

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF)
KENTUCKY UTILITIES COMPANY FOR AN) CASE NO. 2018-00294
ADJUSTMENT OF ITS ELECTRIC RATES)

RESPONSE OF
KENTUCKY UTILITIES COMPANY
TO
THE FIRST SET OF DATA REQUESTS OF
KENTUCKY INDUSTRIAL UTILITY CUSTOMERS, INC.
DATED NOVEMBER 13, 2018

FILED: NOVEMBER 29, 2018

VERIFICATION

**COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)**

The undersigned, **Daniel K. Arbough**, being duly sworn, deposes and says that he is Treasurer for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.


Daniel K. Arbough

Subscribed and sworn to before me, a Notary Public in and before said County
and State, this 29th day of November _____ 2018.


Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Lonnie E. Bellar**, being duly sworn, deposes and says that he is Chief Operating Officer for Louisville Gas and Electric Company and Kentucky Utilities Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.



Lonnie E. Bellar

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 29th day of November 2018.



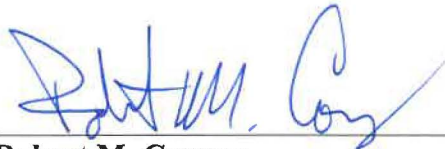
Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Robert M. Conroy**, being duly sworn, deposes and says that he is Vice President, State Regulation and Rates, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.



Robert M. Conroy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 29th day of November 2018.


Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Elizabeth J. McFarland**, being duly sworn, deposes and says that she is Vice President, Customer Services for Louisville Gas and Electric Company and Kentucky Utilities Company and an employee of LG&E and KU Services Company, and that she has personal knowledge of the matters set forth in the responses for which she is identified as the witness, and the answers contained therein are true and correct to the best of her information, knowledge and belief.



Elizabeth J. McFarland

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 29th day of November 2018.


Notary Public

My Commission Expires:

10-16-2020

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Gregory J. Meiman**, being duly sworn, deposes and says that he is Vice President, Human Resources for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.


Gregory J. Meiman

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 29th day of November 2018.

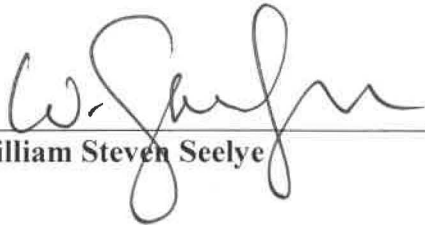

Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **William Steven Seelye**, being duly sworn, deposes and states that he is a Principal of The Prime Group, LLC, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.



William Steven Seelye

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of November 2018.



Notary Public (SEAL)

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

**COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)**

The undersigned, **David S. Sinclair**, being duly sworn, deposes and says that he is Vice President, Energy Supply and Analysis for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 29th day of November 2018.

Notary Public

My Commission Expires:

Judy Schooler

Notary Public, ID No. 603967

State at Large, Kentucky

Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF CUMBERLAND) SS:

The undersigned, **John J. Spanos**, being duly sworn, deposes and says that he is the Senior Vice President for Gannett Fleming Valuation and Rate Consultants, LLC, that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

John J. Spanos

John J. Spanos

Subscribed and sworn to before me, a Notary Public in and before said County and Commonwealth, this 20th day of November 2018.

Cheryl Ann Rutter (SEAL)

Notary Public

My Commission Expires:

February 20, 2019

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Cheryl Ann Rutter, Notary Public
East Pennsboro Twp., Cumberland County
My Commission Expires Feb. 20, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 1

Responding Witness: William Steven Seelye

Q.1-1. Please provide the class cost of service model in excel format with formulas.

A.1-1. See the following Excel attachment to the response to PSC 1-53:

- 1) Att_KU_PSC_1-53_Exhibit_WSS-26_WSS-28_KU_COSS_Functional_Assgmt_and_Class_Alloc.xlsx.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 2

Responding Witness: William Steven Seelye

- Q.1-2. Please provide, in excel format, for each rate class, by Company, monthly coincident peak demand at the generation level (i.e., including losses), for the test year. These rate classes should correspond to the rate classes used in Mr. Seelye's class cost of service study.
- A.1-2. The information required to calculate the monthly peaks for each rate class is provided in the Excel spreadsheet filed in response to AG 1-137.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 3

Responding Witness: David S. Sinclair / William Steven Seelye

Q.1-3. To the extent not provided in response to the previous question, please provide the following information for each rate class/rate schedule included as a separate class in the class cost of service study for the test year 12 months ending April 2020:

- a. monthly system peak load (LGE and KU separately stated and combined).
- b. the load of each rate class at the time of the monthly LGE/KU system peak, showing the following:
 1. load at meter
 2. losses
 3. load at generation
- c. Monthly mWh energy at the generation voltage level for the rate class/rate schedule.
- d. Energy and demand loss factors for each voltage level, by rate class/rate schedule, at which customers on the rate class/rate schedule take service.
- e. Monthly mWh energy sales at the meter, separately stated for each voltage at which customers in each rate class/rate schedule take service, by rate class/rate schedule (for example, the metered mWh for Rate PS secondary and Rate PS primary by month).

A.1-3.

- a. See attached.
- b.
 1. Only load at generation was prepared for study.

2. Only load at generation was prepared for study.
 3. See attached.
- c. See attached.
 - d. See the attachment to the response to Question No. 7, part c.
 - e. Only energy at generation was prepared for study.

Monthly System Peak Load(kWh)			
Year	Month	KU	CC
2019	5	3,251,683	5,426,984
2019	6	3,446,308	5,833,335
2019	7	3,530,854	6,016,996
2019	8	3,680,177	6,360,043
2019	9	3,304,177	5,698,434
2019	10	2,692,745	4,418,552
2019	11	3,251,637	4,837,310
2019	12	3,563,330	5,214,576
2020	1	4,208,233	5,972,313
2020	2	3,588,447	5,246,158
2020	3	3,317,910	5,012,169
2020	4	2,704,578	4,302,754

Load at Generation at Time of KU System Peak(kWh)												
		1	2	100	140	500	510	520	530	600	63	64
		All										
		General			Electric	TOD	TOD	PS	PS	Outdoor		
Year	Month	Residential	RTOD	Service	Schools	Secondary	Primary	Secondary	Primary	RTS	Lighting	EV_Charge
2019	5	1,108,627	114	270,967	25,140	336,827	666,339	330,634	21,025	243,069	46	-
2019	6	1,219,371	122	302,404	27,141	339,544	686,152	351,470	25,056	223,688	35	-
2019	7	1,366,774	167	289,242	22,415	344,373	645,590	374,768	26,959	204,885	24	-
2019	8	1,580,795	215	289,236	19,408	320,177	632,941	319,677	24,279	204,378	23	-
2019	9	1,271,462	154	247,978	30,435	322,534	609,602	362,030	23,091	180,810	37	-
2019	10	902,586	92	208,254	18,272	277,416	547,935	292,850	17,915	192,605	53	8
2019	11	1,165,929	157	270,083	40,224	305,282	641,334	340,356	22,376	196,141	84	-
2019	12	1,598,915	199	309,717	35,725	272,325	465,324	329,126	25,637	166,185	86	-
2020	1	1,992,695	300	337,351	35,694	307,988	548,544	364,391	26,716	203,030	92	-
2020	2	1,726,831	242	265,953	40,677	251,615	497,517	272,244	19,596	182,102	84	-
2020	3	1,371,442	130	225,127	41,234	268,418	524,106	337,938	23,496	190,847	61	-
2020	4	948,033	148	177,806	35,229	246,240	510,989	306,097	21,886	186,906	46	-

620	700	710	60	61	62	ODP
	Muni	Muni	Unmetered	Traffic	Lighting	
FLS	Primary	Transmission	Lighting	Energy	Energy	ODP
				Service	Service	
65,741	35,979	33,105	-	176	-	113,893
94,028	45,708	33,594	-	194	-	97,799
66,362	41,021	42,258	-	174	-	105,841
104,844	41,237	41,019	-	166	-	101,782
89,790	38,084	34,125	-	184	-	93,860
94,149	29,125	29,997	-	185	-	81,304
56,398	30,208	30,620	-	212	-	152,234
90,876	27,804	38,950	-	202	-	202,260
91,700	35,445	40,766	-	224	-	223,298
50,724	32,864	34,199	31,814	218	314	181,452
94,810	34,103	37,474	-	190	-	168,532
85,427	26,615	28,390	-	182	-	130,584

Monthly Energy at Generation Level(MWh)												
		1	2	100	140	500	510	520	530	600	63	64
		All				Outdoor						
				General	Electric	TOD	TOD	PS	PS	RTS	Sports	EV_Charge
Year	Month	Residential	RTOD	Service	Schools	Secondary	Primary	Secondary	Primary	RTS	Lighting	EV_Charge
2019	5	416,087	53	150,013	12,018	177,706	393,059	176,332	14,069	144,982	32	0
2019	6	468,474	61	159,383	10,581	179,518	391,239	177,871	14,006	128,550	28	0
2019	7	581,649	77	179,897	9,341	185,833	380,719	183,820	13,635	126,965	23	0
2019	8	590,174	80	181,819	10,459	186,458	394,464	184,166	14,117	133,845	25	0
2019	9	453,170	62	149,131	11,852	161,247	336,737	158,983	12,043	104,893	26	0
2019	10	370,059	52	138,237	10,919	155,993	338,009	153,477	12,098	124,997	34	0
2019	11	459,672	65	147,243	11,682	167,025	376,712	163,917	13,503	137,120	39	0
2019	12	635,303	92	162,908	15,213	170,448	357,412	167,147	12,830	129,072	45	0
2020	1	827,151	121	187,291	15,952	177,508	361,345	173,917	12,953	140,833	49	0
2020	2	644,871	96	150,429	12,643	142,030	300,385	138,953	10,726	111,993	38	0
2020	3	584,103	88	146,318	11,773	140,996	302,351	137,938	10,819	118,447	37	0
2020	4	417,724	64	126,785	10,377	139,479	309,703	136,363	11,086	112,597	29	0

620	700	710	60	61	62	ODP
	Muni	Muni	Unmetered	Traffic	Lighting	
FLS	Primary	Transmission	Lighting	Energy	Energy	ODP
				Service	Service	
56,093	17,405	15,931	9,628	132	113	53,857
54,284	20,572	16,668	9,369	140	111	50,033
55,056	21,134	21,411	8,857	130	110	52,031
57,989	21,543	20,914	9,055	123	110	52,291
48,104	18,156	17,253	10,492	133	117	43,603
58,077	16,379	16,747	11,289	138	124	44,809
50,597	15,798	15,940	11,764	153	126	60,402
48,104	17,386	20,010	13,355	150	132	78,349
55,705	19,475	20,907	14,317	167	135	95,537
50,334	17,537	17,510	12,324	151	122	74,372
55,320	17,491	19,107	11,288	141	118	69,270
50,422	15,454	15,746	10,675	131	114	53,055

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 4

Responding Witness: William Steven Seelye

Q.1-4. With regard to Exhibit WSS-19 (LOLP), please provide all supporting workpapers, in excel format with all formulas intact, used to develop this exhibit. This would include, but not be limited to:

- a. hourly system load
- b. hourly rate class load at:
 1. meter
 2. generation voltage
 3. loss factor used to convert metered load into load at generation
- c. hourly LOLP for the combined KU-LGE system

A.1-4.

- a. See the response to AG 1-137.
- b. See the response to AG 1-137.
- c. See the response to AG 1-141(a).

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 5

Responding Witness: David S. Sinclair

Q.1-5. Please provide the output of the analysis used to develop hourly LOLP. Provide in excel format, with formulas intact.

A.1-5. See the response to AG 1-141.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 6

Responding Witness: David S. Sinclair

Q.1-6. Provide, for the past three years (2017, 2016 and 2015) the following actual information:

- a. monthly system peak load (LGE and KU separately stated and combined system.
- b. date and hour of the LGE + KU monthly peaks
- c. date and hour of the separate LGE and KU monthly peaks

A.1-6. See attached.

Case No. 2018-00294
Attachment to Response to KIUC-1 Question No. 6ab
Page 1 of 1
Sinclair

Year	Month	Datetime	CC	LGE_CoincidentPeak	KU_CoincidentPeak
2015	1	2015-01-08 07:00	6,833	1,973	4,860
2015	2	2015-02-20 07:00	7,079	1,967	5,112
2015	3	2015-03-06 07:00	5,973	1,712	4,261
2015	4	2015-04-09 14:00	4,240	1,524	2,716
2015	5	2015-05-11 12:00	5,314	1,971	3,343
2015	6	2015-06-15 15:00	6,262	2,472	3,790
2015	7	2015-07-29 14:00	6,392	2,585	3,807
2015	8	2015-08-03 16:00	6,208	2,484	3,724
2015	9	2015-09-04 15:00	6,199	2,443	3,756
2015	10	2015-10-08 15:00	4,802	1,797	3,005
2015	11	2015-11-23 07:00	5,015	1,570	3,445
2015	12	2015-12-04 07:00	5,026	1,570	3,456
2016	1	2016-01-19 07:00	6,223	1,808	4,415
2016	2	2016-02-10 09:00	5,780	1,741	4,039
2016	3	2016-03-02 08:00	4,843	1,496	3,347
2016	4	2016-04-26 14:00	4,791	1,810	2,982
2016	5	2016-05-31 15:00	5,289	2,075	3,214
2016	6	2016-06-23 14:00	6,334	2,498	3,836
2016	7	2016-07-26 15:00	6,458	2,524	3,934
2016	8	2016-08-26 15:00	6,451	2,515	3,936
2016	9	2016-09-07 15:00	6,291	2,436	3,855
2016	10	2016-10-19 15:00	5,114	1,966	3,147
2016	11	2016-11-21 08:00	4,809	1,521	3,288
2016	12	2016-12-15 07:00	5,813	1,797	4,016
2017	1	2017-01-06 11:00	5,679	1,755	3,924
2017	2	2017-02-10 07:00	5,229	1,599	3,630
2017	3	2017-03-16 06:00	5,434	1,618	3,815
2017	4	2017-04-20 15:00	4,708	1,802	2,906
2017	5	2017-05-18 14:00	5,446	2,100	3,346
2017	6	2017-06-13 13:00	6,078	2,367	3,710
2017	7	2017-07-21 16:00	6,503	2,589	3,914
2017	8	2017-08-17 13:00	6,233	2,460	3,774
2017	9	2017-09-21 15:00	5,763	2,305	3,458
2017	10	2017-10-04 15:00	4,807	1,880	2,928
2017	11	2017-11-20 07:00	4,853	1,535	3,318
2017	12	2017-12-28 08:00	5,612	1,651	3,961

Year	Month	Datetime	LGE_NonCoincidentPeak
2015	1	2015-01-08 08:00	1,976
2015	2	2015-02-20 07:00	1,967
2015	3	2015-03-06 08:00	1,724
2015	4	2015-04-09 15:00	1,527
2015	5	2015-05-07 16:00	2,043
2015	6	2015-06-23 15:00	2,488
2015	7	2015-07-29 15:00	2,594
2015	8	2015-08-03 16:00	2,484
2015	9	2015-09-04 15:00	2,443
2015	10	2015-10-07 16:00	1,827
2015	11	2015-11-23 07:00	1,570
2015	12	2015-12-18 18:00	1,577
2016	1	2016-01-18 19:00	1,821
2016	2	2016-02-10 11:00	1,774
2016	3	2016-03-03 12:00	1,549
2016	4	2016-04-26 14:00	1,810
2016	5	2016-05-31 15:00	2,075
2016	6	2016-06-23 14:00	2,498
2016	7	2016-07-19 15:00	2,543
2016	8	2016-08-11 15:00	2,521
2016	9	2016-09-08 15:00	2,480
2016	10	2016-10-06 16:00	1,970
2016	11	2016-11-02 18:00	1,612
2016	12	2016-12-15 20:00	1,815
2017	1	2017-01-06 18:00	1,791
2017	2	2017-02-09 19:00	1,609
2017	3	2017-03-16 07:00	1,627
2017	4	2017-04-20 15:00	1,802
2017	5	2017-05-18 15:00	2,118
2017	6	2017-06-14 15:00	2,431
2017	7	2017-07-21 15:00	2,608
2017	8	2017-08-17 13:00	2,460
2017	9	2017-09-21 15:00	2,305
2017	10	2017-10-04 15:00	1,880
2017	11	2017-11-20 08:00	1,538
2017	12	2017-12-27 18:00	1,731

Year	Month	Datetime	KU_NonCoincidentPeak
2015	1	2015-01-08 07:00	4,860
2015	2	2015-02-20 07:00	5,112
2015	3	2015-03-06 07:00	4,261
2015	4	2015-04-24 06:00	2,753
2015	5	2015-05-11 12:00	3,343
2015	6	2015-06-15 14:00	3,790
2015	7	2015-07-28 13:00	3,865
2015	8	2015-08-04 14:00	3,785
2015	9	2015-09-03 16:00	3,787
2015	10	2015-10-08 15:00	3,005
2015	11	2015-11-23 07:00	3,445
2015	12	2015-12-04 07:00	3,456
2016	1	2016-01-19 07:00	4,415
2016	2	2016-02-10 08:00	4,043
2016	3	2016-03-02 08:00	3,347
2016	4	2016-04-26 16:00	2,991
2016	5	2016-05-31 14:00	3,225
2016	6	2016-06-23 14:00	3,836
2016	7	2016-07-26 14:00	3,936
2016	8	2016-08-26 15:00	3,936
2016	9	2016-09-07 15:00	3,855
2016	10	2016-10-19 13:00	3,150
2016	11	2016-11-21 08:00	3,288
2016	12	2016-12-15 07:00	4,016
2017	1	2017-01-08 08:00	4,004
2017	2	2017-02-10 07:00	3,630
2017	3	2017-03-16 06:00	3,815
2017	4	2017-04-20 15:00	2,906
2017	5	2017-05-18 14:00	3,346
2017	6	2017-06-13 13:00	3,710
2017	7	2017-07-21 16:00	3,914
2017	8	2017-08-17 14:00	3,783
2017	9	2017-09-27 15:00	3,518
2017	10	2017-10-09 15:00	3,002
2017	11	2017-11-20 07:00	3,318
2017	12	2017-12-28 08:00	3,961

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 7

Responding Witness: William Steven Seelye

Q.1-7. Please provide all supporting workpapers, in excel format where available, used to develop the class cost of service study. Include at a minimum the following:

- a. the excel models used to develop the projected test year hourly system and rate class loads.
- b. an excel spreadsheet containing the LOLP hourly results and the development of the LOLP rate class demand allocation factors.
- c. the loss study used to support the energy and demand loss factors used in the class cost of service study.

A.1-7.

- a. See the Excel attachment to the response to AG 1-137.
- b. See the response to part a.
- c. See attached.

LG&E AND KU SERVICES COMPANY

**KU Power System
2010 Analysis of System Losses**

August 2012

Prepared by:



Management Applications Consulting, Inc.
1103 Rocky Drive – Suite 201
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August 16, 2012

Mr. Robert M. Conroy
Director of Rates
LG&E and KU Services Company
220 West Main Street
Louisville, KY 40202

RE: 2010 LOSS ANALYSIS – KU

Dear Mr. Conroy:

Transmitted herewith are the results of the 2010 Analysis of System Losses for LG&E and KU Services Company's Kentucky Utilities (KU) power system. Our analysis develops cumulative expansion factors (loss factors) for both demand (peak/kW) and energy (average/kWh) losses by discrete voltage levels applicable to metered sales data. Our analysis considers only technical losses in arriving at our final recommendations. Please note that the proposed loss factors include a common or system-wide transmission factor for both KU and LG&E studies.

On behalf of MAC, we appreciate the opportunity to assist you in performing the loss analysis contained herein. The level of detailed load research and sales data by voltage level, coupled with a summary of power flow data and power system model, forms the foundation for determining reasonable and representative power losses on the KU system. Our review of these data and calculated loss results support the proposed loss factors as presented herein for your use in various cost of service, rate studies, and demand analyses.

Should you require any additional information, please let us know at your earliest convenience.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Paul M. Normand', is written in black ink.

Paul M. Normand
Principal

Enclosure
PMN/rjp

LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System

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LG&E AND KU SERVICES COMPANY 2010 Analysis of System Losses – KU Power System

1.0 EXECUTIVE SUMMARY

This report presents KU 2010 Analysis of System Losses for the power systems as performed by Management Applications Consulting, Inc. (MAC). The study developed separate demand (kW) and energy (kWh) loss factors for each voltage level of service in the power system for KU. The cumulative loss factor results by voltage level, as presented herein, can be used to adjust metered kW and kWh sales data for losses in performing cost of service studies, determining voltage discounts, and other analyses which may require a loss adjustment.

The procedures used in the overall loss study were similar to prior studies and emphasized the use of "in house" resources where possible. To this end, extensive use was made of the Company's peak hour power flow data and transformer plant investments in the model. In addition, measured and estimated load data provided a means of calculating reasonable estimates of losses by using a "top-down" and "bottom-up" procedure. In the "top-down" approach, losses from the high voltage system, through and including distribution substations, were calculated along with power flow data, conductor and transformer loss estimates, and metered poles.

At this point in the analysis, system loads and losses at the input into the distribution substation system are known with reasonable accuracy. However, it is the remaining loads and losses on the distribution substations, primary system, secondary circuits, and services which are generally difficult to estimate. Estimated and actual Company load data provided the starting point for performing a "bottom-up" approach for calculating the remaining distribution losses. Basically, this "bottom-up" approach develops line loadings by first determining loads and losses at each level beginning at a customer's meter service entrance and then going through secondary lines, line transformers, primary lines, and finally distribution substation. These distribution system loads and associated losses are then compared to the initial calculated input into Distribution Substation loadings for reasonableness prior to finalizing the loss factors. An overview of the loss study is shown on Figure 1 on page 4.

Appendix A of this report presents the Transmission loss analysis which was calculated separately and the results incorporated into the final loss factors as shown on Table 1 on the next page.

Table 1 (columns (a) and (b)) also provides the final results from Appendix B for the 2010 calendar year. Exhibits 8 and 9 of Appendix B present a more detailed analysis of the final calculated summary results of losses by segments and delivery voltage of the power system. The following Table 1 cumulative loss expansion factors are applicable only to metered sales at the point of receipt for adjustment to the power system's input level.

**LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System**

**TABLE 1
Loss Factors at Sales (Meter) Level, Calendar Year 2010**

<u>Voltage Level of Service</u>	<u>Total KU</u> (a)	<u>Delivery System (Excludes Transmission)</u> (b)	<u>Recalculated Total KU With Appendix A Transmission Losses</u> (c) (d) = 1/(c)	
<u>Demand (kW)</u>				
Transmission ¹	1.03295	1.00000	1.02805	0.97272
Primary Substation	1.03883	1.00569	1.03390	0.96721
Primary	1.06632	1.03230	1.06126	0.94228
Secondary	1.09017	1.05539	1.08499	0.92167
<u>Energy (kWh)</u>				
Transmission ¹	1.02827	1.00000	1.02271	0.97779
Primary Substation	1.03382	1.00540	1.02823	0.97255
Primary	1.05011	1.02124	1.04444	0.95745
Secondary	1.07651	1.04692	1.07069	0.93398
Losses – Net System Input ²	5.75% MWh 7.12% MW			
Losses – Net System Output ³	6.10% MWh 7.67% MW			

Notes: Column (a) Results derived from Appendix A for Transmission and Appendix B for all remaining factors.

Column (b) Column (a) loss factors excluding all Transmission-related losses.

Column (c) Column (b) delivery-only loss factors with incorporating the composite LG&E system-wide Transmission loss factors from Appendix A, Schedule 1, lines 5 and 10.

Column (d) All loss factors presented in columns (a), (b), and (c) are expansion factors applicable to metered sales as a multiplier. Column (d) is simply the inverse of column (c) and results in a loss factor that is used to divide metered sales to derive sales requirement at input.

The loss factors presented in the Delivery Only column of Table 1 are the Total KU loss factors divided by the transmission loss factor from column (a) in order to remove these losses from each service level loss factor. For example, the secondary distribution demand loss factor of 1.05539 includes the recovery of all remaining non-transmission losses from the distribution substation, primary lines, line transformers, secondary conductors and services.

¹ Reflects results for 500 kV, 345 kV, 161 kV, 138 kV and 69 kV from Appendix A.

² Net system input equals firm sales plus losses, Company use less non-requirement sales and related losses. See Appendix A, Exhibit 1, for their calculations.

³ Net system output uses losses divided by output or sales data as a reference.

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2010 Analysis of System Losses – KU Power System

The net system input shown in Table 1 represents the MWh losses of 5.75% for the total KU load using calculated losses divided by the associated input energy to the system. The 7.12% represents the MW losses also using system input as a reference. The net system output reference shown in Table 1 represents MWh losses of 6.10% and MW losses of 7.17%. These results use the appropriate total losses for each but are divided by system output or sales. These calculations are all based on the data and results shown on Exhibits 1, 7 and 9 of the study.

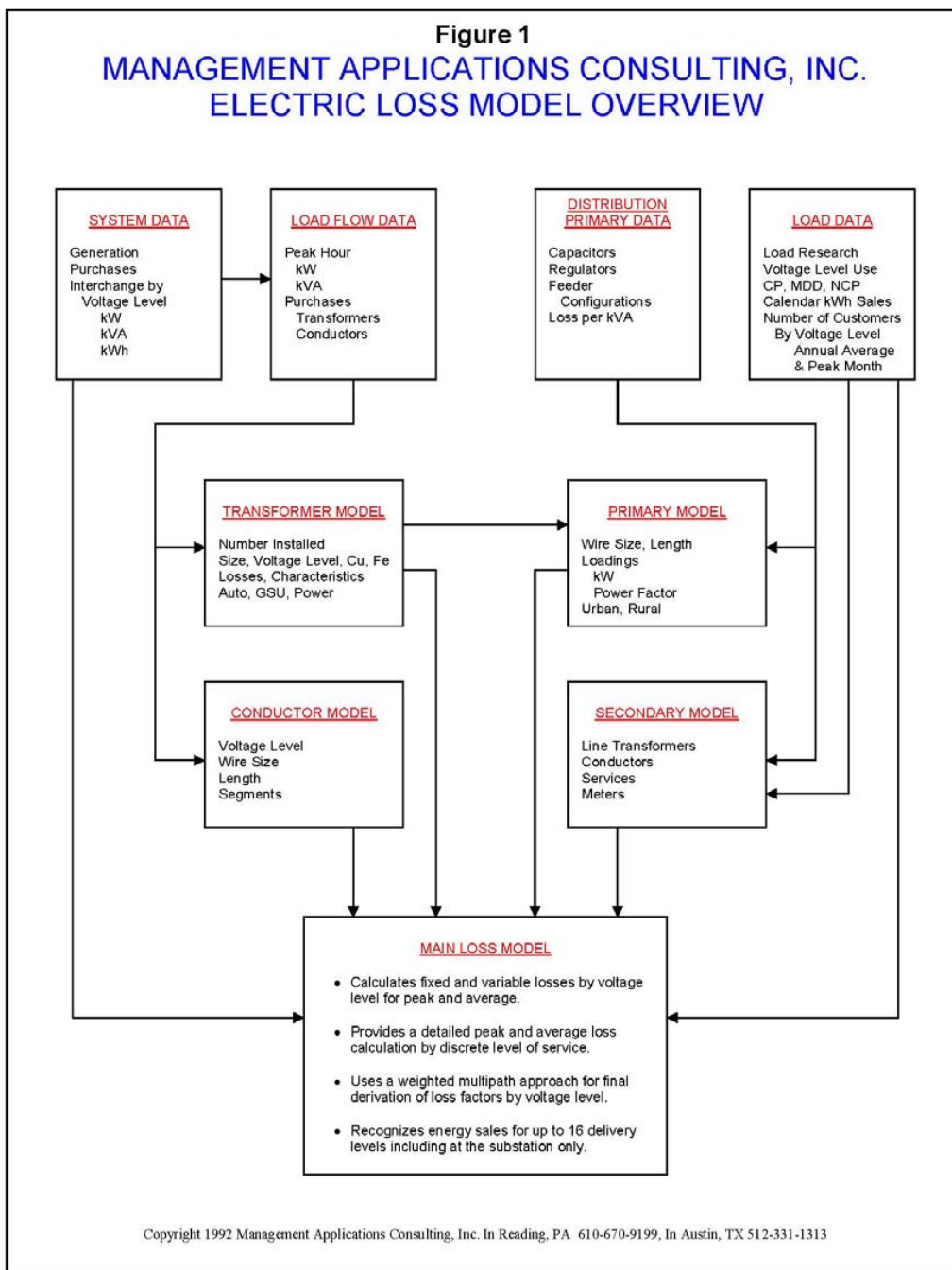
Due to the very nature of losses being primarily a function of equipment loadings, the loss factor derivations for any voltage level must consider both the load at that level plus the loads from lower voltages and their associated losses. As a result, cumulative losses on losses equates to additional load at higher levels along with future changes (+ or –) in loads throughout the power system. It is therefore important to recognize that losses are multiplicative in nature (future) and not additive (test year only) for all future years to ensure total recovery based on prospective fixed loss factors for each service voltage.

The derivation of the cumulative loss factors (Appendix B) shown in Table 1 (columns (a) and (b)) have been detailed for all electrical facilities in Exhibit 9, page 1 for demand and page 2 for energy. Beginning on line 1 of page 1 (demand) under the secondary column, metered sales are adjusted for service losses on lines 3 and 4. This new total load (with losses) becomes the load amount for the next higher facilities of secondary conductors and their loss calculations. This process is repeated for all the installed facilities until the secondary sales are at the input level (line 45). The final loss factor for all delivery voltages using this same process is shown on line 46 and Table 1 for demand. This procedure is repeated in Exhibit 9, page 2, for the energy loss factors.

The loss factor calculation is simply the input required (line 45) divided by the metered sales (line 2).

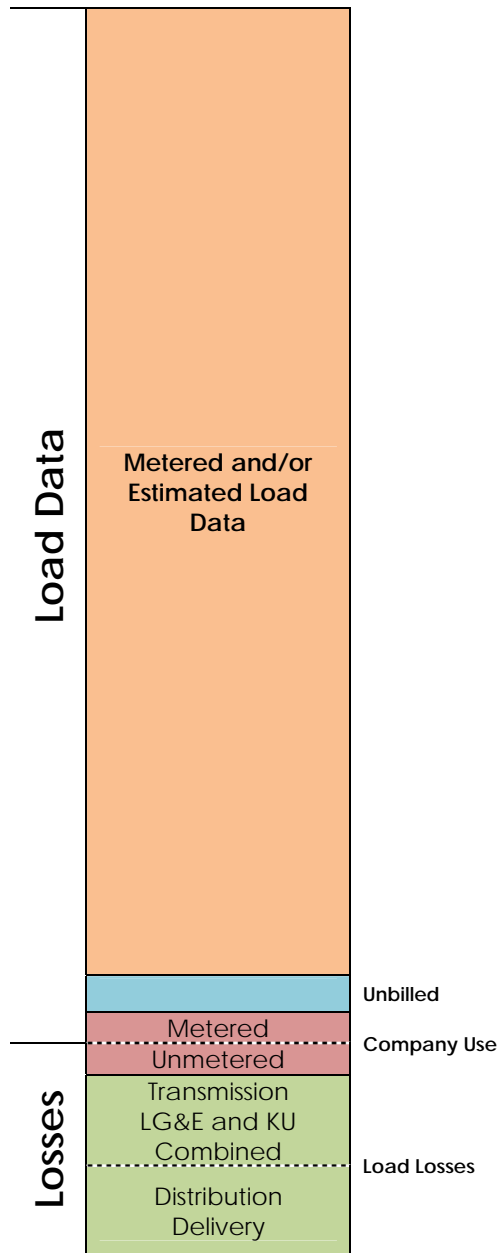
An overview of the loss study is shown on Figure 1 on the next page. Figure 2 simply illustrates the major components that must be considered in a loss analysis.

**LG&E AND KU SERVICES COMPANY
 2010 Analysis of System Losses – KU Power System**



**LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System**

**Figure 2
LG&E and KU Services Company – KU
Jurisdiction Energy and Loss Components**



LG&E AND KU SERVICES COMPANY 2010 Analysis of System Losses – KU Power System

2.0 INTRODUCTION

This report of the 2010 Analysis of System Losses for the KU power system provides a summary of results, conceptual background or methodology, description of the analyses, and input information related to the study.

2.1 Conduct of Study

Typically, between five to ten percent of the total kWh requirements of an electric utility is lost or unaccounted for in the delivery of power to customers. Investments must be made in facilities which support the total load which includes losses or unaccounted for load. Revenue requirements associated with load losses are an important concern to utilities and regulators in that customers must equitably share in all of these cost responsibilities. Loss expansion factors are the mechanism by which customers' metered demand and energy data are mathematically adjusted to the generation or input level (point of reference) when performing cost and revenue calculations.

An acceptable accounting of losses can be determined for any given time period using available engineering, system, and customer data along with empirical relationships. This loss analysis for the delivery of demand and energy utilizes such an approach. A microcomputer loss model⁴ is utilized as the vehicle to organize the available data, develop the relationships, calculate the losses, and provide an efficient and timely avenue for future updates and sensitivity analyses. Our procedures and calculations are similar with prior loss studies, and they rely on numerous databases that include customer statistics and power system investments.

Company personnel performed most of the data gathering and data processing efforts and checked for reasonableness. MAC provided assistance as necessary to construct databases, transfer files, perform calculations, and check the reasonableness of results. A review of the preliminary results provided for additions to the database and modifications to certain initial assumptions based on available data. Efforts in determining the data required to perform the loss analysis centered on information which was available from existing studies or reports within the Company. From an overall perspective, our efforts concentrated on five major areas:

1. System information concerning peak demand and annual energy requirements by voltage level,
2. High voltage power system power flow data and associated loss calculations,
3. Distribution system primary and secondary loss calculations,
4. Derivation of fixed and variable losses by voltage level, and
5. Development of final cumulative expansion factors at each voltage for peak demand (kW) and annual energy (kWh) requirements at the point of delivery (meter).

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2.2 Electric Power Losses

Losses in power systems consist of primarily technical losses with a much smaller level of non-technical losses.

Technical Losses

Electrical losses result from the transmission of energy over various electrical equipment. The largest component of these losses is power dissipation as a result of varying loading conditions and are oftentimes called load losses which are proportional to the square of the current (I^2R). These losses can be as high as 75% of all technical losses. The remaining losses are called no-load and represent essentially fixed (constant) energy losses throughout the year. These no-load losses represent energy required by a power system to energize various electrical equipment regardless of their loading levels. The major portion of no-load losses consists of core or magnetizing energy related to installed transformers throughout the power system.

Non-Technical Losses

These are unaccounted for energy losses that are related to energy theft, metering, non-payment by customers, and accounting errors. Losses related to these areas are generally very small and can be extremely difficult and subjective to quantify. Our efforts generally do not develop any meaningful level as appropriate because we assume that improving technology and utility practices have minimized these amounts.

2.3 Description of Model

The loss model is a customized applications model, constructed using the Excel software program. Documentation consists primarily of the model equations at each cell location. A significant advantage of such a model is that the actual formulas and their corresponding computed values at each cell of the model are immediately available to the analyst.

A brief description of the three (3) major categories of effort for the preparation of each loss model is as follows:

- Main sheet which contains calculations for all primary and secondary losses, summaries of all conductor and transformer calculations from other sheets discussed below, output reports and supporting results.

LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System

- Transformer sheet which contains data input and loss calculations for each distribution substation. Separate iron and copper losses are calculated for each transformer by identified type.

Appendix A presents a separate hourly loss study result which derived the loss factors for the combined LG&E system-wide Transmission only (69 kV through 500 kV) of the LG&E and KU power system. These Transmission results are then incorporated on Table 1 of the Executive Summary to derive the final KU 2010 loss factors by voltage level of energy delivery.

Appendix B presents a detailed loss study result which derives the loss factors for the Company's system-wide power system. Appendix B, Exhibits 8 and 9, presents the final detailed summary results of the demand and energy losses for each major portion of the total KU power system.

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3.0 METHODOLOGY

3.1 Background

The objective of a Loss Study is to provide a reasonable set of energy (average) and demand (peak) loss expansion factors which account for system losses associated with the transmission and delivery of power to each voltage level over a designated period of time. The focus of this study is to identify the difference between total energy inputs and the associated sales with the difference being equitably allocated to all delivery levels. Several key elements are important in establishing the methodology for calculating and reporting the Company's losses. These elements are:

- Selection of voltage level of services,
- Recognition of losses associated with conductors, transformations, and other electrical equipment/components within voltage levels,
- Identification of customers and loads at various voltage levels of service,
- Review of generation or net power supply input at each level for the test period studied, and
- Analysis of kW and kWh sales by voltage levels within the test period.

The three major areas of data gathering and calculations in the loss analysis were as follows:

1. System Information (monthly and annual)
 - MWH generation and MWH sales.
 - Coincident peak estimates and net power supply input from all sources and voltage levels.
 - Customer load data estimates from available load research information, adjusted MWH sales, and number of customers in the customer groupings and voltage levels identified in the model.
 - System default values, such as power factor, loading factors, and load factors by voltage level.

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2010 Analysis of System Losses – KU Power System

2. High Voltage System (Appendix A)
 - Conductor information was summarized from a database by the Company which reflects the transmission system by voltage level. Extensive use was made of the Company's power flow data with the losses calculated and incorporated into the final loss calculations.
 - Transformer information was developed in a database to model transformation at each voltage level. Substation power, step-up, and auto transformers were individually identified along with any operating data related to loads and losses.
 - Power flow data and calculations for each hour (8760) formed the basis for the peak and annual load losses in the high voltage (500 kV through 69 kV) loss calculations.

3. Distribution System (Appendix B)
 - Distribution Substations – Data was developed for modeling each substation as to its size and loading. The Company provided loss characteristics for each transformer. Loss calculations were performed from this data to determine no load losses separately for each transformer. The annual load losses were calculated using an average load level for each transformer which replaced the prior Hoebel formula method.
 - Primary lines – Line loading and loss characteristics for several representative primary circuits were obtained from the Company. These loss results developed kW loss per MW of load and a composite average percentage was calculated to derive the primary loss estimate.
 - Line transformers – Losses in line transformers were based on each customer service group's size, as well as the number of customers per transformer. Accounting and load data provided the foundation with which to model the transformer loadings and to calculate load and no load losses.
 - Secondary network – Typical secondary networks were estimated for conductor sizes, lengths, loadings, and customer penetration for residential and small general service customers.
 - Services – Typical services were estimated for each secondary service class of customers identified in the study with respect to type, length, and loading.

LG&E AND KU SERVICES COMPANY 2010 Analysis of System Losses – KU Power System

The loss analysis was thus performed by constructing the model in segments and subsequently calculating the composite until the constraints of peak demand and energy were met:

- Information as to the physical characteristics and loading of each transformer and conductor segment was modeled.
- Conductors, transformers, and distribution were grouped by voltage level, and unadjusted losses were calculated.
- The loss factors calculated at each voltage level were determined by "compounding" the per-unit losses. Equivalent sales at the supply point were obtained by dividing sales at a specific level by the compounded loss factor to determine losses by voltage level.
- The resulting demand and energy loss expansion factors were then used to adjust all sales to the generation or input level in order to estimate the difference.
- Reconciliation of kW and kWh sales by voltage level using the reported system kW and kWh was accomplished by adjusting the initial loss factor estimates until the mismatch or difference was eliminated (Appendix B, Exhibits 6 and 7).

3.2 Calculations and Analysis

This section provides a discussion of the input data, assumptions, and calculations performed in the loss analysis. Specific appendices have been included in order to provide documentation of the input data utilized in the model.

3.2.1 Bulk and Transmission Lines (500 kV – 69 kV)

The transmission line losses were calculated based on a modeling of unique voltage levels identified by the Company's power flow data and configuration for the entire integrated Power System (Appendix A). Specific information as to length of line, type of conductor, voltage level, and hourly loading were utilized as data input in the power flow analyses.

Actual MW and MVA line loadings were based on KU's hourly loading conditions. Calculations of line losses were performed and summarized by fixed and variable components for both Transmission and GSU facilities for reporting purposes as shown in Appendix A of this report.

LG&E AND KU SERVICES COMPANY 2010 Analysis of System Losses – KU Power System

3.2.2 Bulk and Transmission Transformers

The transmission transformer loss analysis required several steps in order to properly consider the characteristics associated with various transformer types; such as, step-up, auto transformers, distribution substations, and line transformers. In addition, further efforts were required to identify both iron and copper losses within each of these transformer types in order to obtain reasonable peak (kW) and average annual energy (kWh) losses. While iron losses were considered essentially constant for each hour, recognition had to be made for the varying degree of copper losses due to hourly equipment loadings.

The remaining miscellaneous losses considered in the loss study consisted of several areas which do not lend themselves to any reasonable level of modeling for estimating their respective losses and were therefore lumped together into a single loss factor of 0.10%. The typical range of values for these losses is from 0.10% to 0.25%, and we have assumed the lower value to be conservative at this time. The losses associated with this loss factor include bus bars, unmetered station use, and grounding transformers.

3.2.3 Distribution System

The load data at the substation and customer level, coupled with primary and secondary network information, was sufficient to model the distribution system in adequate detail to calculate losses.

Distribution Substations

The Distribution Substation loss derivation required several steps to recognize the loss characteristics relating to iron or fixed losses versus the copper or load varying (I^2R) losses. The fixed component was based on Company loss characteristics from manufacturer's test results. The annual variable loss calculations considered a different approach by using an average hourly loading level and used this to the peak hour losses as a ratio (average/peak)² times 8760 hours with an average adjustment factor and peak hour losses.

Primary Lines

Primary line loadings take into consideration the available distribution load along with the actual customer loads including losses. Primary line loss estimates were prepared by the Company for use in this loss study. These estimates considered loads per substation, voltage levels, loadings, total circuit miles, wire size, and single- to three-phase investment estimates. All of these factors were considered in calculating the actual demand (kW) and energy (kWh) for the primary system.

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Line Transformers

Losses in line transformers were determined based on typical transformer sizes for each secondary customer service group and an estimated or calculated number of customers per transformer. Accounting records and estimates of load data provided the necessary database with which to model the loadings. These calculations also made it possible to determine separate copper and iron losses for distribution line transformers, based on a table of representative losses for various transformer sizes.

Secondary Line Circuits

A calculation of secondary line circuit losses was performed for loads served through these secondary line investments. Estimates of typical conductor sizes, lengths, loadings and customer class penetrations were made to obtain total circuit miles and losses for the secondary network. Customer loads which do not have secondary line requirements were also identified so that a reasonable estimate of losses and circuit miles of these investments could be made.

Service Drops and Meters

Service drops were estimated for each secondary customer reflecting conductor size, length and loadings to obtain demand losses. A separate calculation was also performed using customer maximum demands to obtain kWh losses. Meter loss estimates were also made for each customer and incorporated into the calculations of kW and kWh losses included in the Summary Results.

LG&E AND KU SERVICES COMPANY 2010 Analysis of System Losses – KU Power System

4.0 DISCUSSION OF RESULTS

A brief description of each Exhibit is provided in Appendices A and B:

Exhibit 1 – Summary of Company Data

This exhibit reflects system information used to determine percent losses and a detailed summary of kW and kWh losses by voltage level. The loss factors developed in Exhibit 7 are also summarized by voltage level.

Exhibit 2 – Summary of Conductor Information

A summary of MW and MWH load and no load losses for Distribution conductors by voltage levels is presented. The sum of all calculated losses by high voltage is based on input data information provided in Appendix A. Percent losses are based on equipment loadings.

Exhibit 3 – Summary of Transformer Information

This exhibit summarizes Distribution transformer losses by various types and voltage levels throughout the system. Load losses reflect the copper portion of transformer losses while iron losses reflect the no load or constant losses. MWH losses are estimated using an average load loss factor for copper and the annual load losses times the test year hours.

Exhibit 4 – Summary of Losses Diagram (2 Pages)

This loss diagram represents the inputs and output of power at system peak conditions. Page 1 details information from all points of the power system and what is provided to the distribution system for primary loads. This portion of the summary can be viewed as a "top down" summary into the distribution system.

Page 2 represents a summary of the development of primary line loads and distribution substations based on a "bottom up" approach. Basically, loadings are developed from the customer meter through the Company's physical investments based on load research and other metered information by voltage level to arrive at MW and MVA requirements during peak load conditions by voltage levels.

Exhibit 5 – Summary of Sales and Calculated Losses

Summary of Calculated Losses represents a tabular summary of MW and MWH load and no load losses by discrete areas of delivery within each voltage level. Losses have been identified and are derived based on summaries obtained from Exhibits 2 and 3 and losses associated with meters, capacitors and regulators.

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Exhibit 6 – Development of Loss Factors, Unadjusted

This exhibit calculates demand and energy losses and loss factors by specific voltage levels based on sales level requirements. The actual results reflect loads by level and summary totals of losses at that level, or up to that level, based on the results as shown in Exhibit 5. Finally, the estimated values at generation are developed and compared to actual generation to obtain any difference or mismatch.

Exhibit 7 – Development of Loss Factors, Adjusted

The adjusted loss factors are the results of adjusting Exhibit 6 for any difference. All differences between estimated and actual are prorated to each level based on the ratio of each level's total load plus losses to the system total. These new loss factors reflect an adjustment in losses due only to the kW and kWh mismatch.

Exhibit 8 – Adjusted Losses and Loss Factors by Facility

These calculations present an expanded summary detail of Exhibit 7 for each segment of the power system with respect to the flow of power and associated losses from the receipt of energy at the meter to the generation for the KU power system.

Exhibit 9 – Summary of Losses by Delivery Voltage

These calculations present a reformatted summary of losses presented in Exhibits 7 and 8 by power system delivery segment as calculated by voltage level of service based on reported metered sales.

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2010 Analysis of System Losses – KU Power System

Appendix A

Results of LG&E (KU and LG&E)
Transmission System 2010 Loss Analysis



**Louisville Gas and Electric Company (LGE)
Kentucky Utilities Company (KU)
2011 Transmission Loss Analysis**

Pages 1-2	Index
Schedule 1, Page 3	<p>Presents the summary loss results of the calculated hourly losses for the Company's LGE and KU control areas at the annual peak hour and for the annual average losses for all hours of the year.</p> <p>Calculated loss factors are applicable to the metered (output) sales level. All data is from Schedule 2.</p> <p>Section I - Summarizes the transmission loss results with GSU losses included.</p> <p>Section II - Summarizes GSU only losses.</p> <p>Section III - Summarizes the transmission only losses excluding GSU losses.</p>
Schedule 1A, Page 4	<p>Presents the summary loss results of the calculated hourly losses for the Company's LGE control areas at the annual peak hour and for the annual average losses for all hours of the year.</p>
Schedule 1B, Page 5	<p>Presents the summary loss results of the calculated hourly losses for the Company's KU control areas at the annual peak hour and for the annual average losses for all hours of the year.</p>
Schedule 2, Page 6	<p>Summary of the summer and winter peak hour MW and annual MWH losses for LGE and KU and the total system.</p> <p>Results are detailed by segment and season: Summer (June, July, August, and September), Winter (all months excluding Summer months).</p> <p>Loss data is from Schedule 3.</p>
Schedule 3, Page 7	<p>Summary of MW and MWH loss results for each control area by season and voltage level.</p>
Schedule 4, Page 8	<p>Summary of seasonal peak hour MW and average MWH loss results for LGE by season and voltage level.</p>

**Louisville Gas and Electric Company (LGE)
Kentucky Utilities Company (KU)
2011 Transmission Loss Analysis**

Schedule 5, Summary of seasonal peak hour MW and average MWH loss results for KU by
Page 9 season and voltage level.

Appendices:

Page 10 A - Peak Demand
Page 11 B - Monthly Energy
Page 12 C - Energy Summary
Page 13 D - Demand Summary

Appendices include summaries of hourly calculation of losses for each identified type at transmission voltage levels by season identified by fixed and variable with GSU losses identified separately.

Workpapers:

Page 14 1 - LGE
Page 15 2 - KU

Workpapers 1 and 2 present detailed summary results of eight separate power flows for each control area (LGE and KU) for a total of sixteen unique simulations and loss results.

3 - Corona Loss Calculations

Page 16 Page presents the Corona loss estimate and calculations by voltage level and control area (LGE and KU) for the peak in MW and the annual MWH for 2010.

Page 17 Page presents the pole miles by company and voltage level.

LGEE (LGE & KU) 2011 TRANSMISSION LOSS ANALYSIS (1)

I TRANSMISSION LOSSES WITH GSU		LOSSES	% OF TOTAL TRANSMISSION	INPUT	OUTPUT	LOSS FACTOR (Input/Output)	
A. DEMAND		Peak (MW) Summer (June - September)					
1	LGE	57.9	27.8%	4,060	4,002	1.01448	
2	KU	150.3	72.2%	4,865	4,715	1.03187	
3	Total Demand Losses Combined (3)	208.2	100.0%	7,905	7,697	1.02705	
4	Unmetered Station Use Adjustment					0.00100	
5	Demand Loss Factor					1.02805	
B. ENERGY		Annual MWH					
6	LGE	199,404	21.5%	21,626,727	21,427,323	1.00931	
7	KU	727,568	78.5%	27,462,725	26,735,158	1.02721	
8	Total Energy Losses Combined (3)	926,971	100.0%	43,634,621	42,707,650	1.02171	
9	Unmetered Station Use Adjustment					0.00100	
10	Energy Loss Factor					1.02271	
II TRANSMISSION GSU LOSSES		LOSSES (MW)			LOSSES (MWH)		
		FIXED	VARIABLE	TOTAL	FIXED	VARIABLE	TOTAL
A. GSU LOSSES (2)							
11	LGE	2.90	8.50	11.40	15,715	38,826	54,541
12	KU	2.40	5.40	7.80	14,820	25,784	40,604
13	Total GSU Losses	5.30	13.90	19.20	30,535	64,610	95,145
III TRANSMISSION ONLY LOSSES		LOSSES	% OF TOTAL TRANSMISSION	INPUT	OUTPUT	LOSS FACTOR (Input/Output)	
A. DEMAND LOSSES (Loss II-A)		Peak (MW) Summer (June - September)					
14	LGE	46.5	24.6%	4,049	4,002	1.01163	
15	KU	142.5	75.4%	4,857	4,715	1.03021	
16	Total Demand Combined (2)	189.0	100.0%	7,886	7,697	1.02456	
17	Unmetered Station Use Adjustment					0.00100	
18	Demand Loss Factor					1.02556	
B. ENERGY LOSSES (Loss II-A)		Annual MWH					
19	LGE	144,863	17.4%	21,572,186	21,427,323	1.00676	
20	KU	686,964	82.6%	27,422,121	26,735,158	1.02570	
21	Total Energy Combined (2)	831,826	100.0%	43,539,476	42,707,650	1.01948	
22	Unmetered Station Use Adjustment					0.00100	
23	Energy Loss Factor					1.02048	

Notes:
(1) Study Period from February 2011 through January 2012.
(2) GSU losses from Schedule 3.
(3) See Schedule 1A, Schedule 1B, and Schedule 2.

