

Preliminary ISO-NE Annual Energy & Seasonal Peak Forecast 2014-2023

NEPOOL Load Forecasting Committee



ISO Staff

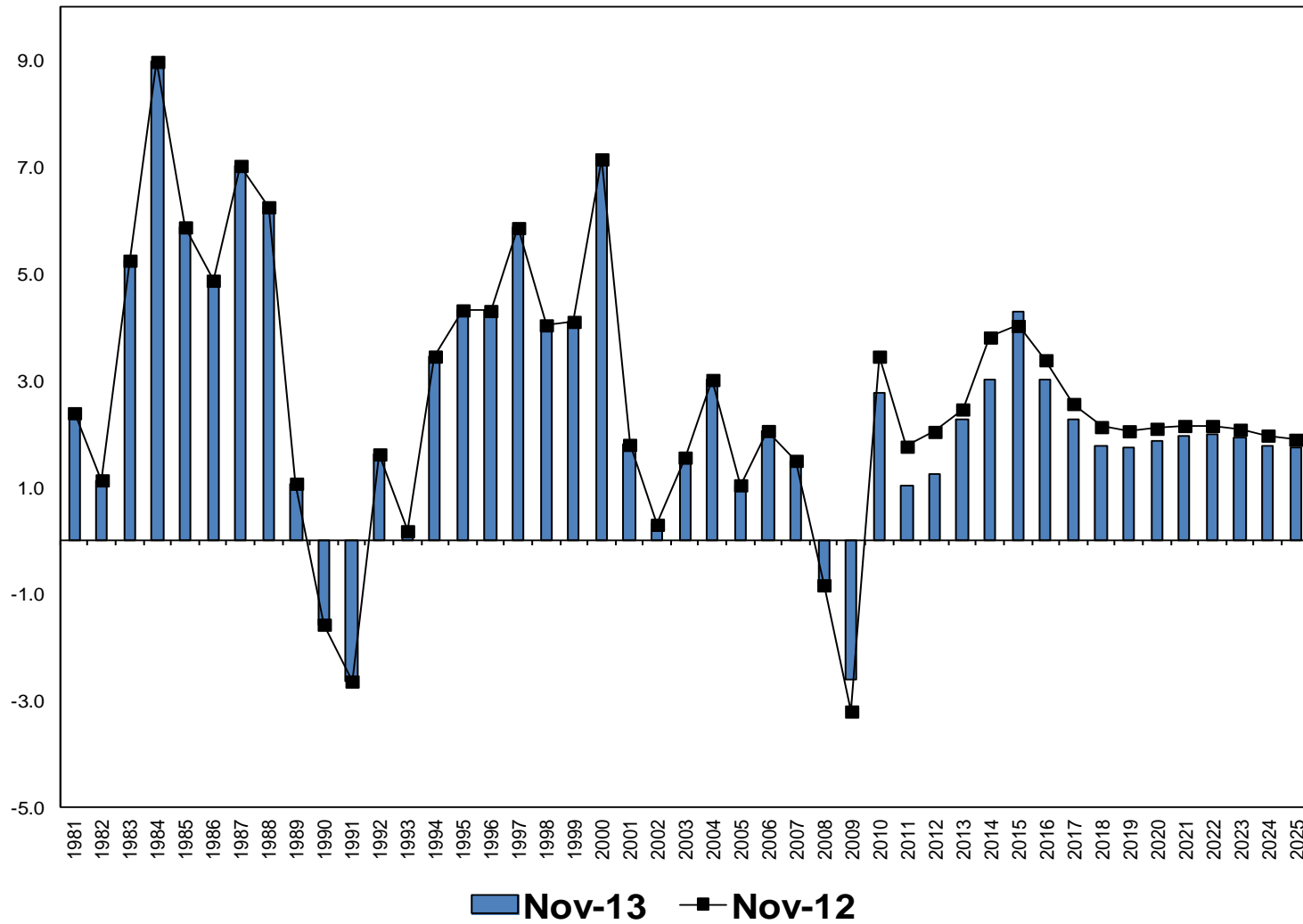
DAVID EHRLICH, SUPERVISOR LOAD FORECASTING



Notes

- Updated Moody's economic forecast from Nov2012 to Nov2013
- Re-estimated econometric models based on actual energy and daily peaks that have been reconstituted for OP4 and passive demand resources
- For monthly peak models energy driver is based on latest 12 months of energy (not the calendar year energy) and the trend in the annual energy forecast
- The 2013 EE forecast was used to calculate the "net forecast" as the 2014 EE forecast is still preliminary. See <http://www.iso-ne.com/eefwg>
- DG/Solar forecast still within stakeholder process - see http://www.iso-ne.com/committees/comm_wkgrps/other/distributed_generation_frcst/index.html
- Annual energy and seasonal peak models and plots
 - The 2014CELT forecast is similar to but has slightly lower growth rates than the 2013CELT forecast
- Forecast difference table
- 2014 CELT forecast table
- 2013 CELT forecast table
- 2013 summer and 2013/2014 winter peak days

