



NYSRC Fall Forecast Update: Preliminary 2021 Weather Normalization and 2022 IRM Forecast

Riaz Khan

Demand Forecasting & Analysis

Load Forecasting Task Force

September 30, 2021, Teleconference

Agenda

- **Summary of 2021 Preliminary Weather Normalized Peaks**
- **Update of Weather Normalization Models**
- **Preliminary 2022 IRM Forecast**

Preliminary IRM Forecast Updates

- Transmission Owner 2021 peak weather adjustment estimates were compared with NYISO estimates. Weather normalized peak values were adjusted where appropriate. Transmission Districts with updated 2021 coincident peak weather normalized values include LIPA and O&R.
- Transmission Owner 2022 Regional Load Growth Factor estimates were compared with NYISO estimates. 1+RLGF values were adjusted where appropriate.
- Resulting changes were made to the Locality weather normalized peaks and forecast values.

Summary of 2021 Preliminary Weather Normalized Peaks

Weather Normalization Updates Since 9/16

- LIPA non-coincident peak (NCP) adjustment was calculated using a linear model with 2021 data and coincident peak (CP) adjustment was determined using NCP/CP ratio. Additional demand response information was provided by LIPA.
- O&R weather adjustment was revised with a linear model with 2021 data only and Combined Temperature Humidity Index (CTHI) data from the White Plains, NY, weather station.

Actual and 20-Year Normal Peak-Producing CTHI Statistics – 2002-2021

NYCA Coincident Peak-Producing CTHI									
Statistic	CE	CH	LI	N Grid	NYPA	NYSEG	OR	RGE	NYCA
Max	90.73	89.42	89.21	85.52	85.87	85.91	89.60	86.53	87.74
20 Yr Avg	85.43	85.38	84.76	82.35	82.11	82.51	84.74	82.95	83.77
Min	82.80	81.18	80.18	77.35	77.13	78.22	82.22	77.80	80.38
StDev	2.19	2.16	2.38	2.06	2.91	2.03	2.14	2.13	2.07
Percentile	CE	CH	LI	N Grid	NYPA	NYSEG	OR	RGE	NYCA
50th	85.43	85.38	84.76	82.35	82.11	82.51	84.74	82.95	83.77
57th	85.82	85.75	85.17	82.71	82.61	82.86	85.12	83.32	84.13
67th	86.38	86.31	85.78	83.23	83.36	83.38	85.66	83.87	84.66
90th	88.25	88.15	87.81	84.98	85.84	85.11	87.48	85.68	86.42
2021 Conditions	CE	CH	LI	N Grid	NYPA	NYSEG	OR	RGE	NYCA
CTHI	83.83	84.20	84.26	81.98	83.94	81.94	83.08	82.41	83.00
Percentile	23%	29%	42%	43%	74%	39%	22%	40%	35%
z	-0.73	-0.54	-0.21	-0.18	0.63	-0.28	-0.78	-0.25	-0.37
CTHI Delta (2021 - Avg)	-1.60	-1.18	-0.50	-0.37	1.83	-0.57	-1.66	-0.54	-0.77

Notes: Cumulative Temperature & Humidity Index (CTHI) is a three-day weighted average of maximum temperature and humidity
 The NYCA design condition of the 57th percentile is based upon a load-weighted average of the TD design conditions.
 The 2021 NYCA peak occurred on August 26, Hour Beginning 16.

Summary of 2021 Preliminary Weather Adjustment

2021 Weather Adjustment Summary							
(1)	(2)	(3)	(4)	(5) = (4) - (3)	(6)	(7)	(8) = {(6) + (7)} / 2
TD	Actual CP 8/26 HB 16 (MW)	CTHI at CP	Design CTHI	Delta CTHI	Pooled Model Weather Adjustment (MW)	2021 Model Weather Adjustment (MW)	Average Weather Adjustment (MW)
Con Ed	11,588.1	83.83	86.38	2.55	651.2	597.4	624.3
Cen Hud	1,053.7	84.20	85.38	1.18	33.2	28.9	31.1
LIPA	5,018.4	84.26	84.76	0.50	49.3*	49.3	49.3
Nat Grid	6,701.3	81.98	82.35	0.37	51.9	47.2	49.6
NYPA	357.3	83.94	82.11	-1.83	-1.5	-1.3	-1.4
NYSEG	2,991.9	81.94	82.51	0.57	37.9	36.4	37.2
O&R	1,038.2	83.08	85.66	2.58	78.8**	78.8	78.8
RG&E	1,547.7	82.41	82.95	0.54	23.0	19.7	21.4
NYCA	30,296.6				923.8	856.4	890.3

Notes: Con-Edison & O&R are at 67th percentile design conditions.

Excludes DR impacts and municipal generation.

*For LIPA, NCP weather normalized load was determined using 2021 model; CP weather normalized load (and weather adjustment) was determined using NCP / CP ratio

** For O&R, a single model with 2021 data only was used

Summary of 2021 Preliminary Transmission District Weather Normalization NYCA Coincident Peak

2021 Weather Normalized Load Summary									
(1)	(2)	(3)	(4)	(5) = (2) + (3) + (4)	(6)	(7) = (5) + (6)	(8)	(9) = (8) - (7)	(10) = (9) / (8) * 100%
Transmission District	2021 Actual MW, 8/26/2021 HB 16	Demand Response Estimate MW	Estimated Muni Self-Gen MW	2021 Actual MW, with Estimated DR and Muni Self Gen MW	Weather Adjustment MW	2021 Weather Normalized MW	2021 ICAP Forecast, Prior to BTM:NG Resources MW	TO Forecast, Over /Under MW	TO Forecast Delta, Percent Over /Under
Con Edison	11,588.1	0.0	0.0	11,588.1	624.3	12,212.4	12,705.8	493.4	3.88%
Cen Hudson	1,053.7	0.0	0.0	1,053.7	31.1	1,084.8	1,107.2	22.4	2.02%
LIPA	5,018.4	68.0	4.1	5,090.5	49.3	5,139.8	5,230.8	91.0	1.74%
Nat. Grid	6,701.3	210.5	38.4	6,950.2	49.6	6,999.8	7,001.8	2.0	0.03%
NYPA	357.3	0.0	0.0	357.3	-1.4	355.9	416.4	60.5	14.53%
NYSEG	2,991.9	46.0	0.0	3,037.9	37.2	3,075.1	3,225.2	150.1	4.65%
O&R	1,038.2	0.0	0.0	1,038.2	78.8	1,117.0	1,092.8	-24.2	-2.21%
RG&E	1,547.7	3.7	0.0	1,551.4	21.4	1,572.8	1,547.5	-25.3	-1.63%
NYCA	30,296.6	328.2	42.5	30,667.3	890.3	31,557.6	32,327.5	769.9	2.38%

Notes: Peak load hours are defined by measurements from the NYISO EMS system (PI Historian). Actual load data is from DSS.
The Demand Response impacts are estimates.

Summary of 2021 Preliminary Transmission District Weather Normalization Locality Peaks

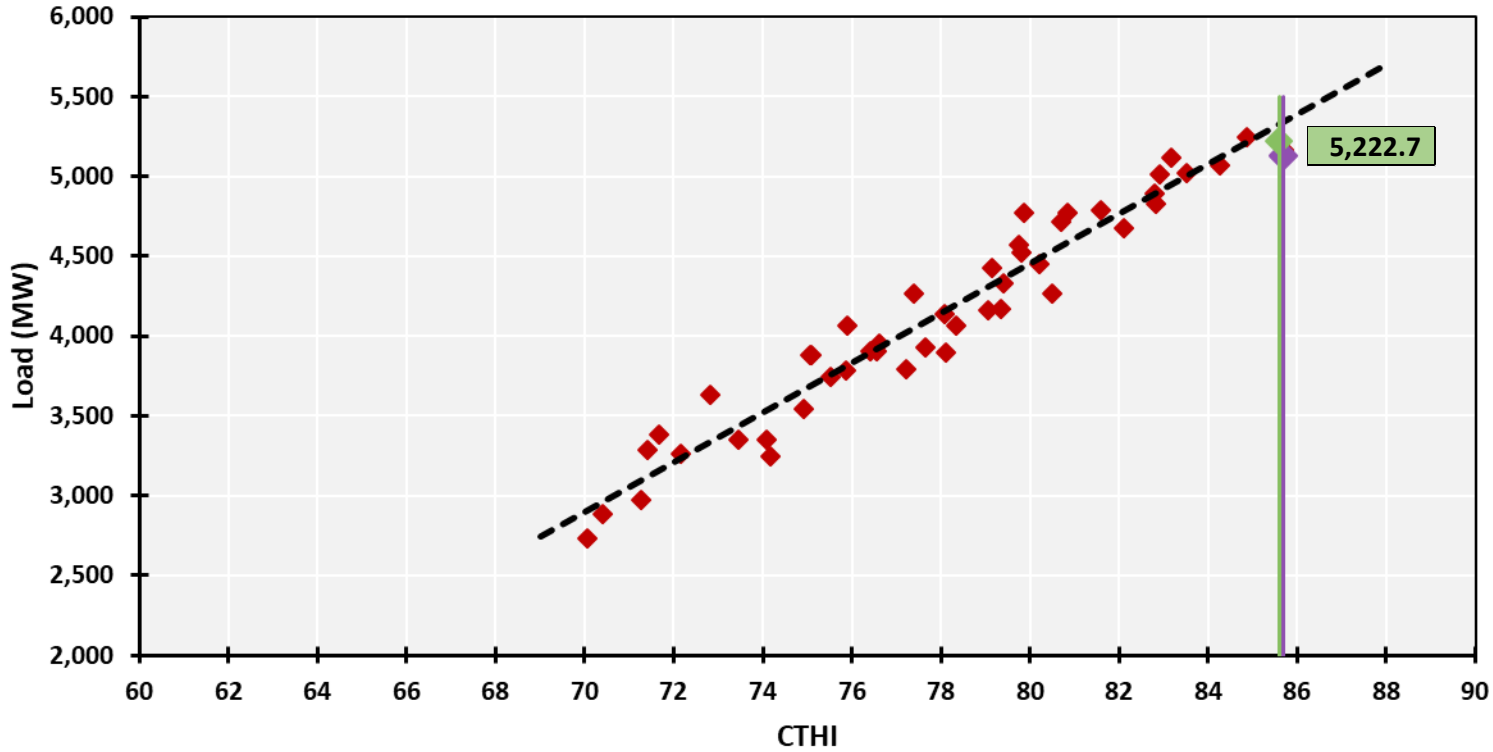
2021 Weather Normalization Summary - Locality												
(1)	(2)	(3)	(4)	(5)	(6) = (3) + (4) + (5)	(7)	(8)	(9) = (7) * (8)	(10) = (9) - (6)	(11)	(12) = (11) - (9)	(13) (12) / (11) * 100%
2021 Locality Peak Information						2021 Locality Weather Normalization Calculation						
Locality	Locality Peak Date and Time	Actual Load at Locality Peak Date and Time MW	DR Estimate at Locality Peak Date and Time MW	Estimated Muni Self-Gen MW	2021 Actual MW, with Estimated DR and Muni Self Gen MW	2021 Weather Normalized Coincident Peak Demand MW	NCP to CP Ratio (15 year avg. with outliers removed)	2021 Locality Weather Normalized MW	Locality Weather Adjustment MW	2021 ICAP Market Forecast MW	Forecast Over /Under MW	Forecast Delta, Percent Over /Under
Zone J - NYC	8/27/2021 HB 14	10,046.1	0.0	0.0	10,046.1	10,577.4	1.0136	10,721.3	675.2	11,199.0	477.7	4.3%
Zone K - LIPA	8/27/2021 HB 16	5,130.6	32.4	4.1	5,167.1	5,139.8	1.0161	5,222.6	55.5*	5,248.6	26.0	0.5%
Zones G-to-J	8/12/2021 HB 16	14,078.2	278.4	0.0	14,356.6	14,781.7	1.0107	14,940.0	583.4	15,411.3	471.3	3.1%

Notes: Peak load hours are defined by measurements from the NYISO EMS system (PI Historian). Actual load data is from DSS. The Demand Response impacts are estimates.

* LIPA weather adjustment includes residual adjustment

Weather Normalization Models (Updated)

LIPA 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 non coincident peak.

Green dot shows 2021 weather normalized non coincident peak.

