Demand Estimation Sub Committee
15th February 2017

NDM Algorithm Performance (Gas Year 2015/16)
Strand 3: NDM Sample Analysis

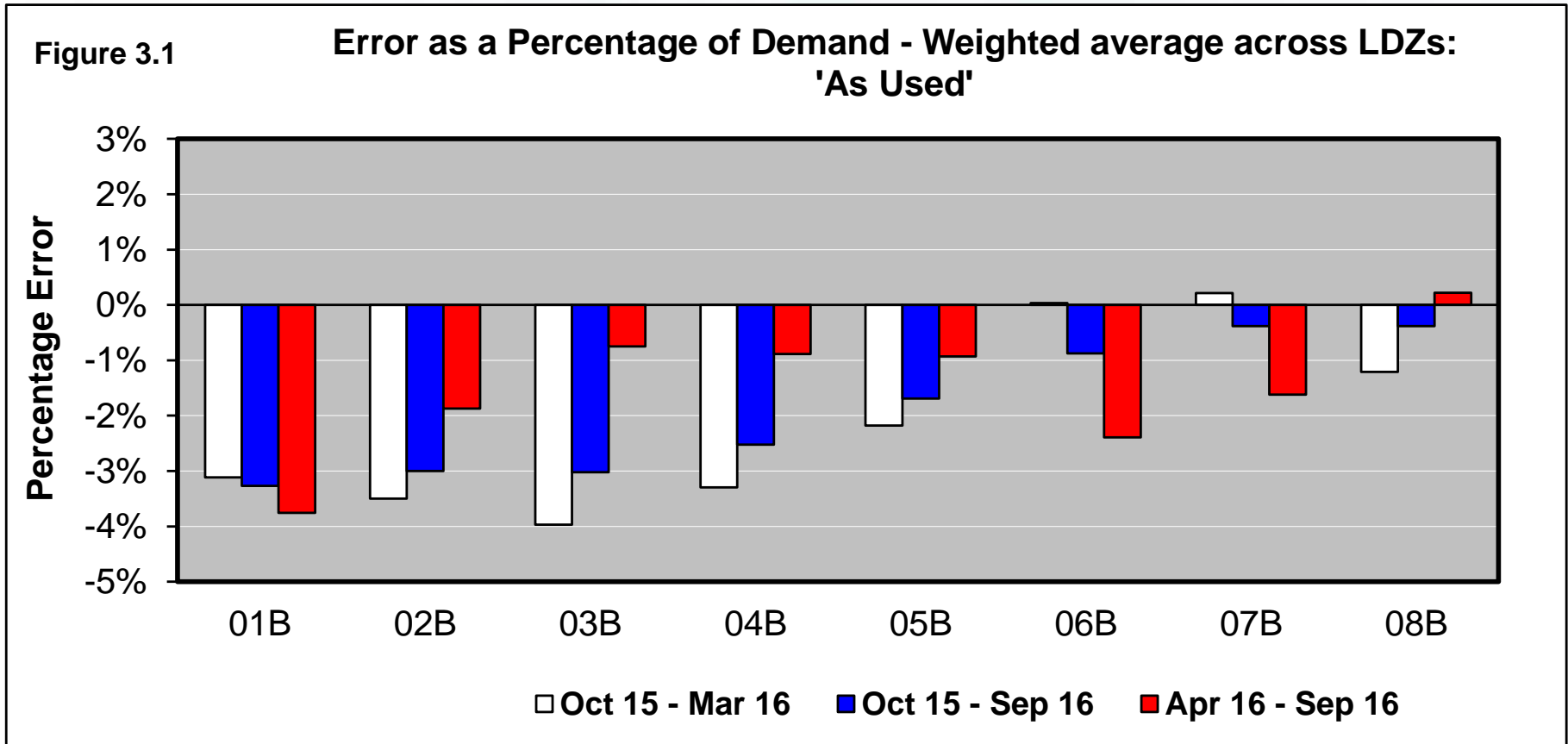# Algorithm Performance 2015/16: Strand 3

- Strand 1 (SF and WCF analysis) & Strand 2 (RV analysis)
  - Not completed for Gas Year 2015/16 as per decision at July 2015 DESC meeting