**MOODY'S 2013 VS 2012 FORECASTS
NEW ENGLAND REAL GROSS REGIONAL PRODUCT ANNUAL PERCENT CHANGE**



2014 CELT ISO-NE Annual Energy Model

Dependent Variable: LOG(NEL_PDR_NE)

Method: Least Squares

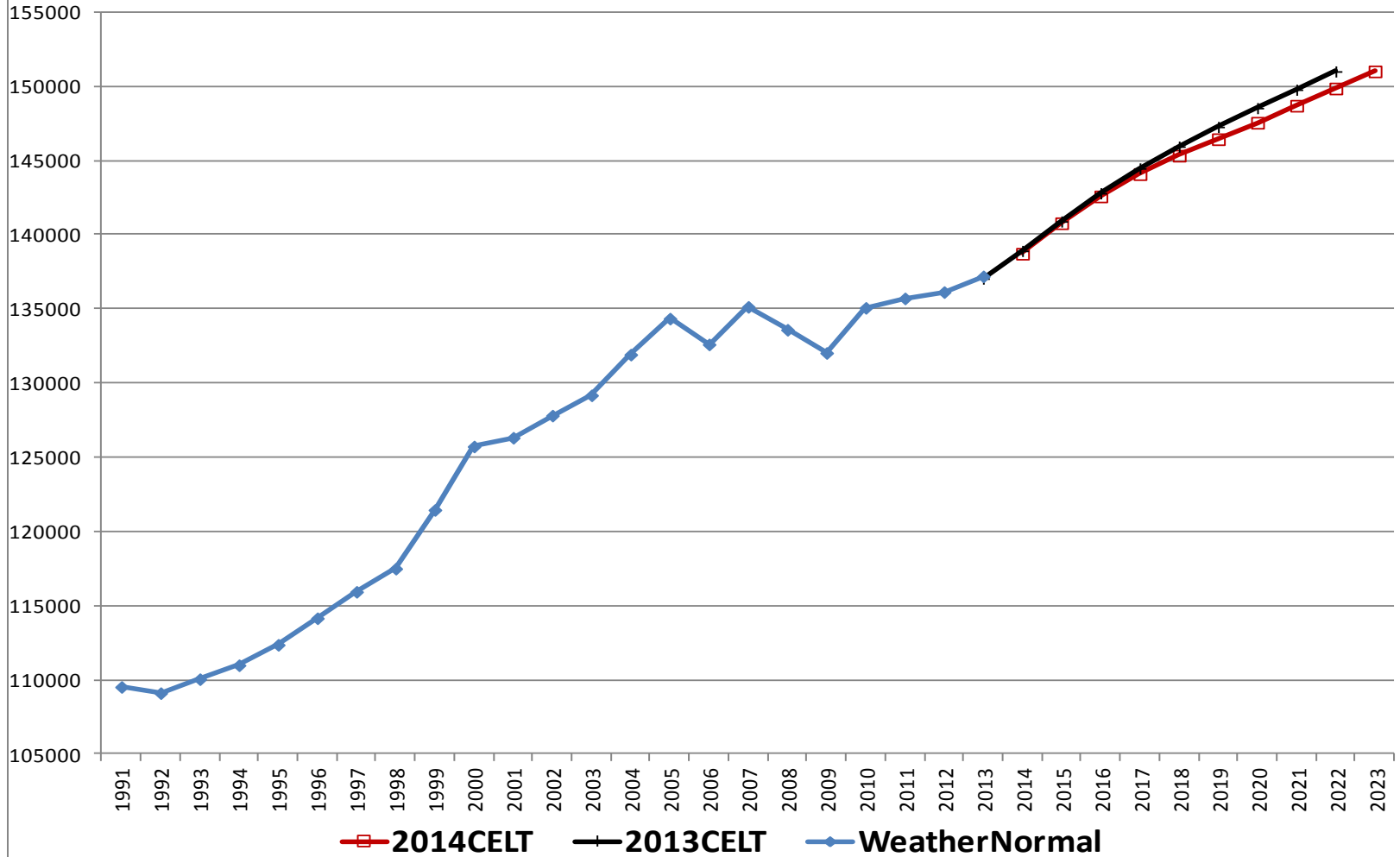
Sample: 1988 2012

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.7239	0.5390	5.0534	0.0001
LOG(NEL_PDR_NE(-1))	0.3783	0.0775	4.8791	0.0002
LOG(RPER_NE)	-0.0702	0.0248	-2.8258	0.0122
LOG(RGSP_NE)	0.2564	0.0396	6.4751	0.0000
LOG(CDD_NE)	0.0227	0.0072	3.1337	0.0064
LOG(HDD_NE)	0.1391	0.0245	5.6677	0.0000
(YR2011_YR2025)*LOG(CDD_NE)	0.0039	0.0012	3.3416	0.0041
YR2005_YR2008*LOG(CDD_NE)	0.0037	0.0011	3.2981	0.0045