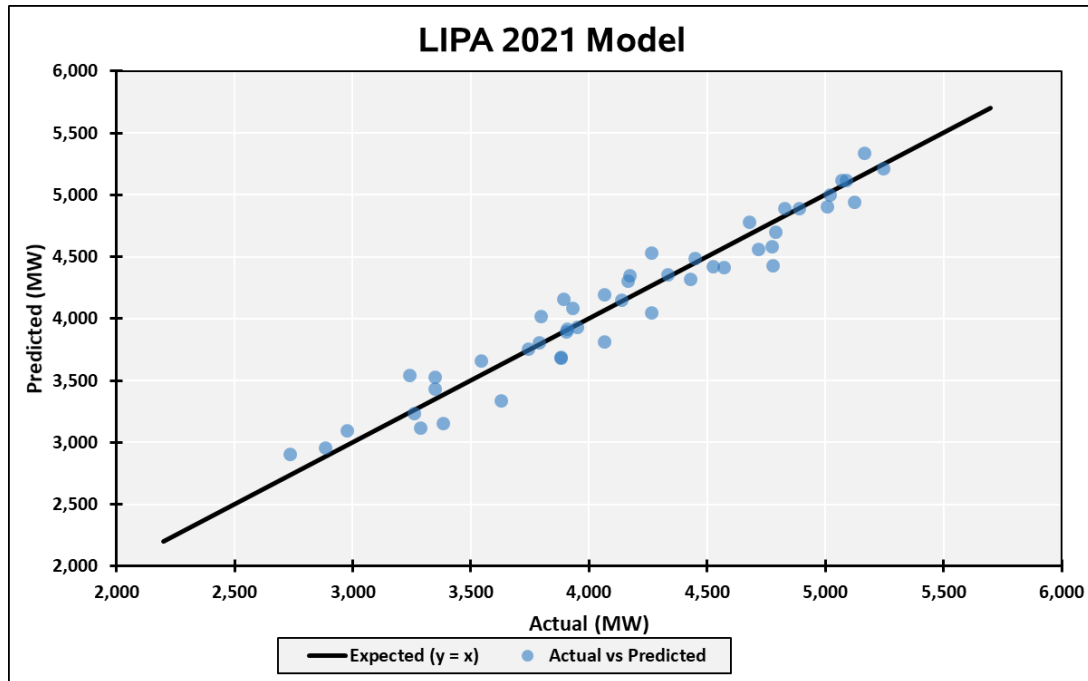
Dotted black line shows model fit during Summer 2021

2021 NCP	5,130.6
2021 CTHI	85.70
Design CTHI	85.59
MW / CTHI	155.8
Weather Adj	-17.4
Other Adj	109.5
2021 WN NCP	5,222.7

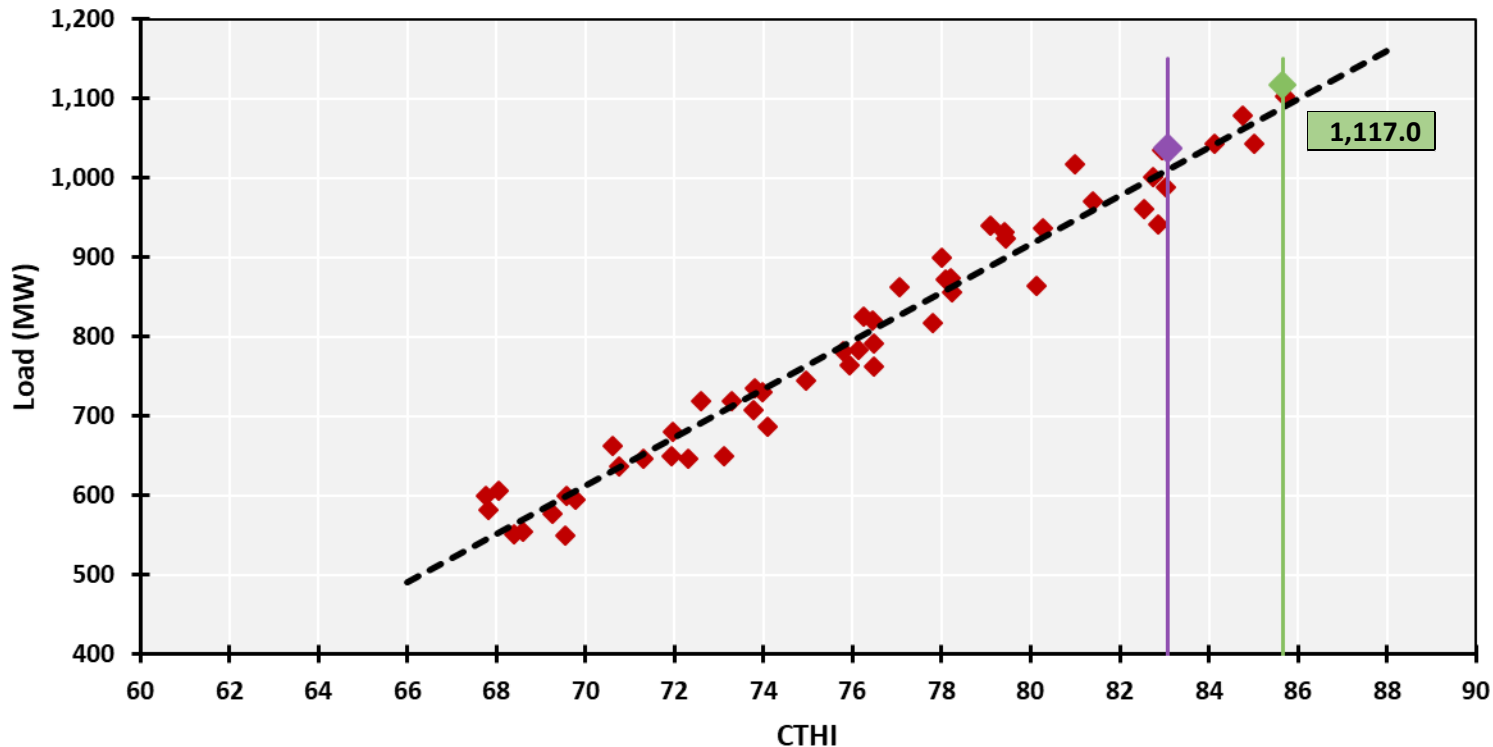
LIPA 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-8006.95	444.76	-18.00	0.00%
CTHI	155.78	5.69	27.36	0.00%

<i>Regression Statistics</i>	
Multiple R	97.1%
R Square	94.3%
Adjusted R Square	94.2%
Standard Error	161
Observations	47



O&R 2021 Model



Design condition is 67th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

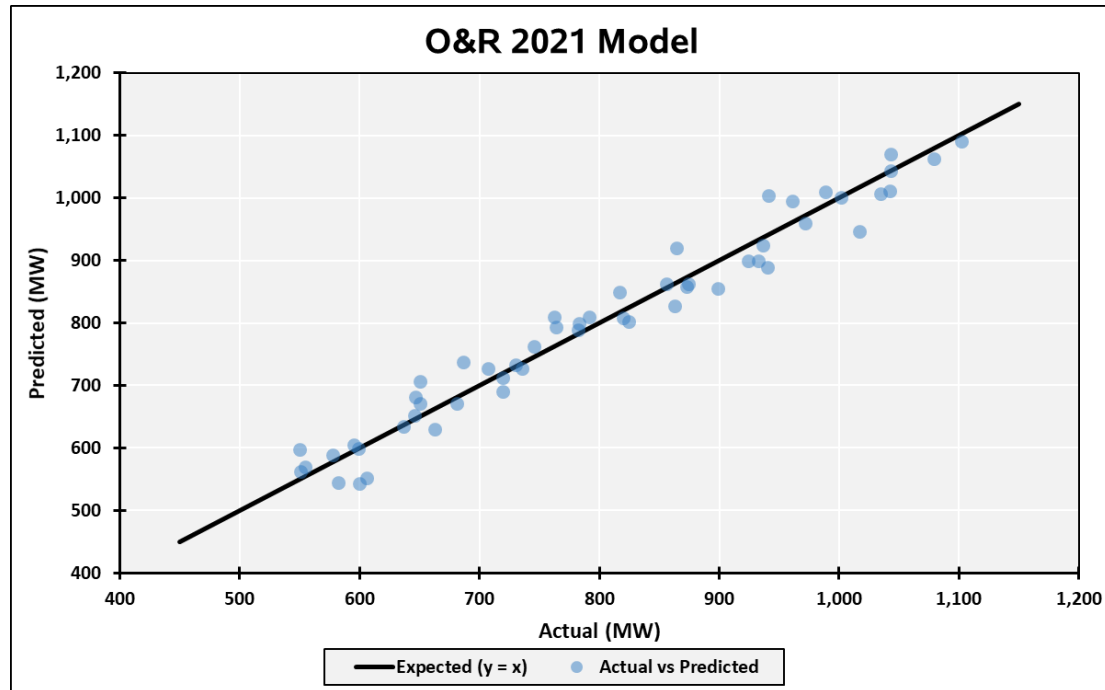
Dotted black line shows model fit during Summer 2021

2021 CP	1,038.2
2021 CTHI	83.08
Design CTHI	85.66
MW / CTHI	30.5
Weather Adj	78.8
2021 WN CP	1,117.0

O&R 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-1521.85	64.40	-23.63	0.00%
CTHI	30.48	0.84	36.12	0.00%

<i>Regression Statistics</i>	
Multiple R	98.1%
R Square	96.2%
Adjusted R Squa	96.2%
Standard Error	32
Observations	53



Preliminary 2022 IRM Forecast

2022 IRM Coincident Peak Forecast by Transmission District

2022 IRM Forecast								
(1)	(2)	(3)	(4)	(5) = (3) * (4)	(6)	(7) = (5) + (6)	(8)	(9) = (7) + (8)
Transmission District	2021 Actual MW, 8/26/2021 HB 16	2021 Weather Normalized MW	Regional Load Growth Factor	2022 Forecast, Before Adjustments MW	BTM:NG Forecast MW	2022 Forecast, With BTM:NG MW	Large Load Forecast MW	2022 IRM Final Forecast MW
Con Edison	11,588.1	12,212.4	1.0187	12,440.4	22.1	12,462.5	0.0	12,462.5
Cen Hudson	1,053.7	1,084.8	0.9950	1,079.4	0.0	1,079.4	0.0	1,079.4
LIPA	5,018.4	5,139.8	0.9800	5,037.0	39.8	5,076.8	0.0	5,076.8
Nat. Grid	6,701.3	6,999.8	1.0000	6,999.8	1.7	7,001.5	55.0	7,056.5
NYPA	357.3	355.9	1.2897	459.0	0.0	459.0	0.0	459.0
NYSEG	2,991.9	3,075.1	1.0020	3,081.3	42.1	3,123.4	140.0	3,263.4
O&R	1,038.2	1,117.0	1.0045	1,122.0	0.0	1,122.0	0.0	1,122.0
RG&E	1,547.7	1,572.8	0.9960	1,566.5	52.5	1,619.0	0.0	1,619.0
NYCA	30,296.6	31,557.6		31,785.4	158.2	31,943.6	195.0	32,138.6
2022 Forecast from 2021 Gold Book				32,178.0				
Change from 2021 Gold Book				-392.6				

2022 IRM Locality Peak Forecast (Non-Coincident)

2022 IRM Forecast - Locality									
(1)	(2)	(3)	(4)	(5) = (3) * (4)	(6)	(7) = (6) - (5)	(8)	(9) = (7) + (8)	(10) = (5) + (8) + (9)
Locality	2021 Locality Peak MW	2021 Weather Normalized Locality Peak MW	Regional Load Growth Factor	2022 Locality Peak Forecast, Before Adjustments MW	2022 Forecast from 2021 Gold Book MW	Change from Gold Book Forecast	BTM:NG Forecast MW	Large Load Forecast MW	2021 IRM Final Forecast MW
Zone J - NYC	10,046.1	10,721.3	1.0187	10,921.3	11,268.0	346.7	22.4	0.0	10,943.7
Zone K - LIPA	5,130.6	5,222.6	0.9800	5,118.0	5,153.0	35.0	40.4	0.0	5,158.5
Zones G-to-J	14,078.2	14,940.0	1.0155	15,171.1	15,435.0	263.9	0.0	0.0	15,171.1

2022 IRM Coincident Peak Forecast by Transmission District and Zone

2022 IRM Coincident Peak Forecast by Transmission District and Zone, With BTM:NG Adjustments and Large Loads												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	A	B	C	D	E	F	G	H	I	J	K	Total
Con Ed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	275.6	1,390.0	10,796.9	0.0	12,462.5
Cen Hud	0.0	0.0	0.0	0.0	3.3	0.0	1,076.1	0.0	0.0	0.0	0.0	1,079.4
LIPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,076.8	5,076.8
Nat Grid	2,005.2	428.2	1,349.8	90.7	950.6	2,232.0	0.0	0.0	0.0	0.0	0.0	7,056.5
NYPA	0.0	0.0	0.0	459.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	459.0
NYSEG	759.0	0.0	1,465.0	106.0	412.2	149.7	21.2	350.3	0.0	0.0	0.0	3,263.4
O&R	0.0	0.0	0.0	0.0	0.0	0.0	1,122.0	0.0	0.0	0.0	0.0	1,122.0
RG&E	0.0	1,619.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,619.0
Total	2,764.2	2,047.2	2,814.8	655.7	1,366.1	2,381.7	2,219.3	625.9	1,390.0	10,796.9	5,076.8	32,138.6

2022 IRM Non-Coincident Peak Forecast by Transmission District and Zone

2022 IRM Non-Coincident Peak Forecast by Transmission District and Zone, With BTM:NG Adjustments and Large Interconnecting Loads											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	A	B	C	D	E	F	G	H	I	J	K
Con Ed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	279.3	1,408.9	10,943.7	0.0
Cen Hud	0.0	0.0	0.0	0.0	3.4	0.0	1,094.0	0.0	0.0	0.0	0.0
LIPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,158.5
Nat Grid	2,119.7	441.8	1,382.2	92.8	991.7	2,267.7	0.0	0.0	0.0	0.0	0.0
NYPA	0.0	0.0	0.0	466.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYSEG	798.3	0.0	1,499.0	108.5	430.0	152.1	21.6	355.1	0.0	0.0	0.0
O&R	0.0	0.0	0.0	0.0	0.0	0.0	1,140.6	0.0	0.0	0.0	0.0
RG&E	0.0	1,670.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2,918.0	2,112.1	2,881.2	668.1	1,425.1	2,419.8	2,256.2	634.4	1,408.9	10,943.7	5,158.5

2022 IRM G-to-J Locality Peak Forecast by Transmission District and Zone

2022 Peak Forecast for G-to-J Locality , Before Adjustments						
(1)	(2)	(3)	(4)	(5)	(7)	(8)
	G	H	I	J	G-to-J Total	RLGF
Con Ed	0.0	278.5	1,404.9	10,890.5	12,573.9	1.0187
Cen Hud	1,087.6	0.0	0.0	0.0	1,087.6	0.9950
LIPA	0.0	0.0	0.0	0.0	0.0	0.9800
Nat Grid	0.0	0.0	0.0	0.0	0.0	1.0000
NYPA	0.0	0.0	0.0	0.0	0.0	1.2897
NYSEG	21.4	354.1	0.0	0.0	375.5	1.0020
O&R	1,134.1	0.0	0.0	0.0	1,134.1	1.0045
RG&E	0.0	0.0	0.0	0.0	0.0	0.9960
Total	2,243.1	632.6	1,404.9	10,890.5	15,171.1	1.0155

2022 IRM Forecast BTM:NG Adjustment

2022 IRM BTM:NG Adjustments to Load												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	A	B	C	D	E	F	G	H	I	J	K	Total
Con Ed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.1	0.0	22.1
Cen Hud	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.8	39.8
Nat Grid	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7
NYPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYSEG	0.0	0.0	42.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.1
O&R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RG&E	0.0	52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.5
Total	0.0	52.5	42.1	0.0	1.7	0.0	0.0	0.0	0.0	22.1	39.8	158.2