- Strand 3: NDM Sample Analysis
  - Compare the actual demand from the NDM sample data *with*
  - Allocated demand for the sample

Strand 3: NDM Sample Analysis

- Using the actual NDM Sample consumption for 2015/16
  - Compare the % error of sample consumption against three models:
    - Allocated using 15/16 ALPs & DAFs, real system WCF and SF – (As Used)

    - Allocated using 15/16 ALPs & DAFs, EWCF and SF=1 - (Best Estimate '15)

    - Allocated using 16/17 ALPs & DAFs adjusted to 2015/16 day/holiday pattern, 15/16 EWCF and SF=1 - (Best Estimate '16)

  - This is completed by EUC for all LDZs and also by month by LDZ

- Supporting document – detailed explanation with full examples

Strand 3: NDM Sample Analysis
Allocated Error As % of Actual Demand – 'As Used'

NOTE: 15/16 ALPs & DAFs; real system WCF and SF; NDM Sample derived AQs (not system AQs)

Figure 3.1

Error as a Percentage of Demand - Weighted average across LDZs: 'As Used'

Legend: □ Oct 15 - Mar 16   ■ Oct 15 - Sep 16   ■ Apr 16 - Sep 16

NOTE: Positive errors = Under allocation; Negative errors = Over allocation

- Over year: Negative errors across all consumption bands (indicate population AQs are lower than NDM sample derived AQs)
- 'As Used' model uses real system SFs which have taken population AQs into account
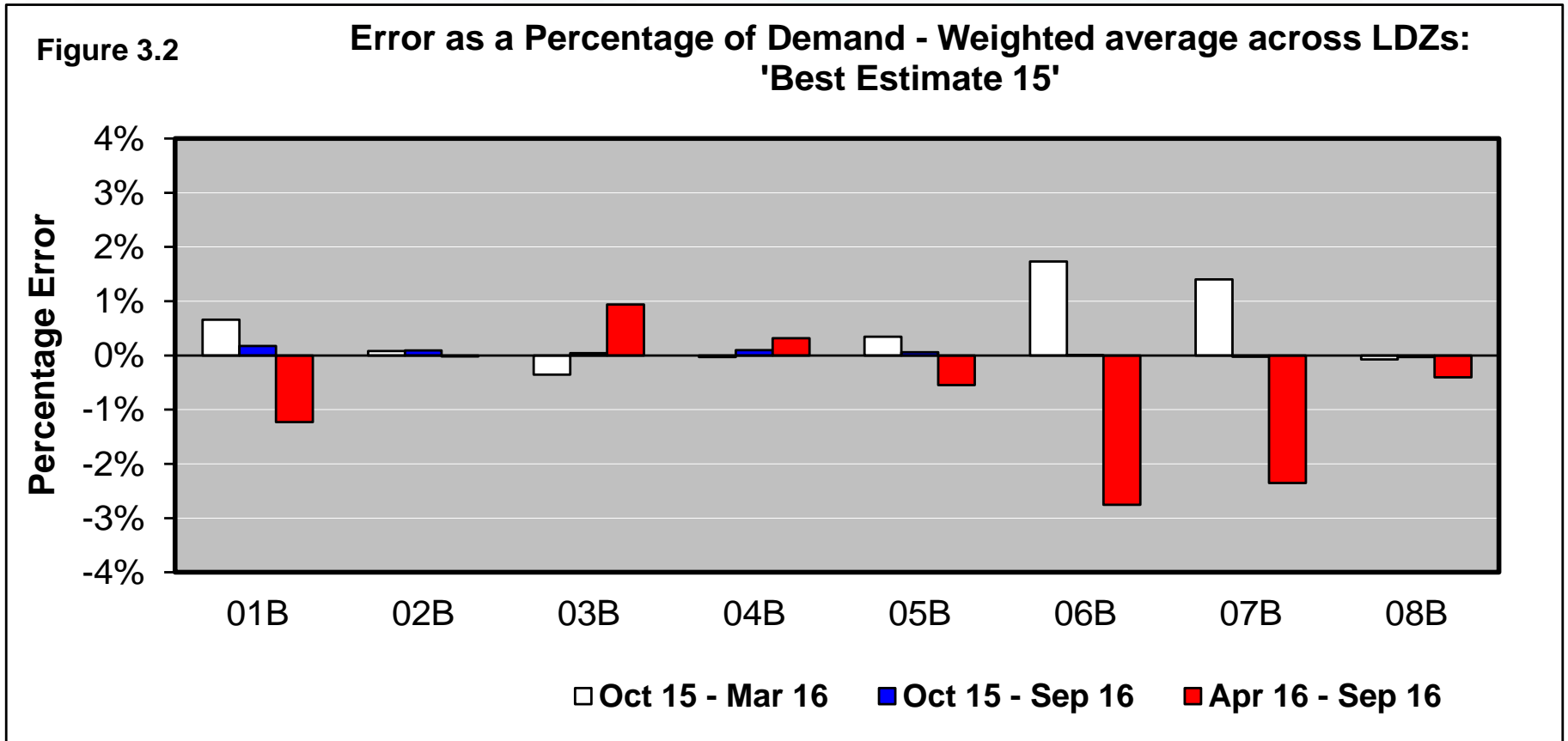- 'As Used' model does not assess EUC profiles, however it can provide indicator of system AQ excess or deficit

