Customizing the SAE Models for Redding Electric Utility

Presented by
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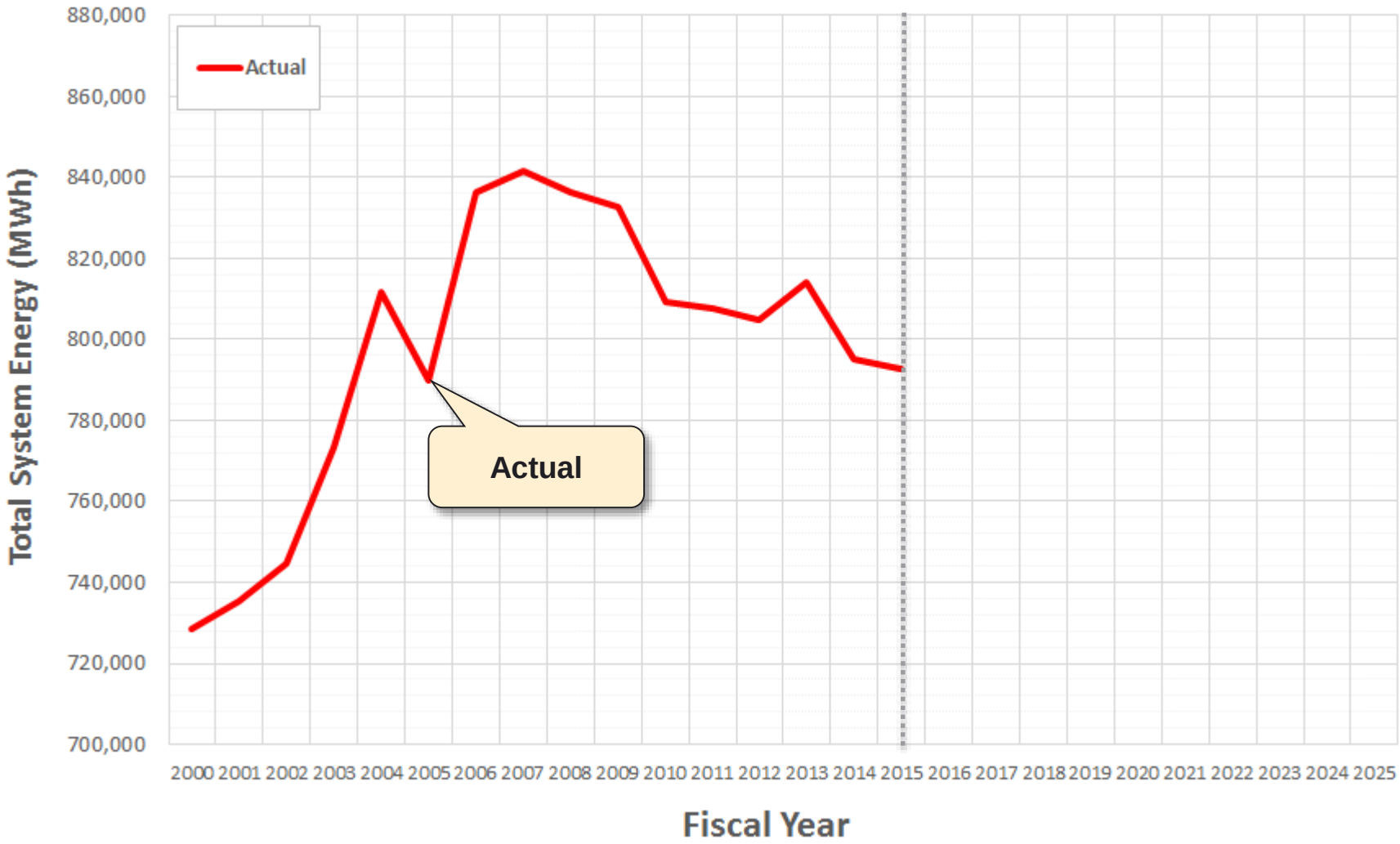
April 27, 2016

Overview

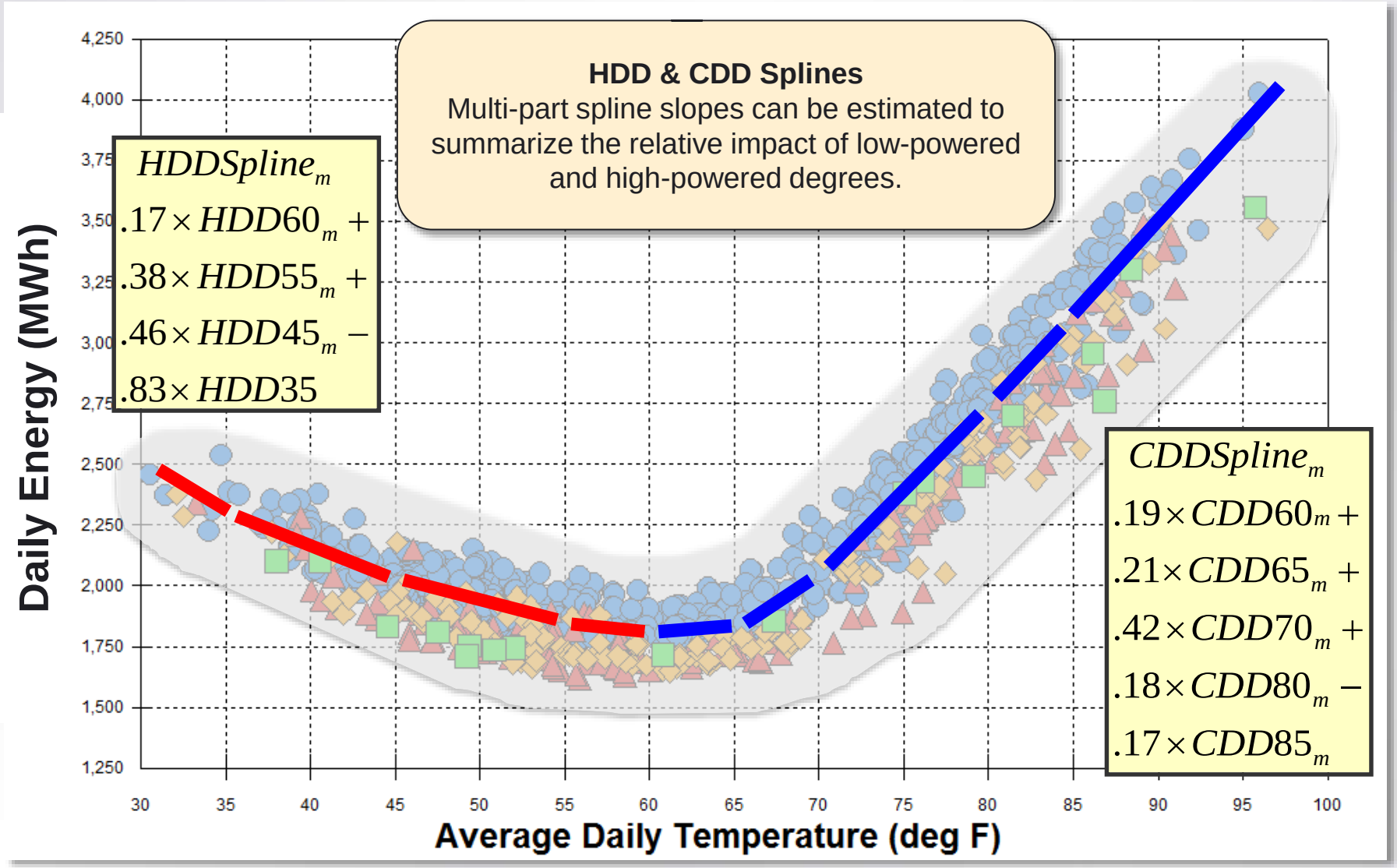
- Why REU Needs SAE
- What happened in 2015?
- Calibrating the Residential Model
- Calibrating the Commercial Model
- Forecast Results

WHY REU NEEDS SAE?