YR2010*LOG(CDD_NE)	0.0071	0.0015	4.6325	0.0003
R-squared	0.9960	Mean dependent var		11.7160
Adjusted R-squared	0.9940	S.D. dependent var		0.0868
S.E. of regression	0.0067	Akaike info criterion		-6.8966
Sum squared resid	0.0007	Schwarz criterion		-6.4578
Log likelihood	95.2069	Hannan-Quinn criter.		-6.7749
F-statistic	499.8267	Durbin-Watson stat		2.3302
Prob(F-statistic)	0.0000			

ISO-NE Annual Energy Analysis (GWh)

History 1980-2013 2013CELT 2013-2022 2014CELT 2014-2023



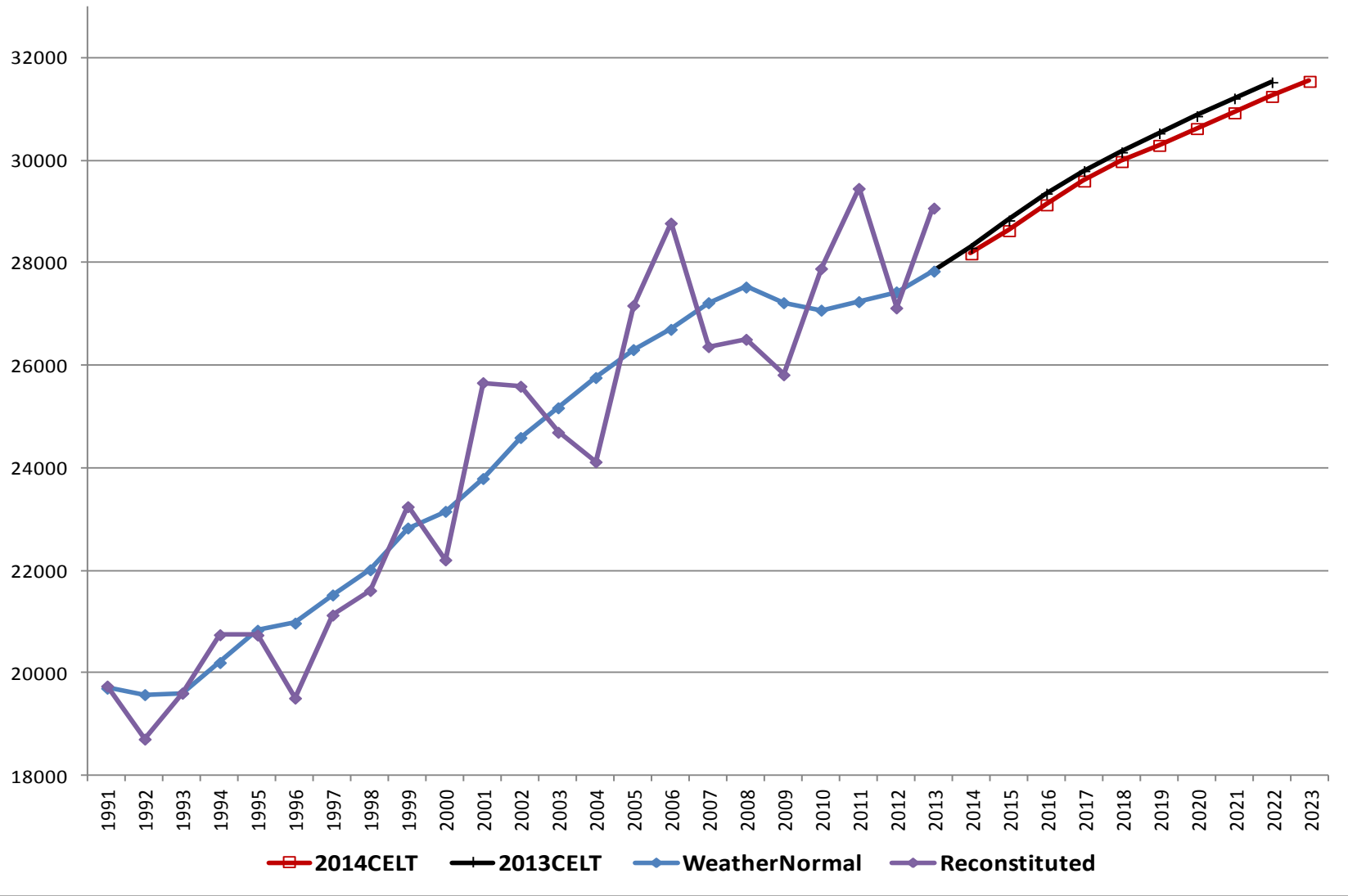
ISO-NE Subtracts Impacts of Federal Efficiency Standards (EISA07) From Energy Forecast (GWh)