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Strand 3: NDM Sample Analysis
As Used Model – AQ Assessment

LDZ	Estimated AQ Excess (+) or Deficit (-) ('as used' analysis full year errors)	Observed AQ Changes in Gemini at start of gas year 2016/17
SC	-0.6%	-1.4%
NO	-1.4%	-0.9%
NW	-1.4%	-0.6%
NE	-0.8%	-0.3%
EM	-1.3%	-1.0%
WM	-0.5%	-0.6%
WN	-	-0.1%
WS	-0.4%	-1.9%
EA	-1.4%	1.1%
NT	-1.6%	-0.4%
SE	-0.7%	0.5%
SO	-0.1%	-0.5%
SW	-0.3%	-1.0%
Overall	**-0.9%**	**-0.5%**

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Strand 3: NDM Sample Analysis
Allocated Error As % of Actual Demand – 'Best Estimate 15'

NOTE: 15/16 ALPs & DAFs; EWCF and SF=1; NDM Sample derived AQs (not system AQs)

Figure 3.2

Error as a Percentage of Demand - Weighted average across LDZs: 'Best Estimate 15'

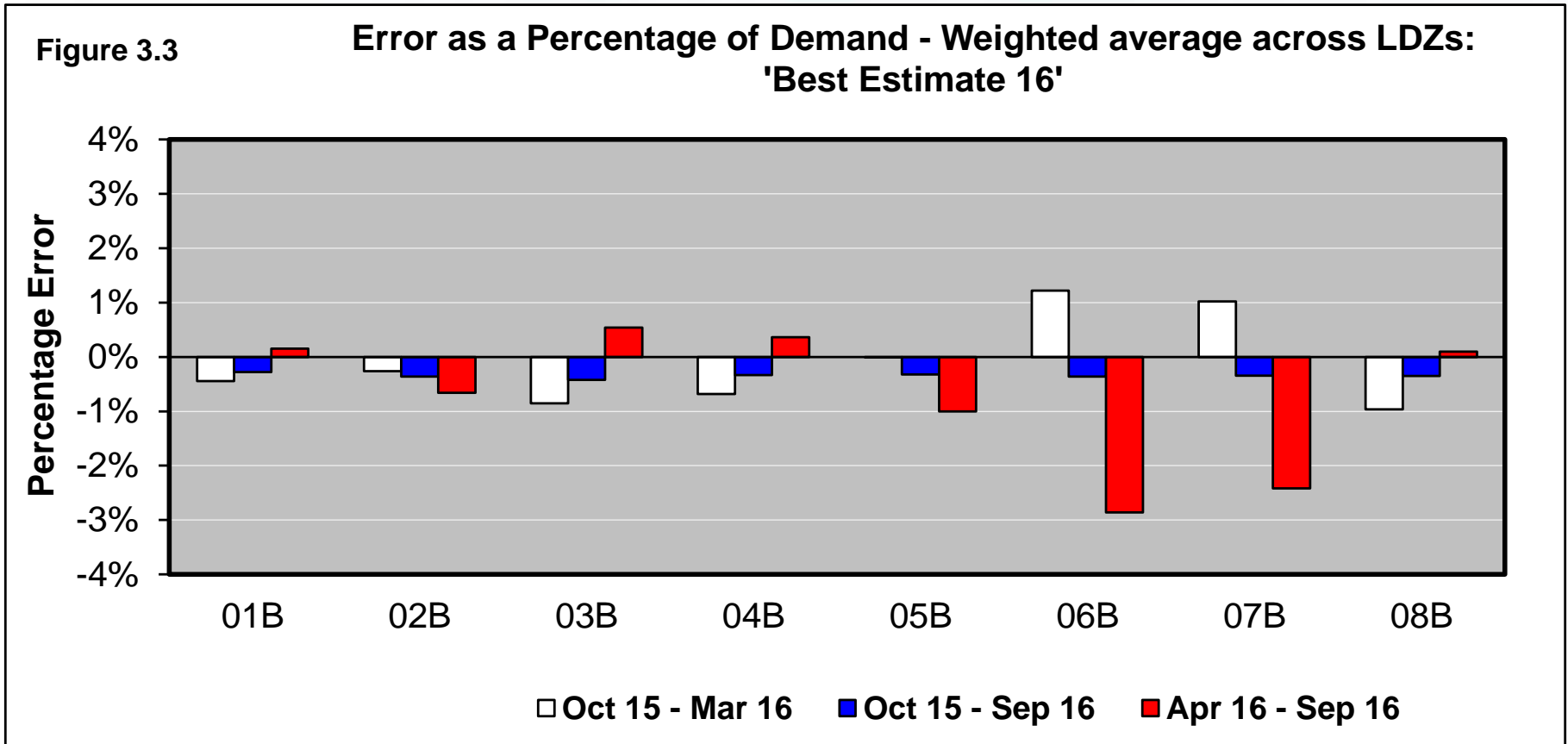Legend: □ Oct 15 - Mar 16 ■ Oct 15 - Sep 16 ■ Apr 16 - Sep 16

NOTE: Positive errors = Under allocation; Negative errors = Over allocation

- Removes SF impact and uses EWCF which avoids potential bias in WCF
- Winter/Summer analysis indicates bands 01, 02, 05, 06, 07 & 08 too flat and bands 03 & 04 too peaky
- Over year: Very little overall error in each band (Range -0.03% to +0.18% for all bands)

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Strand 3: NDM Sample Analysis
Allocated Error As % of Actual Demand – 'Best Estimate 16'

NOTE: 16/17 ALPs & DAFs; 15/16 EWCF and SF=1; NDM Sample derived AQs (not system AQs)

Figure 3.3

Error as a Percentage of Demand - Weighted average across LDZs: 'Best Estimate 16'

Chart: Percentage Error (y-axis from -4% to 4%) across bands 01B, 02B, 03B, 04B, 05B, 06B, 07B, 08B.