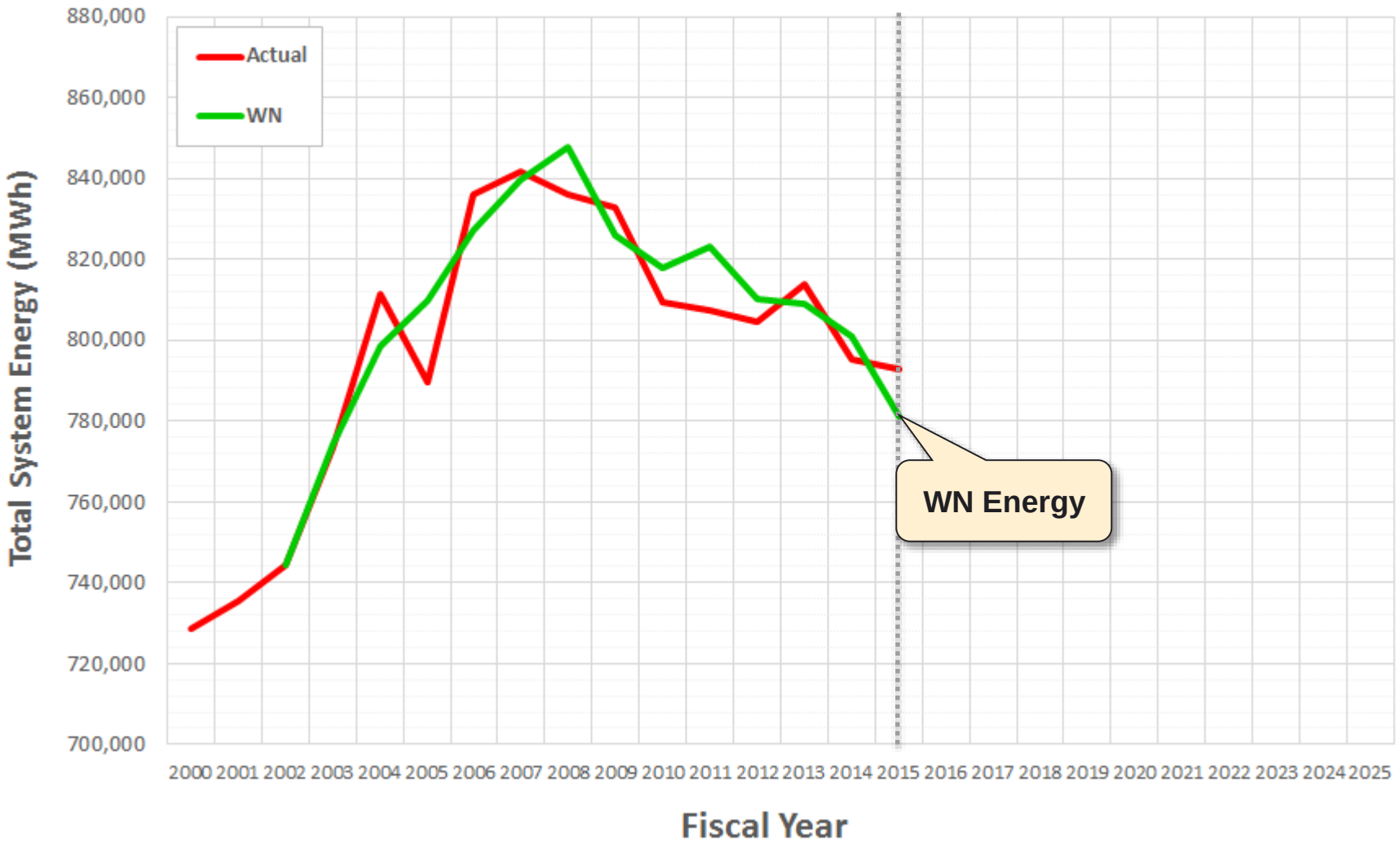
REU Actual System Energy



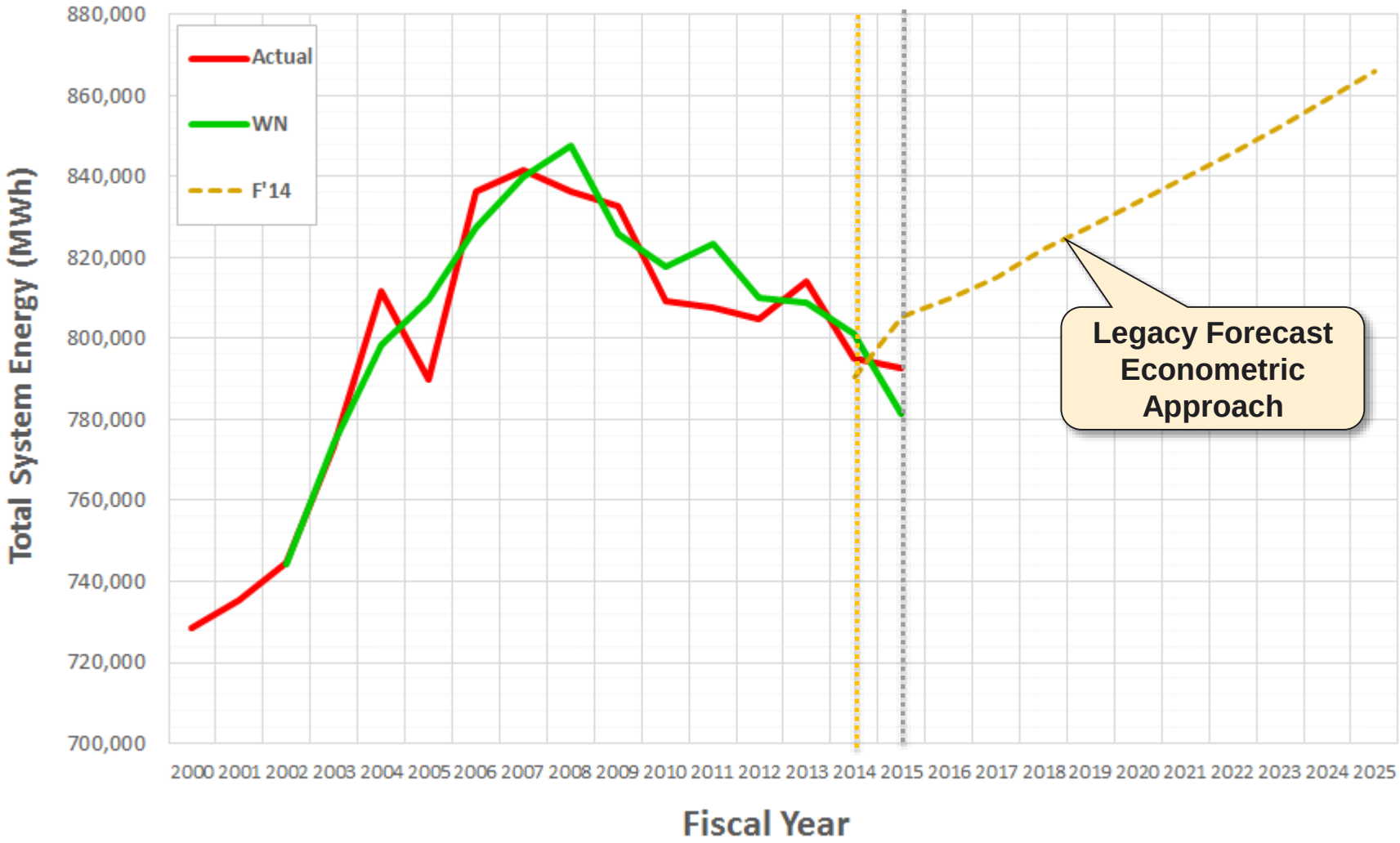
Weather Response Functions



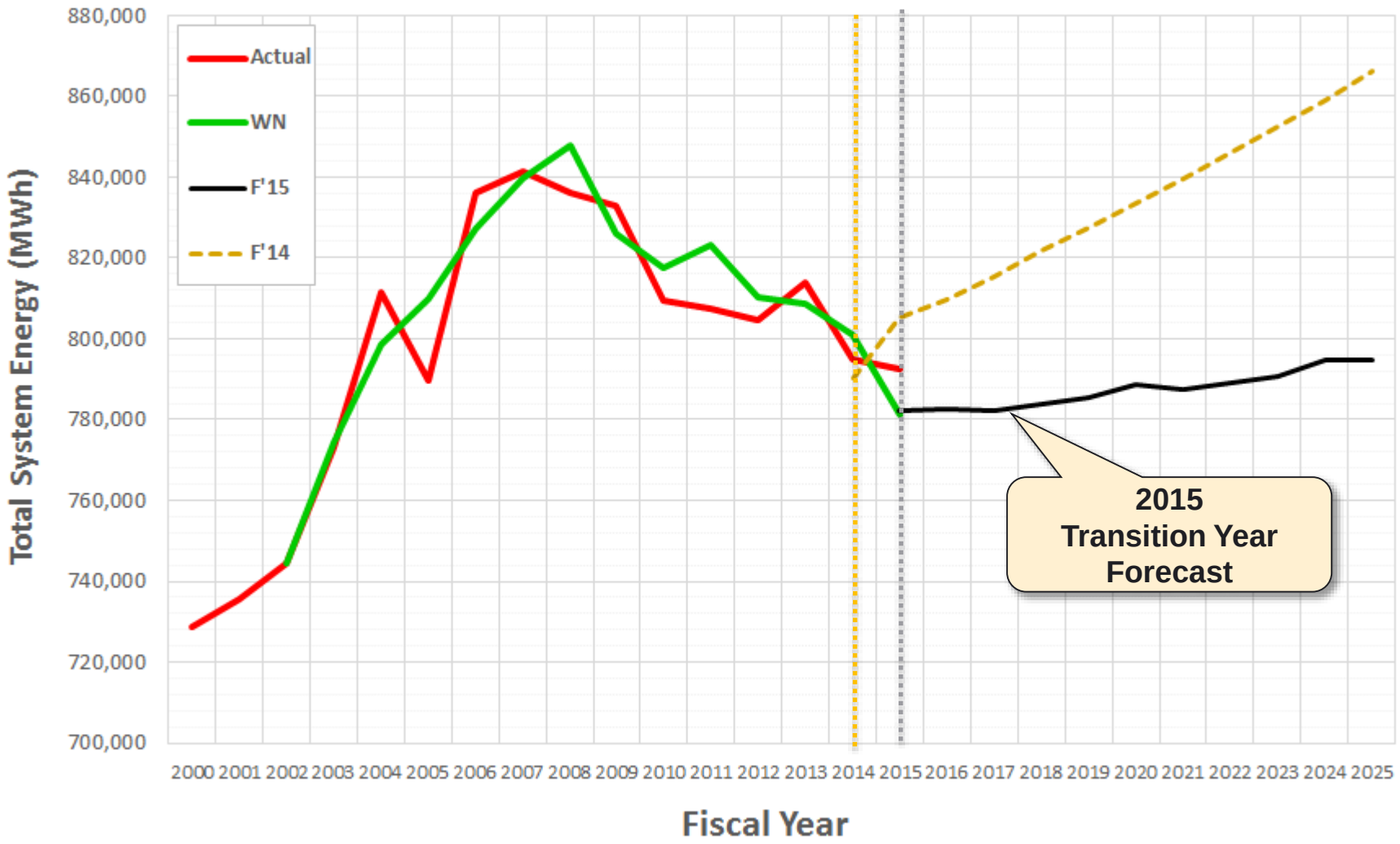
REU WN Actual System Energy



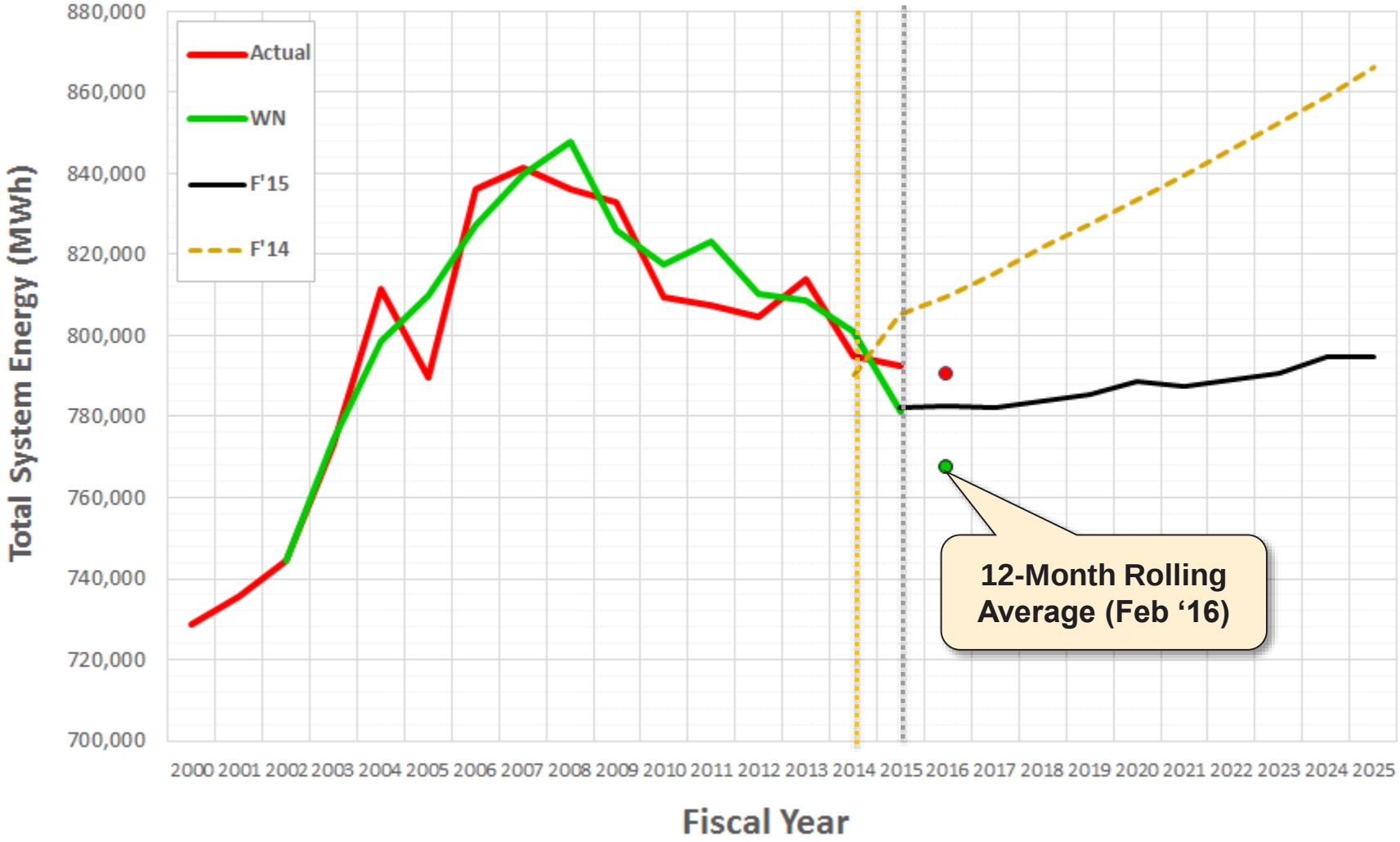
REU WN Actual System Energy

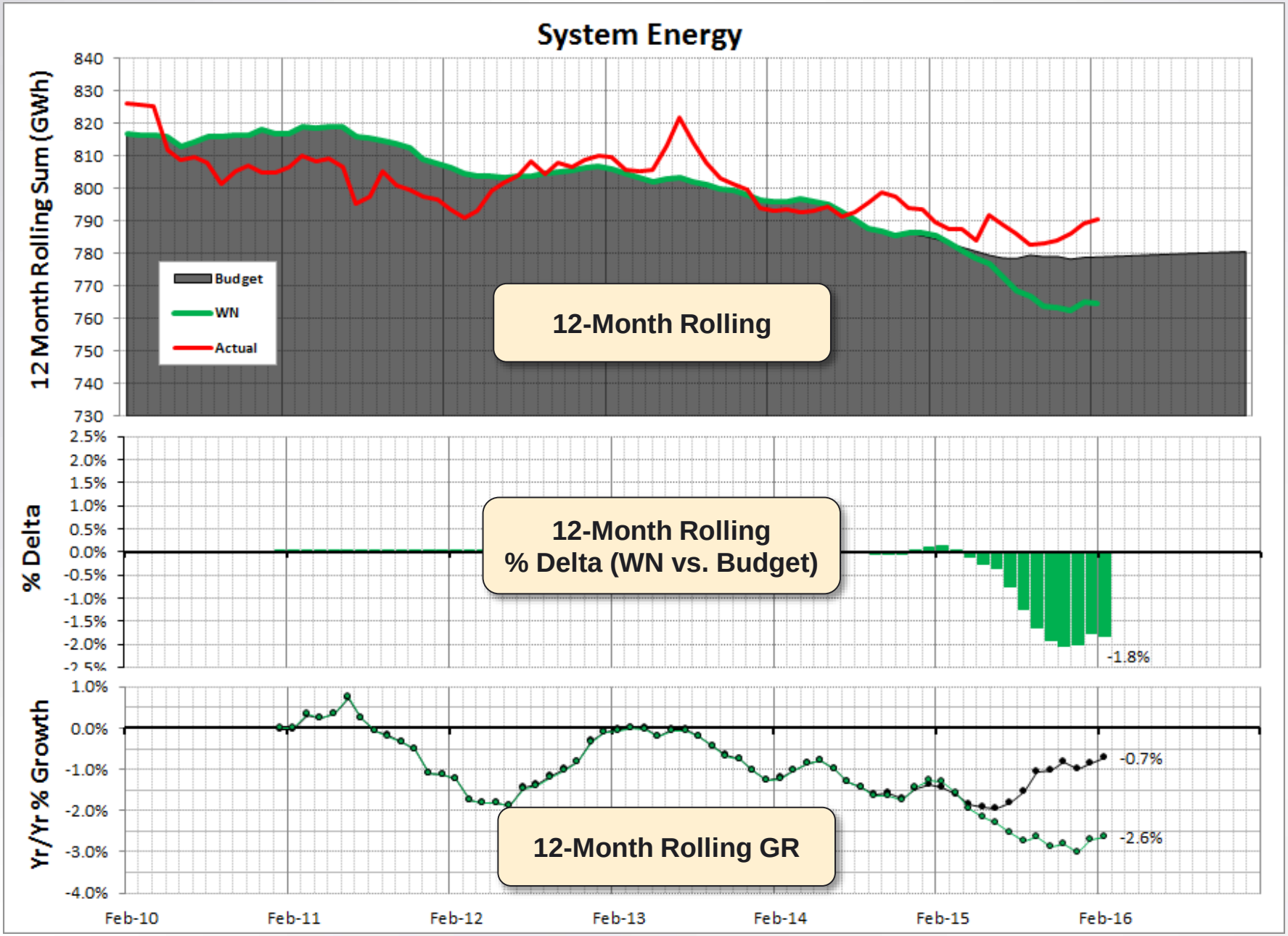


Legacy Peacock Chart

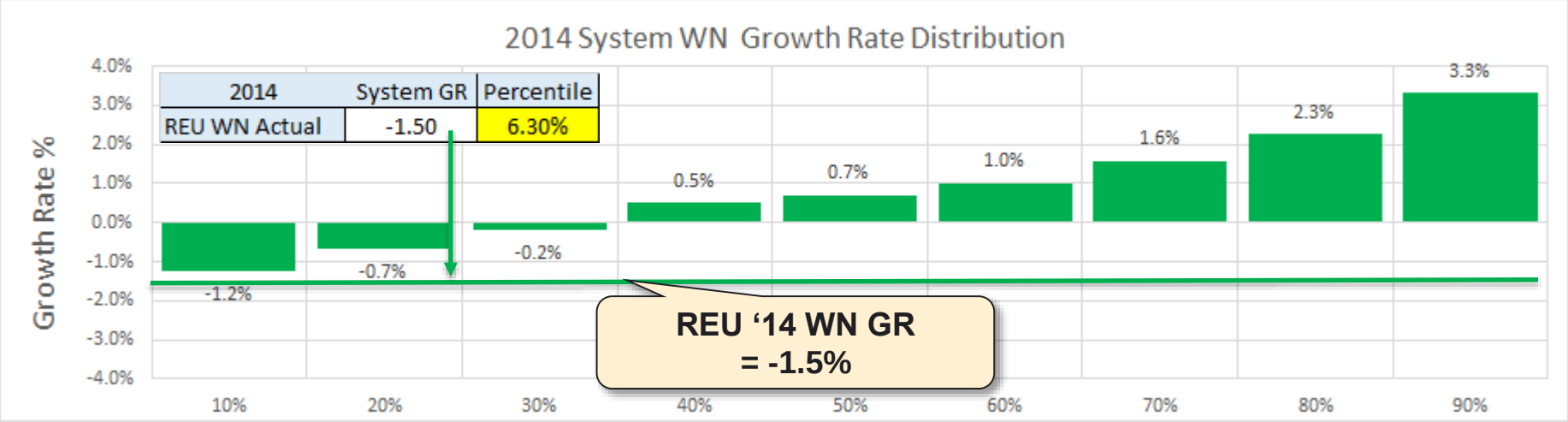


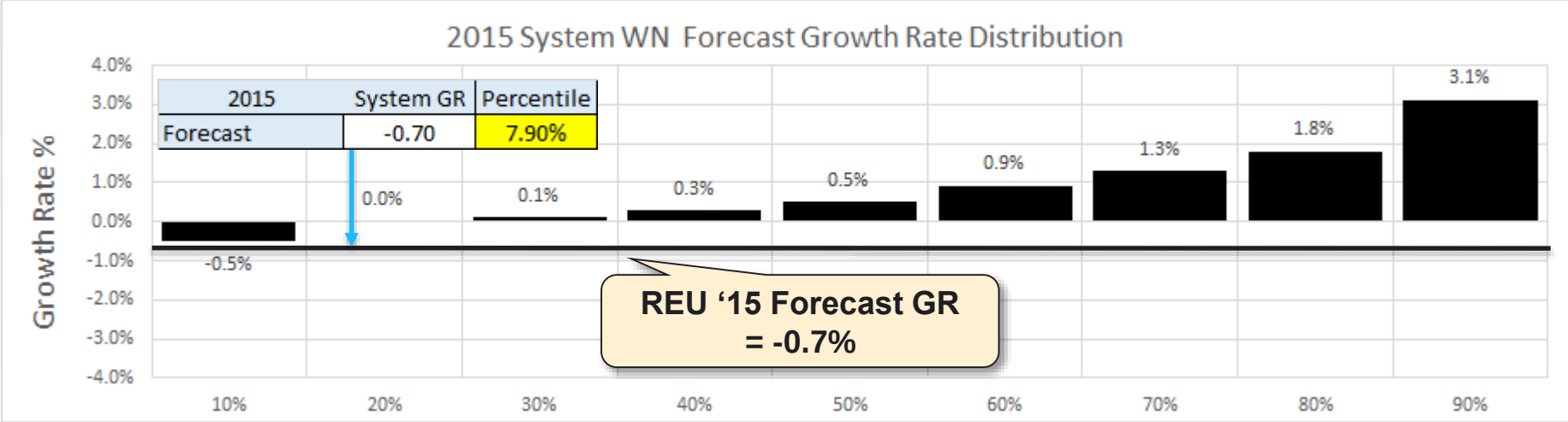
Weather Normalized Energy




System Energy
12 Month Rolling Sum (GWh)
840
830
820
810
800
790
780
770
760
750
740
730
Budget
WN
Actual
12-Month Rolling
% Delta
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
-0.5%
-1.0%
-1.5%
-2.0%
-2.5%
12-Month Rolling
% Delta (WN vs. Budget)
-1.8%
Yr/Yr % Growth
1.0%
0.0%
-1.0%
-2.0%
-3.0%
-4.0%
-0.7%
-2.6%
12-Month Rolling GR
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16

