NDM Algorithm Performance 2006/07 – Strand 2

Reconciliation Variance Analysis
NDM Sample Consumption Analysis

Supporting Document:
Evaluation of Algorithm Performance 200607 RV & Sample.pdf

DESC 15th January 2008

Algorithm Performance 2006/07: Strand 2 Analysis

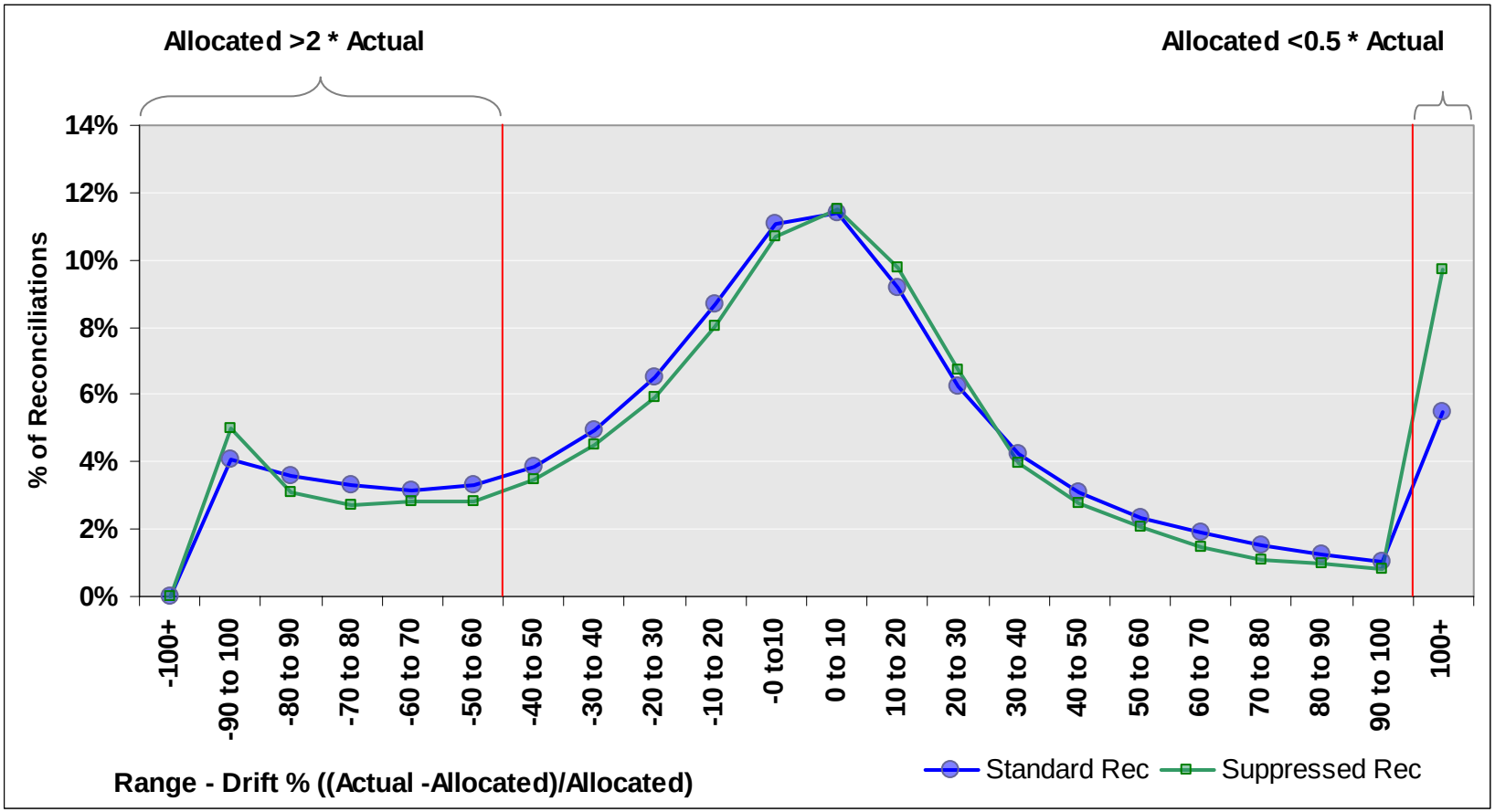
- Strand 1 (SF and WCF analysis) presented at Nov DESC
  - SF consistently below 1 (worse)
  - WCF some negative bias (some improvement)
  - Indicated aggregate NDM SND and AQs potentially too high
- Strand 2: Reconciliation Variance Analysis
  - Compare allocated demand (derived from algorithms) *with*
  - 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) 06/07: 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 & Suppressed Reconciliation