Legend: ☐ Oct 15 - Mar 16   ■ Oct 15 - Sep 16   ■ Apr 16 - Sep 16

NOTE: Positive errors = Under allocation; Negative errors = Over allocation

- ALPs and DAFs for 2016/17 applied to 2015/16 consumption data
- Should provide less error as ALPs and DAFs were partly derived from this consumption data
- Winter / Summer errors are slightly improved in bands 01, 06 & 07 and slightly worse in 02, 03, 04, 05 & 08
- Over whole year, on average, extent of error across all EUCs is slightly increased using models developed in Spring 2016
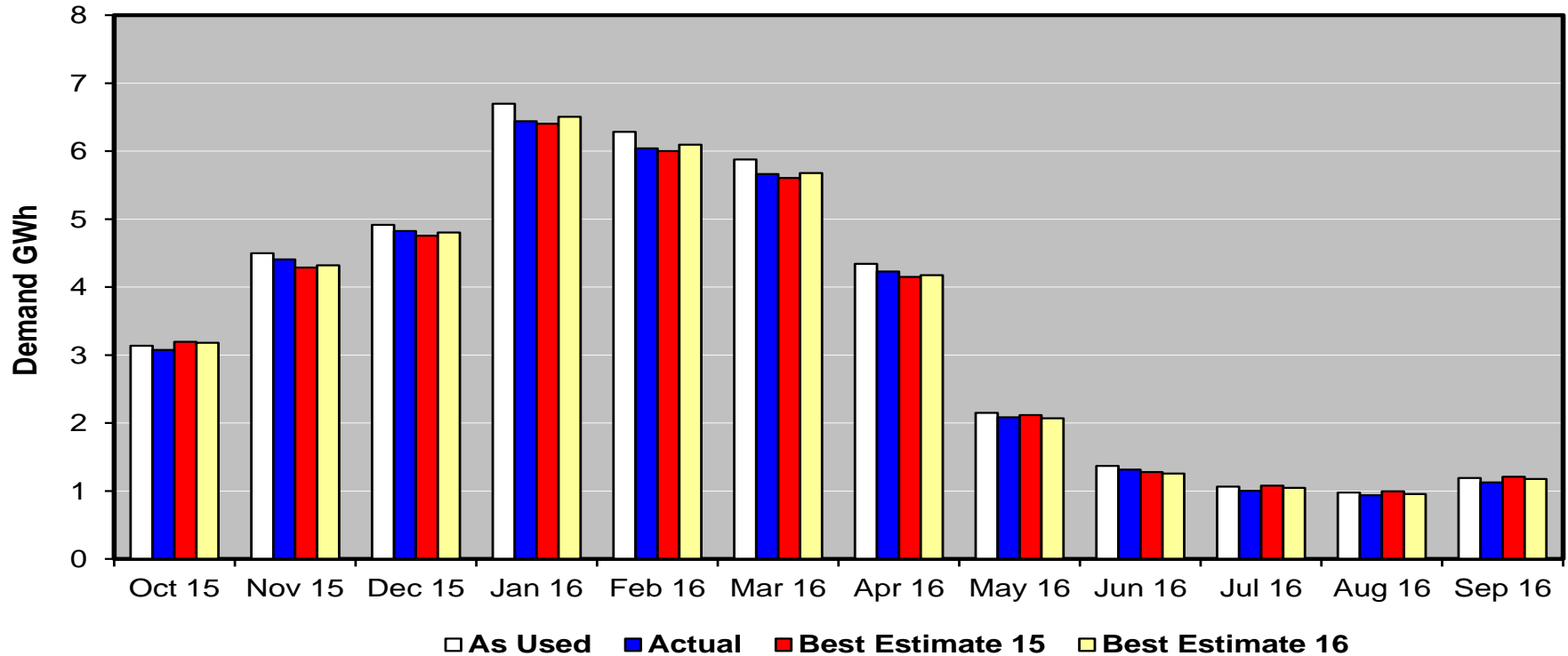- Monthly analysis also completed...

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Strand 3: NDM Sample Analysis
Monthly Actual & Deemed Demand – 01B (ALL LDZs)

Figure 3.4

Monthly Actual & Deemed Demands for 01B (across all LDZs)

Results also provided for previous models but by EUC Band and Month – Equivalent charts for all consumption bands included in supporting document