Industry Perspective – System WN Growth





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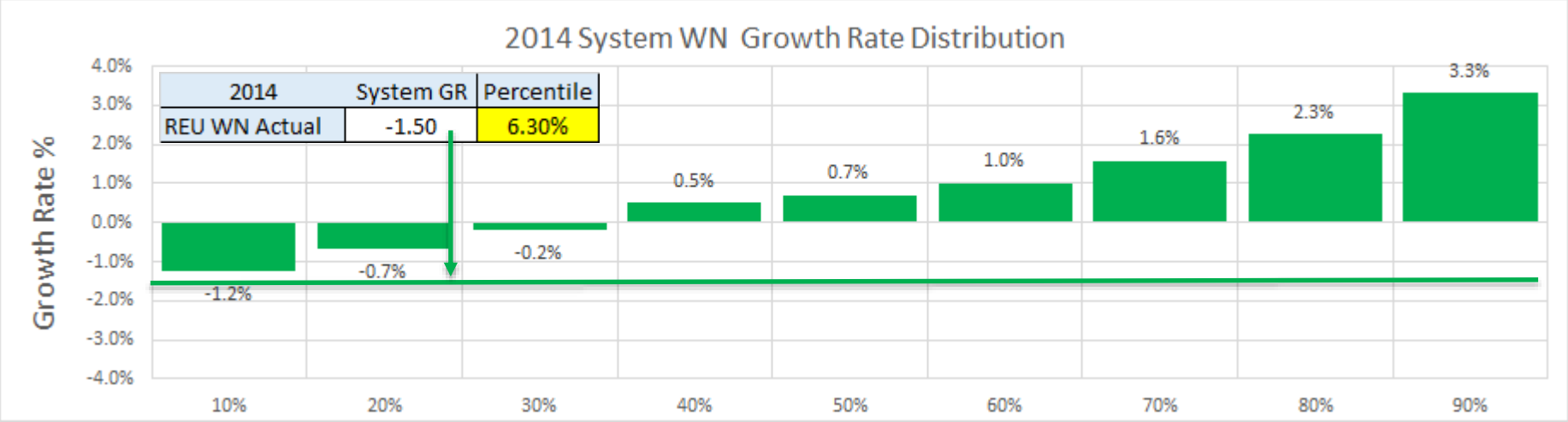
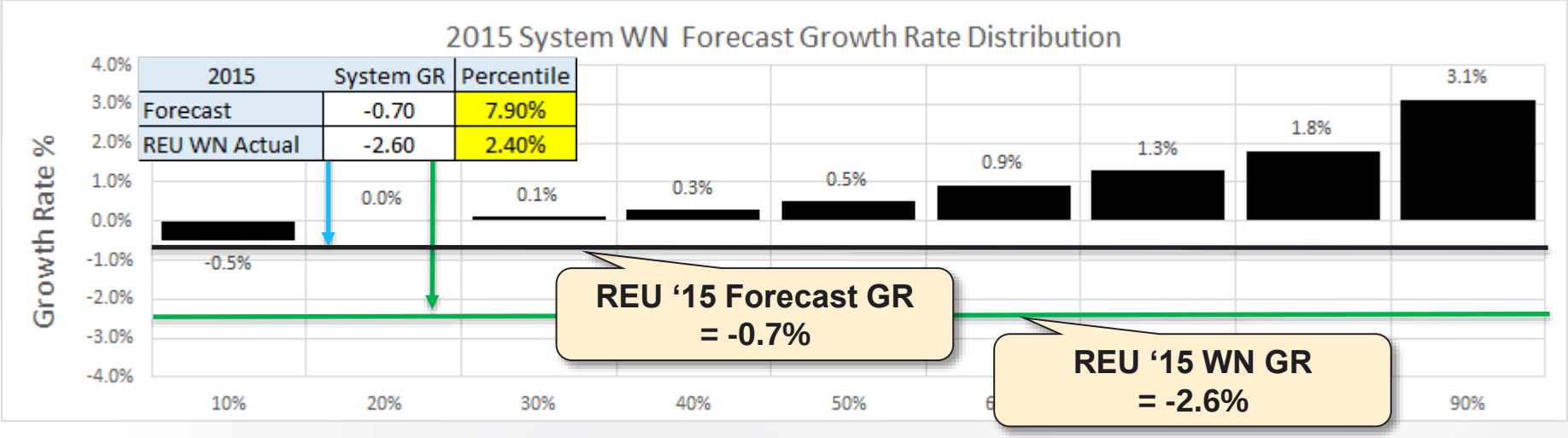
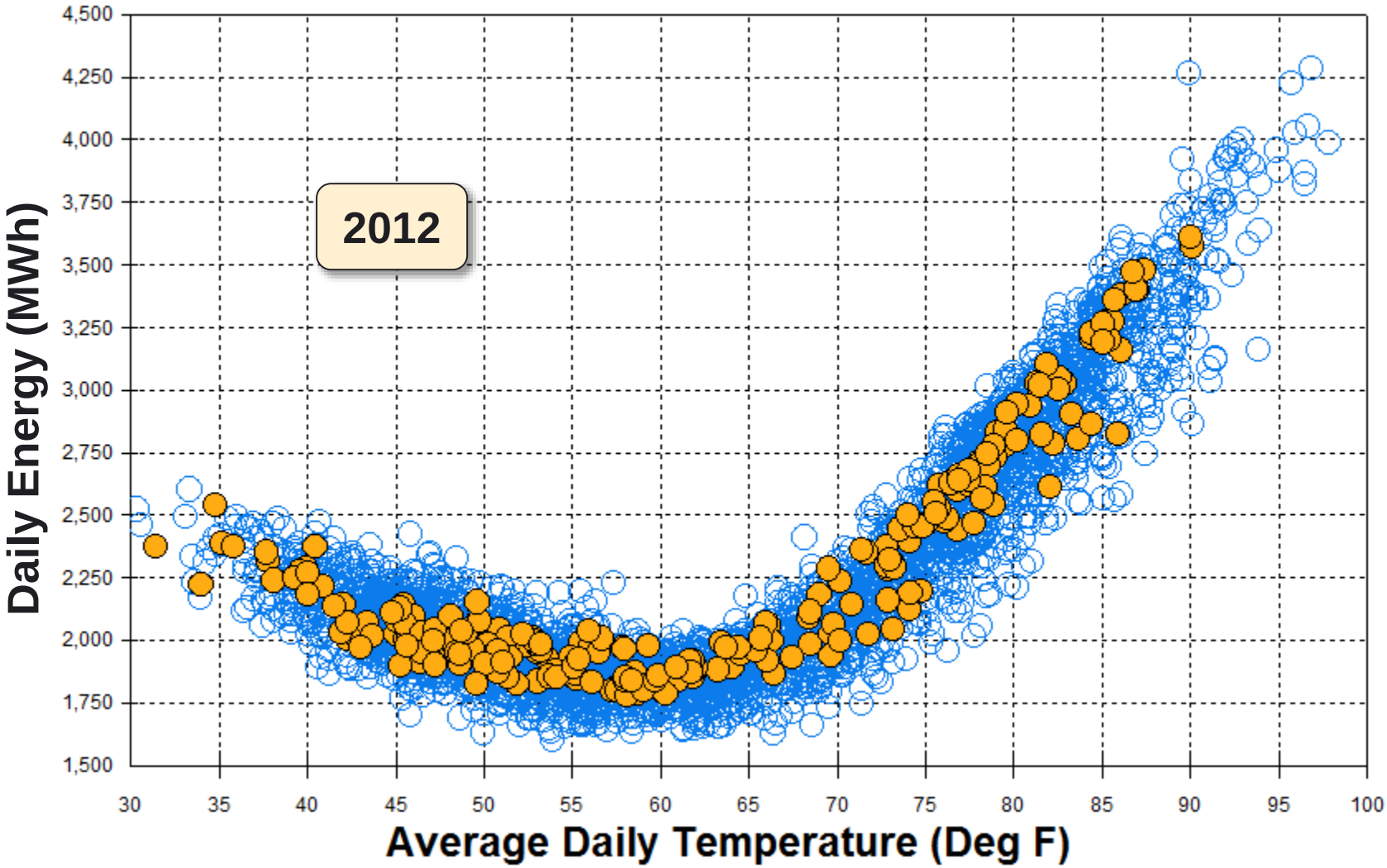


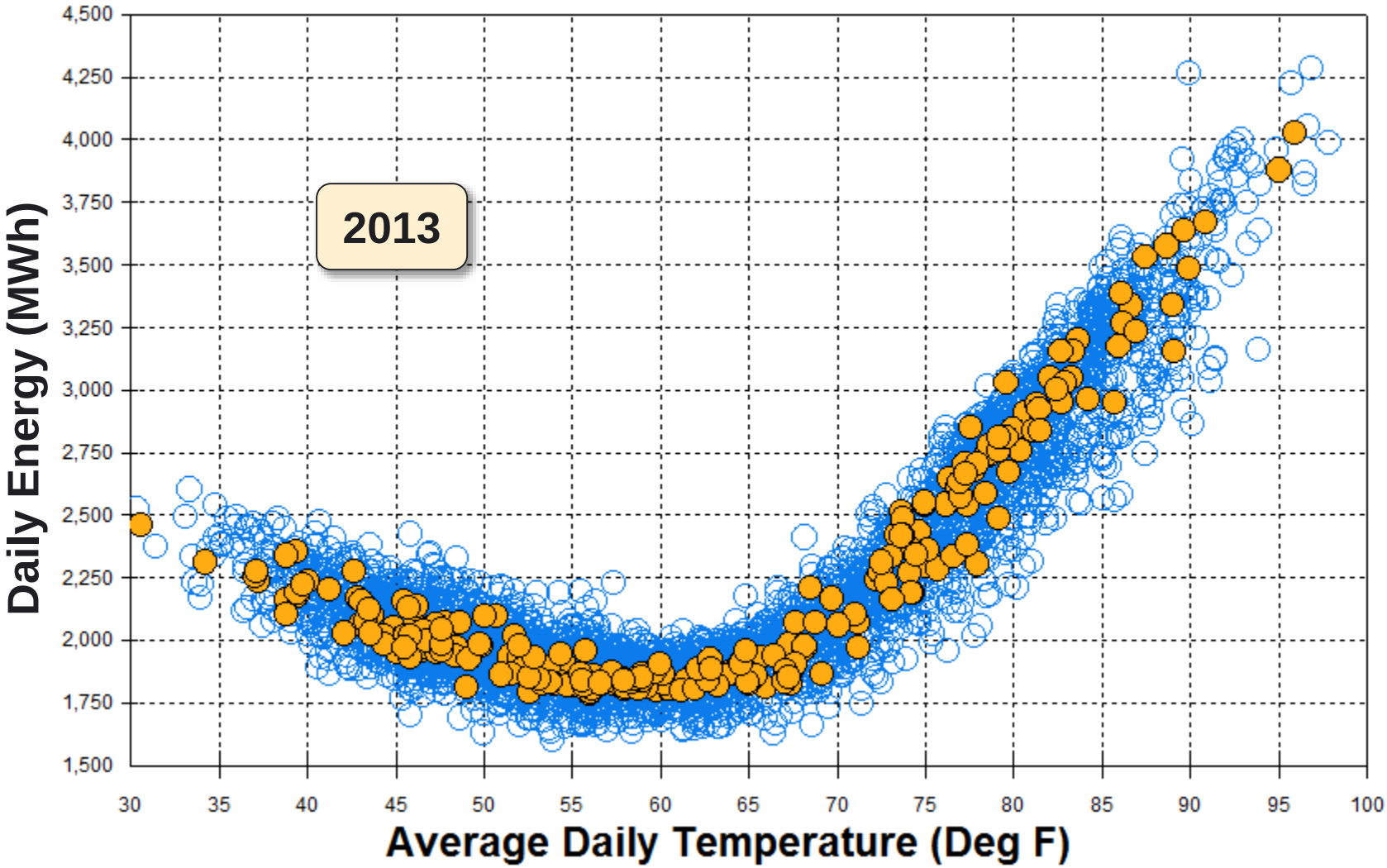


WHAT HAPPENED IN 2015?

Weather Response By Year



Weather Response By Year



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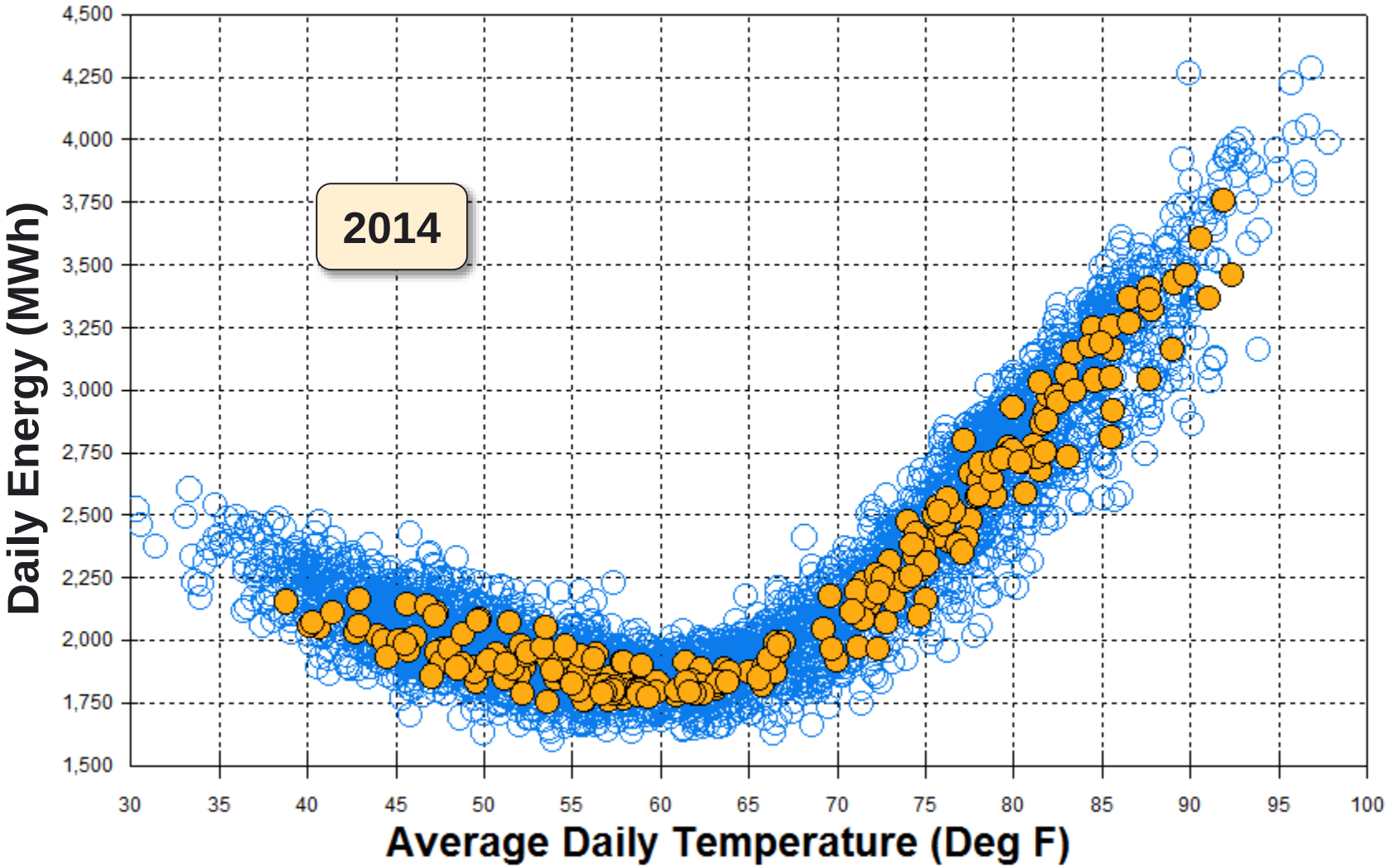

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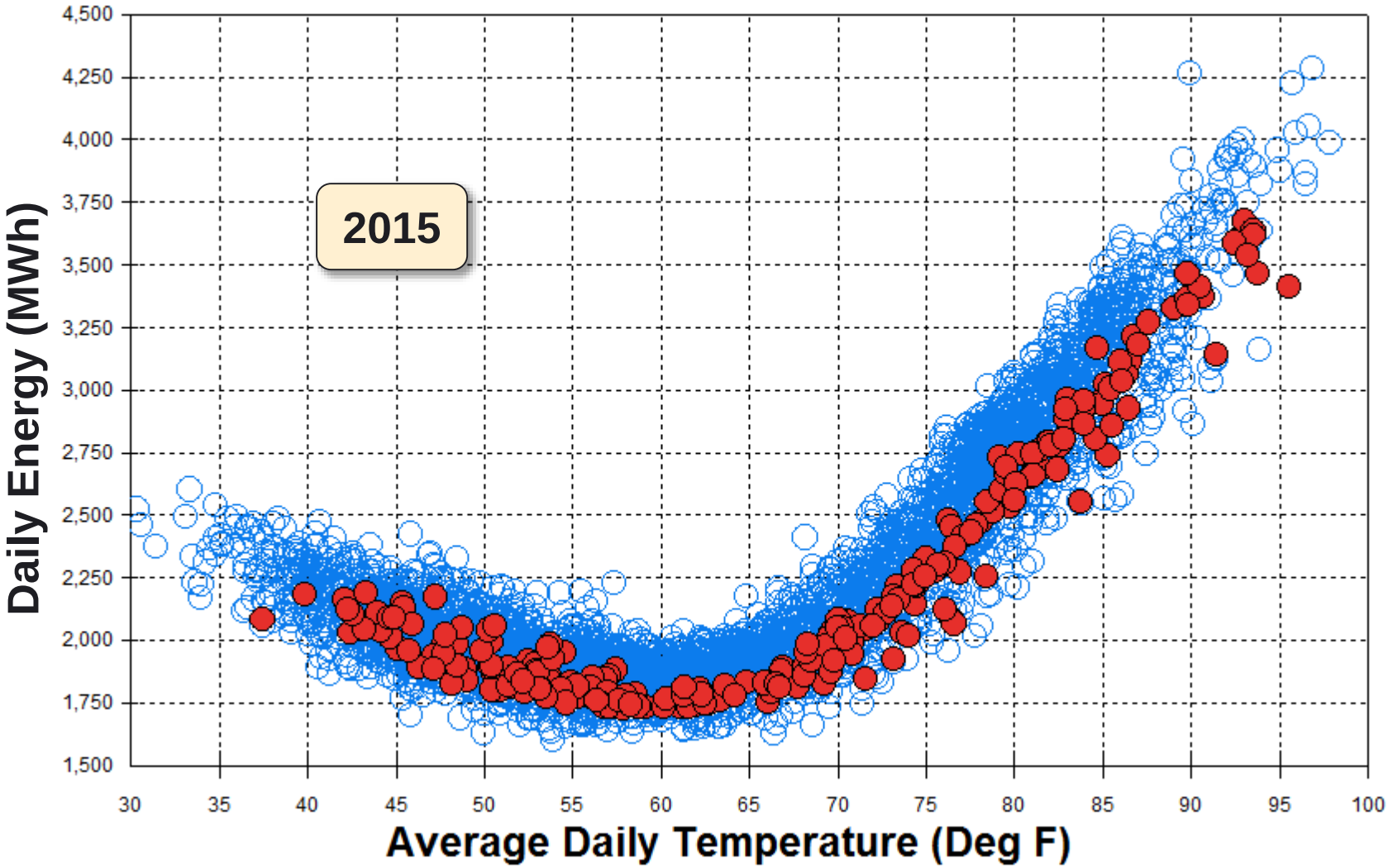

