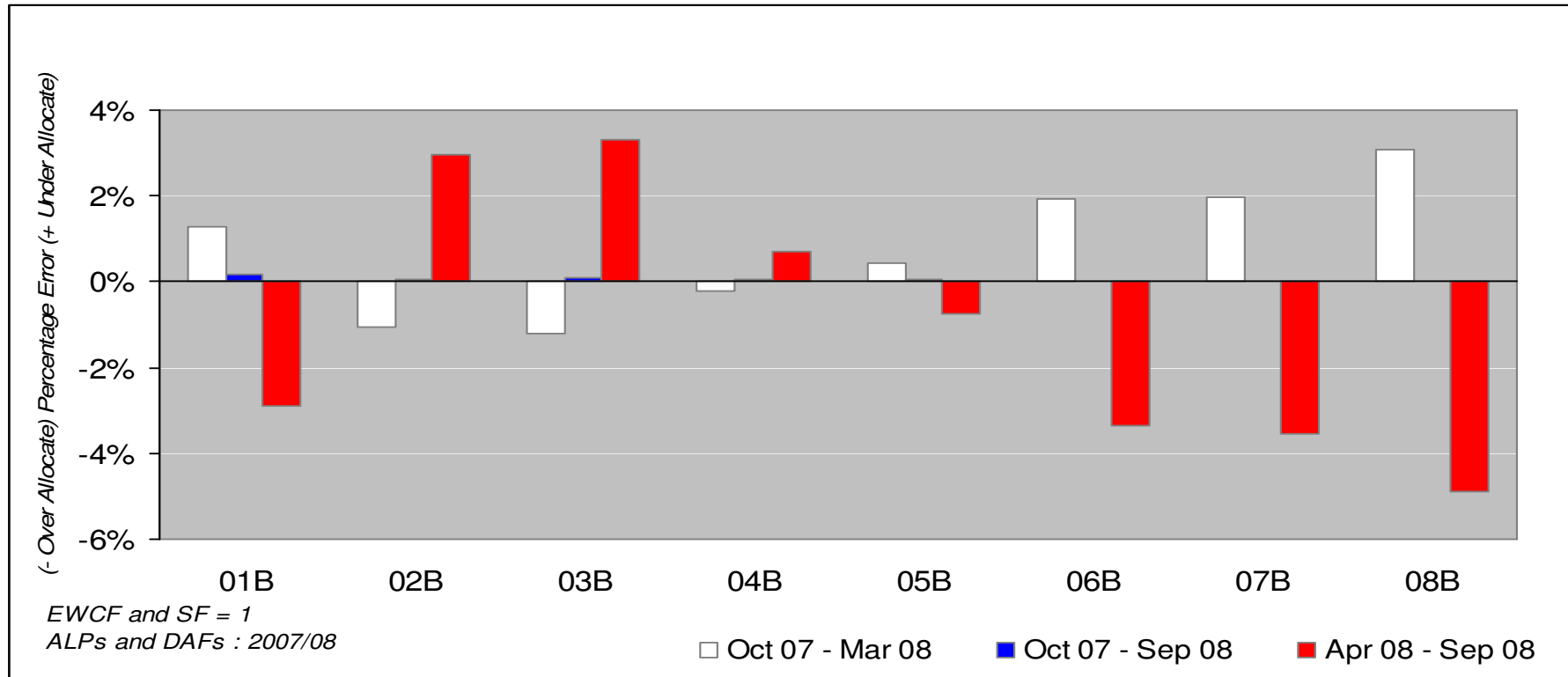
NDM Sample Consumption Analysis

- Using the actual NDM Sample consumption for 07/08
 - Compare the % error of sample consumption against :
 - Allocated using 07/08 ALPs & DAFs, real system WCF and SF
 - Allocated using 07/08 ALPs & DAFs, EWCF and SF = 1
 - Allocated using 08/09 ALPs & DAFs, 07/08 EWCF and SF = 1
 - This is completed by EUC for all LDZs and also by month by LDZ
- *Supporting document: detailed explanation with full examples*

Allocated Error As % of Actual Demand

Weighted average across LDZs. 'Best Estimate 07'

EWCF and SF = 1 – ALPs and DAFs 07/08 Algorithms - NDM Sample derived AQs (not system AQs)