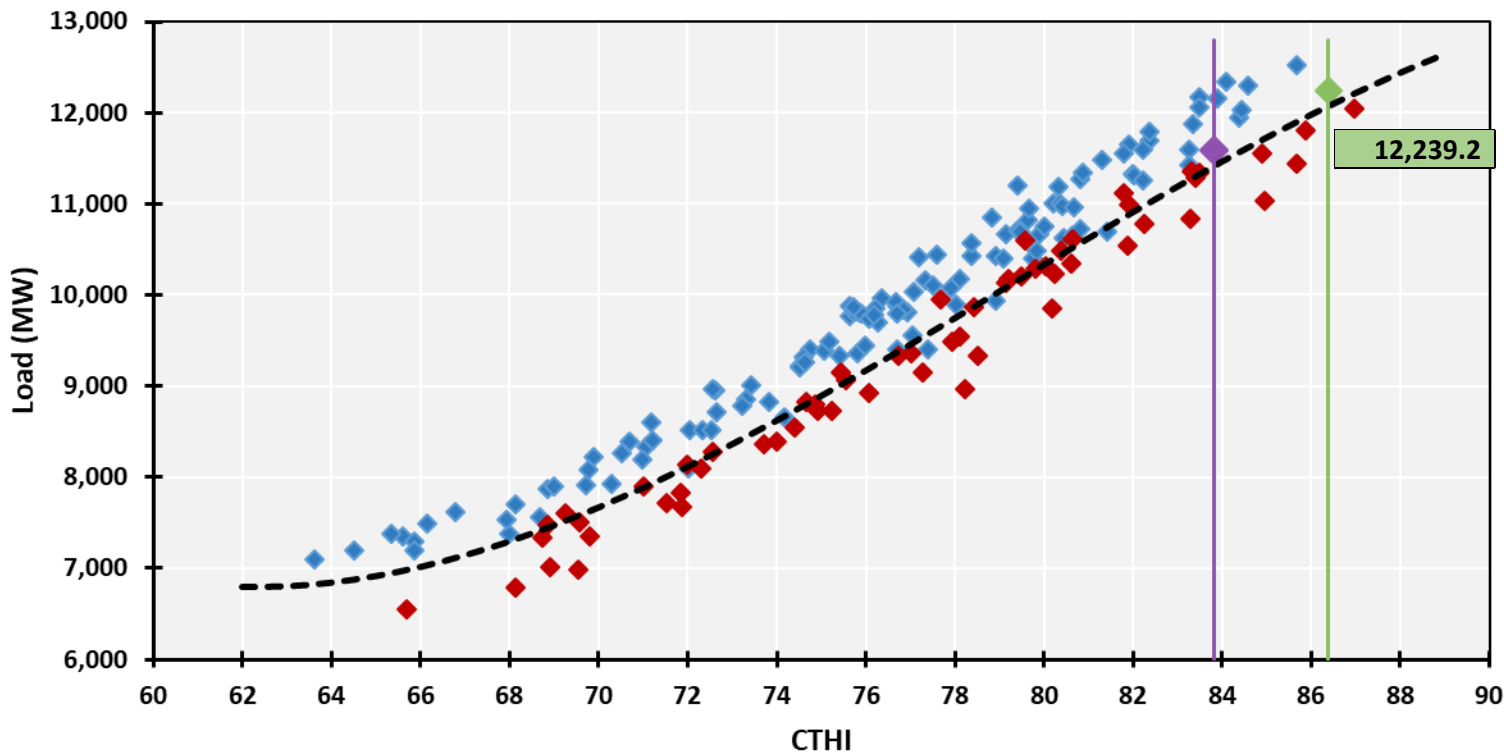
2022 IRM Forecast Large Loads Forecast

Large Load Forecast by Transmission District and Zone												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	A	B	C	D	E	F	G	H	I	J	K	Total
Con Ed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cen Hud	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nat Grid	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.0
NYPA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYSEG	90.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	140.0
O&R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RG&E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	145.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195.0

Questions?

Reference Material

Con Ed Pooled Model



Design condition is 67th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

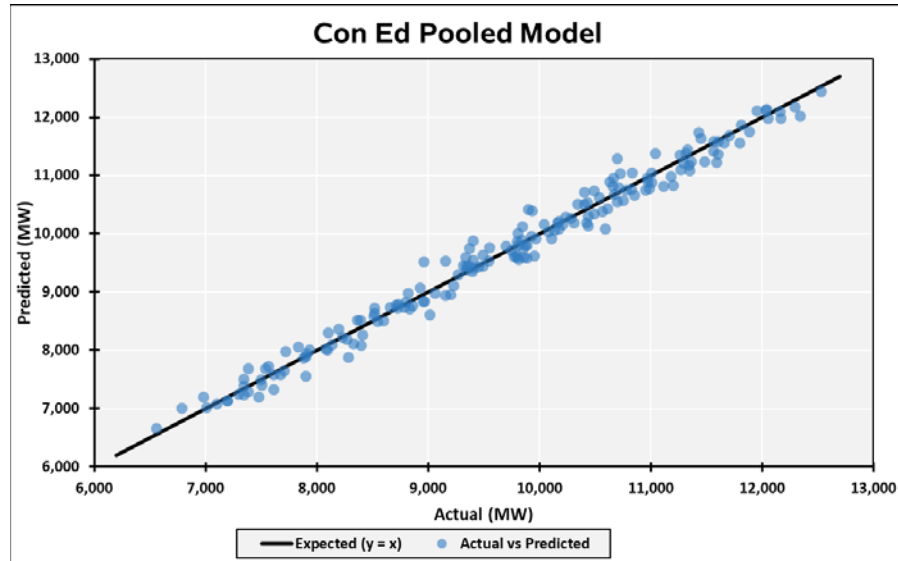
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	11,588.1
2021 CTHI	83.83
Design CTHI	86.38
MW / CTHI	255.4
Weather Adj	651.2
2021 WN CP	12,239.2

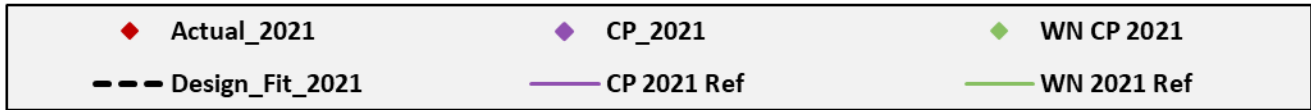
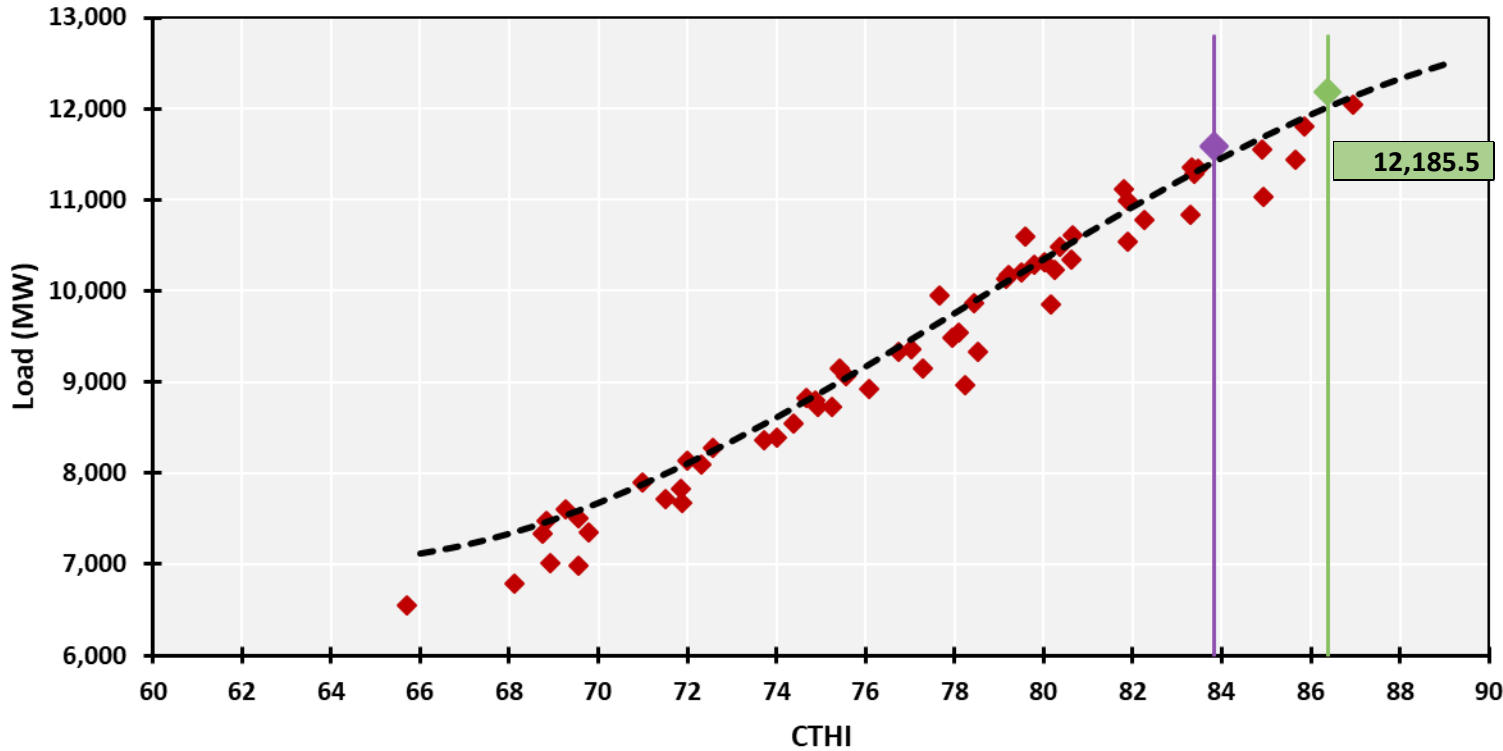
Con Ed Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	156776.69	34923.70	4.49	0.00%
CTHI	-6156.09	1396.95	-4.41	0.00%
CTHI_2	81.46	18.58	4.39	0.00%
CTHI_3	-0.34	0.08	-4.18	0.00%
Y2018	679.36	36.26	18.74	0.00%
Y2019	543.00	36.89	14.72	0.00%
Seasonal_Temperature_Trend	3.07	0.73	4.20	0.00%
Thu	-79.92	38.28	-2.09	3.83%
Fri	-222.54	38.33	-5.81	0.00%

<i>Regression Statistics</i>	
Multiple R	99.1%
R Square	98.2%
Adjusted R Square	98.1%
Standard Error	198
Observations	180



Con Ed 2021 Model



Design condition is 67th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

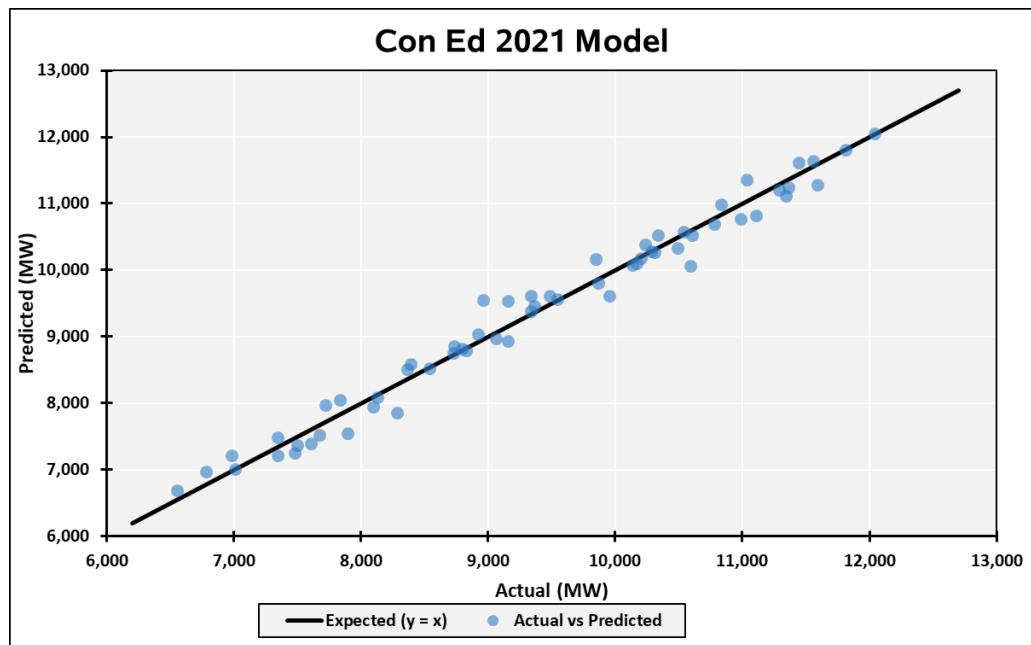
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	11,588.1
2021 CTHI	83.83
Design CTHI	86.38
MW / CTHI	234.3
Weather Adj	597.4
2021 WN CP	12,185.5