LGE 2011 TRANSMISSION LOSS ANALYSIS

I TRANSMISSION LOSSES WITH GSU	LOSSES	INPUT	OUTPUT	LOSS FACTOR (Input/Output)			
	<u>Peak (MW) Summer (June - September)</u>						
1	LGE	57.9	4,060	4,002	1.01448		
2	Unmetered Station Use Adjustment				0.00100		
3	Demand Loss Factor				1.01548		
	<u>Annual MWH</u>						
4	LGE	199,404	21,626,727	21,427,323	1.00931		
5	Unmetered Station Use Adjustment				0.00100		
6	Energy Loss Factor				1.01031		
II TRANSMISSION GSU LOSSES	LOSSES (MW)			LOSSES (MWH)			
	FIXED	VARIABLE	TOTAL	FIXED	VARIABLE	TOTAL	
A. GSU LOSSES (1)							
7	LGE	2.90	8.50	11.40	15,715	38,826	54,541
III TRANSMISSION ONLY LOSSES	LOSSES	INPUT	OUTPUT	LOSS FACTOR (Input/Output)			
	<u>Peak (MW) Summer (June - September)</u>						
8	LGE (Line 1 - Line 7)	46.5	4,049	4,002	1.01163		
9	Unmetered Station Use Adjustment				0.00100		
10	Demand Loss Factor				1.01263		
	<u>Annual MWH</u>						
11	LGE (Line 4 - Line 7)	144,863	21,572,186	21,427,323	1.00676		
12	Unmetered Station Use Adjustment				0.00100		
13	Energy Loss Factor				1.00776		

Notes:
1. GSU losses from Schedule 3.
2. See Schedule 2

KU 2011 TRANSMISSION LOSS ANALYSIS

I TRANSMISSION LOSSES WITH GSU

		LOSSES	INPUT	OUTPUT	LOSS FACTOR (Input/Output)
A. DEMAND		<u>Peak (MW) Summer (June - September)</u>			
1	KU	150.3	4,865	4,715	1.03187
2	Unmetered Station Use Adjustment				0.00100
3	Demand Loss Factor				1.03287
B. ENERGY		<u>Annual MWH</u>			
4	KU	727,568	27,462,725	26,735,158	1.02721
5	Unmetered Station Use Adjustment				0.00100
6	Energy Loss Factor				1.02821

II TRANSMISSION GSU LOSSES

		LOSSES (MW)			LOSSES (MWH)		
		FIXED	VARIABLE	TOTAL	FIXED	VARIABLE	TOTAL
A. GSU LOSSES (1)							
7	KU	2.40	5.40	7.80	14,820	25,784	40,604

III TRANSMISSION ONLY LOSSES

		LOSSES	INPUT	OUTPUT	LOSS FACTOR (Input/Output)
A. DEMAND LOSSES		<u>Peak (MW) Summer (June - September)</u>			
8	KU (Line 1 - Line 7)	142.5	4,857	4,715	1.03021
9	Unmetered Station Use Adjustment				0.00100
10	Demand Loss Factor				1.03121
B. ENERGY LOSSES		<u>Annual MWH</u>			
11	KU (Line 4 - Line 7)	686,964	27,422,121	26,735,158	1.02570
12	Unmetered Station Use Adjustment				0.00100
13	Energy Loss Factor				1.02670

Notes:

1. GSU losses from Schedule 3.
2. See Schedule 2

LGEE (LGE & KU) POWER FLOW RESULTS - SUMMARY OF LOSSES

TRANSMISSION LOSSES WITH GSU	PEAK (SUMMER)		PEAK (OTHER)		ANNUAL	
	Total (MW)	% of Total System Losses	Total (MW)	% of Total System Losses	Total Annual (MWH)	% of Total System Losses
<u>LGE</u>						
1 Transmission Use (Peak MW, Annual MWH)	4,002		3,300		21,427,323	
2 Input (Line 1 + Line 5)	4,060		3,328		21,626,727	
Transmission						
3 Fixed	5.9	2.9%	5.2	2.3%	43,657	4.7%
4 Variable	52.0	25.0%	22.5	10.0%	155,747	16.8%
5 Total Transmission - LGE	57.9	27.8%	27.7	12.3%	199,404	21.5%
6 Losses % of Input (Line 5/Line 2)	1.43%		0.83%		0.92%	
7 Losses % of Output (Line 5/Line 1)	1.45%		0.84%		0.93%	
<u>KU</u>						
8 Transmission Use (Peak MW, Annual MWH)	4,715		4,961		26,735,158	
9 Input (Line 8 + Line 12)	4,865		5,159		27,462,725	
Transmission						
10 Fixed	8.2	3.9%	8.1	3.6%	67,476	7.3%
11 Variable	142.0	68.2%	190.0	84.1%	660,091	71.2%
12 Total Transmission - KU	150.3	72.2%	198.1	87.7%	727,568	78.5%
13 Losses % of Input (Line 12/Line 9)	3.09%		3.84%		2.65%	
14 Losses % of Output (Line 2/Line 8)	3.19%		3.99%		2.72%	
<u>TOTAL LGE & KU</u>						
15 LGEE Load (Peak MW, Annual MWH) Input	8,925		8,487		49,089,452	
16 LGE Energy Delivery to KU	-1,020		-1,228		-5,454,831	
17 Total Load (Peak MW, Annual MWH)	7,905		7,259		43,634,621	
Transmission						
18 Fixed	14.2	6.8%	13.4	5.9%	111,133	12.0%
19 Variable	194.0	93.2%	212.5	94.1%	815,838	88.0%
20 Total System	208.2	100.0%	225.9	100.0%	926,971	100.0%
21 Losses % of Input (Line 20/Line 15)	2.33%		2.66%		1.89%	
22 Losses % of Output (Line 20/Line 15/Line 20))	2.39%		2.73%		1.92%	
COMBINED LGEE DELIVERED ENERGY & LOSSES						
	<u>SUMMER</u>		<u>WINTER</u>		<u>ANNUAL</u>	
23 LGEE Load (All data in MWH) Output	17,146,907		31,015,574		48,162,481	
24 LGE Energy Delivery to KU	-1,689,262		-3,765,569		-5,454,831	
25 Total Load (Annual MWH) Output	15,457,645		27,250,005		42,707,650	
Transmission Losses						
26 Fixed	37,940	11.1%	73,193	12.5%	111,133	12.0%
27 Variable	303,970	88.9%	511,869	87.5%	815,838	88.0%
28 Total Transmission Losses	341,909	100.0%	585,062	100.0%	926,971	100.0%
29 Losses % of Output (Line 28/Line 23)	1.99%		1.89%		1.92%	

LGEE (LGE & KU) POWER FLOW RESULTS - TOTAL TRANSMISSION

CONDUCTOR AND TRANSFORMER LOSSES (MW)

TIME	MW TRANSMISSION USE	Transmission Fixed	Transmission Variable	GSU Fixed	GSU Variable	Subtotal Conductor & Transformer	Load Adjustment for Combined Only
OTHER - LGE							
1 PEAK - MW	3,300	3.15	16.50	2.10	6.00	27.75	1228.00
2 LOSS % TO LOAD		0.095%	0.500%	0.064%	0.182%	0.841%	
3 LOSS % TO TOTAL LOSSES		11.349%	59.461%	7.568%	21.622%	100.000%	
4							
5 OTHER MWH	13,679,183	18,668	63,034	10,054	24,023	115,779	3,765,569
6 LOSS % TO LOAD		0.136%	0.461%	0.073%	0.176%	0.846%	
7 LOSS % TO TOTAL LOSSES		16.124%	54.443%	8.684%	20.749%	100.000%	
SUMMER - LGE							
8 PEAK - MW	4,002	3.05	43.50	2.90	8.50	57.95	1020.00
9 LOSS % TO LOAD		0.076%	1.087%	0.072%	0.212%	1.448%	
10 LOSS % TO TOTAL LOSSES		5.262%	75.066%	5.004%	14.668%	100.000%	
11							
12 SUMMER MWH	7,748,140	9,274	53,887	5,661	14,803	83,625	1,689,262
13 LOSS % TO LOAD		0.120%	0.695%	0.073%	0.191%	1.079%	
14 LOSS % TO TOTAL LOSSES		11.090%	64.439%	6.770%	17.702%	100.000%	
TOTAL ANNUAL - LGE							
15 SUMMER PEAK - MW	4,002	3.05	43.50	2.90	8.50	57.95	1020.00
16 ANNUAL MWH	21,427,323	27,942	116,921	15,715	38,826	199,404	5,454,831
17 LOSS % TO TOTAL ANNUAL OUTPUT		0.130%	0.546%	0.073%	0.181%	0.931%	
LOSS FACTORS - LGE							
18 Demand						1.01448	
19 Energy						1.00931	
OTHER - KU							
20 PEAK - MW	4,961	5.81	183.94	2.30	6.10	198.15	
21 LOSS % TO LOAD		0.117%	3.708%	0.046%	0.123%	3.994%	
22 LOSS % TO TOTAL		2.930%	92.831%	1.161%	3.079%	100.000%	
23							
24 OTHER MWH	17,336,391	35,105	408,661	9,366	16,151	469,283	
25 LOSS % TO LOAD		0.202%	2.357%	0.054%	0.093%	2.707%	
26 LOSS % TO TOTAL LOSSES		7.481%	87.082%	1.996%	3.442%	100.000%	
SUMMER - KU							
27 PEAK - MW	4,715	5.81	136.65	2.40	5.40	150.25	
28 LOSS % TO LOAD		0.123%	2.898%	0.051%	0.115%	3.187%	
29 LOSS % TO TOTAL		3.864%	90.945%	1.597%	3.594%	100.000%	
30							
31 SUMMER MWH	9,398,766	17,551	225,647	5,454	9,633	258,285	
32 LOSS % TO LOAD		0.187%	2.401%	0.058%	0.102%	2.748%	
TOTAL ANNUAL - KU							
33 PEAK - MW	4,715	5.81	136.65	2.40	5.40	150.25	
34 ANNUAL MWH	26,735,158	52,656	634,307	14,820	25,784	727,568	
35 LOSS % TO TOTAL ANNUAL OUTPUT		0.197%	2.373%	0.055%	0.096%	2.721%	
LOSS FACTORS - KU							
36 Demand						1.03187	
37 Energy						1.02721	
TOTAL ANNUAL - LGEE OUTPUT & LOSSES							
38 PEAK SUMMER - MW	8,717	8.86	180.15	5.30	13.90	208.20	1020.00
39 SUMMER MWH	17,146,907	26,825	279,534	11,115	24,436	341,909	1,689,262
40 PEAK OTHER MW	8,262	8.96	200.44	4.40	12.10	225.90	1228.00
41 OTHER MWH	31,015,574	53,773	471,695	19,420	40,174	585,062	3,765,569
42 ANNUAL MWH	48,162,481	80,598	751,228	30,535	64,610	926,971	5,454,831

LGE POWER FLOW RESULTS

CONDUCTOR AND TRANSFORMER LOSSES (MW)

TIME	MW-LGE TRANSMISSION USE	Transmission Fixed (4)	Transmission Variable	GSU Fixed	GSU Variable	Subtotal Conductor & Transformer
OTHER - LGE						
1 PEAK - MW	3,300	3.15	16.50	2.10	6.00	27.75
2 LOSS % TO LOAD		0.095%	0.500%	0.064%	0.182%	0.841%
3 LOSS % TO TOTAL LOSSES		11.349%	59.461%	7.568%	21.622%	100.000%
4						
5 OTHER MWH	13,679,183	18,668	63,034	10,054	24,023	115,779
6 LOSS % TO LOAD		0.136%	0.461%	0.073%	0.176%	0.846%
7 LOSS % TO TOTAL LOSSES		16.124%	54.443%	8.684%	20.749%	100.000%
SUMMER - LGE						
8 PEAK - MW	4,002	3.05	43.50	2.90	8.50	57.95
9 LOSS % TO LOAD		0.076%	1.087%	0.072%	0.212%	1.448%
10 LOSS % TO TOTAL LOSSES		5.262%	75.066%	5.004%	14.668%	100.000%
11						
12 SUMMER MWH	7,748,140	9,274	53,887	5,661	14,803	83,625
13 LOSS % TO LOAD		0.120%	0.695%	0.073%	0.191%	1.079%
14 LOSS % TO TOTAL LOSSES		11.090%	64.439%	6.770%	17.702%	100.000%
TOTAL ANNUAL - LGE						
15 SUMMER PEAK - MW	4,002	3.05	43.50	2.90	8.50	57.95
16 LOSS % TO SUMMER PEAK MW		0.076%	1.087%	0.072%	0.212%	1.448%
17 ANNUAL MWH	21,427,323	27,942	116,921	15,715	38,826	199,404
18 LOSS % TO ANNUAL MWH		0.130%	0.546%	0.073%	0.181%	0.931%
LOSS FACTORS - LGE						
19 Demand						1.01448
20 Energy						1.00931

NOTES:

- (1) Summer Period includes June, July, August, and September.
- (2) Other Period includes all non Summer Period months.
- (3) Transmission Use = Load + Exports + Passthroughs
- (4) Transmission Fixed includes Corona Losses

KU POWER FLOW RESULTS

CONDUCTOR AND TRANSFORMER LOSSES (MW)

TIME	MW-KU TRANSMISSION USE	Transmission Fixed (4)	Transmission Variable (5)	GSU Fixed	GSU Variable	Subtotal Conductor & Transformer
OTHER - KU						
1 PEAK - MW	4,961	5.81	183.94	2.30	6.10	198.15
2 LOSS % TO LOAD		0.117%	3.708%	0.046%	0.123%	3.994%
3 LOSS % TO TOTAL LOSSES		2.930%	92.831%	1.161%	3.079%	100.000%
4						
5 OTHER MWH	17,336,391	35,105	408,661	9,366	16,151	469,283
6 LOSS % TO LOAD		0.202%	2.357%	0.054%	0.093%	2.707%
7 LOSS % TO TOTAL LOSSES		7.481%	87.082%	1.996%	3.442%	100.000%
SUMMER - KU						
8 PEAK - MW	4,715	5.81	136.65	2.40	5.40	150.25
9 LOSS % TO LOAD		0.123%	2.898%	0.051%	0.115%	3.187%
10 LOSS % TO TOTAL LOSSES		3.864%	90.945%	1.597%	3.594%	100.000%
11						
12 SUMMER MWH	9,398,766	17,551	225,647	5,454	9,633	258,285
13 LOSS % TO LOAD		0.187%	2.401%	0.058%	0.102%	2.748%
14 LOSS % TO TOTAL LOSSES		6.795%	87.364%	2.112%	3.730%	100.000%
TOTAL ANNUAL - KU						
15 SUMMER PEAK - MW	4,715	5.81	136.65	2.40	5.40	150.25
16 LOSS % TO SUMMER PEAK MW		0.123%	2.898%	0.051%	0.115%	3.187%
17 ANNUAL MWH	26,735,158	52,656	634,307	14,820	25,784	727,568
18 LOSS % TO ANNUAL MWH		0.197%	2.373%	0.055%	0.096%	2.721%
LOSS FACTORS - KU						
19 Demand						1.03187
20 Energy						1.02721

NOTES:

- (1) Summer Period includes June, July, August, and September.
- (2) Other Period includes all non Summer Period months.
- (3) Transmission Use = Load + Exports + Passthroughs
- (4) Transmission Fixed includes Corona Losses
- (5) Transmission Variable includes Losses at 0.5% from Appendix A (MW) and Appendix B (MWH)

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Kentucky Utilities	OTHER 2/11/11 8:00 February-11	SUMMER 7/11/11 16:00 July-11	OTHER	SUMMER
Loads:				
1 KU Load (including losses)	4,292	4,102		
2 EKPC on KU	446	355		
3 TVA on KU	59	58		
4 OMU Load (3%)	-	12		
5 BREC on KU	6	6		
6 KMPA Load (3%)	108	129		
7 Total Load	4,911	4,662	4,911.00	4,662.00
Export (Delivered):				
8 KU Off-System Sales	-	-		
9 AMEM - Pass Through	-	-		
10 CARGILL - Pass Through	-	-		
11 OMU Exports	249	204		
12 KMPA Exports	-	-		
13 Constellation - Pass Through	-	-		
14 TEA - Pass Through	-	-		
15 TVA (OATT) - Pass Through	-	-		
16 Total Exports	249	204	249.00	204.00
17 BTM (0.5%) - OMU Network Load	112	182		
18 BTM (0.5%) - KMPA Gen	-	49		
19 Total BTM	112	231		
20 Losses at 0.5%	0.560	1.155	5,160.00	4,866.00
21 Losses from Schedule 5, Lines 1 and 8			-198.71	-151.41
22 Peak MW Load			4,961.29	4,714.59



Louisville Gas and Electric

Loads:				
23 LGE Load (including losses)	1,725	2,654		
23 EKPC on LGE	61	77		
24 Hoosier on LGE	5	6		
25 Total Load	1,791	2,737	1,791.00	2,737.00
Export (Delivered):				
26 IMEA	146	146		
27 IMPA	155	157		
28 LGE Off-System Sales	8	-		
29 OVEC to SIGE	-	-		
30 Total Exports	309	303	309.00	303.00
31 LGE to KU	1,228	1,020	1,228.00	1,020.00
32 Losses from Schedule 4, Lines 1 and 8			3,328.00	4,060.00
33 Peak MW Load			-27.75	-57.95
			3,300.25	4,002.05

Notes:

- (1) Information above was gathered through the Peak Load spreadsheet which is used for FERC Form 1 data collection. Additionally, information was gathered from the individual billings each month, which also flows into FERC Form 1.
- (2) OSS information was gathered through multiple spreadsheets from Revenue Accounting and Transmission groups.

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Kentucky Utilities

Prepared by: FR/DH

	February-11	March-11	April-11	May-11	June-11	July-11	August-11	September-11	October-11	November-11	December-11	January-12	Total	Other	Summer
Loads:															
1 KU Load (including losses)	1,882,033	1,838,010	1,567,127	1,688,187	1,906,541	2,167,087	2,097,914	1,653,158	1,650,548	1,687,623	1,918,215	2,083,767	22,140,210		
2 EKPC on KU	192,766	183,756	155,967	163,451	164,293	182,579	182,121	147,273	142,289	161,421	192,322	213,632	2,081,870		
3 TVA on KU	30,019	26,656	20,497	22,985	27,885	34,587	29,211	21,634	19,664	26,719	36,278	34,830	330,965		
4 OMU Load (3%)	-	-	-	555	-	1,043	1,328	165	6,757	-	-	-	-	9,848	
5 BREC on KU	3,047	2,972	2,440	2,382	2,575	2,943	3,367	3,272	3,715	2,495	3,797	4,364	37,370		
6 KMPA Load (3%)	53,933	54,624	50,868	58,455	71,032	79,177	77,514	57,137	49,740	51,011	56,115	56,274	715,880		
7 Total Load	2,161,798	2,106,018	1,796,898	1,936,015	2,172,326	2,467,416	2,391,455	1,882,639	1,872,713	1,929,269	2,206,727	2,392,867	25,316,143	16,402,307	8,913,836
Export (Delivered):															
8 KU Off-System Sales	10,003	1,971	14	13,001	23,568	12,175	4,828	384	29,307	2,890	542	265	98,948		
9 AMEM - Pass Through	-	-	2,400	-	-	-	-	-	12,000	2,400	11,338	51,500	79,638		
10 CARGILL - Pass Through	31,261	100	-	23,399	2,400	-	-	20,527	13,749	70	-	-	91,506		
11 OMU Exports	165,206	183,023	175,905	50,051	156,463	143,444	137,842	155,042	106,507	137,874	176,030	158,940	1,746,327		
12 KMPA Exports	-	-	-	-	-	-	-	-	59	-	-	-	59		
13 Constellation - Pass Through	-	-	-	11,734	4,740	24,485	34,163	25,048	34,099	-	-	-	134,269		
14 TEA - Pass Through	-	-	-	-	-	-	-	-	59	66	-	-	125		
15 TVA (OATT) - Pass Through	-	-	308	-	-	-	-	-	-	-	-	-	308		
16 Total Exports	206,470	185,094	178,627	98,185	187,171	180,104	176,833	201,001	195,780	143,300	187,910	210,705	2,151,180	1,406,071	745,109
17 BTM (0.5%) - OMU Network Load	64,375	67,851	62,989	71,662	86,097	103,156	96,293	73,876	61,587	65,420	69,832	70,719	893,857		
18 BTM (0.5%) - KMPA Gen	-	-	-	1,054	4,315	9,837	4,422	858	1,839	-	1,479	1,872	25,677		
19 Total BTM	64,375	67,851	62,989	72,716	90,412	112,993	100,715	74,734	63,426	65,420	71,311	72,591	919,534		
20 Losses at 0.5%	322	339	315	364	452	565	504	374	317	327	357	363	4,598		
21 Total MWH Input														17,808,378	9,658,945
22 Losses from Schedule 5, Lines 5 and 12														-471,986	-260,179
23 Total MWH Output														17,336,391	9,398,766

Louisville Gas and Electric

	February-11	March-11	April-11	May-11	June-11	July-11	August-11	September-11	October-11	November-11	December-11	January-12	Total	Other	Summer
Loads:															
23 LGE Load (including losses)	903,869	935,217	852,840	998,568	1,189,433	1,431,090	1,316,506	968,118	877,979	870,461	958,046	988,020	12,290,147		
24 EKPC on LGE	25,617	24,530	20,953	24,482	30,141	37,883	33,856	23,583	21,869	22,649	27,706	29,346	322,615		
25 Hoosier on LGE	3,006	3,093	2,628	3,247	3,465	3,908	3,767	3,220	3,081	2,998	3,210	3,263	38,886		
26 Total Load	932,492	962,840	876,421	1,026,297	1,223,039	1,472,881	1,354,129	994,921	902,929	896,108	988,962	1,020,629	12,651,648	7,606,677	5,044,971
Export (Delivered):															
27 IMEA	87,925	74,691	45,921	89,073	102,288	100,626	86,582	74,691	75,238	61,640	90,715	99,872	989,262		
28 IMPA	93,431	79,319	48,912	94,516	107,515	106,729	90,741	77,329	79,575	65,340	97,587	105,971	1,046,965		
29 LGE Off-System Sales	155,240	139,458	45,904	124,917	96,244	96,890	49,158	108,739	205,726	207,341	158,716	95,688	1,484,021		
30 OVEC to SIGE	-	-	-	-	-	-	-	-	-	-	-	-	-		
31 Total Exports	336,596	293,468	140,737	308,506	306,047	304,245	226,481	260,759	360,539	334,321	347,018	301,531	3,520,248	2,422,716	1,097,532
32 LGE to KU	484,518	444,877	370,225	397,072	364,002	440,065	446,201	438,994	458,456	438,203	561,790	610,428	5,454,831	3,765,569	1,689,262
33 Total MWH Input														13,794,962	7,831,765
34 Losses from Schedule 4, Lines 5 and 12														-115,779	-83,625
35 Total MWH Output														13,679,183	7,748,140

Information above was gathered through the Peak Load spreadsheet which is used for FERC Form 1 data collection. Additionally, information was gathered from the individual billings each month, which also flows into FERC Form 1 OSS information was gathered through multiple spreadsheets from Revenue Accounting and Transmission groups.

LGEE Loss Summary

LGE Loss Summary			Transmission Losses		Generation Losses	
Season	Month		Fixed	Variable	Fixed	Variable
1	O	01	1,944	8,405	1,405	3,124
2	O	02	1,753	7,950	1,165	3,114
3	O	03	1,970	8,159	1,205	3,317
4	O	04	1,923	6,323	1,217	2,547
5	O	05	1,978	9,932	1,207	3,076
6	S	06	1,877	13,384	1,289	3,615
7	S	07	1,933	16,655	1,542	4,380
8	S	08	1,940	15,067	1,454	3,936
9	S	09	1,915	8,781	1,376	2,872
10	O	10	1,999	7,087	1,180	2,917
11	O	11	1,937	6,926	1,273	2,856
12	O	12	1,960	8,252	1,402	3,072
13		Total	23,129	116,921	15,715	38,826
14		Summer Corona	1,609			
15	S	Total LGE Summer	9,274	53,887	5,661	14,803
16		Other Corona	3,204			
17	O	Total LGE Other	18,668	63,034	10,054	24,023

KU Loss Summary			Transmission Losses		Generation Losses	
Season	Month		Fixed	Variable	Fixed	Variable
18	O	01	3,246	66,020	1,272	2,314
19	O	02	2,937	65,153	1,209	2,146
20	O	03	3,279	51,357	1,244	2,220
21	O	04	3,200	40,542	1,058	1,929
22	O	05	3,312	41,568	1,190	2,000
23	S	06	3,155	59,549	1,405	2,449
24	S	07	3,247	64,025	1,459	2,832
25	S	08	3,260	61,754	1,436	2,666
26	S	09	3,187	42,213	1,154	1,686
27	O	10	3,306	42,719	1,079	1,752
28	O	11	3,189	49,382	1,089	1,865
29	O	12	3,271	54,623	1,225	1,925
30		Total	38,589	638,905	14,820	25,784
31		Summer Corona	4,702			
32	S	Total KU Summer	17,551	227,541	5,454	9,633
33		Other Corona	9,365			
34	O	Total KU Other	35,105	411,364	9,366	16,151

LGEE Loss Summary			Transmission Losses		Generation Losses	
Season	Month		Fixed	Variable	Fixed	Variable
35	O	01	5,190	74,425	2,677	5,438
36	O	02	4,690	73,103	2,374	5,260
37	O	03	5,249	59,516	2,449	5,537
38	O	04	5,123	46,865	2,275	4,476
39	O	05	5,290	51,500	2,397	5,076
40	S	06	5,032	72,933	2,694	6,064
41	S	07	5,180	80,680	3,001	7,212
42	S	08	5,200	76,821	2,890	6,602
43	S	09	5,102	50,994	2,530	4,558
44	O	10	5,305	49,806	2,259	4,669
45	O	11	5,126	56,308	2,362	4,721
46	O	12	5,231	62,875	2,627	4,997
47		Total	61,718	755,826	30,535	64,610
48		Summer Corona	6,311			
49	S	Total LGEE Summer	26,825	281,428	11,115	24,436
50		Other Corona	12,569			
51	O	Total LGEE Other	53,773	474,398	19,420	40,174

Notes:

(1) Includes Corona Losses from Workpaper 3

Summer Peak Hour 2011-07-11-1600

		Transmission Losses		Generation Losses	
		Fixed (1)	Variable	Fixed	Variable
1	KU	5.8	137.8	2.4	5.4
2	LG&E	3.0	43.5	2.9	8.5
3	Combined	8.9	181.3	5.3	13.9

Winter Peak Hour 2011-02-11-0800

		Transmission Losses		Generation Losses	
		Fixed (1)	Variable	Fixed	Variable
4	KU	5.8	184.5	2.3	6.1
5	LG&E	3.1	16.5	2.1	6.0
6	Combined	9.0	201.0	4.4	12.1

		Corona Losses (MW)
		Fixed (1)
7	KU	1.606
8	LG&E	0.549
9	Combined	2.155

Notes:

(1) Includes Corona Losses from Workpaper 3

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Hour	LG&E Load	KU on LG&E	EKPC on LG&E	HE on LG&E	LG&E T Loss-f	LG&E T Loss-v	LG&E G Loss-f	LG&E G Loss-v	Net Export	BLG Export	Month
2011-02-01-0100	1217.7	6.3	35.6	4.3	2.6	11.5	1.7	4.6	1394.6	0	02
2011-02-01-0200	1179.1	6	34.4	4.4	2.6	11	1.7	4.4	1373.9	0	02
2011-02-01-0300	1147.9	5.8	33.6	4	2.6	10.8	1.7	4.3	1354.7	0	02
2011-02-01-0400	1138.1	5.6	33	4	2.6	11.6	1.7	4.3	1374.9	0	02
2011-02-01-0500	1149.1	5.7	33.8	3.9	2.6	12	1.7	4.5	1398.1	0	02
2011-02-01-0600	1201.1	6	37.3	4	2.6	12.5	1.7	4.6	1379.2	0	02
2011-02-01-0700	1347.6	6.8	41.9	4.1	2.6	15.3	1.7	5.6	1454.3	0	02
2011-02-01-0800	1429.8	7.2	43.4	4.3	2.6	15.6	1.7	5.6	1354.1	0	02
2011-02-01-0900	1431	7.1	41.9	4.7	2.6	15.6	1.7	5.5	1329.5	0	02
2011-02-01-1000	1424.8	7	41	4.6	2.6	15.4	1.7	5	1236.6	0	02
2011-02-01-1100	1440.5	7	40.8	4.6	2.6	14	1.7	4.6	1122.7	0	02
2011-02-01-1200	1442.4	6.9	40.3	4.5	2.6	14.3	1.7	4.7	1132	0	02
2011-02-01-1300	1438.7	6.8	40.3	4.5	2.6	14.5	1.7	4.8	1159.1	0	02
2011-02-01-1400	1394.7	6.7	39.4	4.4	2.6	13.6	1.7	4.6	1138.9	0	02
2011-02-01-1500	1371.6	6.6	39	4.6	2.6	13.2	1.7	4.3	1098	0	02
2011-02-01-1600	1388.5	6.7	39.7	4.6	2.6	13.2	1.7	4.2	1038.9	0	02
2011-02-01-1700	1408.8	6.8	41.6	4.3	2.6	13.5	1.7	4.3	1064.8	0	02
2011-02-01-1800	1448.7	7	44.2	4.3	2.6	14.7	1.7	4.6	1129.1	0	02
2011-02-01-1900	1483.7	7.2	45.7	4.4	2.6	15.1	1.7	4.8	1162.1	0	02
2011-02-01-2000	1450.8	7.1	45.2	4.7	2.6	15	1.7	4.6	1149.2	0	02
2011-02-01-2100	1414.2	7	44	4.7	2.6	14.5	1.7	4.6	1163.9	0	02
2011-02-01-2200	1337.9	6.6	41.1	4.6	2.6	12.8	1.7	4.5	1190.9	0	02
2011-02-01-2300	1255.5	6.1	37.2	4.2	2.6	11.5	1.7	4.1	1168.2	0	02
2011-02-02-0000	1140.4	5.7	32.8	4	2.6	9	1.7	3.4	1062.1	0	02
2011-02-02-0100	1076.3	5.4	30.7	4.3	2.6	8.1	1.7	3.2	1029.2	0	02
2011-02-02-0200	1046.7	5.3	30.5	4.2	2.6	7.9	2.1	3.3	1168.7	0	02
2011-02-02-0300	1071.2	5.4	32.4	4.1	2.6	8.1	2.1	3.5	1273.5	0	02
2011-02-02-0400	1101.7	5.7	35.5	4.2	2.6	8.3	2	3.6	1282.3	0	02
2011-02-02-0500	1162.1	6.1	38.3	4.3	2.6	9.4	2.1	4.2	1451.1	0	02
2011-02-02-0600	1230.2	7	42.9	4.5	2.6	10.5	2.1	4.6	1495.4	0	02
2011-02-02-0700	1387.9	8.1	49.3	4.7	2.6	13.1	2.1	5.6	1531.5	0	02
2011-02-02-0800	1502.7	9	51.8	4.6	2.6	15.4	2.1	6.5	1611.9	0	02
2011-02-02-0900	1511.5	9	50.4	4.6	2.6	15.2	2.1	6.3	1585.1	0	02
2011-02-02-1000	1514.9	9.3	49.8	4.8	2.6	15.1	2.1	6.2	1560.6	0	02
2011-02-02-1100	1544.2	9.1	49.4	4.9	2.6	15.6	2.1	6.4	1580	0	02
2011-02-02-1200	1552	9.1	49	4.7	2.6	15.7	2.1	6.4	1549	0	02
2011-02-02-1300	1558.5	9	48.6	4.5	2.6	15.9	2.1	6.8	1617.1	0	02
2011-02-02-1400	1559.7	8.9	48.3	4.5	2.6	16	2.1	6.7	1606.8	0	02
2011-02-02-1500	1554.9	8.8	47.3	4.5	2.6	15.8	2.1	6.6	1601.7	0	02
2011-02-02-1600	1538.9	8.7	47.9	4.6	2.6	15.6	2.1	6.5	1595	0	02
2011-02-02-1700	1537.9	8.6	50.4	5	2.6	15.6	2.1	6.9	1654.1	0	02
2011-02-02-1800	1556.3	9	52.5	5	2.6	15.6	2.1	6.7	1595.9	0	02
2011-02-02-1900	1616.8	9.4	56.5	5	2.6	16.6	2.1	6.5	1492.9	0	02
2011-02-02-2000	1618.7	9.4	57.6	5	2.6	16.6	2.1	6.5	1486	0	02

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Hour	KU Load	KU on LG&E	KU on EKPC	EKPC on KU	BREC on KU	TVA on KU	OMU on KU	KMPA on KU	KU T Loss-f	KU T Loss-v	KU G Loss-f	KU G Loss-v	Net Export	OMU Export	PADP Gen	Month
2011-02-01-0100	2345.7	6.3	59.6	280.6	5	37.6	82	68.6	4.4	85.8	1.9	2.1	-1050.5	146.1	0	02
2011-02-01-0200	2259.9	6	57.9	265.6	4.9	35.2	83.5	65	4.4	82.9	1.9	1.9	-924.7	200.2	0	02
2011-02-01-0300	2191.3	5.8	56.9	257.6	4.7	33.7	82.5	63.8	4.4	82.7	1.9	1.8	-891.2	209	0	02
2011-02-01-0400	2131.8	5.6	56.5	257.6	4.7	32.5	83.8	63.4	4.4	88.1	1.9	1.9	-713	261.3	0	02
2011-02-01-0500	2137.1	5.7	56.5	259.3	4.5	32.5	85.3	64.1	4.4	88	1.9	2.1	-658.3	285.5	0	02
2011-02-01-0600	2244.3	6	58.2	274.8	5.3	33.8	86.3	66.1	4.4	92.3	1.9	2.3	-679.2	282.5	0	02
2011-02-01-0700	2500.3	6.8	62.4	286.8	5.5	37.6	91.7	72.1	4.3	103.6	1.9	3.5	-549.8	277.5	0	02
2011-02-01-0800	2682.1	7.2	67.2	271.4	5.6	43	102.2	82.5	4.3	100	1.9	3.5	-768.4	277	0	02
2011-02-01-0900	2691.9	7.1	68.7	287	5.7	40.3	110.7	88.1	4.3	100.7	1.9	3.5	-802.1	259.3	0	02
2011-02-01-1000	2698.6	7	69	273.9	6.1	38.8	111.1	91.6	4.3	100.1	1.9	3.5	-811.1	222.6	0	02
2011-02-01-1100	2693.2	7	68.6	279.1	5.4	38.7	111.1	92.6	4.4	92.6	1.9	3.1	-1025.6	139.2	0	02
2011-02-01-1200	2651	6.9	67.8	248.7	5.9	38.1	111	93.1	4.4	90.2	1.9	3	-973.1	146.9	0	02
2011-02-01-1300	2613.9	6.8	67	275.6	6	37.6	110	93.3	4.4	90.3	1.8	3.2	-891.5	181	0	02
2011-02-01-1400	2572.4	6.7	66.8	272.8	5.7	37.1	108.8	92.7	4.4	85.9	1.8	2.9	-969.7	143.2	0	02
2011-02-01-1500	2589.4	6.6	67.4	265.5	5.9	36.7	111.3	91.2	4.4	86.2	1.8	3.1	-898.7	166	0	02
2011-02-01-1600	2575.3	6.7	66.9	274.1	6.1	36.9	111.4	89.8	4.4	88.3	1.8	3.3	-812.7	181	0	02
2011-02-01-1700	2602.6	6.8	67.8	275.4	6.3	38.4	108.4	87.5	4.4	91.7	1.8	3.4	-803	190.5	0	02
2011-02-01-1800	2624.9	7	68.9	238.4	5.8	41.1	109.3	86.5	4.4	94.1	1.8	3.5	-723.5	205.5	0	02
2011-02-01-1900	2663.8	7.2	69.2	302.1	5.5	43.6	111.1	87.6	4.4	92.3	1.8	3.7	-789.1	204.2	0	02
2011-02-01-2000	2622.6	7.1	68.4	289	5.7	44.3	112.1	87.7	4.4	93.4	1.8	3.6	-713.7	256.7	0	02
2011-02-01-2100	2563.1	7	66.5	273.6	6	43.4	110.2	89.2	4.4	90.2	1.8	3.4	-687.2	282	0	02
2011-02-01-2200	2507.5	6.6	64.8	209.9	6.6	42.3	103.5	89.6	4.4	82.9	1.8	3	-751.7	205	0	02
2011-02-01-2300	2368.7	6.1	61.7	207	6	40.3	99.1	87.9	4.4	79.3	1.8	2.5	-830.1	182.7	0	02
2011-02-02-0000	2254.8	5.7	59.2	259.1	6.1	39.4	100.7	85.1	4.4	67.9	1.8	1.7	-1208.7	5.4	0	02
2011-02-02-0100	2176.4	5.4	57.5	224.2	5	38.8	96.9	81.1	4.4	58.5	1.8	1.6	-1101	62.2	0	02
2011-02-02-0200	2133.6	5.3	56.1	215.2	5.4	41	96.4	79.9	4.4	65.9	1.8	1.8	-950.7	105.5	0	02
2011-02-02-0300	2110	5.4	57.9	216.3	5.3	44.4	98.6	79.9	4.4	68.5	1.8	1.7	-899.7	151.2	0	02
2011-02-02-0400	2176.8	5.7	60.6	227	5.2	47	96.1	79.4	4.4	69.7	1.8	1.8	-955	156	0	02
2011-02-02-0500	2336.8	6.1	63.4	169.1	5	48.8	95.2	80.5	4.4	77.7	1.8	1.9	-1049.8	155.8	0	02
2011-02-02-0600	2567.8	7	68.1	194.7	5.6	52.8	96.9	83.3	4.4	88.2	1.8	2.4	-1133.3	155	0	02
2011-02-02-0700	2924.8	8.1	74.6	226.9	5.4	58.2	102.9	89.2	4.3	112.3	1.9	3.4	-1207.1	154.8	0	02
2011-02-02-0800	3226	9	81.8	238.4	5.4	64.2	113.3	99.3	4.3	124.3	1.9	4.5	-1232.2	149.9	0	02
2011-02-02-0900	3300.9	9	84.2	232.4	6	62.8	119.2	103.1	4.3	126.6	1.9	4.6	-1250.3	142.5	0	02
2011-02-02-1000	3382	9.3	84.9	235.4	6.4	63	121.8	105.2	4.3	133.4	1.9	4.8	-1295.4	137.9	0	02
2011-02-02-1100	3356	9.1	85.9	238.8	6.8	63.9	123.4	106.3	4.3	134.6	1.9	4.8	-1275.6	137.7	0	02
2011-02-02-1200	3363.5	9.1	86.2	239.7	6.6	62.9	123.4	106.9	4.3	136.2	2	4.8	-1235.3	138.5	0	02
2011-02-02-1300	3378.4	9	85.4	236.6	6.5	62.3	123.5	106.1	4.3	141.1	2	4.7	-1315.8	137.3	0	02
2011-02-02-1400	3340.1	8.9	85.3	232.6	7.3	60.8	125.9	104.4	4.3	142.4	2	4.7	-1293.7	137.4	0	02
2011-02-02-1500	3329	8.8	84.5	230.2	6.9	60.1	127.1	103.6	4.3	141.5	2	4.6	-1289.9	137.4	0	02
2011-02-02-1600	3260.3	8.7	83.9	232.4	7.1	60.1	125.4	102.5	4.3	139.7	2	4.5	-1250.9	138.6	0	02
2011-02-02-1700	3267.5	8.6	84.2	273.5	7.4	61.6	110.9	100.9	4.3	142.4	1.9	4.4	-1376.6	138.8	0	02
2011-02-02-1800	3385	9	85	325.2	7.4	64.4	112.4	102.1	4.3	138.9	1.9	4.6	-1384.8	180.4	0	02
2011-02-02-1900	3495.9	9.4	86.9	325.3	6.7	68.5	119	106.7	4.3	143.5	1.9	4.9	-1408.1	233.8	0	02
2011-02-02-2000	3498	9.4	87.8	340	6.3	69.5	122.9	108.5	4.3	146.4	1.9	4.9	-1405.7	260.1	0	02

LGE & KU - CORONA LOSS ESTIMATE

	VOLTAGE (kV)	MILES	CORONA PEAK LOSS FACTOR (MW Mile)	CORONA LOSSES (MW)	CORONA WINTER HOURS & LOSSES (MWH)	CORONA SUMMER HOURS & LOSSES (MWH)	CORONA TOTAL LOSSES (MWH)
A. Fair Weather Corona Losses							
	LGE				5,832	2,928	
1	345	172	0.0032	0.549	3,204	1,609	4,813
2	161	116	0.0000	0.000	0	0	0
3	138	334	0.0000	0.000	0	0	0
4	69	289	0.0000	0.000	0	0	0
5	Subtotal	911		0.549	3,204	1,609	4,813
	KU				5,832	2,928	
6	500	57	0.0060	0.341	1,990	999	2,989
7	345	395	0.0032	1.265	7,375	3,703	11,078
8	161	518	0.0000	0.000	0	0	0
9	138	888	0.0000	0.000	0	0	0
10	69	2,218	0.0000	0.000	0	0	0
11	Subtotal	4,076		1.606	9,365	4,702	14,067
12	TOTAL	4,987		2.155	12,569	6,311	18,880
B. Unmetered Station Use							
13	Estimated Unmetered Substation Use at			0.0010			

NOTE:

(1) Lines 5 and 11 loss results included in Schedules 3, 4, and 5.

LGE & KU

Voltage by Company	Number of Miles		
	LGE	KU	Total
1 LGE			
2 Overhead			
3 345	171.7		
4 161	116.4		
5 138	329.6		
6 69	286.3		
7 Total Overhead	904.0		904.0
8			
9 Underground			
10 138	4.0		
11 69	2.9		
12 Total Underground	6.9		6.9
13			
14 Total LGE	910.9		910.9
15			
16 KU			
17 500		56.9	
18 345		395.2	
19 161		518.2	
20 138		887.6	
21 69		2,218.4	
22			
23 Total KU		4,076.3	4,076.3
24			
25			
26 Total Pole Miles	910.9	4,076.3	4,987.2

LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System

Appendix B

Results of KU
2010 Loss Analysis



KENTUCKY UTILITIES 2010 LOSS ANALYSIS

KENTUCKY UTILITIES

EXHIBIT 1

SUMMARY OF COMPANY DATA

ANNUAL PEAK	4,354 MW
ANNUAL SYSTEM INPUT	23,358,179 MWH
ANNUAL SALES	22,015,243 MWH
SYSTEM LOSSES @ INPUT	1,342,936 or 5.75%
SYSTEM LOAD FACTOR	61.2%

SUMMARY OF LOSSES - OUTPUT RESULTS

SERVICE	KV	--- MW ---	% TOTAL	--- MWH ---	% TOTAL
		Input		Input	
TRANS	500,345,138 69	138.9	44.78%	642,185	47.82%
		3.19%		2.75%	
PRIM SUBS	33,12,1	20.6	6.64%	102,336	7.62%
		0.47%		0.44%	
PRIMARY	33,12,1	91.5	29.49%	267,414	19.91%
		2.10%		1.14%	
SECONDARY	120/240,to,477	59.2	19.09%	331,001	24.65%
		1.36%		1.42%	
TOTAL		310.2	100.00%	1,342,936	100.00%
		7.12%		5.75%	

SUMMARY OF LOSS FACTORS

SERVICE	KV	CUMMULATIVE SALES EXPANSION FACTORS			
		DEMAND (Peak)		ENERGY (Annual)	
		d	1/d	e	1/e
TOT TRANS	500,345,138 69	1.03295	0.96810	1.02827	0.97251
PRIM SUBS	33,12,1	1.03883	0.96262	1.03382	0.96728
PRIMARY	33,12,1	1.06632	0.93781	1.05011	0.95228
SECONDARY	120/240,to,477	1.09017	0.91729	1.07651	0.92892

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

SUMMARY OF CONDUCTOR INFORMATION

EXHIBIT 2

DESCRIPTION	CIRCUIT MILES	LOADING % RATING	---- MW LOSSES ----		TOTAL
			LOAD	NO LOAD	
--- BULK ----- 500 KV OR GREATER -----					
TIE LINES	0.0	0.00%	0.000	0.000	0.000
<u>BULK TRANS</u>	<u>0.0</u>	<u>0.00%</u>	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
SUBTOT	0.0		0.000	0.000	0.000
--- TRANS ----- 138 KV TO 500.00 KV -----					
TIE LINES	0	0.00%	0.000	0.000	0.000
TRANS1	345 KV	0.0	0.00%	0.000	0.000
<u>TRANS2</u>	<u>138 KV</u>	<u>0.0</u>	<u>0.00%</u>	<u>0.000</u>	<u>0.000</u>
SUBTOT		0.0		0.000	0.000
--- SUBTRANS ----- 35 KV TO 138 KV -----					
TIE LINES	0	0.00%	0.000	0.000	0.000
SUBTRANS1	KV	0.0	0.00%	0.000	0.000
SUBTRANS2	KV	0.0	0.00%	0.000	0.000
<u>SUBTRANS3</u>	<u>KV</u>	<u>0.0</u>	<u>0.00%</u>	<u>0.000</u>	<u>0.003</u>
SUBTOT		0.0		0.000	0.003
PRIMARY LINES	16,372		80.472	4.246	84.718
SECONDARY LINES	3,708		4.160	0.000	4.160
SERVICES	7,637		9.210	1.131	10.341
TOTAL	27,717		93.843	5.380	99.223

---- MWH LOSSES ----		
LOAD	NO LOAD	TOTAL
0	0	0
<u>0</u>	<u>0</u>	<u>0</u>
0	0	0
0	0	0
0	0	0
<u>0</u>	<u>26</u>	<u>26</u>
0	26	26
230,573	37,193	267,766
11,528	0	11,528
29,961	9,910	39,872
272,062	47,130	319,192

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

SUMMARY OF TRANSFORMER INFORMATION

EXHIBIT 3

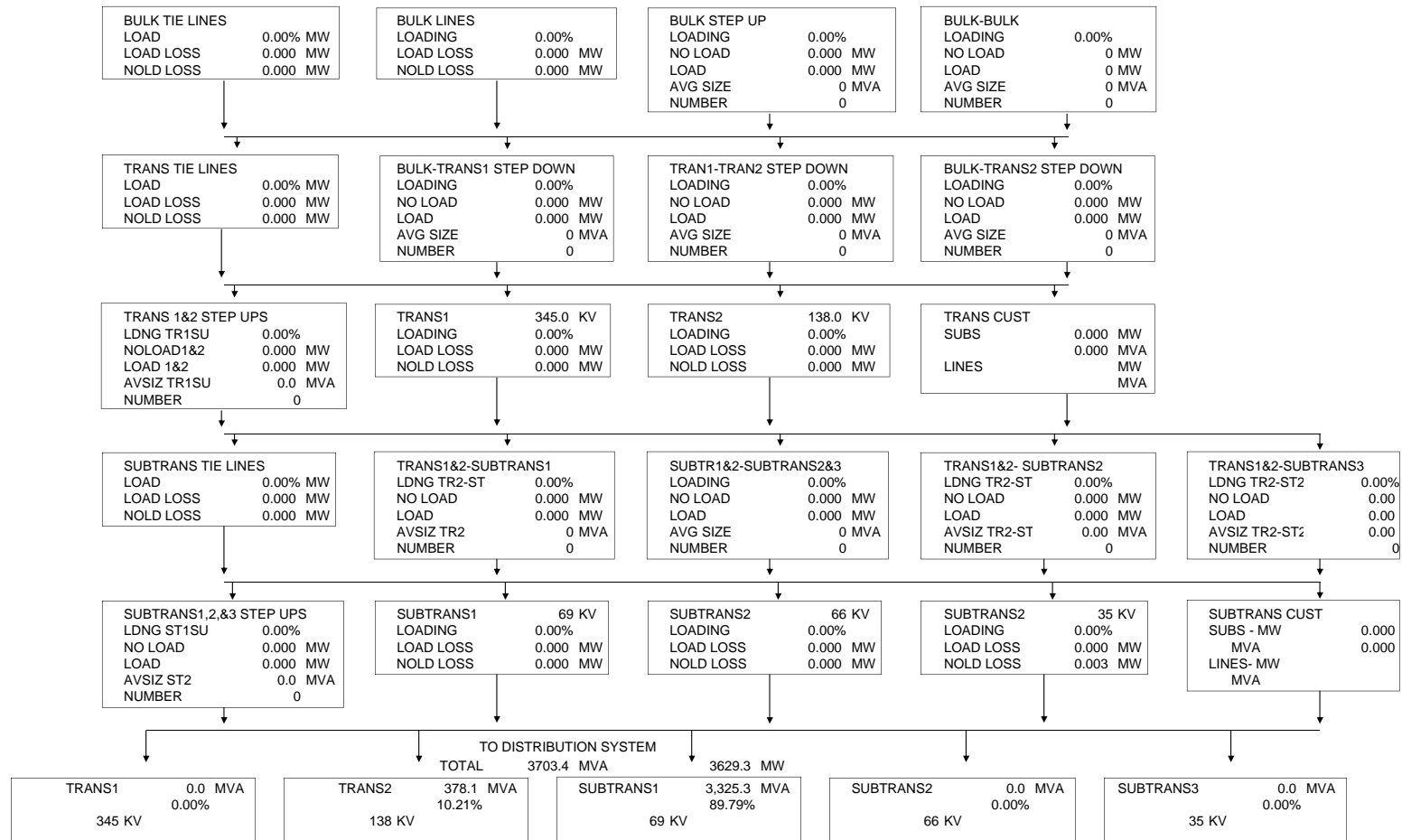
DESCRIPTION	KV CAPACITY		NUMBER TRANSFMR	AVERAGE SIZE	LOADING %	MVA LOAD	MW LOSSES			MWH LOSSES		
	VOLTAGE	MVA					LOAD	NO LOAD	TOTAL	LOAD	NO LOAD	TOTAL
BULK STEP-UP	500	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
BULK - BULK		0.0	0	0.0	0.00%	0	0	0.000	0.000	0	0	0
BULK - TRANS1	345	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
BULK - TRANS2	138	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1 STEP-UP	345	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1 - TRANS2	138	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1-SUBTRANS1	69	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1-SUBTRANS2	66	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1-SUBTRANS3	35	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2 STEP-UP	138	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2-SUBTRANS1	69	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2-SUBTRANS2	66	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2-SUBTRANS3	35	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN1 STEP-UP	69	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN2 STEP-UP	66	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN3 STEP-UP	35	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN1-SUBTRAN2	66	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN1-SUBTRAN3	35	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN2-SUBTRAN3	35	0.0	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
DISTRIBUTION SUBSTATIONS												
TRANS1 -	345	33	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1 -	345	12	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS1 -	345	1	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2 -	138	33	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
TRANS2 -	138	12	28	25.2	53.66%	378	0.878	0.836	1.715	3,041	6,042	9,083
TRANS2 -	138	1	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN1-	69	33	18	15.5	39.75%	111	0.226	0.301	0.527	784	2,257	3,041
SUBTRAN1-	69	12	374	13.3	55.44%	2,758	7.347	6.518	13.865	25,435	47,736	73,171
SUBTRAN1-	69	1	164	5.8	47.72%	457	1.412	1.610	3.022	4,888	12,550	17,439
SUBTRAN2-	66	33	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN2-	66	12	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN2-	66	1	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN3-	35	33	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN3-	35	12	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
SUBTRAN3-	35	1	0	0.0	0.00%	0	0.000	0.000	0.000	0	0	0
PRIMARY - PRIMARY			50	3.0	44.74%	66	0.198	0.200	0.398	686	1,750	2,437
LINE TRANSFRMR			229,808	40.7	31.58%	2,956	11.556	28.926	40.482	27,494	253,394	280,888
TOTAL		16,421	230,442				21.617	38.391	60.008	62,328	323,729	386,058

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

SUMMARY OF LOSSES DIAGRAM - DEMAND MODEL - SYSTEM PEAK

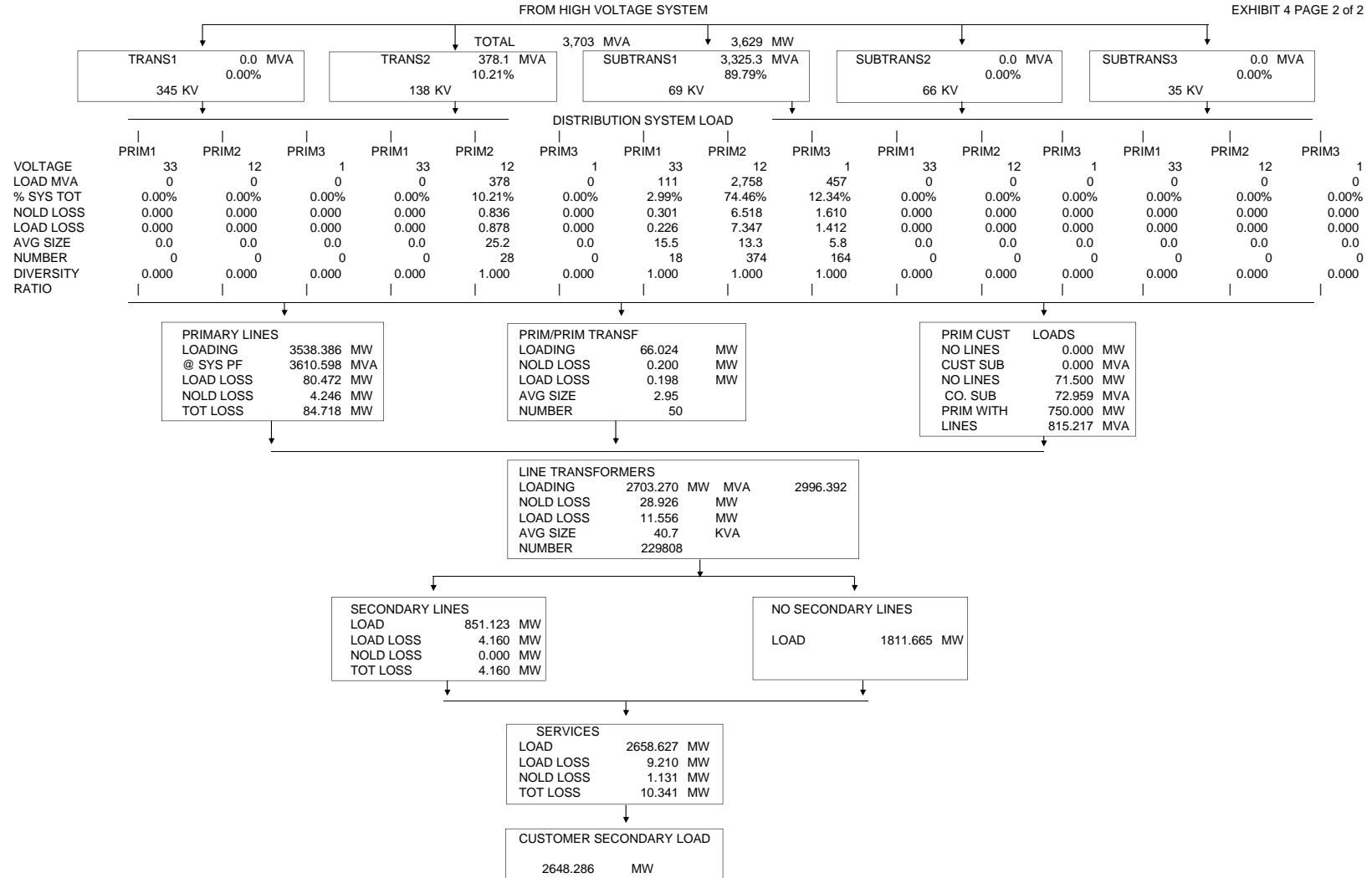
4354 MW

EXHIBIT 4 PAGE 1 of 2



KENTUCKY UTILITIES 2010 LOSS ANALYSIS

EXHIBIT 4 PAGE 2 of 2



KENTUCKY UTILITIES 2010 LOSS ANALYSIS

SUMMARY of SALES and CALCULATED LOSSES

EXHIBIT 5

LOSS # AND LEVEL	MW LOAD	NO LOAD	+	LOAD	=	TOT LOSS	EXP FACTOR	CUM EXP FAC	MWH LOAD	NO LOAD	+	LOAD	=	TOT LOSS	EXP FACTOR	CUM EXP FAC
1 BULK XFMMR	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0	0
2 BULK LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
3 TRANS1 XFMR	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
4 TRANS1 LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
5 TRANS2TR1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
6 TRANS GSU	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
7 TRANS2 LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
TOTAL TRAN	4,354.0	7.58		131.32		138.90	1.032953	1.032953	23,358,179	59,557		582,628		642,185	1.0282702	1.0282702
8 STR1BLK SD																
9 STR1T1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
10 SRT1T2 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
11 SUBTRANS1 LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
12 STR2T1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
13 STR2T2 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
14 STR2S1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
15 SUBTRANS2 LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
16 STR3T1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
17 STR3T2 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
18 STR3S1 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
19 STR3S2 SD	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
20 SUBTRANS3 LINES	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
21 SUBTRANS TOTAL	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
22 TOT TRANS LOSS FAC	4,354.0	7.58		131.32		138.90	1.032953	1.032953	23,358,179	59,557		582,628		642,185	1.028270	1.0282702
DISTRIBUTION SUBST																
TRANS1	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
TRANS2	370.5	0.84		0.88		1.71	1.004649	0.000000	1,945,541	6,042		3,041		9,083	1.0046905	0.000000
SUBTR1	3,258.8	8.43		8.99		17.41	1.005372	0.000000	17,111,051	62,543		31,107		93,650	1.0055032	0.000000
SUBTR2	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
SUBTR3	0.0	0.00		0.00		0.00	0.000000	0.000000	0	0		0		0	0.000000	0.000000
WEIGHTED AVERAGE	3,629.3	9.26		9.86		19.13	1.005298	1.038426	19,056,592	68,585		34,148		102,733	1.0054202	1.0338436
PRIMARY INTRCHNGE	0.0						0.000000		0						0.000000	
PRIMARY LINES	3,538.2	4.25		80.67		84.92	1.024590	1.063961	17,239,383	37,193		231,259		268,453	1.0158184	1.0501973
LINE TRANSF	2,703.3	28.93		11.56		40.48	1.015203	1.080136	13,498,846	253,394		27,494		280,888	1.0212504	1.0725145
SECONDARY	2,662.8	0.00		4.16		4.16	1.001565	1.081827	13,217,958	0		11,528		11,528	1.0008729	1.0734507
SERVICES	2,658.6	1.13		9.21		10.34	1.003905	1.086051	13,206,431	9,910		29,961		39,872	1.0030283	1.0767013
TOTAL SYSTEM		51.15		246.78		297.93				428,640		917,018		1,345,658		