- Band 01B profile – indicates winter under allocation (except October 2015) and mostly small summer over allocation (except April & June 2016)
- Relevant to recall weather conditions in 15/16 when interpreting results
  - During Winter months, November 2015 & December 2015 were particularly warm months, ranking 3rd and 1st warmest in last 50 years respectively)
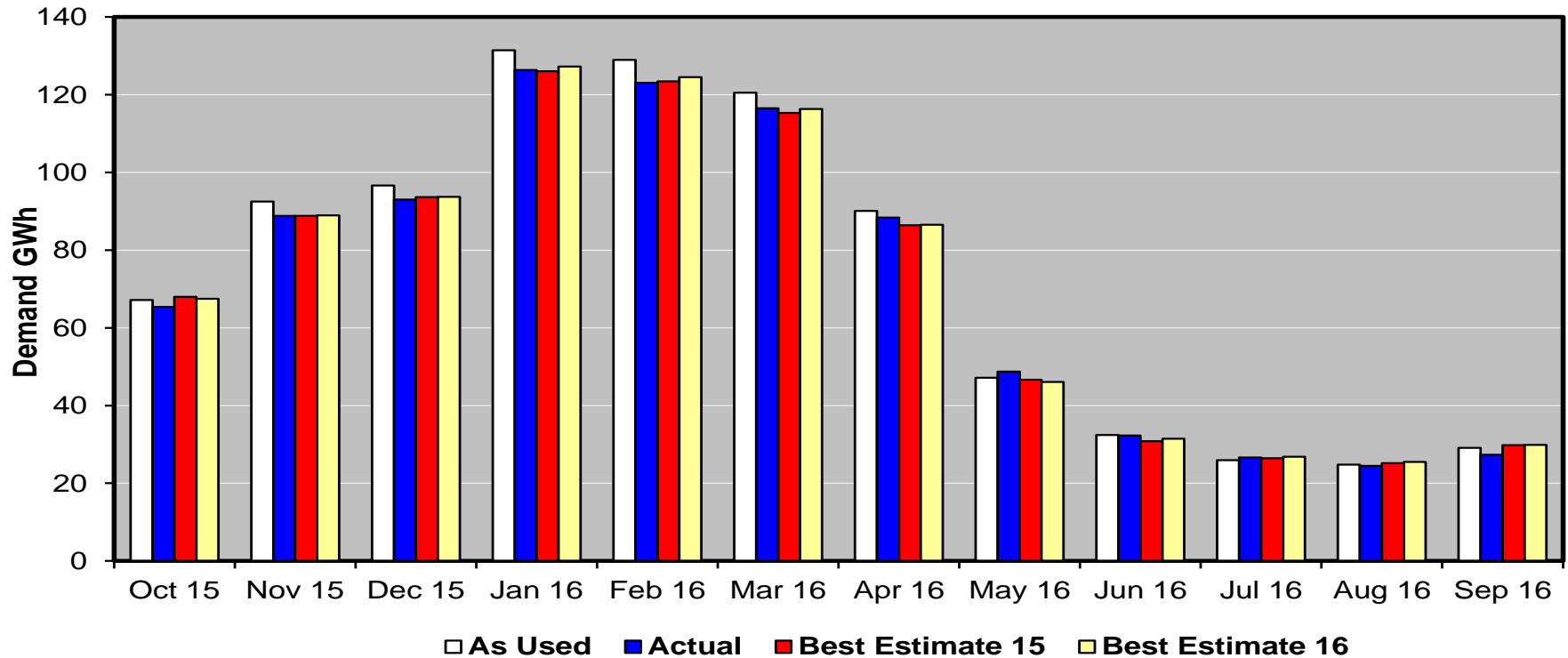 - Summer months fairly average except for a warm September (ranked 2nd warmest in last 50 years)

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Strand 3: NDM Sample Analysis
# Monthly Actual & Deemed Demand – 03B (ALL LDZs)

Figure 3.6

Monthly Actual & Deemed Demands for 03B (across all LDZs)

- Band 03B profile indicates:
  - Winter over allocation in October, December and February but also shows small under allocation in November, January and March.
  - Slight under allocation in summer months (except in August and September).

Strand 3: NDM Sample Analysis
Daily Actual & Deemed Demand – 01B (ALL LDZs)