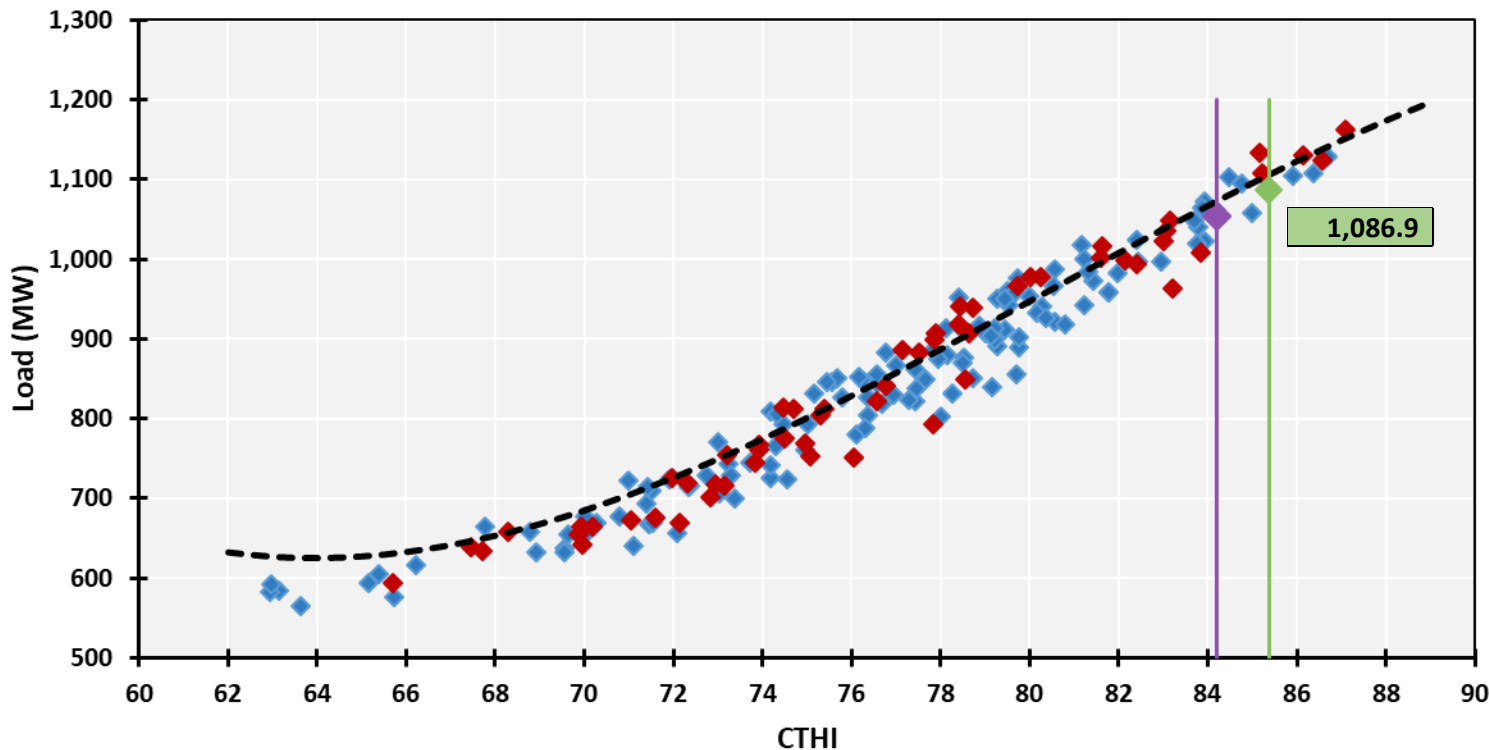
Con Ed 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	212803.60	83749.70	2.54	1.40%
CTHI	-8358.69	3275.90	-2.55	1.36%
CTHI_2	110.20	42.59	2.59	1.24%
CTHI_3	-0.47	0.18	-2.54	1.40%
Seasonal_Temperature_Trend	3.94	1.27	3.10	0.31%
Fri	-192.96	70.94	-2.72	0.88%

<i>Regression Statistics</i>	
Multiple R	99.0%
R Square	98.0%
Adjusted R Square	97.8%
Standard Error	216
Observations	60



Central Hudson Pooled Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

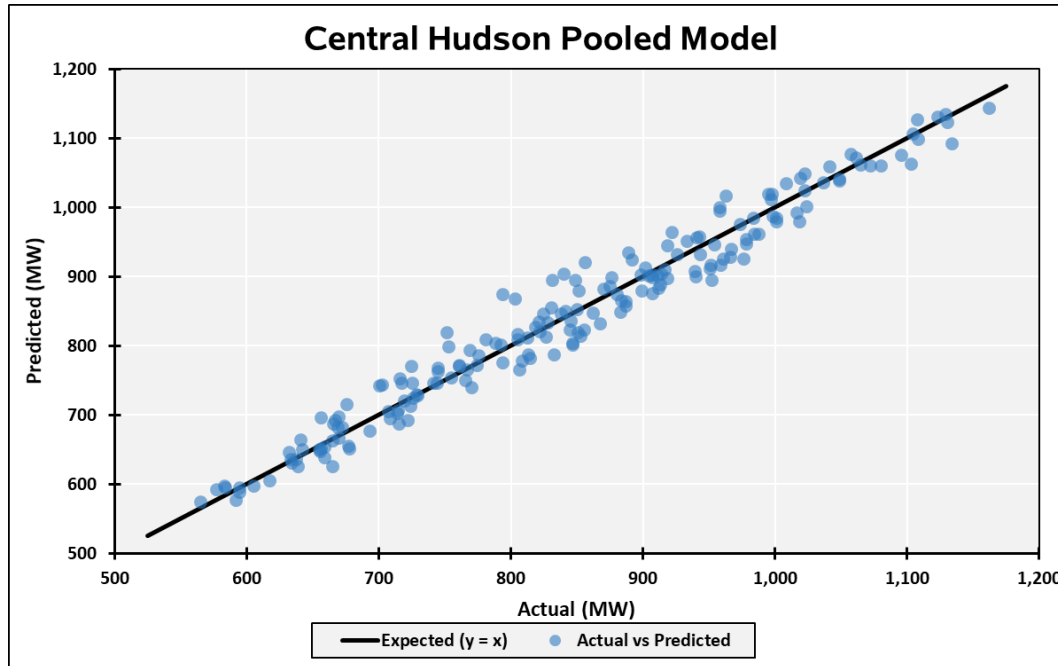
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	1,053.7
2021 CTHI	84.20
Design CTHI	85.38
MW / CTHI	28.2
Weather Adj	33.2
2021 WN CP	1,086.9

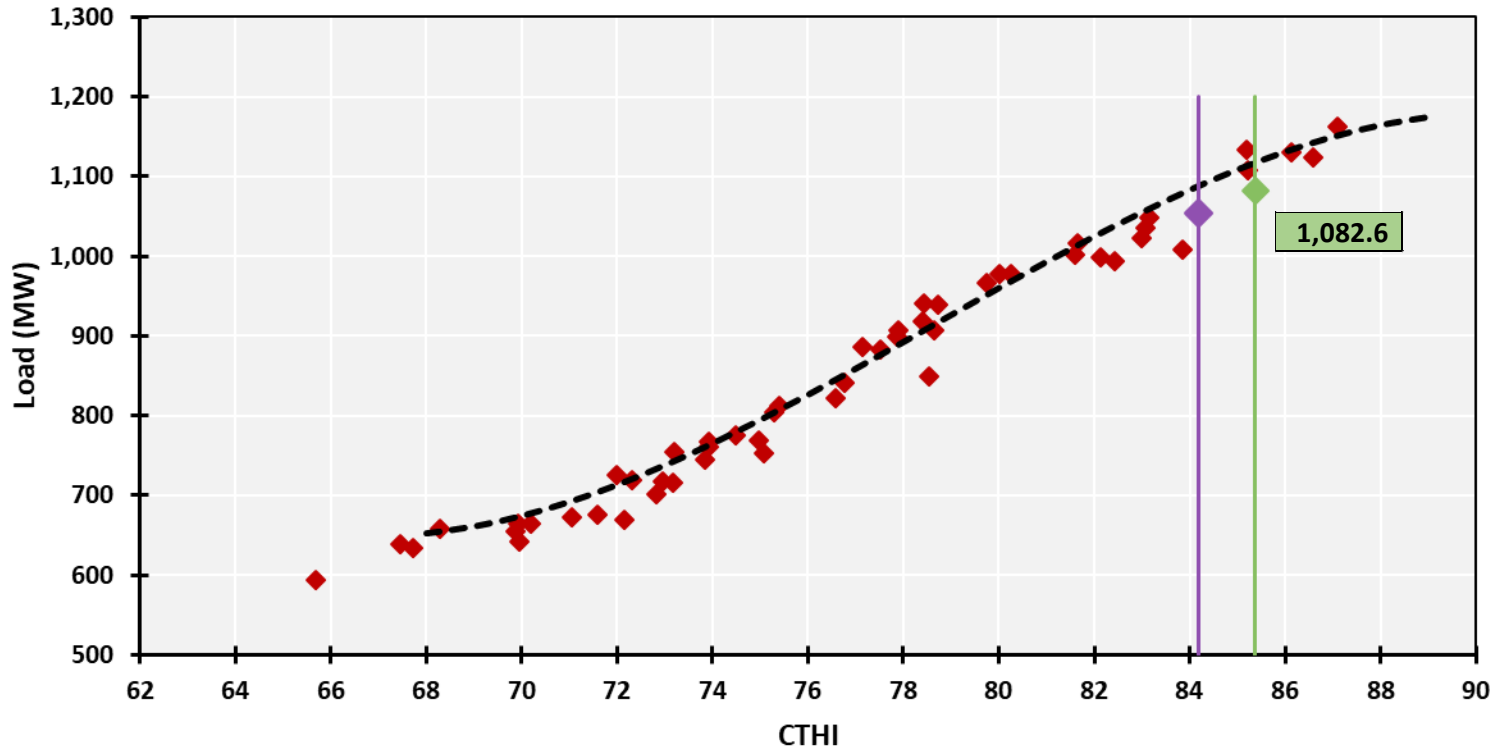
Central Hudson Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	17986.52	3504.22	5.13	0.00%
CTHI	-697.90	140.89	-4.95	0.00%
CTHI_2	9.06	1.88	4.82	0.00%
CTHI_3	-0.04	0.01	-4.50	0.00%
Y2019	-17.49	4.19	-4.18	0.00%
Seasonal_Temperature	0.35	0.10	3.59	0.04%

<i>Regression Statistics</i>	
Multiple R	98.3%
R Square	96.6%
Adjusted R Square	96.5%
Standard Error	27
Observations	186



Central Hudson 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

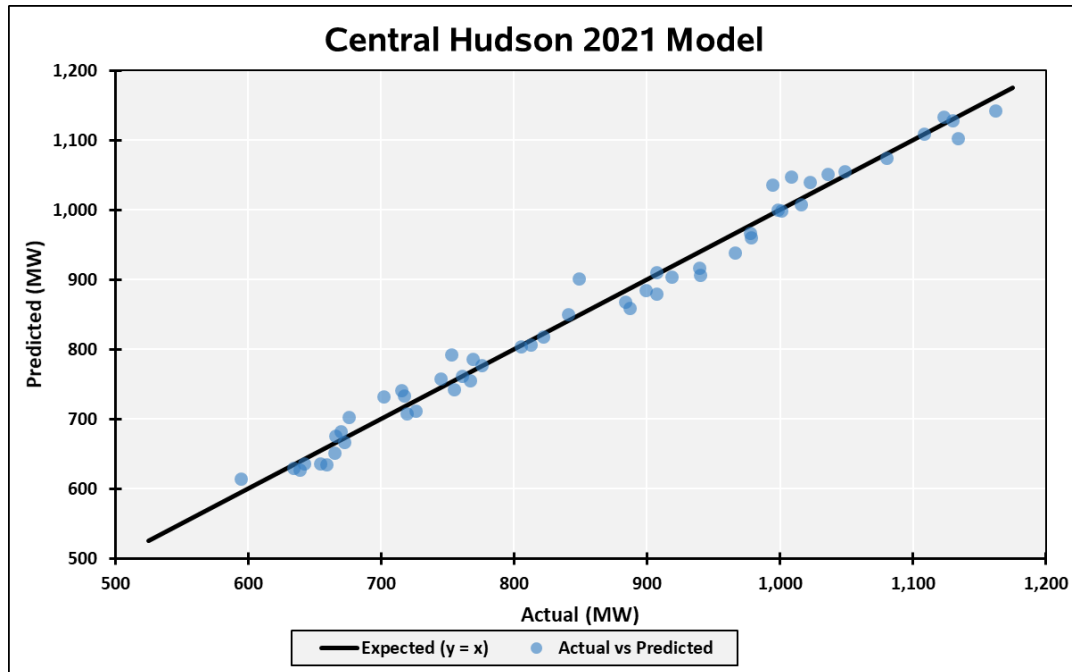
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	1,053.7
2021 CTHI	84.20
Design CTHI	85.38
MW / CTHI	24.6
Weather Adj	28.9
2021 WN CP	1,082.6

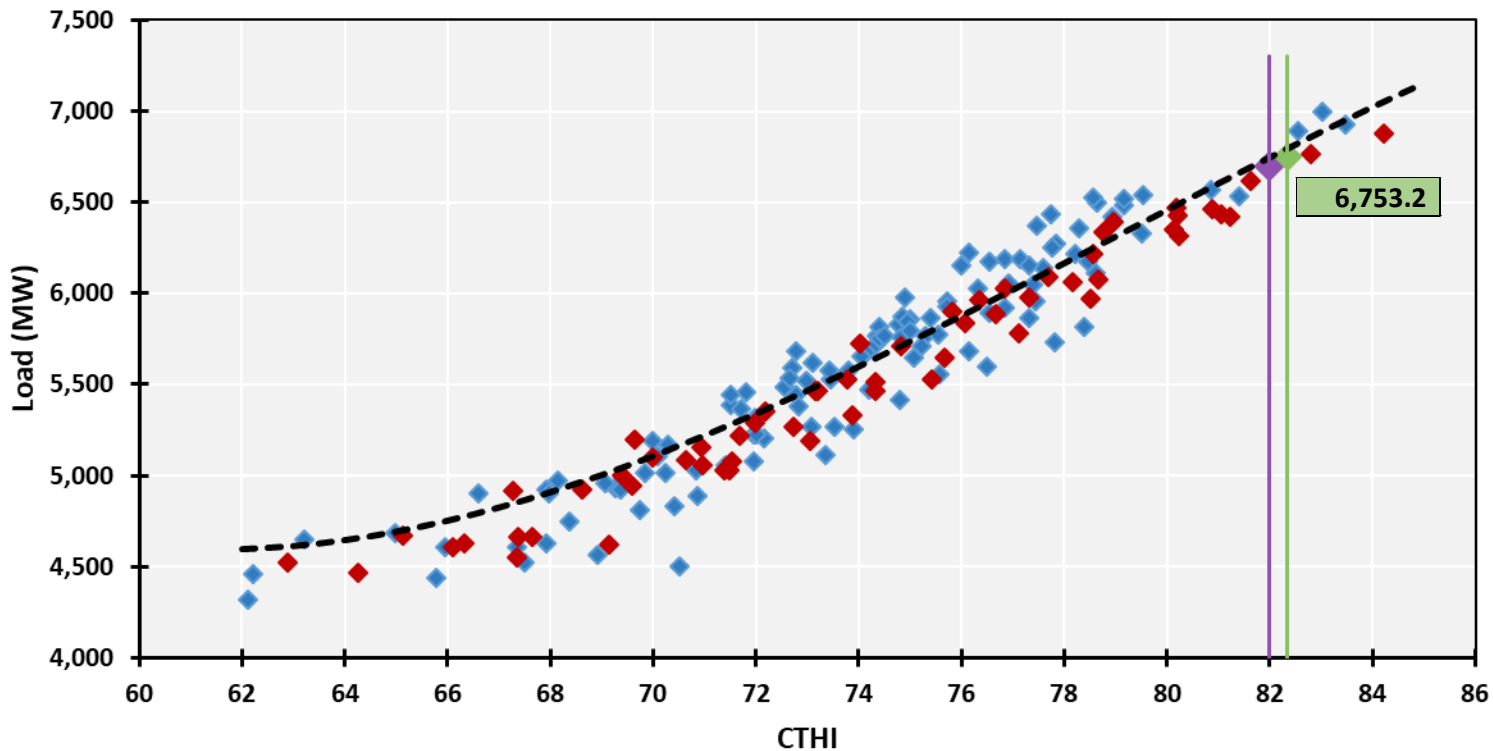
Central Hudson 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	37902.70	7313.50	5.18	0.00%
CTHI	-1480.07	286.72	-5.16	0.00%
CTHI_2	19.25	3.74	5.15	0.00%
CTHI_3	-0.08	0.02	-5.04	0.00%
Seasonal_Temperature_Trend	0.38	0.12	3.13	0.29%