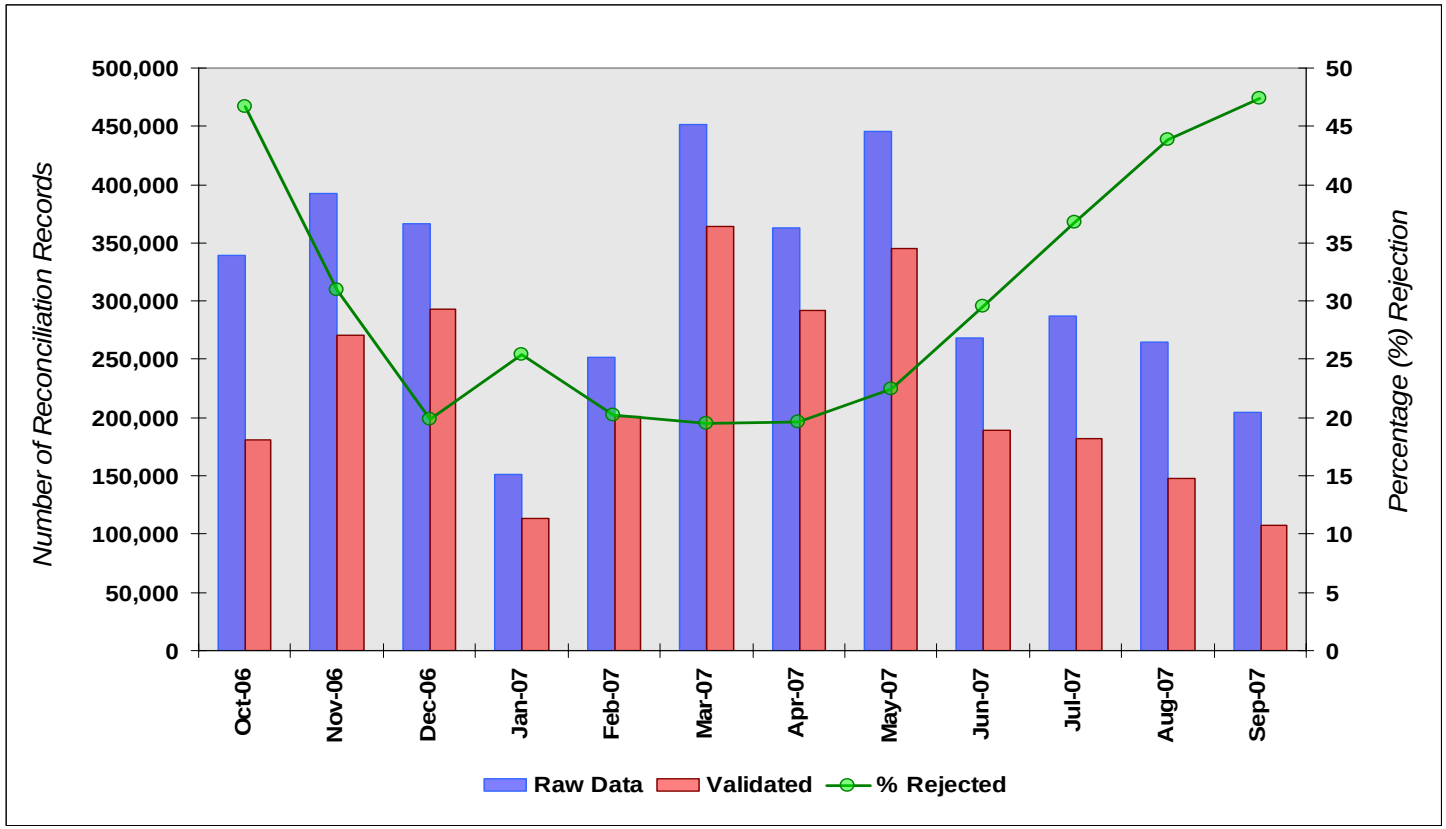
(based on reconciliations during April to September 2007)



- % Drift between Actual & Allocated energy (Drift) for Standard & Suppressed (issue) reconciliations
- Removed erroneous reconciliations due to non-algorithm ‘errors’

RV Analysis: Levels of Validation Fall Out

- Criteria: AQ <=3 kWh ; AQ <=0 ; Actual >0 and Allocated > 2*Actual ; Actual >0 and Allocated <0.5*Actual