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

DEVELOPMENT of LOSS FACTORS
UNADJUSTED
DEMAND

EXHIBIT 6

LOSS FACTOR LEVEL	CUSTOMER SALES MW	CALC LOSS TO LEVEL	SALES MW @ GEN	CUM PEAK EXPANSION FACTORS	
	a	b	c	d	1/d
BULK LINES	0.0	0.0	0.0	0.00000	0.00000
TRANS SUBS	0.0	0.0	0.0	0.00000	0.00000
TRANS LINES	0.0	0.0	0.0	0.00000	0.00000
SUBTRANS SUBS	0.0	0.0	0.0	0.00000	0.00000
TOTAL TRANS	574.0	18.9	592.9	1.03295	0.96810
PRIM SUBS	71.5	2.7	74.2	1.03843	0.96300
PRIM LINES	750.0	48.0	798.0	1.06396	0.93988
SECONDARY	<u>2,648.3</u>	<u>227.9</u>	<u>2,876.2</u>	1.08605	0.92077
TOTALS	4,043.8	297.5	4,341.3		

DEVELOPMENT of LOSS FACTORS
UNADJUSTED
ENERGY

LOSS FACTOR LEVEL	CUSTOMER SALES MWH	CALC LOSS TO LEVEL	SALES MWH @ GEN	CUM ANNUAL EXPANSION FACTORS	
	a	b	c	d	1/d
BULK LINES	0	0	0	0.00000	0.00000
TRANS SUBS	0	0	0	0.00000	0.00000
TRANS LINES	0	0	0	0.00000	0.00000
SUBTRANS SUBS	0	0	0	0.00000	0.00000
TOTAL TRANS	3,663,030	103,554	3,766,584	1.02827	0.97251
PRIM SUBS	1,713,570	57,993	1,771,563	1.03384	0.96726
PRIM LINES	3,472,084	174,289	3,646,373	1.05020	0.95220
SECONDARY	<u>13,166,559</u>	<u>1,009,893</u>	<u>14,176,452</u>	1.07670	0.92876
TOTALS	22,015,243	1,345,730	23,360,973		

ESTIMATED VALUES AT GENERATION

LOSS FACTOR AT VOLTAGE LEVEL	MW	MWH
BULK LINES	0.00	0
TRANS SUBS	0.00	0
TRANS LINES	0.00	0
SUBTRANS SUBS	0.00	0
SUBTRANS LINES	592.91	3,766,584
PRIM SUBS	74.25	1,771,563
PRIM LINES	797.97	3,646,373
SECONDARY	2,876.17	14,176,452
SUBTOTAL	4,341.31	23,360,973
ACTUAL ENERGY	4,354.00	23,358,179
MISSMATCH	(12.69)	2,794
% MISSMATCH	-0.29%	0.01%

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

DEVELOPMENT of LOSS FACTORS
ADJUSTED
DEMAND

EXHIBIT 7

LOSS FACTOR LEVEL	CUSTOMER SALES MW a	SALES ADJUST b	CALC LOSS TO LEVEL c	SALES MW @ GEN d	CUM PEAK EXPANSION FACTORS e	f=1/e
BULK LINES	0.0	0.0	0.0	0.0	0.00000	0.00000
TRANS SUBS	0.0	0.0	0.0	0.0	0.00000	0.00000
TRANS LINES	0.0	0.0	0.0	0.0	0.00000	0.00000
SUBTRANS SUBS	0.0	0.0	0.0	0.0	0.00000	0.00000
TOTAL TRANS	574.0	0.0	18.9	592.9	1.03295	0.96810
PRIM SUBS	71.5	0.0	2.8	74.3	1.03883	0.96262
PRIM LINES	750.0	0.0	49.7	799.7	1.06632	0.93781
SECONDARY	<u>2,648.3</u>	<u>0.0</u>	238.8	<u>2,887.1</u>	1.09017	0.91729
			310.2			
TOTALS	4,043.8	0.0	310.2	4,354.0		

DEVELOPMENT of LOSS FACTORS
ADJUSTED
ENERGY

LOSS FACTOR LEVEL	CUSTOMER SALES MWH a	SALES ADJUST b	CALC LOSS TO LEVEL c	SALES MWH @ GEN d	CUM ANNUAL EXPANSION FACTORS e	f=1/e
BULK LINES	0	0	0	0	0.00000	0.00000
TRANS SUBS	0	0	0	0	0.00000	0.00000
TRANS LINES	0	0	0	0	0.00000	0.00000
SUBTRANS SUBS	0	0	0	0	0.00000	0.00000
TOTAL TRANS	3,663,030	0	103,554	3,766,584	1.02827	0.97251
PRIM SUBS	1,713,570	0	57,958	1,771,528	1.03382	0.96728
PRIM LINES	3,472,084	0	174,001	3,646,085	1.05011	0.95228
SECONDARY	<u>13,166,559</u>	<u>0</u>	1,007,420	<u>14,173,979</u>	1.07651	0.92892
			1,342,934			
TOTALS	22,015,243	0	1,342,936	23,358,177		

ESTIMATED VALUES AT GENERATION

LOSS FACTOR AT VOLTAGE LEVEL	MW	MWH
BULK LINES	0.00	0
TRANS SUBS	0.00	0
TRANS LINES	0.00	0
SUBTRANS SUBS	0.00	0
SUBTRANS LINES	592.91	3,766,584
PRIM SUBS	74.28	1,771,528
PRIM LINES	799.74	3,646,085
SECONDARY	2,887.07	14,173,979
	4,354.00	23,358,177
ACTUAL ENERGY	4,354.00	23,358,179
MISSMATCH	0.00	(2)
% MISSMATCH	0.00%	0.00%

KENTUCKY UTILITIES 2010 LOSS ANALYSIS

Adjusted Losses and Loss Factors by Facility

EXHIBIT 8

Unadjusted Losses by Segment				
	MW	Unadjusted	MWH	Unadjusted
Service Drop Losses	10.34	10.31	39,872	39,876
Secondary Losses	4.16	4.15	11,528	11,529
Line Transformer Losses	40.48	40.38	280,888	280,916
Primary Line Losses	84.92	84.70	268,453	268,480
Distribution Substation Losses	19.13	19.08	102,733	102,744
<u>Transmission System Losses</u>	<u>138.90</u>	<u>138.90</u>	<u>642,185</u>	<u>642,185</u>
Total	297.93	297.52	1,345,658	1,345,730

Mismatch Allocation by Segment			
	MW	MWH	
Service Drop Losses	-0.83	158	
Secondary Losses	-0.33	46	
Line Transformer Losses	-3.23	1,116	
Primary Line Losses	-6.78	1,066	
Distribution Substation Losses	-1.53	408	
<u>Transmission System Losses</u>	<u>0.00</u>	<u>0</u>	
Total	-12.69	2,794	

Adjusted Losses by Segment				
	MW	% of Total	MWH	% of Total
Service Drop Losses	11.14	3.6%	39,718	3.0%
Secondary Losses	4.48	1.4%	11,483	0.9%
Line Transformer Losses	43.61	14.1%	279,800	20.8%
Primary Line Losses	91.48	29.5%	267,414	19.9%
Distribution Substation Losses	20.61	6.6%	102,336	7.6%
<u>Transmission System Losses</u>	<u>138.90</u>	<u>44.8%</u>	<u>642,185</u>	<u>47.8%</u>
Total	310.21	100.0%	1,342,936	100.0%

Loss Factors by Segment		MW	MWH	
Retail Sales from Service Drops		2,648,286	13,166,559	
<u>Adjusted Service Drop Losses</u>		<u>11,140</u>	<u>39,718</u>	
Input to Service Drops		2,659,426	13,206,277	
Service Drop Loss Factor		1.00421	1.00302	
Output from Secondary		2,659,426	13,206,277	
<u>Adjusted Secondary Losses</u>		<u>4,482</u>	<u>11,483</u>	
Input to Secondary		2,663,908	13,217,760	
Secondary Conductor Loss Factor		1.00169	1.00087	
Output from Line Transformers		2,663,908	13,217,760	
<u>Adjusted Line Transformer Losses</u>		<u>43,609</u>	<u>279,800</u>	
Input to Line Transformers		2,707,517	13,497,560	
Line Transformer Loss Factor		1.01637	1.02117	
Retail Sales from Primary		750,000	3,472,084	
Req. Whls Sales from Primary		0,000	0	
<u>Input to Line Transformers</u>		<u>2,707,517</u>	<u>13,497,560</u>	
Output from Primary Lines		3,457,517	16,969,644	
<u>Adjusted Primary Line Losses</u>		<u>91,477</u>	<u>267,414</u>	
Input to Primary Lines		3,548,994	17,237,058	
Primary Line Loss Factor		1.02646	1.01576	
Output PI from Distribution Substations		3,548,994	17,237,058	
Req. Whls Sales from Substations		0,000	0	
Retail Sales from Substations		71,500	1,713,570	
Total Output from Distribution Substations		3,620,494	18,950,628	
<u>Adjusted Distribution Substation Losses</u>		<u>20,606</u>	<u>102,336</u>	
Input to Distribution Substations		3,641,100	19,052,964	
Distribution Substation Loss Factor		1.00569	1.00540	
Retail Sales at from SubTransmission		574,000	3,663,030	
Req. Whls Sales from SubTransmission		0,000	0	
Non-Req. Whls Sales from SubTransmission		0,000	0	
Losses		0,000	0	4457
<u>Input to Distribution Substations</u>		<u>3,641,100</u>	<u>19,052,964</u>	
Output from SubTransmission		4,215,100	22,715,994	4,354,000
<u>SubTransmission System Losses</u>		<u>138,900</u>	<u>642,185</u>	138,900
Input to Transmission		4,354,000	23,358,179	138,900
TotTransmission System Loss Factor		1.03295	1.02827	138,900

DEMAND MW		SUMMARY OF LOSSES AND LOSS FACTORS BY DELIVERY VOLTAGE						EXHIBIT 9
SERVICE LEVEL		SALES MW	LOSSES	SECONDARY	PRIMARY	SUBSTATION	SUBTRANS	TRANSMISSION
1	SERVICES							
2	SALES	2,648.3		2,648.3				
3	LOSSES		11.1	11.1				
4	INPUT			2,659.4				
5	EXPANSION FACTOR	1.00421						
6	SECONDARY							
7	SALES							
8	LOSSES		4.5	4.5				
9	INPUT			2,663.9				
10	EXPANSION FACTOR	1.00169						
11	LINE TRANSFORMER							
12	SALES							
13	LOSSES		43.6	43.6				
14	INPUT			2,707.5				
15	EXPANSION FACTOR	1.01637						
16	PRIMARY							
17	SECONDARY			2,707.5				
18	SALES	750.0			750.0			
19	LOSSES		91.5	71.6	19.8			
20	INPUT			2,779.2	769.8			
21	EXPANSION FACTOR	1.02646						
22	SUBSTATION							
23	PRIMARY			2,779.2	769.8			
24	SALES	71.5				71.5		
25	LOSSES		20.6	15.8	4.4			
26	INPUT			2,795.0	774.2	71.9		
27	EXPANSION FACTOR	1.00569						
28	SUB-TRANSMISSION							
29	DISTRIBUTION SUBS							
30	SALES							
31	LOSSES							
32	INPUT							
33	EXPANSION FACTOR							
34	TRANSMISSION							
35	SUBTRANSMISSION							
36	DISTRIBUTION SUBS			2,795.0	774.2	71.9		
37	SALES	574.0						574.0
38	LOSSES		138.9	92.1	25.5	2.4		18.9
39	INPUT			2,887.1	799.7	74.3		592.9
40	EXPANSION FACTOR	1.03295						
41	TOTALS							
42	LOSSES		310.2	238.8	49.7	2.8		18.9
43	% OF TOTAL		100%	76.97%	16.03%	0.90%		6.10%
44	SALES	4,043.8		2,648.3	750.0	71.5		574.0
45	% OF TOTAL	100.00%		65.49%	18.55%	1.77%		14.19%
46	INPUT	4,354.0		2,887.1	799.7	74.3		592.9
47	CUMMULATIVE EXPANSION LOSS FACTORS			1.09017	1.06632	1.03883		1.03295
	(from meter to system input)							

ENERGY MWH		SUMMARY OF LOSSES AND LOSS FACTORS BY DELIVERY VOLTAGE						EXHIBIT 9
SERVICE LEVEL		SALES	LOSSES	SECONDARY	PRIMARY	SUBSTATION	SUBTRANS	TRANSMISSION
1	SERVICES							
2	SALES	13,166,559		13,166,559				
3	LOSSES		39,718	39,718				
4	INPUT			13,206,277				
5	EXPANSION FACTOR	1.00302						
6	SECONDARY							
7	SALES							
8	LOSSES		11,483	11,483				
9	INPUT			13,217,760				
10	EXPANSION FACTOR	1.00087						
11	LINE TRANSFORMER							
12	SALES							
13	LOSSES		279,800	279,800				
14	INPUT			13,497,560				
15	EXPANSION FACTOR	1.02117						
16	PRIMARY							
17	SECONDARY			13,497,560				
18	SALES	3,472,084.000			3,472,084			
19	LOSSES		267,414	212,699	54,714			
20	INPUT			13,710,259	3,526,798			
21	EXPANSION FACTOR	1.01576						
22	SUBSTATION							
23	PRIMARY			13,710,259	3,526,798			
24	SALES	1,713,570				1,713,570		
25	LOSSES		102,336	74,037	19,045	9,253		
26	INPUT			13,784,297	3,545,844	1,722,823		
27	EXPANSION FACTOR	1.00540						
28	SUB-TRANSMISSION							
29	DISTRIBUTION SUBS							
30	SALES							
31	LOSSES							
32	INPUT							
33	EXPANSION FACTOR							
34	TRANSMISSION							
35	SUBTRANSMISSION							
36	DISTRIBUTION SUBS			13,784,297	3,545,844	1,722,823		
37	SALES	3,663,030						3,663,030
38	LOSSES		642,185	389,684	100,242	48,705		103,554
39	INPUT			14,173,981	3,646,085	1,771,528		3,766,584
40	EXPANSION FACTOR	1.02827						
41	TOTALS		1,342,936	1,007,422	174,001	57,958		103,554
42	% OF TOTAL		100%	75.02%	12.96%	4.32%		7.71%
43	SALES	22,015,243		13,166,559	3,472,084	1,713,570		3,663,030
44	% OF TOTAL	100.00%		59.81%	15.77%	7.78%		16.64%
45	INPUT	23,358,179		14,173,981	3,646,085	1,771,528		3,766,584
46	CUMMULATIVE EXPANSION LOSS FACTORS			1.07651	1.05011	1.03382		1.02827
	(from meter to system input)							

LG&E AND KU SERVICES COMPANY
2010 Analysis of System Losses – KU Power System

Appendix C

Discussion of Hoebel Coefficient



COMMENTS ON THE HOEBEL COEFFICIENT

The Hoebel coefficient represents an established industry standard relationship between peak losses and average losses and is used in a loss study to estimate energy losses from peak demand losses. H. F. Hoebel described this relationship in his article, "Cost of Electric Distribution Losses," Electric Light and Power, March 15, 1959. A copy of this article is attached.

Within any loss evaluation study, peak demand losses can readily be calculated given equipment resistance and approximate loading. Energy losses, however, are much more difficult to determine given their time-varying nature. This difficulty can be reduced by the use of an equation which relates peak load losses (demand) to average losses (energy). Once the relationship between peak and average losses is known, average losses can be estimated from the known peak load losses.

Within the electric utility industry, the relationship between peak and average losses is known as the loss factor. For definitional purposes, loss factor is the ratio of the average power loss to the peak load power loss, during a specified period of time. This relationship is expressed mathematically as follows:

$$\frac{(1) F_{LS} \cdot A_{LS}}{P_{LS}} \quad \text{where: } F_{LS} = \text{Loss Factor}$$

$$A_{LS} = \text{Average Losses}$$

$$P_{LS} = \text{Peak Losses}$$

The loss factor provides an estimate of the degree to which the load loss is maintained throughout the period in which the loss is being considered. In other words, loss factor is the ratio of the actual kWh losses incurred to the kWh losses which would have occurred if full load had continued throughout the period under study.

Examining the loss factor expression in light of a similar expression for load factor indicates a high degree of similarity. The mathematical expression for load factor is as follows:

$$\frac{(2) F_{LD} \cdot A_{LD}}{P_{LD}} \quad \text{where: } F_{LD} = \text{Load Factor}$$

$$A_{LD} = \text{Average Load}$$

$$P_{LD} = \text{Peak Load}$$

This load factor result provides an estimate of the degree to which the load loss is maintained throughout the period in which the load is being considered. Because of the similarities in definition, the loss factor is sometimes called the "load factor of losses." While the definitions are similar, a strict equating of the two factors cannot be made. There does exist, however, a relationship between these two factors which is dependent upon the shape of the load duration curve. Since resistive losses vary as the square of the load, it can be shown mathematically that the loss factor can vary between the extreme limits of load factor and load factor squared. The relationship between load factor and loss factor has become an industry standard and is as follows:

$$\underline{(3) F_{LS} \cdot H \cdot F_{LD}^2 + (1-H) \cdot F_{LD}}$$

where: F_{LS} = Loss Factor
 F_{LD} = Load Factor
H = Hoebel Coeff

As noted in the attached article, the suggested value for H (the Hoebel coefficient) is 0.7. The exact value of H will vary as a function of the shape of the utility's load duration curve. In recent years, values of H have been computed directly for a number of utilities based on EEI load data. It appears on this basis, the suggested value of 0.7 should be considered a lower bound and that values approaching unity may be considered a reasonable upper bound. Based on experience, values of H have ranged from approximately 0.85 to 0.95. The standard default value of 0.9 is generally used.

Inserting the Hoebel coefficient estimate gives the following loss factor relationship using Equation (3):

$$\underline{(4) F_{LS} \cdot 0.90 \cdot F_{LD}^2 + 0.10 \cdot F_{LD}}$$

Once the Hoebel constant has been estimated and the load factor and peak losses associated with a piece of equipment have been estimated, one can calculate the average, or energy losses as follows:

$$\underline{(5) A_{LS} \cdot P_{LS} \cdot [H \cdot F_{LD}^2 + (1-H) \cdot F_{LD}]}$$

where: A_{LS} = Average Losses
 P_{LS} = Peak Losses
H = Hoebel Coefficient
 F_{LD} = Load Factor

Loss studies use this equation to calculate energy losses at each major voltage level in the analysis.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 8

Responding Witness: Christopher M. Garrett

Q.1-8. Please provide in excel spreadsheet format, by month, by Company, by rate class, the following information for each of the past 3 years:

- a. actual kWh sales
- b. weather normalized kWh sales using the same weather normalization methodology that is used by the Companies and PPL in the Quarterly Earnings Call Presentations
- c. the number of customers

A.1-8. See the attachment being provided in Excel format. Some customers have multiple contracts and are reflected in multiple rate codes. The duplications are removed in the Duplicate Customers lines.

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 9

Responding Witness: David S. Sinclair

Q.1-9. Please provide, in excel spreadsheet format, the electric sales forecast, by month, by rate class, by Company that supports the 2019 Business Plan Electric Forecast (807 KAR 5:001 Sec. 16(7)(c)C).

A.1-9. See the attachment being provided in Excel format.

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 10

Responding Witness: David S. Sinclair

Q.1-10. Please provide a complete explanation of the methodology that is used to develop weather normalized sales, by rate class. For the 12 months ending July 2018, provide the analysis, including excel spreadsheets with formulas intact, that was used to weather normalize actual sales by rate class for each Company.

A.1-10. Weather normalized adjustments are calculated using a cubic smoothing spline methodology on hourly weather data. Hourly weather data is particularly important to capture the true impact on sales of sudden changes in temperature due to events like afternoon summer storms where cooling load declines quickly. The cubic smoothing splines capture the non-linear relationship between load and temperature which can cause significant differences compared to a linear model at extreme temperatures. This process is done in the R language for statistical computing and graphics so no spreadsheets with formulas are available. The process used to produce the forecast of normal weather is described in the Electric Sales and Demand Forecast Process (807 KAR 5:001 Sec. 16(7)(c)B).

See attachment being provided in Excel format with weather normalization adjustments by rate for August 2017 – July 2018.

In addition, a number of R files are being provided in response to this request. The Company is providing them on separate electronic storage media subject to a motion to deviate because the files cannot be uploaded to the Commission's website. The Company will supply copies on electronic storage media to the Commission, the Attorney General, and all parties who have already requested copies of all responses filed. The Company will provide the files to any other party to this proceeding upon request.

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 11

Responding Witness: David S. Sinclair

Q.1-11. For each Company, please identify any large customer loads expected in the Future Test Year on rates RTS, TOD-PRI, TOD-SEC and FLS) that the Company is currently aware of but were not included in the test year projected mWh and revenues. For each such customer, provide the customer's name, the rate class on which the customer is expected to take service, the mWh expected by month during the test year the base revenues expected by month during the test year.

A.1-11.

For LG&E, the Companies are not aware of any large customer loads that were not included in the Future Test Year.

For KU, the Companies are aware of one potential increase in a TOD-PRI customer load that was not explicitly included in the Future Test Year. A transmission service request for 27 MW beginning April 1, 2019 has been submitted for this customer. Whether this customer will ultimately take service at this level and at that time is unknown. The Companies are also aware of some potential small changes to other TOD-PRI customers, both positive and negative, but these potential changes would not have a material impact on the forecast. Thus, the TOD-PRI forecast remains a reasonable forecast.

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 12

Responding Witness: David S. Sinclair / Elizabeth J. McFarland

- Q.1-12. With respect to the Company's response to the previous question, please indicate whether the Company has provided any incentives and/or discounts (e.g., discounted contracts) associated with such customer. If there were such incentives and/or discounts provided, please provide the specific incentives/discount provisions associated with such customer.
- A.1-12. No incentives or discounts were provided to any of the customers referenced in the previous response.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 13

Responding Witness: William Steven Seelye

Q.1-13. With regard to Att_KU_PSC_1_53_ElecSchedM_Forecasted, Schedule M-2.2 and Att_LGE_PSC_1_53_ElecSchedM_Forecasted, Schedule M-2.2, please provide:

- a. an excel spreadsheet that shows the monthly kWh for each rate class for the forecasted test year corresponding to the kWh shown in column "Total kWh."
- b. to the extent that this sales forecast (Schedule M-2.2) is different for any rate class from the Financial Forecast GWh shown in 807 KAR 5:001 Section 16(7)(h)(5), page 1 of 2, please provide a reconciliation and an explanation for any differences.
- c. to the extent that this sales forecast (Schedule M-2.2) is different for any rate class from the 2019 Business Plan Electric Forecast GWh, please provide a reconciliation and an explanation for any differences.

A.1-13.

- a. See the attachment being provided in Excel format.
- b. There are no differences. However, note that the sales forecast (Schedule M-2.2) is for the forecasted test year (May 2019 – April 2020) while the Financial Forecast GWh in 807 KAR 5:001 Section 16(7)(h)(5), page 1 of 2 is calendar year.
- c. There are no differences.

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 14

Responding Witness: David S. Sinclair

Q.1-14. With regard to the LOLP analysis used in the class cost of service study, please provide the following:

- a. an explanation of how tie line capacity to other utilities was treated in the analysis.
- b. an explanation of whether there were any adjustments to hourly loads in the development of the LOLP analysis.
- c. a detailed description of the methodology used to calculate the hourly LOLP results. Provide an illustration of the LOLP methodology using a simplified hypothetical.

A.1-14.

- a. Purchases up to 558 MW per hour were included in the analysis.
- b. There were no adjustments to the hourly loads developed for the 2019 Business Plan.
- c. See the response to AG 1-139.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 15

Responding Witness: William Steven Seelye

Q.1-15. Please provide any information available to Mr. Seelye, the Prime Group or LG&E/KU regarding the following:

- a. Any regulatory jurisdiction that has adopted the LOLP cost of service method used by Mr. Seelye in this case.
- b. For each such jurisdiction, please provide a copy of a Commission Order addressing this issue.
- c. Identification of any electric utility that supported the LOLP method in testimony before a state regulatory commission. Please identify the name of the utility, the case number and a copy of the testimony.
- d. Identification of any electric utility in KY that has presented testimony before the KPSC in support of the LOLP cost of service method. For each such utility, please provide the name of the utility, the case number and a copy of the testimony.

A.1-15.

- a. Mr. Seelye is unaware of any regulatory jurisdiction that has adopted the LOLP cost of service method used in this case.
- b. See the response to part a.
- c. KU and LG&E supported the LOLP methodology in Case No. 2016-00370 and Case No. 2016-00371, respectively.
- d. See the response to part c.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 16

Responding Witness: William Steven Seelye

- Q.1-16. Please provide any testimony, papers or presentations prepared by Mr. Seelye or any other employee of the Prime Group in the past ten years which addresses the LOLP cost of service methodology. This would include all testimony, papers or presentations supporting the LOLP method and testimony opposing the LOLP method.
- A.1-16. Mr. Seelye submitted testimony supporting the LOLP methodology in KU's and LG&E's last rate case proceedings (Case No. 2016-00370 and Case No. 2016-00371, respectively).

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 17

Responding Witness: David S. Sinclair

Q.1-17. With regard to Mr. Sinclair's testimony on page 6, please provide the following in excel format, with formulas.

- a. Copies of the 30-year demand and energy forecast prepared in the years 2015 through 2018 (it is our understanding that the "2019 Load Forecast" was prepared in 2018). Include rate class detail, as described in Mr. Sinclair's testimony on page 6, lines 12 through 18.
- b. With regard to Mr. Sinclair's testimony at page 13, line 11 to page 14, line 4, provide an analysis of the actual base period kWh energy sales for the first six months of 2018 on a weather normalized basis for each rate class.
- c. With reference to 807 KAR 5:001 Sec. 16(7)(c)B Page 4 of 38 ("The final part of the forecast process includes validating and documenting the forecast results. To ensure results are reasonable,", please provide any analyses, including internal only reports, that have been prepared by, or are available to the Company that perform an assessment of the Company's load and energy forecasts. Include any such documents that have been developed in the past 5 years.
- d. With reference to 807 KAR 5:001 Sec. 16(7)(c)B Page 4 of 38 "Software Tools," please explain the "@Risk" model and provide a copy of the analysis used to assess the sales forecast used to develop the projected test year sales, by rate class, in this case.

A.1-17.

- a. See attachment being provided in Excel format.
- b. See attachment being provided in Excel format.

- c. See attached. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

See Filing Requirement 807 KAR 5:001 Sec. 16(7)(c) – Item C “2019 Business Plan Electric Sales Forecast.” The confidential version of this document was filed as part of the Company’s application in this proceeding and can be provided upon request to any party that enters into a confidentiality agreement with the Company.

- d. The @Risk model is a top-down econometric model that uses weather and economic factors to predict Company-level energy requirements. The model is unable to account for rate-specific factors but provides a good assessment of the reasonableness of the bottom-up rate-level forecasts. The primary function of the @Risk technology is to provide a quantitative assessment of economic and weather-related risk to the aggregate load forecast using Monte Carlo simulation.

See attachment being provided in Excel format. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

The attachment is
provided in a separate
file in Excel format.

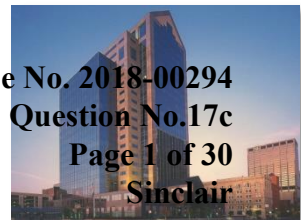
The attachment is
provided in a separate
file in Excel format.



PPL companies

2015 Business Plan Electric Sales Forecast

July 24, 2014



Major assumptions and changes vs. 2014 Plan

- Unfavorable inputs
 - *Further decline in eastern Kentucky mining*
 - *Departure of 10 KU municipal customers by 2019*
 - *Lower household growth rate for KU*
 - *More rapid adoption of high efficiency lighting*
- Favorable inputs
 - *Personal income and wholesale employment slightly higher*
 - *Major account forecasts higher*
- Overriding theme
 - *Economic growth still slow*

Municipal terminations result in ~320 MW load reduction in May 2019

- 2015 Plan assumes that [REDACTED] and [REDACTED] remain KU customers
- Significant load impact occurs in May 2019 with departure of eight larger municipal customers; two prior departures have less impact

— [REDACTED]

— [REDACTED]

CONFIDENTIAL INFORMATION REDACTED

Balance of year 2014 forecast 240 GWh below 2014 Plan

2014 Combined Company Plan to Plan					
Period	2013 WN		2015	Variance	
	Actuals	2014 Plan	Plan	2014-2015	
	(GWh)	(GWh)	(GWh)	Plan	Pct Var
	(GWh)	(GWh)	(GWh)	(GWh)	
Jan - May (WN Actuals)	13,360	13,302	13,327	25	0.2%
June*	2,742	2,984	2,919	(65)	-2.2%
July	3,105	3,303	3,245	(58)	-1.8%
August	3,150	3,331	3,293	(38)	-1.1%
September	2,668	2,764	2,704	(59)	-2.1%
October	2,516	2,525	2,492	(33)	-1.3%
November	2,561	2,551	2,522	(29)	-1.1%
December	2,892	2,922	2,900	(22)	-0.7%
Total	32,994	33,681	33,401	(280)	-0.8%

* June 2014 is actual value non-WN in 2015 Plan

2015 Plan with and without municipal customers

- Energy forecast with municipal customers (all years)

	Total Company Sales (GWh)				KU/ODP Sales (GWh)				LG&E Sales (GWh)			
	2015 Plan*	2014 Plan	Delta	% Change	2015 Plan	2014 Plan	Delta	% Change	2015 Plan	2014 Plan	Delta	% Change
2014	33,442	33,681	(239)	-0.7%	21,585	21,774	(189)	-0.9%	11,857	11,908	(50)	-0.4%
2015	33,394	33,845	(451)	-1.3%	21,416	21,860	(445)	-2.0%	11,978	11,985	(6)	-0.1%
2016	33,634	34,092	(459)	-1.3%	21,544	22,016	(472)	-2.1%	12,090	12,077	13	0.1%
2017	33,918	34,307	(390)	-1.1%	21,706	22,159	(452)	-2.0%	12,211	12,148	63	0.5%
2018	34,254	34,593	(340)	-1.0%	21,924	22,340	(416)	-1.9%	12,330	12,253	77	0.6%
2019	34,559	34,888	(329)	-0.9%	22,123	22,537	(413)	-1.8%	12,436	12,351	85	0.7%

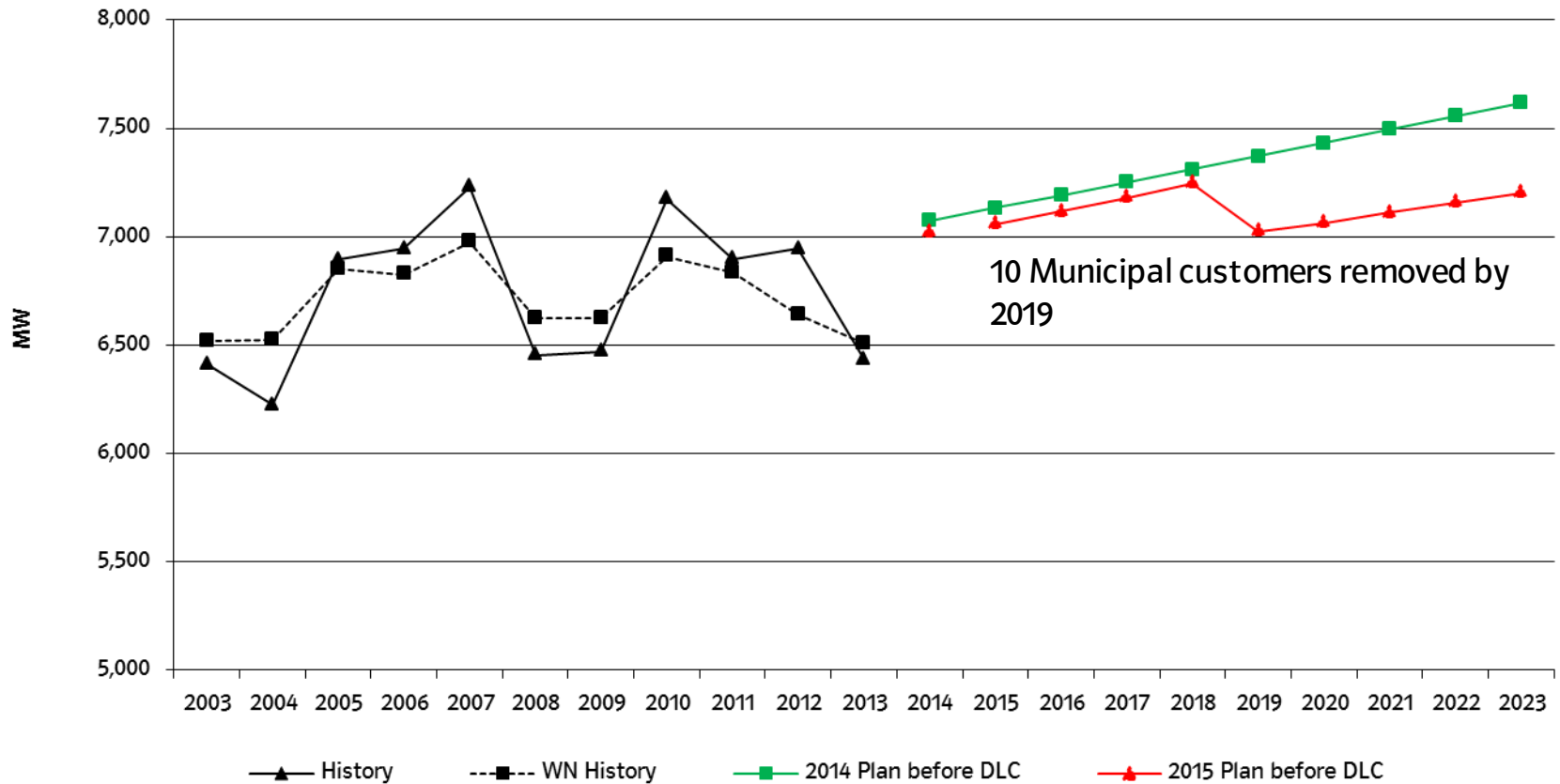
- 2015 BP: Municipals exit per schedule in 2016-2019

	Total Company Sales (GWh)				KU/ODP Sales (GWh)				LG&E Sales (GWh)			
	2015 Plan*	2014 Plan	Delta	% Change	2015 Plan	2014 Plan	Delta	% Change	2015 Plan	2014 Plan	Delta	% Change
2014	33,442	33,681	(239)	-0.7%	21,585	21,774	(189)	-0.9%	11,857	11,908	(50)	-0.4%
2015	33,394	33,845	(451)	-1.3%	21,416	21,860	(445)	-2.0%	11,978	11,985	(6)	-0.1%
2016	33,632	34,092	(461)	-1.4%	21,542	22,016	(474)	-2.2%	12,090	12,077	13	0.1%
2017	33,868	34,307	(439)	-1.3%	21,656	22,159	(502)	-2.3%	12,211	12,148	63	0.5%
2018	34,181	34,593	(412)	-1.2%	21,852	22,340	(489)	-2.2%	12,330	12,253	77	0.6%
2019	33,514	34,888	(1,374)	-3.9%	21,078	22,537	(1,459)	-6.5%	12,436	12,351	85	0.7%

* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

Uncurtailed peak forecast decreases 55-77 MW consistent with lower energy forecast

Combined Company Summer Peak Demand - 10 Year View

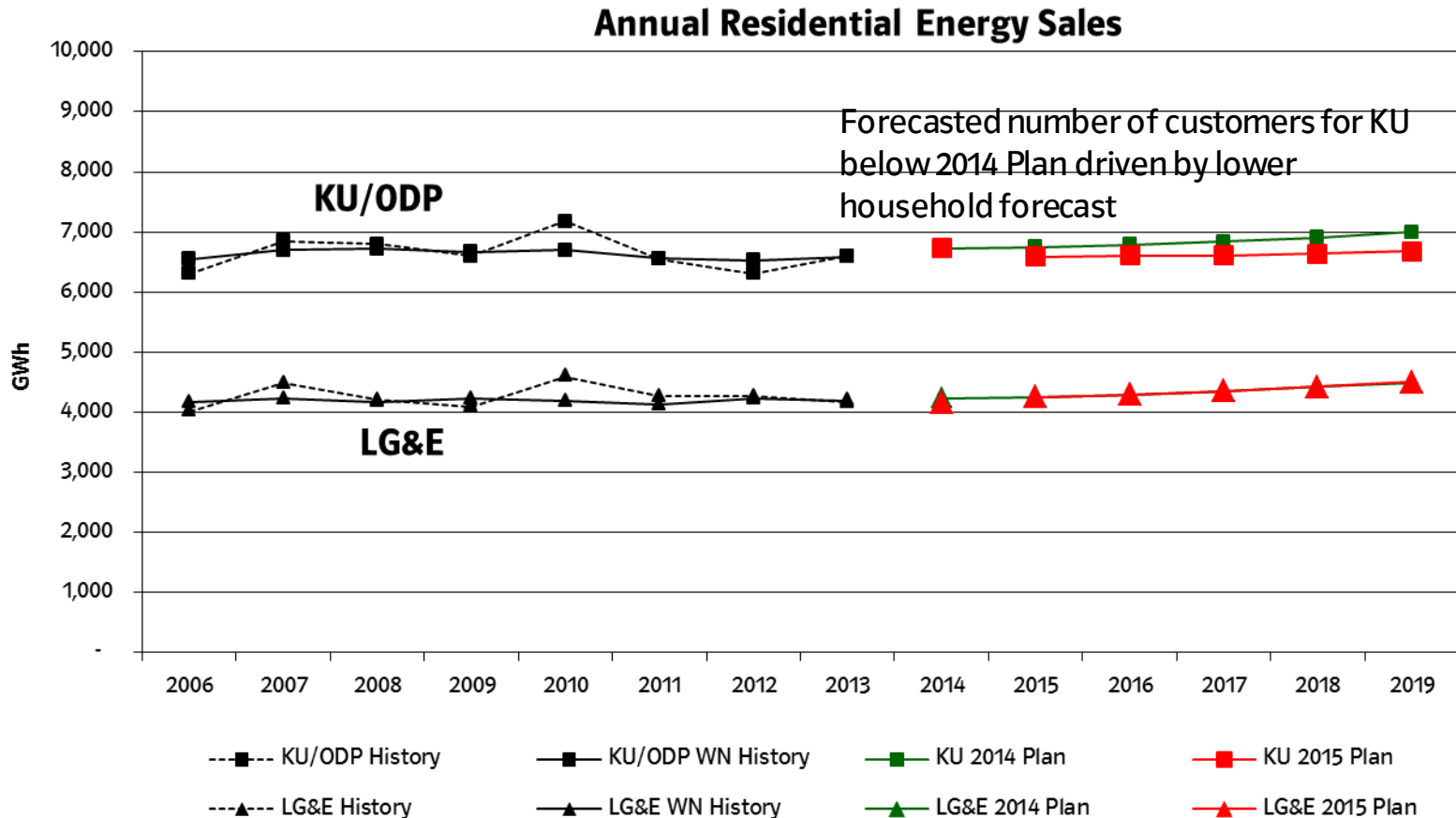


* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

** In 2015 Plan forecast, peak forecast is adjusted ~20 MW higher to cover [redacted] obligation.

CONFIDENTIAL INFORMATION REDACTED

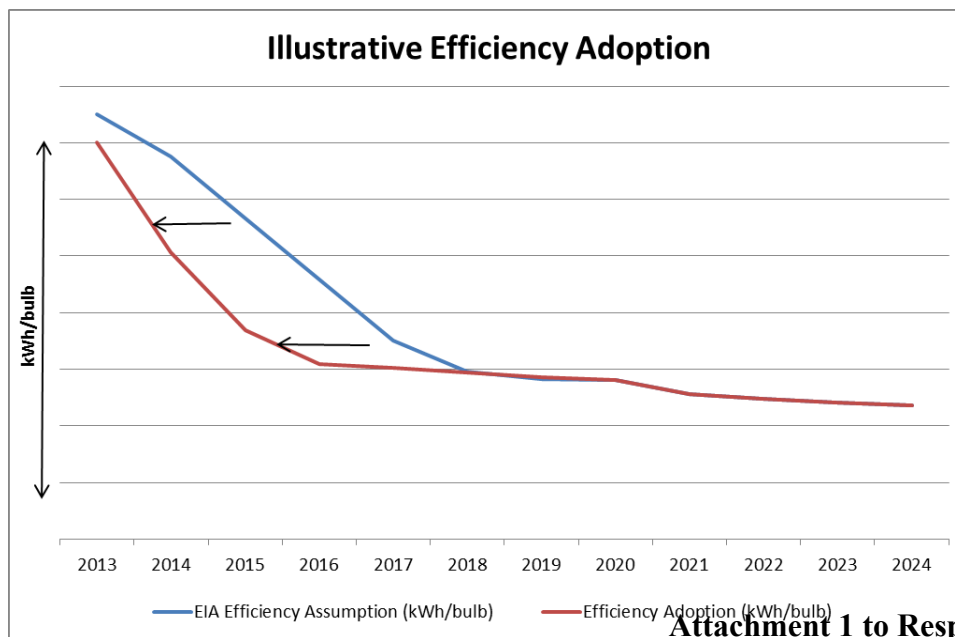
Residential sales forecast is slightly lower for KU



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

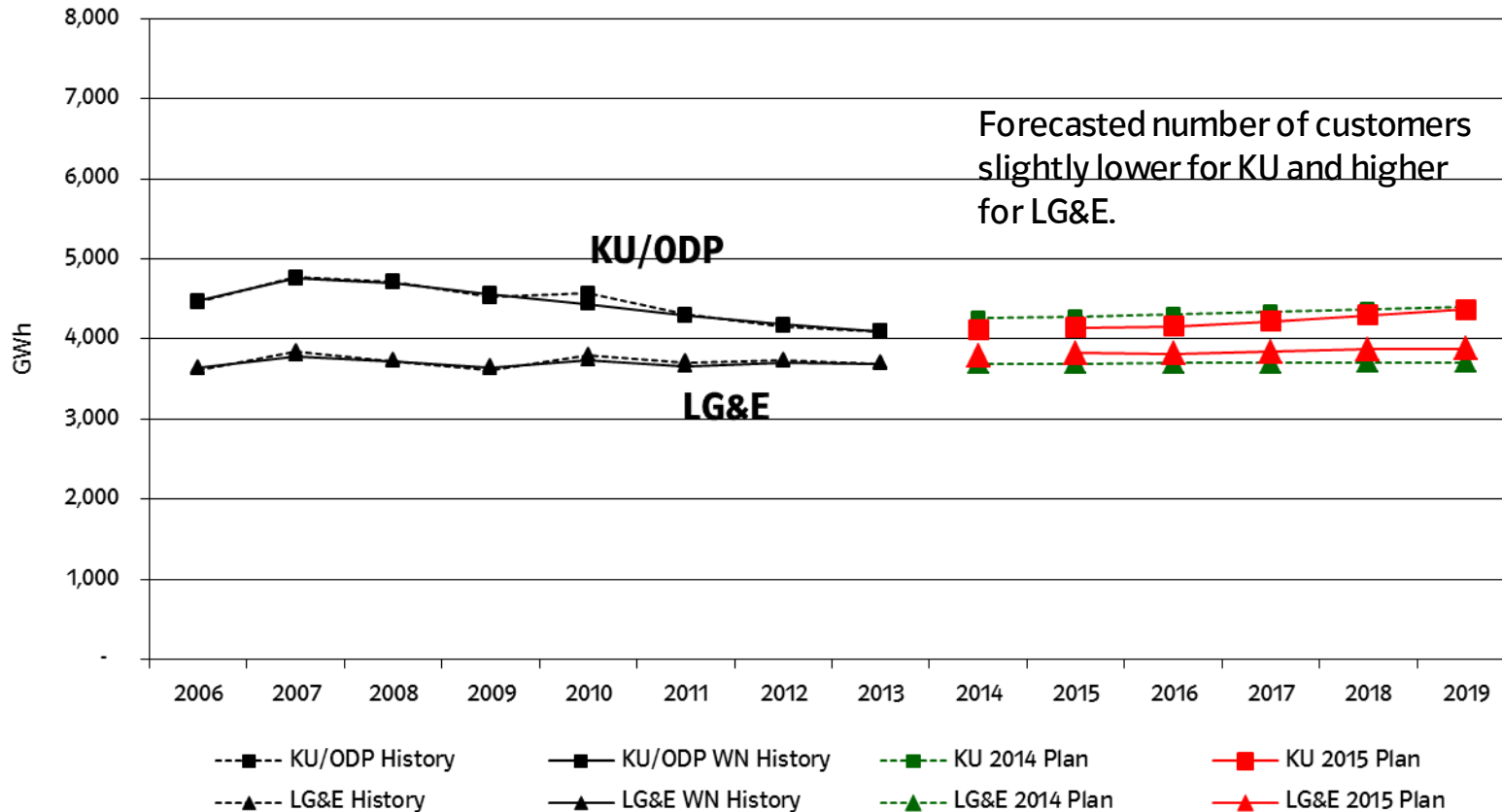
Residential lighting - faster adoption of LED lighting reduces residential energy consumption

- 35% of LG&E residential customers surveyed have at least one LED bulb in service
- Plan assumes 55% of LG&E customers add 5 additional LED bulbs each year, resulting in an average annual energy reduction of 118 GWh.



Combined Company commercial sales largely consistent with prior plan

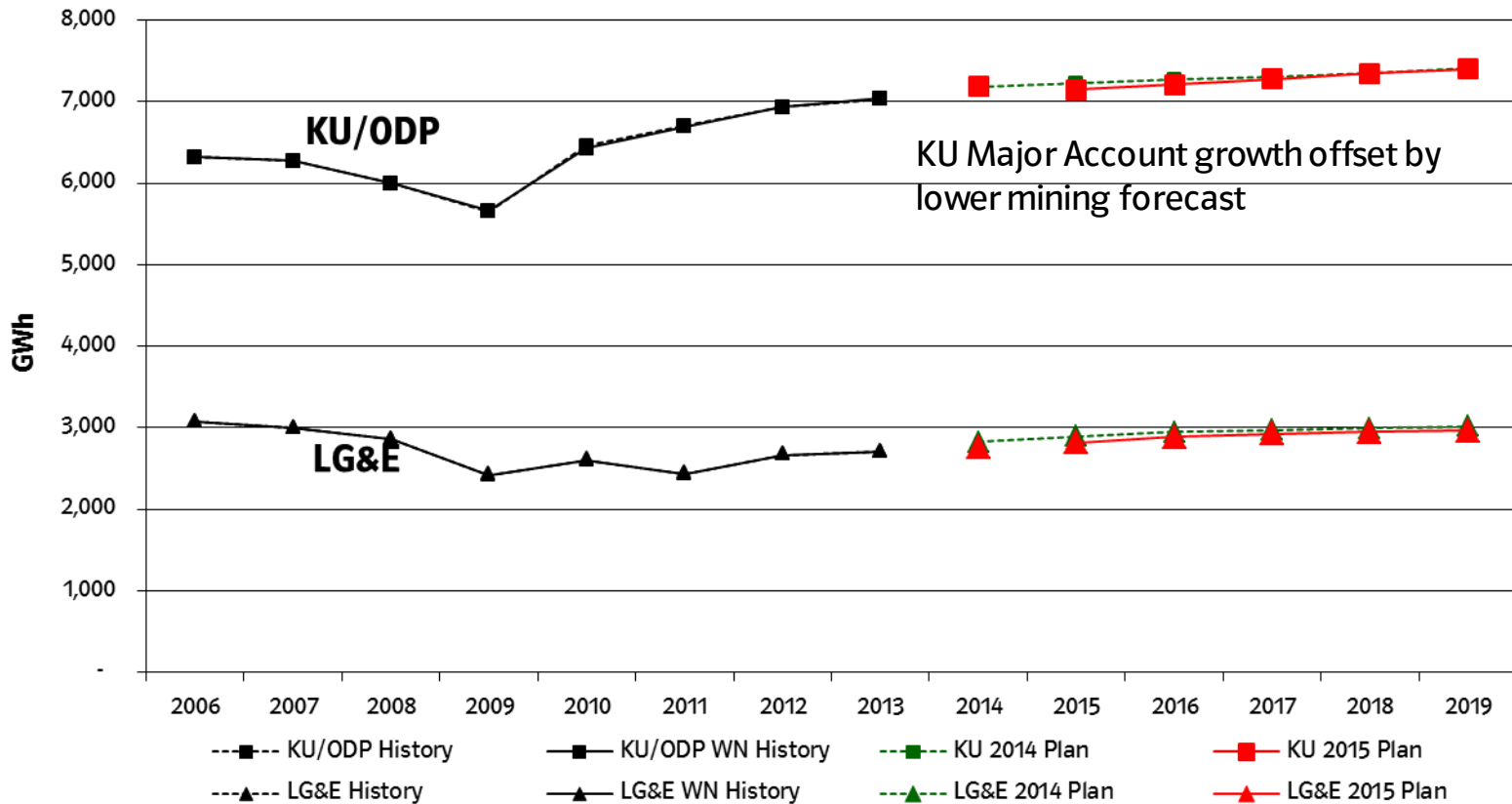
Annual Commercial Energy Sales



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

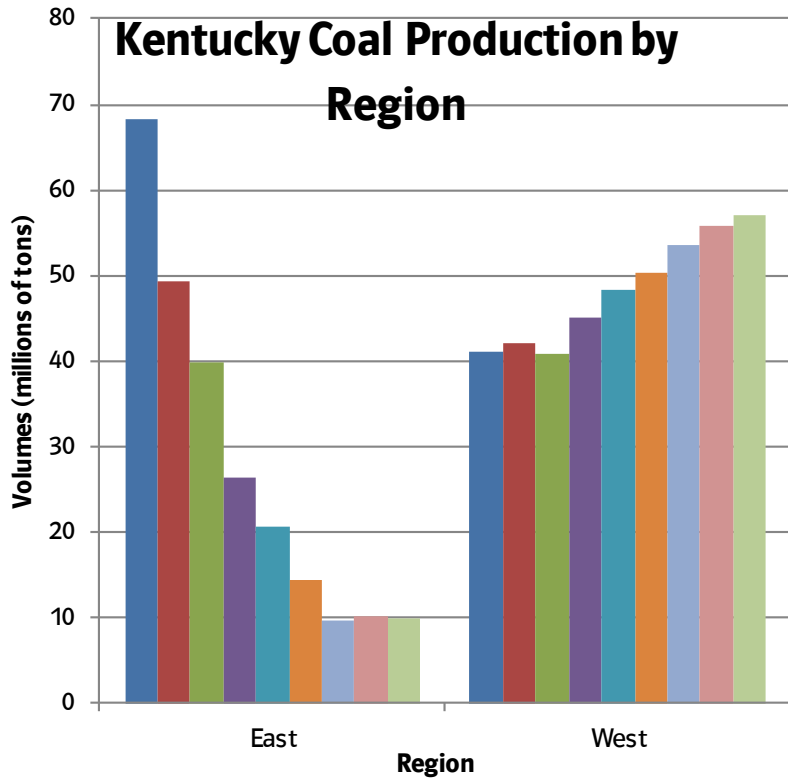
Slow growth expected in industrial class consistent with prior Plan

Annual Industrial Energy Sales



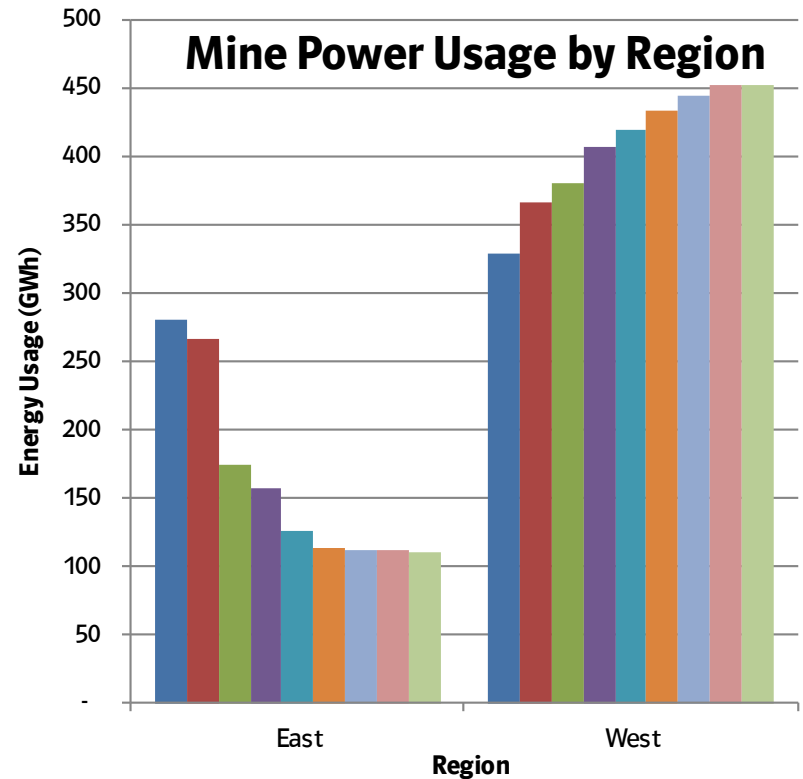
* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

Eastern KY coal production expected to fall by 85% from 2011 to 2019



■ 2011 ■ 2012 ■ 2013 ■ 2014 ■ 2015 ■ 2016 ■ 2017 ■ 2018 ■ 2019

Source: 2014 Spring Wood Mackenzie LTFP Forecast (updated May '14)



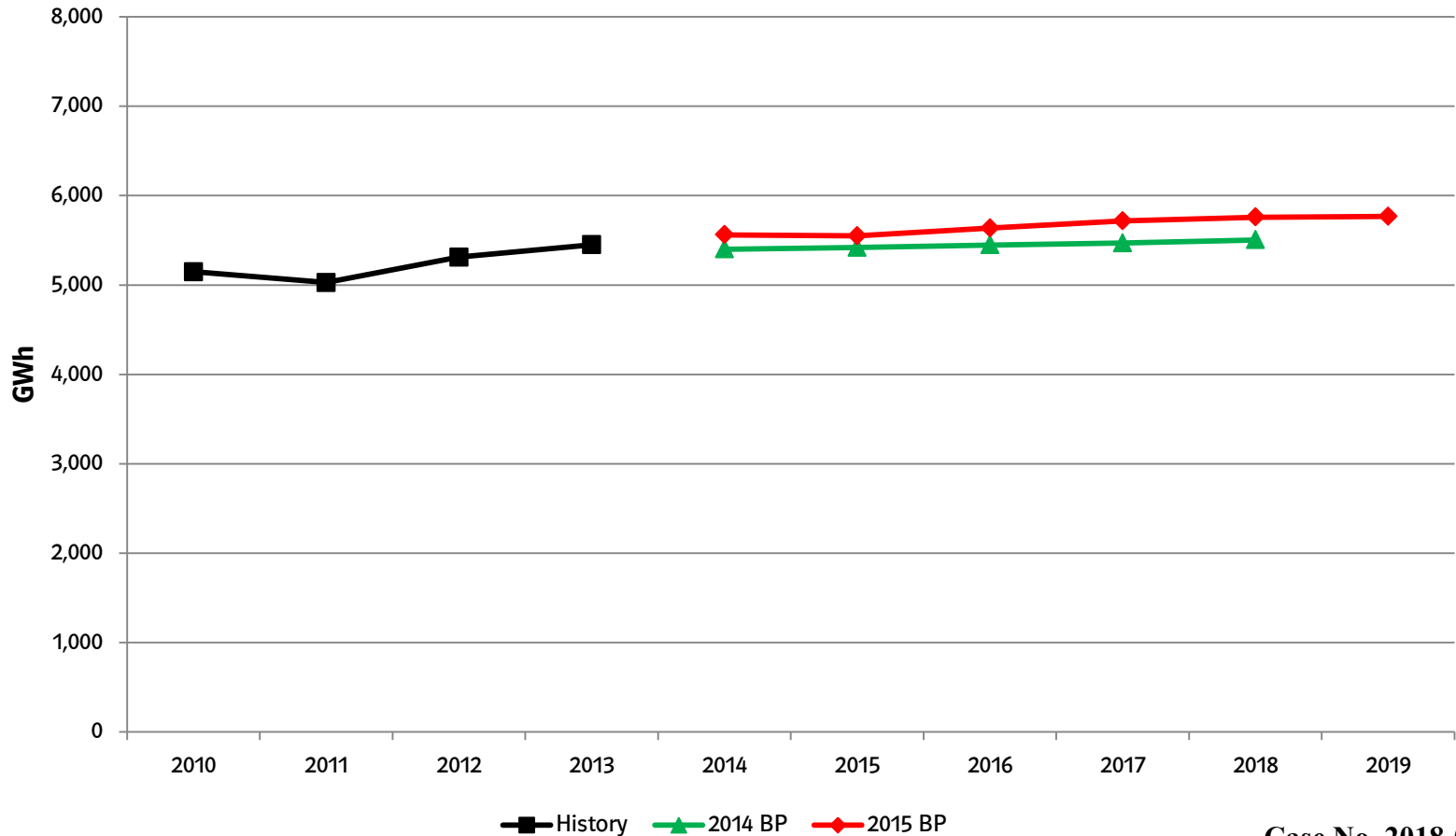
■ 2011 ■ 2012 ■ 2013 ■ 2014 ■ 2015 ■ 2016 ■ 2017 ■ 2018 ■ 2019

2011 – 2013 data is Billed actual. 2014 are billed actuals for Jan-May + June
Dec from 2015 BP.