<i>Regression Statistics</i>	
Multiple R	99.2%
R Square	98.5%
Adjusted R Square	98.3%
Standard Error	21
Observations	53



National Grid Pooled Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

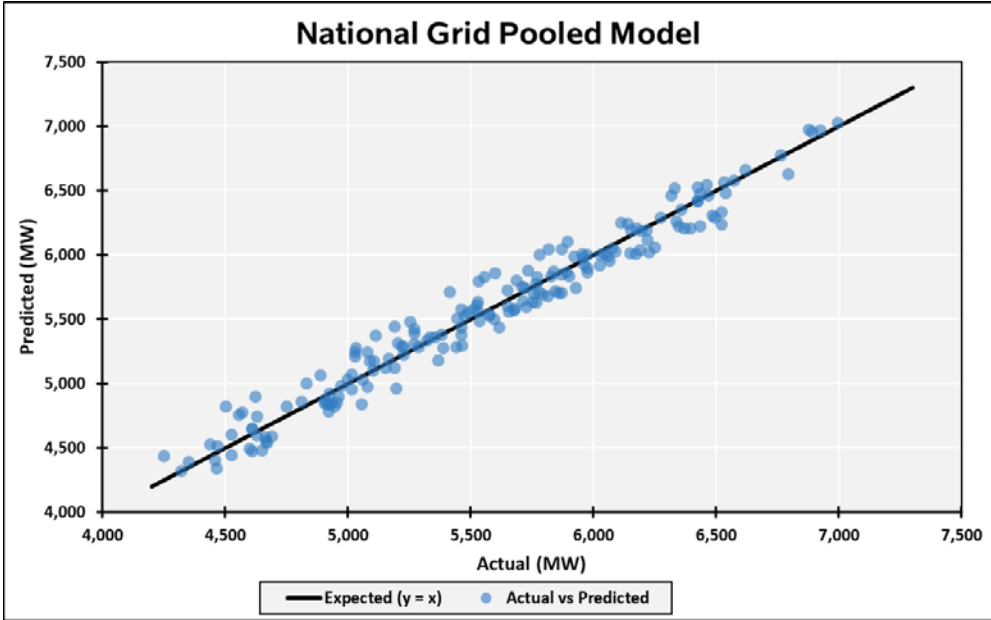
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	6,701.3
2021 CTHI	81.98
Design CTHI	82.35
MW / CTHI	141.2
Weather Adj	51.9
2021 WN CP	6,753.2

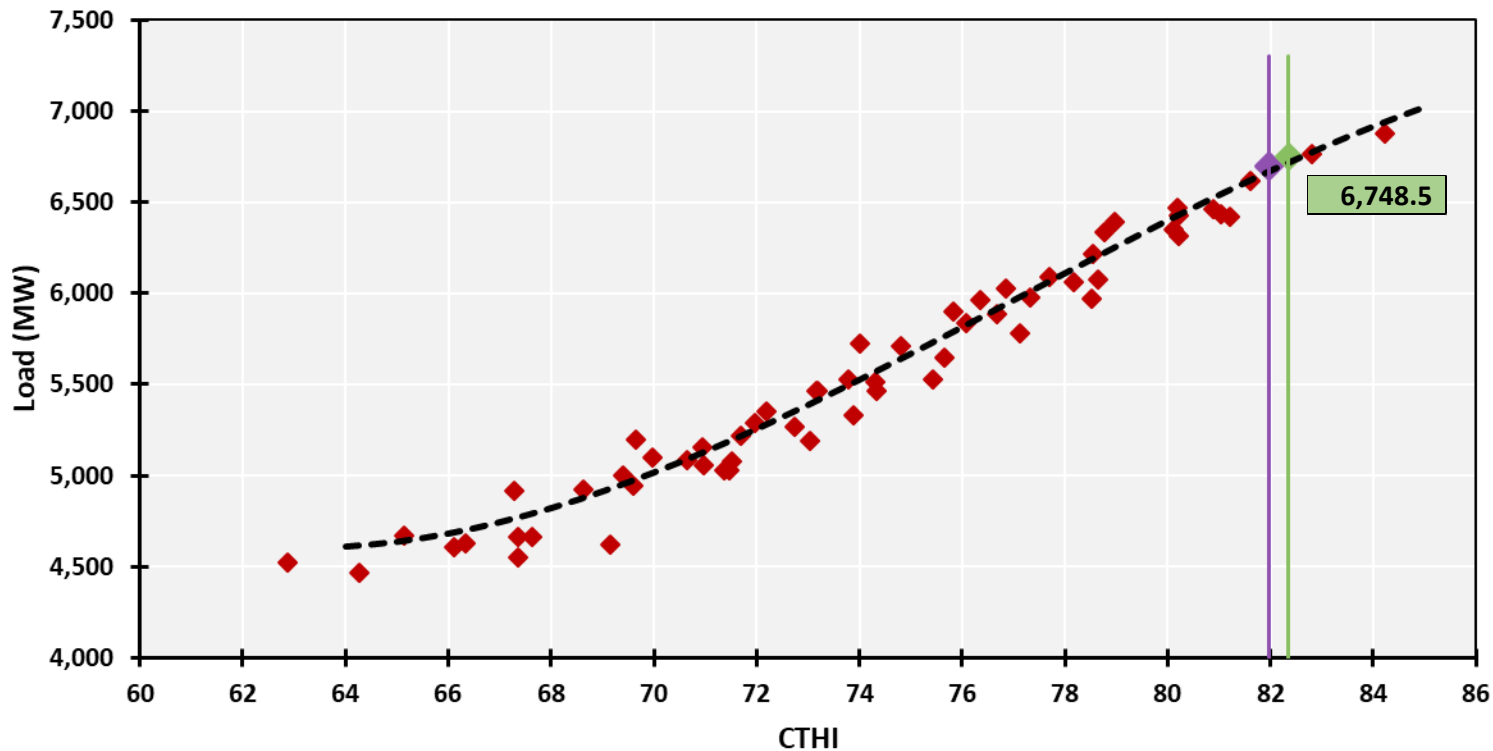
National Grid Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	73035.98	12726.69	5.74	0.00%
CTHI	-2842.32	541.19	-5.25	0.00%
CTHI_2	37.88	7.64	4.96	0.00%
CTHI_3	-0.16	0.04	-4.47	0.00%
Y2018	148.69	20.07	7.41	0.00%
Fri	-91.51	23.63	-3.87	0.02%
Seasonal_Temperature_Trend	3.16	0.45	7.06	0.00%

<i>Regression Statistics</i>	
Multiple R	98.11%
R Square	96.25%
Adjusted R Square	96.13%
Standard Error	127
Observations	181



National Grid 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

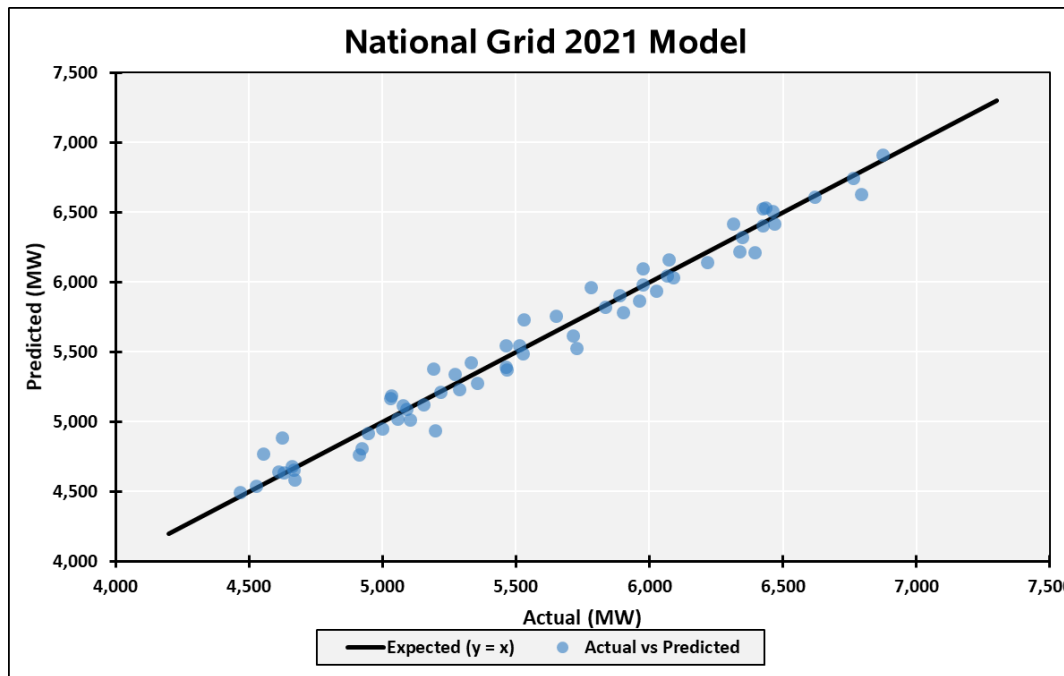
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	6,701.3
2021 CTHI	81.98
Design CTHI	82.35
MW / CTHI	128.5
Weather Adj	47.2
2021 WN CP	6,748.5

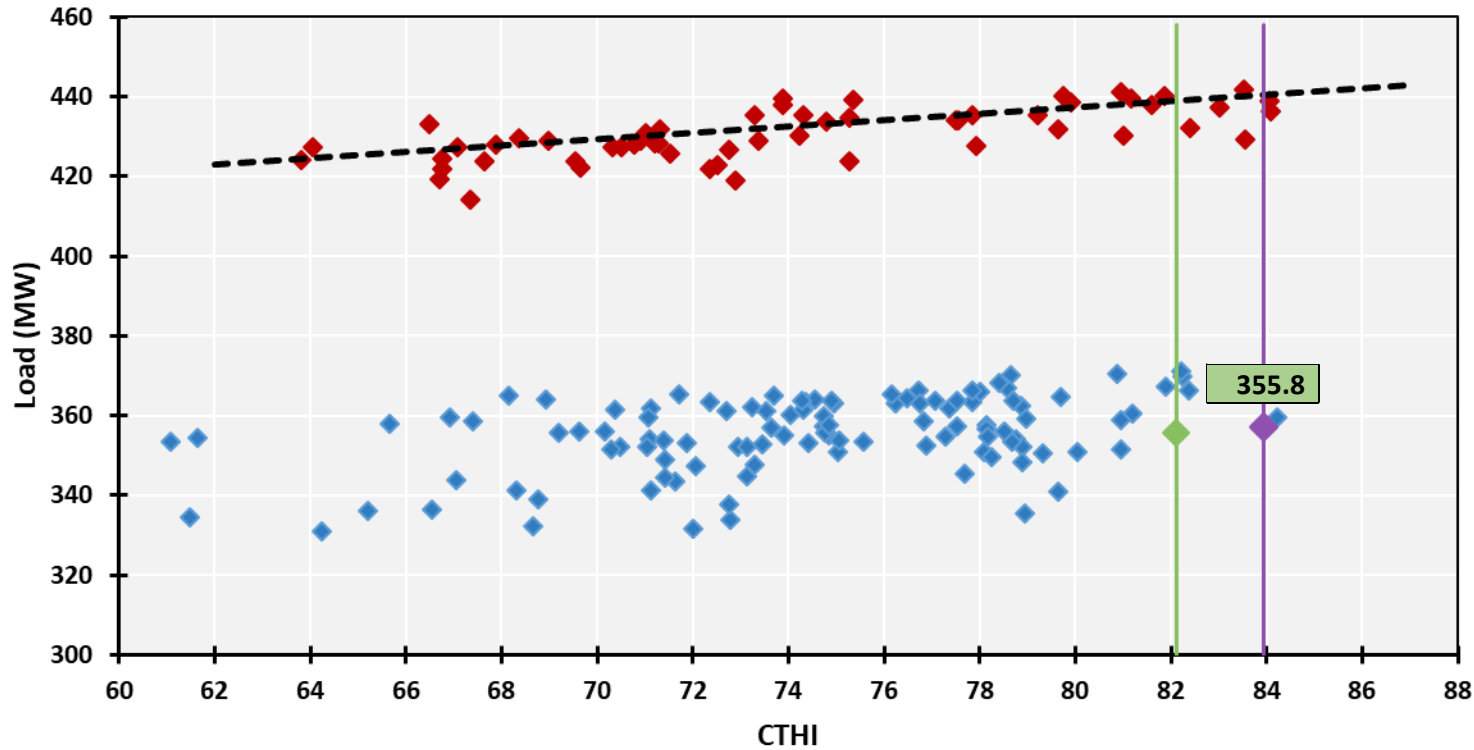
National Grid 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	110931.92	34335.45	3.23	0.21%
CTHI	-4383.83	1406.37	-3.12	0.29%
CTHI_2	58.77	19.15	3.07	0.33%
CTHI_3	-0.25	0.09	-2.93	0.49%
Seasonal_Temperature_Trend	1.19	0.55	2.15	3.62%