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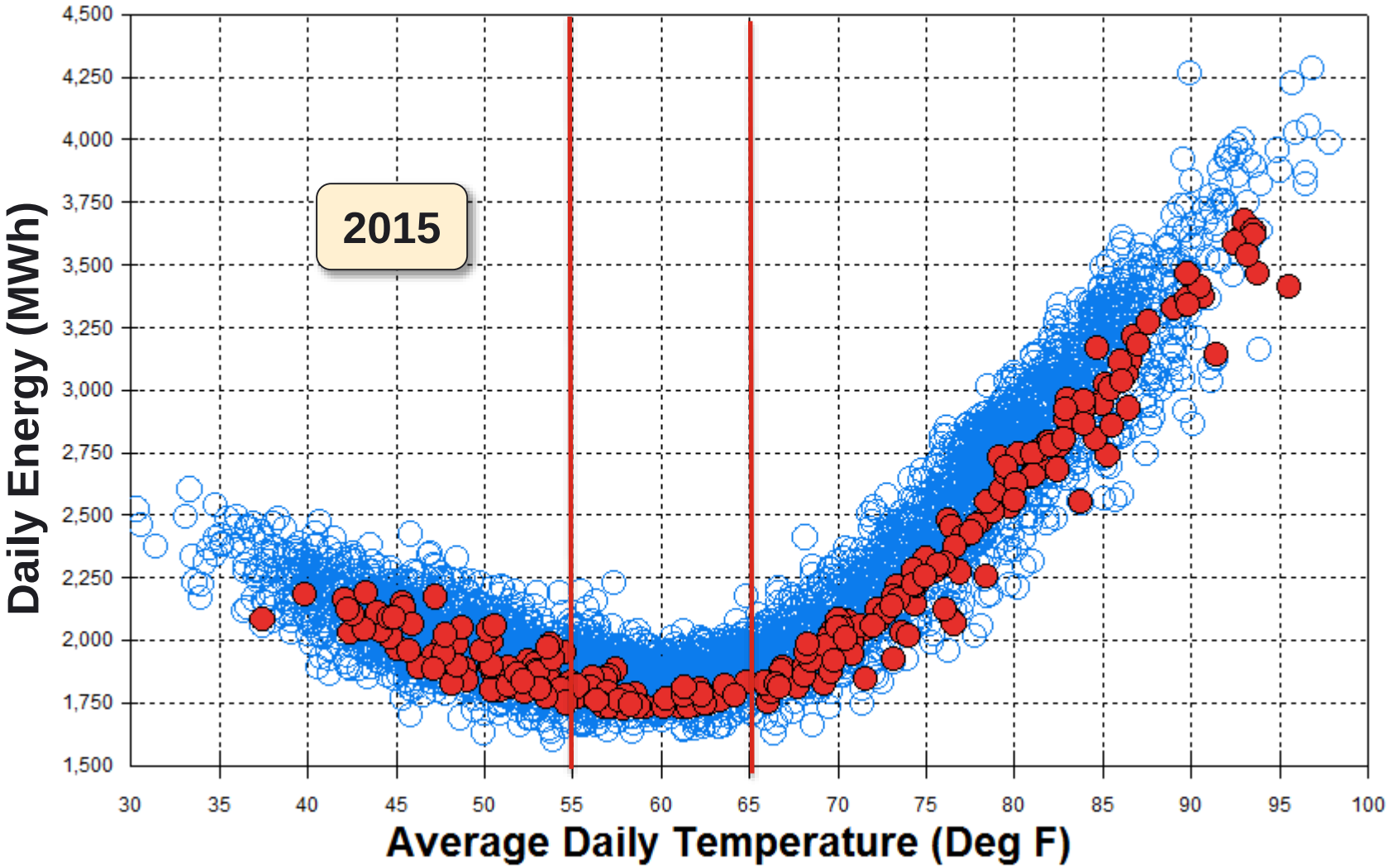
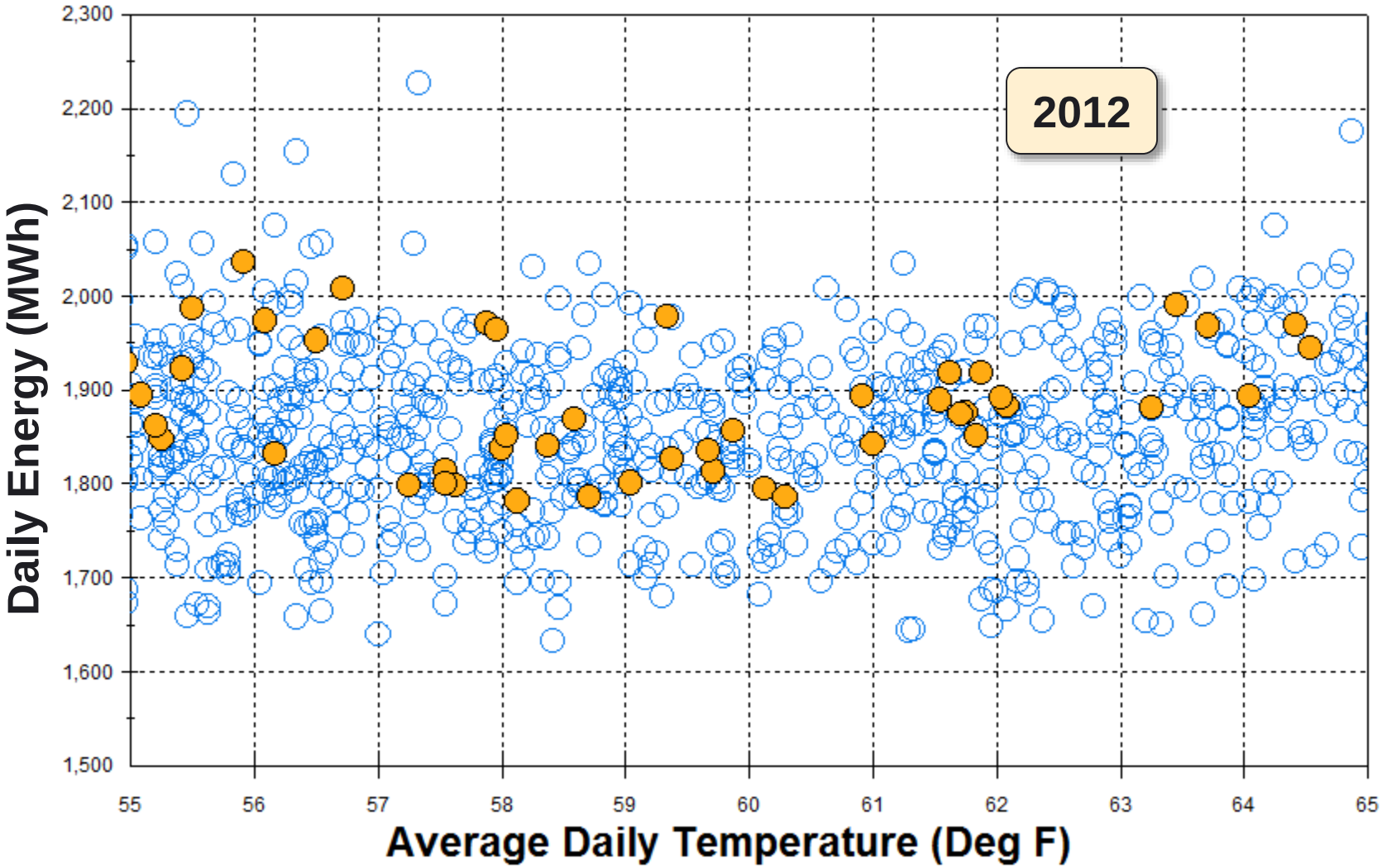


Base Load By Year



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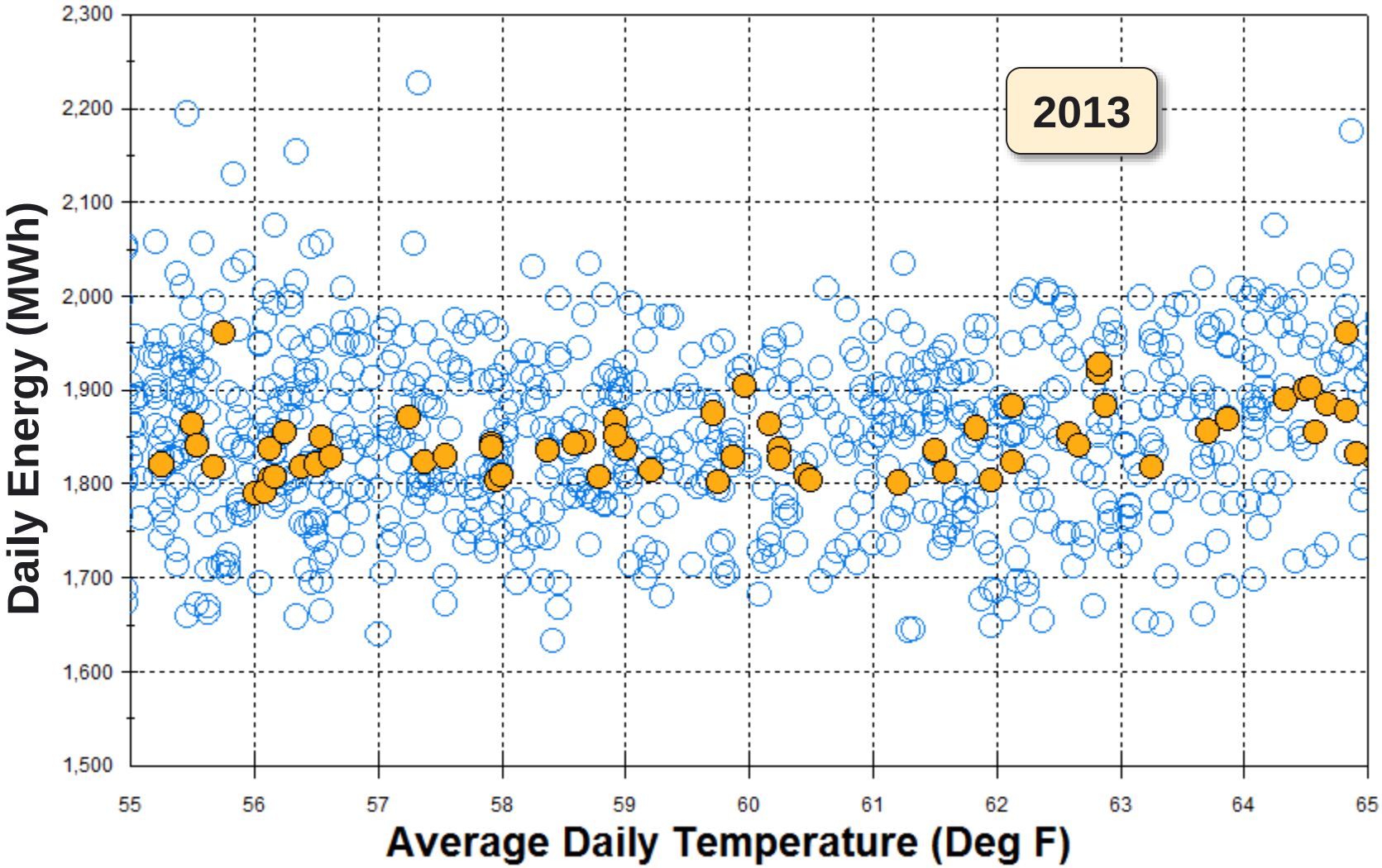

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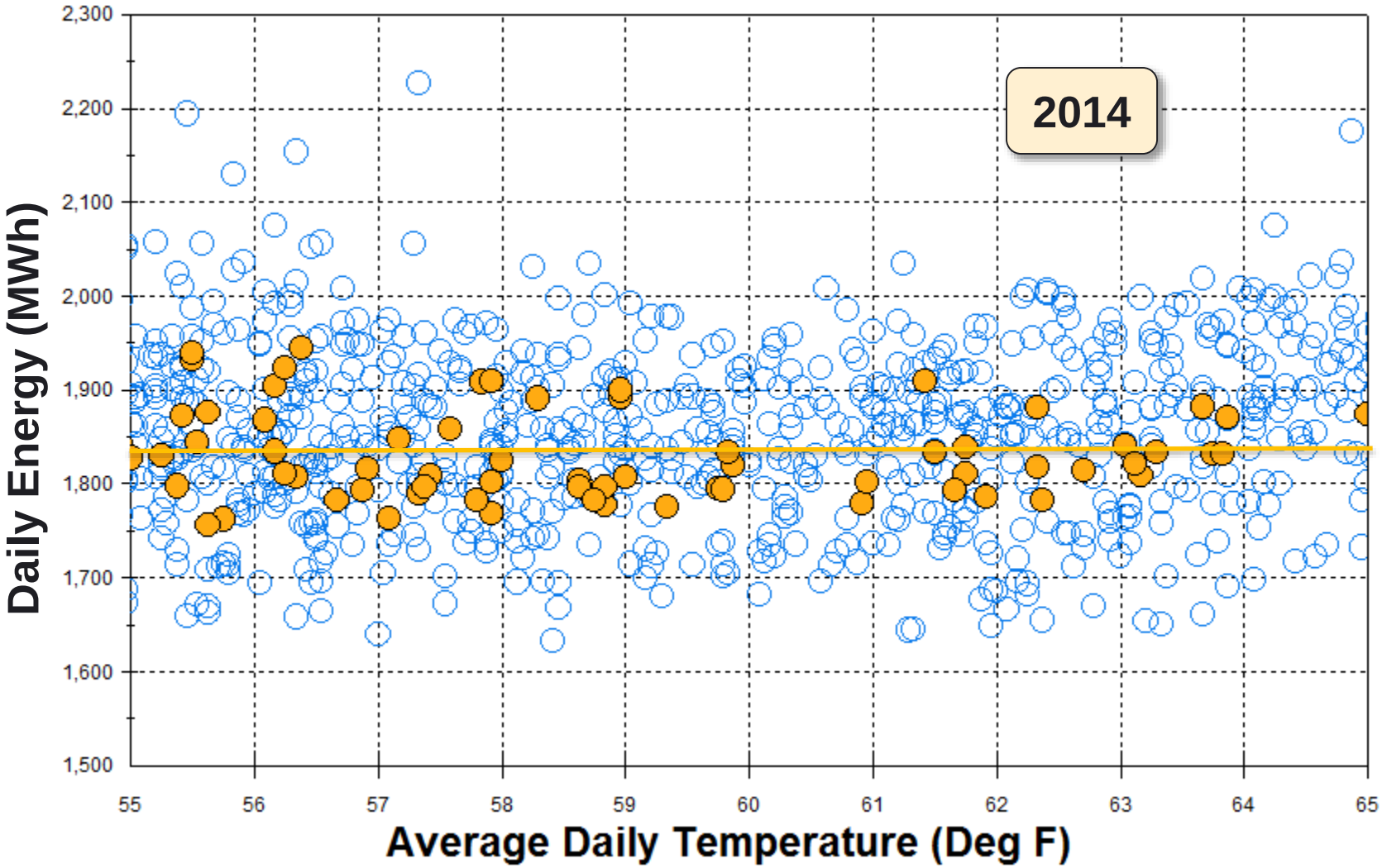