Case No. 2018-00294
Attachment 1 to Response to KUC-1 Question No. 17c

2015 Plan Major Account sales increase slightly from prior Plan

Major Accounts History and Forecast



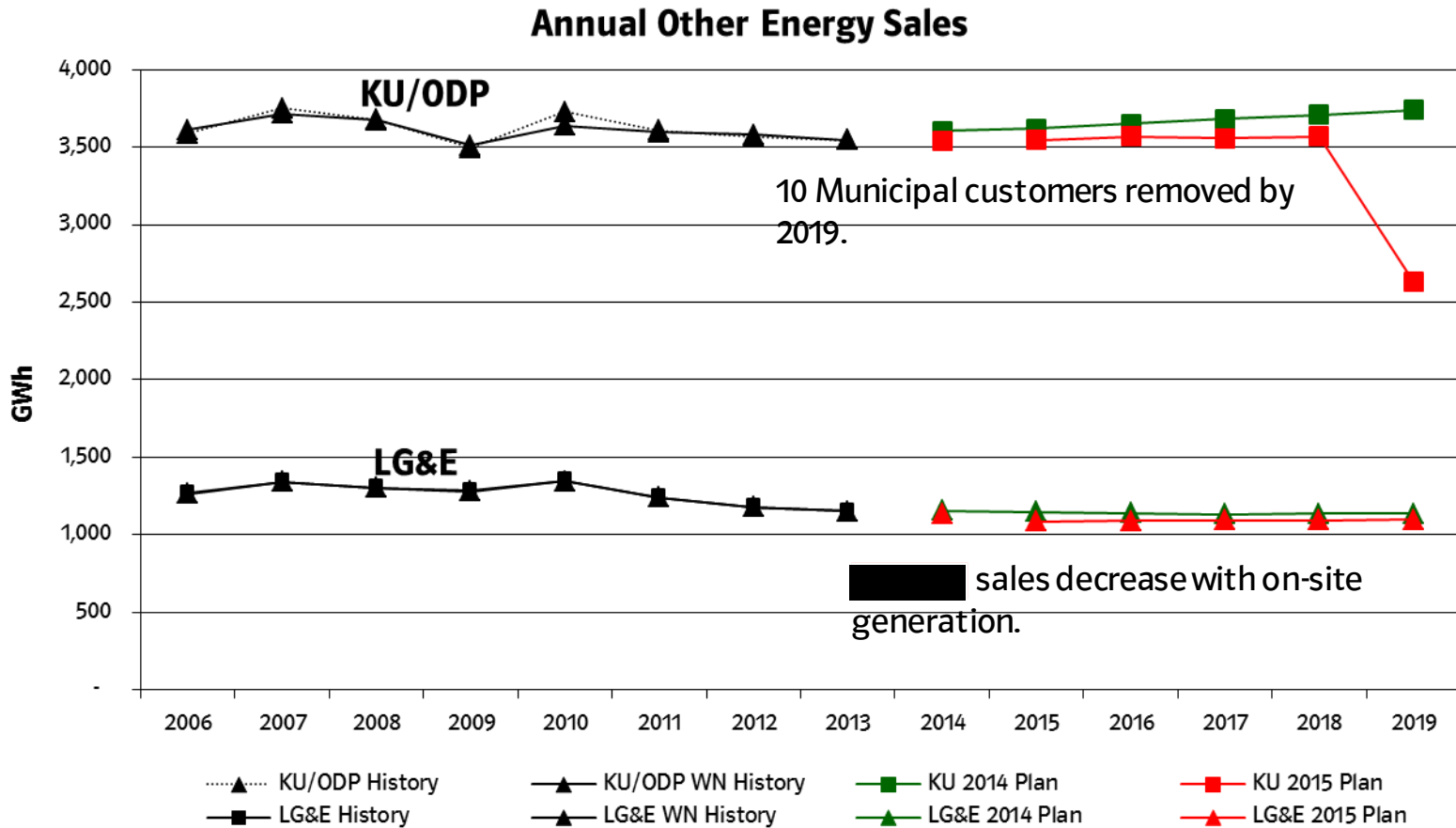
Changes in 26 Major Account sales for 2015: 132 GWh higher than 2014 BP

- Significant changes for 2015

Customer	Energy Change	Driver
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

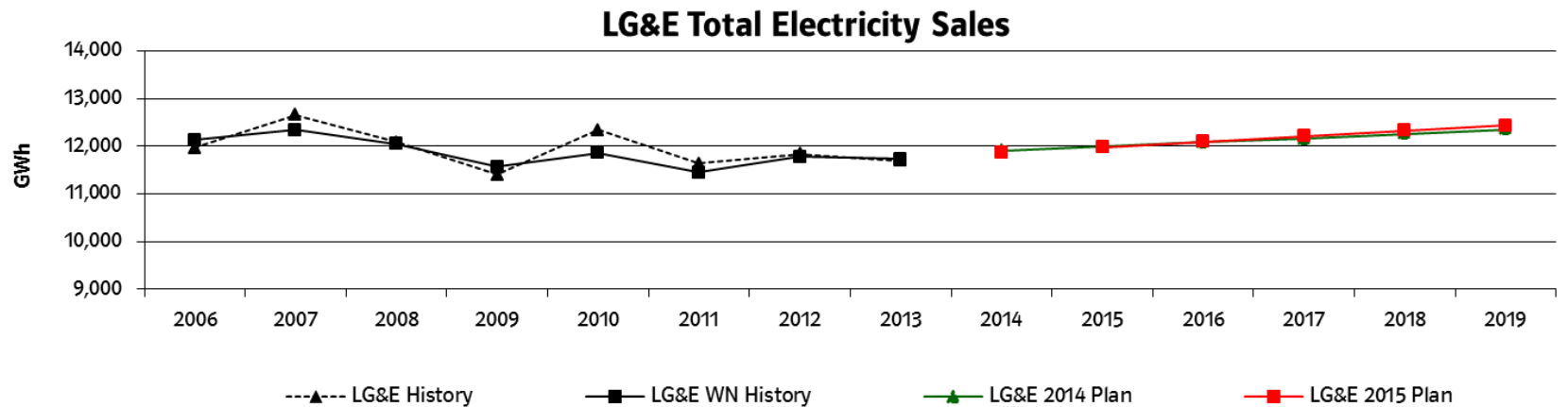
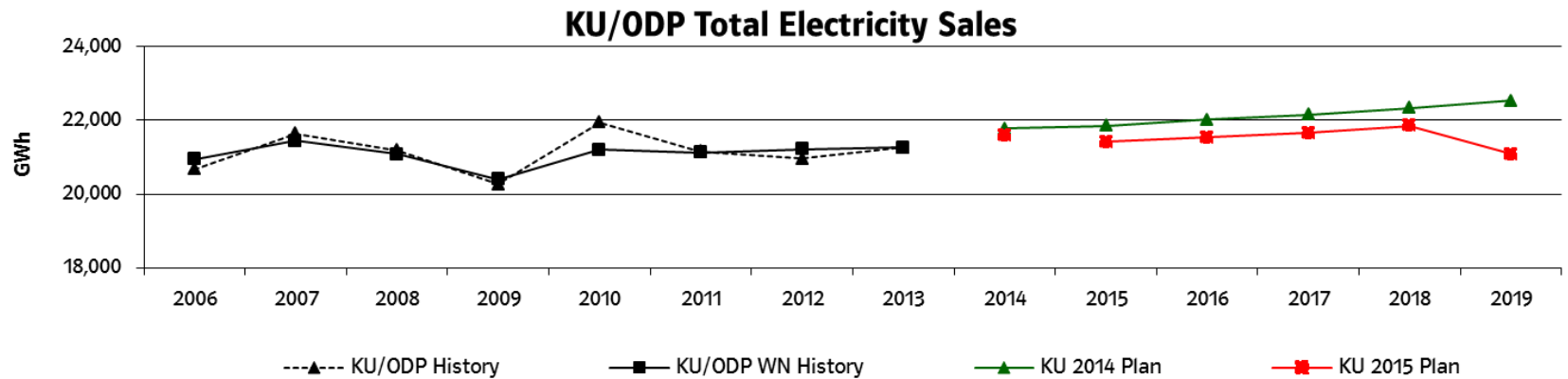
CONFIDENTIAL INFORMATION REDACTED

Public Authority sales impacted by lower [REDACTED] forecast in LG&E and lower Muni forecast in KU



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

KU energy sales reflect lower commercial and residential usage



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

2015 Plan energy forecast growth rate below EIA regional forecasts

- 2015 Plan growth rates are less than EIA regional projections
 - *East South Central (ESC): Kentucky, Tennessee, Alabama, Mississippi*
 - *East North Central (ENC): Indiana, Illinois, Ohio, Michigan, Wisconsin*

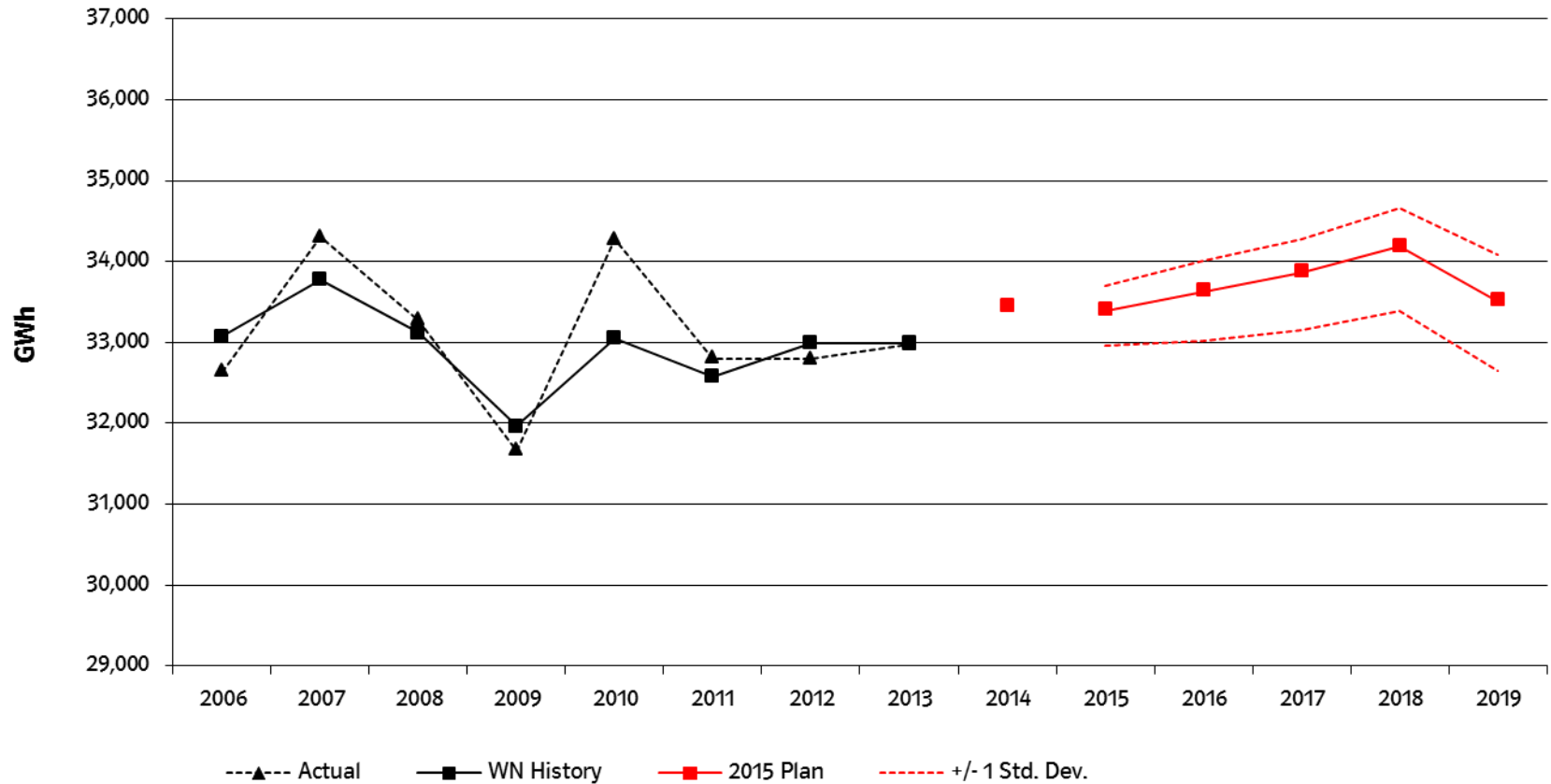
	CAGR	
	2014-2019	2014-2040
2015 BP (excl Munis)	0.6%	0.5%
2014 AEO ESC region	1.9%	1.0%
2014 AEO ENC region	1.1%	0.6%

Plan risks: weather continues to be a significant near term risk

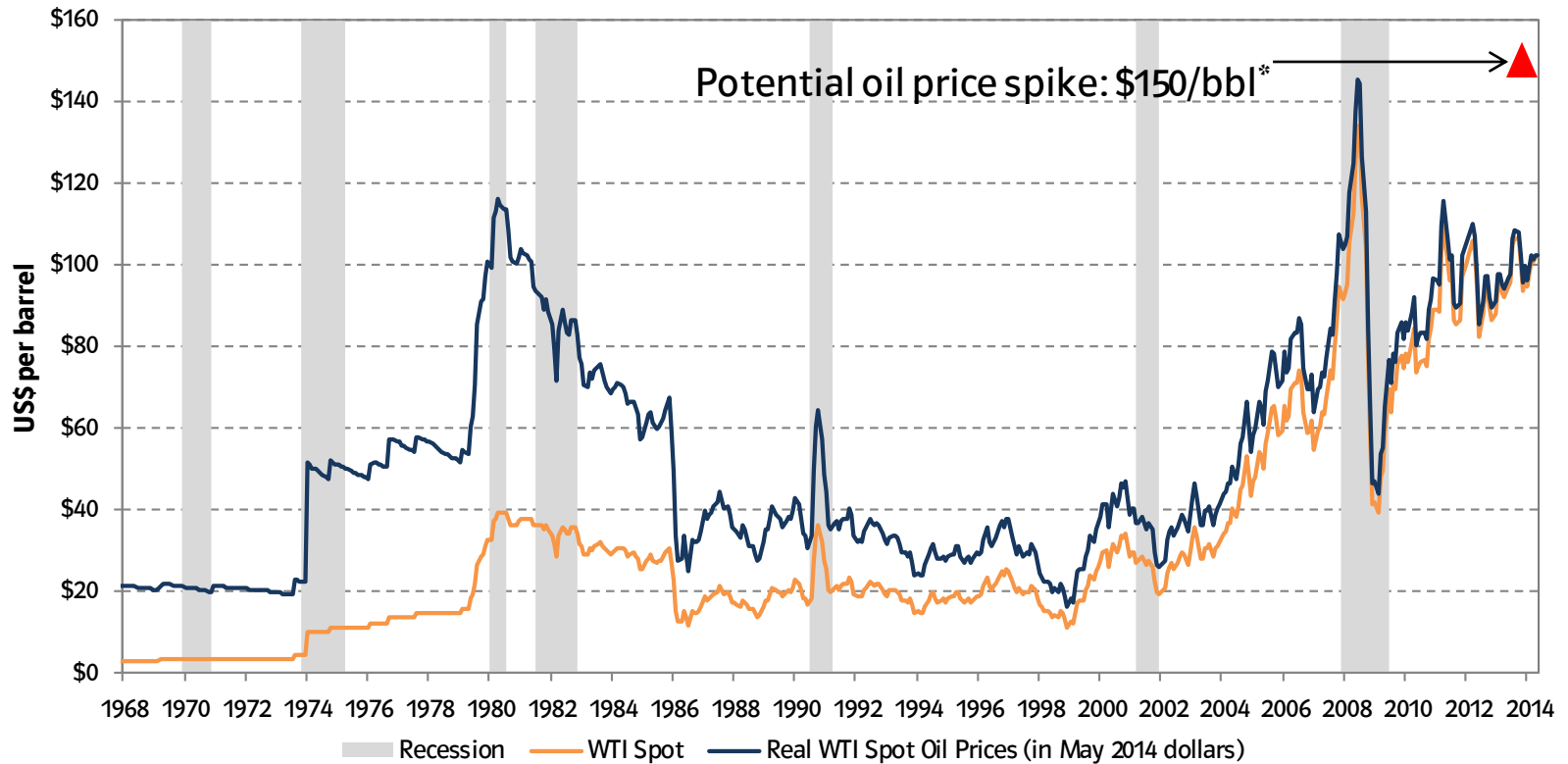
- Near term (2015)
 - *Weather - winter/summer extremes (+/- 400 GWh)*
 - *Economic downturn related to potential oil price spike (-500 GWh)*
- Medium term (2015-2019)
 - *Continued slower than forecasted economic growth (200 GWh /year; 1,000 GWh by 2019)*
 - *More rapid adoption of efficiency measures (40 GWh/year; 200 GWh by 2019)*

Sales risk based on IHS GSP risk scenario

Combined Company Total Electricity Sales



Historical risk of recession with spike in oil prices



*Source: International Monetary Fund "World Economic Outlook", October 2013

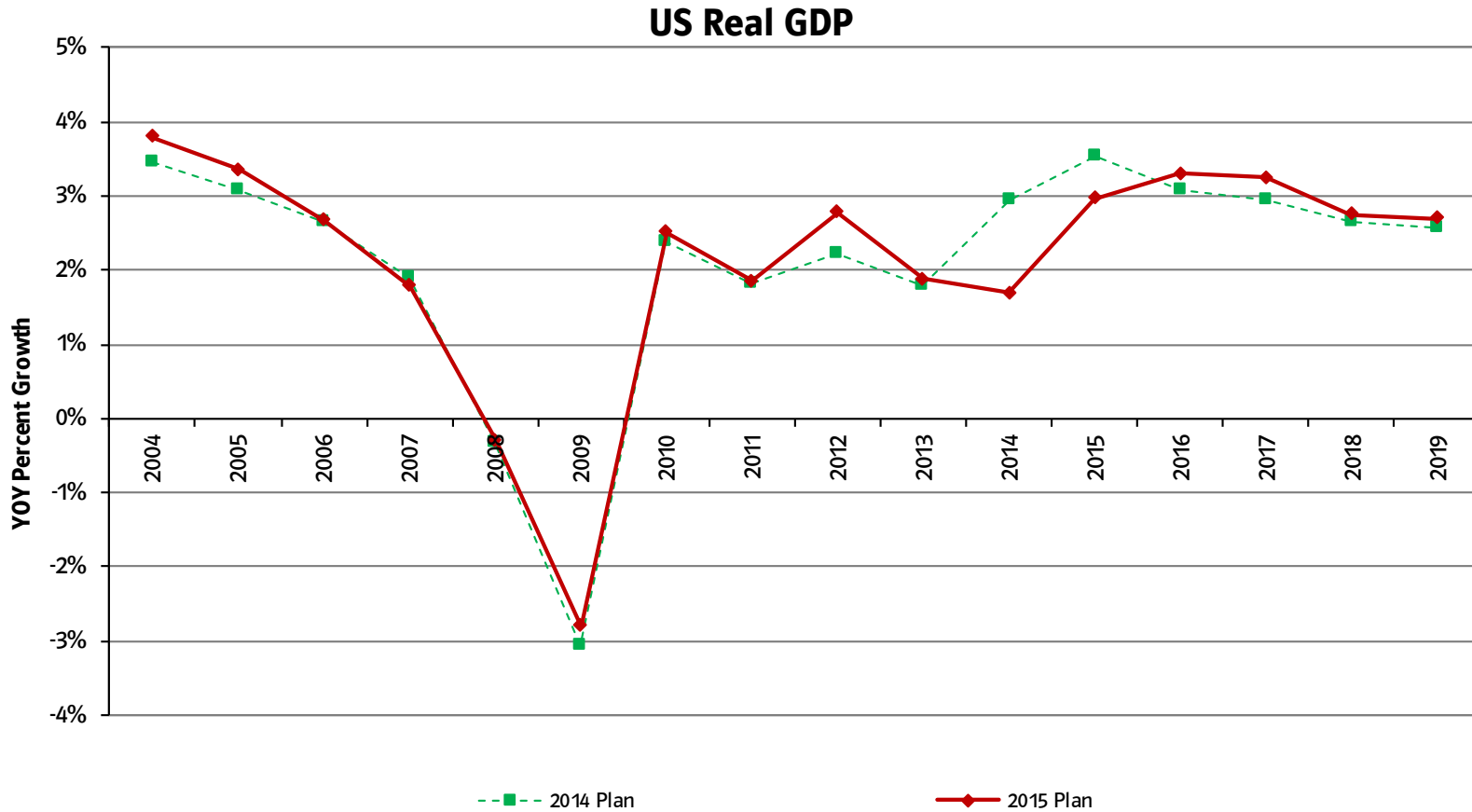
Major Account recession risk of 500 GWh based on 2008-09 downturn

Customer	2010 History (GWh)	2015 2015 BP (GWh)	Delta (GWh)
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total	2,682	3,215	533

CONFIDENTIAL INFORMATION REDACTED

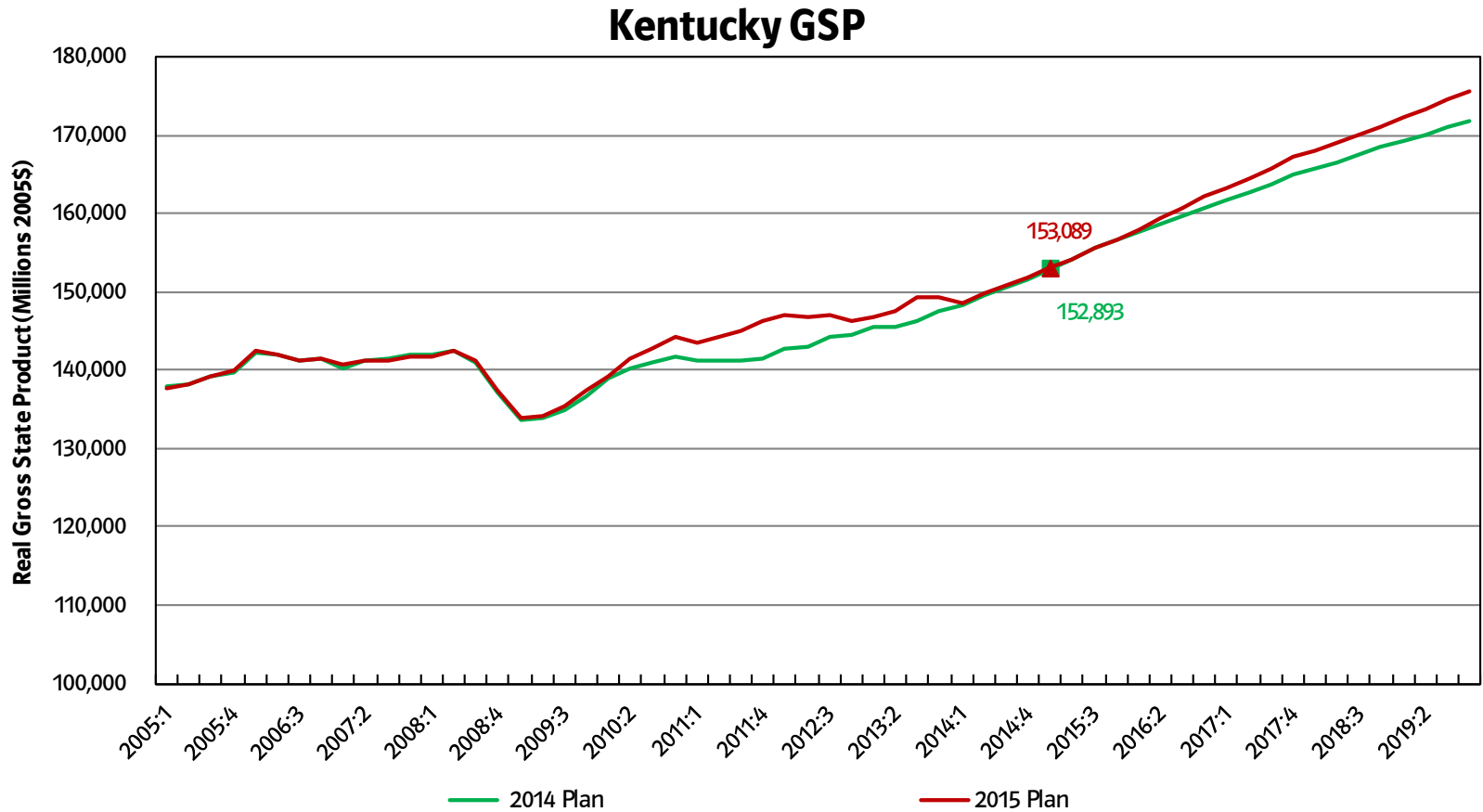
Appendix A – Macroeconomic Inputs

Slower near-term US GDP Growth Expected



Source: IHS Global Insight

Near-term Kentucky GSP forecast unchanged



Source: IHS Global Insight

Appendix B - Customer Data

Customers by Rate

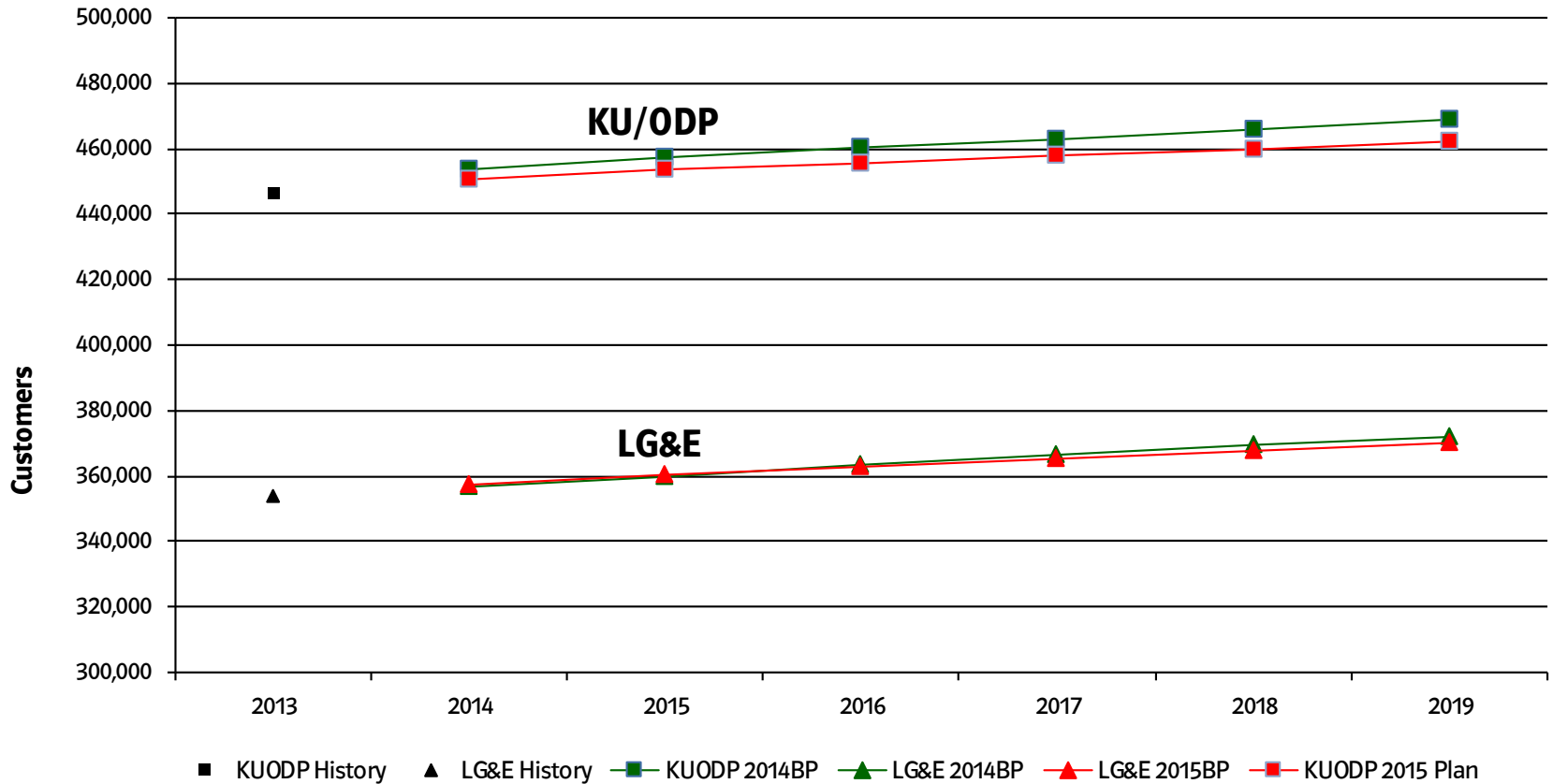
		Current	
	Rate Category	Contract	Forecast
KU/ODP		Count*	for 2015
	AES	779	774
	GS	86,210	86,376
	LTOD-Pri	54	52
	PS-Pri	270	238
	PS-Sec	5,459	5,304
	RS	448,376	453,478
	RTS	42	43
	TOD-Pri	159	184
	TOD-Sec	422	416
	FLS	1	1
	Muni Pumping	13	13
	Municipals	12	12
		<u>541,797</u>	<u>546,890</u>

		Current	
	Rate Category	Contract	Forecast
LG&E		Count*	for 2015
	CPS-Pri	57	53
	CPS-Sec	2,592	2,580
	CTOD-Pri	35	37
	CTOD-Sec	202	214
	GS	44,362	44,497
	IPS-Pri	22	21
	IPS-Sec	251	221
	ITOD-Pri	66	68
	ITOD-Sec	74	90
	RS	356,308	360,289
	RTS	12	12
		<u>403,979</u>	<u>408,080</u>

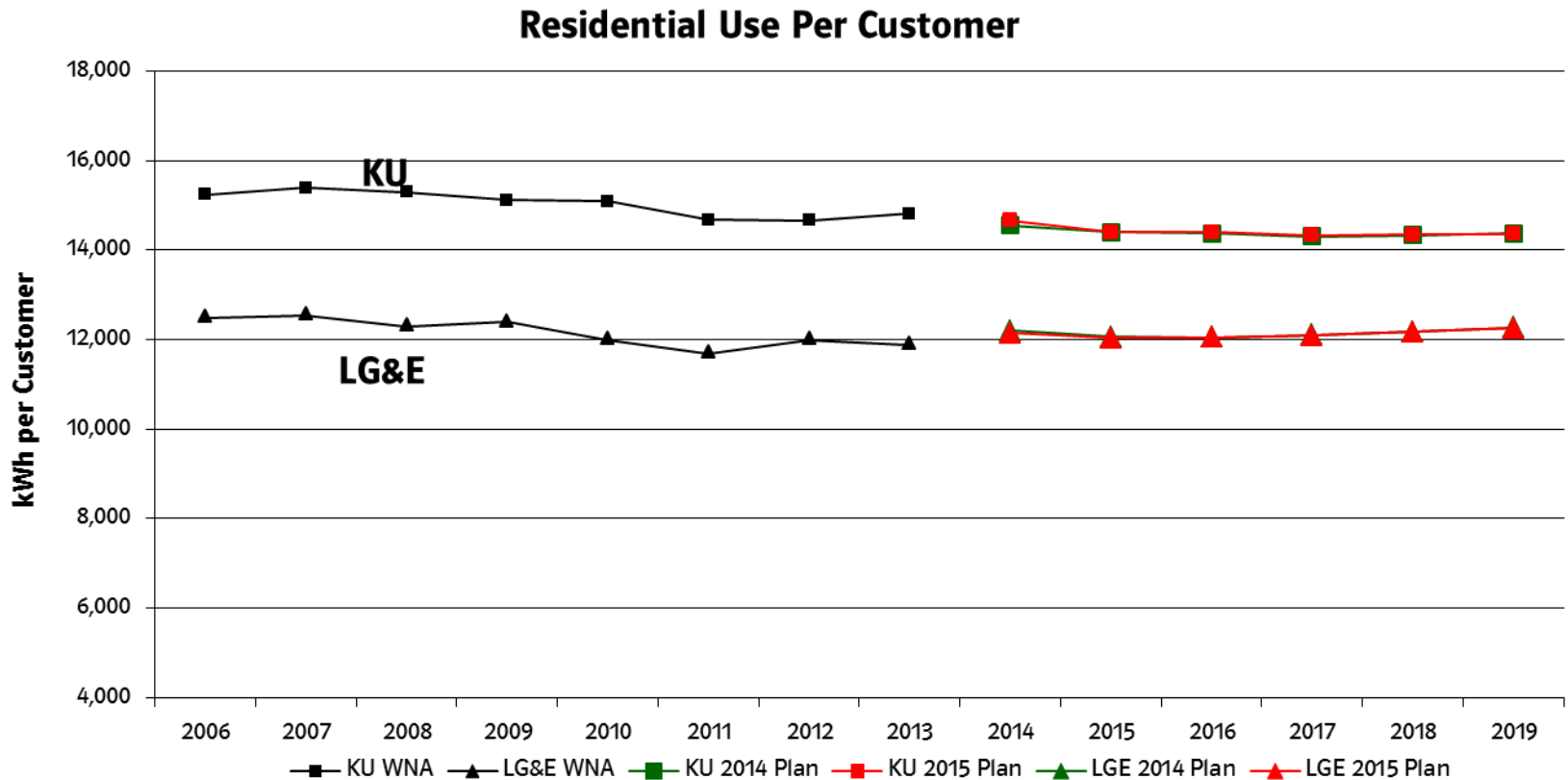
* Average of Jan-May 2014

KU Residential customer growth slightly below 2014 Plan

Residential Customer Forecast Comparison



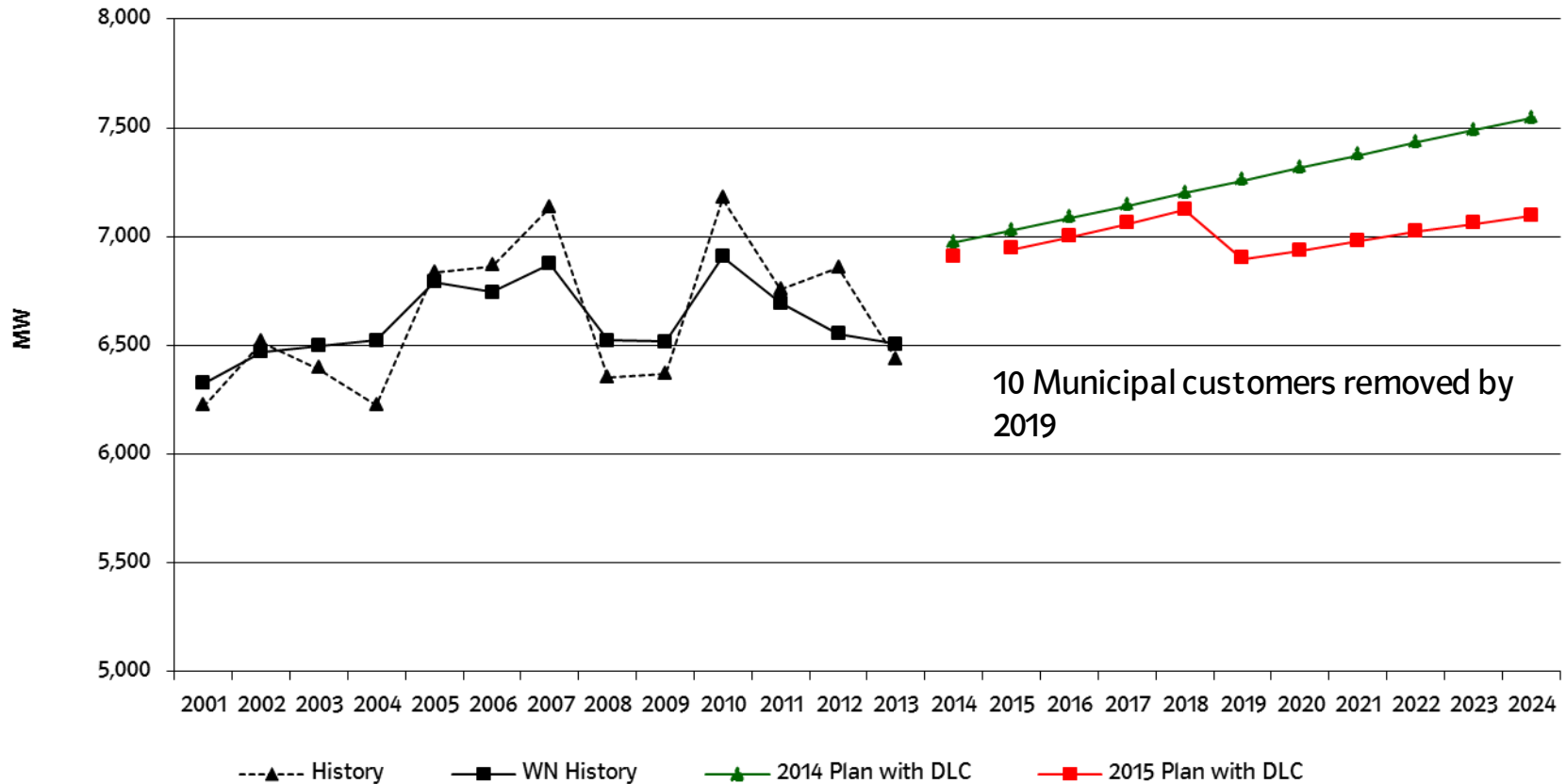
Use per customer for both KU and LG&E largely consistent with 2014 Plan



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

Uncurtailed peak forecast after DLC slightly lower consistent with lower energy forecast and higher DLC customer forecast

Combined Company Summer Peak Demand - 10 Year View



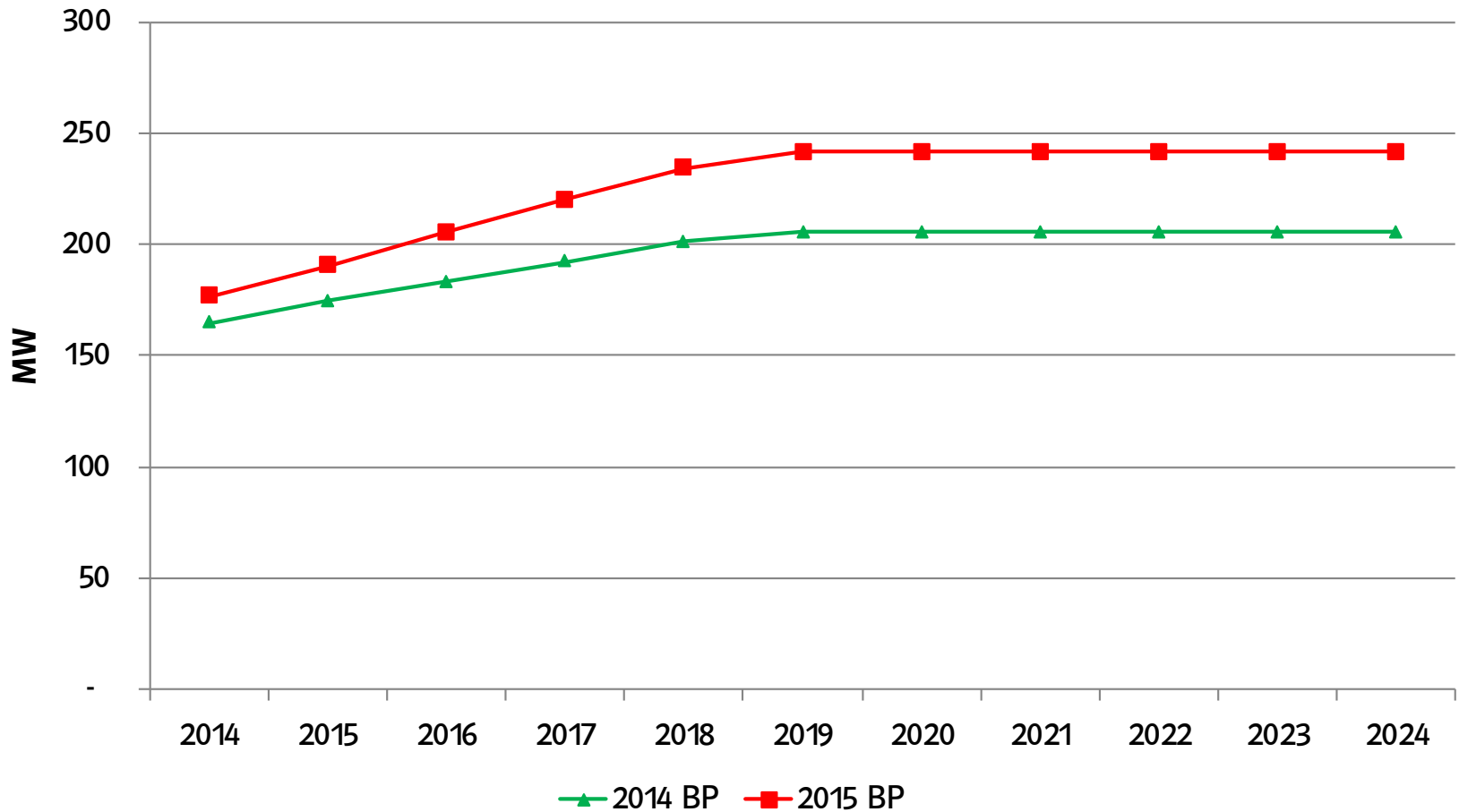
10 Municipal customers removed by 2019

* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

** In 2015 Plan forecast, peak forecast is adjusted ~20 MW higher to cover [redacted] obligation.

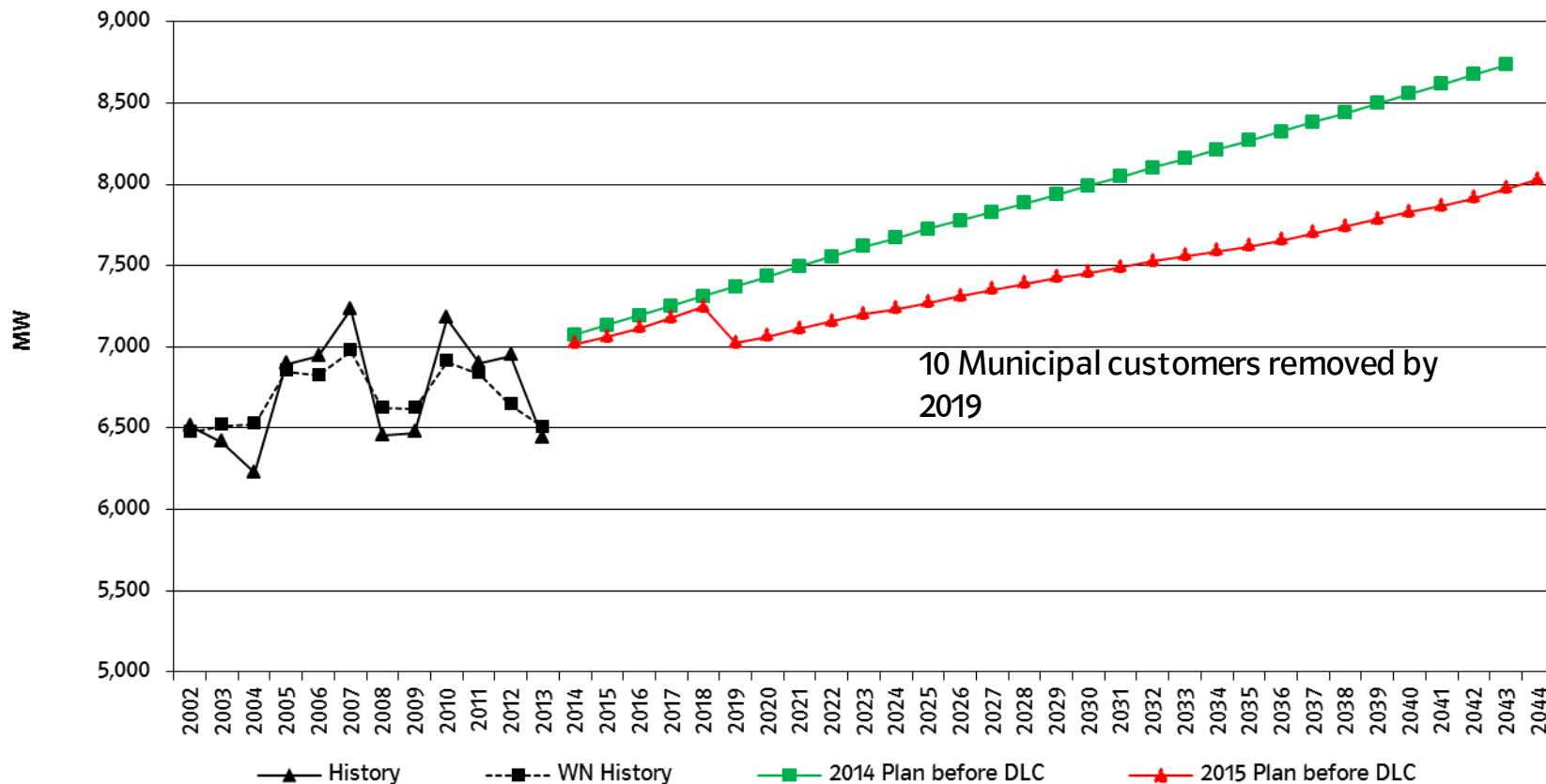
CONFIDENTIAL INFORMATION REDACTED

Additional DLC of 36 MW by 2019 due to higher customer participation forecast



Uncurtailed peak forecast slightly lower consistent with lower energy forecast and reduction in municipal load

Combined Company Summer Peak Demand - 30 Year View



10 Municipal customers removed by 2019

* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

** In 2015 Plan forecast, peak forecast is adjusted ~20 MW higher to cover [redacted] obligation.

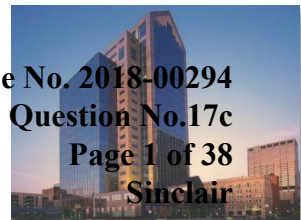
CONFIDENTIAL INFORMATION REDACTED



PPL companies

2016 Business Plan Electric Sales Forecast

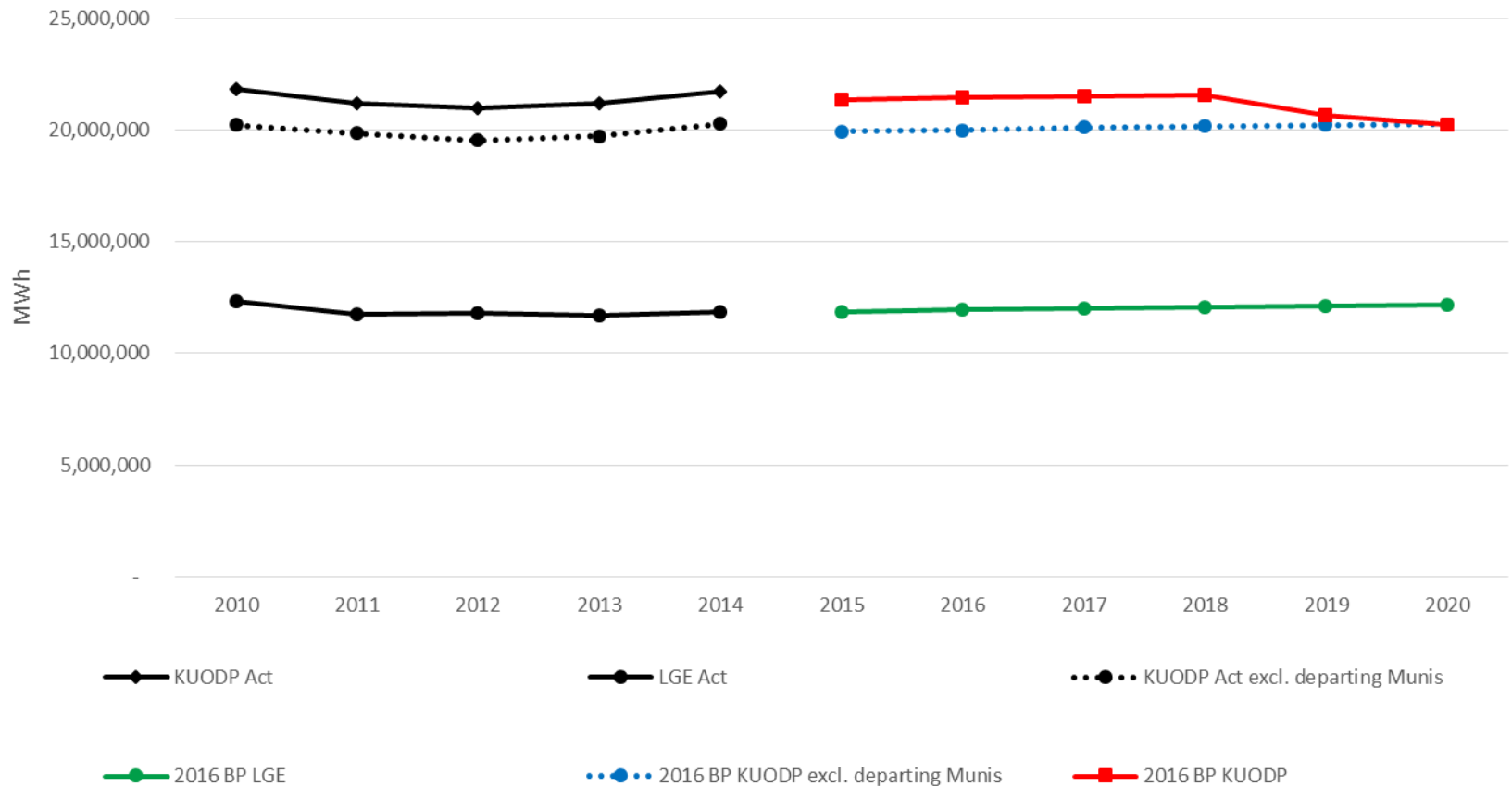
July 10, 2015



Major assumptions and changes vs. 2015 Plan

- Unfavorable inputs
 - *Lower population growth rate*
 - *EIA forecasts more rapid adoption of high efficiency appliances*
- Favorable inputs
 - *Major account forecasts slightly higher*
- Overriding theme
 - *Continuing slow economic growth*

Slow growth - the future looks like the recent past



Balance of year 2015 forecast 141 GWh below 2015 Plan

Period	2015 Combined Company Plan to Plan					Variance	
	2014 WN	2015 Plan (GWh)	2016	Variance	Pct Var	2014 WN -	Pct Var
	Actuals		Plan/2015	2015-2016		2016 Plan	
	(GWh)		Actuals	Plan		(GWh)	
January	3,152	3,033	3,077	44	1.5%	(75)	-2.4%
February	2,638	2,717	2,694	(23)	-0.9%	55	2.1%
March	2,655	2,644	2,634	(9)	-0.4%	(21)	-0.8%
April	2,380	2,366	2,318	(48)	-2.0%	(63)	-2.6%
May	2,500	2,617	2,524	(93)	-3.5%	24	1.0%
June	2,811	2,969	2,946	(23)	-0.8%	135	4.8%
July	3,173	3,196	3,171	(26)	-0.8%	(2)	-0.1%
August	3,131	3,262	3,239	(23)	-0.7%	107	3.4%
September	2,630	2,689	2,671	(18)	-0.7%	42	1.6%
October	2,440	2,477	2,462	(16)	-0.6%	22	0.9%
November	2,538	2,509	2,495	(14)	-0.6%	(43)	-1.7%
December	2,889	2,915	2,893	(21)	-0.7%	4	0.1%
Total	32,939	33,394	33,124	(270)	-0.8%	185	0.6%

2016 Plan has slightly lower growth rate compared to 2015 Plan

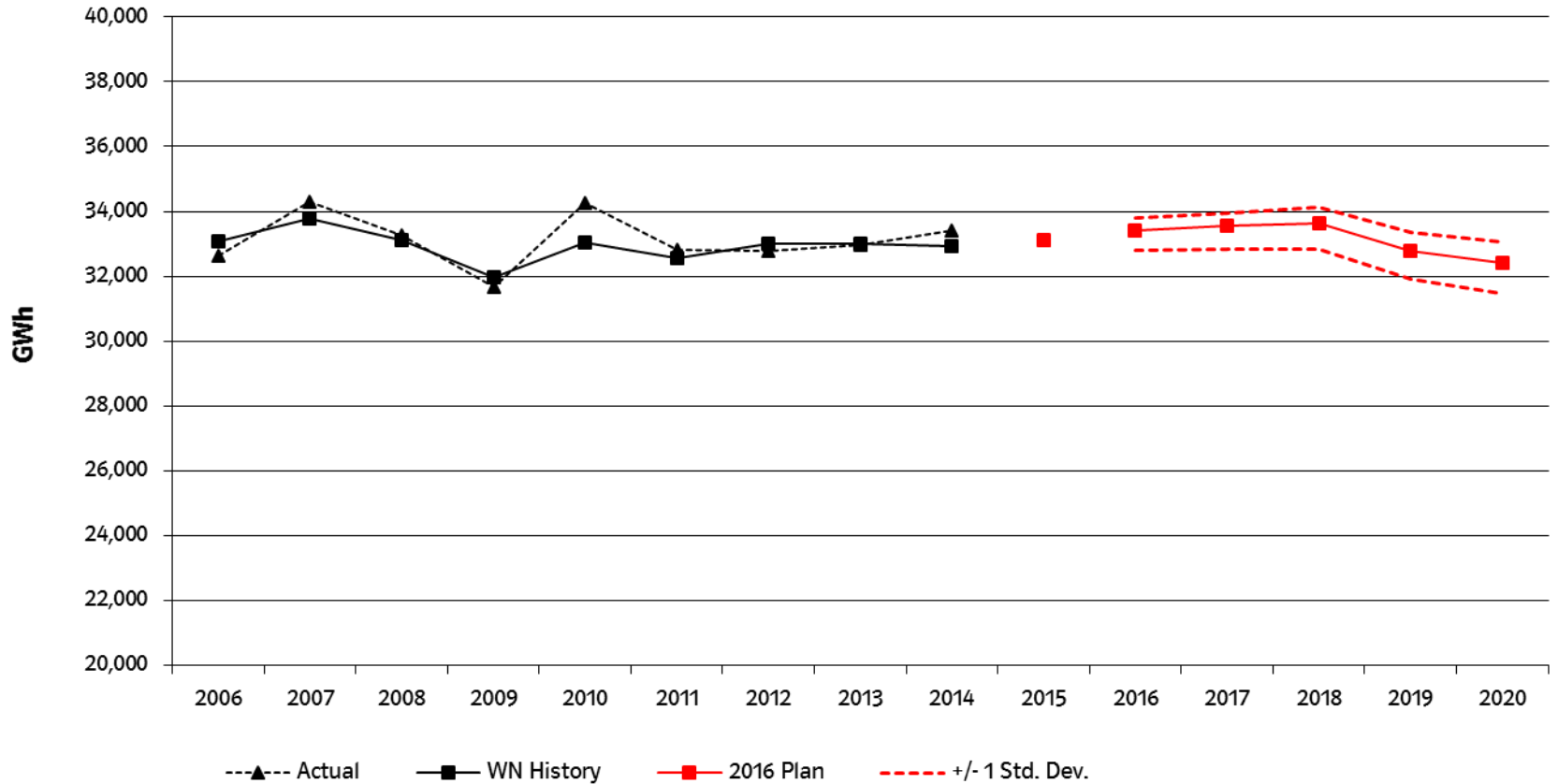
- Large weather adjustments impacting actuals in 2015

	Total Company Sales (GWh)				KU/ODP Sales (GWh)				LG&E Sales (GWh)			
	2016 Plan*	2015 Plan	Delta	% Change	2016 Plan*	2015 Plan	Delta	% Change	2016 Plan*	2015 Plan	Delta	% Change
2010	33,054				21,200				11,854			
2011	32,578				21,133				11,444			
2012	32,991				21,216				11,775			
2013	32,994				21,262				11,732			
2014	32,939				21,253				11,686			
2015	33,124	33,394	(270)	-0.8%	21,285	21,416	(131)	-0.6%	11,839	11,978	(139)	-1.2%
2016	33,413	33,632	(219)	-0.7%	21,434	21,542	(108)	-0.5%	11,979	12,090	(111)	-0.9%
2017	33,545	33,868	(323)	-1.0%	21,525	21,656	(131)	-0.6%	12,020	12,211	(192)	-1.6%
2018	33,632	34,181	(550)	-1.6%	21,567	21,852	(284)	-1.3%	12,064	12,330	(266)	-2.2%
2019	32,782	33,514	(732)	-2.2%	20,664	21,078	(414)	-2.0%	12,118	12,436	(318)	-2.6%
2020	32,426	33,265	(839)	-2.5%	20,248	20,746	(498)	-2.4%	12,178	12,520	(342)	-2.7%

* In 2016 Plan forecast, 2010 – 2014 is WN Actuals and 2015 value is a weather-normalized 5+7 forecast.

