Measurement and Verification for Variable DR Economic Resources

DRS

3/27/2013

CBL certification process

- Ensure load can be forecast on a reasonably accurate basis before participation
- If load can be forecast on a accurate basis then load reductions can be quantified
- Variable Customers = Hourly load can not be forecast on an accurate basis
  - Based on existing CBL methods.
- RRMSE test is objective way to determine accuracy of CBL to forecast load.

CBL breakdown for all Economic DR registrations

CBL	MW	MW (%)	Registration (Count)	Registration (%)
3 Day Types with SAA (high 4 of 5)	1,122	47%	748	71%
Non-hourly metered sites DLC	768	32%	79	8%
MBL(Max Base Load)	270	11%	170	16%
Manual	140	6%	28	3%
3 Day Types (high 4 of 5)	107	4%	23	2%
7 Day Types with SAA (3 day average)	4	0%	3	0%
7 Day Types (3 day average)	0.1	0%	1	0%
3 Day Types with WSA (high 4 of 5)	-	0%	0	0%
Metered Generation	-	0%	0	0%
	2,411	100%	1,052	100%

Alternative CBL development

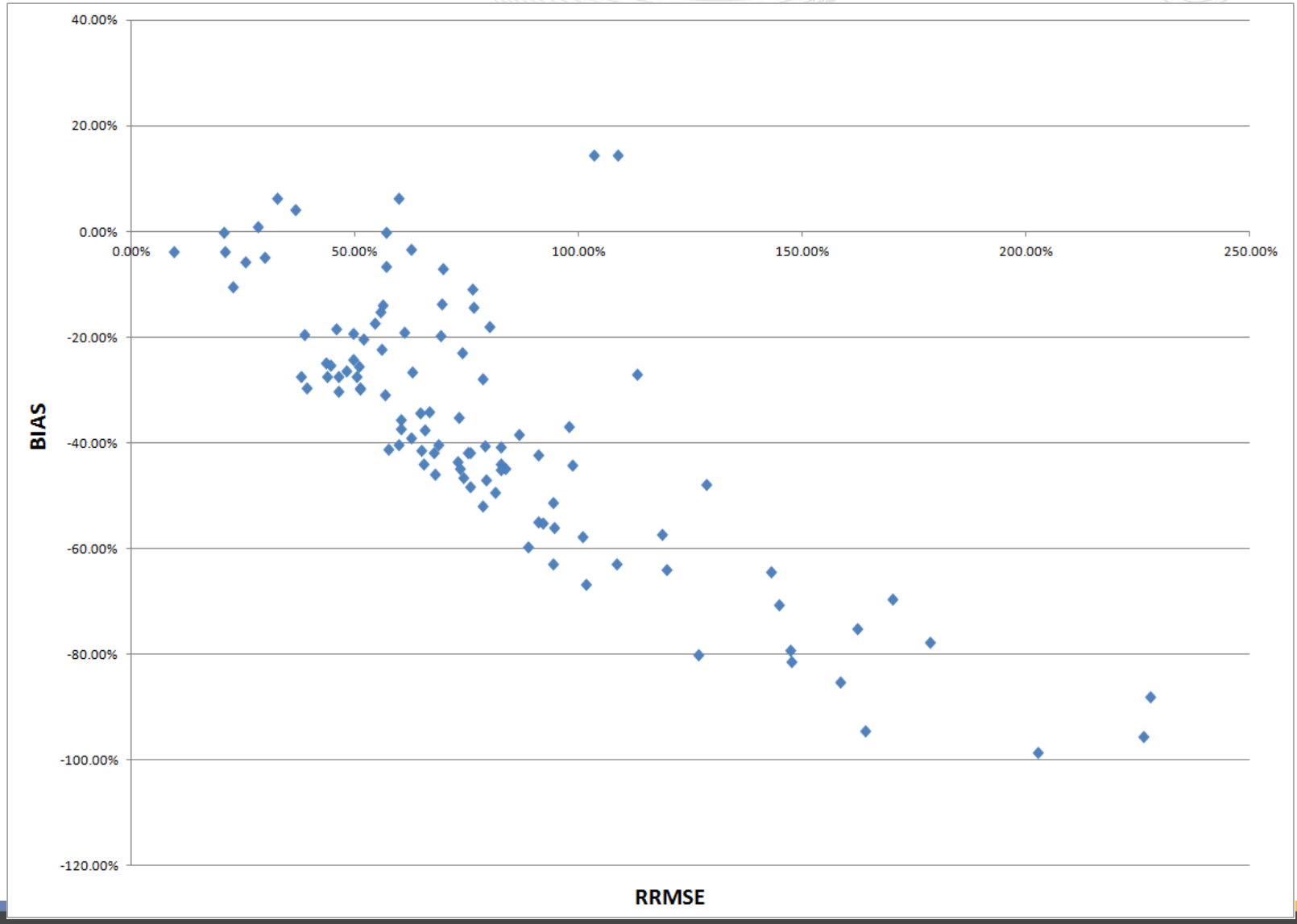
Alternative CBL applicable to specific load patterns/customer situations and therefore applicable to similar situations in the market

Variable Load alternative CBLs

- Max Base Load (MBL)
  - Developed to accommodate random load which can not be forecast.
    - Dynamic FSL type approach to determine quantifiable load reductions
- 3 Before + 2 After (3+2)
  - Developed to capture intra-day variation where daily usage is fairly consistent but hourly usage is variable
- 7 Day Types with SAA (3 day average)
  - Developed to capture reasonably consistent inter-day variation
    - Monday is fairly consistent but different than Tuesday
- Other thoughts from group?
  - Production schedule as input – did not work in practice.
  - WSA no longer used because SAA is doing reasonably accurate job.