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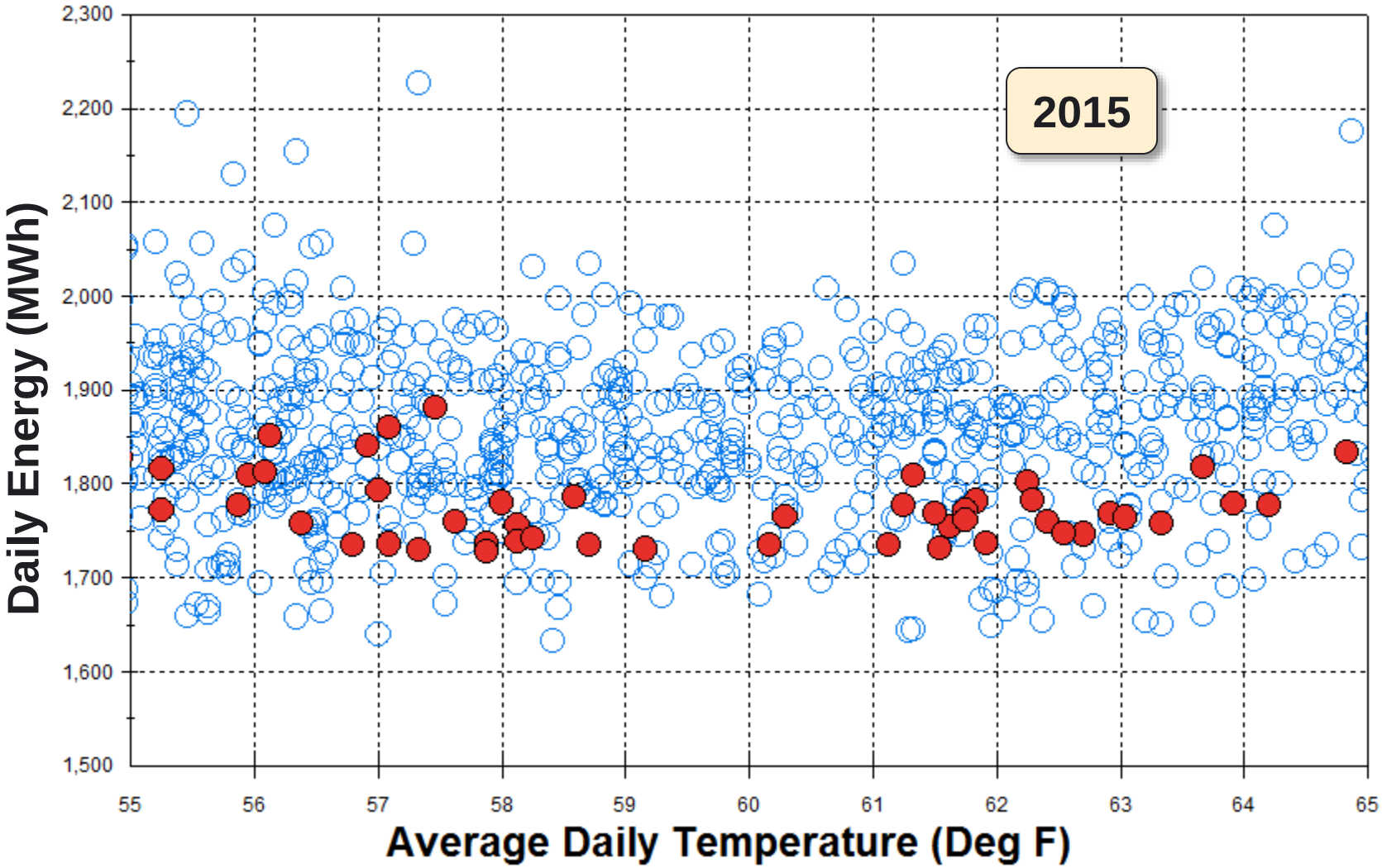

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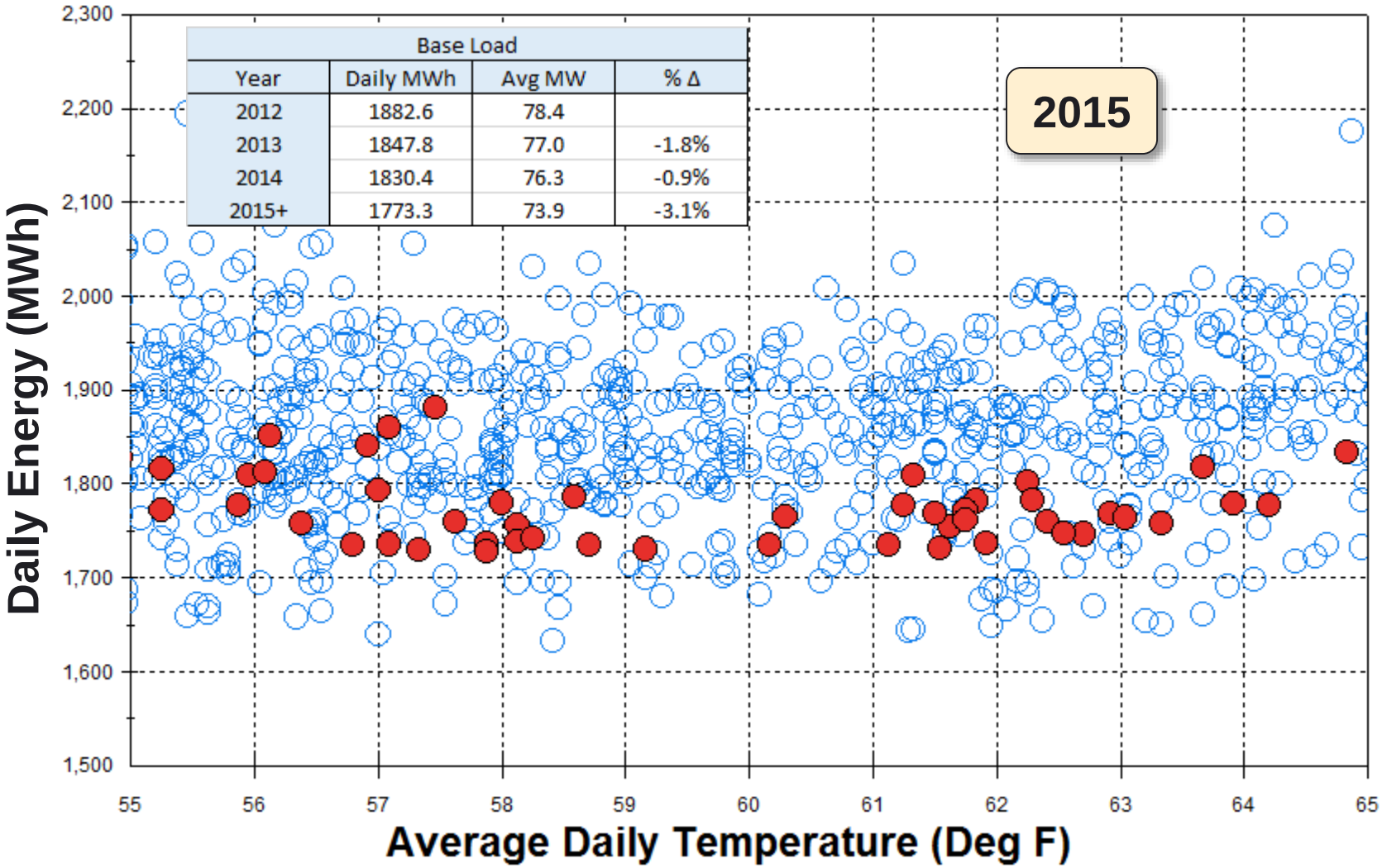
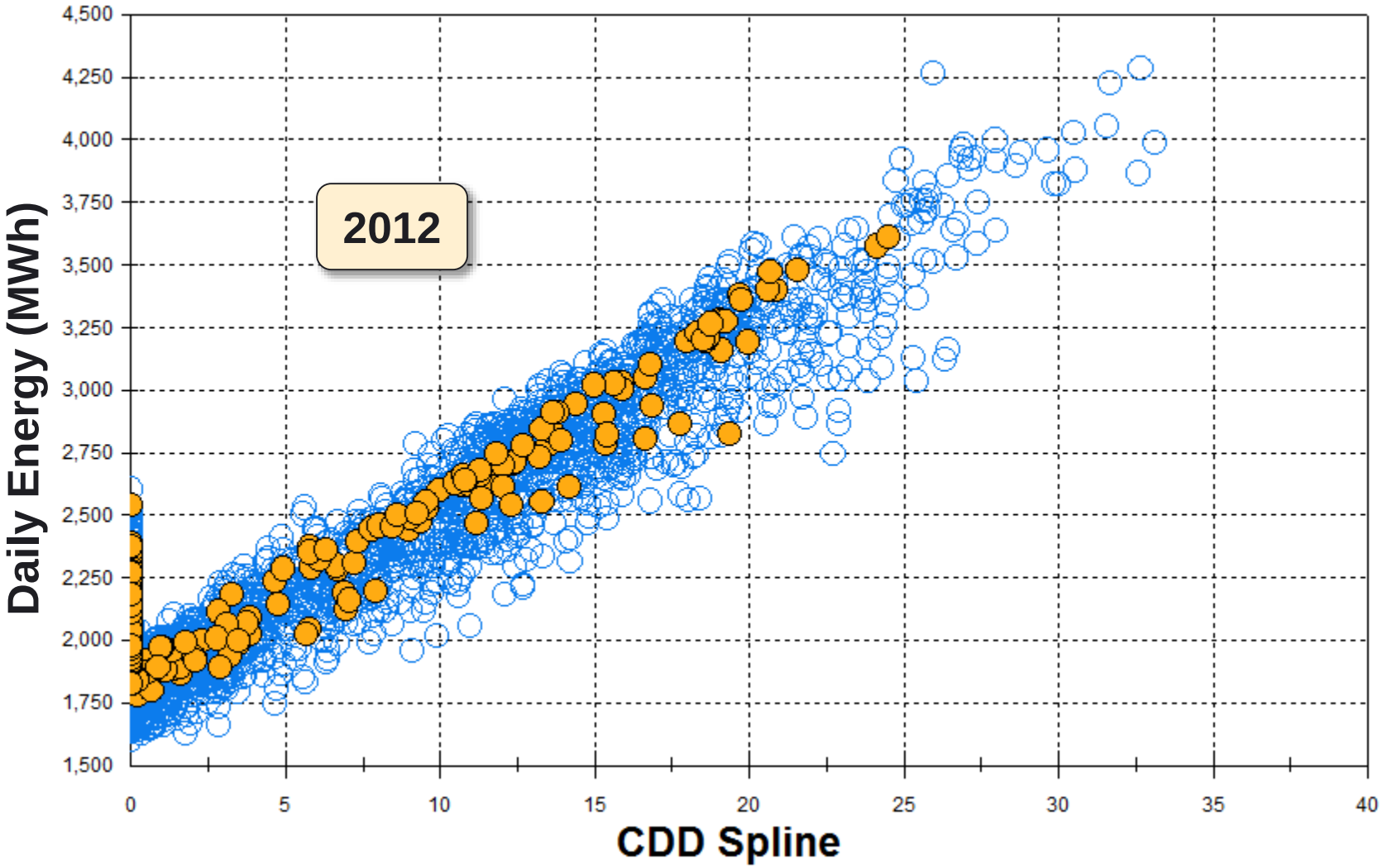


Base Load			
Year	Daily MWh	Avg MW	% Δ
2012	1882.6	78.4	
2013	1847.8	77.0	-1.8%
2014	1830.4	76.3	-0.9%
2015+	1773.3	73.9	-3.1%

Cooling Response By Year



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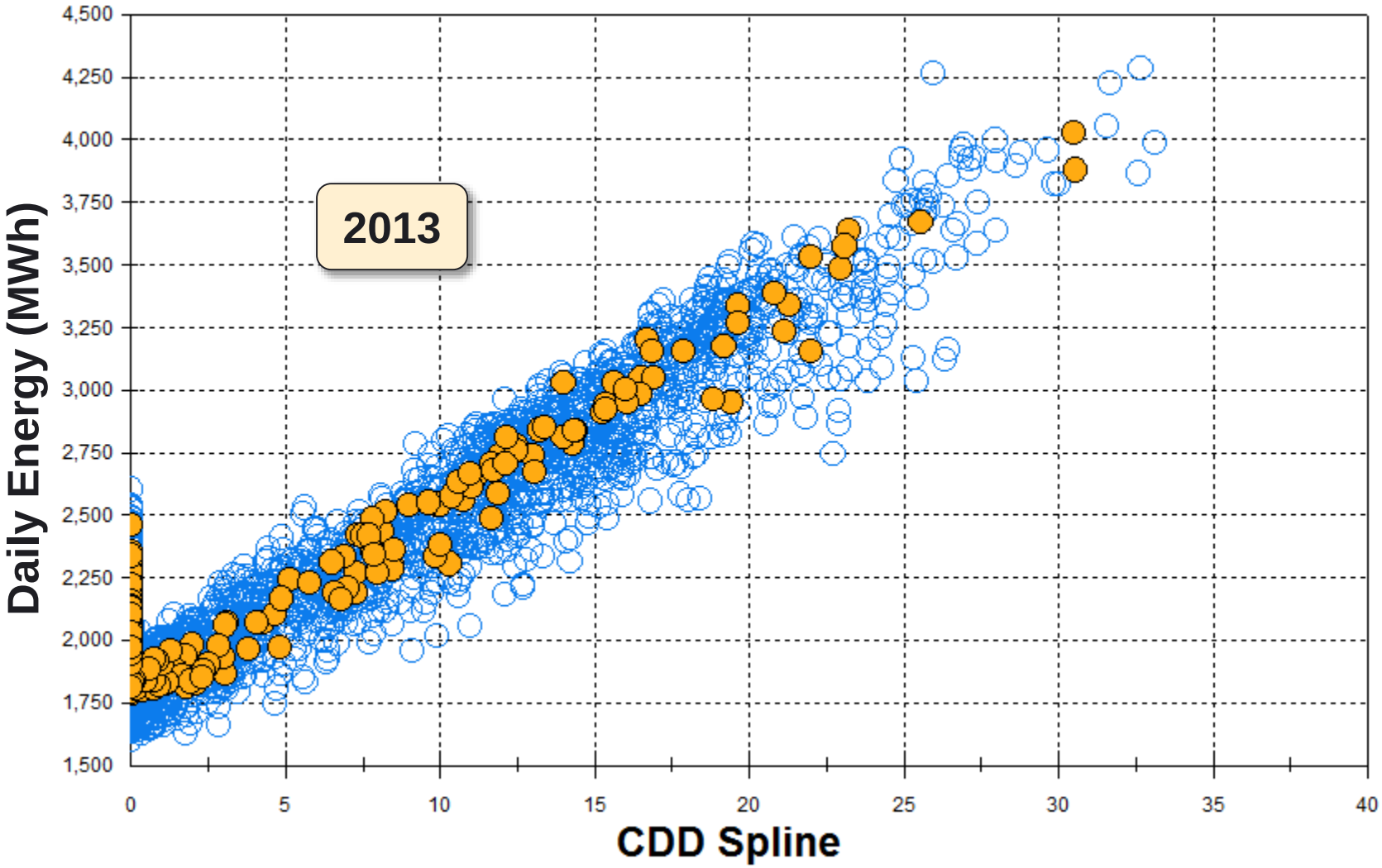

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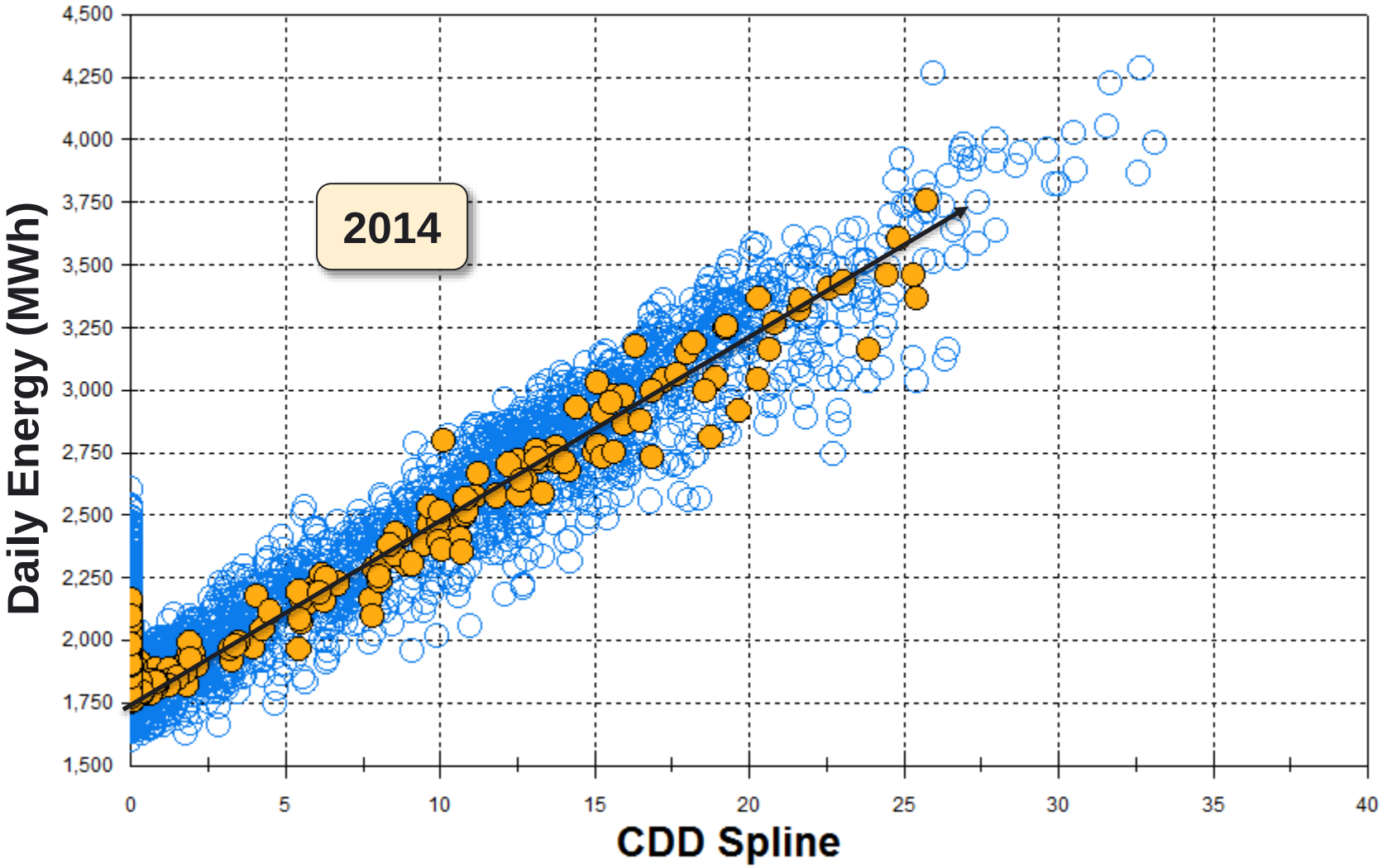