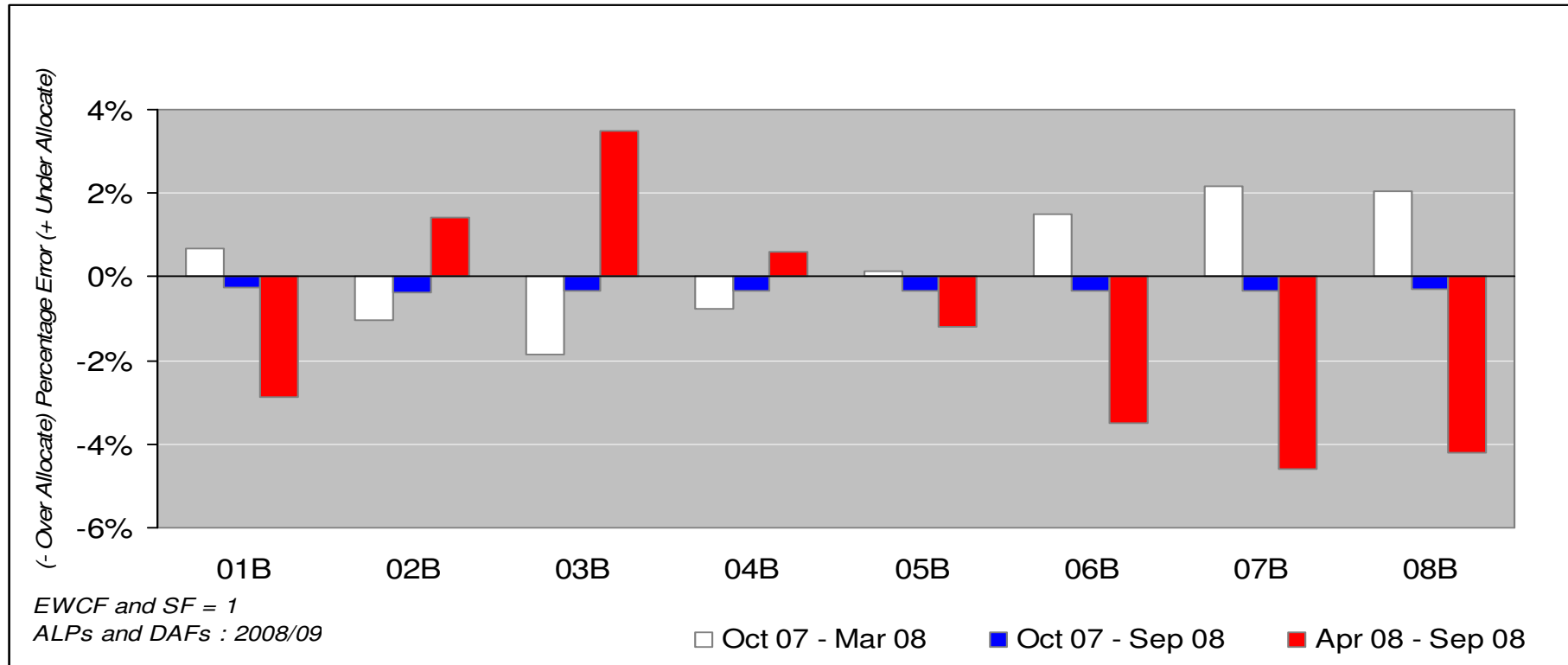


- Remove SF impact and remove NDM SND error bias (use EWCF which eliminates SND bias)
- Positive errors = Under allocation ; Negative errors = Over allocation
- **Winter:** Ranges from -1.2% to +3.1% & **Summer:** Ranges from +0.7% to -4.9%
- Winter/Summer analysis indicates bands 01,05,06,07,08 little too flat and 02,03,04 little too peaky
- **Year:** Little overall error in each band

Allocated Error As % of Actual Demand

Weighted average across LDZs. 'Best Estimate 08'