<i>Regression Statistics</i>	
Multiple R	98.7%
R Square	97.5%
Adjusted R Square	97.3%
Standard Error	110
Observations	61



NYPA Pooled Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

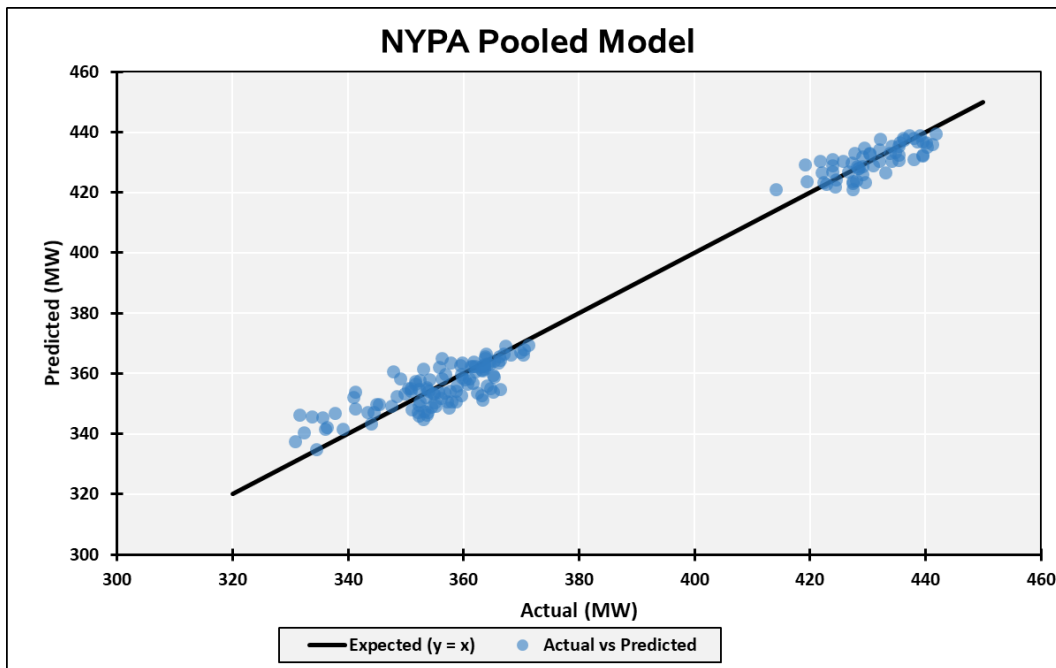
Dotted black line shows model fit during 2021 late July design conditions.¹¹

2021 CP	357.3
2021 CTHI	83.94
Design CTHI	82.11
MW / CTHI	0.8
Weather Adj	-1.5
2021 WN CP	355.8

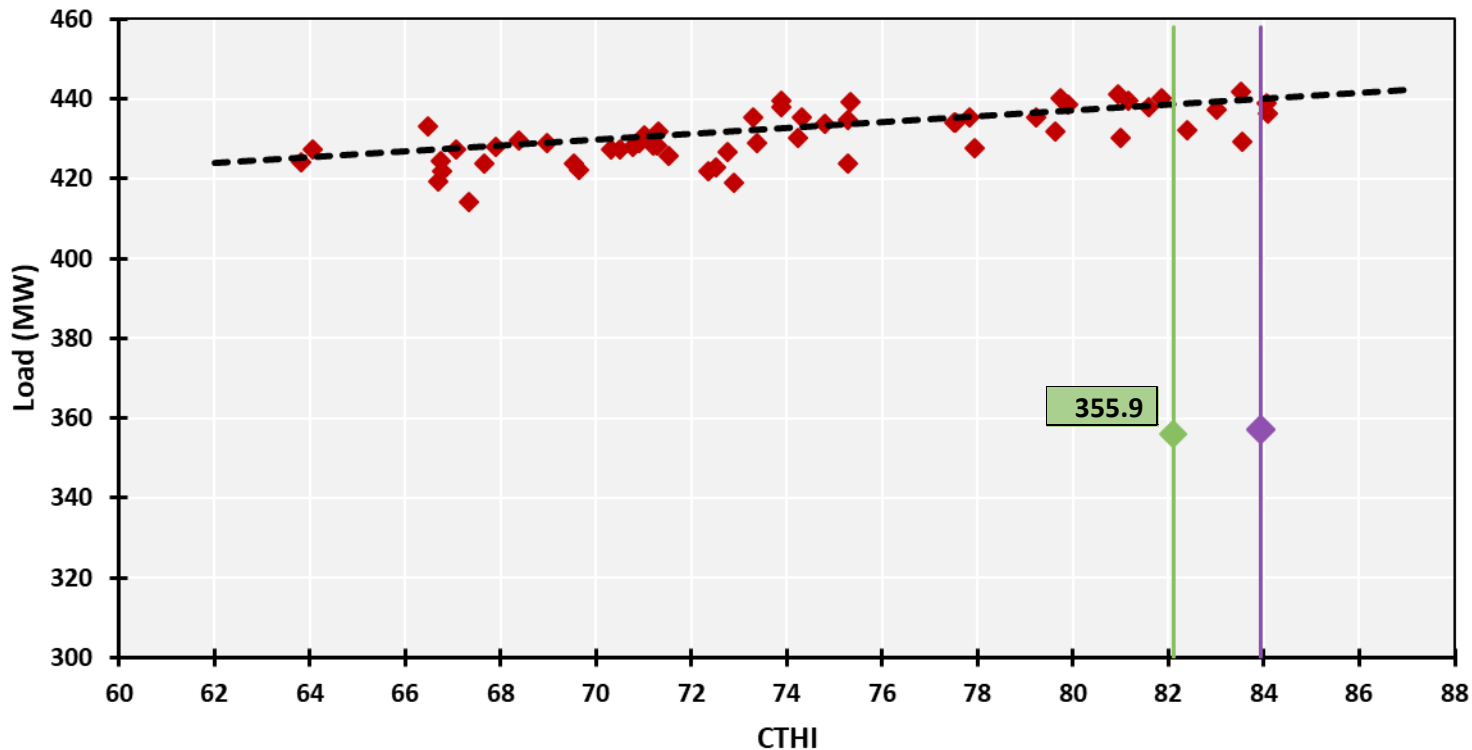
NYPA Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	366.73	6.17	59.46	0.00%
CTHI	0.80	0.09	9.16	0.00%
Y2018	-81.68	1.01	-80.51	0.00%
Y2019	-69.64	0.99	-70.05	0.00%
Seasonal_Temperature_Trend	0.07	0.02	3.84	0.02%
Fri	-2.44	1.03	-2.36	1.95%

<i>Regression Statistics</i>	
Multiple R	99.0%
R Square	98.0%
Adjusted R Square	97.9%
Standard Error	5
Observations	167



NYPA 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

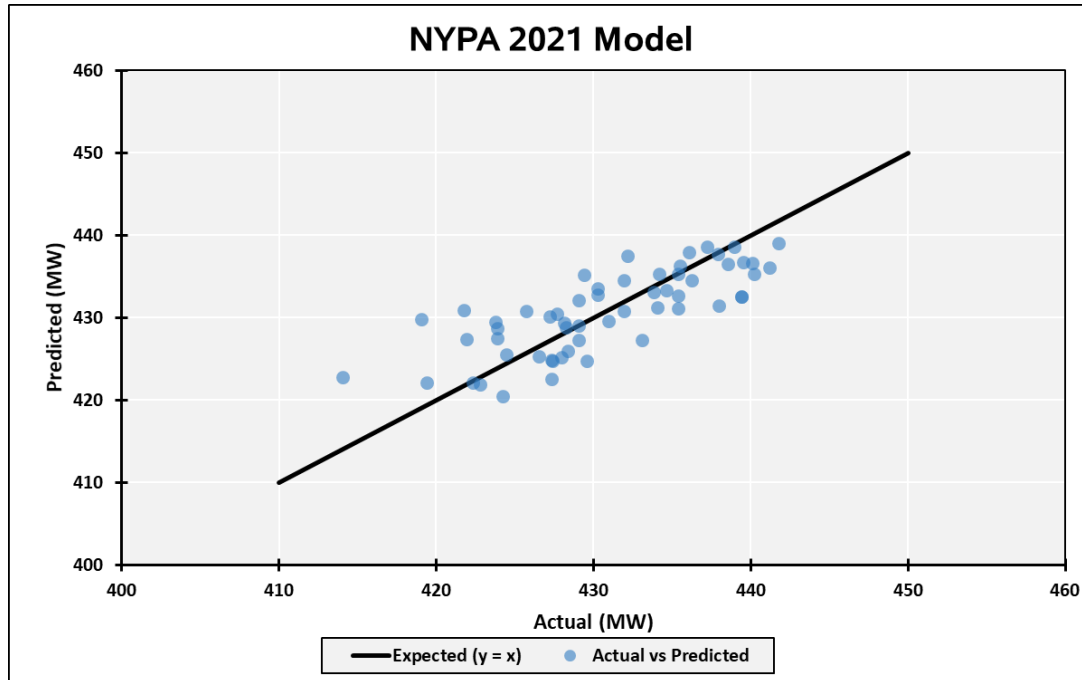
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	357.3
2021 CTHI	83.94
Design CTHI	82.11
MW / CTHI	0.7
Weather Adj	-1.3
2021 WN CP	355.9

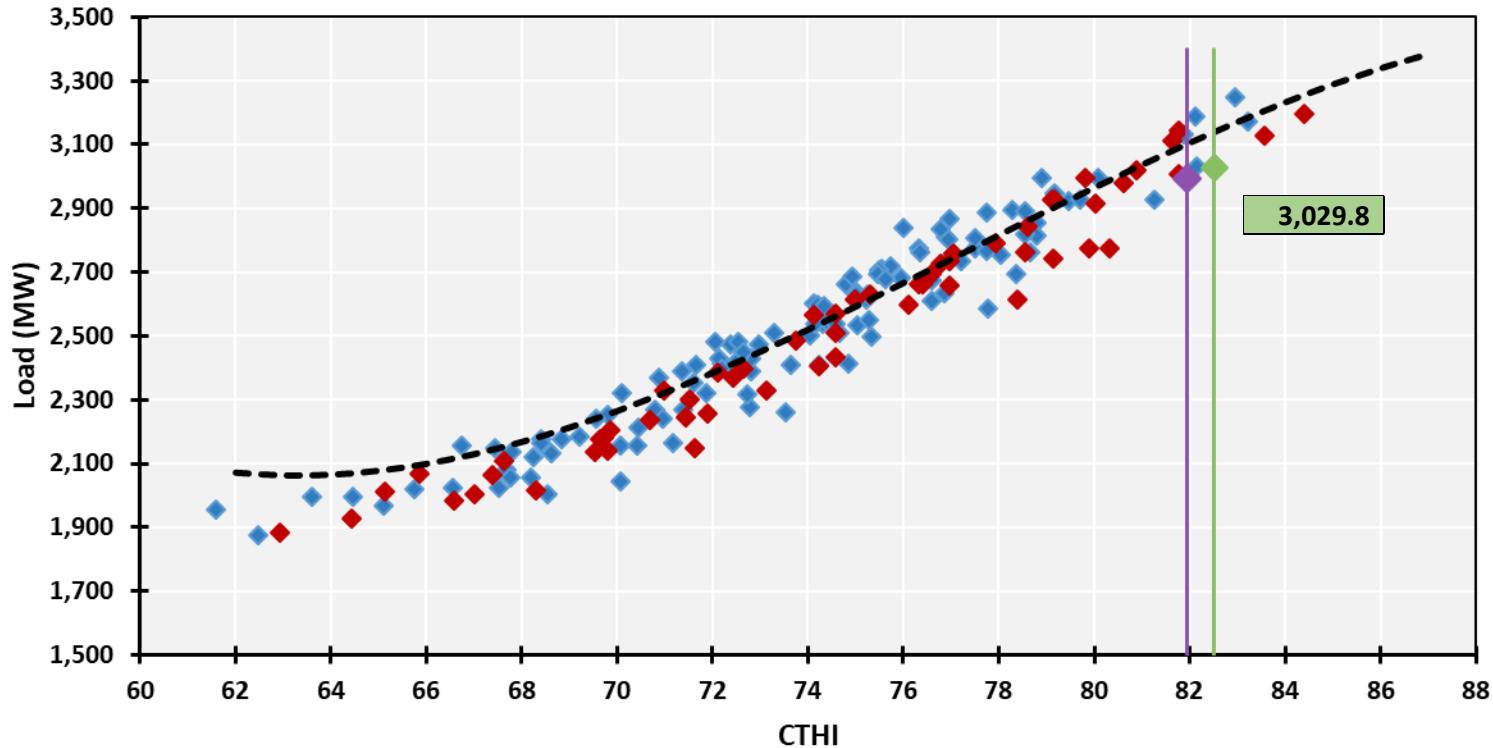
NYPA 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	373.53	7.36	50.78	0.00%
CTHI	0.73	0.10	7.47	0.00%
Seasonal_Temperature_Trend	0.06	0.02	2.69	0.95%
Fri	-4.79	1.52	-3.15	0.27%

<i>Regression Statistics</i>	
Multiple R	77.7%
R Square	60.4%
Adjusted R Square	58.1%
Standard Error	4
Observations	57