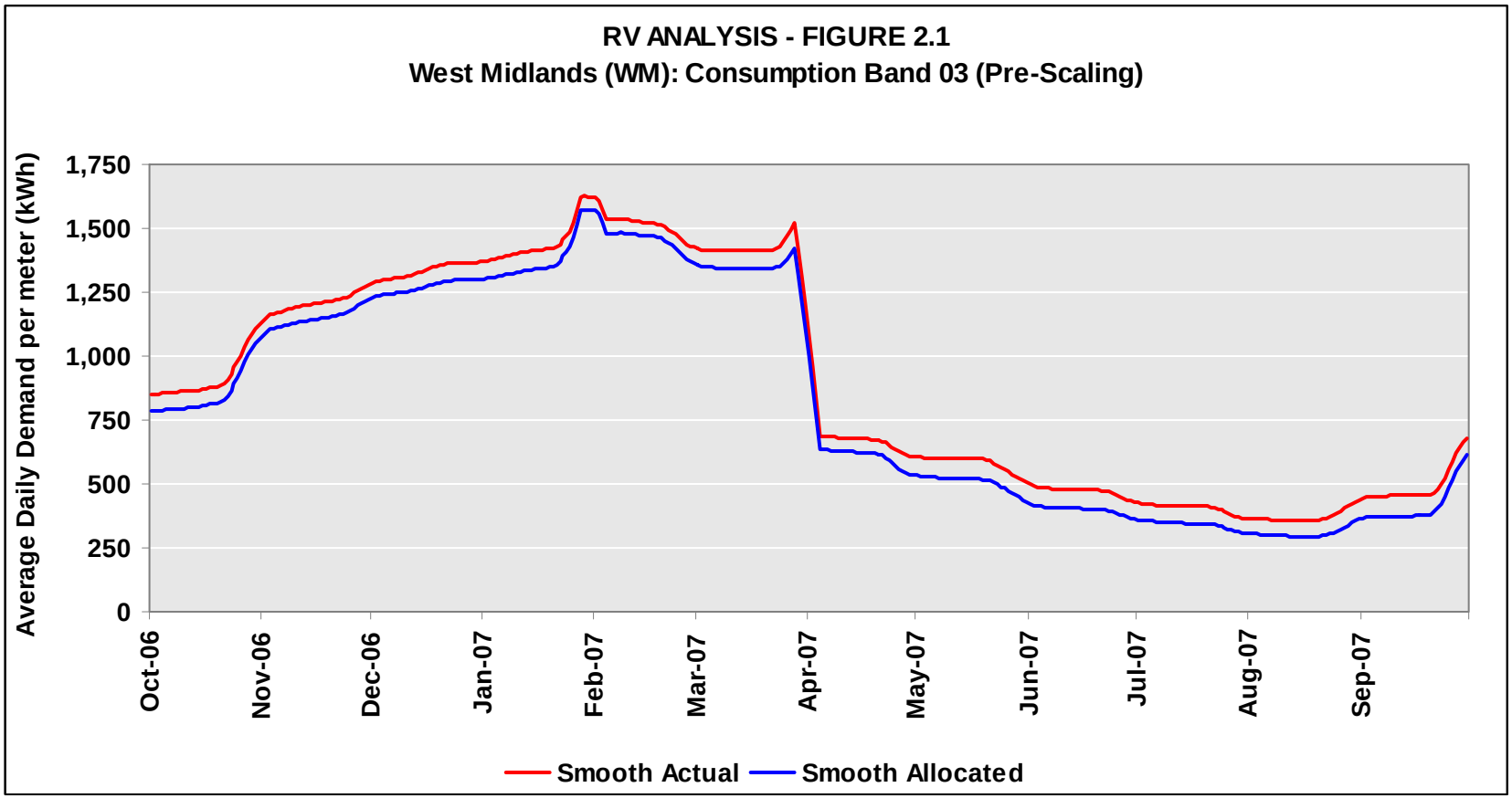
- Rejection rates higher in summer due to smaller consumptions thereby resulting in greater % differences
- Profiles consistent with previous years and post-validation numbers good

RV Analysis 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)

WM: Consumption Band 03 (Pre-Scaling)

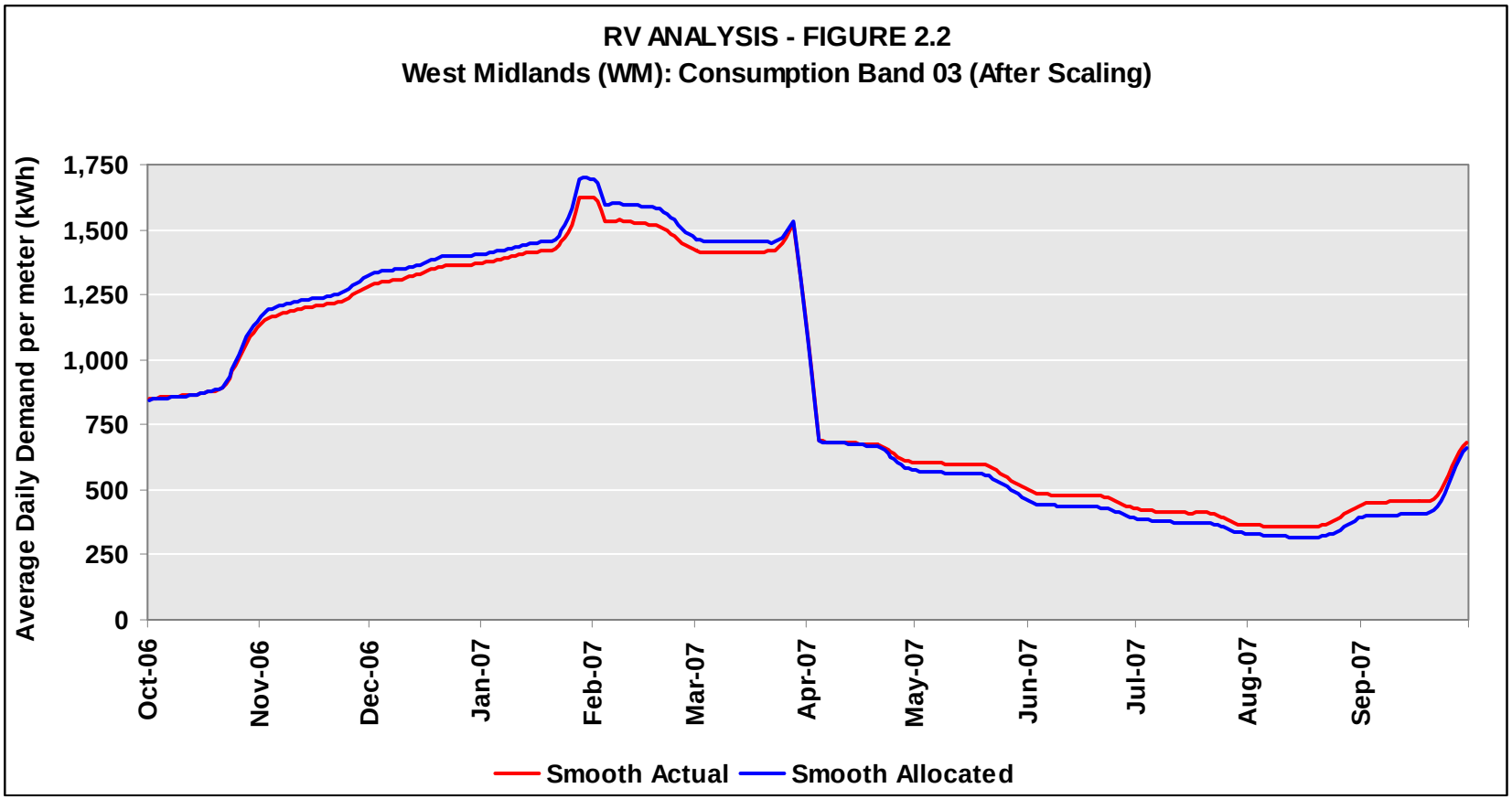
RV Analysis – Allocated to Actual



- 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…..