Figure 3.19

Daily Actual and Deemed Demands for 01B (across all LDZs)
**(including CWV)**
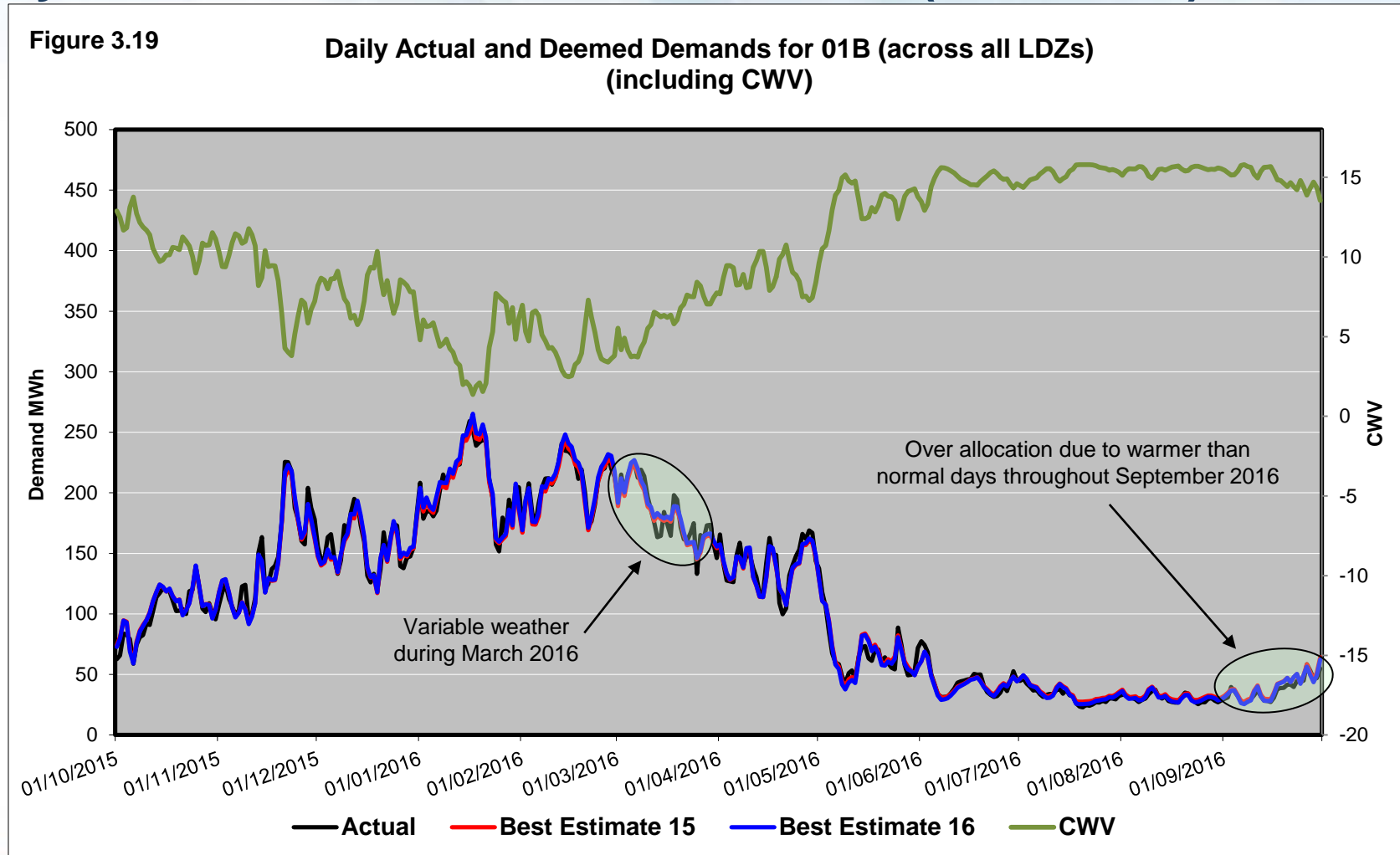
- The daily chart for Band 01 shows that allocated demand was generally close to actual demand
- The most notable exceptions occurred during the particularly variable weather in March 2016 and the much warmer than normal days throughout September 2016

Strand 3: NDM Sample Analysis
Daily Actual & Deemed Demand – 03B (ALL LDZs)

