LONG RANGE LOAD FORECASTING

SCAMPS 2016

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Why Perform Load Forecasts?

- Obvious Answer - To have an accurate projection of future loads for your work purposes.

Two Types of Load Forecasts

- Short Range
  - Typically 24 hours
  - Used for load management decisions
- Long Range
  - Typically 10 to 15 years
  - Used to plan system expansions, project revenues, perform cost of service and rate studies

Today's Presentation will Focus on Long Range Load Forecasting Techniques

Two Key Elements

- Prepare the forecast based on small “key” load growth components
- Prepare analysis packets so down the road the Forecast can be easily updated

Smaller "Key" Components

- Perform Work for each class of customer separately – Residential, Commercial, Industrial, City, Utility, Schools, Churches, Special Customers (i.e. Hospitals), Area Lights, etc.
- **Separate historical data for these customer classes into two components:**
  - **Number of customers**
  - **Average energy usage per customer**
- Analyze number of customers with consideration to:
  - Area saturation
  - Changing demographics
  - Possible annexations
  - Re-zoning
  - Consider an overlaying area grid
- Analyze Avg. kWH/Cust with consideration to:
  - Weather – HDD/CDD
  - Economic Conditions – GDP
  - Relative Cost of Energy

Forecasts Aren't Perfect

- As you head into the forecast work, know that <u>it is very unlikely</u> that future loads will develop exactly as you have forecasted them – but don't be discouraged.
  - Unexpected changes in growth driving parameters will occur
  - However, by using small key components, you can update, reassemble, and you are back in business

Classical Forecasting Technique

- Regression Analysis
  - Simplest and perhaps the oldest model
  - Least-Squared-Error regression curve fit of historical data versus year extrapolated into the future
  - Mathematical equation that fits among the data points with the least squared error
  - Two common equations
    - Constant Growth $Y_G = A * B^{\wedge x}$
    - Straight Line Growth $Y_{SL} = m * x + b$
  - You get the data, Excel will do the work for you

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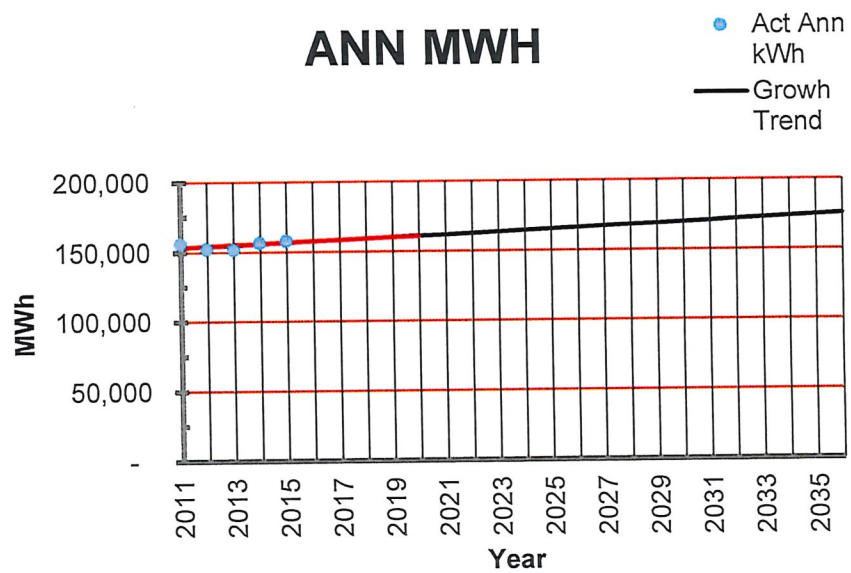
Example Regression Forecast

			$Y_G = a * b^{\wedge x}$	$Y_{SL} = m * x + b$	
		b	1.00540	838	m
	x	a	152,343	152,328	b

Yr.	Yr. Count	Act.MWh	Gr. Trend MWh	Lin. Trend MWh
2011	1	155,640	153,166	153,166
2012	2	152,418	153,993	154,004
2013	3	151,857	154,824	154,842
2014	4	156,507	155,661	155,680
2015	5	157,786	156,501	156,518
2016	6		157,346	157,356
2017	7		158,196	158,194
2018	8		159,050	159,032
2019	9		159,909	159,870
2020	10		160,773	160,708
2021	11		161,641	161,546
2022	12		162,514	162,384
2023	13		163,392	163,222
2024	14		164,274	164,060
2025	15		165,161	164,898
2026	16		166,053	165,736
2027	17		166,950	166,575
2028	18		167,852	167,413
2029	19		168,758	168,251
2030	20		169,669	169,089
2031	21		170,586	169,927
2032	22		171,507	170,765
2033	23		172,433	171,603
2034	24		173,364	172,441
2035	25		174,301	173,279
2036	26		175,242	174,117



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The 64 Thousand Dollar Question is, “What are the reasons to expect the trend growth will continue into the future, and for how long?”