	Forecast-Standards	Standards	Forecast			
2014	138723	1696	140419			
2015	140776	1968	142744			
2016	142584	2149	144733			
2017	144084	2254	146338			
2018	145331	2288	147619			
2019	146441	2322	148763			
2020	147551	2353	149904			
2021	148697	2395	151092			
2022	149859	2450	152309			
2023	151012	2506	153518			

2104CELT ISO-NE Summer Peak Model				
Dependent Variable: PEAK_NE				
Method: Least Squares				
Sample: 7/01/2000 7/27/2005 7/29/2005 8/06/2007 7/01/2008 8/07/2013 IF				
MONTH=7 OR (MONTH=8 AND DAY<=7) AND YEAR>2000				
Included observations: 492				
Convergence achieved after 10 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1370.678000	2394.5460	0.5724	0.5673
NEL_MA_NE	0.100512	0.0182	5.5175	0.0000
(WTHI_NE-55)^2	14.801910	0.7436	19.9068	0.0000
TIME*(WTHI_NE-55)^2	0.284680	0.0449	6.3418	0.0000
WTHI_79	-528.223200	151.3300	-3.4905	0.0005
WEEKEND*(WTHI_NE-55)^2	-10.406410	0.9194	-11.3190	0.0000
JULY_04*(WTHI_NE-55)^2	-3.277674	0.6671	-4.9136	0.0000
WEEKEND*TIME*(WTHI_NE-55)^2	0.236209	0.0531	4.4444	0.0000
HOLIDAY*(WTHI_NE-55)^2	-3.772119	0.6381	-5.9118	0.0000
MONDAY	219.757500	83.1768	2.6421	0.0085
AR(1)	0.372101	0.0461	8.0743	0.0000
AR(2)	-0.084923	0.0454	-1.8696	0.0622
R-squared	0.954082	Mean dependent var		20831
Adjusted R-squared	0.953030	S.D. dependent var		3021
S.E. of regression	654.720400	Akaike info criterion		15.8304
Sum squared resid	2.06E+08	Schwarz criterion		15.9328
Log likelihood	-3882.274000	Hannan-Quinn criter.		15.8706
F-statistic	906.680500	Durbin-Watson stat		2.0020
Prob(F-statistic)	0.000000			