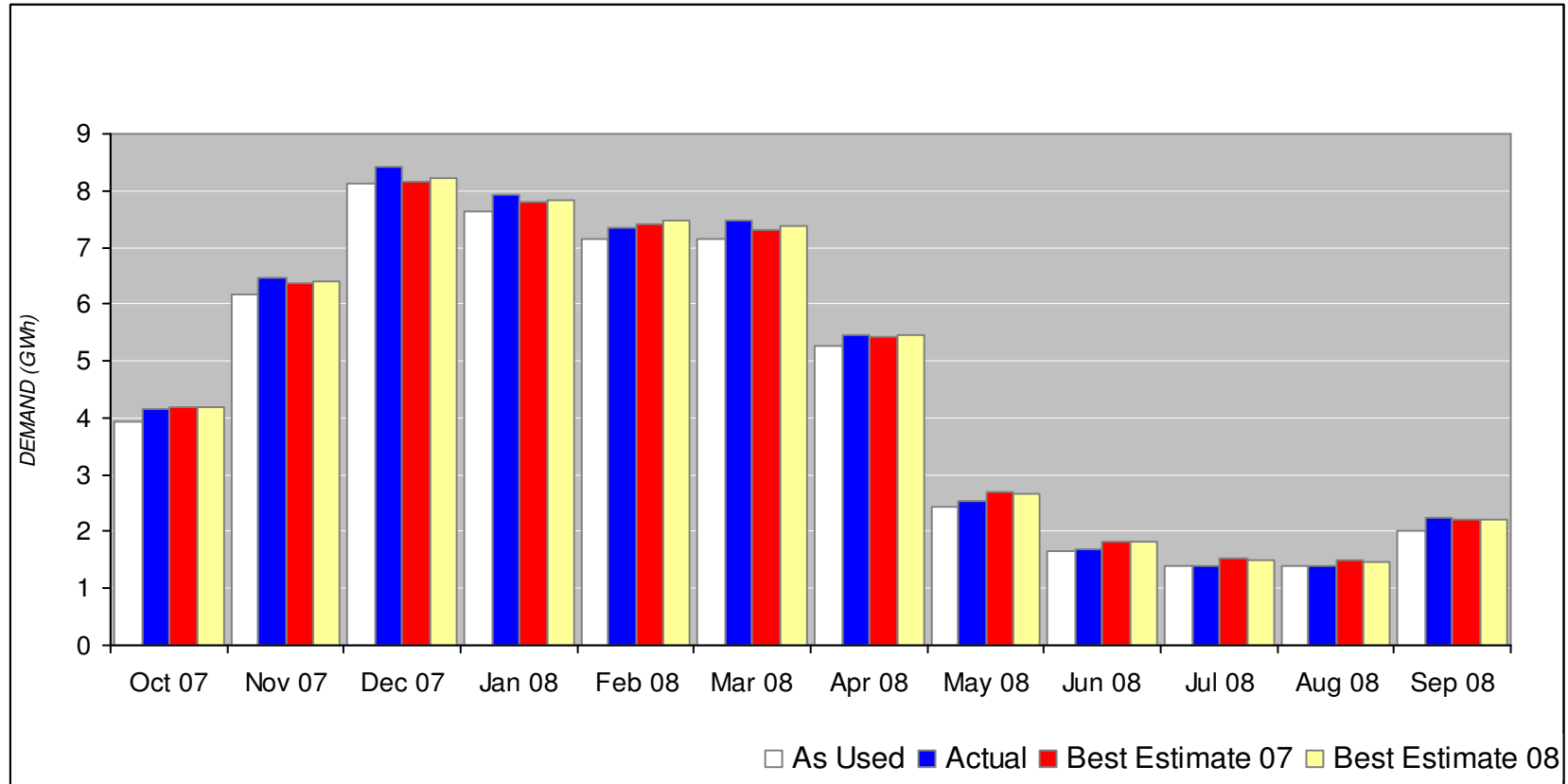
EWCF and SF = 1 – ALPs and DAFs 08/09 Algorithms - NDM Sample derived AQs (not system AQs)



- ALPs and DAFs for 2008/09 applied to 2007/08 consumption data
- Should provide less error as ALPs and DAFs were derived from this consumption data
- Winter / Summer errors same outcome as Best Estimate 07 / Overall year errors are all negative
- Generally extent of error is reduced using 08/09 algorithms in most EUCs
- Monthly analysis also completed...

Monthly Actual & Deemed Demand 01B (All LDZs)