NYSEG Pooled Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

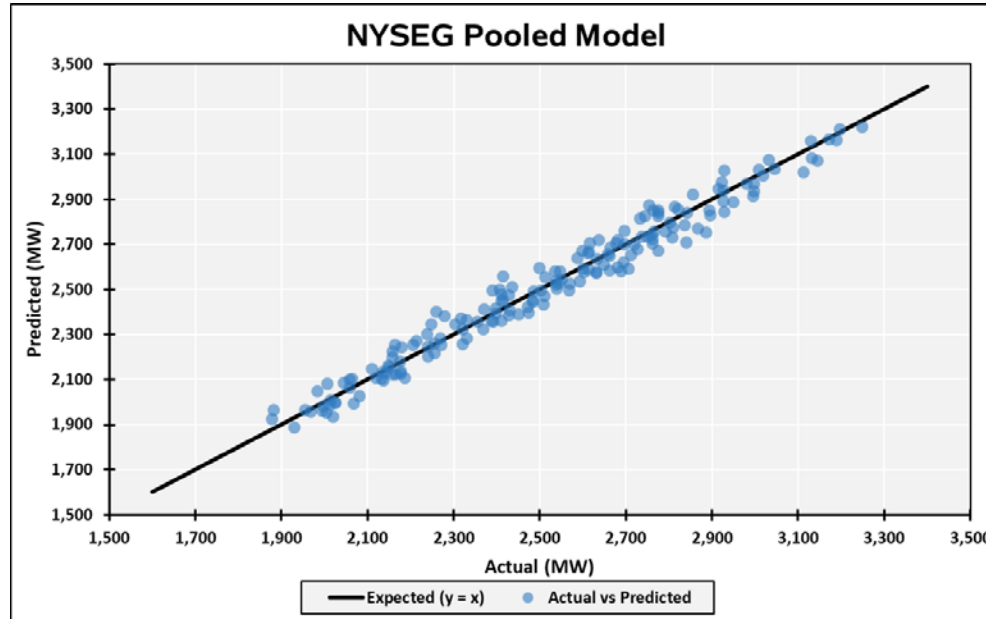
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	2,991.9
2021 CTHI	81.94
Design CTHI	82.51
MW / CTHI	66.5
Weather Adj	37.9
2021 WN CP	3,029.8

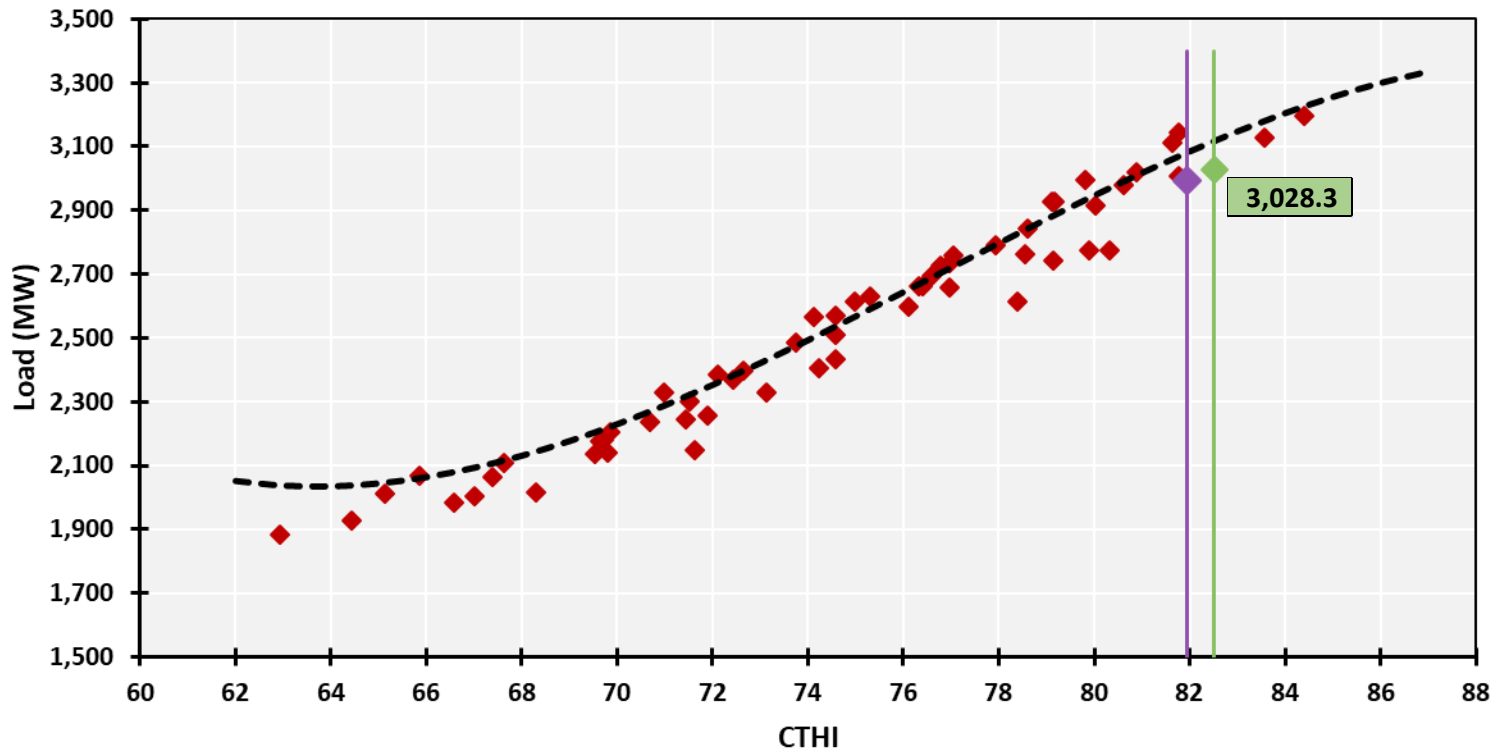
NYSEG Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	55126.22	9867.79	5.59	0.00%
CTHI	-2186.67	406.66	-5.38	0.00%
CTHI_2	29.22	5.57	5.24	0.00%
CTHI_3	-0.13	0.03	-4.96	0.00%
Y2018	60.61	9.21	6.58	0.00%
Fri	-35.46	10.71	-3.31	0.11%
Seasonal_Temperature_Trend	1.82	0.20	8.95	0.00%

<i>Regression Statistics</i>	
Multiple R	98.5%
R Square	97.1%
Adjusted R Square	97.0%
Standard Error	57
Observations	175



NYSEG 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

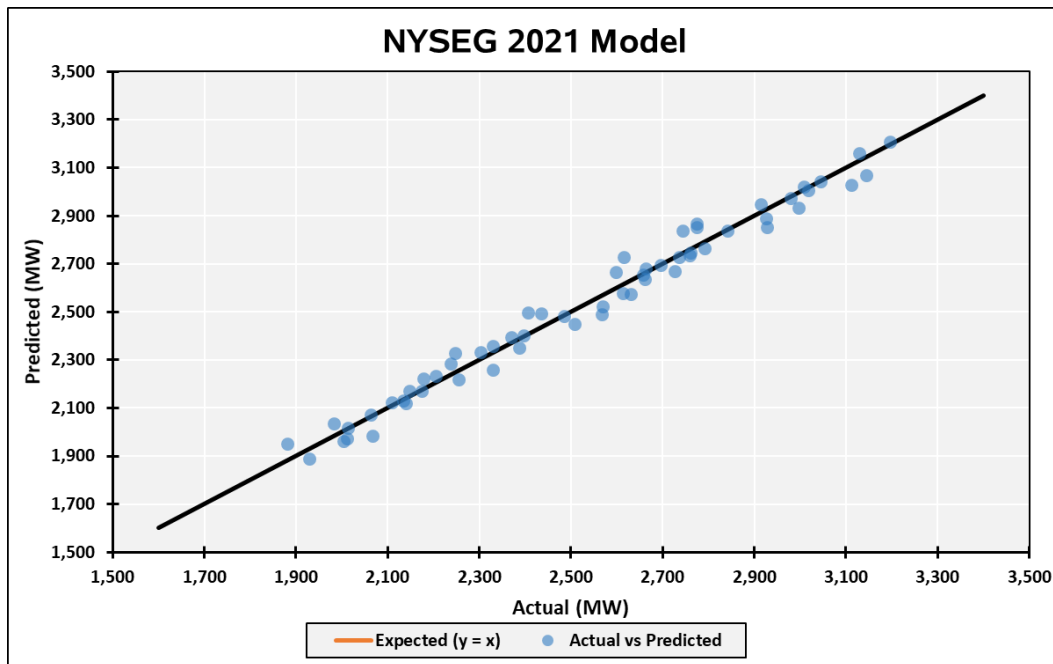
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	2,991.9
2021 CTHI	81.94
Design CTHI	82.51
MW / CTHI	63.9
Weather Adj	36.4
2021 WN CP	3,028.3

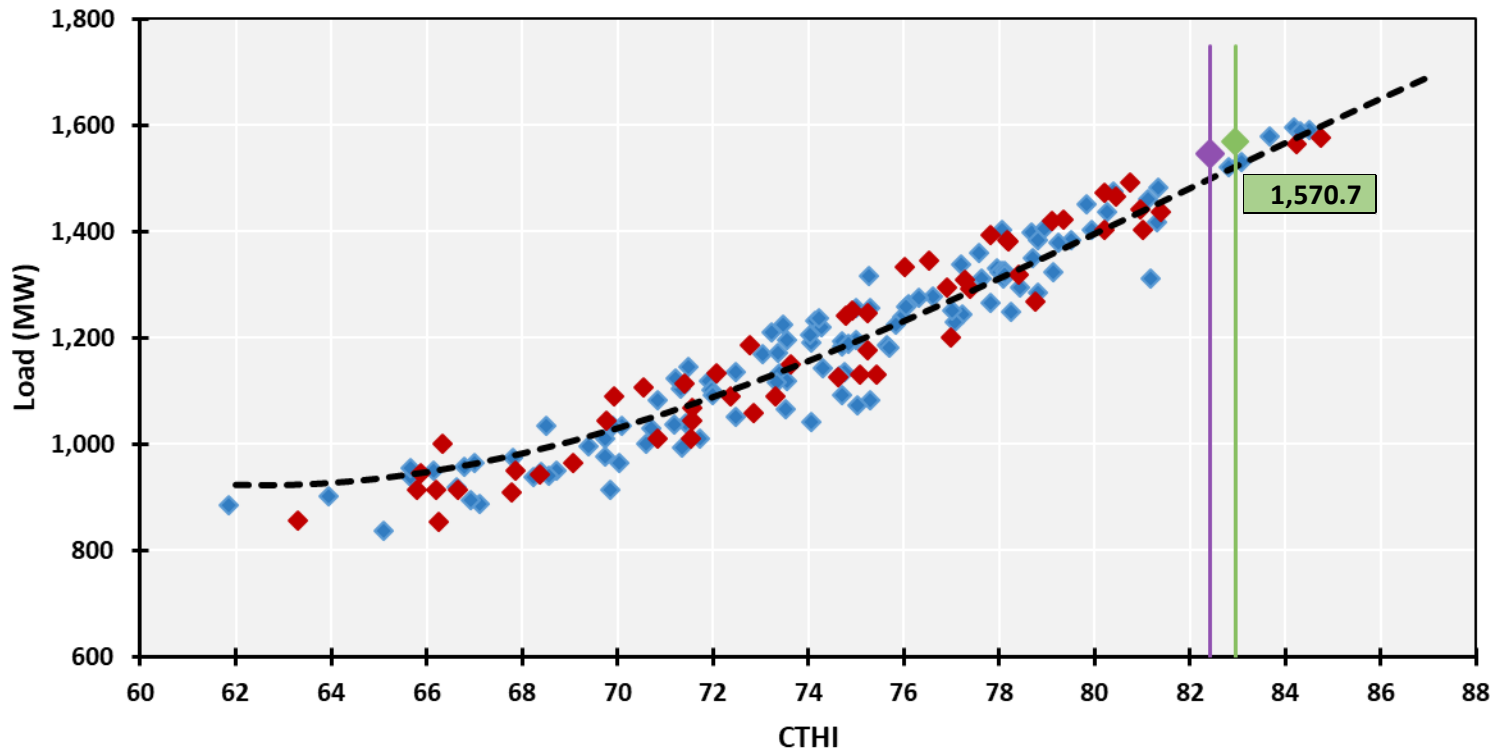
NYSEG 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	58532.67	15892.44	3.68	0.05%
CTHI	-2336.00	648.80	-3.60	0.07%
CTHI_2	31.37	8.80	3.56	0.08%
CTHI_3	-0.14	0.04	-3.43	0.12%
Fri	-42.75	17.23	-2.48	1.63%
Seasonal_Temperature_Trend	1.46	0.26	5.58	0.00%

<i>Regression Statistics</i>	
Multiple R	99.0%
R Square	98.1%
Adjusted R Square	97.9%
Standard Error	52
Observations	59



RG&E Pooled Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

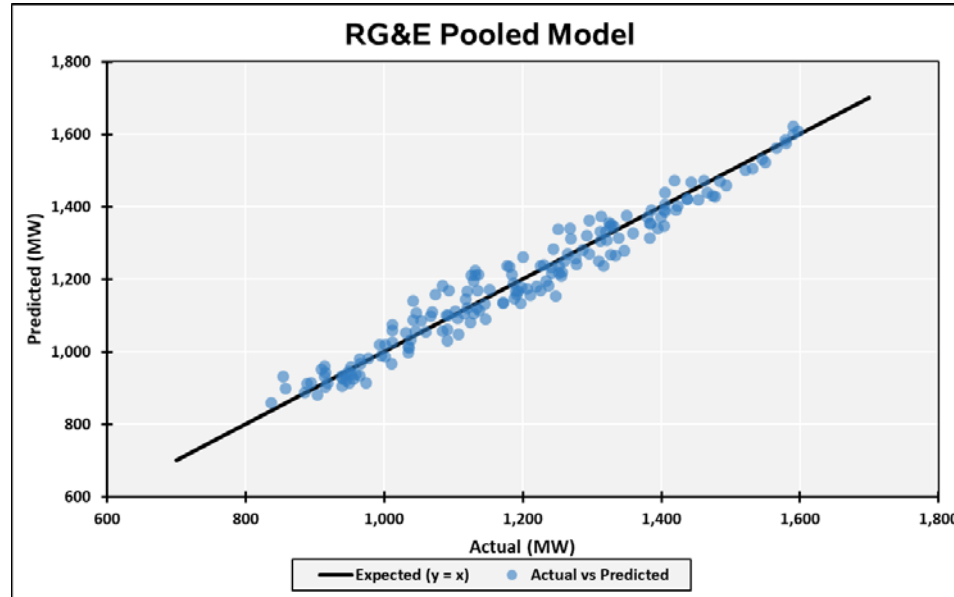
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	1,547.7
2021 CTHI	82.41
Design CTHI	82.95
MW / CTHI	42.9
Weather Adj	23.0
2021 WN CP	1,570.7