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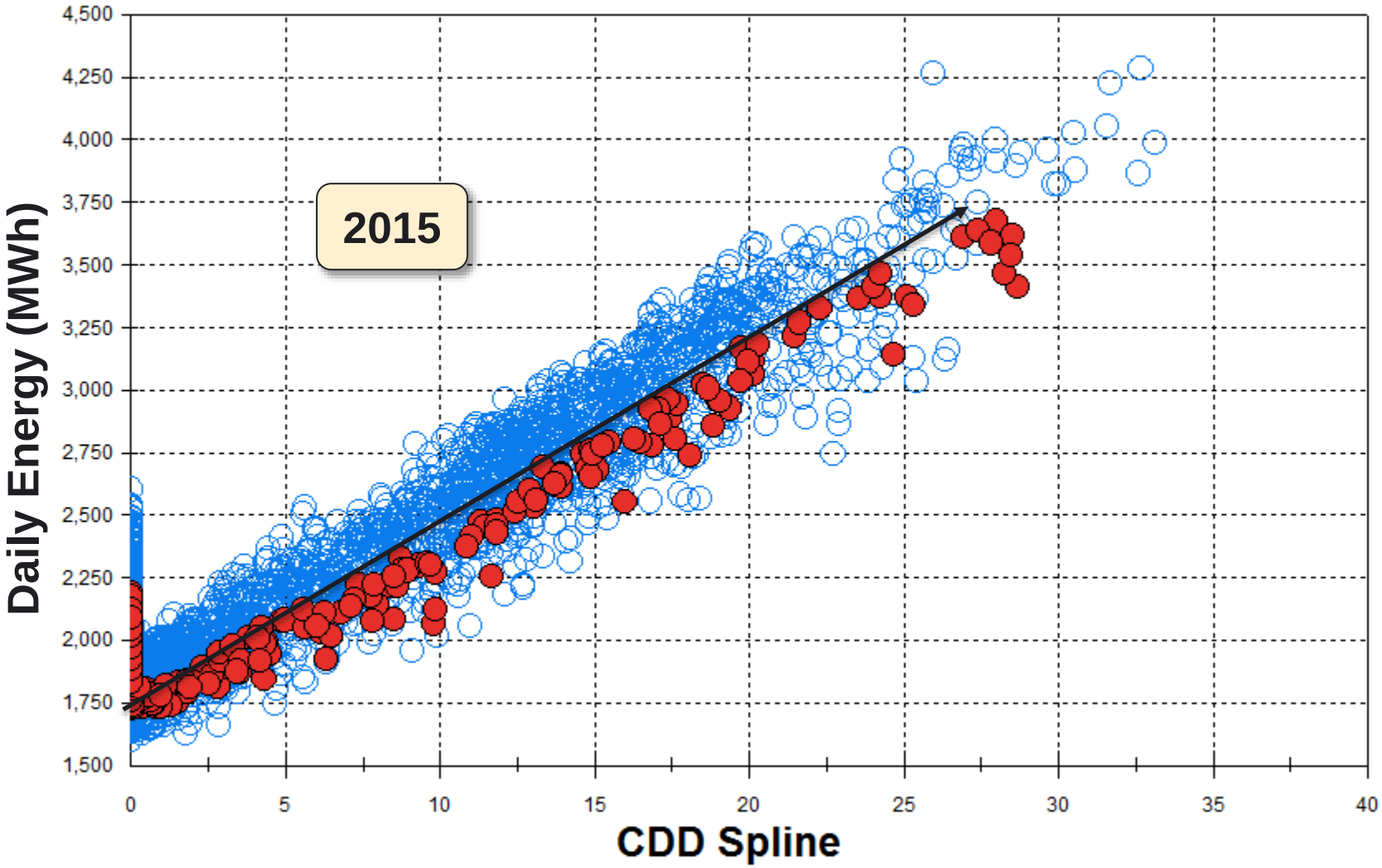
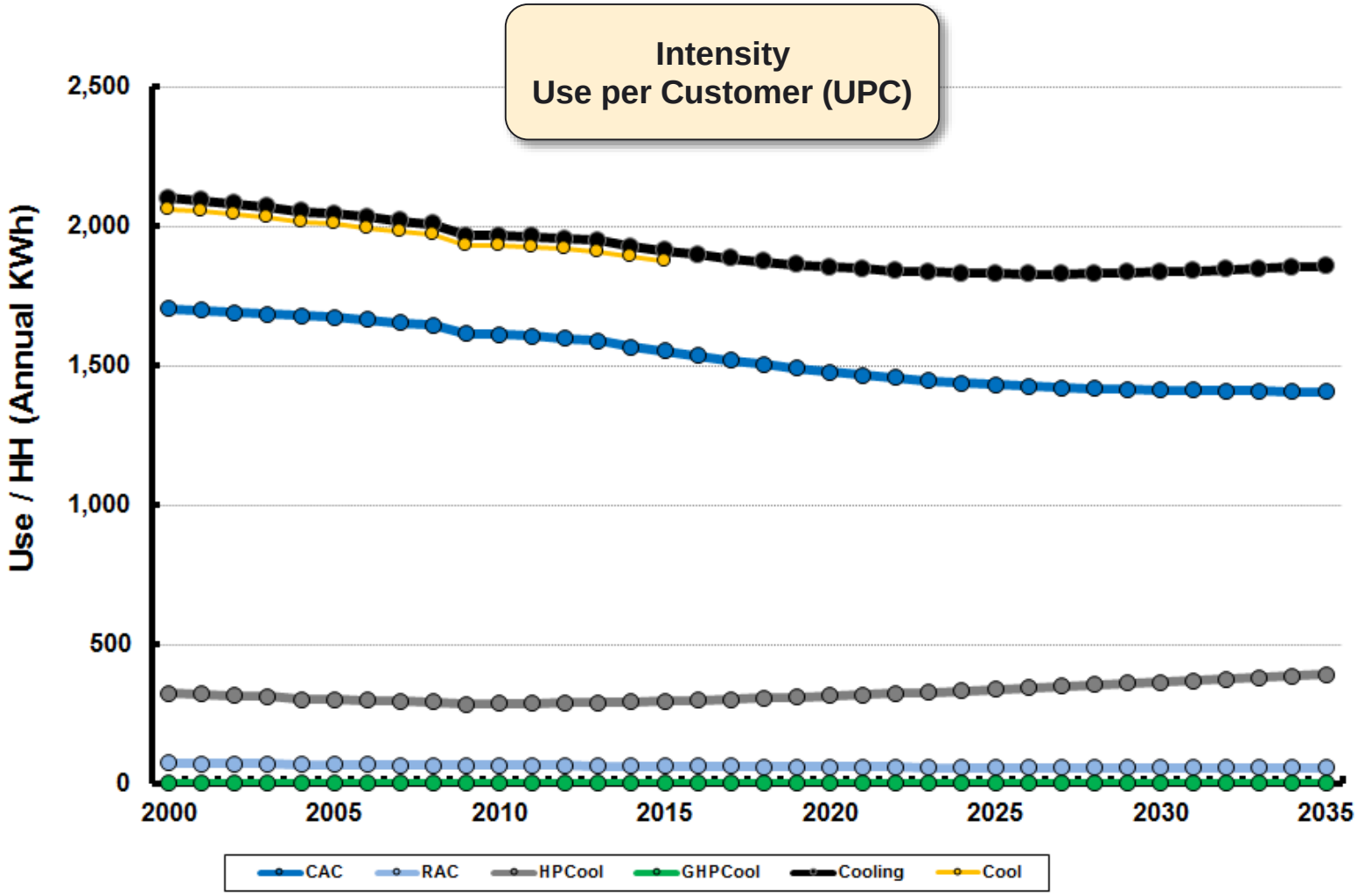
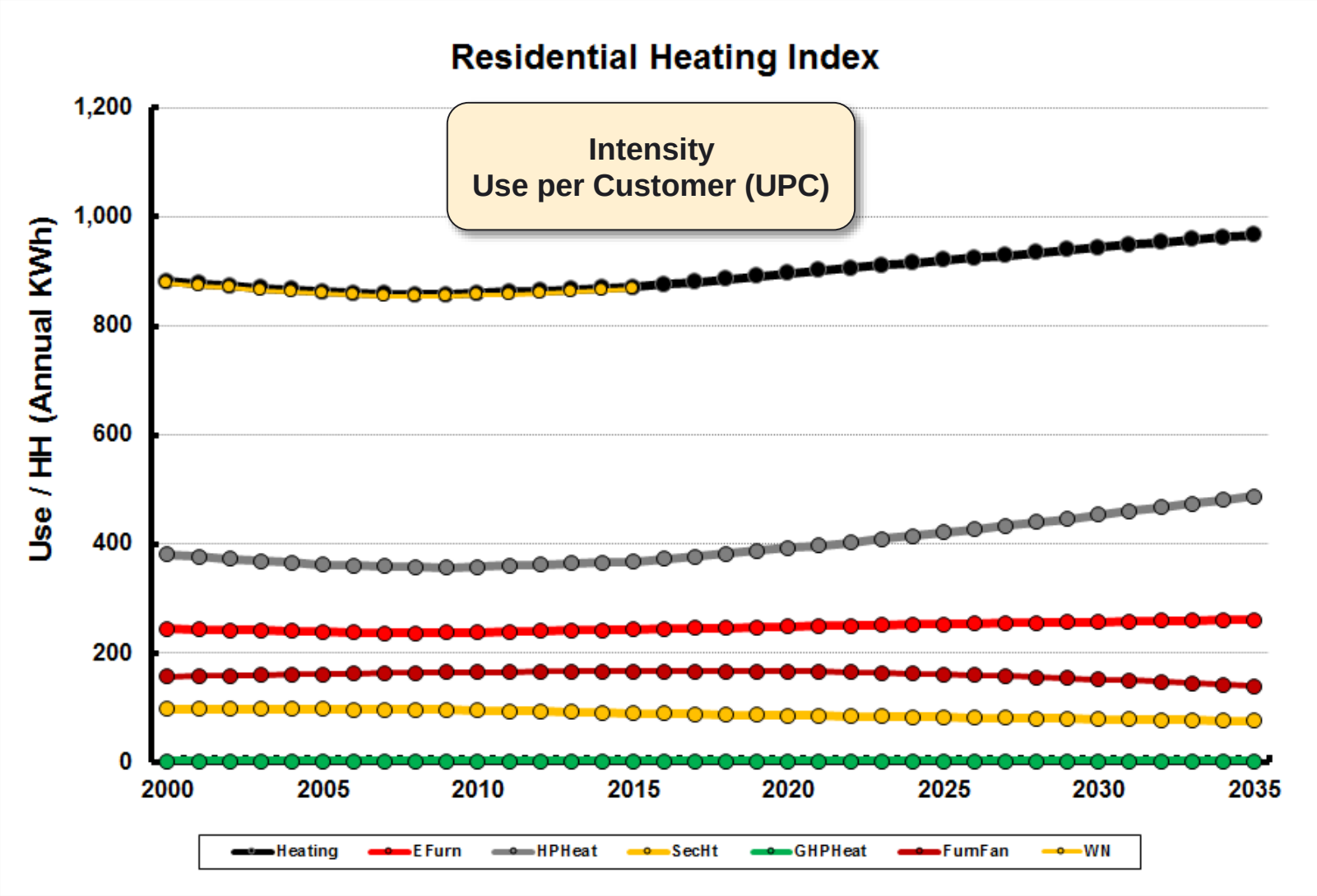