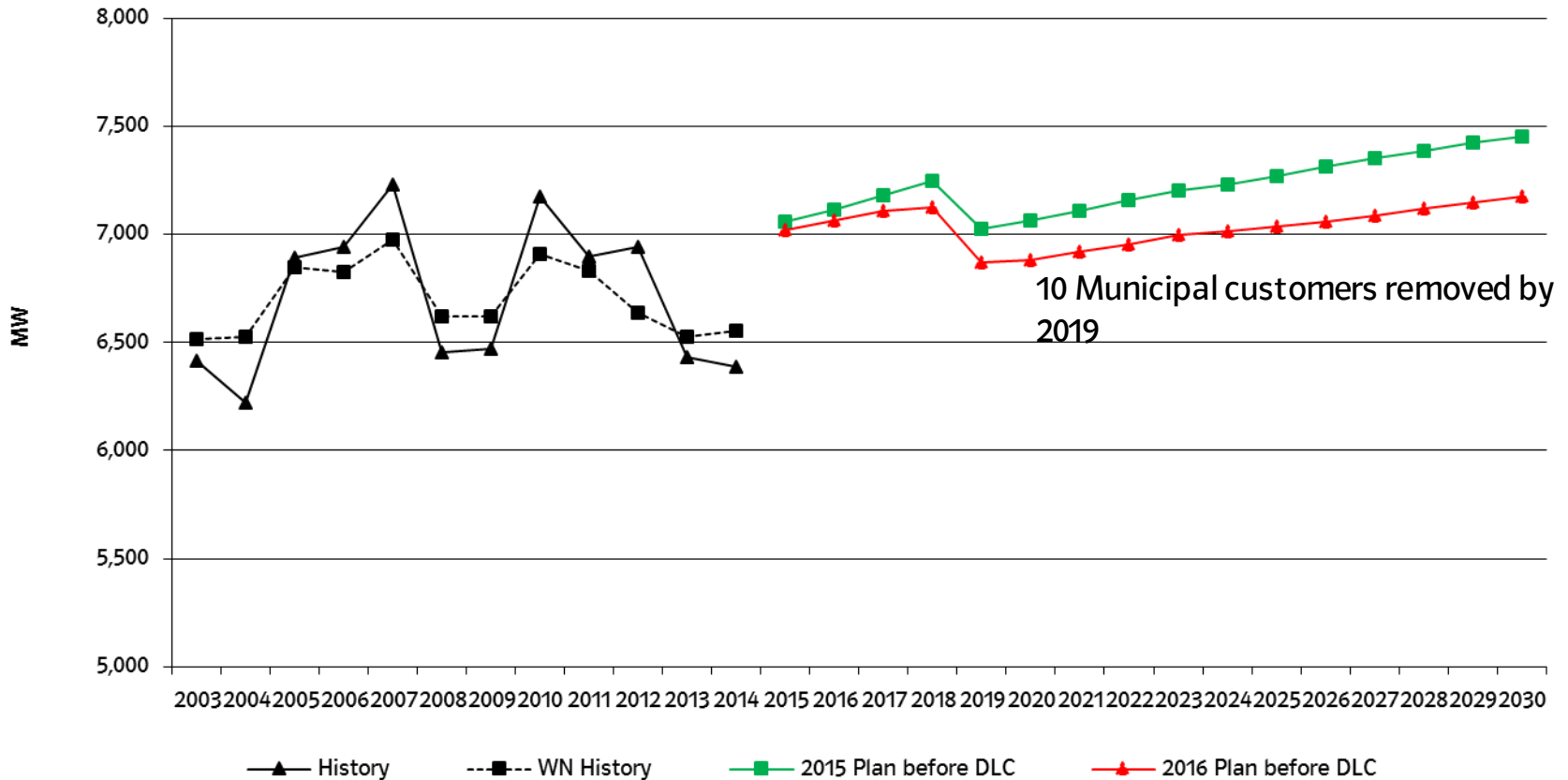
Sales risk based on IHS Gross State Product risk scenario - downside flat

Combined Company Total Electricity Sales



Uncurtailed peak forecast decreases consistent with lower energy forecast

Combined Company Summer Peak Demand - 15 Year View



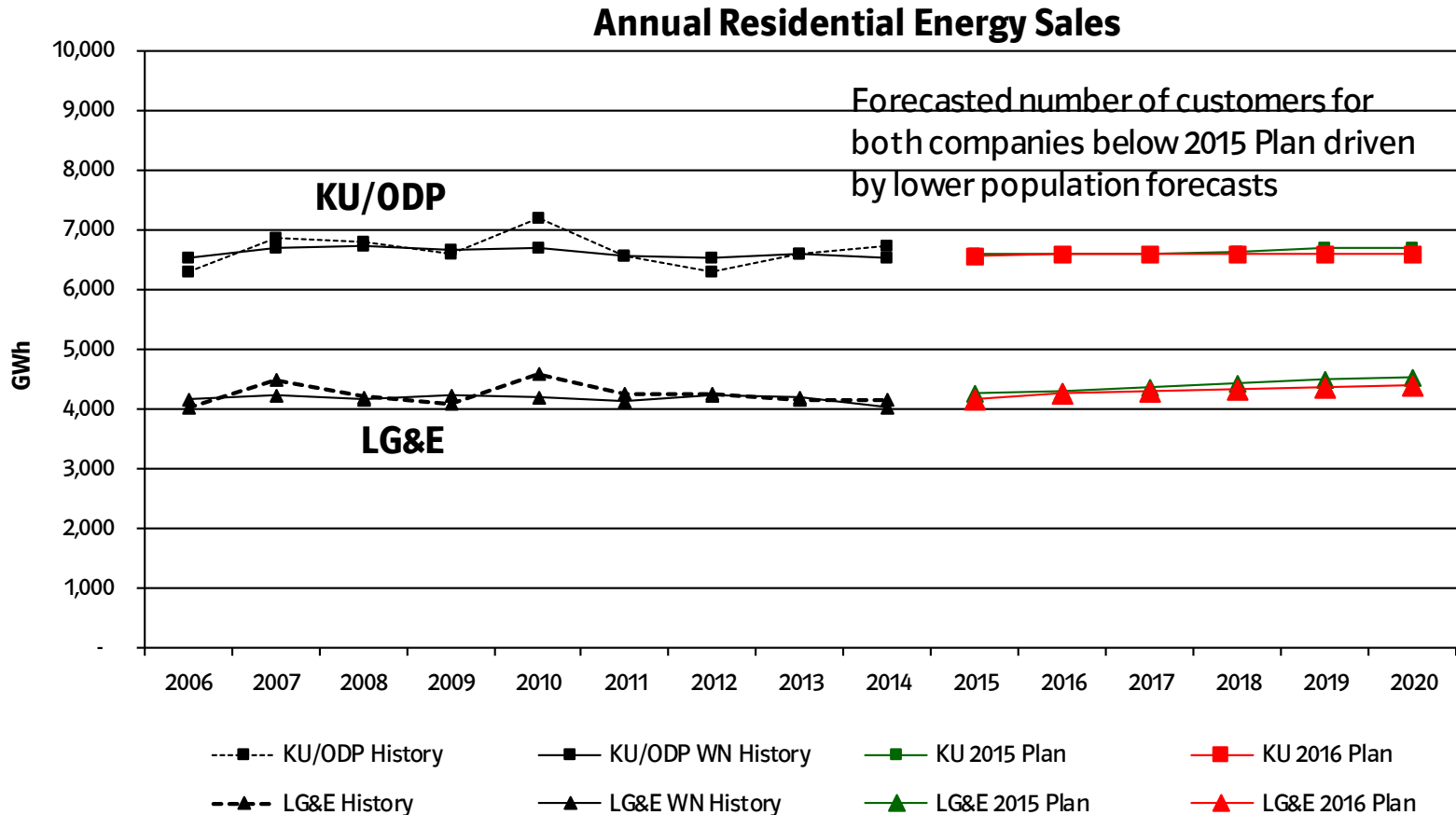
10 Municipal customers removed by 2019

* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

** In 2016 Plan forecast, peak forecast is adjusted ~20 MW higher to cover [redacted] obligation.

CONFIDENTIAL INFORMATION REDACTED

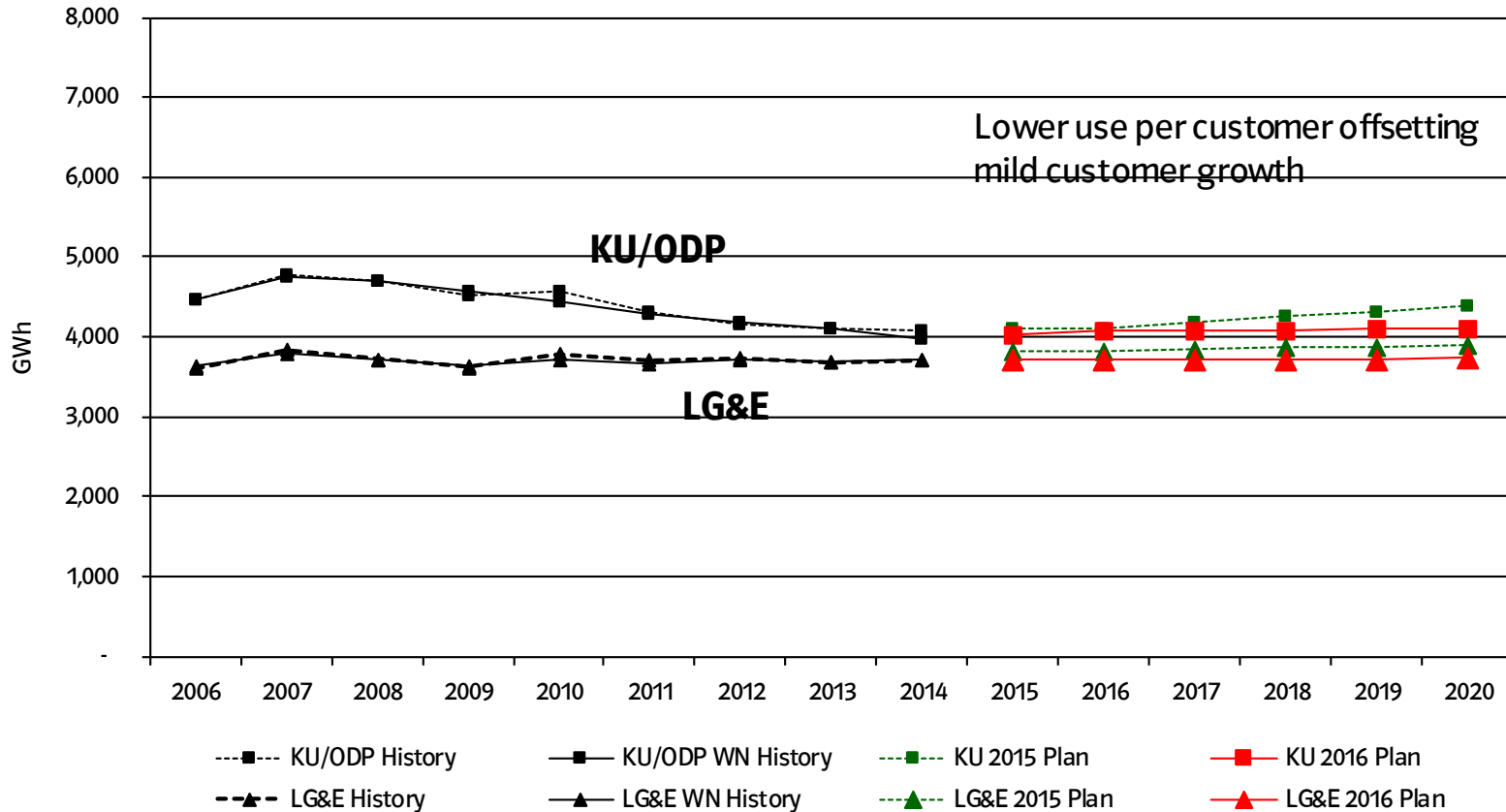
Residential sales forecast is slightly lower



* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

Commercial sales have slightly lower growth rates

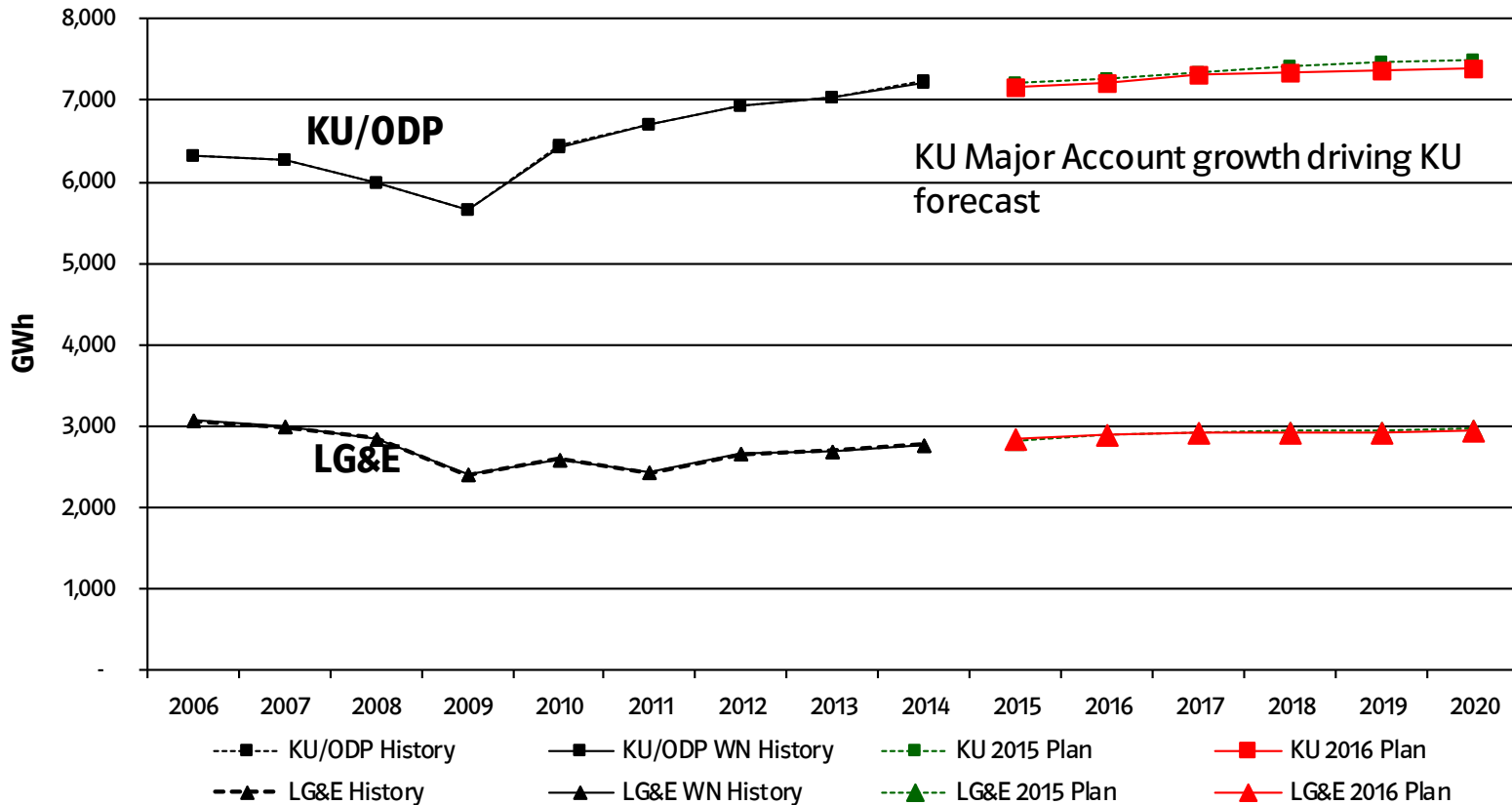
Annual Commercial Energy Sales



* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

Industrial class largely consistent with prior Plan

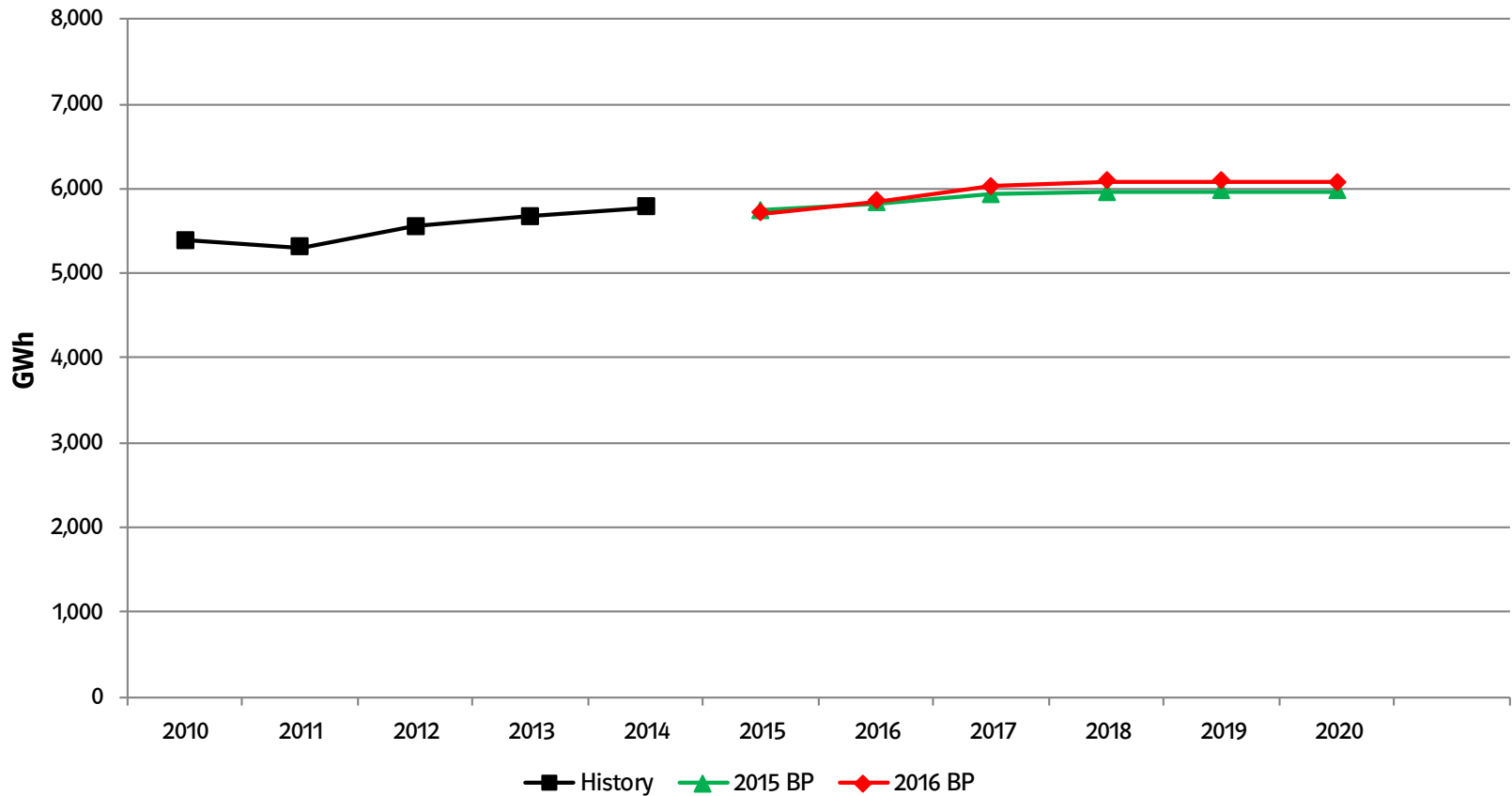
Annual Industrial Energy Sales



* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

2016 Plan Major Account sales increase slightly from prior Plan

Major Accounts History and Forecast



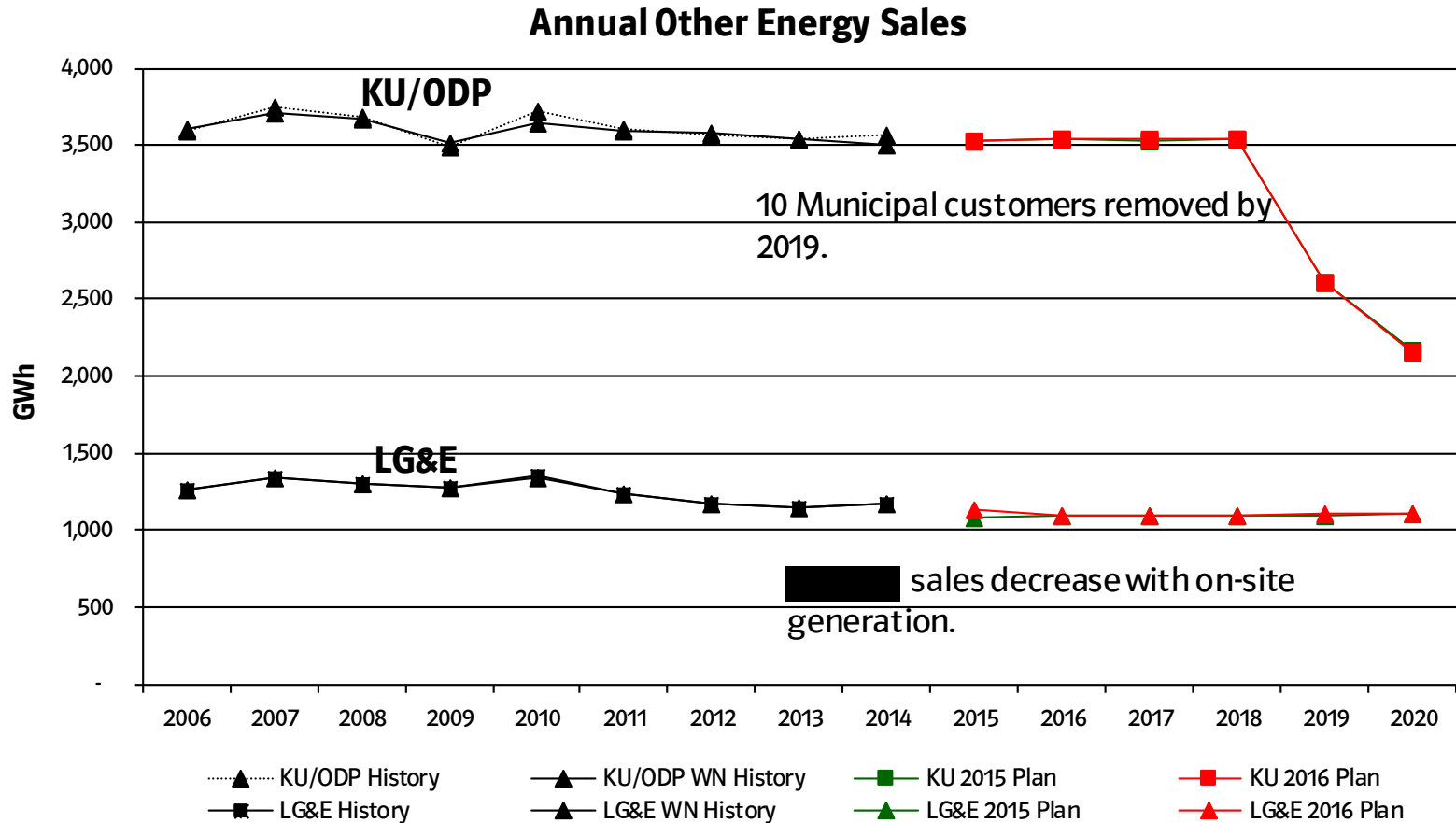
Expansions from late 2015 thru early 2017 driving major account sales

Energy Change by Year (GWh)				Driver
Customer	2016	2017	2018	
[REDACTED]	45	74	34	[REDACTED]
[REDACTED]	6	72	14	[REDACTED]
[REDACTED]	19	19	-	[REDACTED]
[REDACTED]	33	-	-	[REDACTED]
[REDACTED]	15	-	-	[REDACTED]

CONFIDENTIAL INFORMATION REDACTED

Public Authority sales slightly lower than 2015

Plan for KU

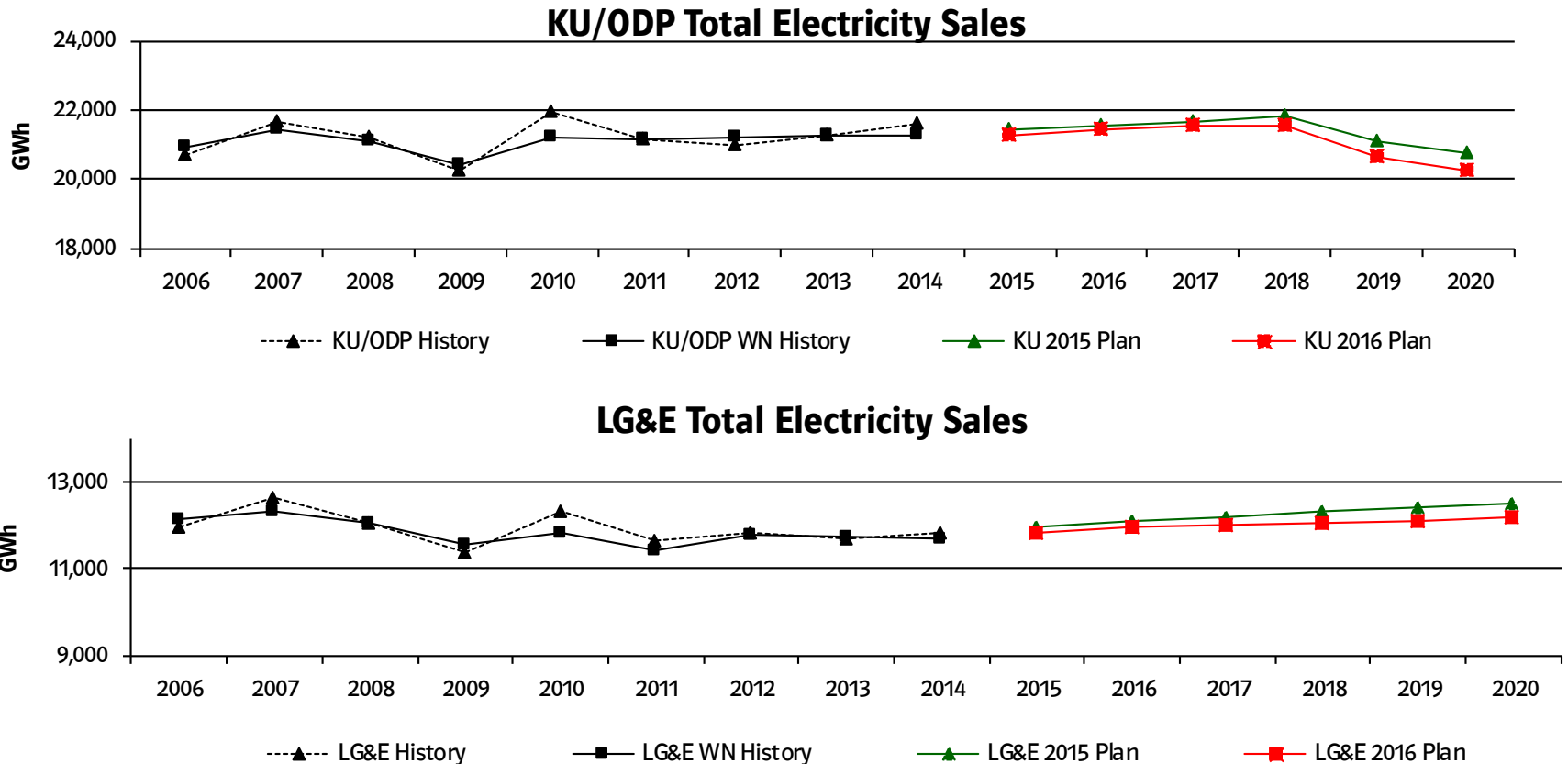


* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

Attachment 2 to Response to KUUC-1 Question No. 17c

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2016 Plan reflects slightly lower commercial and residential growth rates



* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

Plan risks: weather continues to be a significant near term risk

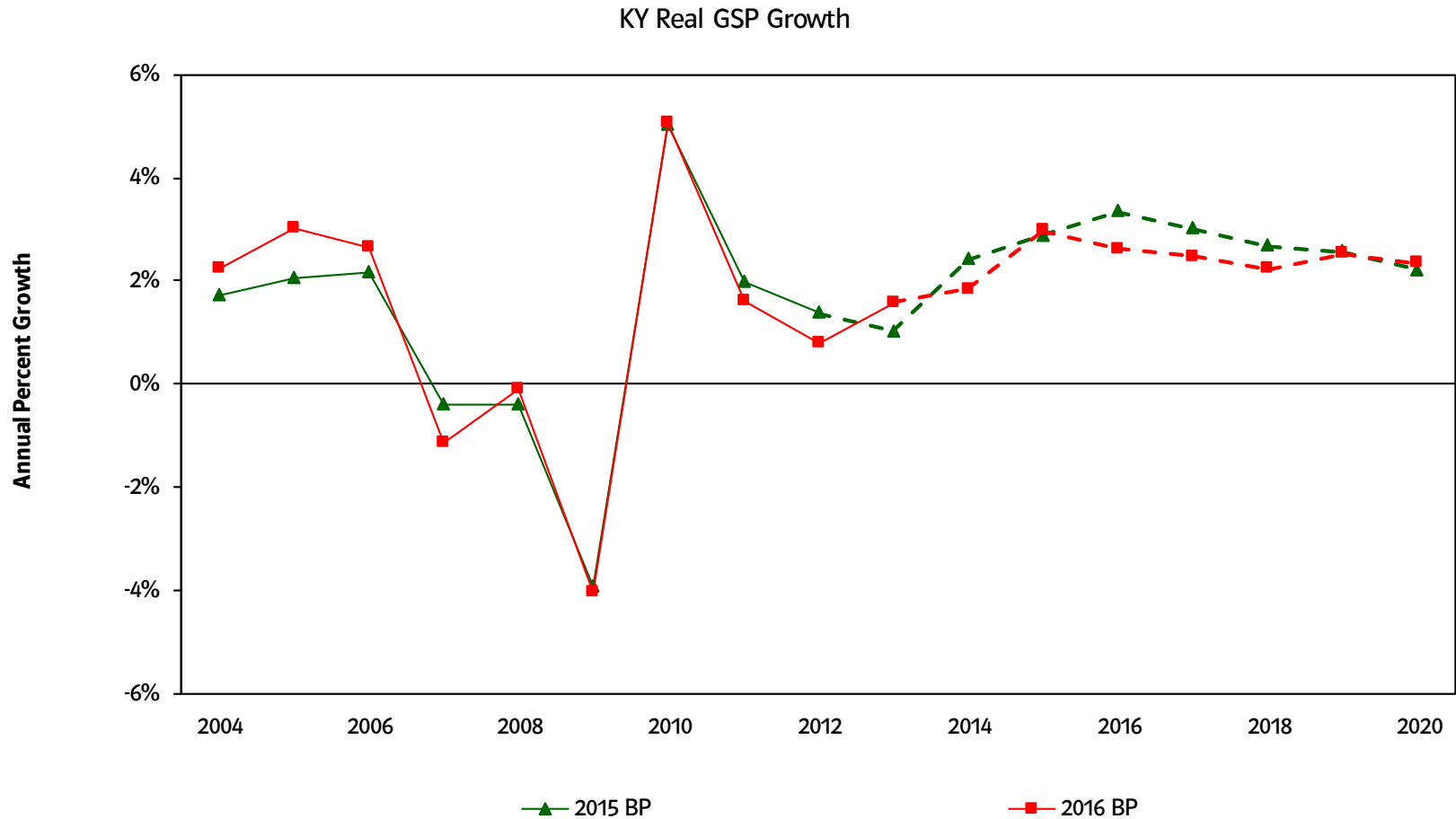
- Near term (2016)
 - *Weather - winter/summer extremes (+/- 450 GWh)*
- Medium term (2016-2020)
 - *Flat industrial growth: 326 GWh by 2020*

Summary: Slow load growth continues

- Load growth since 2010 has been relatively flat
- Customer growth in residential and commercial classes is mostly offset by improving efficiencies
- US GDP growth and KY GSP growth has consistently fallen below expectations in recent years
- Electricity sales growth is not keeping up with economic growth to the same degree as in the past as the Kentucky economy becomes less energy intensive

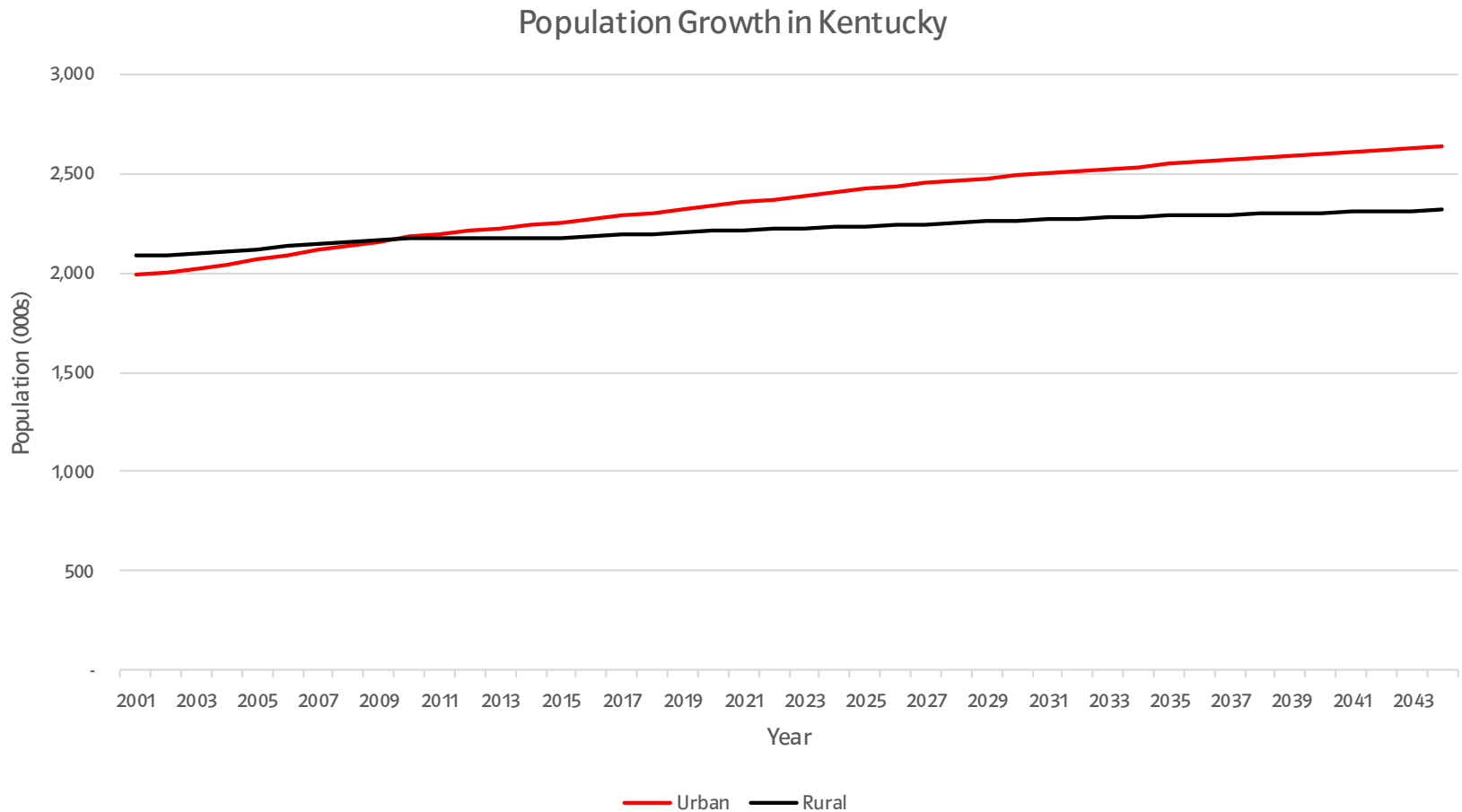
Appendix A - Macroeconomic Inputs

Near-term Kentucky GSP slightly lower than 2015 Plan



Source: IHS Global Insight

Population growth in rural areas much slower than urban areas of the state



- Urban represents Louisville and Lexington economic regions, rural all remaining
- Source: [Kentucky Chamber Analysis](#)

Appendix B - Customer Data

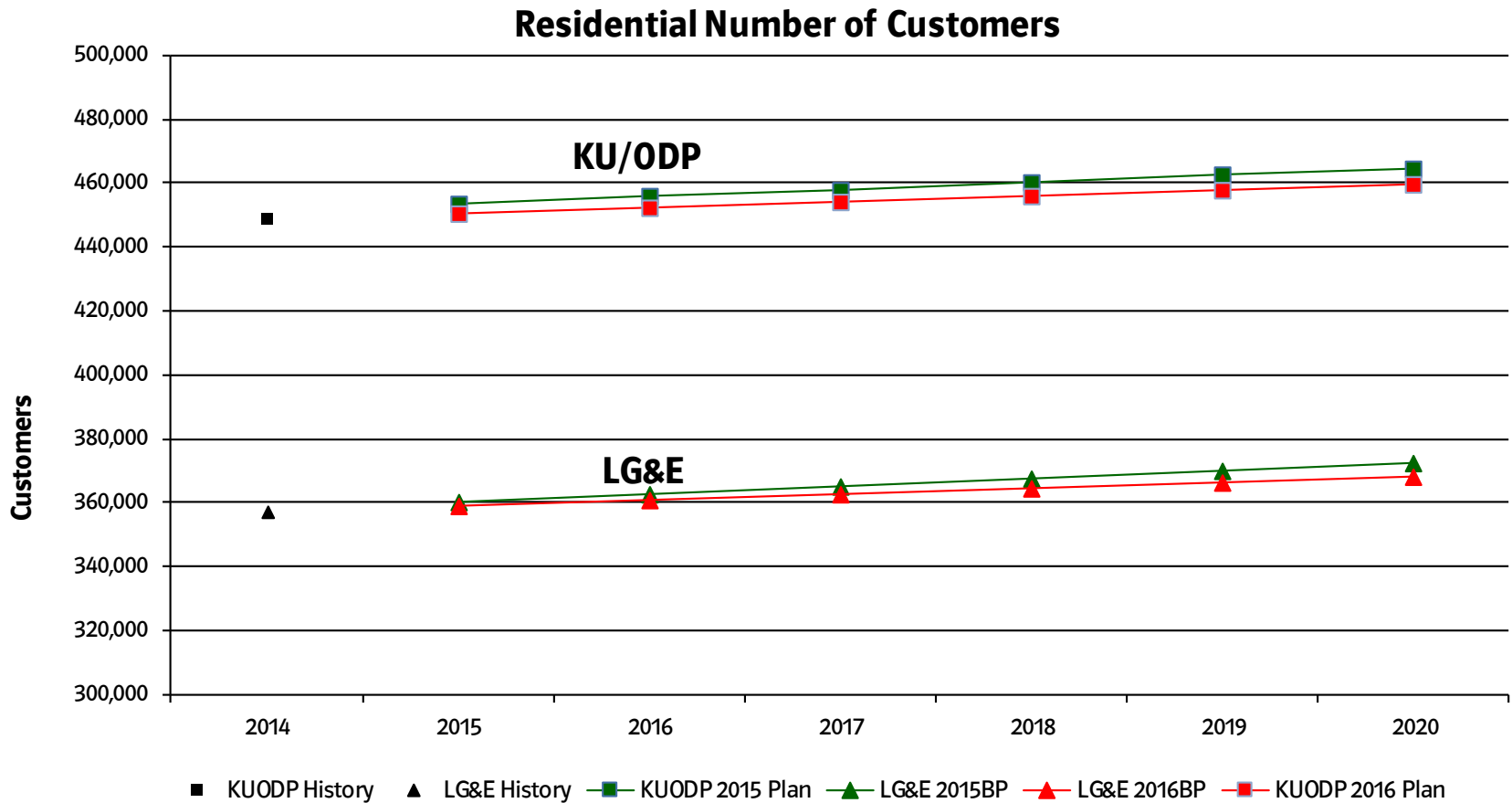
Customers by Rate

	Rate Category	Current Contract Count*	Forecast for 2016
KU/ODP	AES	743	735
	GS	86,311	87,194
	LTOD-Pri	55	55
	PS-Pri	244	224
	PS-Sec	4,970	4,947
	RS	449,823	452,954
	RTS	38	39
	TOD-Pri	190	211
	TOD-Sec	581	587
	FLS	1	1
	Muni Pumping	15	15
	Municipals	12	12
		542,983	546,974

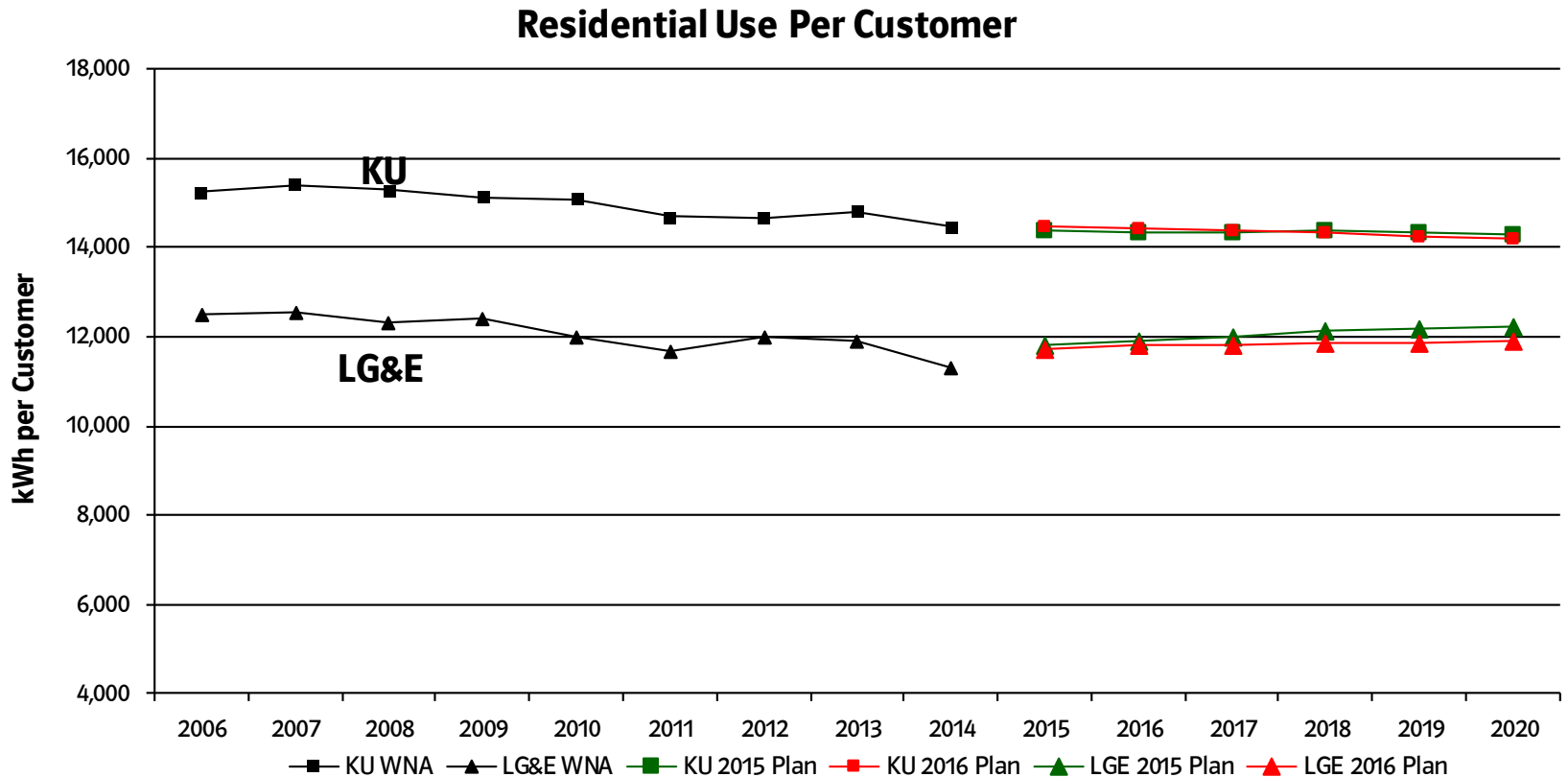
	Rate Category	Current Contract Count*	Forecast for 2016
LG&E	CPS-Pri	54	52
	CPS-Sec	2,621	2,598
	CTOD-Pri	37	41
	CTOD-Sec	246	246
	GS	44,703	44,839
	IPS-Pri	23	23
	IPS-Sec	236	234
	ITOD-Pri	66	70
	ITOD-Sec	85	85
	RS	357,719	358,705
	RTS	13	13
	405,803	406,906	

* Average of Jan-May 2015

Residential number of customers slightly below 2015 Plan



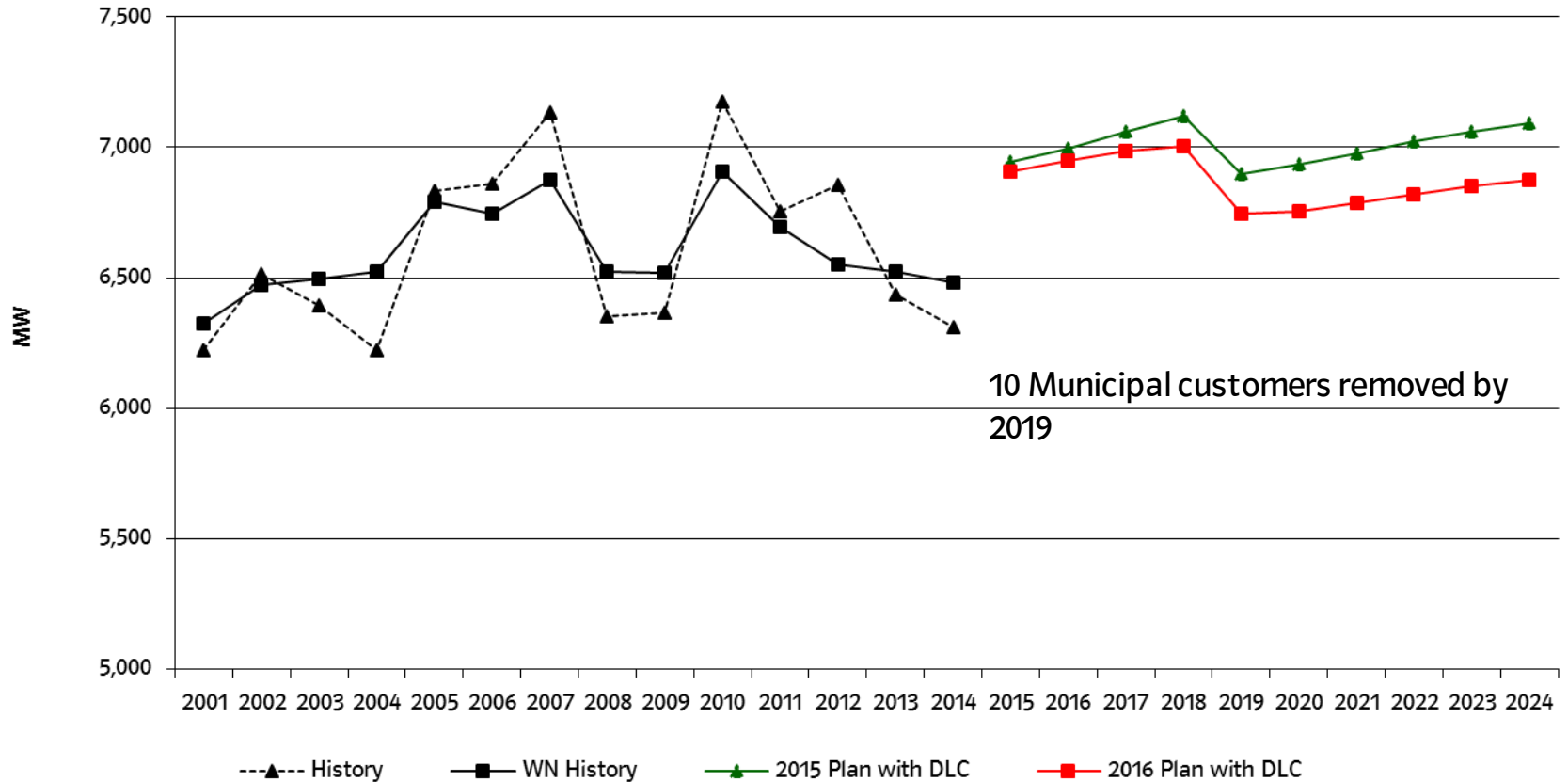
Use per customer for both KU and LG&E largely consistent with 2015 Plan



* In 2015 Plan forecast, 2014 value is a weather-normalized 5+7 forecast.