- The fact is, time (years) is not the reason
- We need to examine what the parameters are that impact load growth

Load Growth Parameters

- Number of customers
  - Area Saturation
  - Re-Zoning
  - Annexation
- Average Load per Customer
  - Weather (HDD and CDD)
  - Economic Conditions – Gross Domestic Product
    - Productivity
    - New products using electric energy
  - Relative Cost of Power

Regression Analysis Considering Multiple Independent Variables

- The two example regression analyses were for one dependent variable, Y, and one independent variable, x, which was Time
- Regression analyses can be performed considering multiple independent variables such as:
  - Heating Degree Days
  - Cooling Degree Days
  - Gross Domestic Product
  - Relative Cost of Energy, $/kWh
  - Unemployment
- Excel will do this work for you also

Example of Residential Forecast

Number of Residential Customers

Reg Res	b	1.00012	1.00065	0.99951
R	a	2,854	2,858	

Mo/Yr	Mo. Count	No. Cust.	Per Unit of Avg. No. Cust.	Trend Mo. No. Cust	Forecast Mo. No. Cust
Jan-11	1	2,850	0.99474	2,854	
Feb-11	2	2,862	0.99892	2,855	
Mar-11	3	2,877	1.00416	2,855	
Apr-11	4	2,872	1.00241	2,856	
May-11	5	2,861	0.99857	2,856	
Jun-11	6	2,872	1.00241	2,856	
Jul-11	7	2,853	0.99578	2,857	
Aug-11	8	2,878	1.00451	2,857	
Sep-11	9	2,880	1.00521	2,857	
Oct-11	10	2,861	0.99857	2,858	
Nov-11	11	2,862	0.99892	2,858	
Dec-11	12	2,853	0.99578	2,858	
Jan-12	13	2,845	0.99423	2,859	
Feb-12	14	2,844	0.99388	2,859	
Mar-12	15	2,868	1.00227	2,859	
Apr-12	16	2,864	1.00087	2,860	
May-12	17	2,858	0.99878	2,860	
Jun-12	18	2,868	1.00227	2,860	
Jul-12	19	2,876	1.00507	2,861	
Aug-12	20	2,868	1.00227	2,861	
Sep-12	21	2,874	1.00437	2,861	
Oct-12	22	2,860	0.99948	2,862	
Nov-12	23	2,864	1.00087	2,862	
Dec-12	24	2,849	0.99563	2,862	
Jan-13	25	2,832	0.99131	2,863	
Feb-13	26	2,846	0.99621	2,863	

Chart Mo.	Typ Mo. p.u. of Ann Avg	Yr. Count
Jan	0.99703	1
Feb	0.99698	2
Mar	1.00068	3
Apr	0.99970	4
May	0.99872	5
Jun	0.99998	6
Jul	1.00033	7
Aug	1.00305	8
Sep	1.00221	9
Oct	1.00228	10
Nov	1.00158	11
Dec	0.99879	12
	12.00132	13
		14
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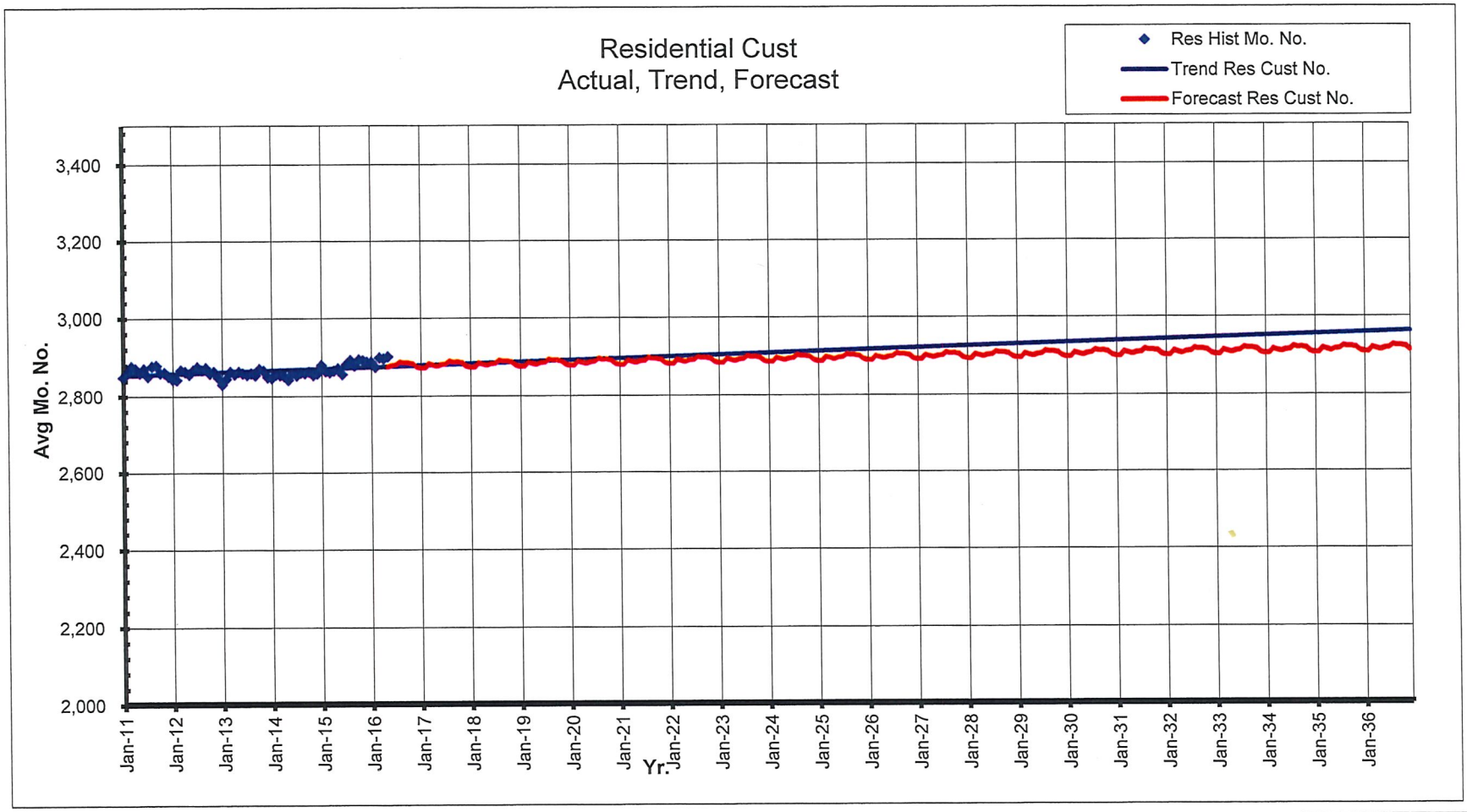
		25
		26