WM: Consumption Band 03 (After Scaling)

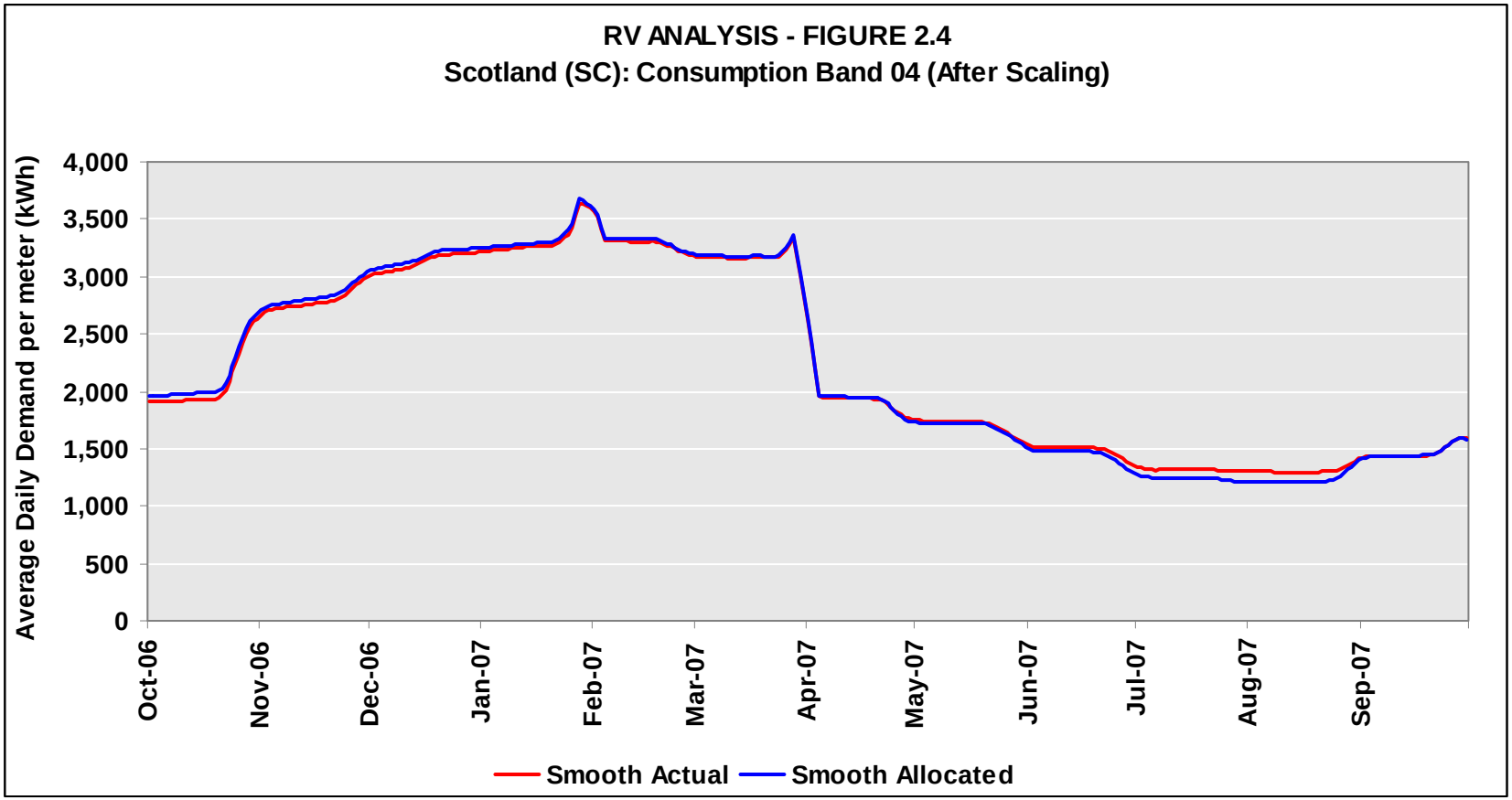
RV Analysis – Allocated to Actual



- 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)

SC: Consumption Band 04 (After Scaling)