Uncurtailed peak forecast after DLC slightly lower consistent with lower energy forecast

Combined Company Summer Peak Demand - 10 Year View



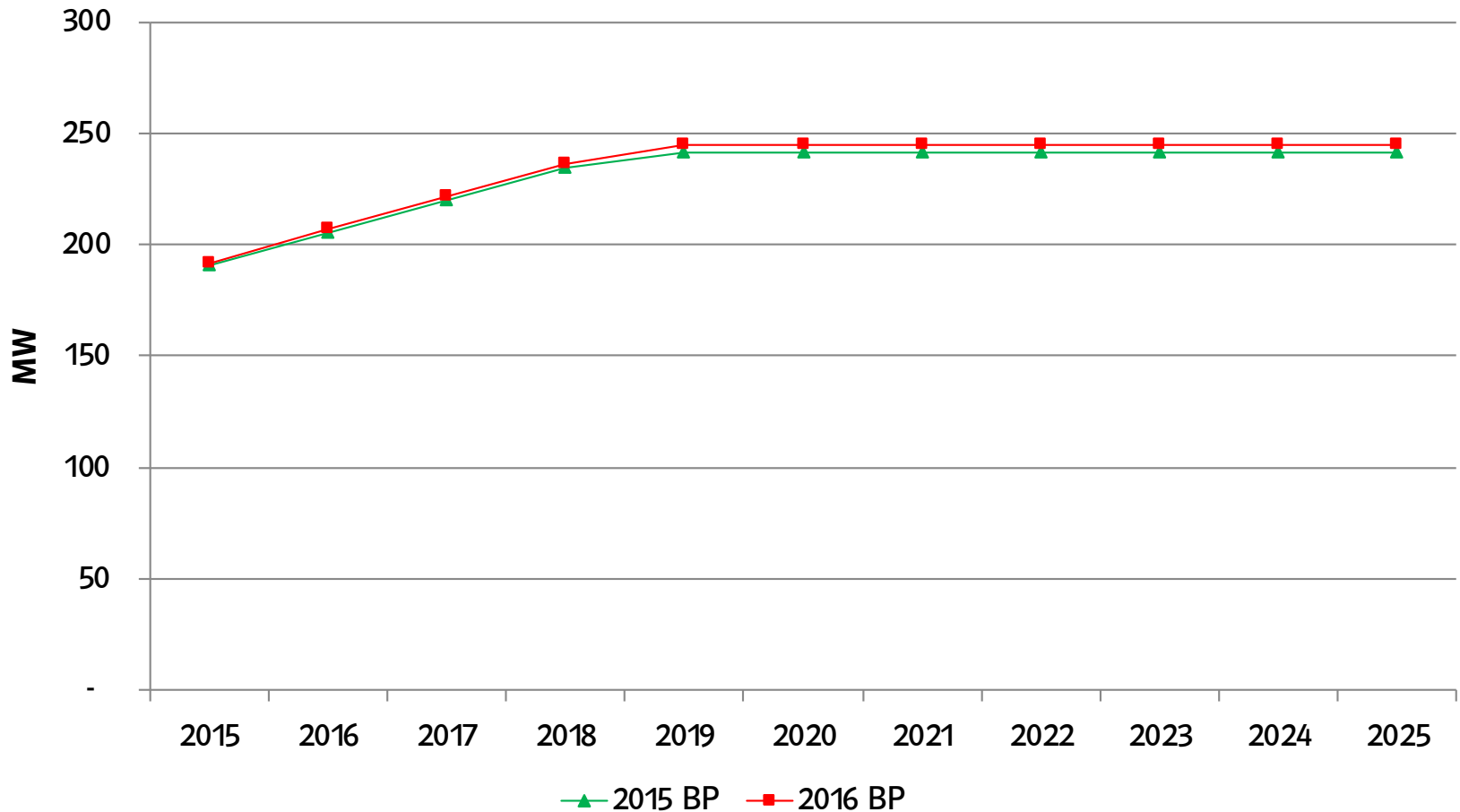
10 Municipal customers removed by 2019

* In 2016 Plan forecast, 2015 value is a weather-normalized 5+7 forecast.

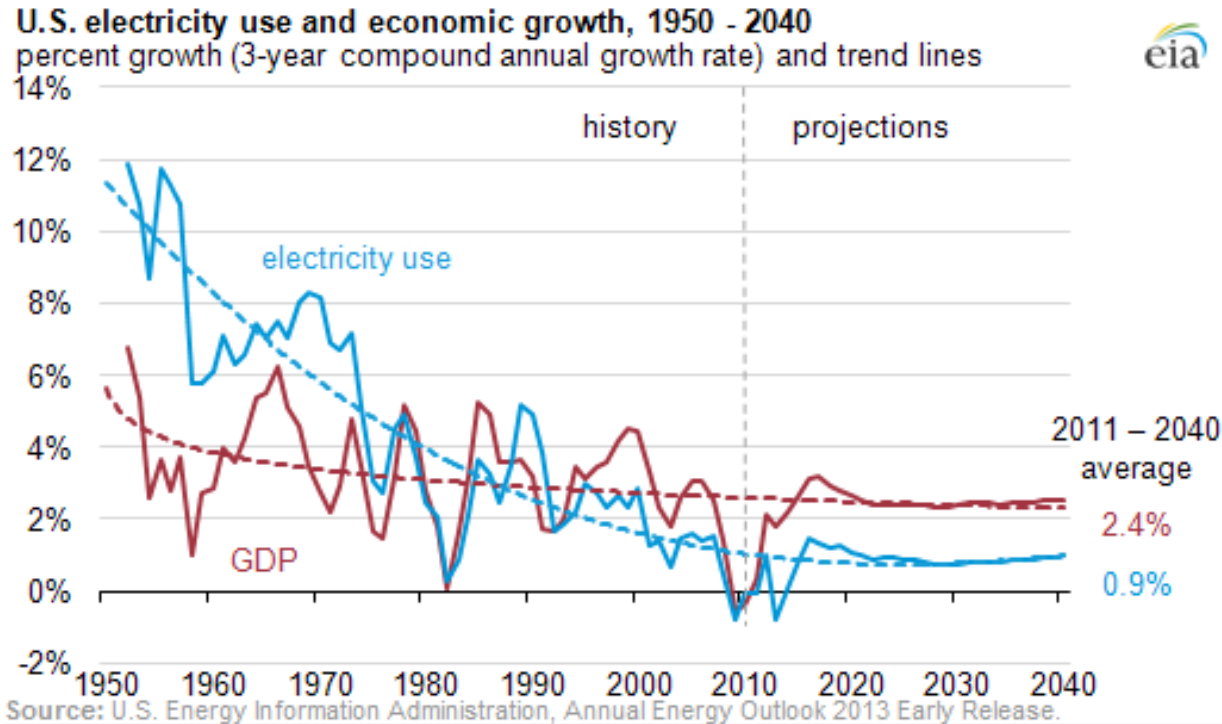
** In 2016 Plan forecast, peak forecast is adjusted ~20 MW higher to cover [redacted] obligation.

CONFIDENTIAL INFORMATION REDACTED

Additional DLC of 3 MW by 2020 due to higher customer participation forecast



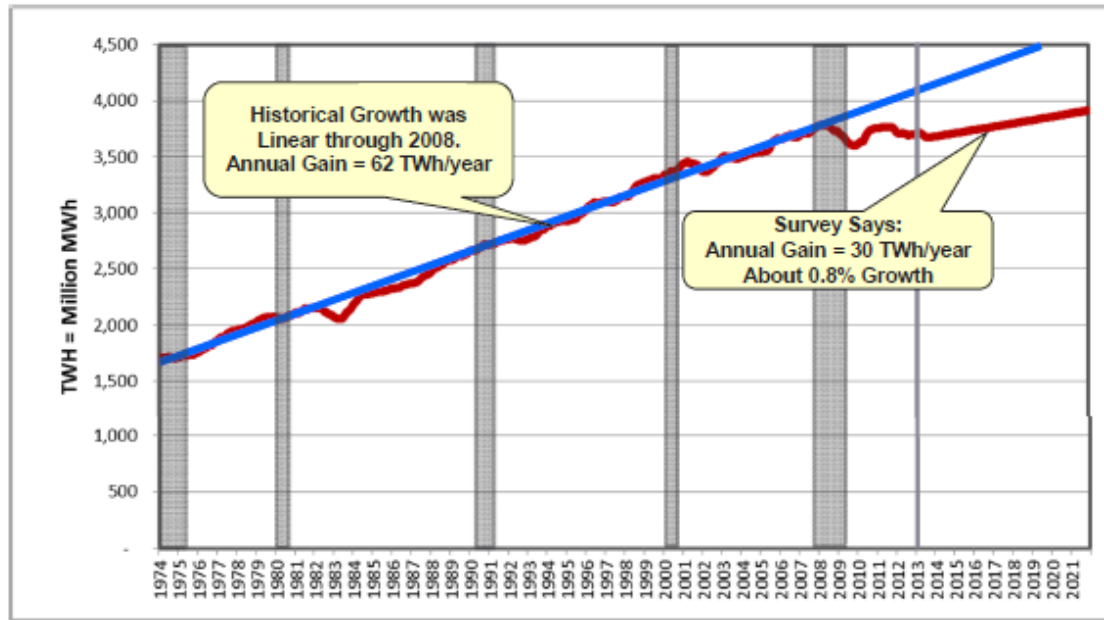
Economy growing at a faster pace than electricity usage



Note: AEO 2015 now shows 0.8% growth compared to the 0.9% in 2013 AEO chart.

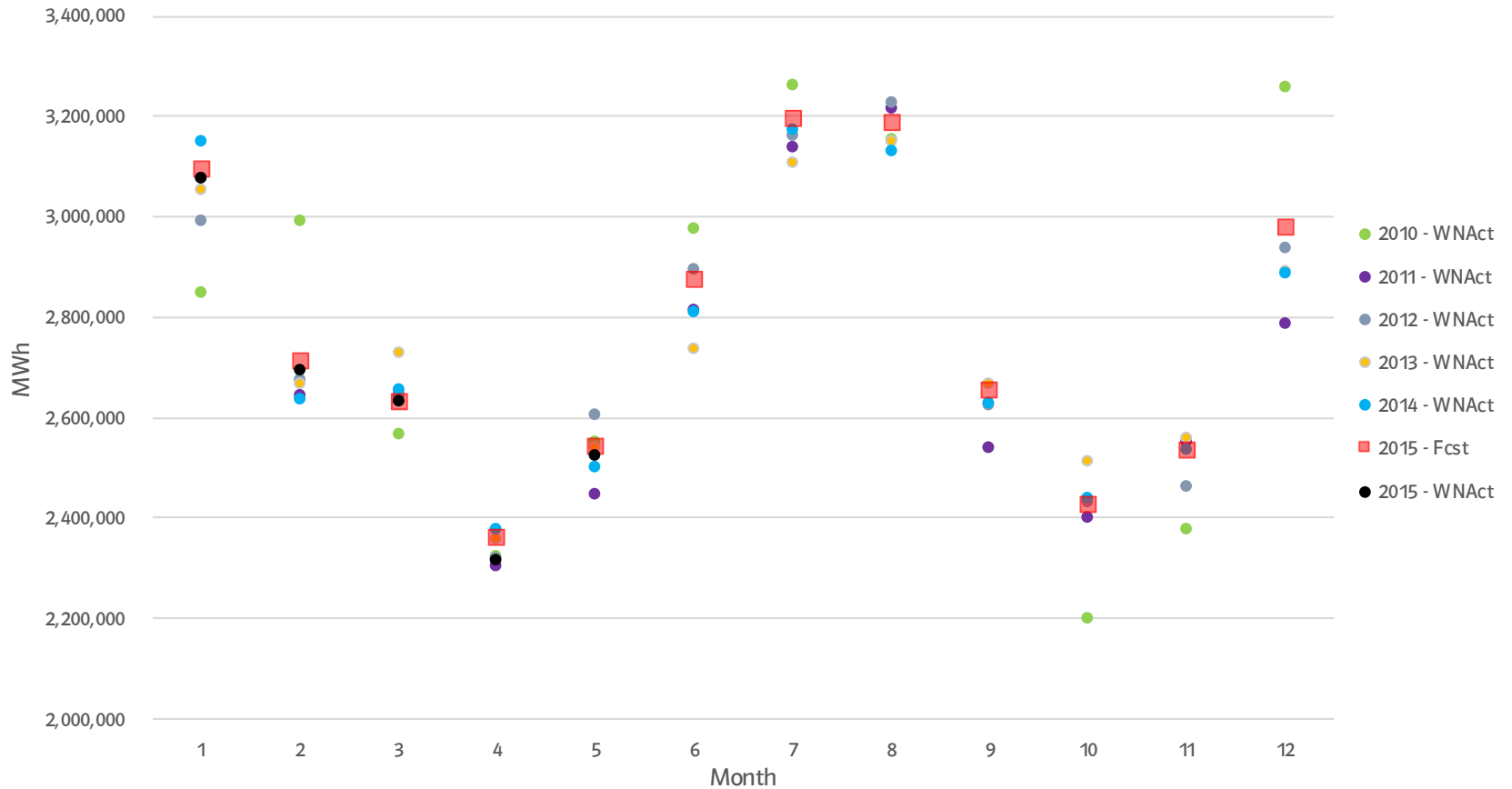
U.S. electricity growth slowing since 2008

Living in a 1% World

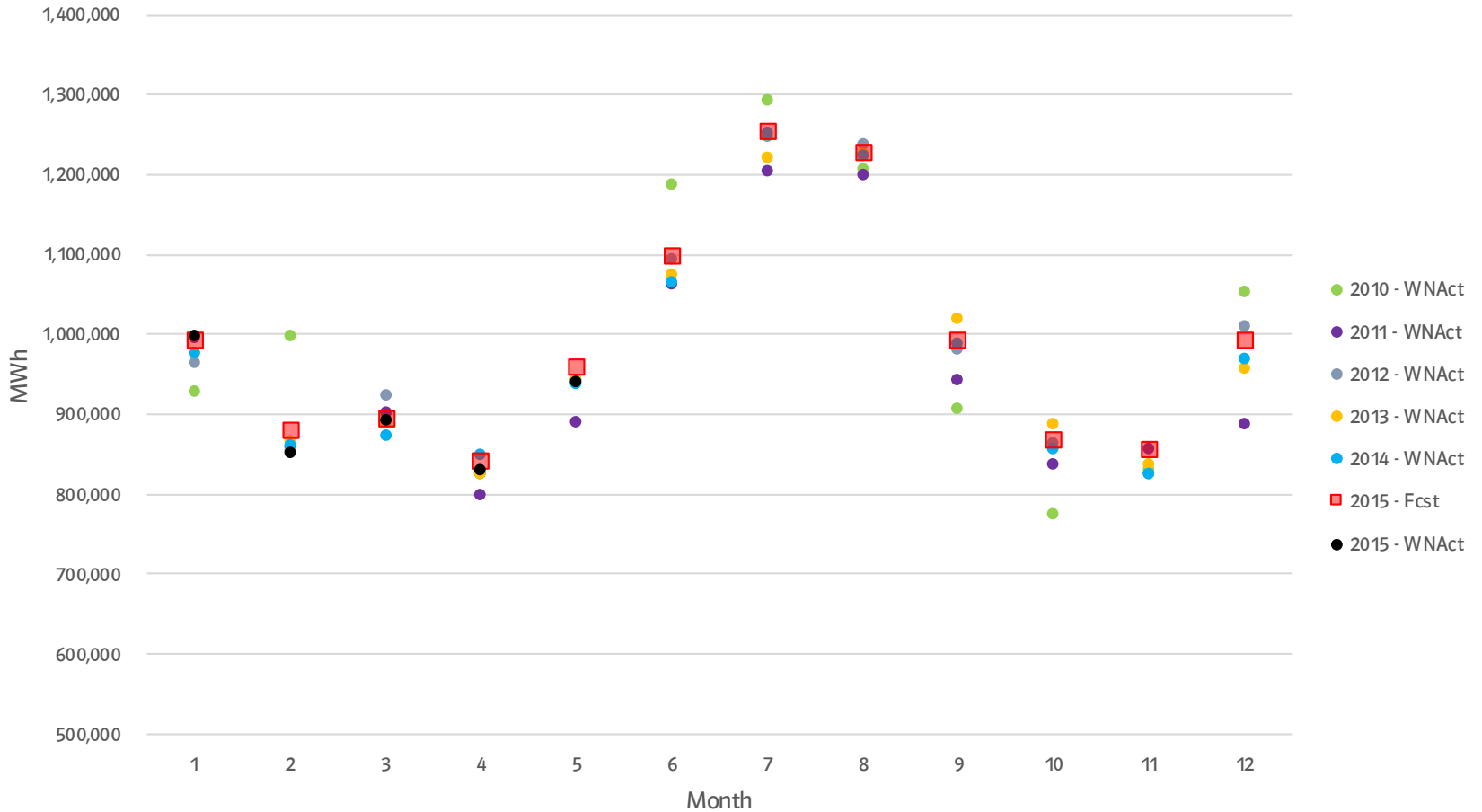


Iron

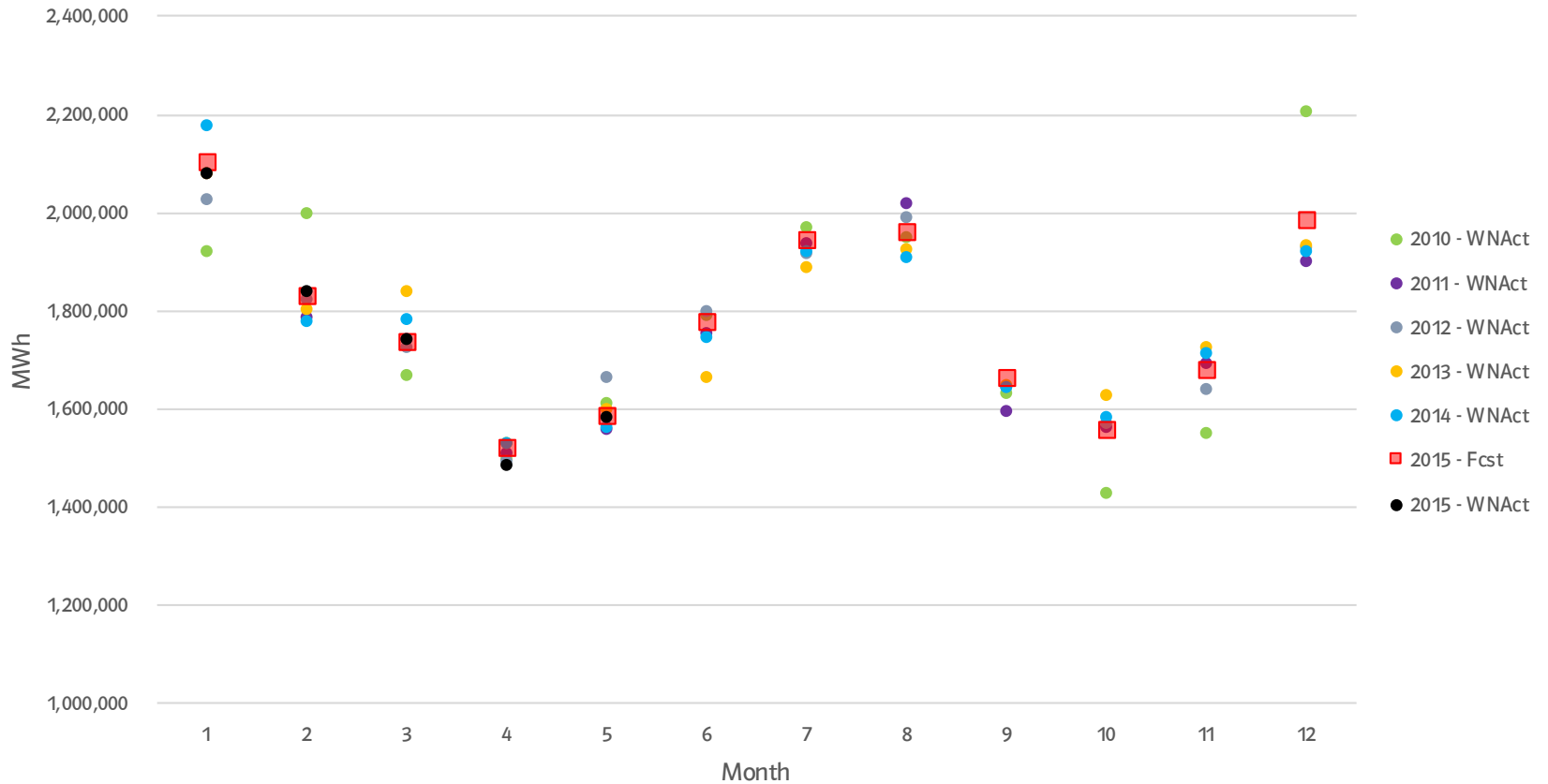
CC Total Sales



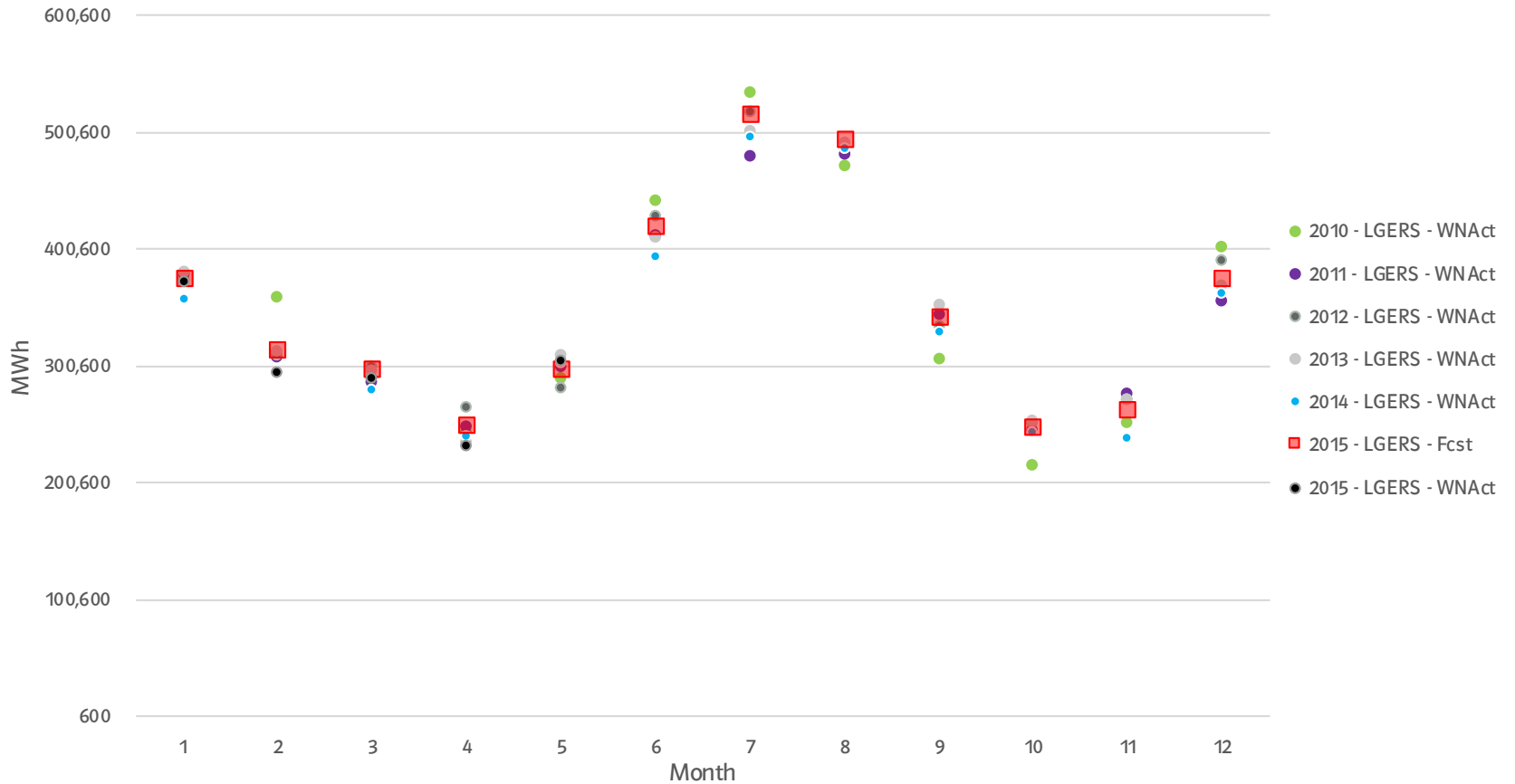
LGE Total Sales



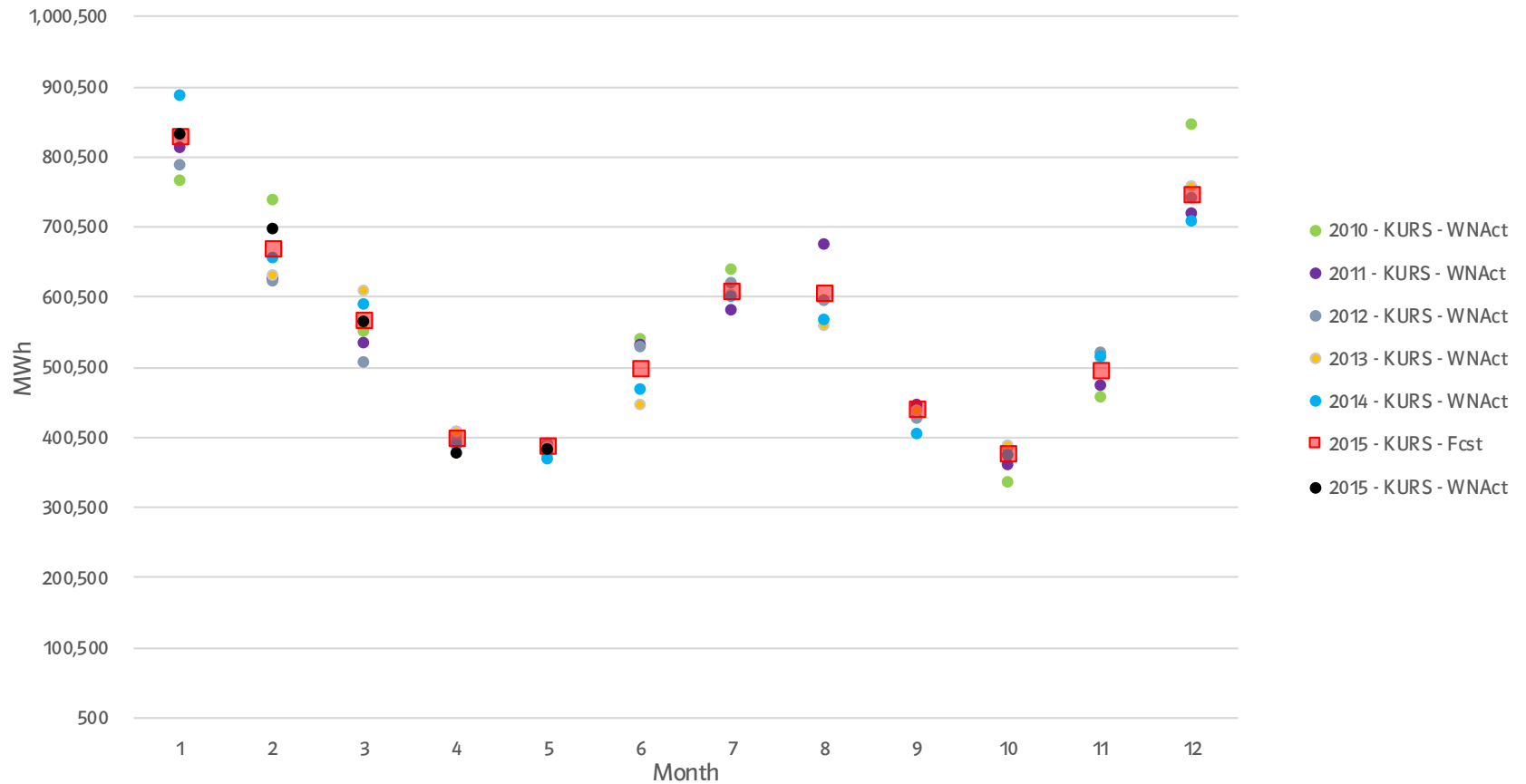
KU Total Sales



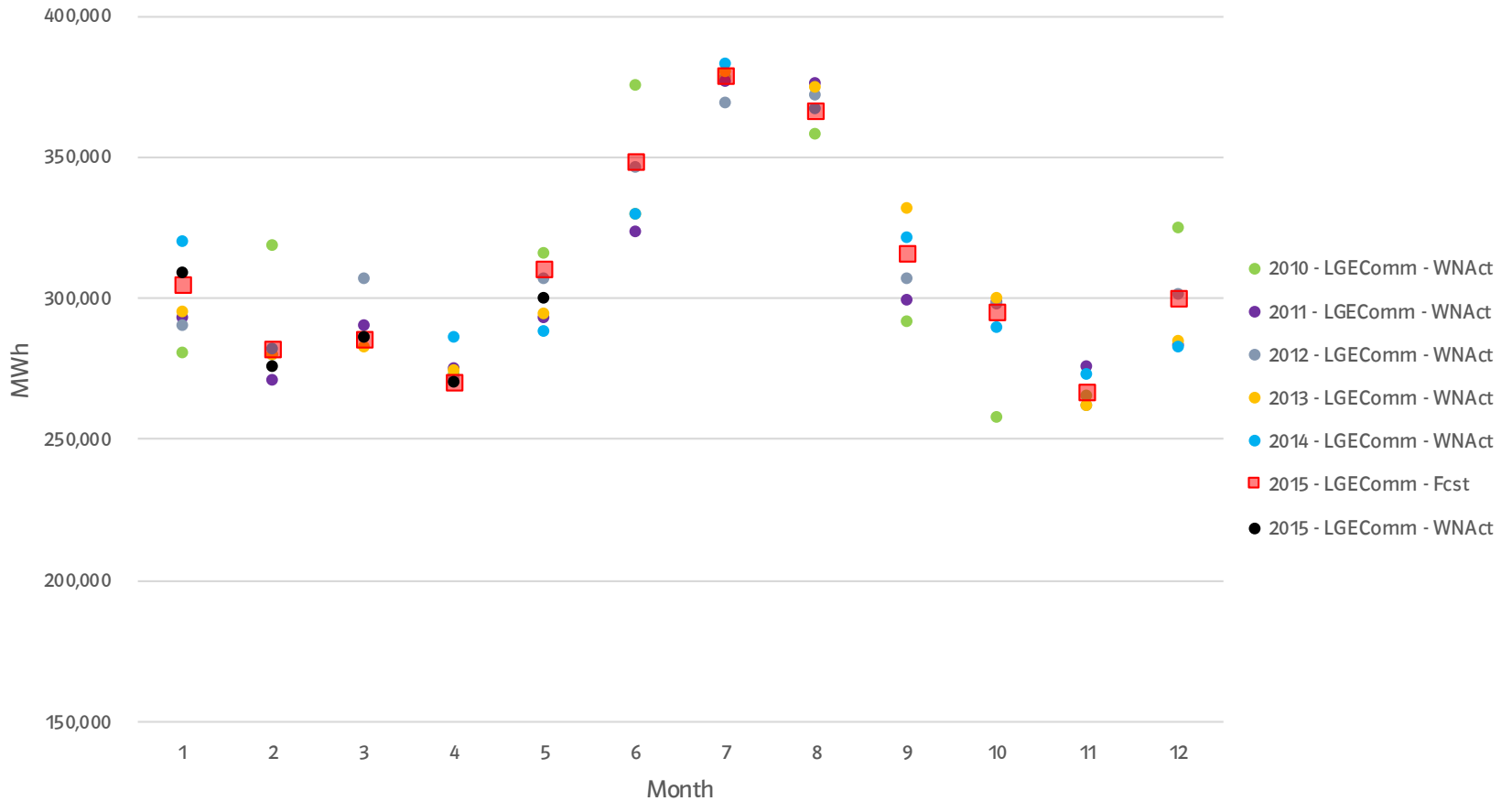
LGE Residential Sales



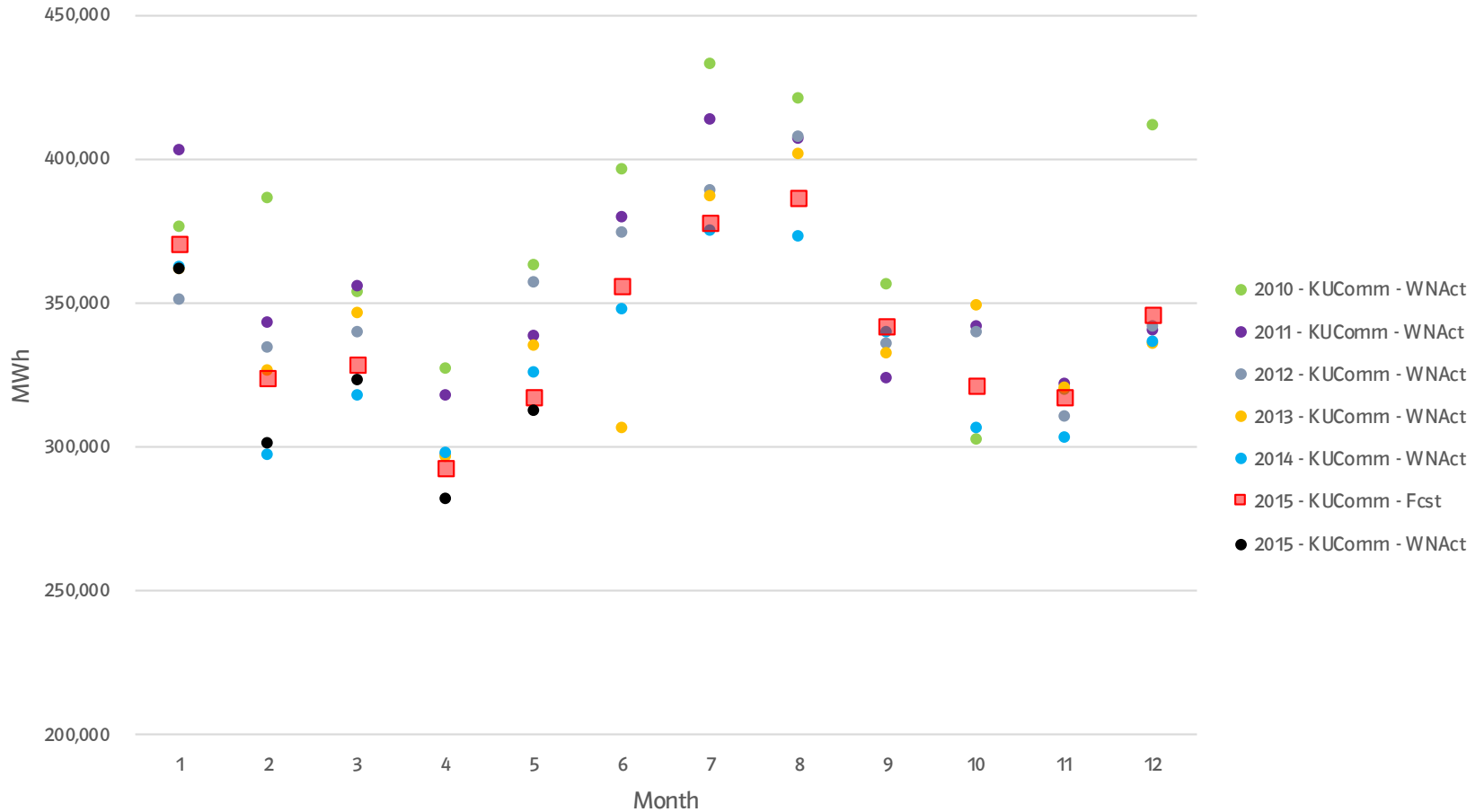
KU Residential Sales



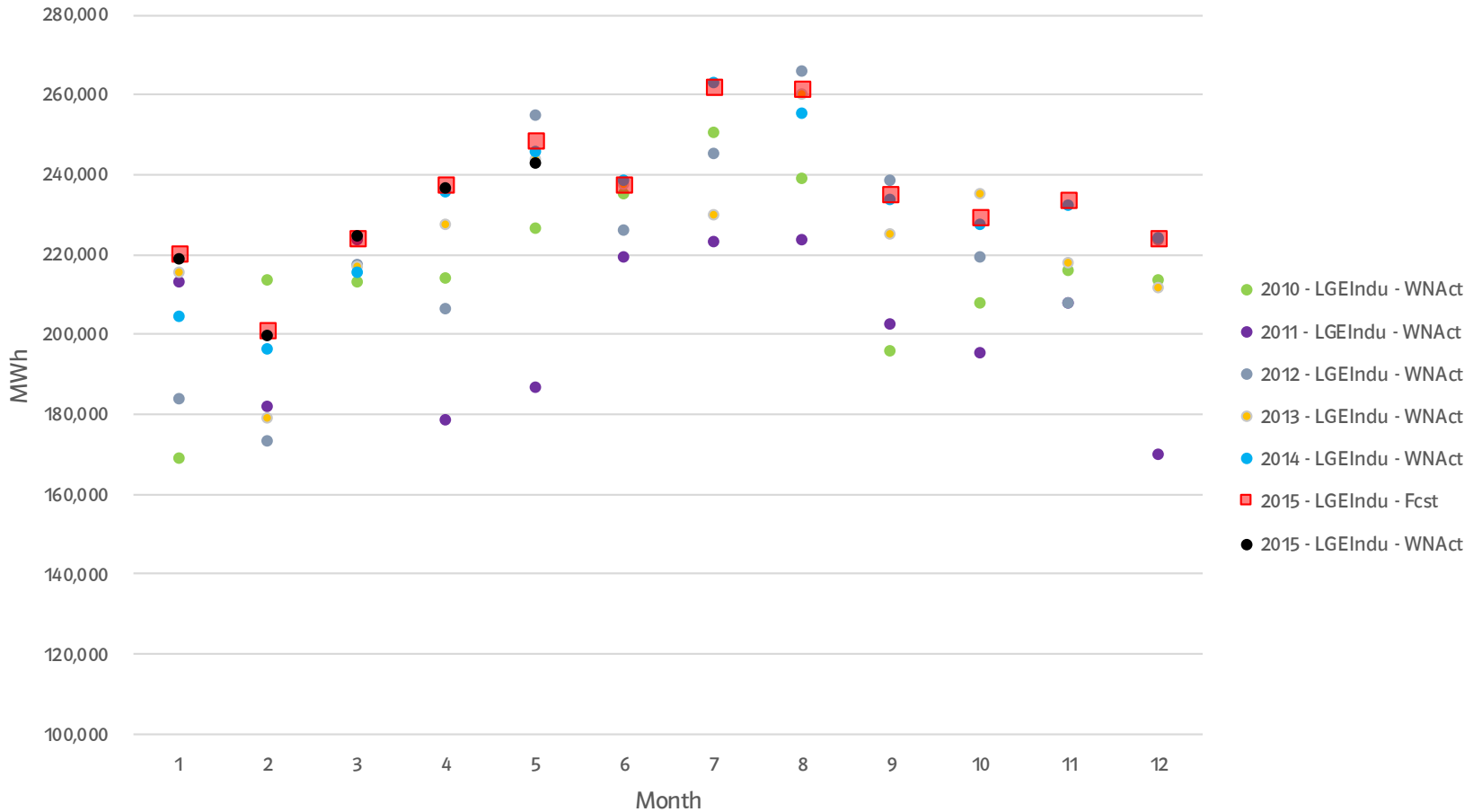
LGE Commercial Sales



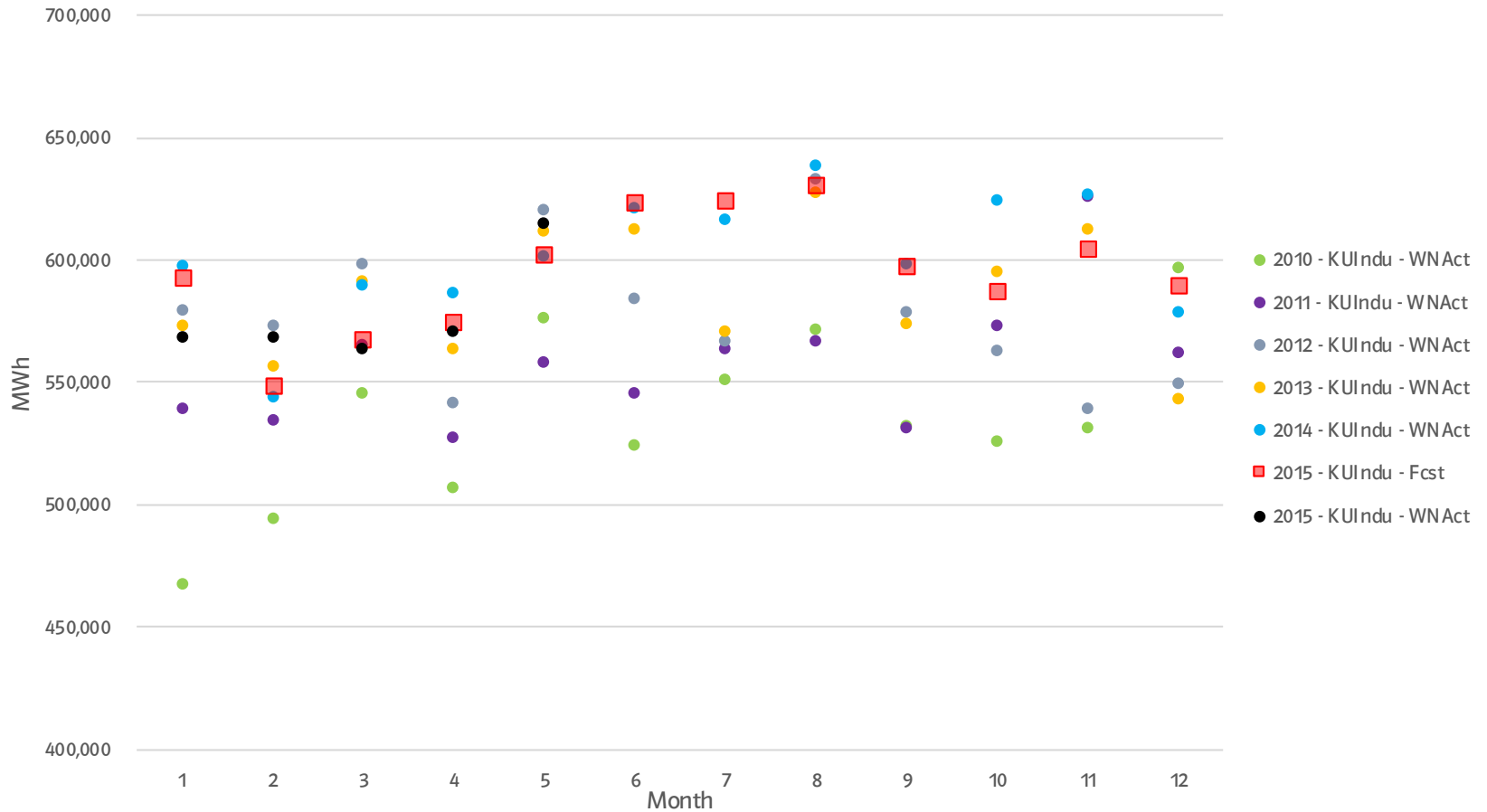
KU Commercial Sales



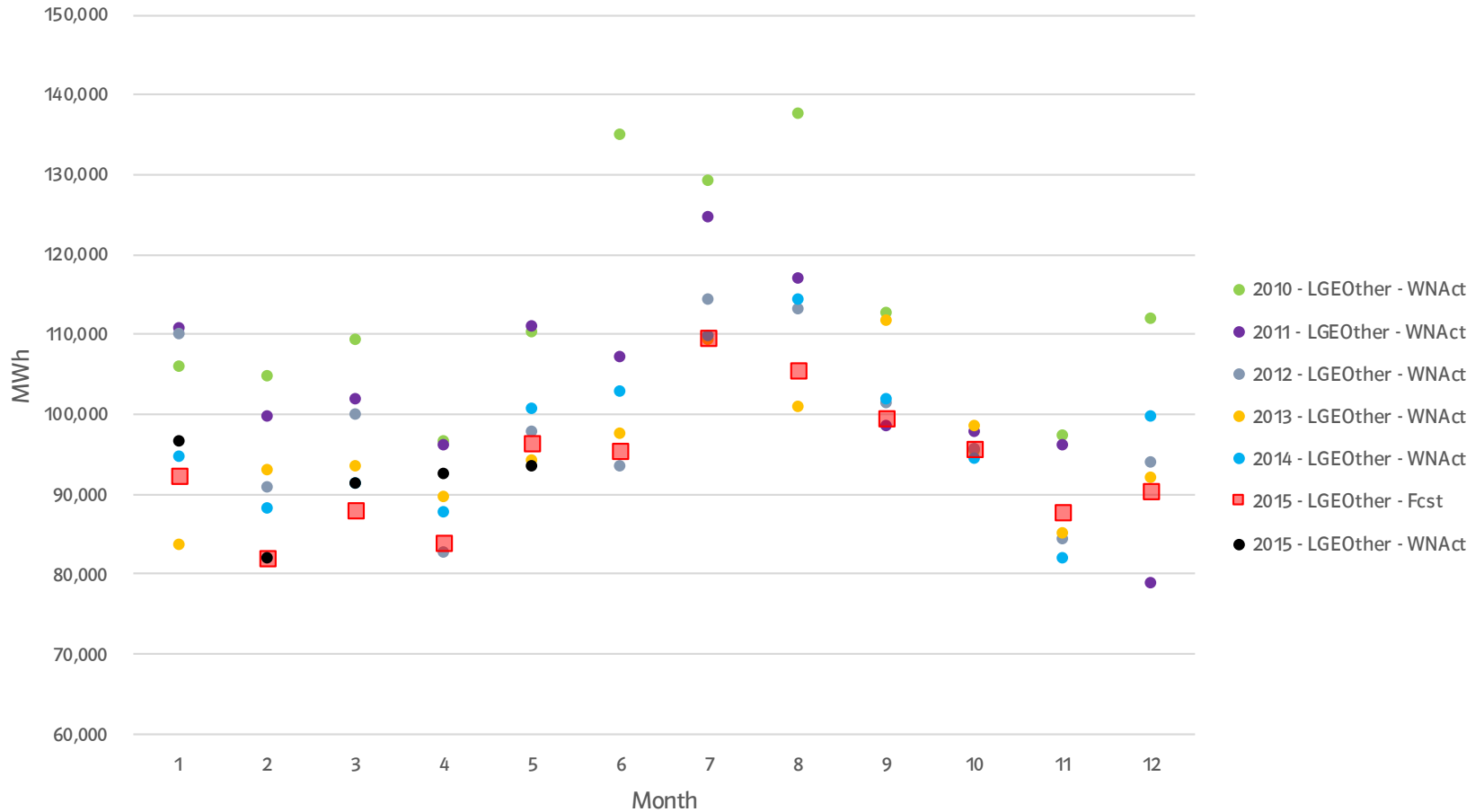
LGE Industrial Sales



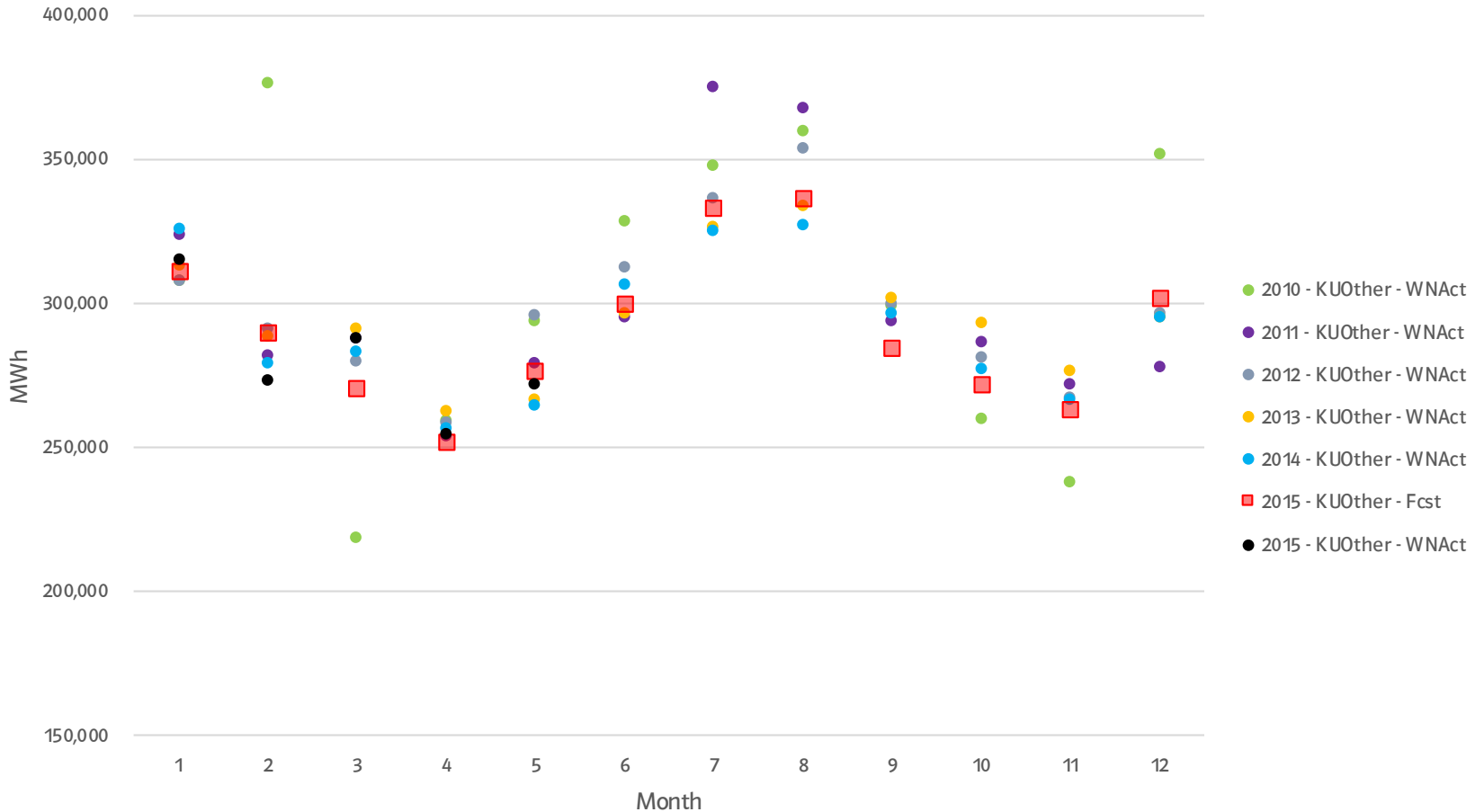
KU Industrial Sales



LGE Other (Public Authority/Lighting) Sales



KU Other (Muni, Public Authority/Lighting) Sales

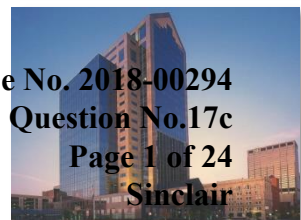




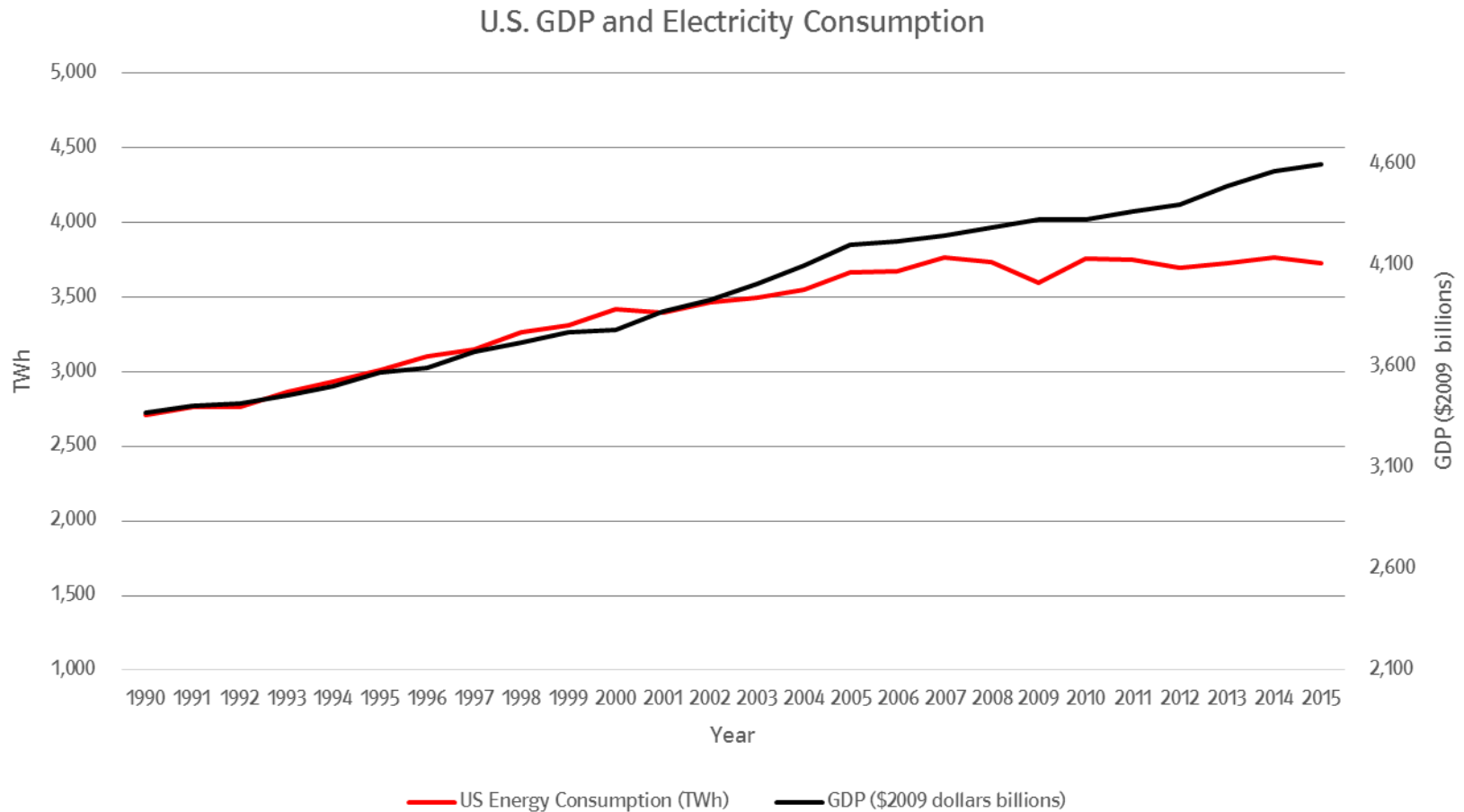
PPL companies

2017 Business Plan Electric Sales Forecast

July 11, 2016



US electricity demand has remained flat from 2010-2015

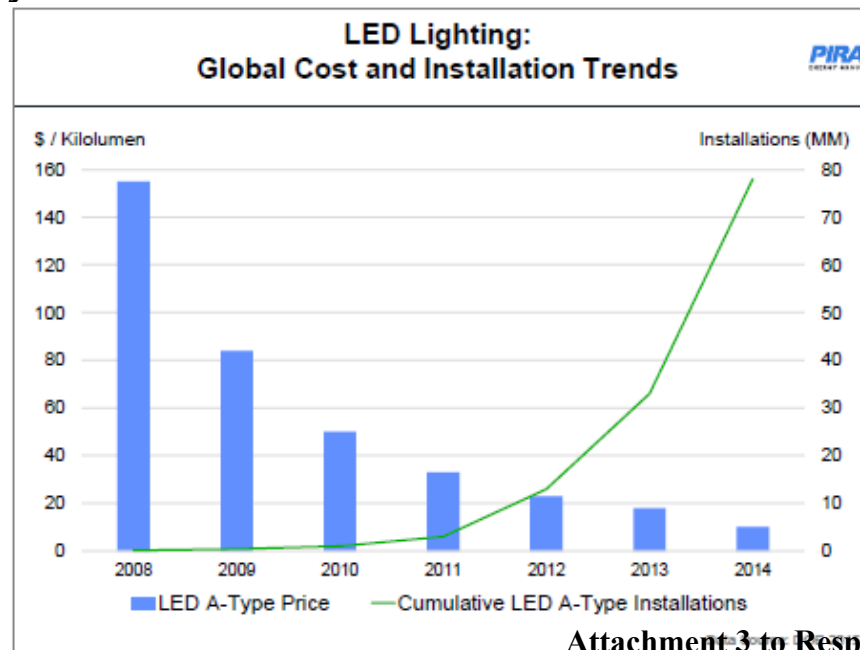


Structural headwinds may lead to declining US electricity growth

- Morgan Stanley forecasts US electricity consumption to decrease by ~0.3% annually over the next decade
 - *Forecast risk skewed to the downside given the potential for efficiency breakthroughs and / or incremental government regulations*
 - *GDP, population, computing, and electric vehicles provide the most upside*
- 0.3% CAGR 2015-2040 residential sales (EIA)
 - *Reduced from 0.5% in previous AEO*
- 0.54% CAGR in electricity sales through 2035 (PIRA)
 - *Reduced from 0.83% in previous forecast*