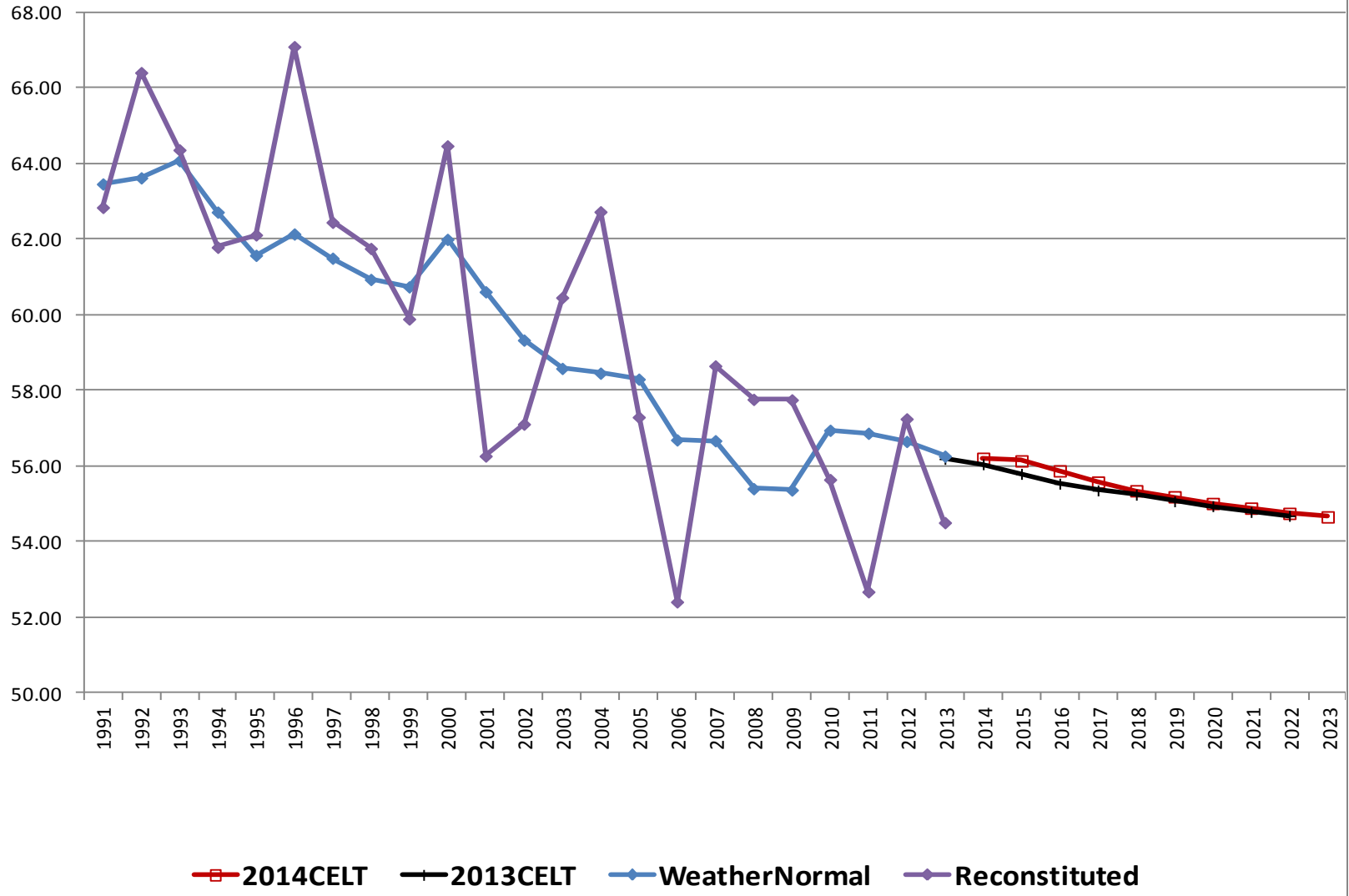
ISO-NE 50/50 Summer Peak Analysis (MW)

History 1980-2013 2013CELT 2013-2022 2014CELT 2014-2023



ISO-NE 50/50 Summer Peak Load Factor Anlysis

History 1980-2013 2013CELT 2013-22 2014CELT 2014-2023



2014 CELT ISO-NE Winter Peak Model

Dependent Variable: PEAK_NE

Method: Least Squares

Date: 02/06/14 Time: 11:26

Sample: 12/01/2002 12/26/2003 12/28/2003 12/11/2008 12/15/2008 12/28
/2009 12/30/2009 12/26/2011 12/28/2011 12/31/2013 IF MONTH=12