CALIBRATING THE RESIDENTIAL MODEL

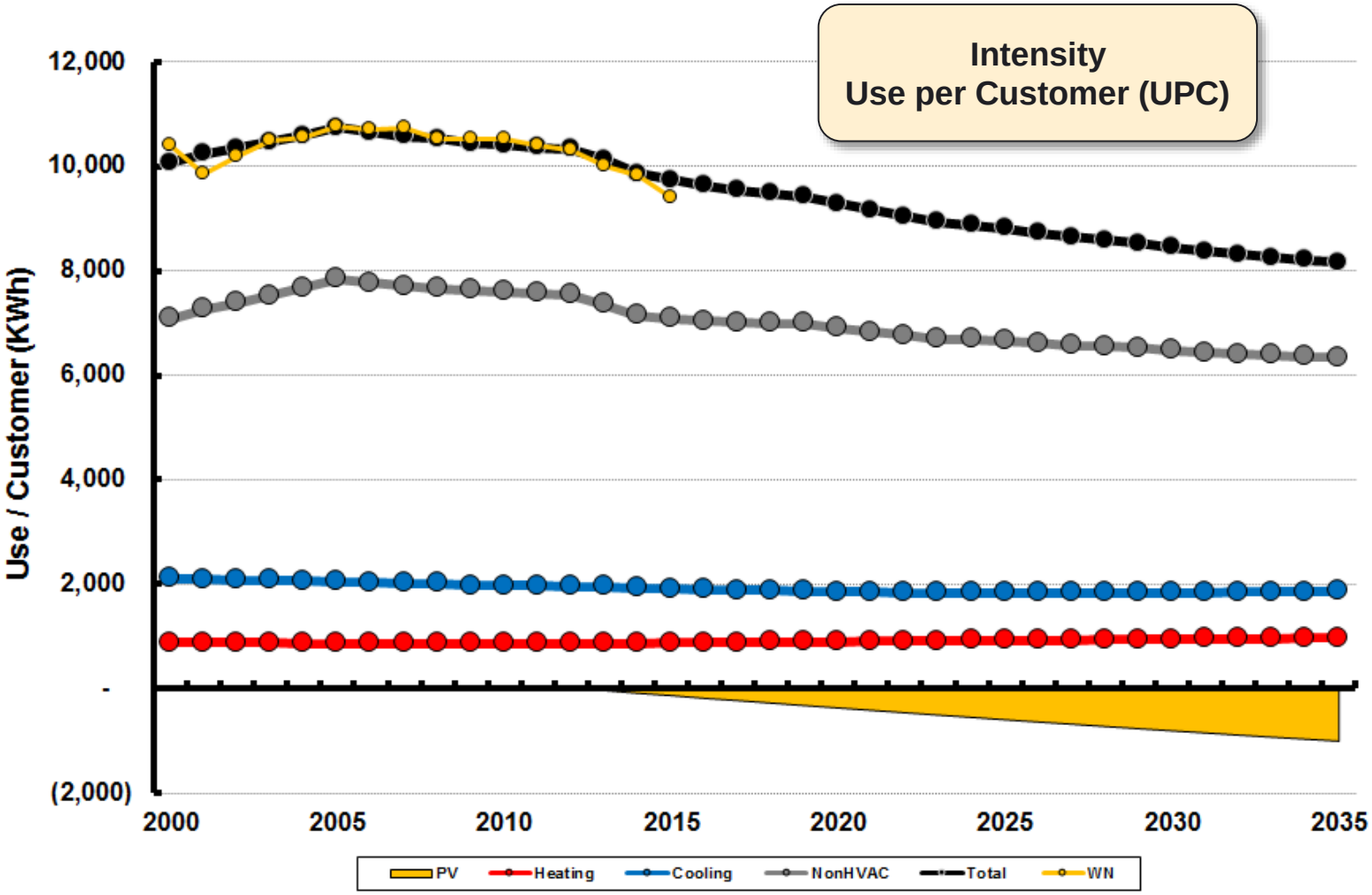
Residential Cooling Use per Customer



Residential Heating Use per Customer



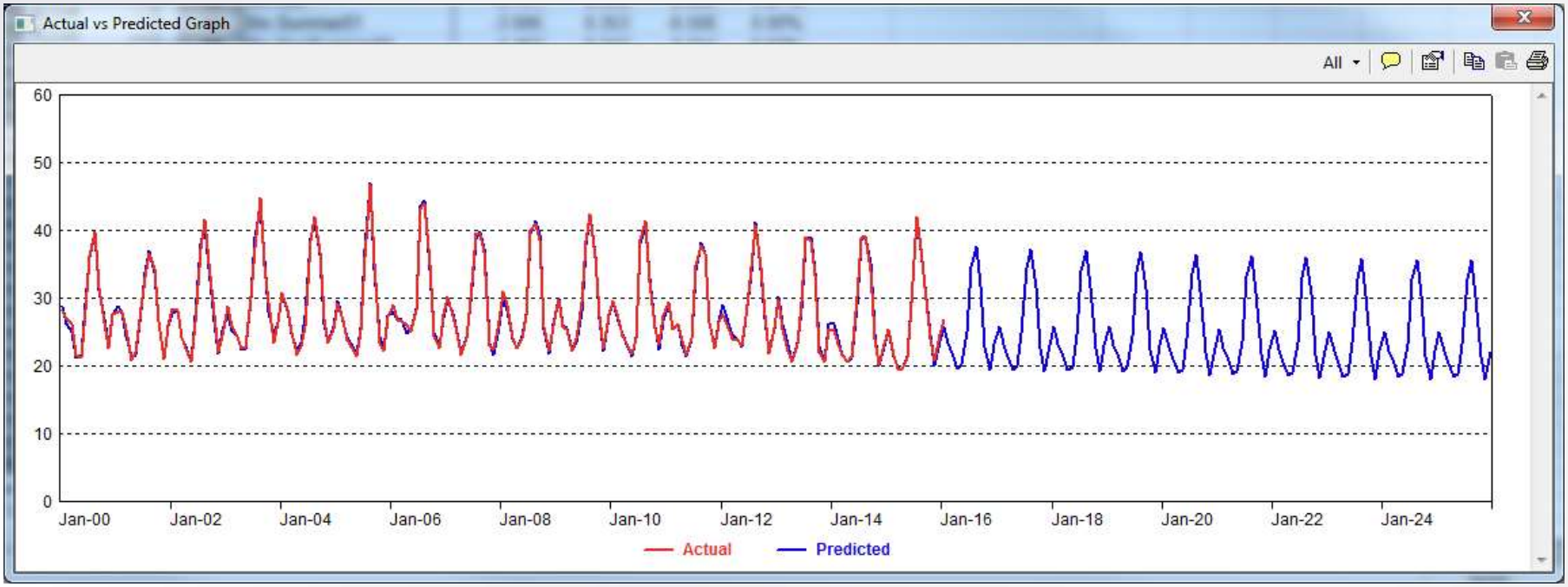
Residential UPC – Pulling it all Together



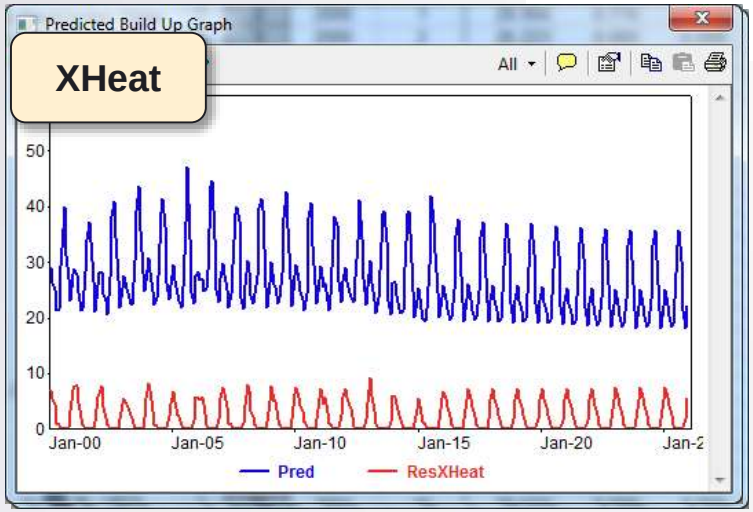
Residential Model Results

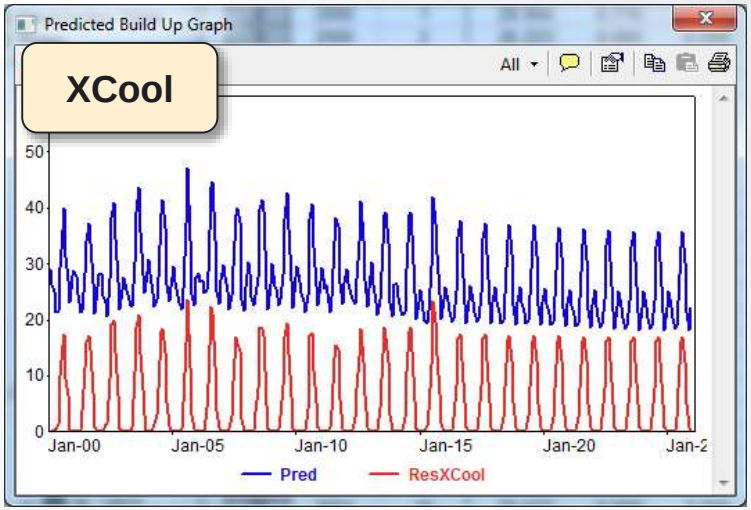
Variable	Coef	StdErr	T-Stat
ResXOther	1.021	0.023	44.517
ResXHeat	0.623	0.045	13.901
ResXCool	1.74	0.061	28.346
Shift_'15+	-0.604	0.296	-2.042
Shift_July'15+	-1.72	0.475	-3.62

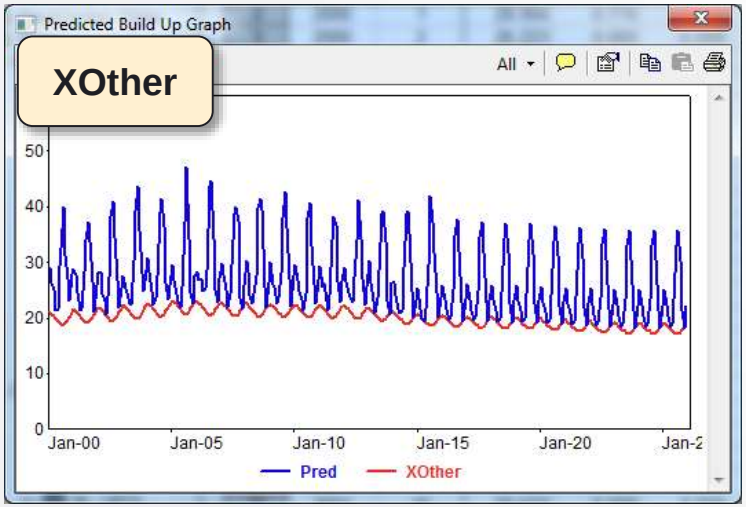
Model Statistics	
Adjusted R-Squared	0.99
Mean Abs. Dev. (MAD)	0.47
Mean Abs. % Err. (MAPE)	1.67%
Durbin-Watson Statistic	1.79



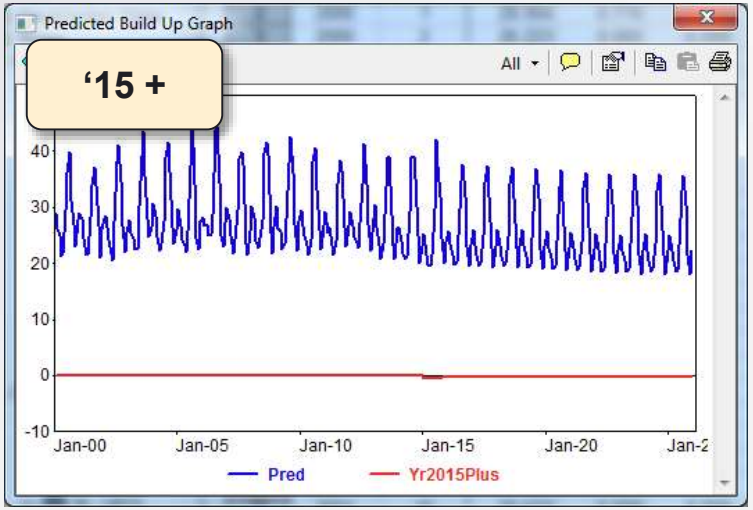
Residential SAE Inputs (BX)

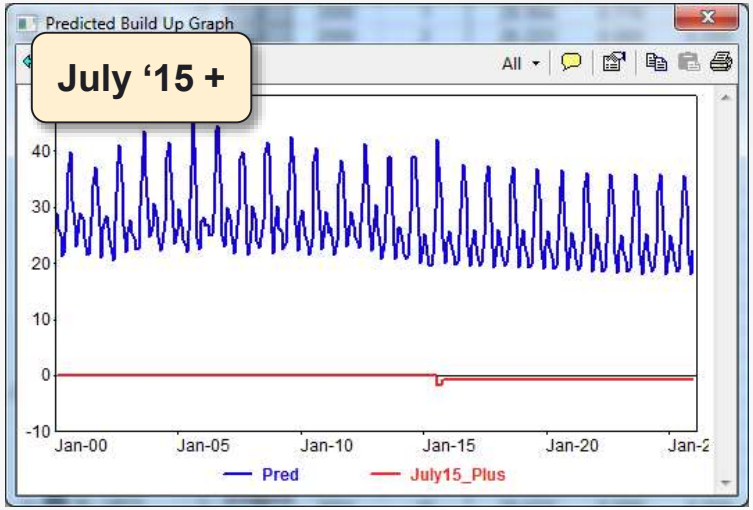






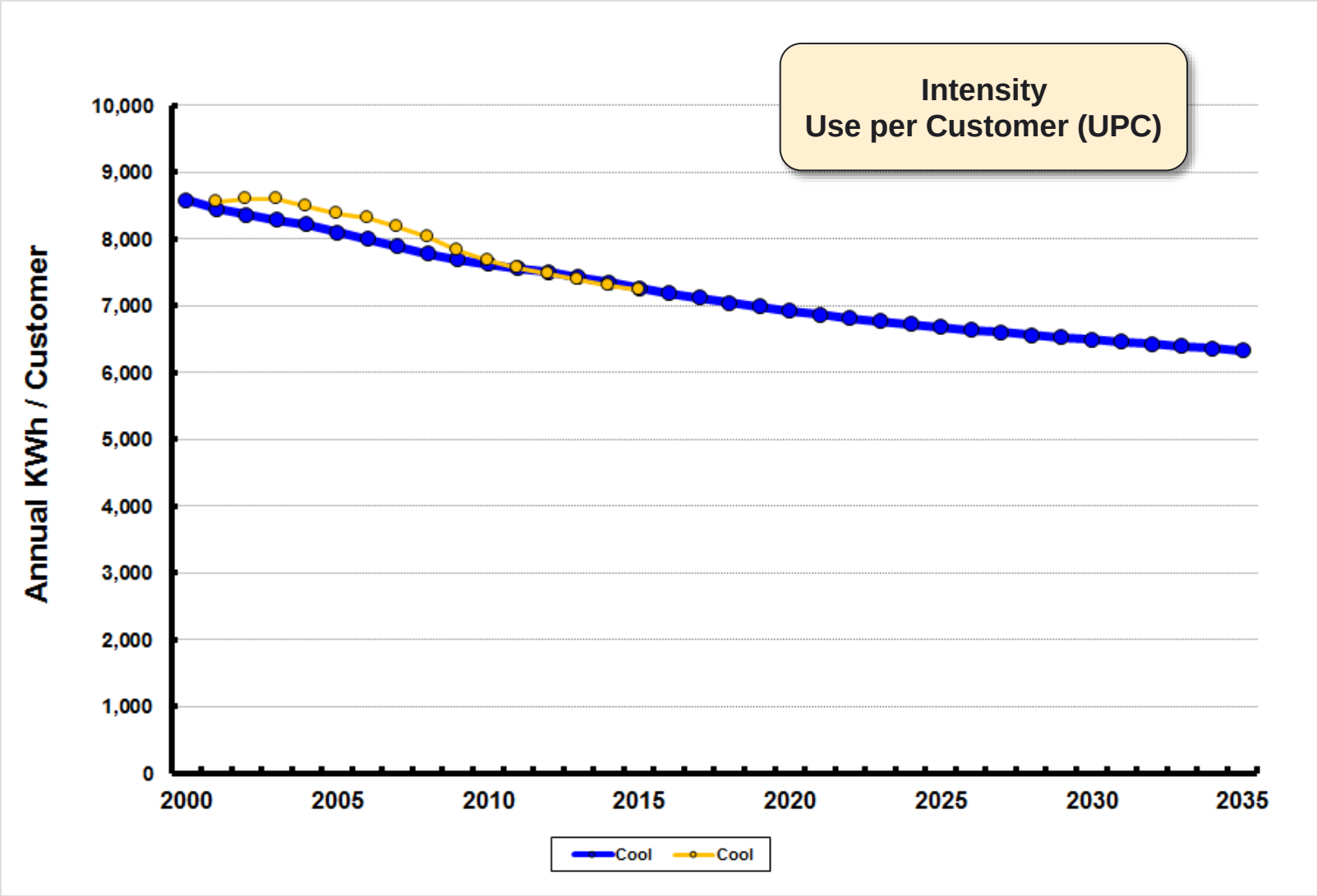
Residential Behavioral Shift (BX)