Chart Yr.	Ann. Avg. No. Cust.	Trend Ann Avg No. Cust	Forecast Avg No. Cust.
2011	2,865	2,860	
2012	2,862	2,861	
2013	2,857	2,863	
2014	2,855	2,865	2,855
2015	2,878	2,867	2,878
2016		2,869	2,879
2017		2,871	2,881
2018		2,873	2,883
2019		2,874	2,885
2020		2,876	2,887
2021		2,878	2,889
2022		2,880	2,891
2023		2,882	2,893
2024		2,884	2,894
2025		2,886	2,896
2026		2,888	2,898
2027		2,890	2,900
2028		2,891	2,902
2029		2,893	2,904
2030		2,895	2,906
2031		2,897	2,908
2032		2,899	2,910
2033		2,901	2,911
2034		2,903	2,913
2035		2,905	2,915
2036		2,907	2,917

Chart of No. Res Cust. Forecast



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Residential kWh/Cust. Forecast

Reg Res				b	1.00012										1.000281556	0.027499445	1.2278833	1.16217	265.46204
R				a	2,854									m5	m4	m3	m2	m1	b
Mo/Yr	Mo. Count	No. Cust.	Per Unit of Avg. No. Cust.	Trend Mo. No. Cust	Forecast Mo. No. Cust	Energy - kWh	Energy/Cust - kWh	HDD p.u.	CDD p.u.	Elec Cost/kWh - 2009 $	US Mo. Productivity - 2009 $	Oconee Co. Employment - %	Trend Energy/Cust - kWh	Act Ann kWh/Cust	Trend Ann kWh/Cust			
Jan-11	1	2,850	0.99474	2,854		3,202,128	1,124	3.189	0.000	$0.11333	$ 4,413	88.88%	992					
Feb-11	2	2,862	0.99892	2,855		2,854,100	997	1.882	0.000	$0.11333	$ 4,372	89.05%	806					
Mar-11	3	2,877	1.00416	2,855		2,010,950	699	1.465	0.099	$0.10759	$ 4,310	89.90%	775					
Apr-11	4	2,872	1.00241	2,856		2,059,771	717	0.398	0.305	$0.10942	$ 4,316	90.22%	685					
May-11	5	2,861	0.99857	2,856		1,934,791	676	0.104	1.197	$0.11000	$ 4,290	89.75%	780					
Jun-11	6	2,872	1.00241	2,856		2,872,422	1,000	0.000	3.178	$0.11014	$ 4,319	88.99%	1,162					
Jul-11	7	2,853	0.99578	2,857		3,852,782	1,350	0.000	3.948	$0.10100	$ 4,353	88.72%	1,420					
Aug-11	8	2,878	1.00451	2,857		3,944,798	1,371	0.000	3.636	$0.10051	$ 4,327	89.41%	1,324					
Sep-11	9	2,880	1.00521	2,857		3,728,175	1,295	0.000	1.684	$0.10152	$ 4,300	89.97%	877					
Oct-11	10	2,861	0.99857	2,858		2,060,989	720	0.773	0.152	$0.10140	$ 4,348	90.32%	729					
Nov-11	11	2,862	0.99892	2,858		1,888,224	660	1.430	0.000	$0.10692	$ 4,332	90.56%	762					
Dec-11	12	2,853	0.99578	2,858		2,195,419	770	2.060	0.000	$0.09815	$ 4,342	90.56%	866	11,380	11,177			
Jan-12	13	2,845	0.99423	2,859		2,766,486	972	2.373	0.053	$0.09750	$ 4,404	90.50%	937					
Feb-12	14	2,844	0.99388	2,859		2,333,502	821	1.894	0.000	$0.10044	$ 4,376	90.44%	846					
Mar-12	15	2,868	1.00227	2,859		2,120,783	739	0.673	0.564	$0.10168	$ 4,325	91.46%	776					
Apr-12	16	2,864	1.00087	2,860		1,999,317	698	0.437	0.267	$0.10198	$ 4,307	91.73%	700					
May-12	17	2,858	0.99878	2,860		1,932,993	676	0.054	1.578	$0.10112	$ 4,318	91.07%	871					
Jun-12	18	2,868	1.00227	2,860		2,634,448	919	0.000	2.104	$0.10034	$ 4,344	90.34%	972					
Jul-12	19	2,876	1.00507	2,861		3,677,218	1,279	0.000	3.872	$0.09683	$ 4,410	89.90%	1,442					
Aug-12	20	2,868	1.00227	2,861		3,809,492	1,328	0.000	2.713	$0.09425	$ 4,362	90.32%	1,132					
Sep-12	21	2,874	1.00437	2,861		3,354,007	1,167	0.023	1.555	$0.09250	$ 4,311	91.25%	888					
Oct-12	22	2,860	0.99948	2,862		1,897,723	664	0.599	0.267	$0.09234	$ 4,321	91.29%	746					
Nov-12	23	2,864	1.00087	2,862		2,123,890	742	1.774	0.000	$0.09653	$ 4,333	91.46%	833					
Dec-12	24	2,849	0.99563	2,862		2,075,496	728	1.937	0.038	$0.09483	$ 4,350	91.04%	870	10,737	11,012			