Figure 3.21

Daily Actual and Deemed Demands for 03B (across all LDZs)
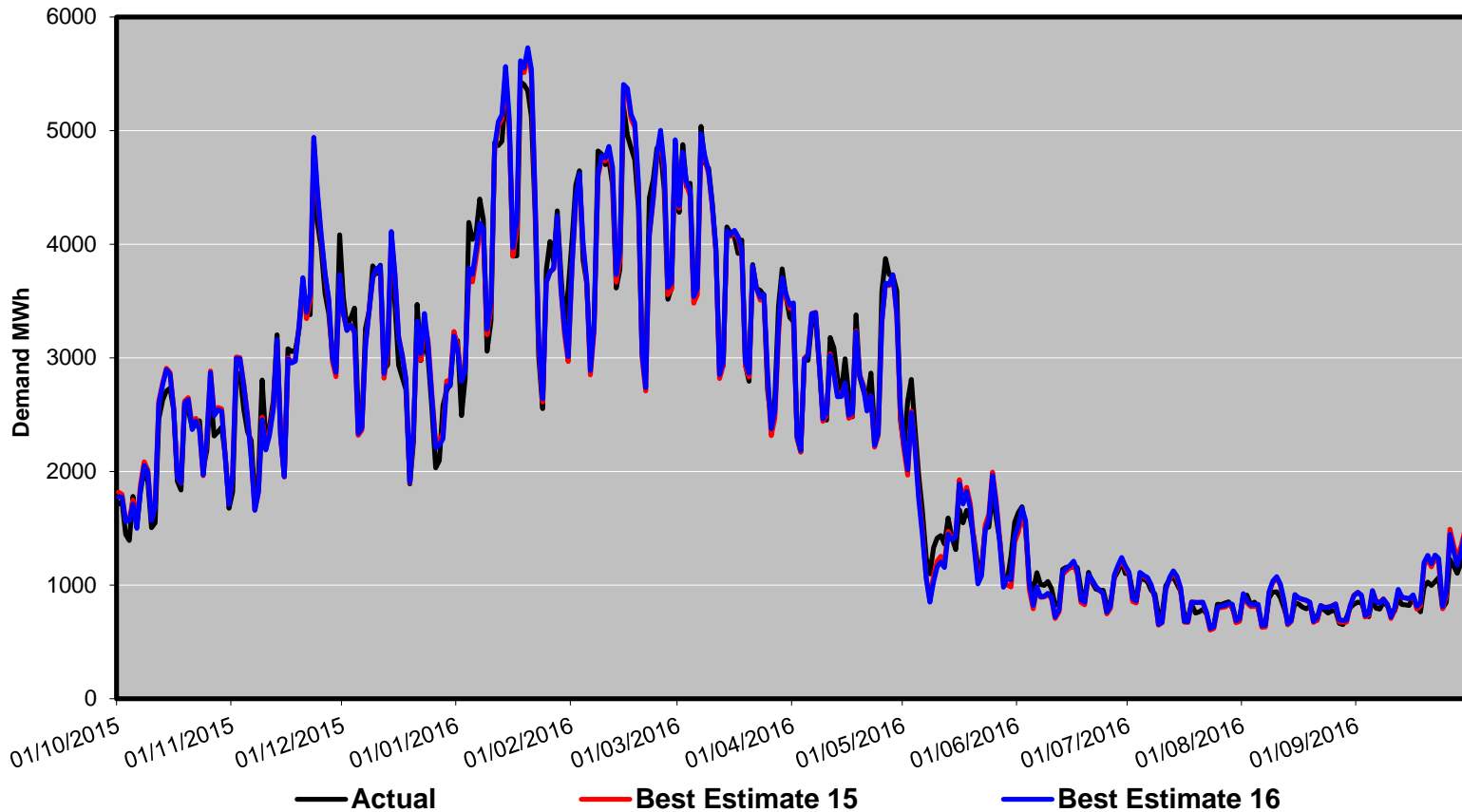
- The daily chart for Band 03 shows that allocated demand was generally close to actual demand.
- There appears to be a tendency for slight over allocation during the winter and summer months.

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Strand 3: NDM Sample Analysis Summary

- The " best estimate 15" analysis suggest:
  - For bands 01, 02, 05, 06, 07 & 08; under allocation (+ve errors) in the winter and over allocation (-ve errors) in the summer. Profile too flat
  - For bands 03 and 04; over allocation (-ve errors) in the winter and under allocation (+ve errors) in the summer. Profile too peaky

- The "best estimate 16" analysis suggest:
  - For bands 02, 05, 06 & 07; under allocation (+ve errors) in the winter and over allocation (-ve errors) in the summer. Profile too flat
  - For bands 01, 03, 04 and 08; over allocation (-ve errors) in the winter and under allocation (+ve errors) in the summer. Profile too peaky

Strand 3: NDM Sample Analysis Conclusions

- Considerations
  - NDM sample analysis is based on validated NDM SAMPLE data, which despite our attempts, may not be necessarily be representative of the population as a whole
  - The sample suffers from small numbers of contributing meter points at the higher consumption bands

- NDM Sample Analysis, subject to it's limitations, suggests only small inaccuracies over the year as a whole

- Full explanatory document on Joint Office website:
  - 'Evaluation of Algorithm Performance 2015-16'