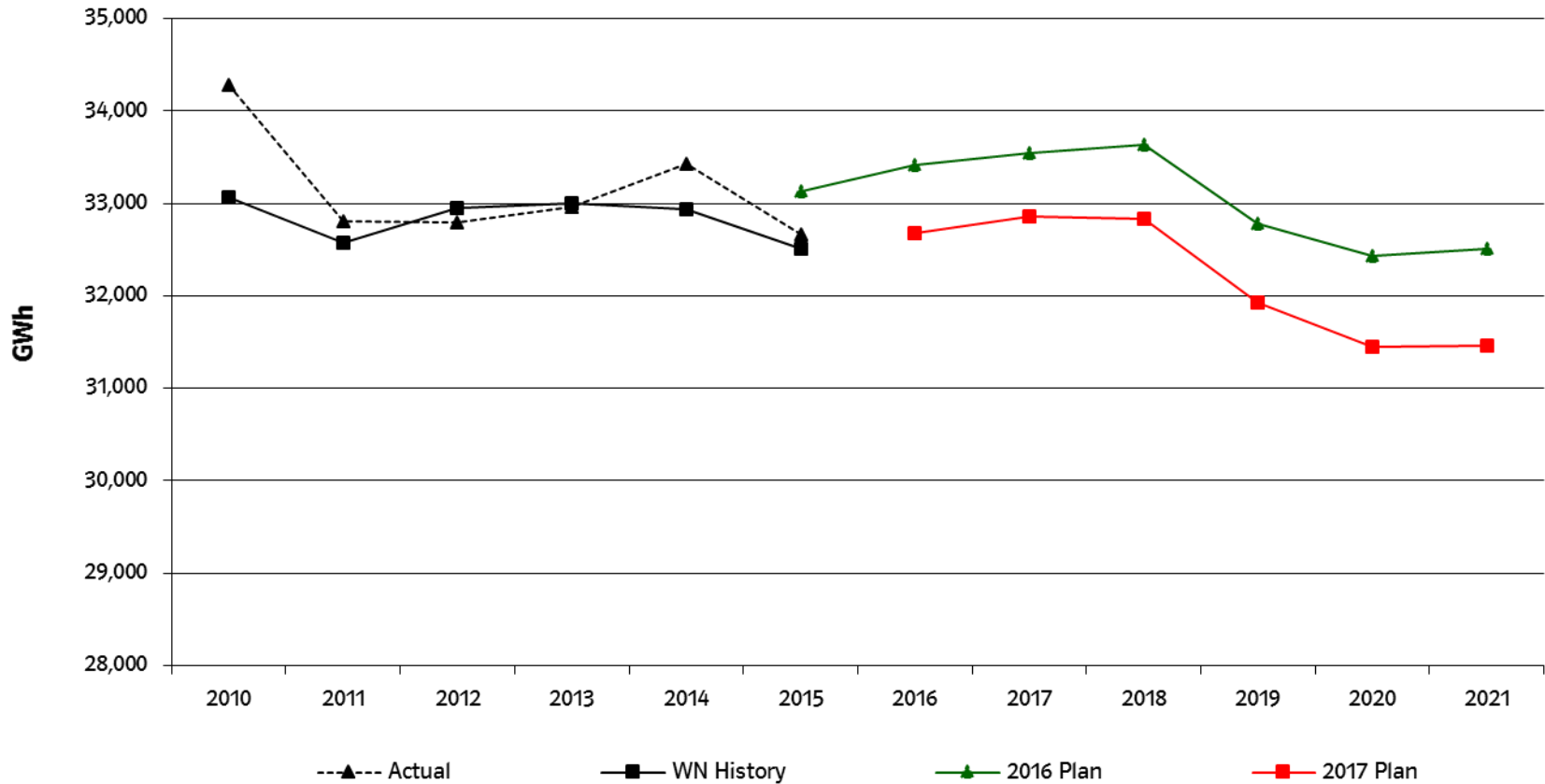
Greater anticipated end-use efficiencies drive reductions in PIRA electricity sales forecast

- LED Lighting
 - Costs have fallen 90% since 2008; efficiency expected to double by 2025.
 - DOE forecasts 48% market share by 2020 and 84% in 2030, up from 2% in 2013. This would reduce lighting consumption by 15% in 2020 and 40% in 2030.
- Space Cooling
 - New standard for commercial rooftop air conditioners in 2018 expected to cut consumption by 30%.



2017 Plan 2-3% lower through 2021

Combined Company Total Electricity Sales



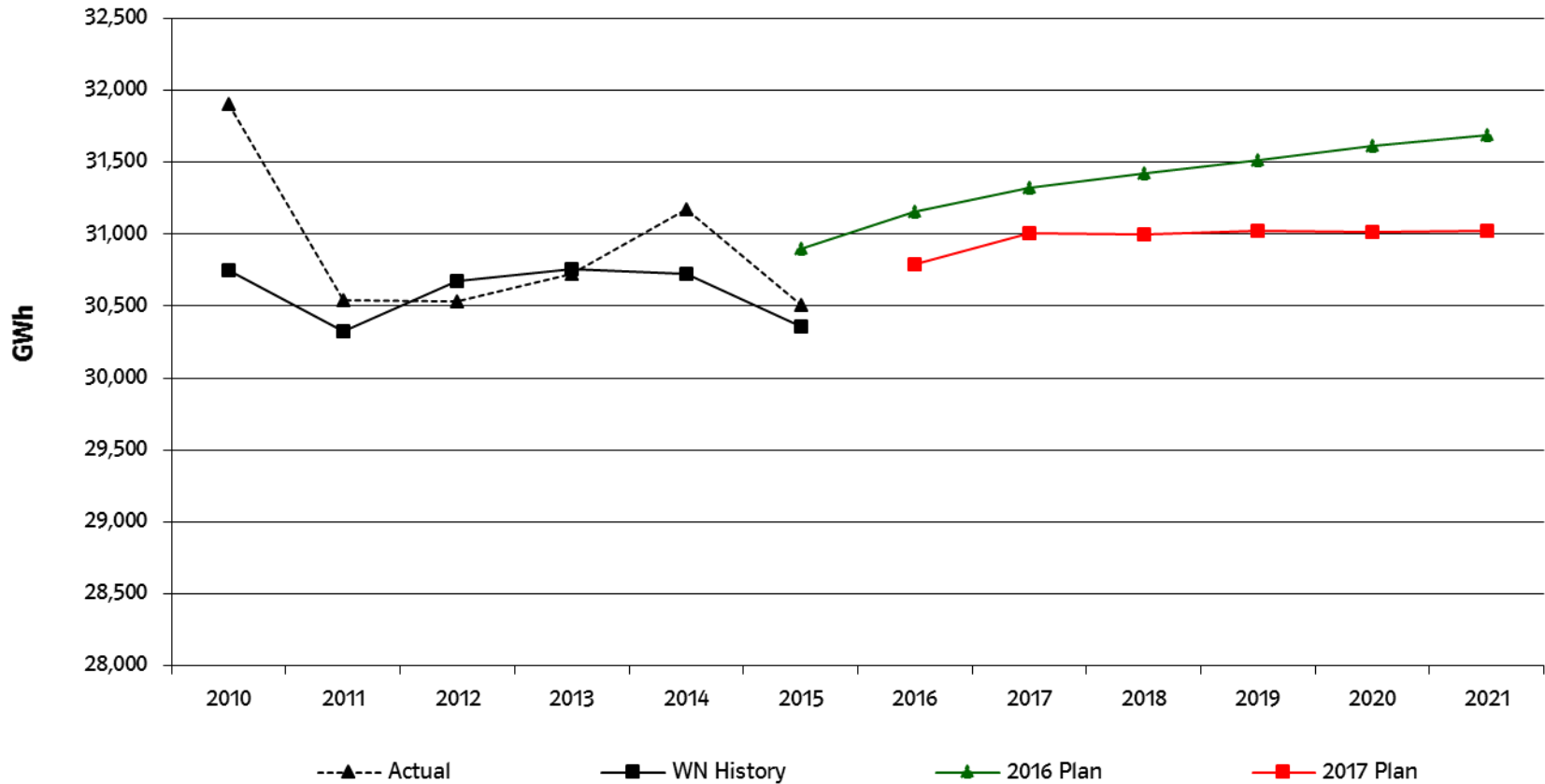
In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

██████████ and Municipal customers included

CONFIDENTIAL INFORMATION REDACTED

2017 Plan lower than 2016 Plan with slower growth

Combined Company Total Electricity Sales

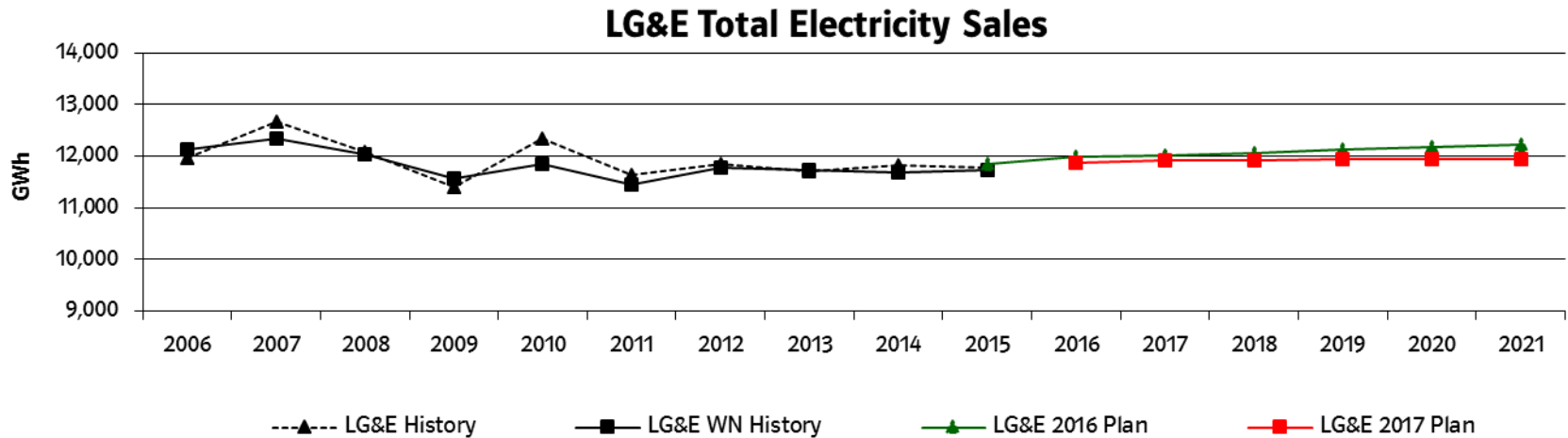
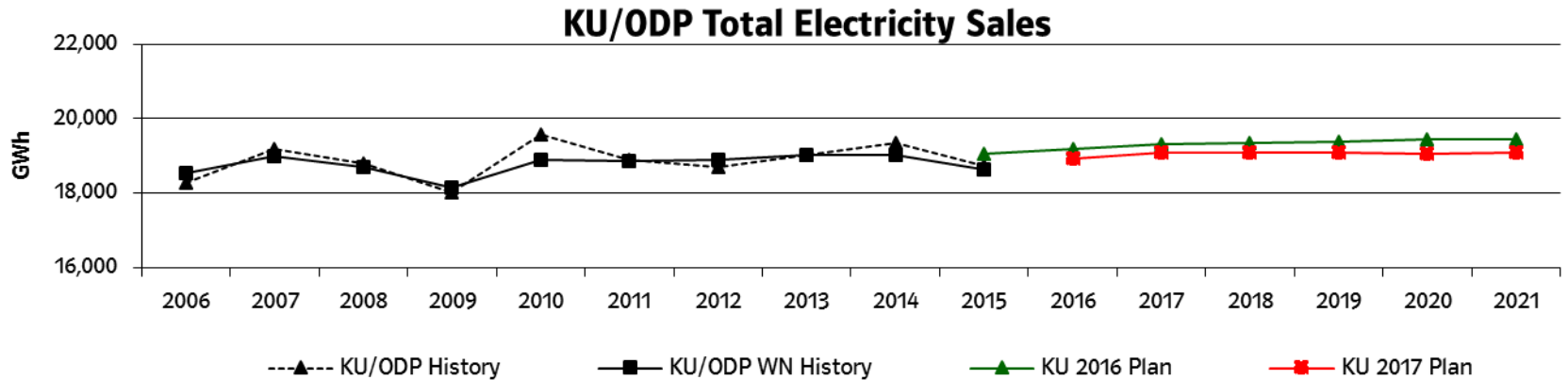


In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

██████████ and Municipal customers have been excluded.

CONFIDENTIAL INFORMATION REDACTED

Sales forecasts decreased for both LG&E and KU

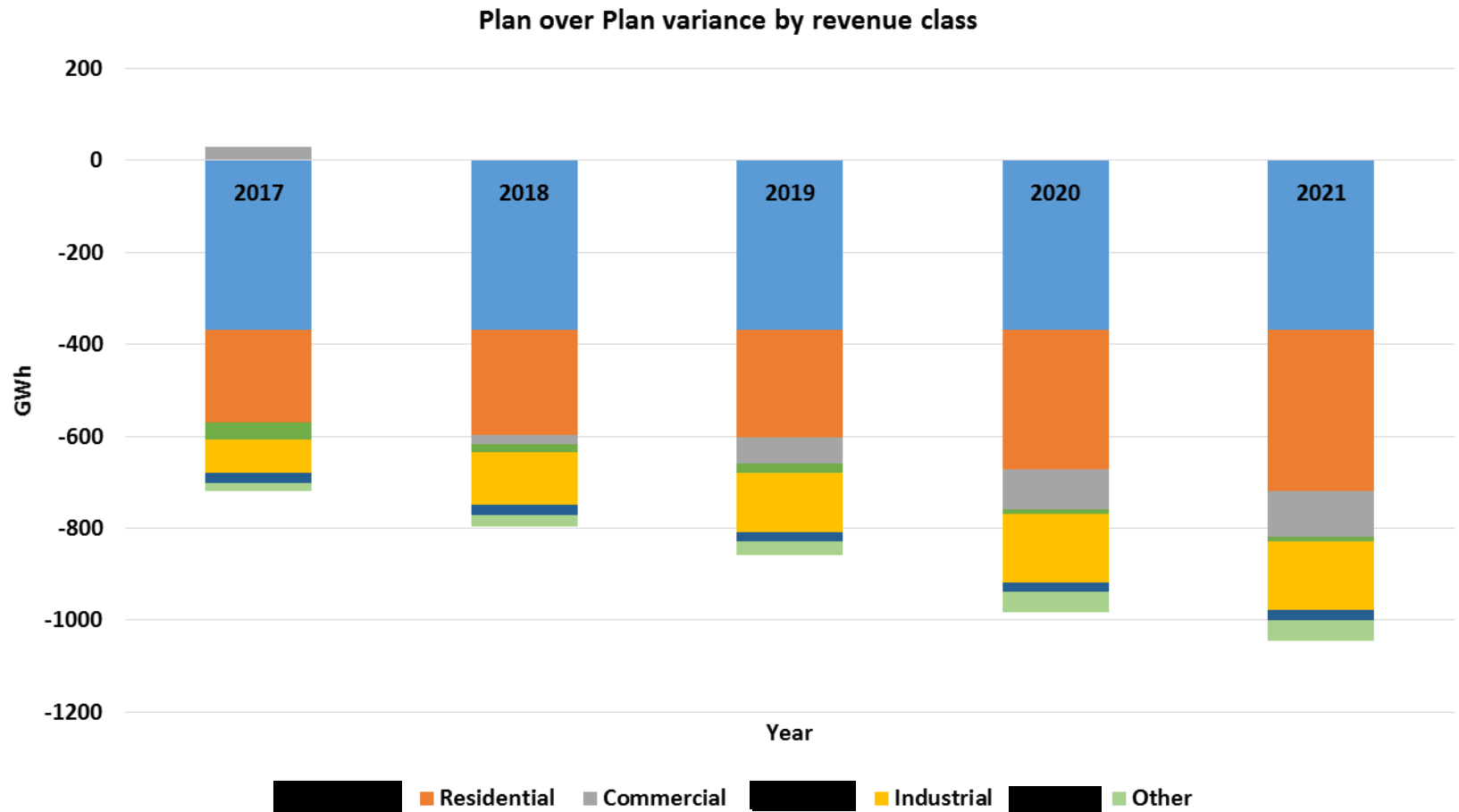


In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

██████████ and Municipal customers have been excluded.

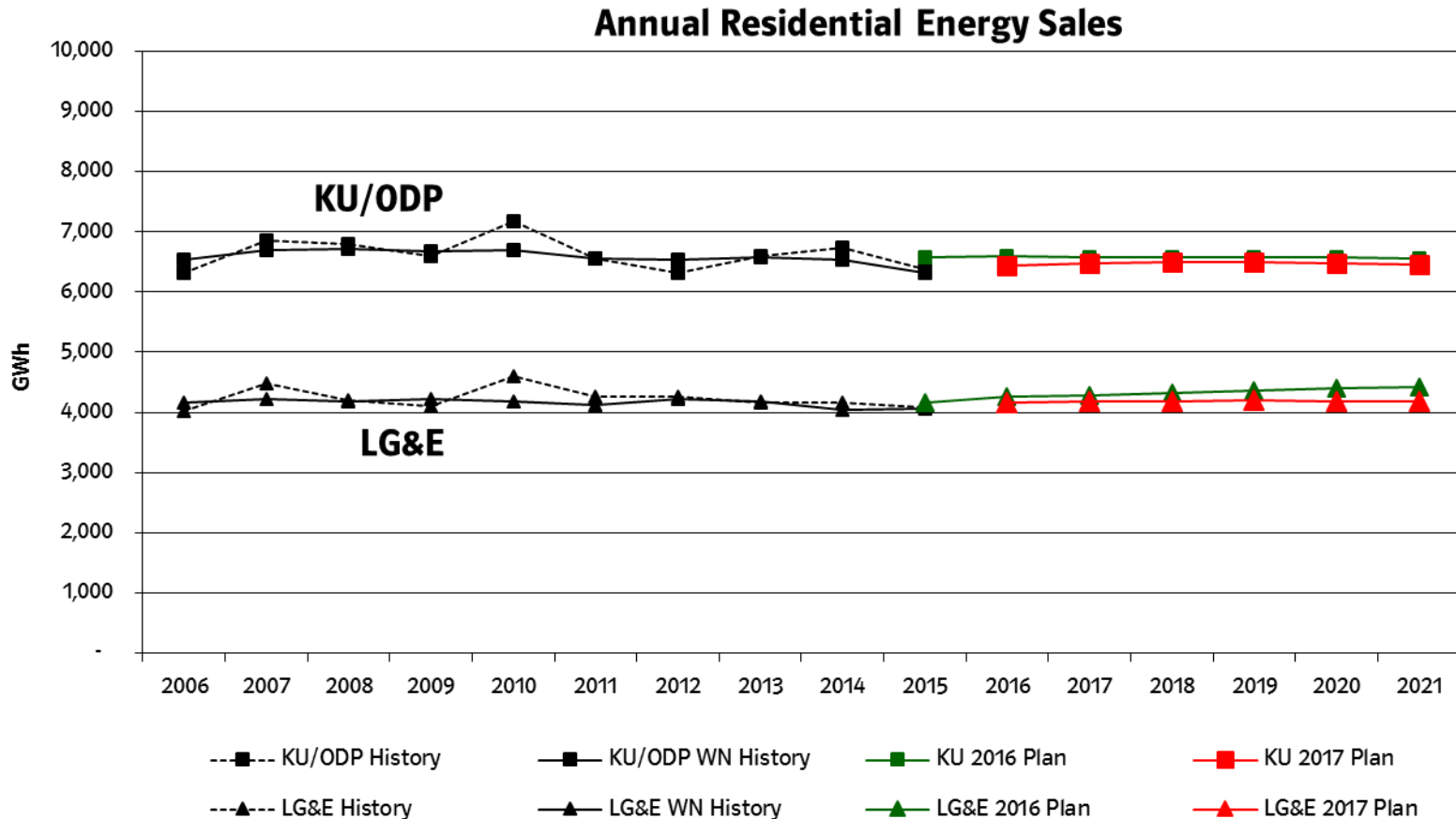
CONFIDENTIAL INFORMATION REDACTED

Loss of [REDACTED] and reductions to Residential and Industrial forecasts drive forecast variances



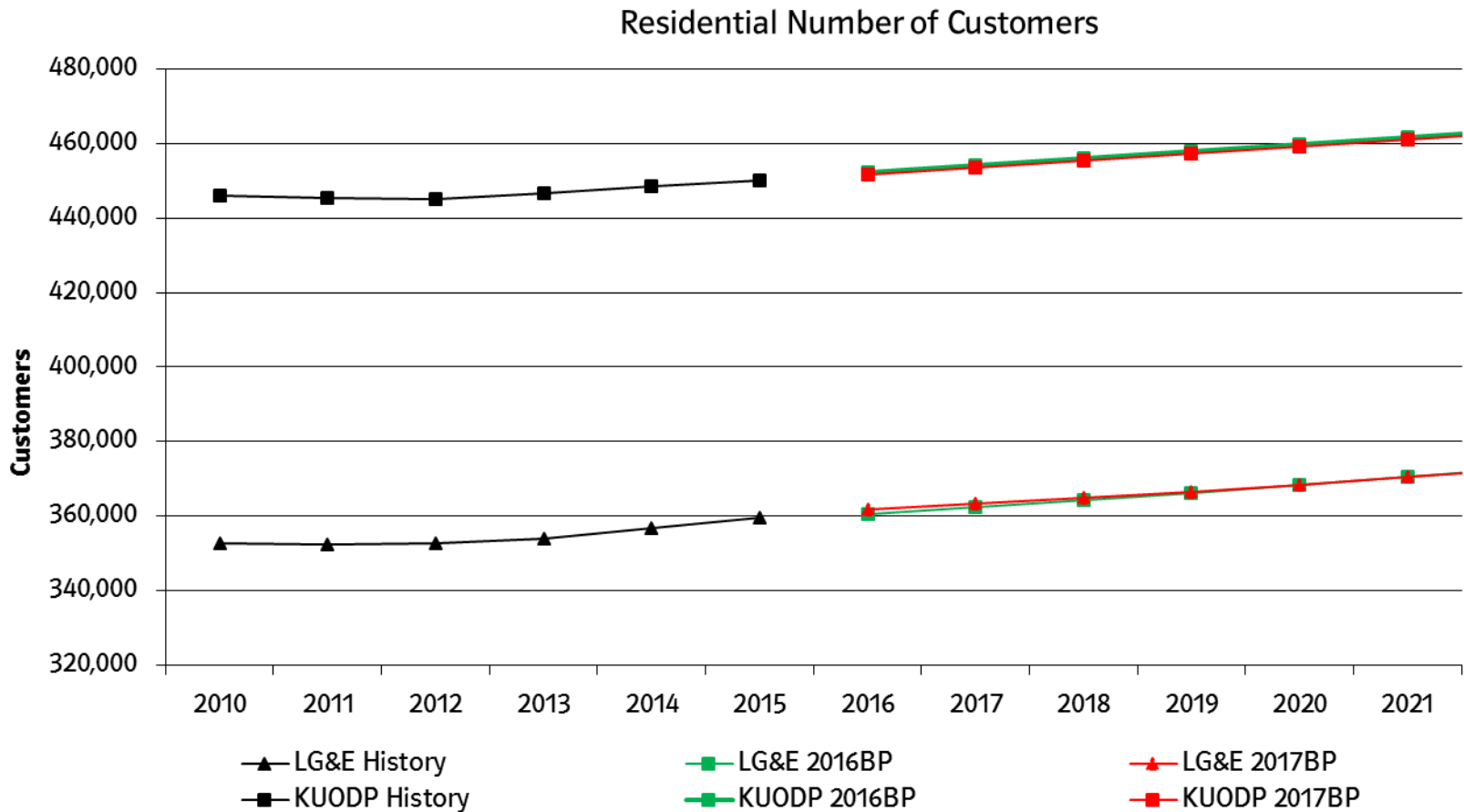
CONFIDENTIAL INFORMATION REDACTED

Residential Sales remain flat as increased efficiency offsets customer growth

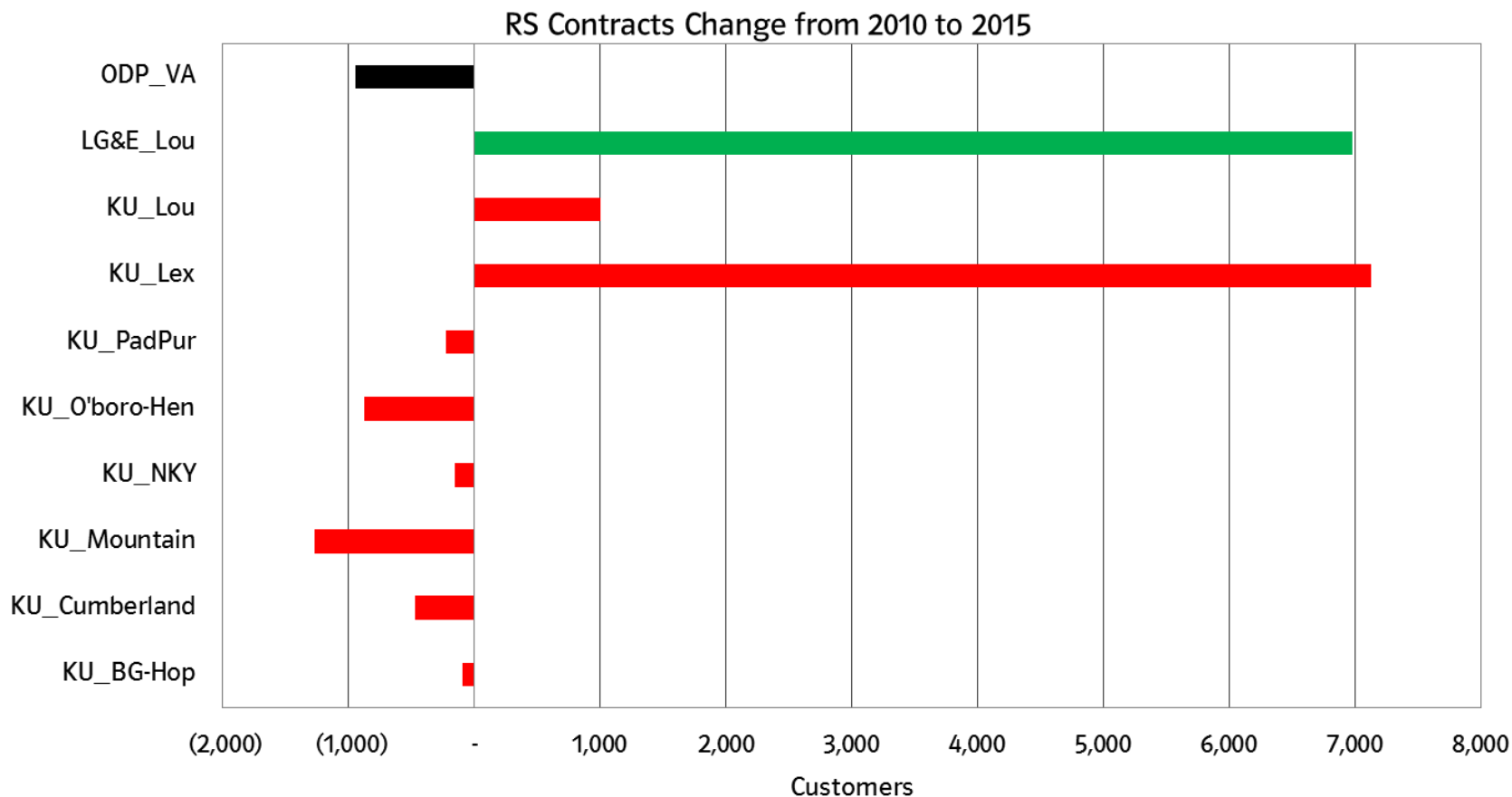


In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

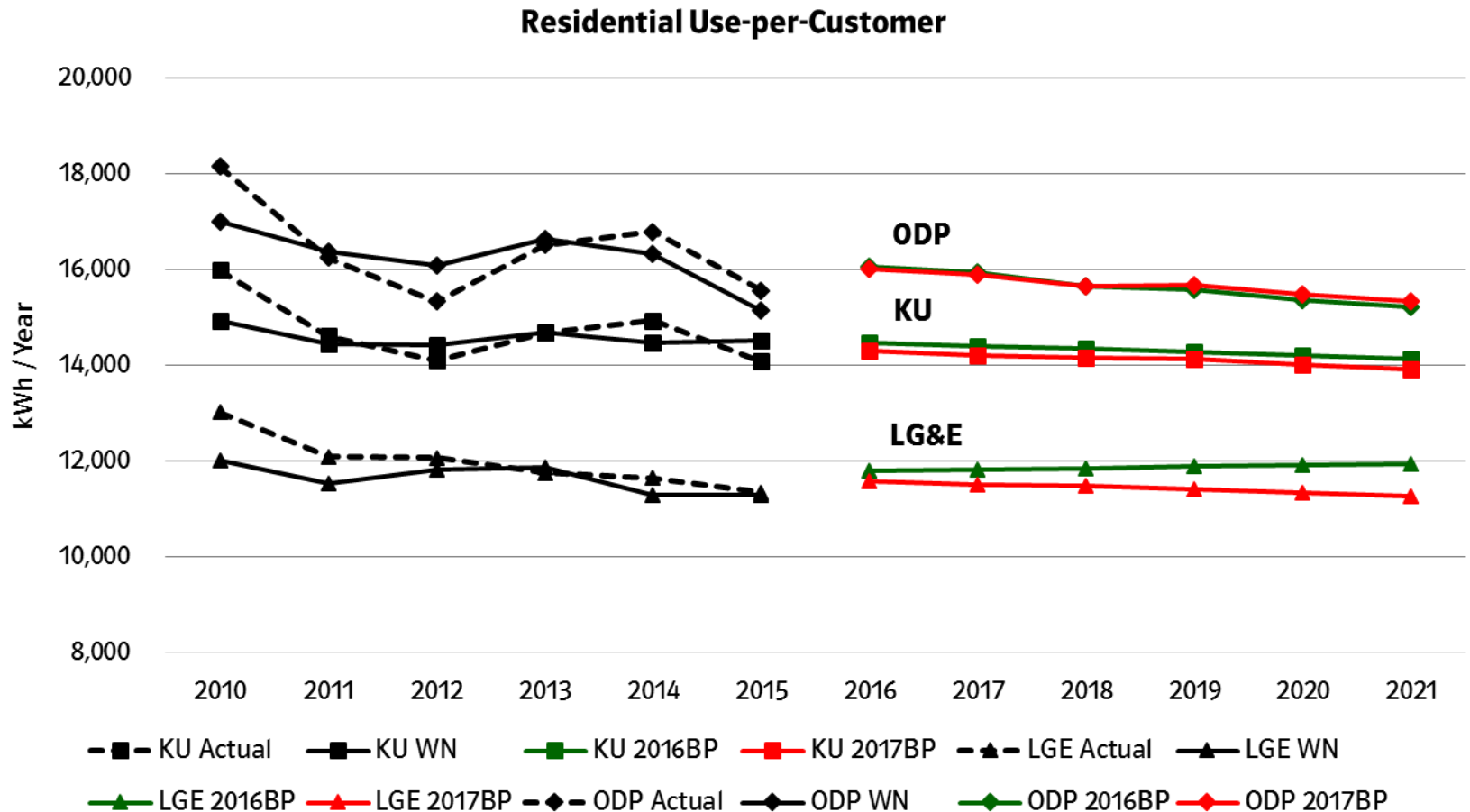
0.4% Annual Residential Customer Growth



Residential customer growth tempered by reductions in rural regions

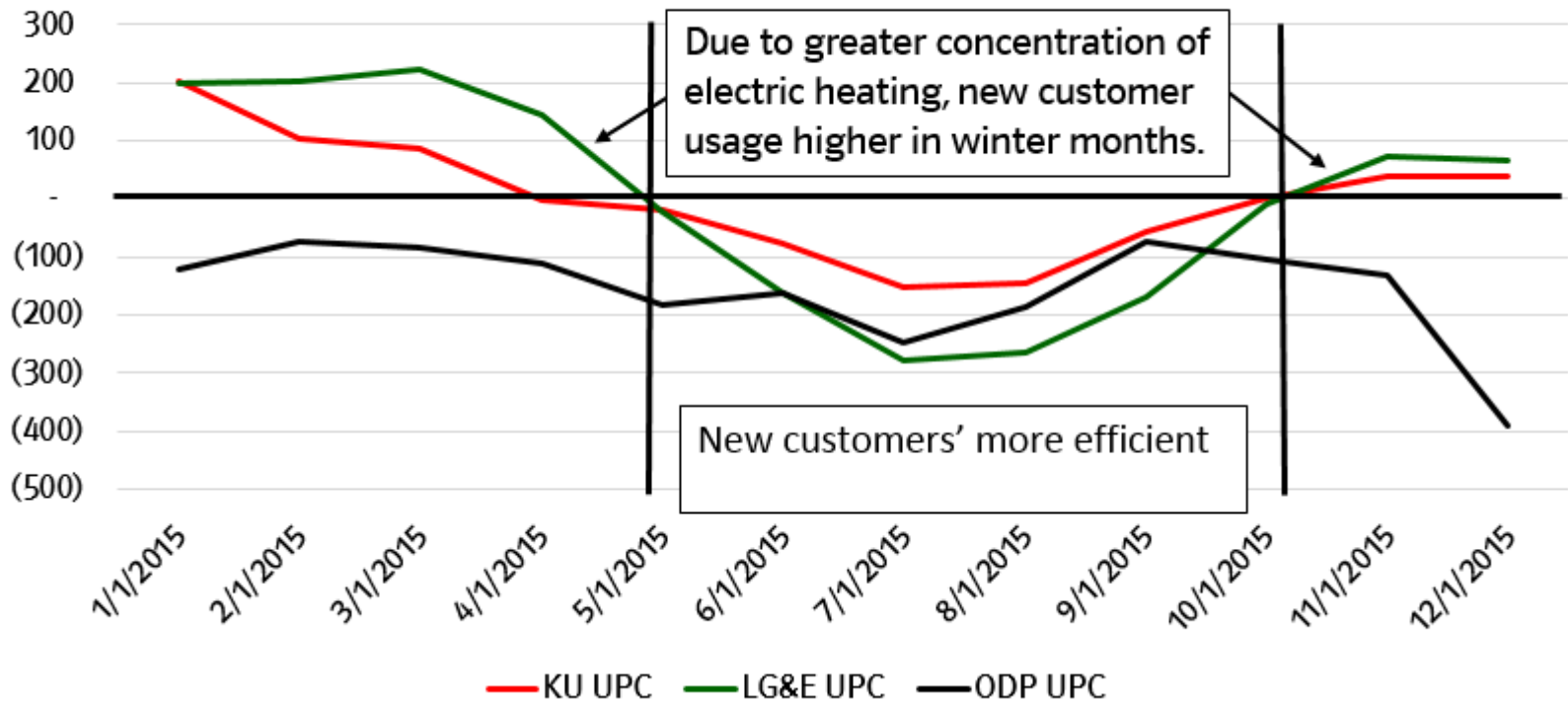


Consistent with history, residential usage per customer declining in all service territories



Electric heating offsetting efficiency impacts at LG&E

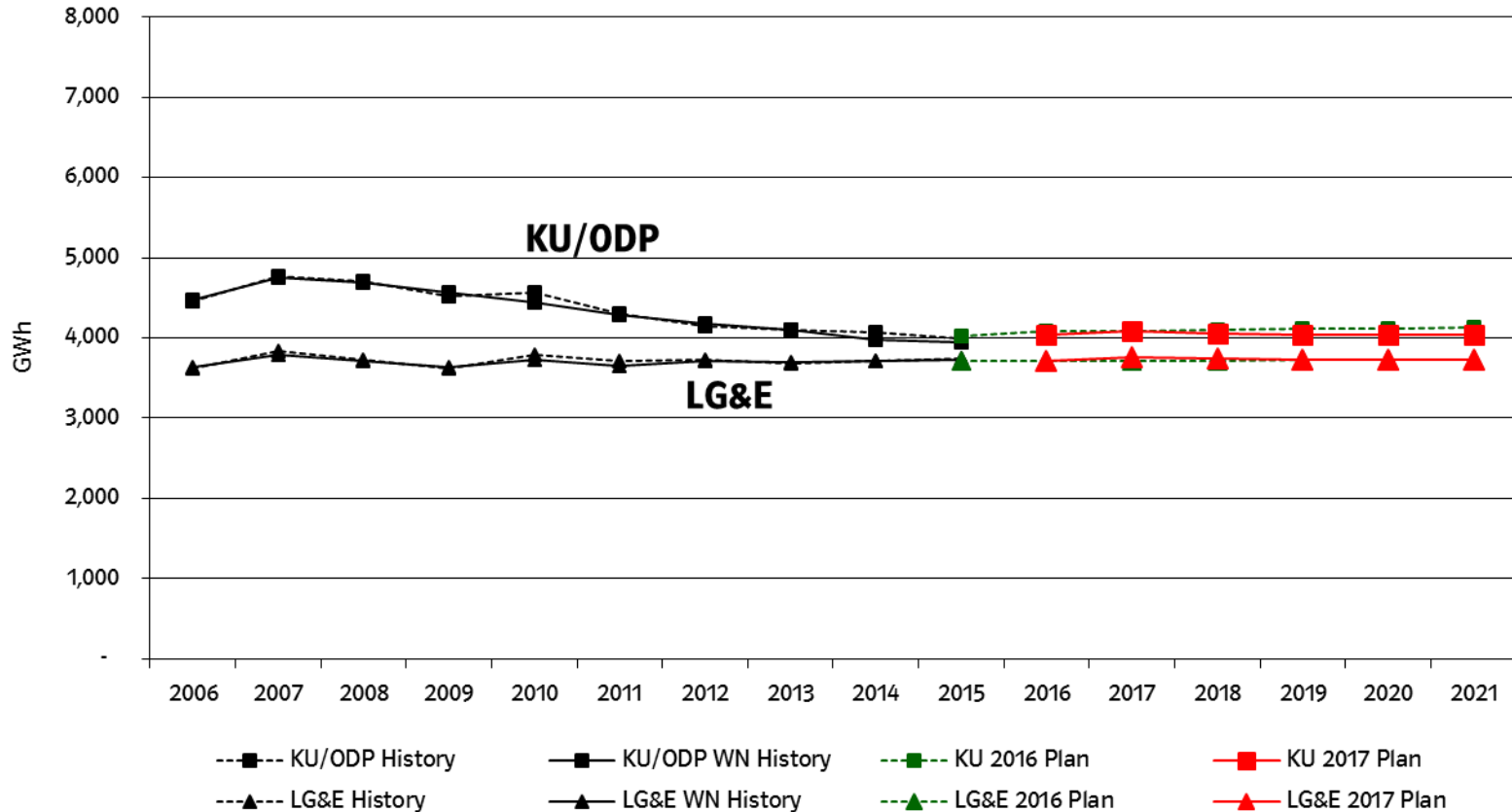
UPC Variance: New Customers less Existing Customers



	Existing UPC	New Premise UPC	% Change
KU	14,251	14,269	0%
LG&E	11,461	11,465	0%
ODP	15,782	13,917	-12%

KU Commercial remains flat after post-recessionary decline

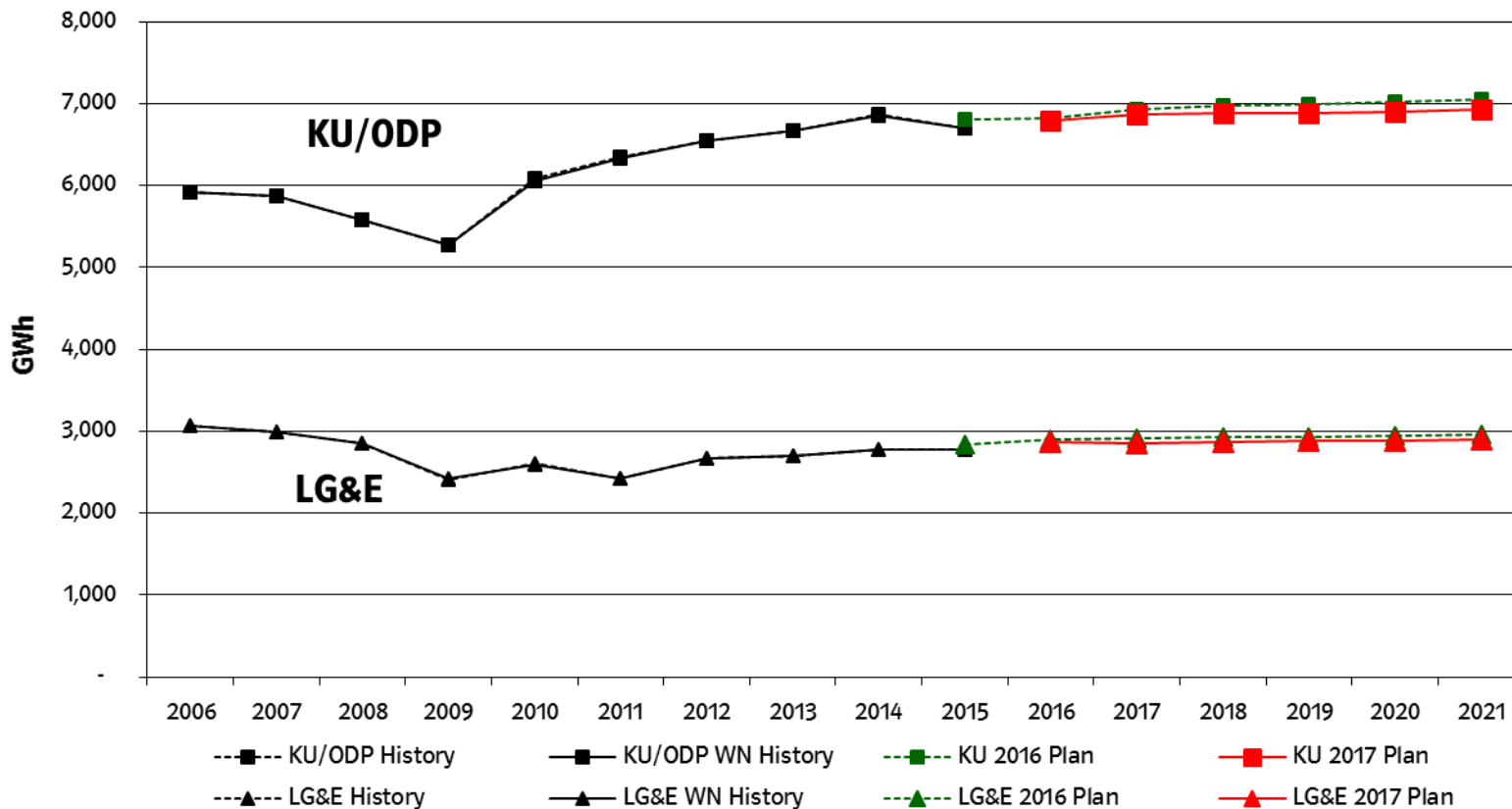
Annual Commercial Energy Sales



In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

Major accounts drive short-term Industrial growth

Annual Industrial Energy Sales

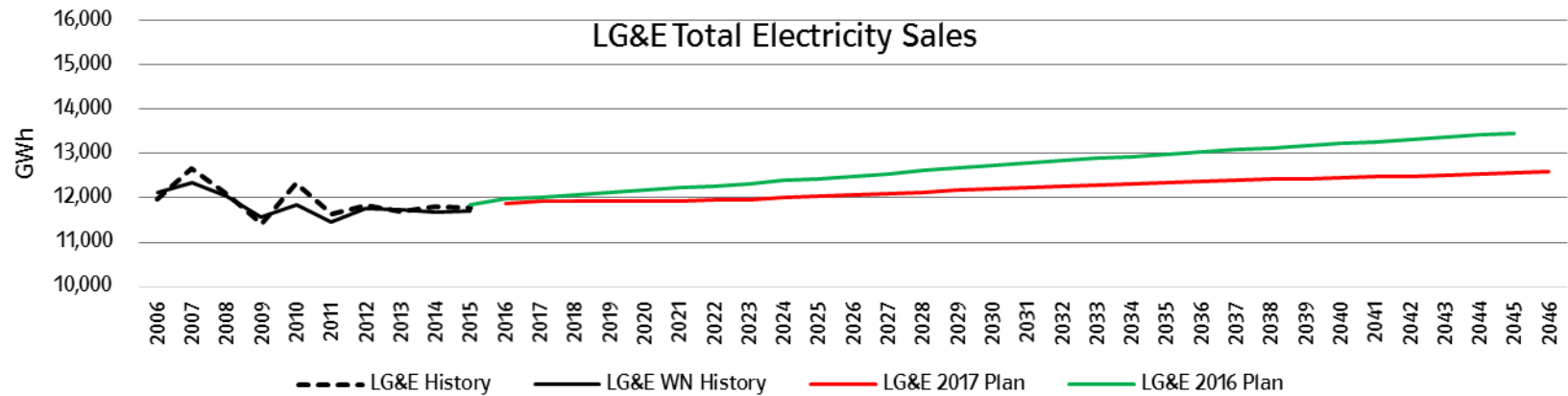
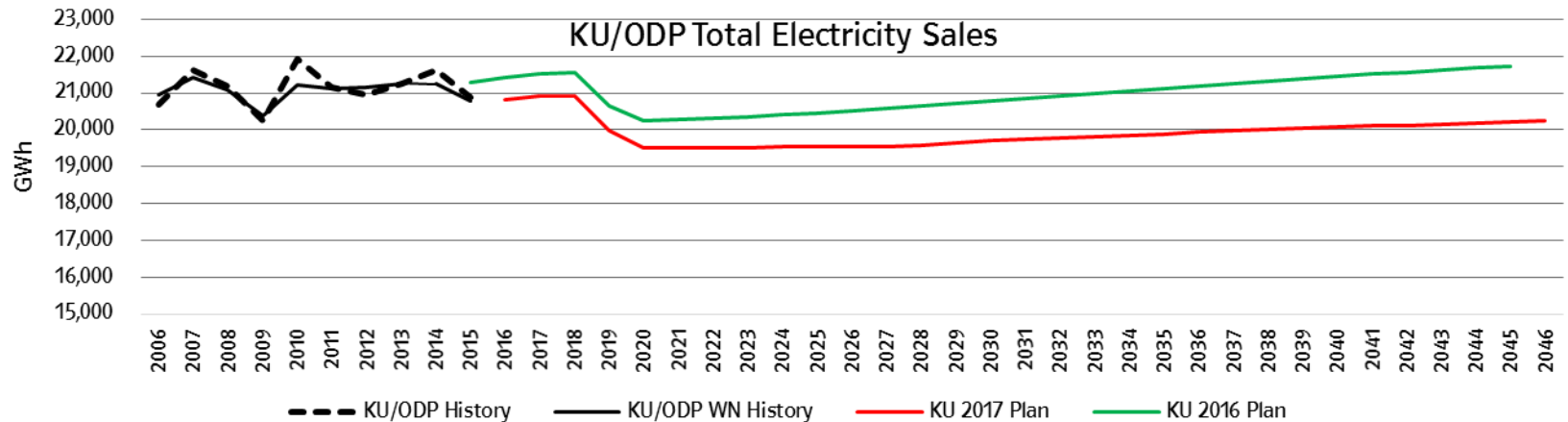


In 2017 Plan forecast, 2016 value is a weather-normalized 5+7 forecast.

██████ has been excluded.