OR MONTH=1

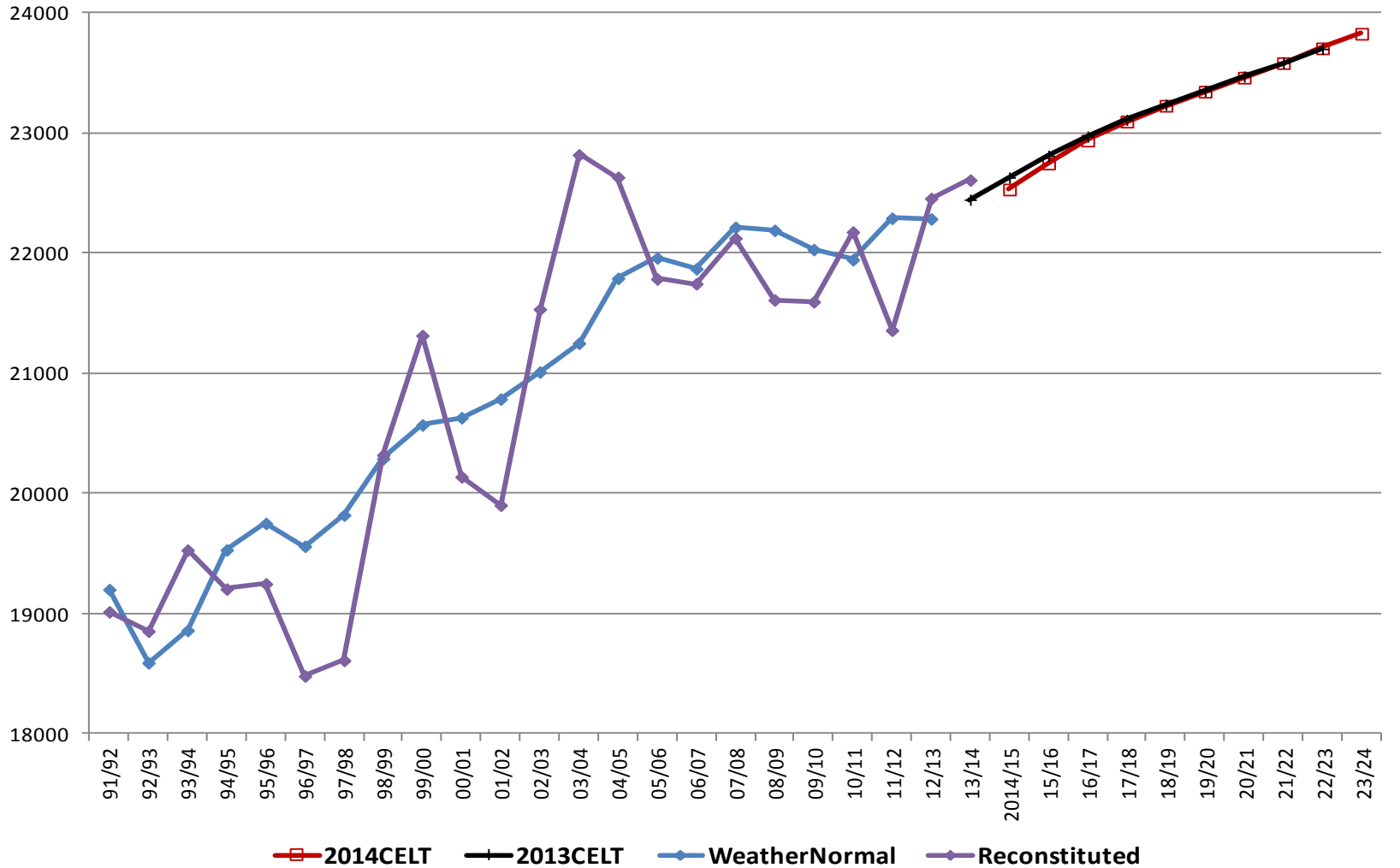
Included observations: 707

Convergence achieved after 14 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4792.6590	1384.0120	3.4629	0.0006
NEL_MA_NE	0.1060	0.0103	10.2629	0.0000
(65-DB_NE)^2	1.2139	0.0399	30.4191	0.0000
JANUARY*(65-DB_NE)^2	-0.1937	0.0526	-3.6823	0.0002
JANUARY	-328.5187	86.1311	-3.8142	0.0001
X_EVE	-708.7635	106.9280	-6.6284	0.0000
CHRISTMAS	-2799.8420	79.9352	-35.0264	0.0000
NEW_YEAR	-1768.1420	114.1332	-15.4919	0.0000
DJEHOL*DECEMBER	-1297.8840	82.5313	-15.7260	0.0000
FRIDAY	-497.6635	34.7158	-14.3354	0.0000
SAT	-1644.8450	43.1025	-38.1613	0.0000
SUN	-1347.6460	51.7400	-26.0465	0.0000
MLK*YR2006	685.8312	46.4919	14.7516	0.0000
YR2009*DECEMBER	331.4545	89.9071	3.6866	0.0002
YR2010*JANUARY	441.9142	127.7016	3.4605	0.0006
YR2010*DECEMBER	175.9569	78.7167	2.2353	0.0257
YR2013*DECEMBER	484.1354	87.7837	5.5151	0.0000
YR2006*JANUARY	-549.7560	143.7109	-3.8254	0.0001
YR2008*JANUARY	-194.3633	142.3692	-1.3652	0.1726
YR2013*JANUARY	494.9571	87.5125	5.6558	0.0000
X_EVE*YR2008	947.3616	120.4928	7.8624	0.0000
AR(1)	0.4086	0.0362	11.2774	0.0000
AR(4)	-0.0381	0.0209	-1.8254	0.0684
AR(5)	0.0888	0.0196	4.5340	0.0000
AR(6)	0.0570	0.0217	2.6312	0.0087
R-squared	0.9196	Mean dependent var		19479
Adjusted R-squared	0.9168	S.D. dependent var		1251
S.E. of regression	360.7812	Akaike info criterion		14.6491
Sum squared resid	8.88E+07	Schwarz criterion		14.8104
Log likelihood	-5153.471	Hannan-Quinn criter.		14.7115
F-statistic	325.2329	Durbin-Watson stat		2.0319
Prob(F-statistic)	0			

ISO-NE 50/50 Winter Peak Analysis (MW)