Jan-13	25	2,832	0.99131	2,863		2,557,429	903	2.215	0.061	$0.09549	$ 4,407	90.48%	923					
Feb-13	26	2,846	0.99621	2,863		2,651,905	932	2.350	0.000	$0.09384	$ 4,348	91.03%	921					
Mar-13	27	2,864	1.00251	2,863		2,442,392	853	2.254	0.000	$0.09629	$ 4,309	92.16%	890					
Apr-13	28	2,858	1.00041	2,864		2,169,676	759	0.630	0.122	$0.09486	$ 4,319	92.60%	721					
May-13	29	2,864	1.00251	2,864		1,892,295	661	0.267	0.694	$0.09664	$ 4,317	91.70%	762					
Jun-13	30	2,860	1.00111	2,864		2,493,397	872	0.000	2.447	$0.10704	$ 4,326	90.70%	1,013					
Jul-13	31	2,856	0.99971	2,865		3,042,143	1,065	0.000	2.881	$0.10456	$ 4,381	91.20%	1,135					
Aug-13	32	2,860	1.00111	2,865		3,376,606	1,181	0.000	2.508	$0.10832	$ 4,353	91.20%	1,029					
Sep-13	33	2,855	0.99936	2,865		3,144,907	1,102	0.023	1.578	$0.10664	$ 4,340	92.10%	855					
Oct-13	34	2,871	1.00496	2,866		2,040,524	711	0.530	0.335	$0.10582	$ 4,392	92.50%	728					
Nov-13	35	2,866	1.00321	2,866		2,156,543	752	1.948	0.000	$0.11038	$ 4,388	93.00%	826					
Dec-13	36	2,850	0.99761	2,866		2,390,421	839	2.242	0.000	$0.10992	$ 4,370	93.40%	860	10,627	10,663			
Jan-14	37	2,848	0.99740	2,867		3,016,625	1,059	3.487	0.000	$0.10873	$ 4,327	93.30%	1,029					
Feb-14	38	2,856	1.00020	2,867		3,315,363	1,161	2.080	0.000	$0.10622	$ 4,311	93.50%	837					
Mar-14	39	2,855	0.99985	2,867		2,136,093	748	1.991	0.000	$0.11881	$ 4,287	93.70%	784					
Apr-14	40	2,852	0.99880	2,868		2,014,746	706	0.564	0.152	$0.11408	$ 4,305	93.97%	667					
May-14	41	2,843	0.99565	2,868		1,996,675	702	0.093	1.273	$0.11451	$ 4,286	93.81%	777					
Jun-14	42	2,859	1.00125	2,869		2,561,961	896	0.000	2.790	$0.12047	$ 4,294	93.22%	1,027					
Jul-14	43	2,854	0.99950	2,869		3,447,752	1,208	0.000	2.835	$0.11666	$ 4,337	92.68%	1,063					
Aug-14	44	2,861	1.00196	2,869		3,226,779	1,128	0.000	2.622	$0.11655	$ 4,329	93.38%	1,016					
Sep-14	45	2,860	1.00161	2,870		3,325,167	1,163	0.000	1.768	$0.11126	$ 4,315	93.74%	865					
Oct-14	46	2,863	1.00266	2,870		2,147,937	750	0.499	0.373	$0.10833	$ 4,367	93.80%	718					
Nov-14	47	2,855	0.99985	2,870		2,012,475	705	2.087	0.000	$0.11308	$ 4,391	93.92%	836					
Dec-14	48	2,859	1.00125	2,871		2,415,960	845	2.169	0.000	$0.11345	$ 4,412	93.85%	850	11,073	10,470			
Jan-15	49	2,880	1.00087	2,871		3,057,728	1,062	2.887	0.000	$0.11067	$ 4,436	94.59%	963					
Feb-15	50	2,865	0.99566	2,871		2,776,260	969	2.911	0.000	$0.10745	$ 4,407	94.49%	970					
Mar-15	51	2,862	0.99461	2,872		2,644,302	924	1.357	0.122	$0.10774	$ 4,366	95.12%	778					
Apr-15	52	2,866	0.99600	2,872		1,957,806	683	0.421	0.282	$0.10753	$ 4,396	95.39%	705					
May-15	53	2,872	0.99809	2,872		1,957,424	682	0.070	1.456	$0.11055	$ 4,370	95.24%	835					
Jun-15	54	2,857	0.99288	2,873		2,542,252	890	0.000	3.110	$0.11000	$ 4,371	94.64%	1,163					
Jul-15	55	2,882	1.00156	2,873		3,881,068	1,347	0.000	3.712	$0.10548	$ 4,400	94.09%	1,349					
Aug-15	56	2,893	1.00539	2,873		4,057,298	1,402	0.000	3.140	$0.10232	$ 4,391	94.79%	1,210					
Sep-15	57	2,879	1.00052	2,874		3,129,099	1,087	0.000	1.662	$0.10222	$ 4,365	95.16%	887					
Oct-15	58	2,894	1.00573	2,874		2,086,001	721	0.646	0.229	$0.10410	$ 4,156	95.22%	682					
Nov-15	59	2,892	1.00504	2,874		1,960,592	678	1.221	0.053	$0.10938	$ 4,161	95.34%	705					
Dec-15	60	2,888	1.00365	2,875		2,007,627	695	1.307	0.145	$0.11035	$ 4,172	95.28%	727	11,141	10,974			