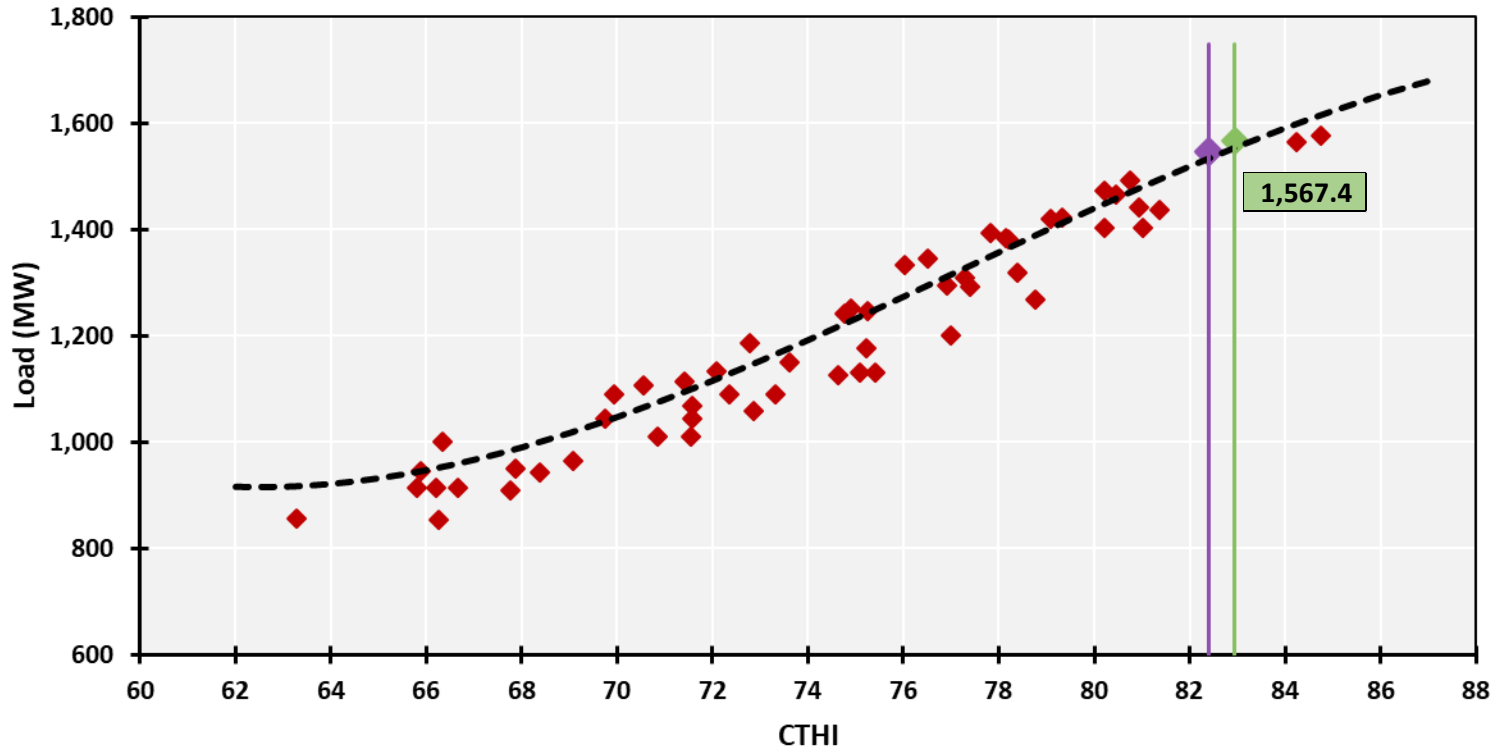
RG&E Pooled Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	19140.26	7010.27	2.73	0.70%
CTHI	-733.82	285.57	-2.57	1.11%
CTHI_2	9.50	3.87	2.46	1.51%
CTHI_3	-0.04	0.02	-2.22	2.76%
Y2019	-17.89	6.71	-2.67	0.84%
Seasonal_Temperature_Trend	0.35	0.19	1.80	7.33%
Jun	-40.74	10.72	-3.80	0.02%
Fri	-31.45	7.81	-4.03	0.01%

<i>Regression Statistics</i>	
Multiple R	97.7%
R Square	95.5%
Adjusted R Square	95.4%
Standard Error	41
Observations	170



RG&E 2021 Model



Design condition is 50th percentile.

Purple dot shows 2021 coincident peak.

Green dot shows 2021 weather normalized coincident peak.

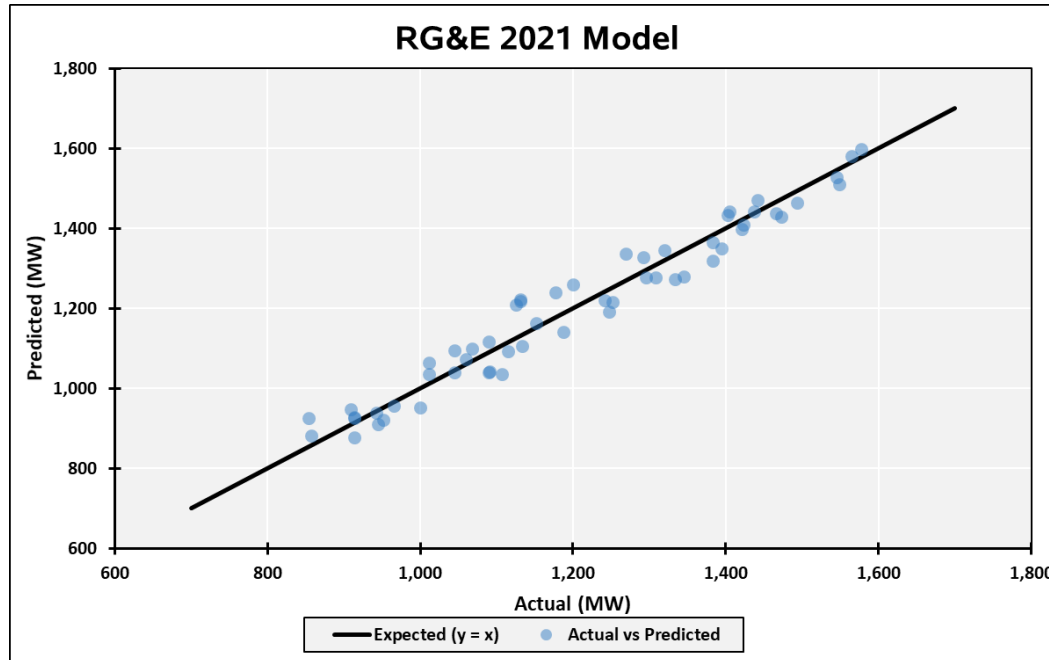
Dotted black line shows model fit during 2021 late July design conditions.

2021 CP	1,547.7
2021 CTHI	82.41
Design CTHI	82.95
MW / CTHI	36.7
Weather Adj	19.7
2021 WN CP	1,567.4

RG&E 2021 Model

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	27117.37	14370.81	1.89	6.50%
CTHI	-1085.74	583.40	-1.86	6.86%
CTHI_2	14.57	7.87	1.85	7.01%
CTHI_3	-0.06	0.04	-1.78	8.17%
Seasonal_Temperature_Trend	0.66	0.22	3.01	0.41%
Fri	-29.73	15.15	-1.96	5.52%

<i>Regression Statistics</i>	
Multiple R	97.8%
R Square	95.6%
Adjusted R Square	95.1%
Standard Error	45
Observations	56



Locality Coincident and Non-Coincident Peak Ratios

NCP / CP Ratio Calculation Methodology

1. Calculate 15-year Average

- I. Calculate the average locality peak of prior 15 years
- II. Calculate the average locality load during NYCA peak load hour
- III. Calculate average NCP/CP ratio using the information from steps (I) and (II)

2. Detect Outliers*

- I. Use average ratio calculated in step 1 and standard deviation of last 15 years' ratio

3. Repeat Step 1 excluding outlier years' data

* Outlier years are defined as those that have a NCP to CP ratio of over 1.65 standard deviations above the historical average, representing the upper 5% tail of the distribution. Outlier years are taken out of the ratio calculation.

NCP / CP Ratio – Locality J

Zone J Locality Peak Ratio									
Year	Zone J Date	J Hr Beg	NCP MW	NYCA Date	NYCA Hr Beg	CP MW	Delta	Ratio	Outlier
2007	8/8/2007	16	10,919	8/8/2007	16	10,919	0	1.0000	FALSE
2008	7/18/2008	16	10,476	7/18/2008	15	10,414	62	1.0060	FALSE
2009	8/21/2009	15	10,656	8/17/2009	15	10,387	269	1.0259	FALSE
2010	7/6/2010	16	11,213	7/6/2010	16	11,213	0	1.0000	FALSE
2011	7/22/2011	11	11,399	7/22/2011	15	11,319	80	1.0071	FALSE
2012	7/18/2012	12	11,138	7/17/2012	16	10,721	417	1.0389	FALSE
2013	7/19/2013	16	11,411	7/19/2013	16	11,411	0	1.0000	FALSE
2014	7/8/2014	16	10,094	7/1/2014	16	9,565	529	1.0553	TRUE
2015	7/20/2015	16	10,598	7/29/2015	16	10,386	212	1.0204	FALSE
2016	8/11/2016	16	10,966	8/11/2016	16	10,966	0	1.0000	FALSE
2017	7/20/2017	16	10,642	7/19/2017	17	10,224	418	1.0409	FALSE
2018	8/29/2018	16	10,878	8/29/2018	15	10,802	76	1.0070	FALSE
2019	7/17/2019	17	10,756	7/29/2019	16	10,199	557	1.0546	TRUE
2020	7/28/2020	14	10,106	7/27/2020	17	9,786	320	1.0327	FALSE
2021	8/27/2021	14	10,046	8/26/2021	16	10,021	25	1.0025	FALSE
Average			10,753			10,556	198	1.0187	
Std Dev								0.0198	
Average (Excluding Outliers)			10,804			10,659		1.0136	

NCP / CP Ratio – Locality K

Zone K Locality Peak Ratio									
Year	Zone K Date	K Hr Beg	NCP MW	NYCA Date	NYCA Hr Beg	CP MW	Delta	Ratio	Outlier
2007	8/8/2007	17	5,384	8/8/2007	16	5,363	21	1.0039	FALSE
2008	7/18/2008	16	5,201	7/18/2008	15	5,181	20	1.0039	FALSE
2009	8/21/2009	15	5,191	8/17/2009	15	5,060	131	1.0259	FALSE
2010	7/6/2010	16	5,822	7/6/2010	16	5,822	0	1.0000	FALSE
2011	7/22/2011	15	5,914	7/22/2011	15	5,914	0	1.0000	FALSE
2012	7/18/2012	13	5,456	7/17/2012	16	5,111	345	1.0675	TRUE
2013	7/18/2013	16	5,764	7/19/2013	16	5,673	91	1.0160	FALSE
2014	7/3/2014	16	4,868	7/1/2014	16	4,579	289	1.0632	TRUE
2015	7/20/2015	16	5,247	7/29/2015	16	5,136	111	1.0216	FALSE
2016	8/12/2016	16	5,411	8/11/2016	16	5,190	221	1.0426	FALSE
2017	7/20/2017	16	5,137	7/19/2017	17	4,989	148	1.0297	FALSE
2018	8/29/2018	16	5,411	8/29/2018	15	5,359	52	1.0097	FALSE
2019	7/17/2019	16	5,057	7/29/2019	16	4,947	110	1.0222	FALSE
2020	7/20/2020	17	5,433	7/27/2020	17	5,344	89	1.0167	FALSE
2021	8/13/2021	17	5,138	8/26/2021	16	5,018	119	1.0237	FALSE
Average			5,362			5,246	117	1.0222	
Std Dev								0.0201	
Average (Excluding Outliers)			5,393			5,307		1.0161	

NCP / CP Ratio – Locality G-to-J

G-to-J Peak Ratio									
Year	G-to-J Date	G-to-J Hr Beg	NCP MW	NYCA Date	NYCA Hr Beg	CP MW	Delta	Ratio	Outlier
2007	8/8/2007	16	15,253	8/8/2007	16	15,253	0	1.0000	FALSE
2008	7/18/2008	16	14,603	7/18/2008	15	14,538	65	1.0045	FALSE
2009	8/21/2009	14	14,585	8/17/2009	15	14,388	197	1.0137	FALSE
2010	7/6/2010	16	15,809	7/6/2010	16	15,809	0	1.0000	FALSE
2011	7/22/2011	15	15,972	7/22/2011	15	15,972	0	1.0000	FALSE
2012	7/18/2012	13	15,420	7/17/2012	16	14,993	427	1.0285	FALSE
2013	7/19/2013	16	15,981	7/19/2013	16	15,981	0	1.0000	FALSE
2014	7/8/2014	16	13,959	7/1/2014	16	13,374	585	1.0437	TRUE
2015	7/20/2015	16	14,708	7/29/2015	16	14,440	268	1.0186	FALSE
2016	8/11/2016	16	15,067	8/11/2016	16	15,067	0	1.0000	FALSE
2017	7/20/2017	16	14,678	7/19/2017	17	14,163	515	1.0364	FALSE
2018	8/29/2018	16	15,033	8/29/2018	15	14,943	90	1.0060	FALSE
2019	7/17/2019	15	14,602	7/29/2019	16	14,157	445	1.0314	FALSE
2020	7/28/2020	14	14,077	7/27/2020	17	13,911	166	1.0119	FALSE
2021	8/12/2021	16	14,078	8/26/2021	16	14,034	44	1.0032	FALSE
Average			14,922			14,735	187	1.0127	
Std Dev								0.0145	
Average (Excluding Outliers)			14,990			14,832		1.0107	

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