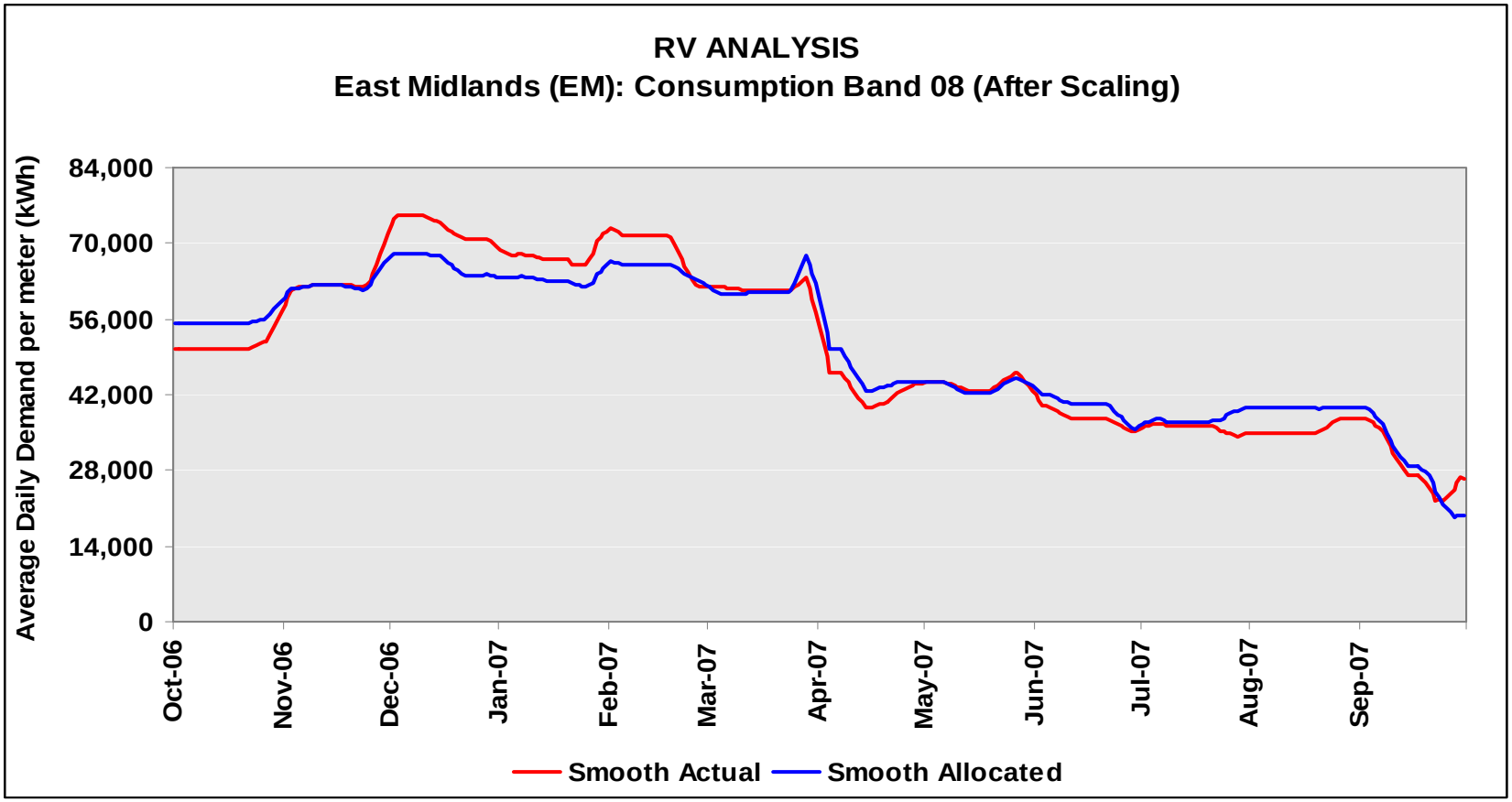
RV Analysis – Allocated to Actual



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

EM: 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 2006/07

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')
- 2006/07: 'Peaky' profile 49%, 'Ok' profile 33%, 'Flat' 5%, No data for analysis 13%
- 2005/06: 'Peaky' profile 22%, 'Ok' profile 51%, 'Flat' 15%, No data for analysis 12%
- Profiles more 'Peaky'

RV Categorisation : Annual Scaling Values

Gas Year 2006/07

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	1.03	1.05	1.03	1.04	1.04	1.04	0.98	1.04	1.04	1.04	1.04	1.04	1.05
03	B	1.04	1.06	1.05	1.06	1.07	1.08	1.00	1.05	1.07	1.07	1.06	1.06	1.06
04	B	1.04	1.06	1.05	1.06	1.07	1.08	1.01	1.04	1.06	1.06	1.08	1.07	1.06
05	B	1.03	1.07	1.05	1.05	1.07	1.05	0.95	1.07	1.06	1.05	1.06	1.06	1.07
06	B	1.07	0.98	1.04	1.04	1.05	1.03	1.04	1.07	1.09	1.06	1.05	1.05	1.08
07	B	0.97	1.15	0.93	1.06	1.08	1.05	0.76	0.96	1.04	1.04	1.06	1.03	1.04
08	B		1.11	1.02	0.99	1.03	1.14		0.96		1.08	0.94	1.08	1.14
09	B	0.98					1.02			1.06				

- Scaling values used to normalise calculated AQ to actual consumptions
  - (Pink) indicates uplift of allocated to actual consumptions (77%): AQs to low 06/07
  - 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
- 2006/07 saw a greater level of ‘peaky’ profiles:
  - Levels of rec. rejected as part of criteria same as previous years
  - Reduction in the number of available rec. for analysis (Bands 2/3)
    - Analysis is revised in Spring 2008, 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…