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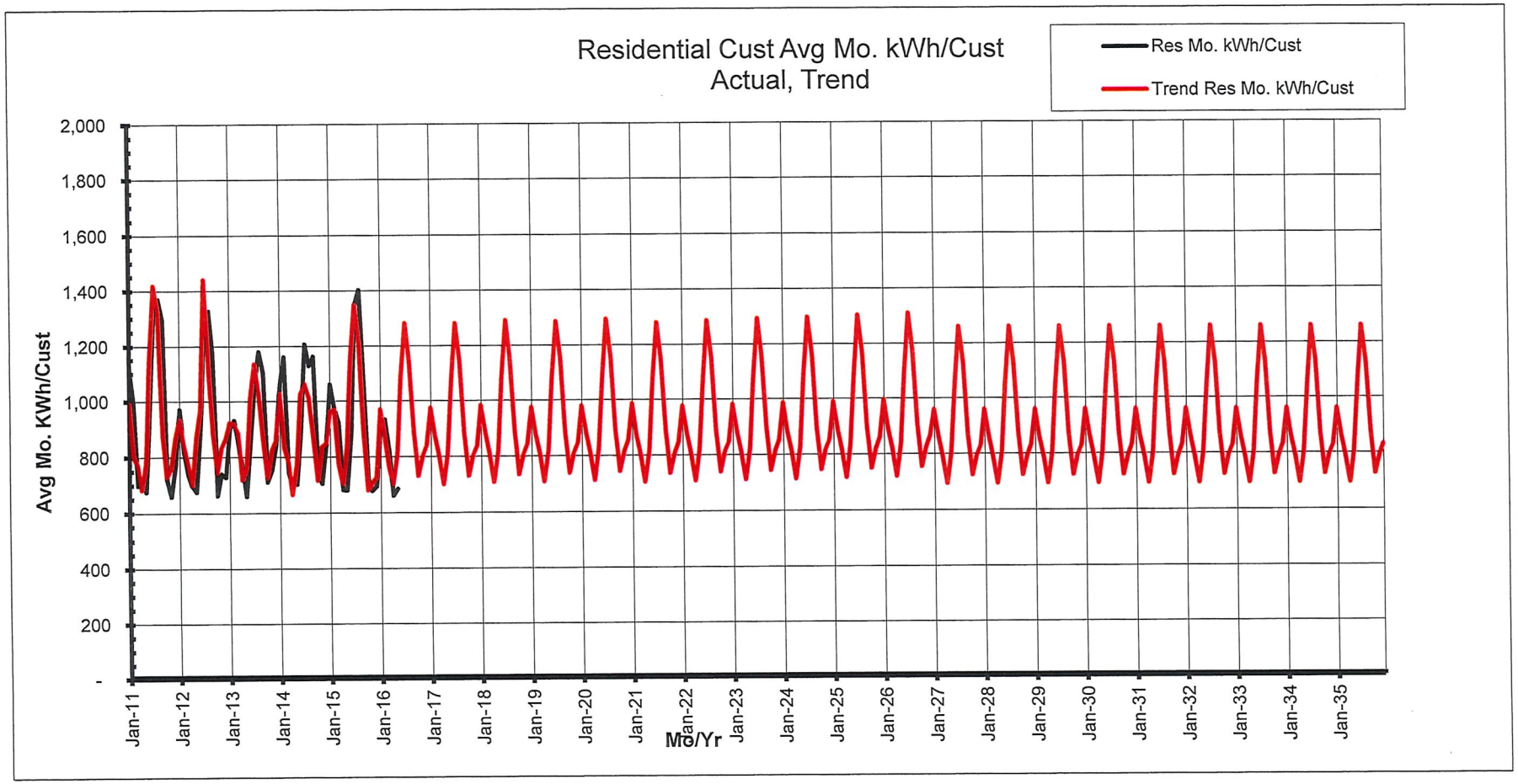
Chart of Res. kWh/Cust. Forecastt