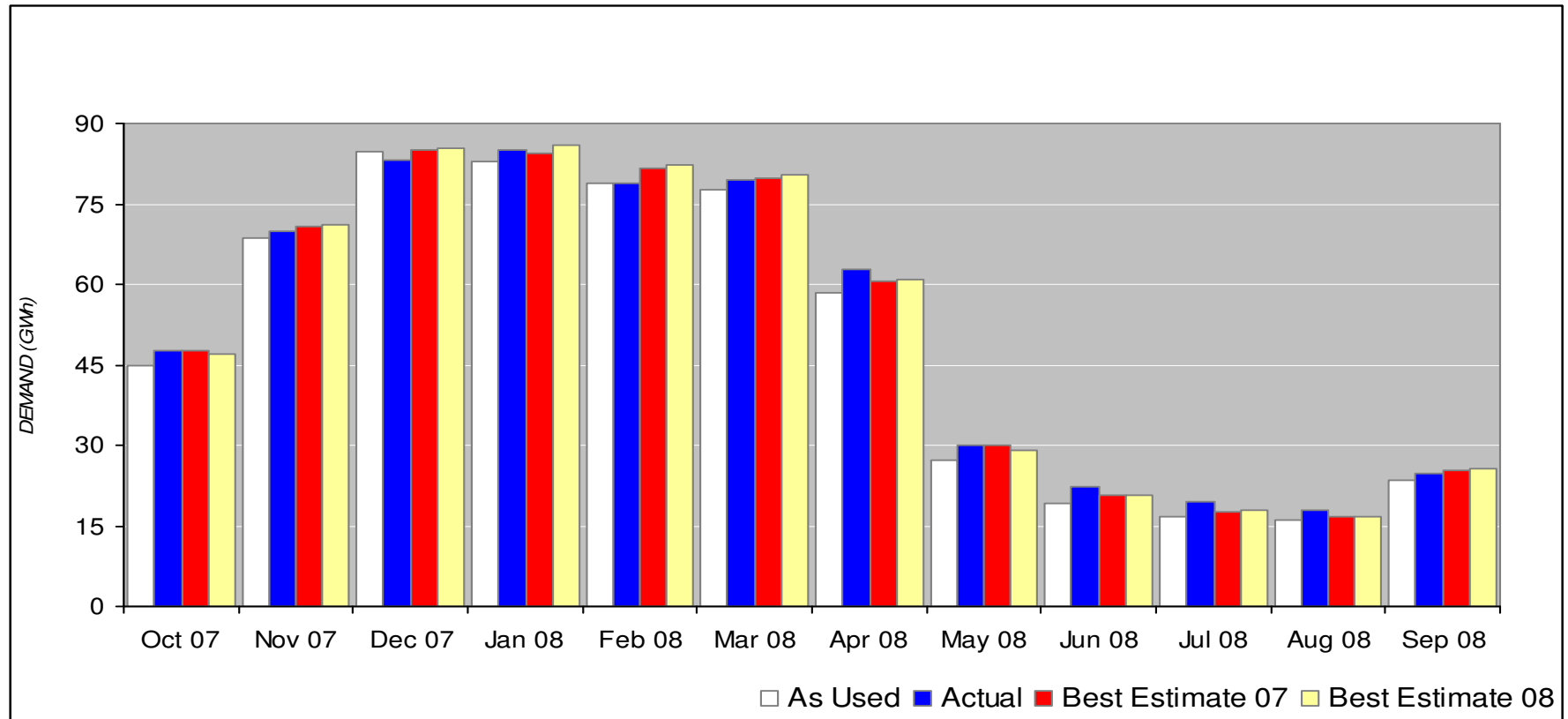
As previous but by EUC Band and By Month



- Two examples of previous analysis but by EUC Band and Month
- General trend: Small winter under allocation, modest summer over allocation
- Band 01B profile - Too flat despite warmer than average winter period (except March)
- May: over allocation – warmest May on record

Monthly Actual & Deemed Demand 03B (All LDZs)

As previous but by EUC Band and By Month



- General trend: Small winter over allocation, summer under allocation
- Band 03B profile Too peaky
- February notably over allocated with April significantly under allocated

RV Analysis & NDM Sample Analysis Summary

	NDM Sample Analysis	RV Analysis
01B	Flat	-
02B	Peaky	Peaky
03B	Peaky	Peaky
04B	Peaky	Peaky
05B	Flat	Peaky
06B	Flat	Flat
07B	Flat	Mixed
08B	Flat	Flat

- **Peaky**: Over Allocation in Winter and Under Allocation in Summer
- **Flat**: Under Allocation in Winter and Over Allocation in Summer

RV Analysis & NDM Sample Analysis Conclusions

- Overall Outcomes
 - Consistent for bands 02, 03, 04, 06 and 08
 - Different for bands 05 and 07
 - No RV analysis available for band 01
- Limitations - different, restricted data sets
 - RV analysis excludes band 01B & based on a sub-set of rec data
 - NDM sample analysis is based on validated NDM SAMPLE data
 - Both analyses suffer from small numbers of contributing meter/supply points at the higher consumption bands
- Important Point: Both suggest only small inaccuracies
- Spring 2009 RV analysis is updated to provide better representation