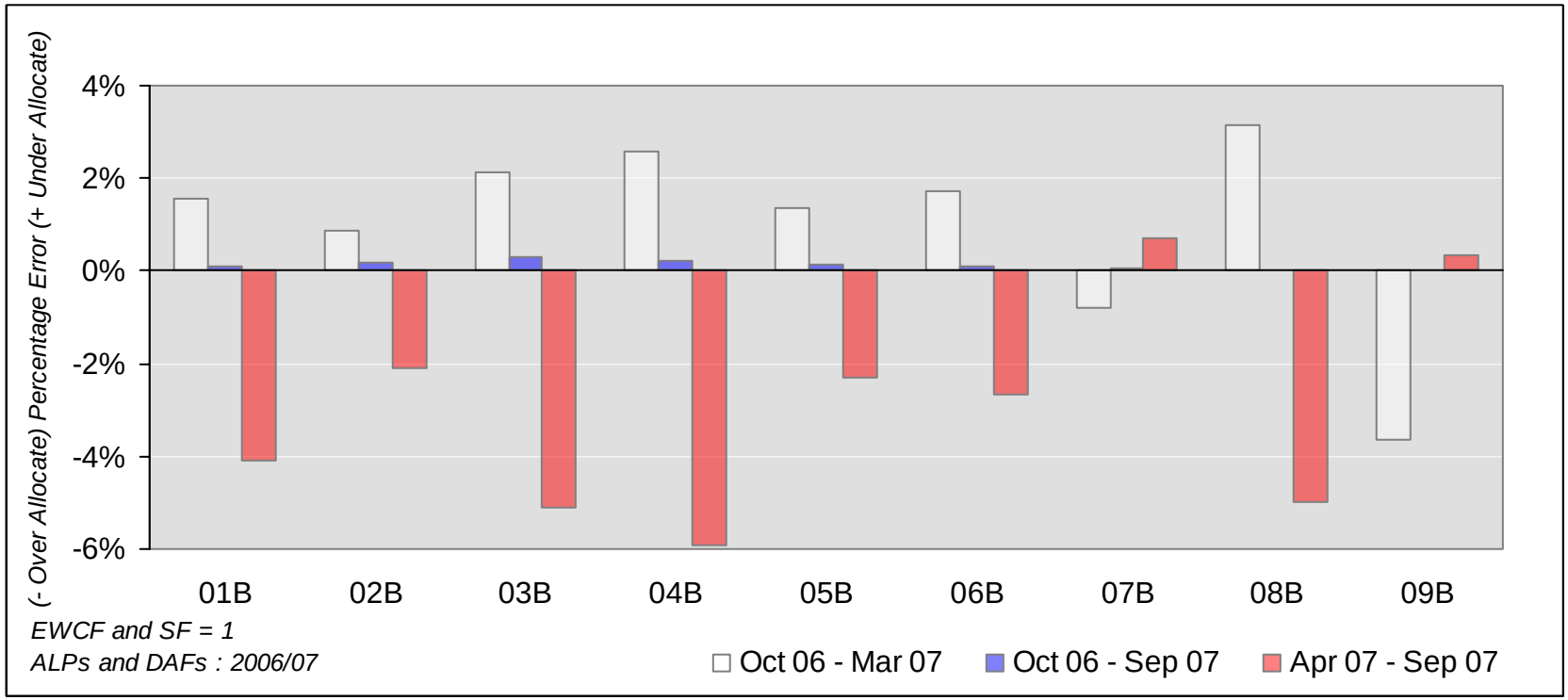
NDM Sample Consumption Analysis

- Using the actual NDM Sample consumption for 06/07
  - Compare the % error of sample consumption against :
    - Allocated using 06/07 ALPs & DAFs, EWCF and SF = 1
    - Allocated using 07/08 ALPs & DAFs, 06/07 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 06'

EWCF and SF =1 – ALPs and DAFs 06/07 Algorithms - NDM Sample derived AQs (not system AQs)