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Total System Forecast

Mo/Yr	Res	Res AE	Com Dm	Com Dm AE	Com non Dm	Com Lg	Hospital	L&W Dm	L&W non Dm	City Dm	City non Dm	CityTraf Lt	CitySt Lt	Security Lts	Subtotal	Losses	7.30%% of Total	Ann. Losses	Total kWh	Ann. Total	Mo. L.F.	NCP - kW
Jan-11	3,202,128	3,953,006	3,156,742	549,614	1,143,577	172,000	871,200	318,549	10,196	51,155	10,937	3,437	155,474	165,755	13,763,770	805,561	5.5%		14,569,331		66.1%	29,641
Feb-11	2,854,100	3,896,706	3,209,665	572,278	1,015,106	178,800	868,800	313,498	9,955	45,673	7,182	2,921	120,485	139,733	13,234,902	(2,026,350)	-18.1%		11,208,553		64.1%	26,015
Mar-11	2,010,950	2,294,275	2,663,390	448,401	777,533	167,200	846,400	297,668	6,516	34,029	6,944	2,892	112,596	143,654	9,812,448	1,291,002	11.6%		11,103,450		70.2%	21,263
Apr-11	2,059,771	2,135,909	2,984,752	449,240	870,890	188,800	995,600	335,776	6,761	38,691	8,594	3,226	111,710	128,327	10,318,047	237,770	2.3%		10,555,817		67.1%	21,855
May-11	1,934,791	1,809,732	3,197,576	473,900	882,636	184,800	1,042,800	296,767	1,537	40,900	11,647	3,278	105,962	121,554	10,107,880	2,479,315	19.7%		12,587,195		52.6%	32,194
Jun-11	2,872,422	2,370,086	3,911,602	575,620	1,101,136	209,200	1,190,400	193,912	1,723	53,039	12,347	3,049	90,766	106,939	12,692,241	2,549,661	16.7%		15,241,902		62.4%	33,951
Jul-11	3,852,782	2,386,158	3,904,641	591,968	1,235,896	214,800	1,293,200	139,136	2,114	55,842	14,453	3,219	97,023	99,453	13,890,685	3,256,175	19.0%		17,146,860		67.0%	34,414
Aug-11	3,944,798	3,017,787	4,607,739	691,531	1,269,033	230,800	1,360,000	135,978	2,370	65,543	14,899	3,061	91,830	99,453	15,534,822	1,430,488	8.4%		16,965,310		64.7%	35,240
Sep-11	3,728,175	2,955,001	4,171,250	629,538	1,254,145	208,800	1,246,400	194,521	2,154	57,467	14,905	3,529	123,502	106,939	14,696,326	(2,059,734)	-16.3%		12,636,592		53.4%	32,886
Oct-11	2,060,989	1,911,313	3,364,853	507,117	824,223	181,600	1,095,600	136,688	1,099	42,876	10,605	2,983	110,697	121,554	10,372,197	278,732	2.6%		10,650,929		72.1%	19,853
Nov-11	1,888,224	1,828,763	3,000,898	453,798	763,974	173,200	965,200	216,607	2,481	37,776	8,071	3,196	136,589	128,327	9,607,104	1,167,111	10.8%	7.4%	10,774,214		67.9%	22,042
Dec-11	2,195,419	2,289,510	2,744,751	429,982	783,732	165,200	936,400	284,050	4,599	36,438	8,336	2,904	130,568	154,705	10,146,594	2,053,391	16.8%	11,463,122	12,199,985	155,640,137	69.8%	23,498
Jan-12	2,766,486	3,071,473	3,109,629	500,574	990,081	171,200	950,000	182,059	6,697	40,563	7,981	3,542	154,488	165,755	12,120,528	824,612	6.4%		12,945,141		61.2%	28,449
Feb-12	2,333,502	2,688,165	3,068,326	488,994	827,768	172,800	934,000	186,061	7,294	39,867	6,584	2,871	120,907	139,733	11,016,872	379,302	3.3%		11,396,174		62.0%	26,431
Mar-12	2,120,783	2,374,031	2,855,779	433,204	774,420	164,800	929,600	163,592	6,013	36,152	6,687	2,962	115,797	143,654	10,127,474	892,803	8.1%		11,020,277		66.0%	22,435
Apr-12	1,999,317	1,938,360	3,228,643	472,953	856,242	178,800	1,071,200	155,253	2,235	42,476	9,741	3,504	123,895	128,327	10,210,946	319,925	3.0%		10,530,871		59.5%	24,596
May-12	1,932,993	1,788,109	3,336,250	478,711	821,045	179,600	1,067,200	159,578	1,670	45,597	9,622	2,690	96,560	121,554	10,041,179	3,072,130	23.4%		13,113,309		62.4%	28,224
Jun-12	2,634,448	2,310,317	3,775,200	545,118	991,963	192,400	1,148,000	125,347	1,568	53,185	12,404	2,921	93,667	106,939	11,993,477	1,884,177	13.6%		13,877,654		55.9%	34,451
Jul-12	3,677,218	2,918,595	4,079,144	596,570	1,240,435	209,200	1,245,600	142,925	1,911	61,949	12,835	3,010	98,978	99,453	14,357,823	2,785,660	16.2%		17,173,483		66.7%	34,631
Aug-12	3,809,492	2,996,151	4,277,591	637,858	1,157,391	222,000	1,305,200	137,381	1,849	64,440	13,120	2,782	97,093	99,453	14,821,801	351,438	2.3%		15,173,239		62.2%	32,810
Sep-12	3,354,007	2,768,116	4,155,406	577,530	1,125,639	216,400	1,195,600	123,050	1,813	56,254	14,634	2,597	125,438	106,939	13,823,422	(1,100,007)	-8.6%		12,723,415		60.0%	29,457
Oct-12	1,897,723	1,759,396	3,388,953	481,118	750,899	185,600	1,022,400	210,905	737	42,633	9,158	2,411	96,986	121,554	9,970,473	974,976	8.9%		10,945,448		67.6%	21,748
Nov-12	2,123,890	2,114,057	3,176,634	462,912	879,847	169,600	878,000	322,096	3,762	41,306	10,161	3,204	169,471	128,327	10,483,267	803,753	7.1%	9.1%	11,287,020		70.4%	22,279
Dec-12	2,075,496	2,247,144	2,873,450	435,479	705,350	162,000	462,400	267,125	5,369	36,612	8,449	2,458	108,381	154,705	9,544,418	2,687,745	22.0%	13,876,514	12,232,163	152,418,193	72.2%	22,773
Jan-13	2,557,429	2,893,559	3,140,469	488,417	881,927	176,000	464,000	314,839	5,364	39,072	7,321	2,980	150,910	165,755	11,288,042	1,587,961	12.3%		12,876,003		67.0%	25,827
Feb-13	2,651,905	3,030,753	3,215,256	491,161	890,308	171,600	572,800	256,854	7,464	40,930	7,423	2,731	126,492	139,733	11,605,410	472,072	3.9%		12,077,483		69.7%	25,779
Mar-13	2,442,392	2,879,271	2,909,567	440,305	827,003	153,200	794,400	260,083	7,542	38,143	6,496	2,559	113,280	143,654	11,017,895	1,489,967	11.9%		12,507,863		65.5%	25,866
Apr-13	2,169,676	2,464,702	3,093,764	471,717	790,486	171,600	936,800	238,002	6,967	38,806	7,905	2,697	106,176	128,327	10,627,625	(240,497)	-2.3%		10,387,127		66.4%	21,728
May-13	1,892,295	1,852,453	3,119,785	459,381	828,407	166,000	984,000	283,944	2,396	38,696	9,227	2,998	113,826	121,554	9,874,962	1,842,083	15.7%		11,717,044		60.1%	26,205