History 1980-2013 2013CELT 2013-2022 2014CELT 2014-2023



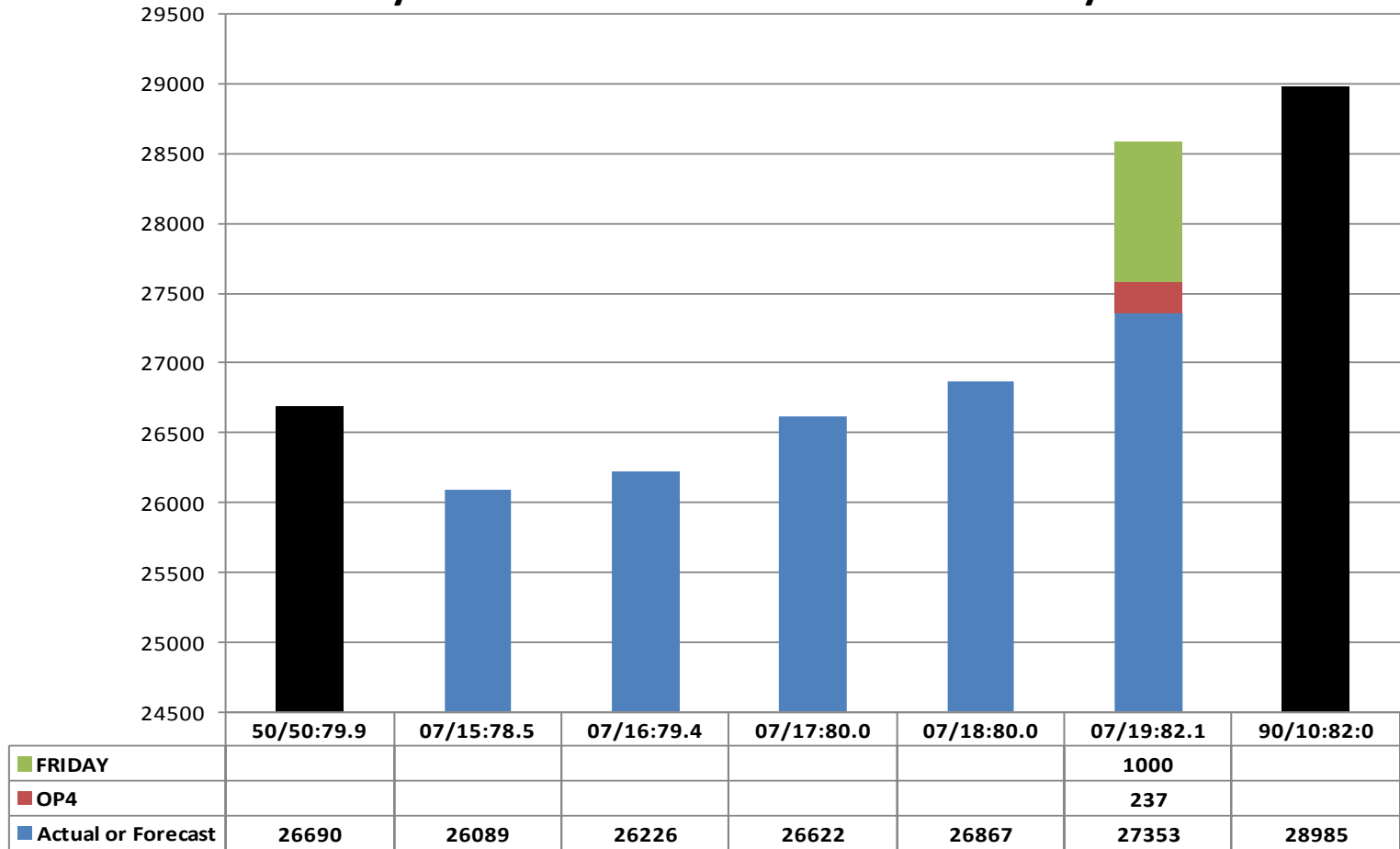
Forecast Comparison Table: 2014CELT and 2013CELT

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2014-22 Average Change	2014-22 Growth Rate
50/50 Summer Peak (MW)												
2014 CELT	28173	28625	29129	29593	29973	30289	30617	30924	31244	31538	384	1.3
2013 CELT	28290	28825	29350	29790	30155	30525	30860	31205	31520		404	1.4
Difference	-117	-200	-221	-197	-182	-236	-243	-281	-276			
90/10 Summer Peak (MW)												
2014 CELT	30475	30958	31493	31988	32398	32744	33104	33441	33792	34116	415	1.3
2013 CELT	30620	31185	31740	32210	32615	33010	33380	33755	34105		436	1.4
Difference	-145	-227	-247	-222	-217	-266	-276	-314	-313			
50/50 Winter Peak (MW)												
2014 CELT	22530	22746	22937	23095	23227	23344	23461	23582	23705	23826	147	0.6
2013 CELT	22630	22810	22970	23110	23235	23350	23470	23585	23700		134	0.6
Difference	-100	-64	-33	-15	-8	-6	-9	-3	5			
Energy (GWh)												
2014 CELT	138723	140776	142584	144084	145331	146441	147551	148697	149859	151012	1392	0.9
2013 CELT	138915	140894	142795	144469	145944	147265	148531	149776	151009		1512	0.9
Difference	-192	-118	-211	-385	-613	-824	-980	-1079	-1150			