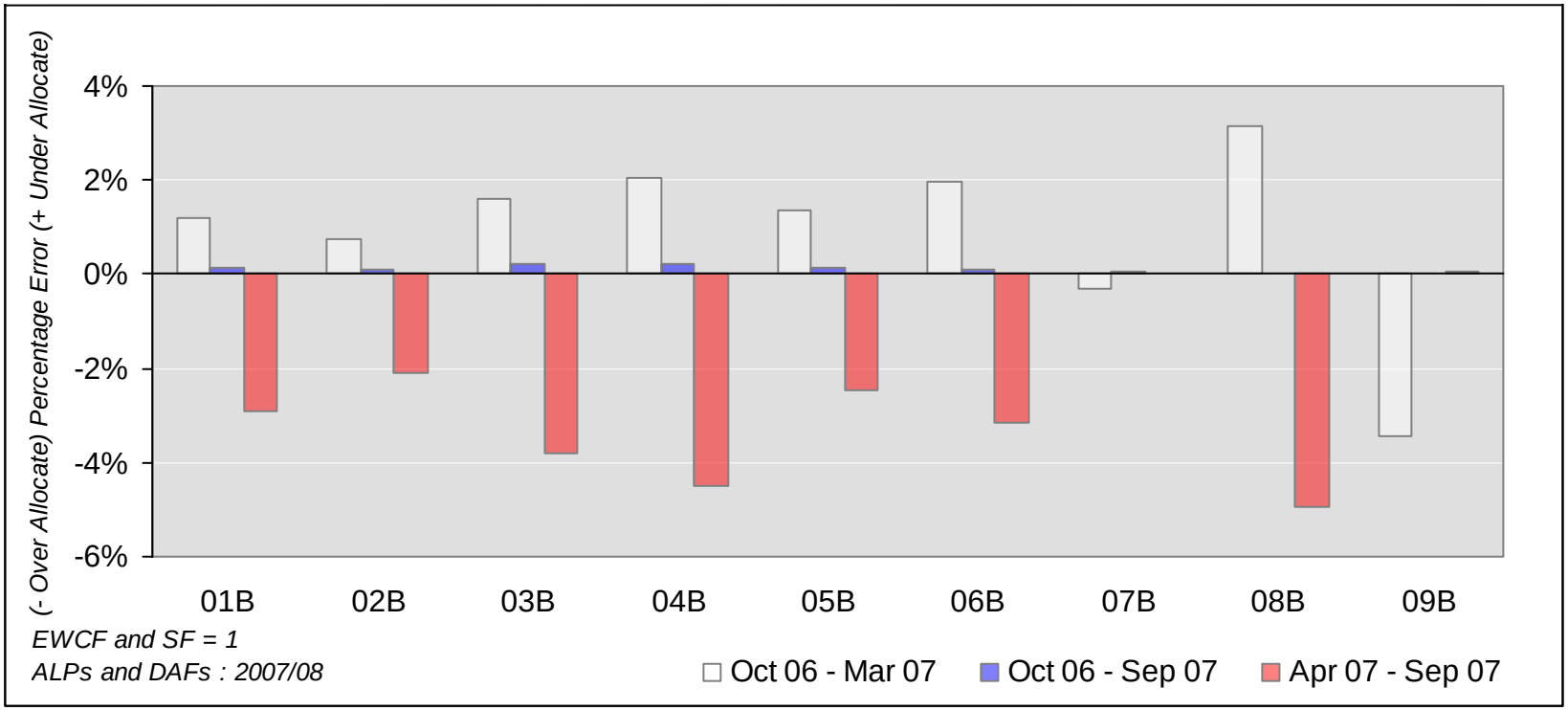


- Remove SF impact and remove NDM SND error bias (use EWCF which eliminates SND bias)
- Positive errors = Under allocation ; Negative errors = Over allocation
- Winter: Under allocation 0 and 3.2%
- Summer: Over allocation 0 and 6% (greater % error possibly due to smaller demand levels)
- Year: Little overall error in each band – Winter / Summer errors indicate 'flat' profiles

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)

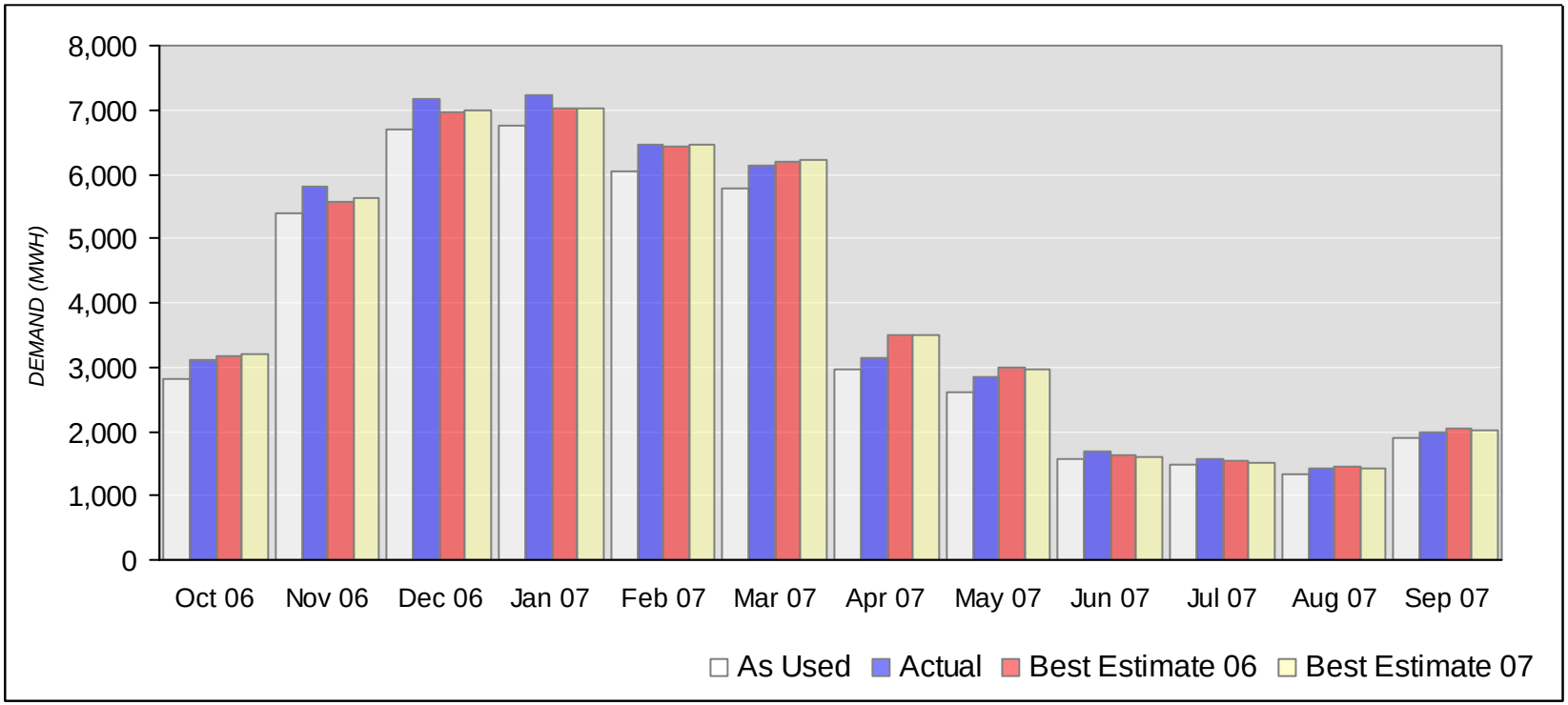


- ALPs and DAFs applied for 2007/08 applied to 2006/07 consumption data
- Should provide less error as ALPs and DAFs were derived from this consumption data
- Shows similar profile as previous – Winter under, Summer over allocation. Overall, small error
- BUT – extent of error is reduced using 07/08 algorithms in most EUCs
- Monthly analysis also completed…