- Widely applicable to variable loads
- Logical relationship between unpredictable load and negative bias.
  - The more unpredictable the load the higher the negative bias
- Issues
  - Some registrations have had positive bias
  - Some customers believe it provides a low estimate of load reductions

MBL – RRMSE vs Bias



- OK job is some instances
- Issues:
  - HVAC/thermal storage
    - Snap back included in CBL hours.
    - Pre-cooling (making ice for storage)
  - On-site generation
    - If unit that normally operates ramps down during CBL hour it has a big impact on CBL.
  - Abnormal behavior during CBL hours
    - Spikes
    - Ramp down before notification
  - Manual calculation errors (not automated in system yet)

Next Steps

- Determine load reduction capability for MBL by RRMSE score strata
  - Help to focus effort
- Continue to analyze source of variation
- Look at sensitivity of RRMSE for multiple hours

Appendix

- MBL
- 3+2
- Existing CBL list

- MBL was designed as a default to accommodate variable load that cannot be forecast
  - Based on average of min hourly load on previous non-event days for event period.
    - Days with event period usage < 25% are not used
  - Since load is so unpredictable this provides a dynamic FSL type approach to determine quantifiable load reductions
    - MBL comes from terminology used in NAESB M&V requirements

Manual Baseline(s) used last summer

- 3 Before + 2 After CBL
  - Average hourly load for 3 hours before event (skip 1 hour before start) plus 2 after (skip 1 hour after)
  - Must be available for dispatch or offer in DA market for at least 4 contiguous hours
    - Avoid any cherry picking issues
- Typically improved results for Variable load customers (RRMSE ~20 to 30%)

CBL Options

Parameter/CBLs	3 DayTypes		3 Day Types with SAA (Tariff Default)		3 Day Types with WSA	
DayType	Weekdays,	Sat ,Sun/Hol	Weekdays	Sat,Sun/Hol	Weekdays	Sat, Sun/Hol
Calculation[1]	Average	Average	Average	Average	Average	Average
CBL Basis Window[2]	5	3	5	3	5	3
CBL Basis Window Limit[3]	45	45	45	45	45	45
Start Selection From Days Prior to Event[4]	1	1	1	1	1	1
Exclude Previous Curtailment Days[5]	Y	Y	Y	Y	Y	Y
Exclude Long/Short DST Days[6]	N/A	Y	N/A	Y	N/A	Y
Exclude Avg. Event Period Usage Less than Threshold[7]	25%	25%	25%	25%	25%	25%
Exclude # of Low Usage Days[8]	1	1	1	1	1	1
Use Previous Curtailment if CBL Basis Window incomplete[9]	Yes	Yes	Yes	Yes	Yes	Yes
Use Highest or Recent Previous Curtailment Day[10]	Highest	Highest	Highest	Highest	Highest	Highest
Adjustments[11]	None	None	Symmetric Additive	Symmetric Additive	Weather Sensitive	Weather Sensitive
Allow Negative Adjustments[12]	N/A	N/A	Yes	Yes	Yes	Yes
Adjustments Start (HE0-x)[13]	N/A	N/A	4	4	0	0
Adjustment Basis Hours[14]	N/A	N/A	3	3	Event Hours	Event Hours

CBL Options (cont')

Parameter/CBLs	7 DayTypes	7 Day Types with SAA	MBL(Max Base Load)[4]		Metered Generation[11]
DayType	Mon,Tue,Wed,Thu,Fri,Sat,Sun/Hol	Mon,Tue,Wed,Thu,Fri,Sat,Sun/Hol	Weekdays	Sat,Sun/Hol	N/A
Calculation[1]	Average	Average	Average	Average	N/A
CBL Basis Window[2]	3	3	5	3	N/A
CBL Basis Window Limit[3]	60	60	45	45	N/A
Start Selection From Days Prior to Event[4]	1	1	1	1	N/A
Exclude Previous Curtailment Days[5]	Y	Y	Y	Y	N/A
Exclude Long/Short DST Days[6]	Y	Y	N/A	Y	N/A
Exclude Avg. Event Period Usage Less than Threshold[7]	25%	25%	25%	25%	N/A
Exclude # of Low Usage Days[8]	0	0	0	0	N/A
Use Previous Curtailment if CBL Basis Window incomplete[9]	Yes	Yes	Yes	Yes	N/A
Use Highest or Recent Previous Curtailment Day[10]	Highest	Highest	Recent	Recent	N/A
Adjustments[11]	None	Symmetric Additive	None	None	N/A
Allow Negative Adjustments[12]	N/A	Yes	N/A	N/A	N/A
Adjustment Start (HE0-x)[13]	N/A	4	N/A	N/A	N/A
Adjustment Basis Hours[14]	N/A	3	N/A	N/A	N/A