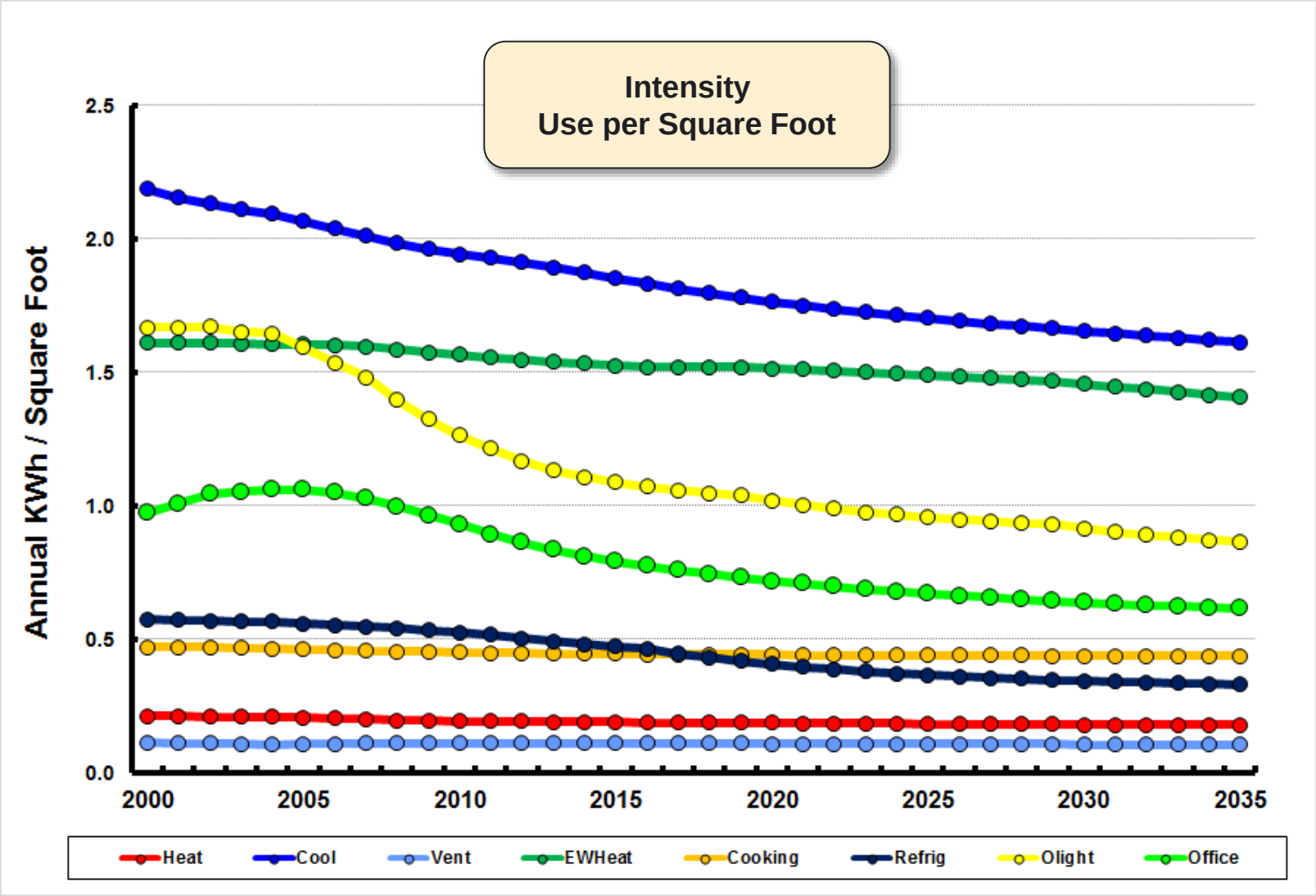


CALIBRATING THE COMMERCIAL MODEL

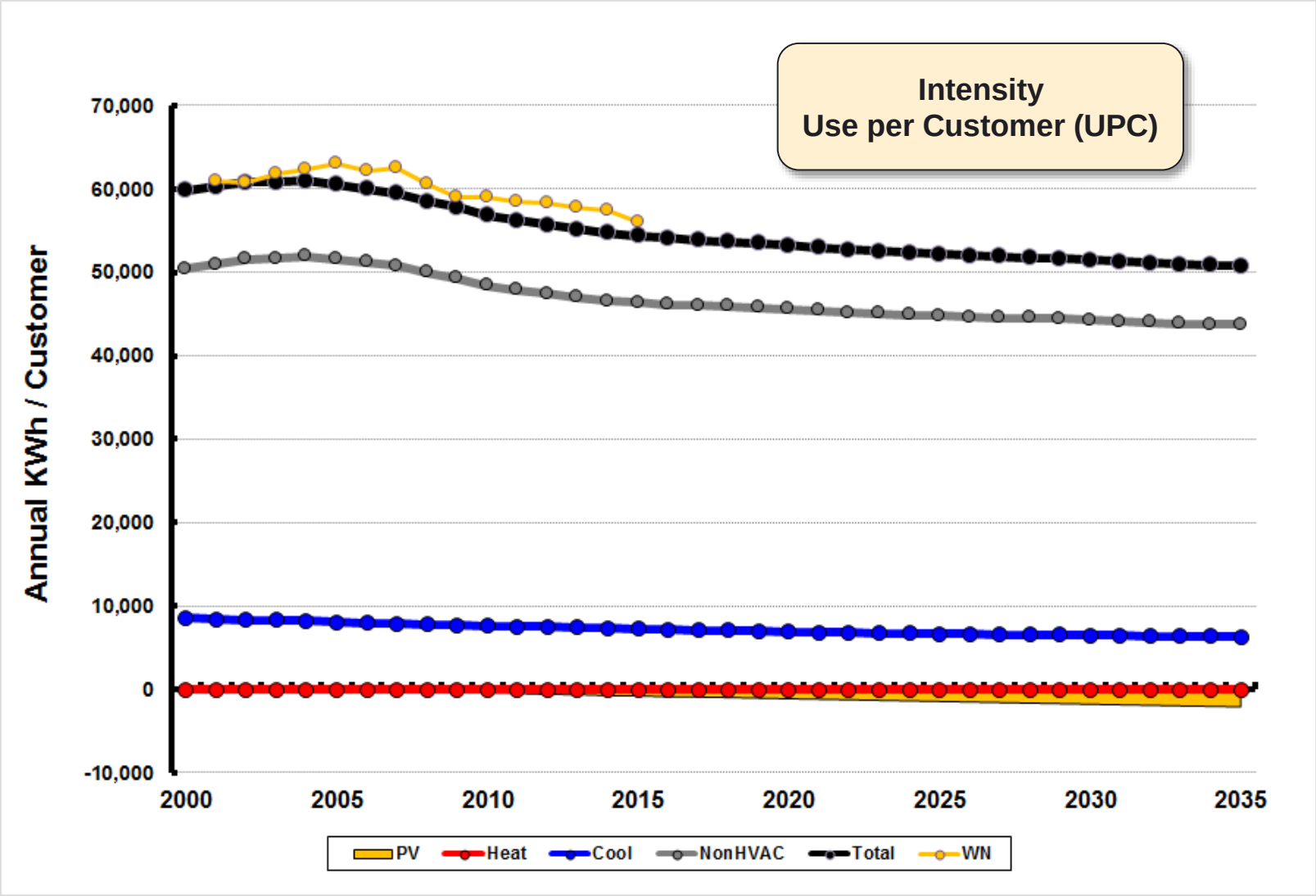
Commercial Cooling Intensity



Commercial Intensity Trends



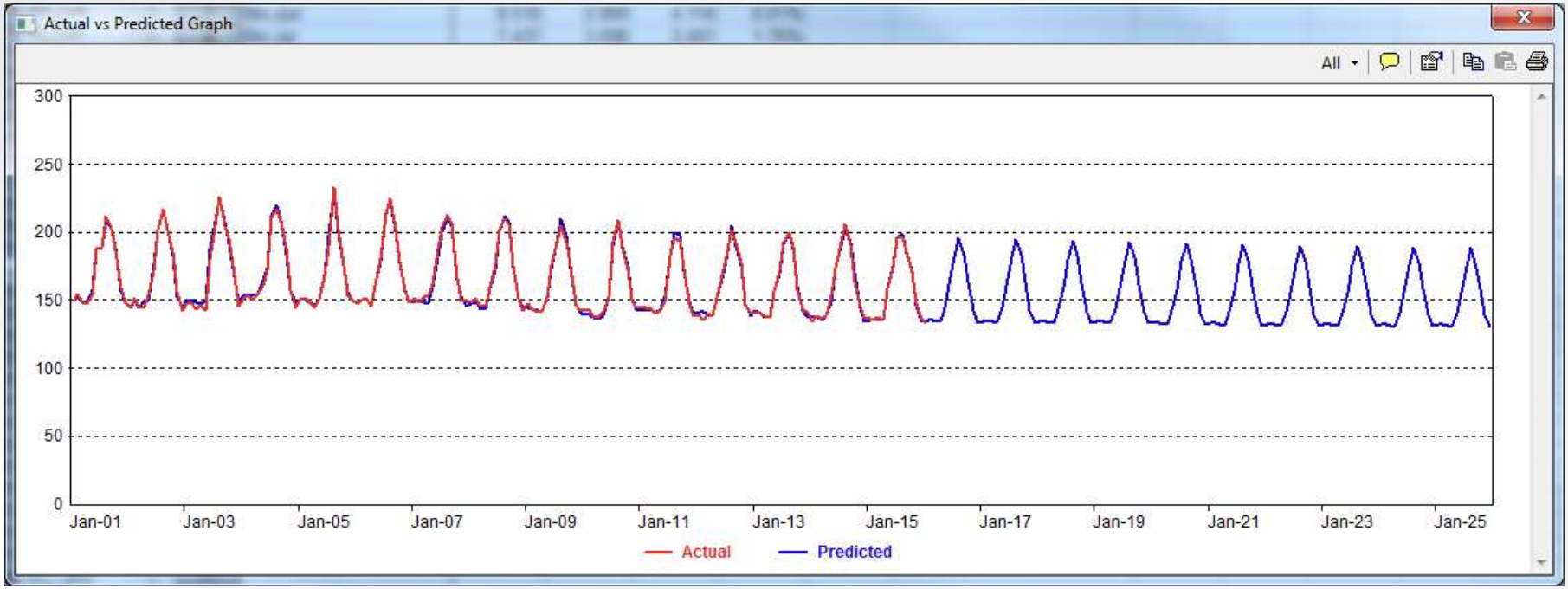
Commercial UPC Indices



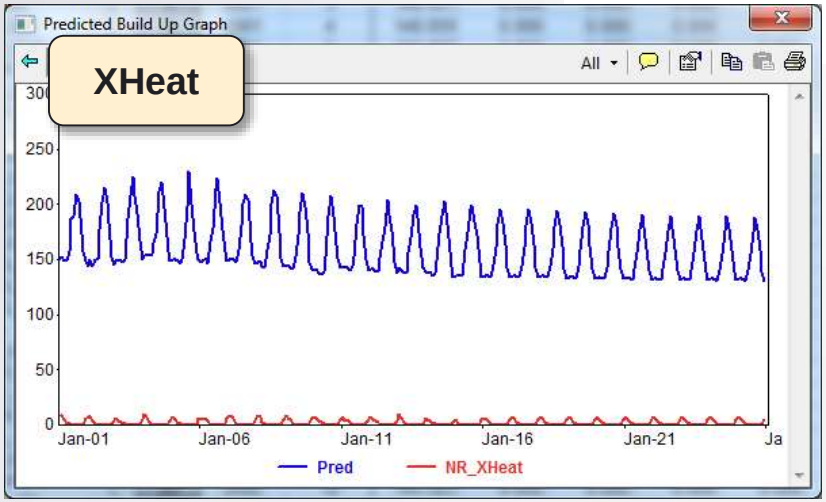
Commercial Model Results

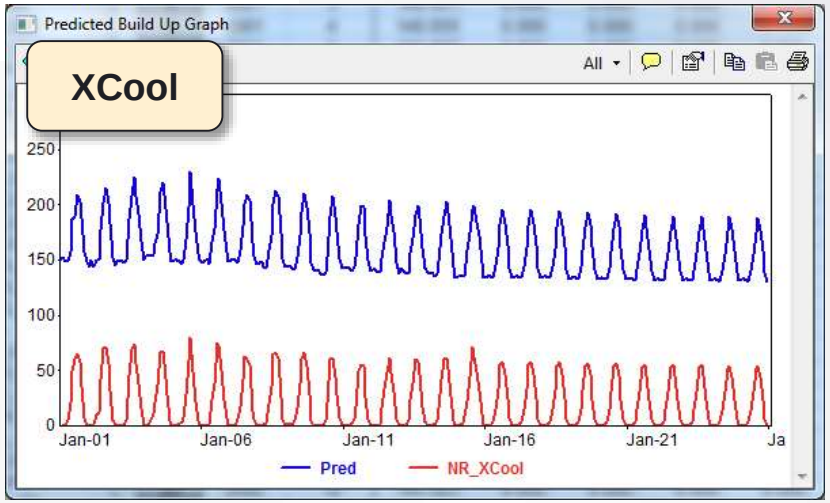
Variable	Coef	StdErr	T-Stat
ResXOther	0.968	0.009	103.197
ResXHeat	1.045	0.238	4.39
ResXCool	3.814	0.175	21.747
Shift_July'15+	-4.489	2.034	-2.207

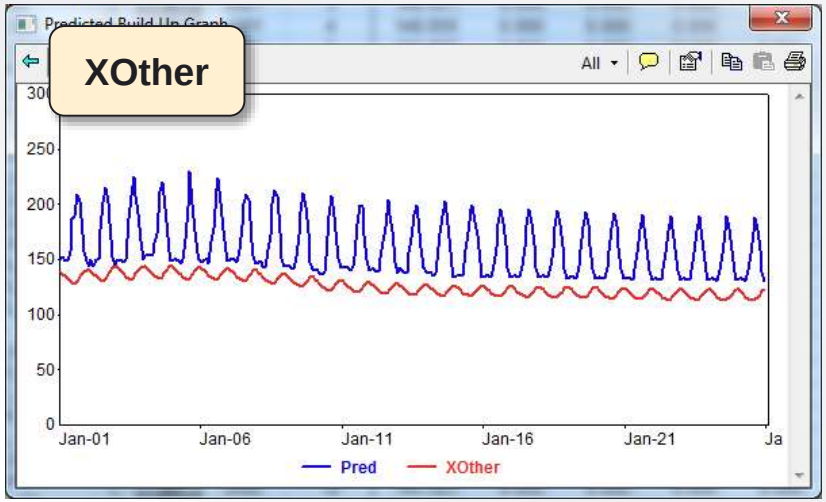
Model Statistics	
Adjusted R-Squared	0.989
Mean Abs. Dev. (MAD)	1.9
Mean Abs. % Err. (MAPE)	1.15%
Durbin-Watson Statistic	1.63

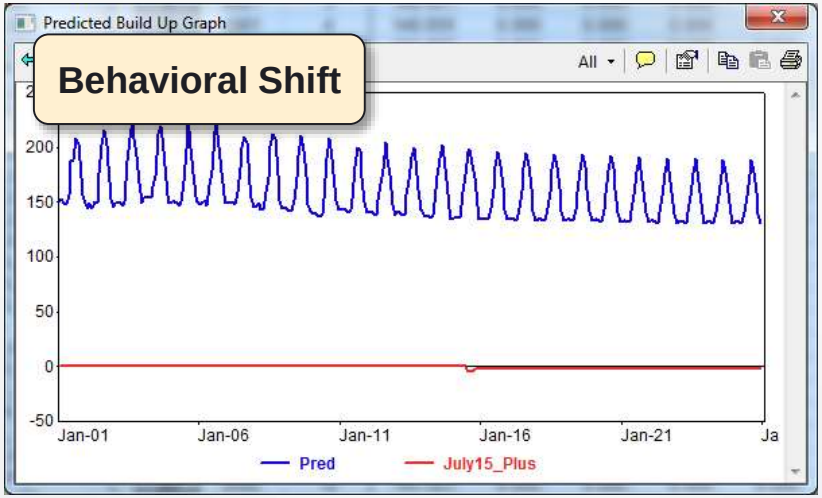


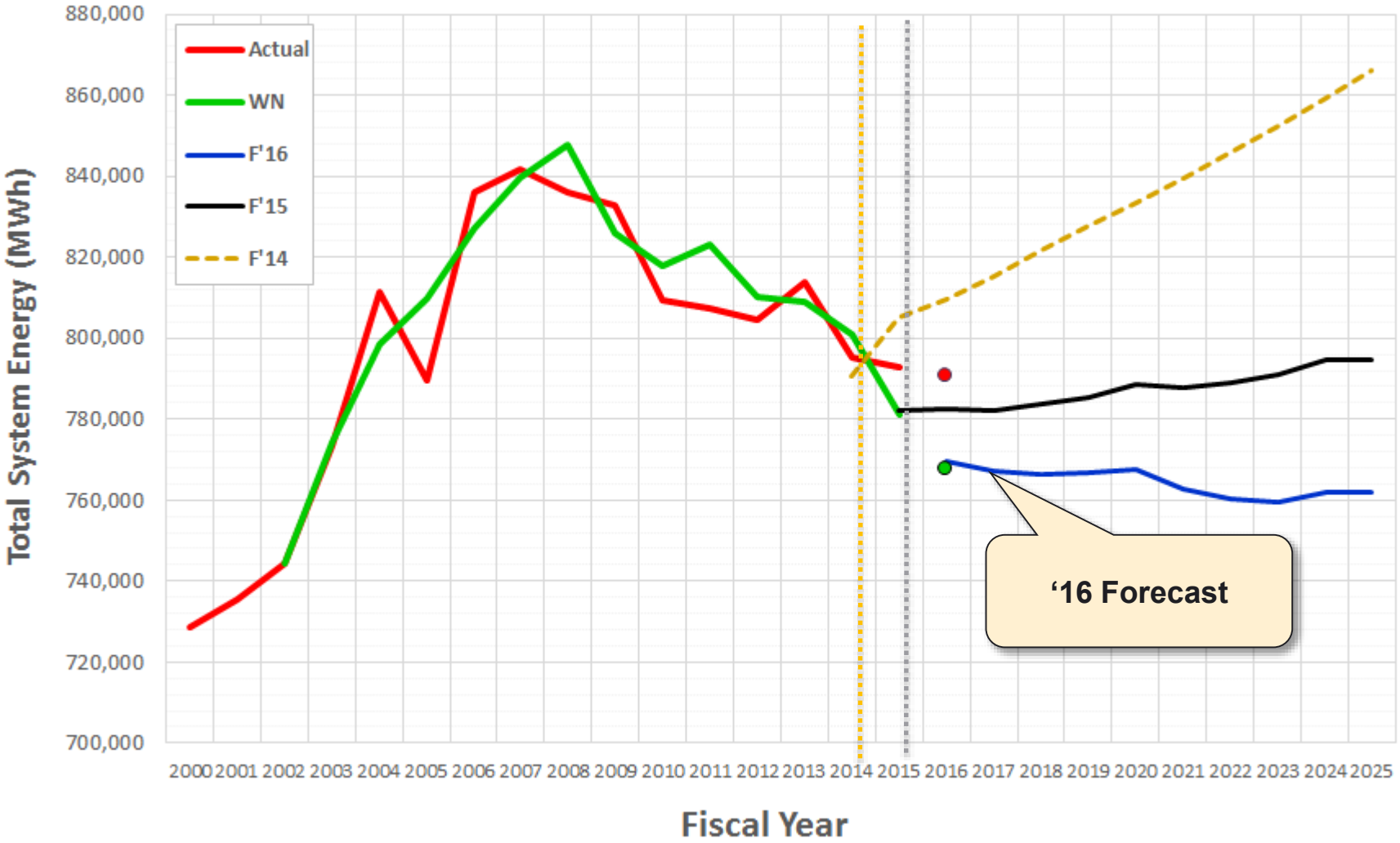
Commercial SAE Inputs (BX)









FORECAST RESULTS

2015 Forecast