Monthly Actual & Deemed Demand

01B (All LDZs)

As previous but by EUC Band and By Month

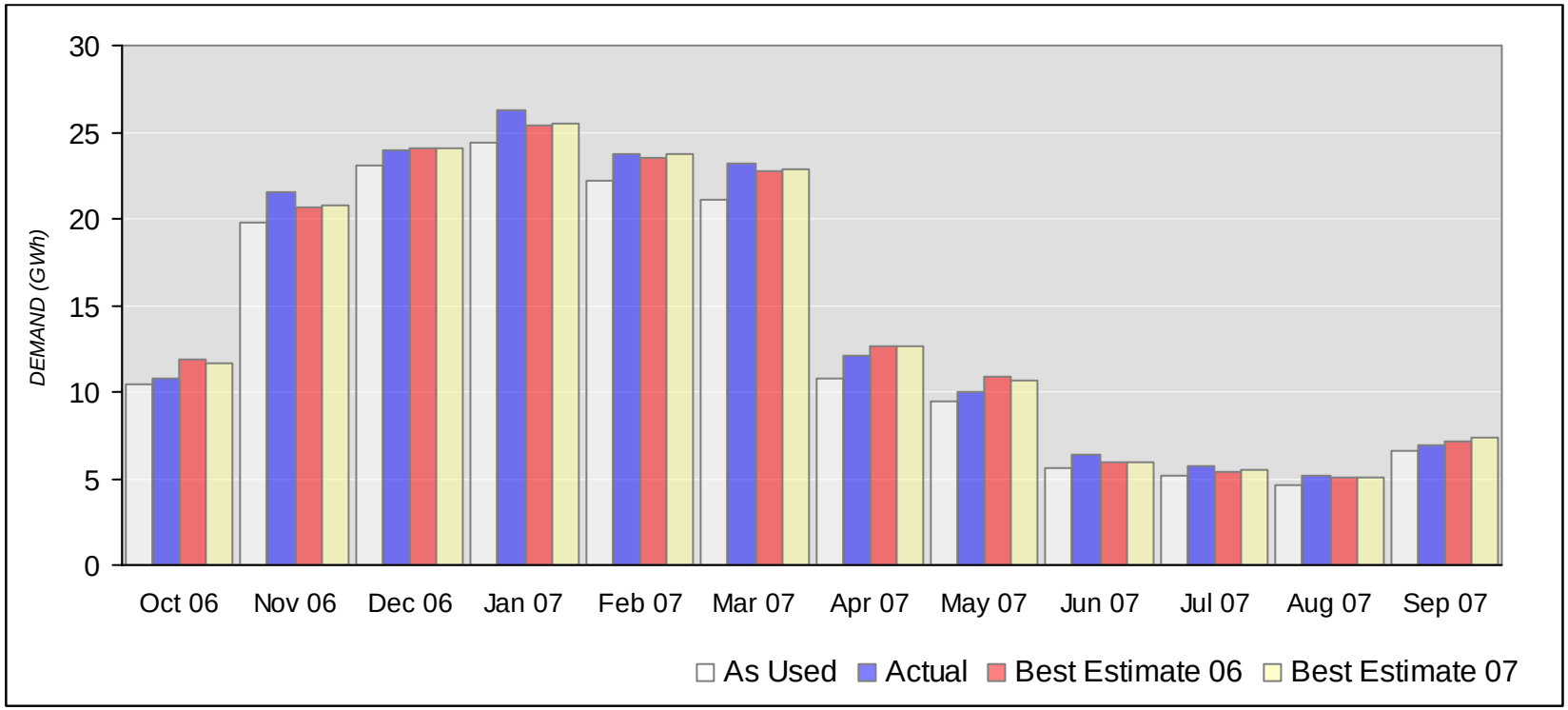


- Two examples of previous analysis but by EUC Band and Month: Trends
- General trend winter under allocation, summer over allocation
- April: over allocation – exceptionally warm weather
- May – Sep: spells of extreme wet weather

Monthly Actual & Deemed Demand

02B (All LDZs)

As previous but by EUC Band and By Month



- 02B as Band 01B
- General trend winter under allocation, summer over allocation
- April: over allocation – exceptionally warm weather
- May – Sep: spells of extreme wet weather

RV Analysis & NDM Sample Analysis
Conclusions

	NDM Sample Analysis	RV Analysis
WINTER	UNDER Allocation	OVER Allocation
SUMMER	OVER Allocation	UNDER Allocation

- Conflicting outcomes when assessing algorithm performance
- Are 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 - but both suggest only small inaccuracies (as did SF analysis)
- Possibility that actual algorithm performance is between the two
- Comparable with previous years
- Spring 2008 RV analysis is updated to provide better representation