Jun-13	2,493,397	2,234,694	3,784,212	526,582	983,413	192,000	1,123,600	305,532	1,798	52,512	11,065	2,899	92,232	106,939	11,910,875	2,121,025	15.1%		14,031,900		62.2%	31,354
Jul-13	3,042,143	2,464,037	3,915,366	559,086	1,085,505	201,200	1,167,200	305,135	1,845	54,751	10,699	2,873	100,152	99,453	12,989,445	1,837,214	12.4%		14,826,659		63.7%	31,272
Aug-13	3,376,606	2,690,361	4,132,131	576,425	1,110,775	205,600	1,246,400	306,456	1,945	55,539	11,571	2,833	97,793	99,453	13,913,888	572,647	4.0%		14,486,535		61.8%	31,501
Sep-13	3,144,907	2,576,534	4,172,943	560,257	1,103,381	198,000	1,140,000	317,061	2,021	57,845	13,268	3,110	125,257	106,939	13,521,523	(380,676)	-2.9%		13,140,847		61.9%	29,463
Oct-13	2,040,524	1,823,132	3,654,148	485,381	842,424	177,200	1,024,000	273,571	1,217	45,812	8,988	2,591	111,927	121,554	10,611,469	652,318	5.8%		11,264,787		64.1%	23,618
Nov-13	2,156,543	2,021,458	3,156,445	423,651	787,054	172,000	947,200	228,783	2,135	39,958	9,611	2,824	135,861	128,327	10,211,850	1,463,360	12.5%	8.6%	11,675,209		66.1%	24,548
Dec-13	2,390,421	2,653,929	3,234,639	463,199	832,499	164,000	846,800	225,389	6,047	41,650	11,151	2,723	128,306	154,705	11,155,458	1,710,545	13.3%	13,128,019	12,866,002	151,857,460	67.1%	25,781
Jan-14	3,016,625	3,463,595	3,195,116	480,923	1,004,606	164,400	841,200	256,272	8,771	46,696	10,526	2,940	153,778	165,755	12,811,203	3,139,548	19.7%		15,950,752		58.9%	36,414
Feb-14	3,315,363	4,123,982	3,470,005	542,015	1,102,782	163,200	887,600	257,854	9,224	50,548	10,508	2,966	106,347	139,733	14,182,127	(2,403,207)	-20.4%		11,778,920		64.0%	27,374
Mar-14	2,136,093	2,442,081	2,948,645	425,434	716,378	152,400	871,200	246,354	5,326	38,059	8,006	2,341	107,300	143,654	10,243,271	1,645,477	13.8%		11,888,748		66.4%	24,054
Apr-14	2,014,746	2,205,786	3,134,914	432,741	757,157	170,000	949,600	212,173	6,022	38,946	7,479	2,832	111,789	128,327	10,172,512	263,204	2.5%		10,435,716		69.5%	20,859
May-14	1,996,675	1,895,441	3,292,281	450,450	789,163	174,400	1,012,000	219,915	2,303	43,000	8,656	2,802	74,078	121,554	10,082,718	2,471,944	19.7%		12,554,661		60.3%	27,984
Jun-14	2,561,961	2,255,549	4,063,726	525,245	1,079,319	202,210	1,150,553	182,828	1,905	55,855	11,282	2,906	82,499	106,939	12,282,776	2,403,643	16.4%		14,686,420		65.6%	31,078
Jul-14	3,447,752	2,713,471	4,220,190	531,183	1,065,505	206,493	1,163,487	182,181	1,903	58,200	11,355	3,254	87,411	99,453	13,789,839	1,280,826	8.5%		15,070,665		62.8%	32,279
Aug-14	3,226,779	2,590,079	4,149,156	524,537	1,110,775	203,606	1,142,251	185,217	1,911	54,610	11,017	3,071	90,321	99,453	13,392,785	1,588,518	10.6%		14,981,303		63.0%	31,969
Sep-14	3,325,167	2,688,363	3,824,621	473,548	1,103,381	193,461	1,091,388	197,877	1,943	48,687	9,380	3,224	100,775	106,939	13,168,753	129,554	1.0%		13,298,307		58.1%	31,784
Oct-14	2,147,937	1,940,607	3,497,305	427,873	842,424	181,302	956,103	225,194	2,558	41,034	7,710	2,848	94,191	121,554	10,488,639	697,112	6.2%		11,185,752		61.6%	24,425
Nov-14	2,012,475	1,916,493	3,311,094	428,241	787,054	170,602	793,326	248,071	5,671	41,143	7,348	3,277	128,113	128,327	9,981,233	2,048,374	17.0%	9.4%	12,029,607		58.6%	28,493
Dec-14	2,415,960	2,604,505	3,364,723	448,491	832,499	171,698	786,801	248,932	5,904	41,255	7,350	2,860	109,985	154,705	11,195,667	1,450,676	11.5%	14,715,669	12,646,343	156,507,193	67.1%	25,322
Jan-15	3,057,728	3,208,608	3,410,602	462,455	1,004,606	169,480	729,966	312,502	8,438	42,254	8,317	3,369	141,004	165,755	12,725,083	1,474,414	10.4%		14,199,497		56.2%	33,945
Feb-15	2,776,260	3,258,966	3,347,468	464,362	1,102,782	167,152	730,271	312,811	8,535	42,286	8,318	2,955	106,642	139,733	12,468,541	1,154,646	8.5%		13,623,187		59.4%	34,129
Mar-15	2,644,302	3,163,341	3,412,402	447,001	716,378	173,839	866,300	284,440	3,936	40,819	8,424	2,851	104,132	143,654	12,011,819	(578,393)	-5.1%		11,433,426		69.3%	22,182
Apr-15	1,957,806	1,970,381	3,613,310	438,428	757,157	183,307	954,638	269,937	2,466	40,428	8,593	3,068	90,475	128,327	10,418,321	319,643	3.0%		10,737,964		65.7%	22,713
May-15	1,957,424	1,800,650	3,947,341	484,345	789,163	194,581	1,072,585	242,806	2,024	46,791	10,135	3,119	92,156	121,554	10,764,673	2,359,131	18.0%		13,123,804		61.4%	28,744
Jun-15	2,542,252	2,182,713	4,454,486	550,006	1,079,319	212,529	1,203,883	212,979	1,893	58,313	11,805	3,059	82,499	106,939	12,702,674	2,811,674	18.1%		15,514,348		62.9%	34,273
Jul-15	3,881,068	2,950,067	4,787,652	582,054	1,105,565	221,964	1,257,730	203,275	1,871	63,231	12,855	3,254	87,411	99,453	15,257,451	1,557,386	9.3%		16,814,836		65.6%	34,475
Aug-15	4,057,298	3,086,384	4,573,311	557,664	1,064,330	214,645	1,209,020	212,477	1,892	58,552	11,856	3,071	90,321	99,453	15,240,275	539,528	3.4%		15,779,804		61.0%	34,792
Sep-15	3,129,099	2,539,386	3,996,752	476,100	947,814	196,614	1,103,868	238,258	1,947	47,993	9,239	3,224	100,775	106,939	12,897,988	41,741	0.3%		12,939,729		57.8%	31,118
Oct-15	2,086,001	1,903,622	3,114,889	412,364	822,604	162,921	941,564	273,662	2,759	40,440	7,557	2,848	94,191	121,554	9,986,975	1,018,680	9.3%		11,005,654		69.0%	21,426
Nov-15	1,960,592	1,866,657	3,050,373	407,139	868,725	158,813	872,351	284,308	3,685	40,262	7,385	3,277	128,113	128,327	9,780,008	1,148,661	10.5%	8.5%	10,928,669		66.2%	22,914
Dec-15	2,007,627	2,061,567	3,101,331	428,786	887,865	159,864	869,391	283,328	3,837	40,876	7,483	2,860	109,985	154,705	10,119,506	1,565,486	13.4%	13,412,596	11,684,992	157,785,910	70.2%	22,365