ISO-NE 2014 CELT & RSP Load Forecast & 2013 Passive Demand Resources															
	Summer	Summer	Summer	Summer	Summer		Winter	Winter	Winter	Winter	Winter		Annual	Energy	Annual
	50/50	90/10	Passive	50/50	90/10		50/50	90/10	Passive	50/50	90/10		CELT	Passive	Energy
	CELT	CELT	Demand	Peak	Peak		CELT	CELT	Demand	Peak	Peak		Energy	Demand	Net PDR
	Peak	Peak	Resource	Net PDR	Net PDR		Peak	Peak	Resource	Net PDR	Net PDR			Resource	
ISO-NE															
2014	28173	30475	1361	26812	29114		22530	23200	1358	21172	21842		138723	7873	130850
2015	28625	30958	1535	27090	29423		22746	23416	1532	21214	21884		140776	9064	131712
2016	29129	31493	1520	27609	29973		22937	23607	1519	21418	22088		142584	9520	133064
2017	29593	31988	1737	27856	30251		23095	23765	1736	21359	22029		144084	11050	133034
2018	29973	32398	1942	28031	30456		23227	23897	1940	21287	21957		145331	12486	132845
2019	30289	32744	2134	28155	30610		23344	24014	2132	21212	21882		146441	13835	132606
2020	30617	33104	2314	28303	30790		23461	24131	2313	21148	21818		147551	15103	132448
2021	30924	33441	2484	28440	30957		23582	24252	2482	21100	21770		148697	16291	132406
2022	31244	33792	2642	28602	31150		23705	24375	2640	21065	21735		149859	17406	132453
2023	31538	34116	2788	28750	31328		23826	24496	2786	21040	21710		151012	18368	132644
CAGR	1.3	1.3		0.8	0.8		0.6	0.6		-0.1	-0.1		0.9		0.2

2013 CELT & RSP Forecast Detail: ISO-NE Control Area														
	Summer	Summer	Summer	Summer	Summer	Winter	Winter	Winter	Winter	Winter	Annual	Energy	Annual	
	50/50	90/10	Passive	50/50	90/10	50/50	90/10	Passive	50/50	90/10	CELT	Passive	Energy	
	CELT	CELT	Demand	Peak	Peak	CELT	CELT	Demand	Peak	Peak	Energy	Demand	Net PDR	
	Peak	Peak	Resource	Net PDR	Net PDR	Peak	Peak	Resource	Net PDR	Net PDR		Resource		
ISO-NE														
2013	27840	30135	1150	26690	28985	22445	23080	1146	21299	21934	137045	6635	130410	
2014	28290	30620	1361	26929	29259	22630	23255	1358	21272	21897	138910	7873	131037	
2015	28825	31185	1535	27290	29650	22810	23440	1532	21278	21908	140895	9064	131831	
2016	29350	31740	1520	27830	30220	22970	23620	1519	21451	22101	142795	9520	133274	
2017	29790	32210	1737	28053	30473	23110	23780	1736	21374	22044	144470	11050	133420	
2018	30155	32615	1942	28213	30673	23235	23920	1940	21295	21980	145940	12486	133454	
2019	30525	33010	2134	28391	30876	23350	24045	2132	21218	21913	147265	13835	133430	
2020	30860	33380	2314	28546	31066	23470	24160	2313	21157	21847	148535	15103	133432	
2021	31205	33755	2484	28721	31271	23585	24280	2482	21103	21798	149775	16291	133484	
2022	31520	34105	2642	28878	31463	23700	24395	2640	21060	21755	151005	17406	133599	
CAGR	1.4	1.4		0.9	0.9	0.6	0.6		-0.1	-0.1	1.1		0.3	

July 15-19, 2013 Daily Peaks 2013 CELT 50/50 and 90/10 ISO-NE Forecasts Net of EE July 19 Reconstituted for OP4 DR & Friday Effect



Month/Day : Weather Conditions (Temperature/Humidity Index)

2013/2014 Selected Winter Daily Peaks (MW) 2013 CELT 10/90, 50/50 , and 90/10 ISO-NE Forecasts Net of EE