SCAMPS 2016

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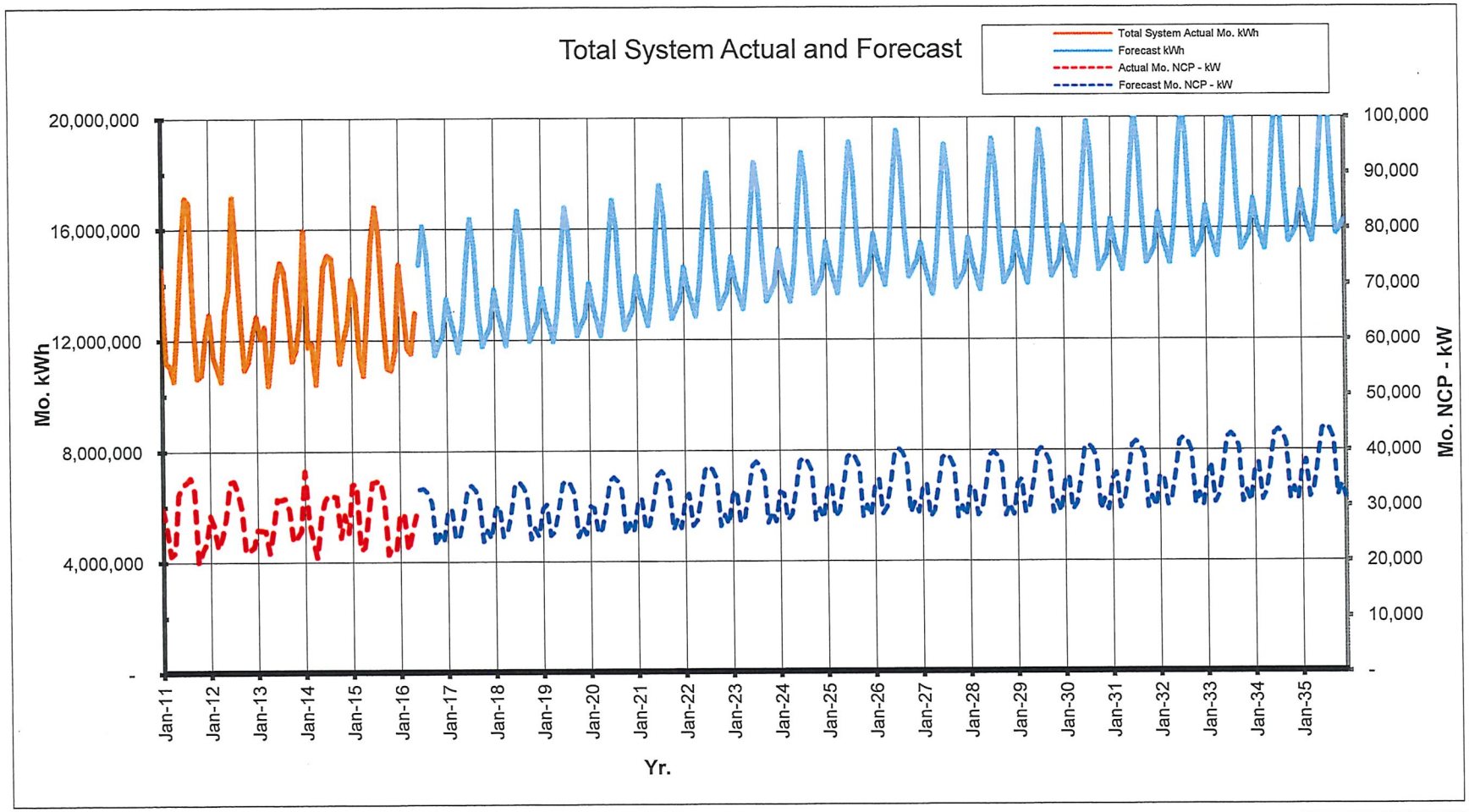
Chart Total System Forecast



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QUESTIONS/DISCUSSION

Thank you for the opportunity to discuss Load Forecasting Techniques

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