CONFIDENTIAL INFORMATION REDACTED

Consistent with national forecasts, 2017 Plan long-term growth rate is lower than 2016 Plan



Downside risks likely outweigh upside risks in 2017 Plan forecast

- Downside risk
 - *Faster LED adoption*
 - *Faster coal decline*
 - *Auto industry recession*
 - *General US recession*
- Upside risk
 - *Rapid EV expansion*
 - *Major economic development*

Conclusion

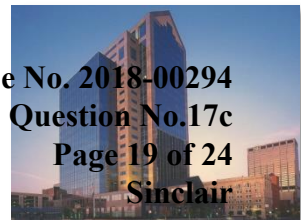
- Consistent with national forecasts, 2017 Plan lower than 2016 Plan
- Modest growth in near-term due to major account expansions
- Loss of [REDACTED] and slower growth in Residential sales will also reduce peak demand

CONFIDENTIAL INFORMATION REDACTED



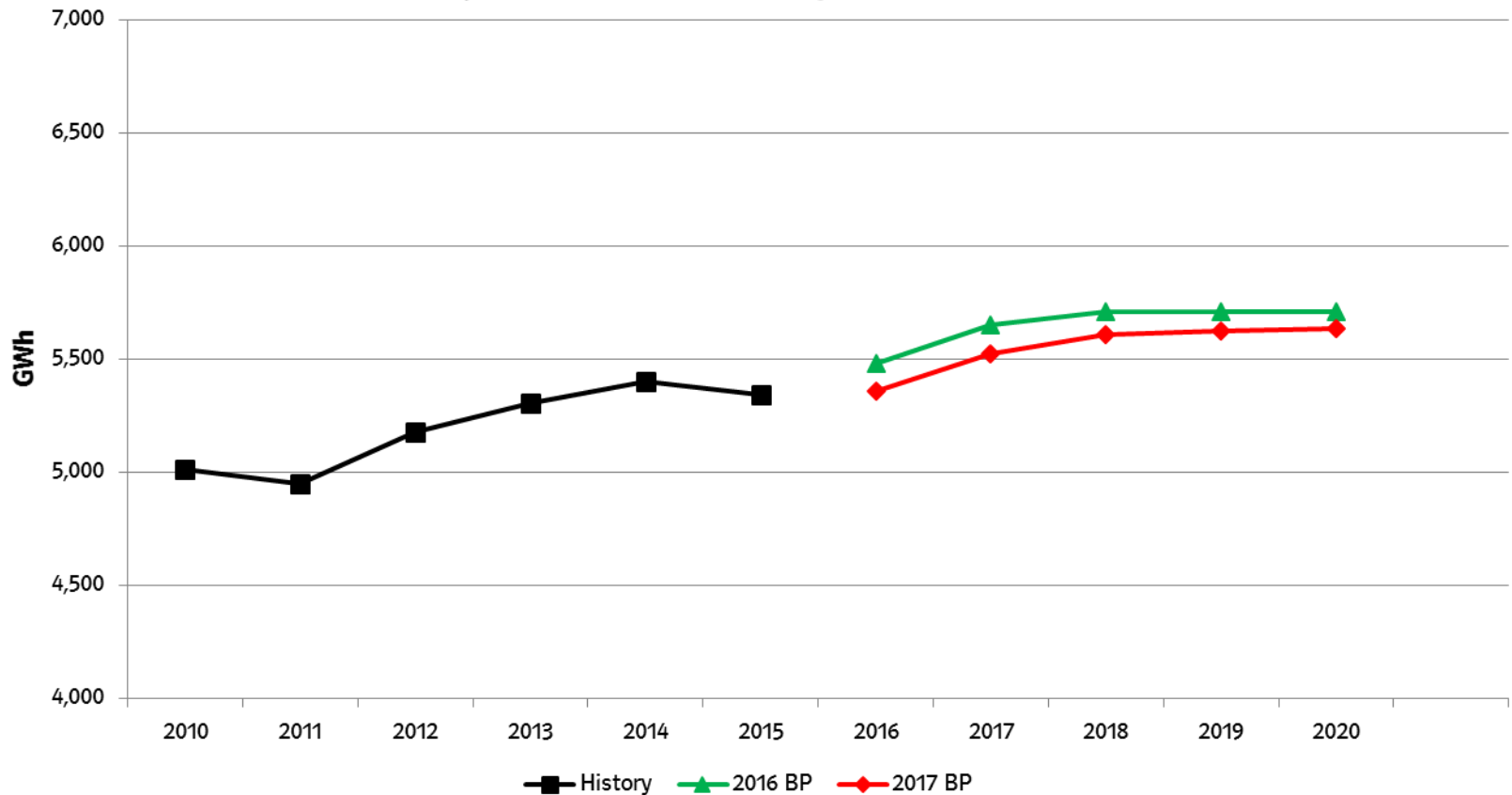
PPL companies

Appendix



Major Accounts below 2016 Plan; growth through 2018 led by [REDACTED] and [REDACTED]

Major Accounts History and Forecast



[REDACTED] removed from history and 2016 Plan

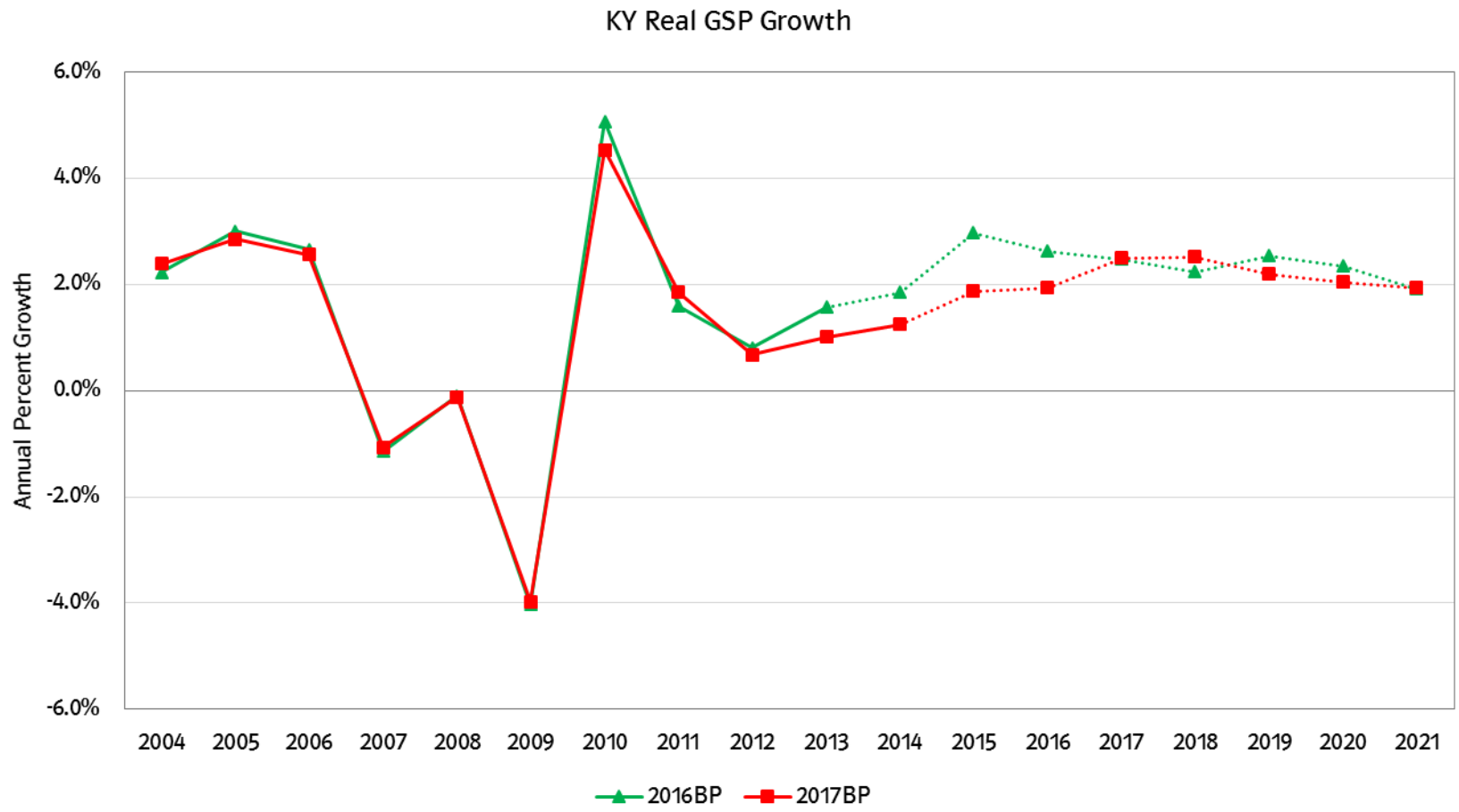
CONFIDENTIAL INFORMATION REDACTED

Plan over plan Major Account changes in 2017

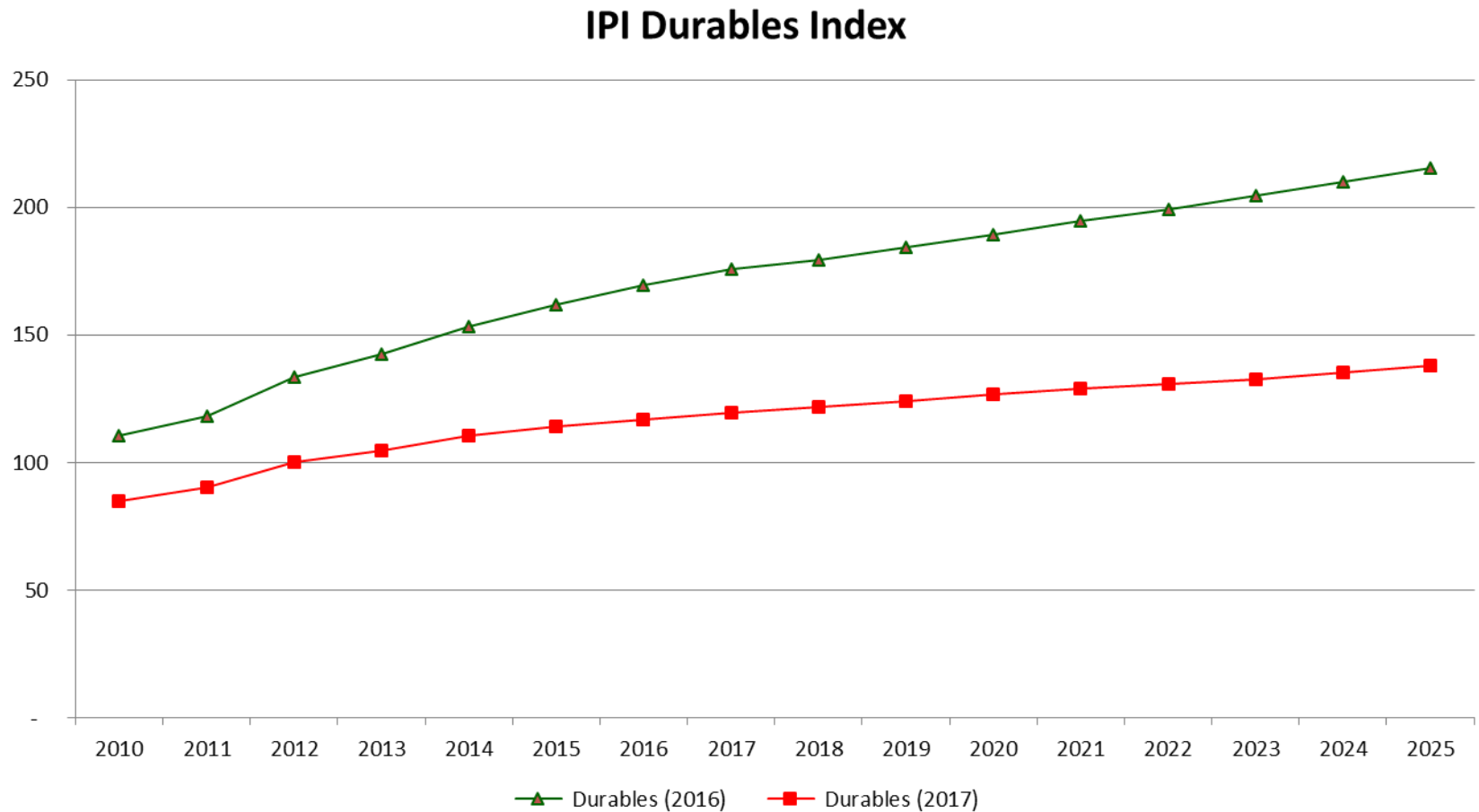
Major Account	2017 Plan (GWh)	2016 Plan (GWh)	Delta (GWh)	Notes
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[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

CONFIDENTIAL INFORMATION REDACTED

GSP recent history revised downwards

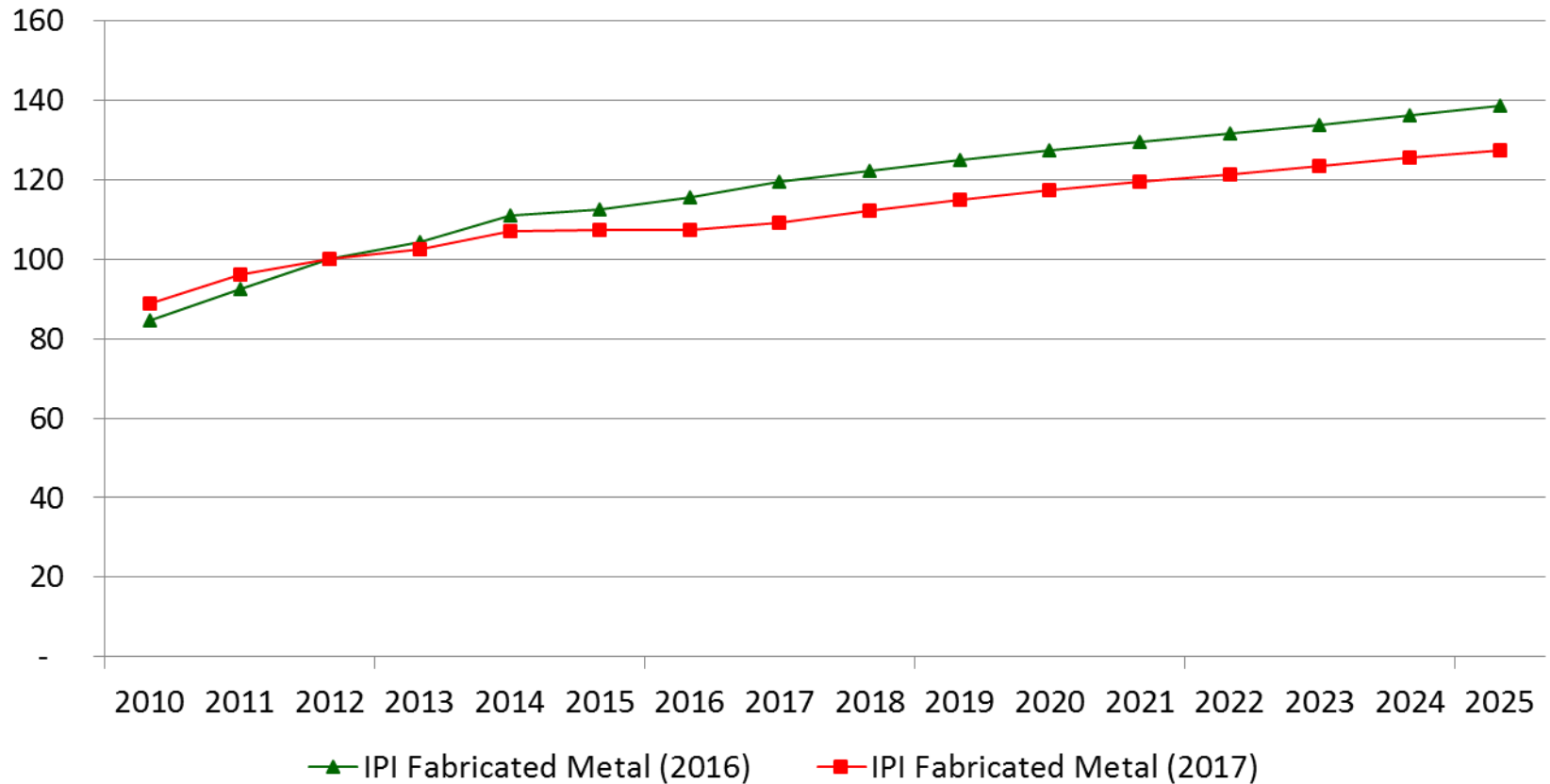


IPI Durables lower than 2016 Plan



Fabricated Metals Index lowered in near term

IPI Fabricated Metals Index



2018 Business Plan Electric Sales Forecast



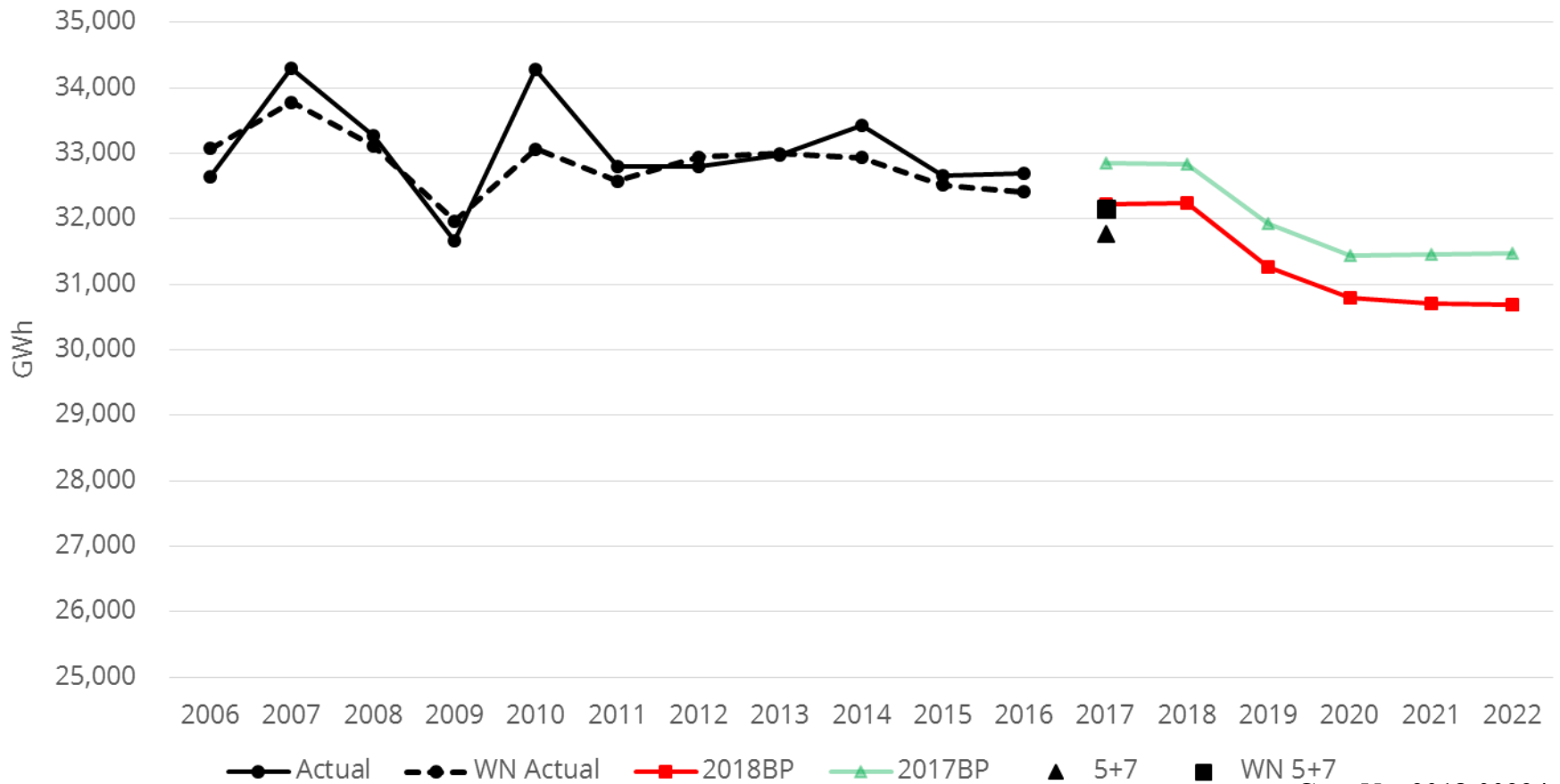
Sales Analysis & Forecasting
July 11, 2017

Forecast Summary

- 2018 Plan sales forecast is 597 GWh (1.8%) lower in 2018 vs. 2017 Plan; 2-2.5% lower through 2022
 - 316 GWh lower in Q3 and Q4 of 2017
 - Decrease driven by residential, commercial, and industrial efficiency gains
- Increasing penetration of distributed solar generation reduces energy requirements by 947 GWh in 2040
 - Impact is small through 2022
- Ignoring likelihood of extreme weather, annual sales can vary by over 1,000 GWh due to weather

Municipal departure dominates near-term trend in Combined Company sales forecast

Combined Company Calendar Sales



Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

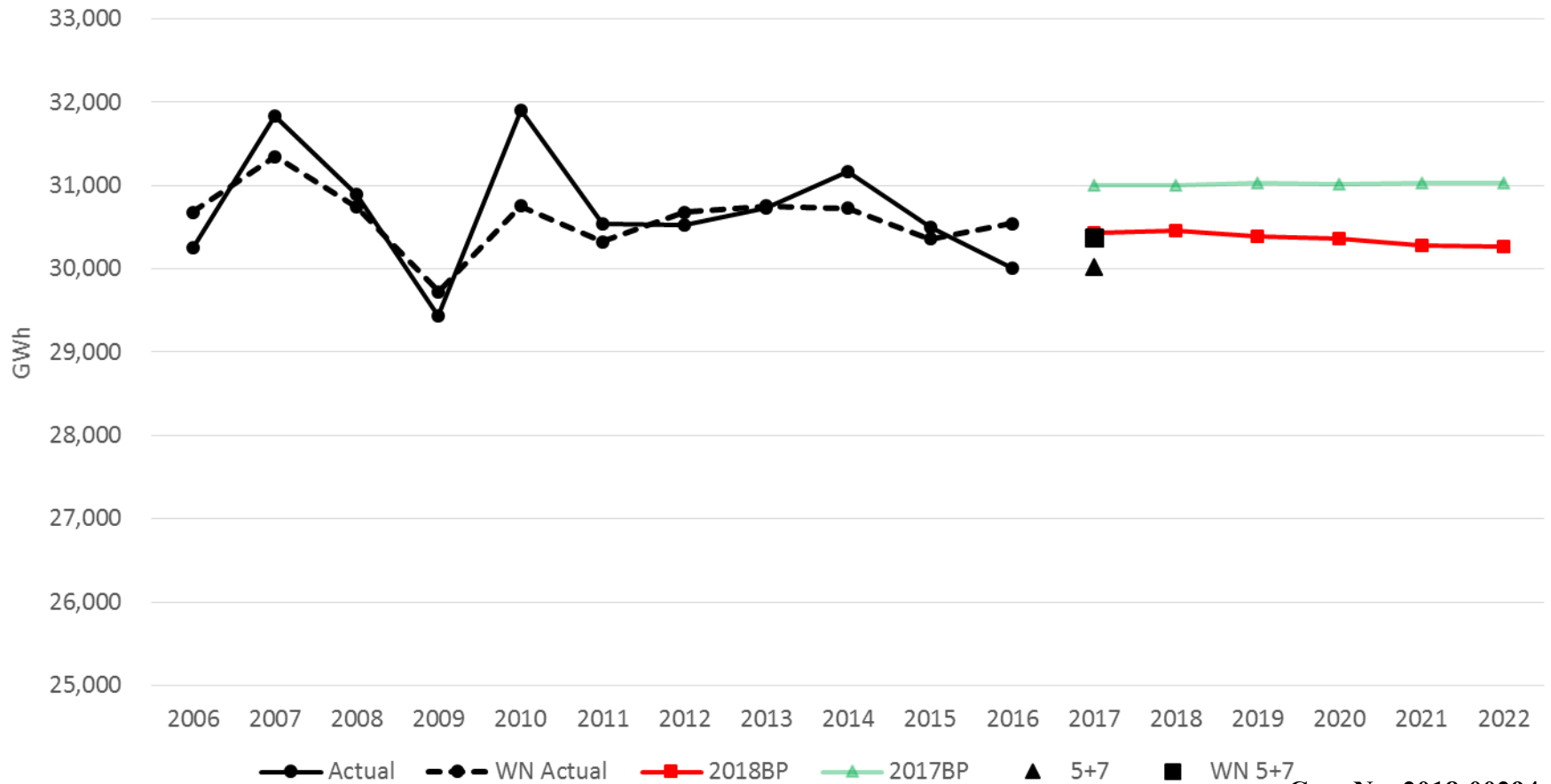
Page 3 of 23

Sinclair

Excluding municipals, plan-over-plan decline in 2018 is 541 GWh

CONFIDENTIAL INFORMATION REDACTED

Combined Company Calendar Sales Excl. Municipals/ [REDACTED]



Case No. 2018-00294

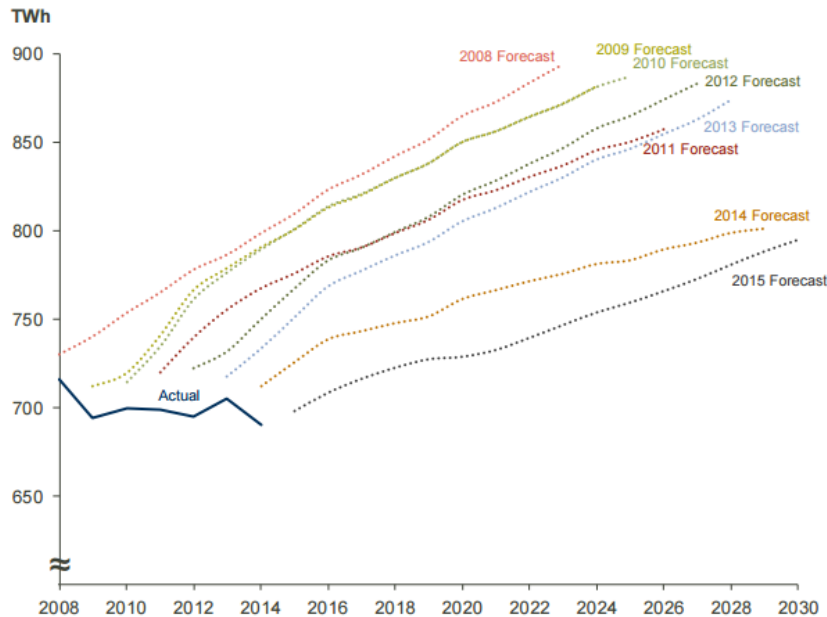
Attachment 4 to Response to KIUC-1 Question No.17c

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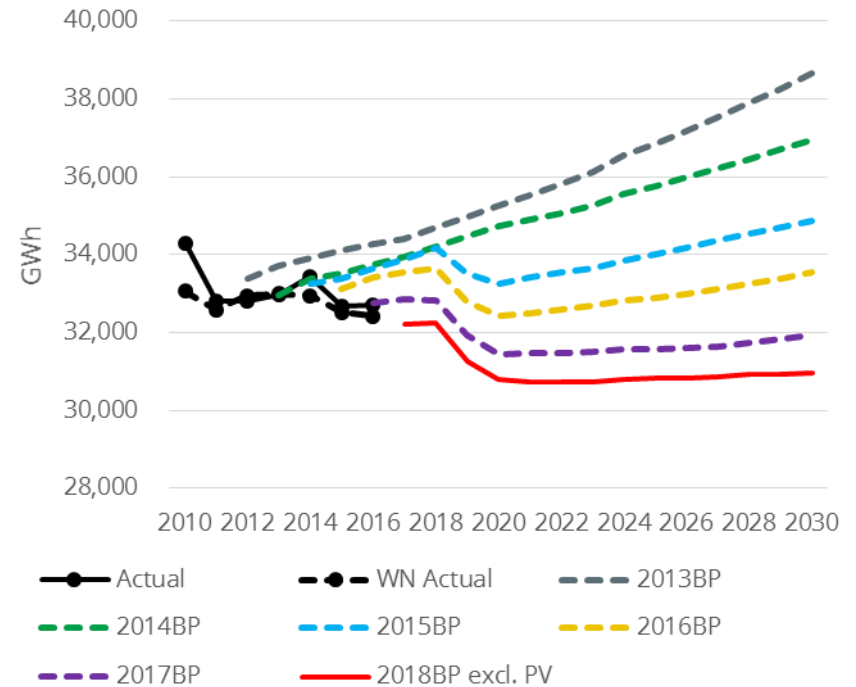
Sinclair

Load forecasts have been progressively lowered over past 5-10 years

PJM Long Term Energy Forecasts



LKE Combined Company Sales



Case No. 2018-00294

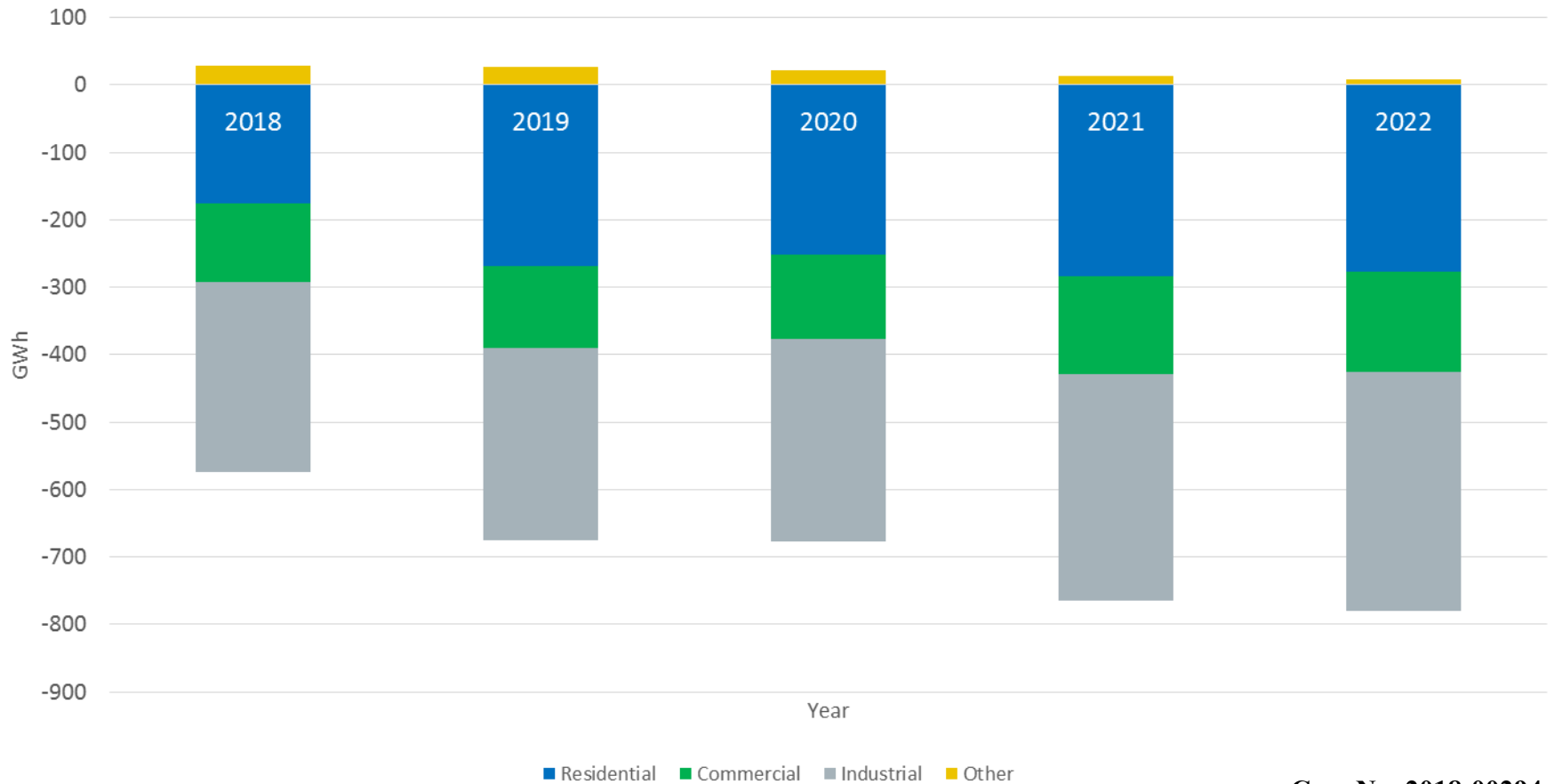
Attachment 4 to Response to KIUC-1 Question No.17c

Page 5 of 23

Sinclair

Residential and Industrial decreases drive plan-over-plan variance

Plan over Plan variance by revenue class



Case No. 2018-00294

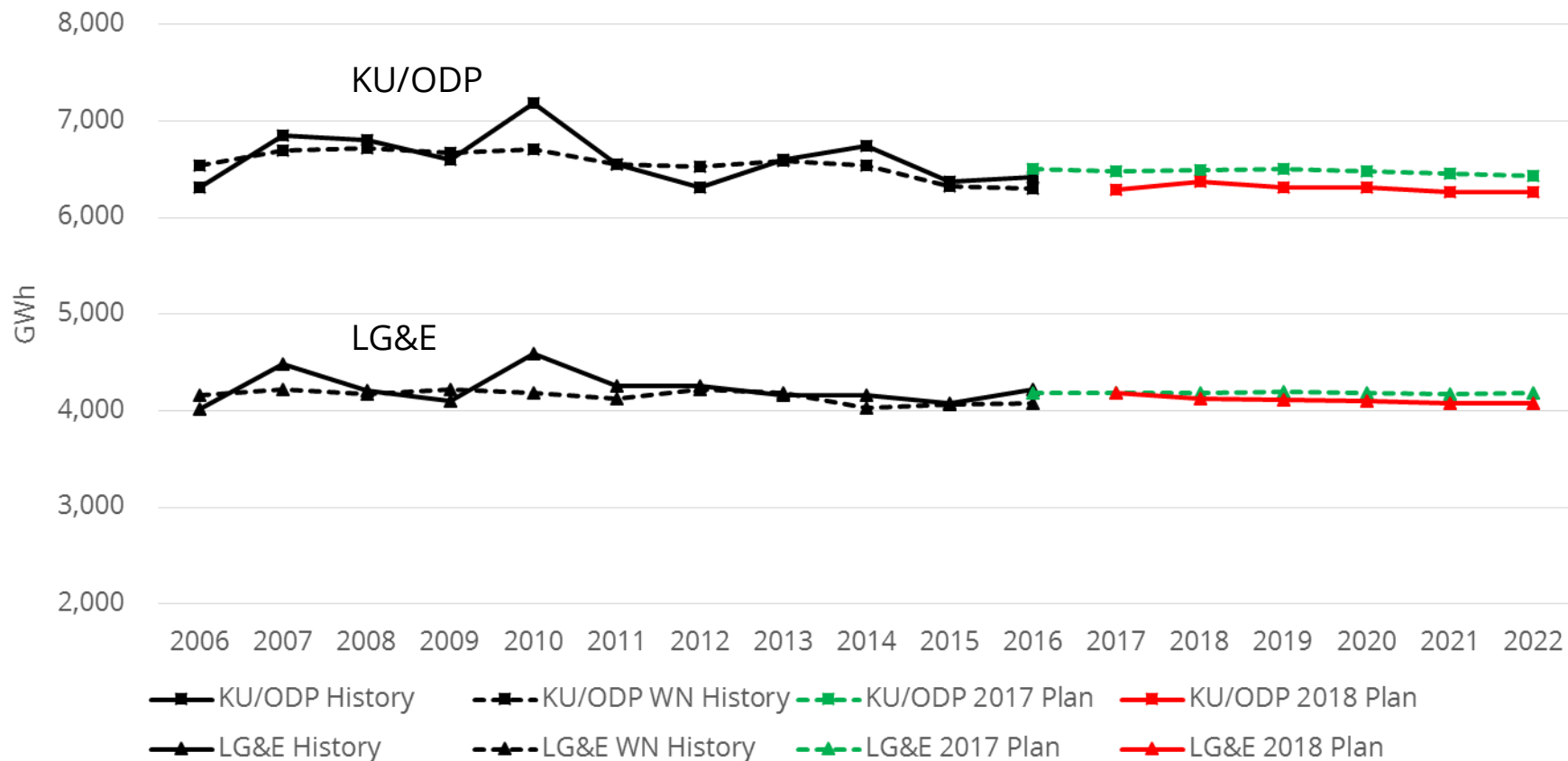
Attachment 4 to Response to KIUC-1 Question No.17c

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Sinclair

Residential use-per-customer decreases outweigh customer growth through 2022

Annual Residential Energy Sales



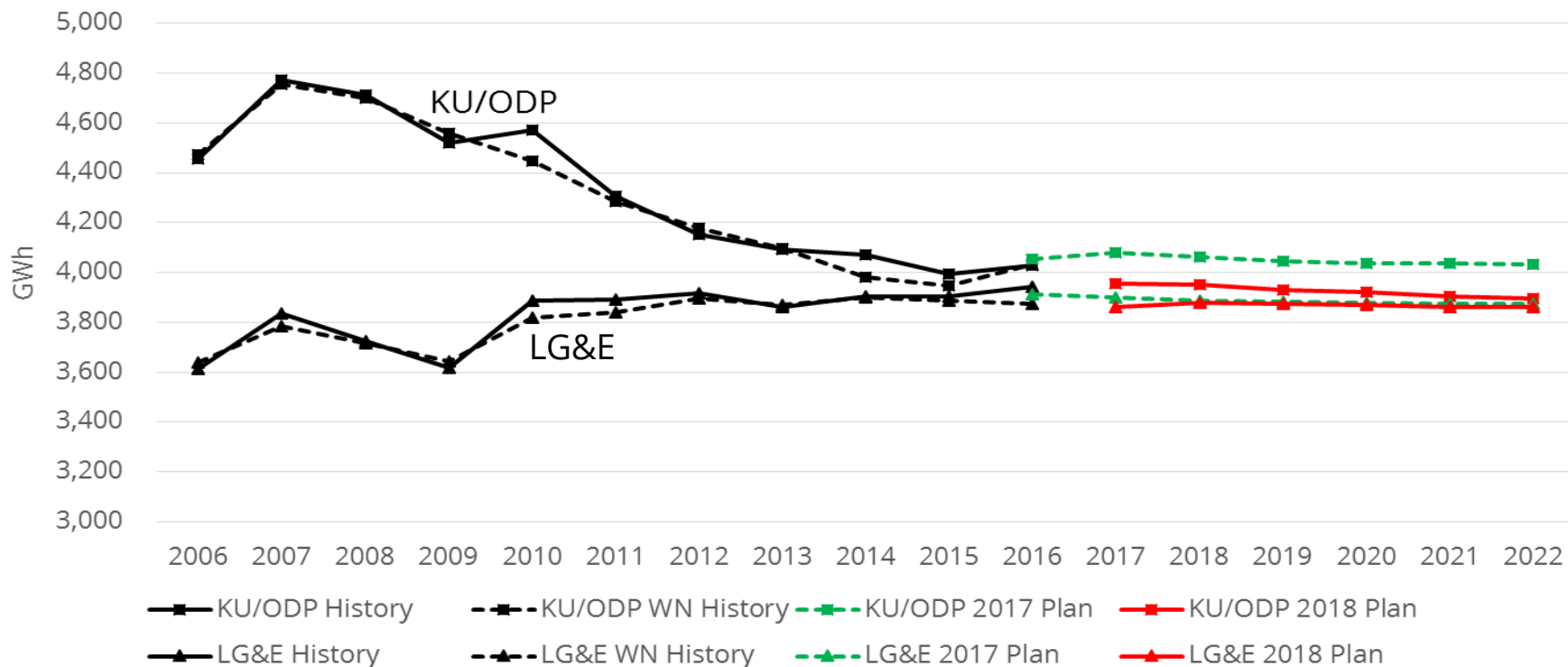
In 2018 Plan forecast, 2017 value is a weather-normalized 5+7 forecast

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

Cooling and lighting efficiencies continue to drive Commercial sales lower through 2022

Annual Commercial Energy Sales

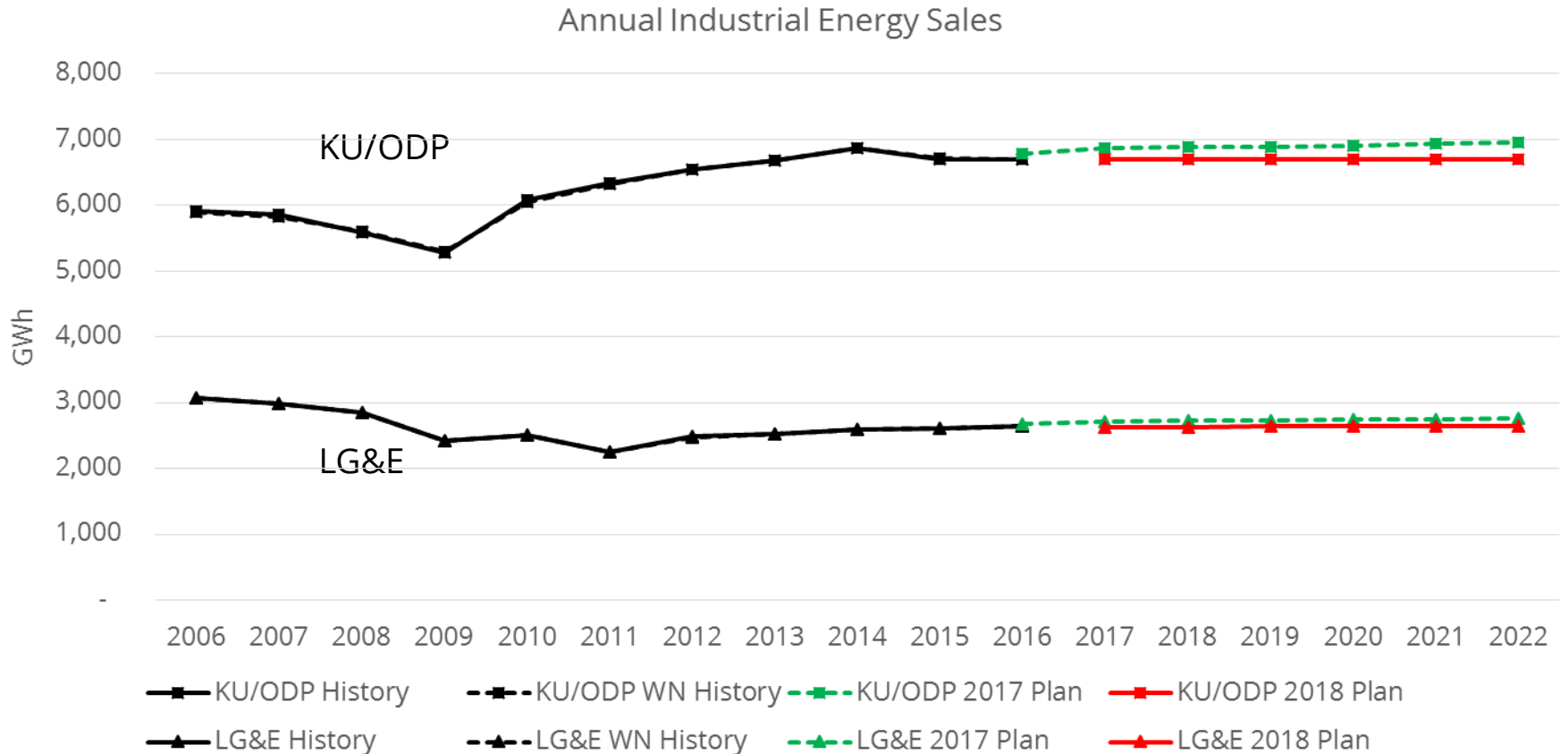


In 2018 Plan forecast, 2017 value is a weather-normalized 5+7 forecast
 Historical [redacted] volumes included in Commercial

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

Industrial sales remain flat



In 2018 Plan forecast, 2017 value is a weather-normalized 5+7 forecast

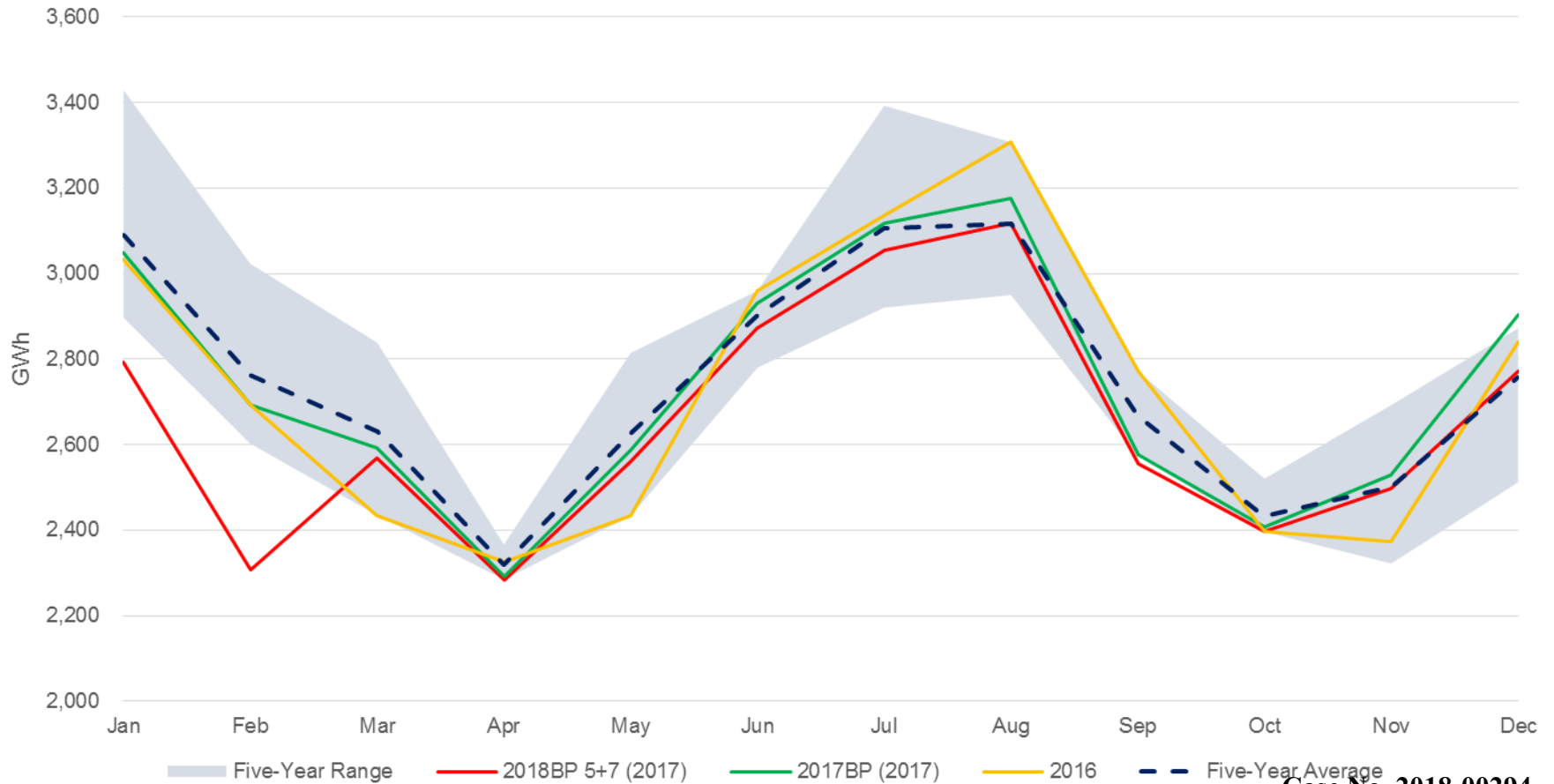
██████████ excluded from history; Historical ██████████ volumes moved to Commercial

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

316 GWh Plan over Plan reduction in Q3 & Q4 2017

2018BP 5+7 Fcast (2017) vs Historical Actual Sales



Case No. 2018-00294

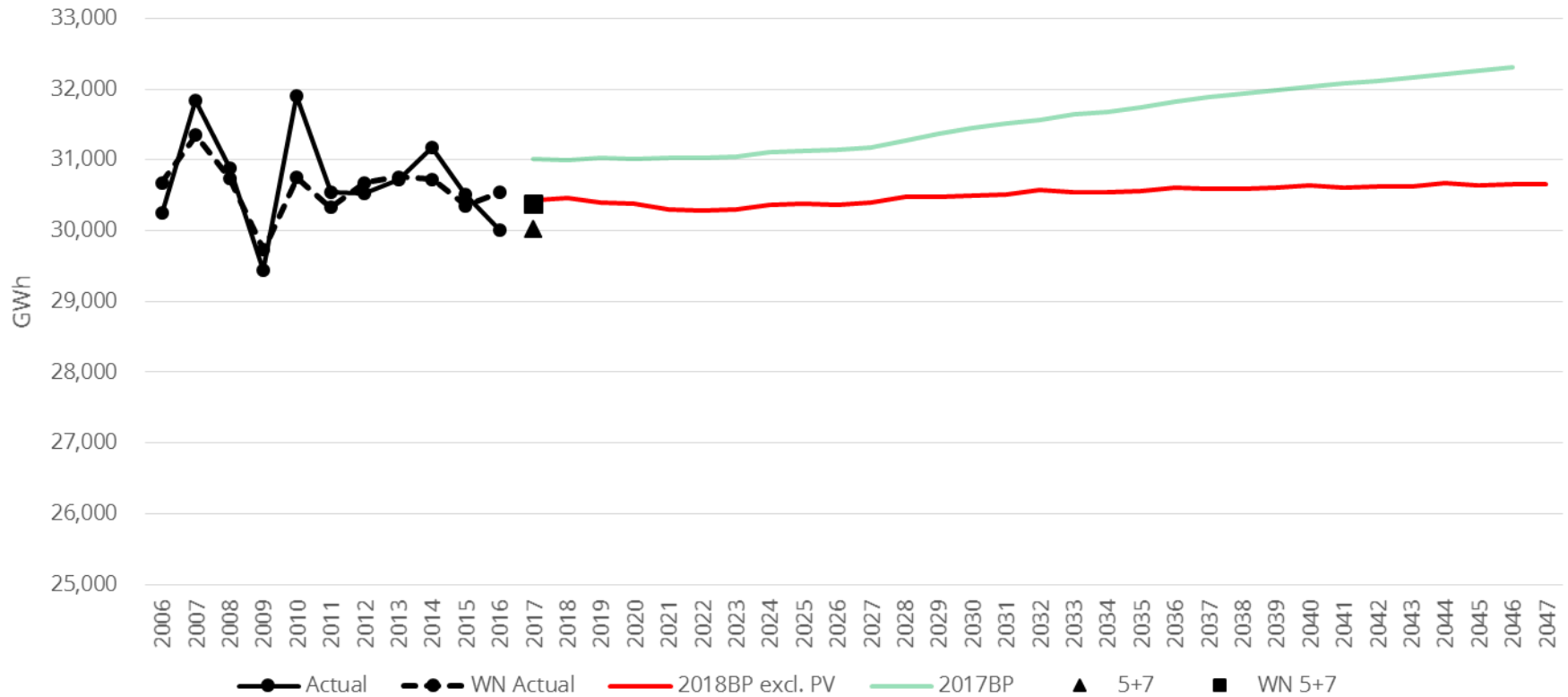
Attachment 4 to Response to KIUC-1 Question No.17c

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Sinclair

Customer growth begins to outweigh efficiency gains after 2022

Combined Company Sales Excluding Municipals



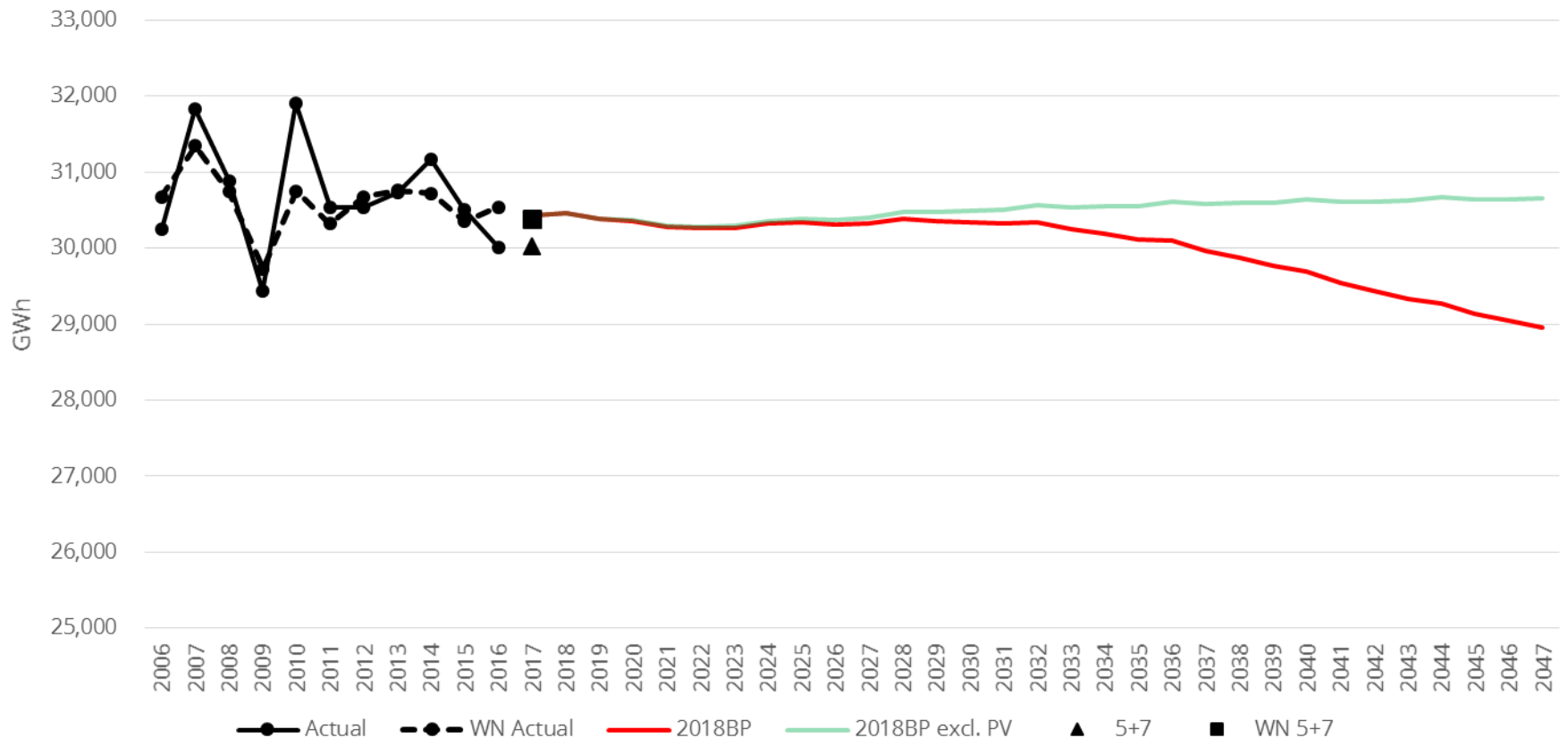
excluded from history

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

Distributed solar PV generation (PV) reduces sales by 947 GWh in 2040

Combined Company Sales Excluding Municipals



excluded from history

Case No. 2018-00294

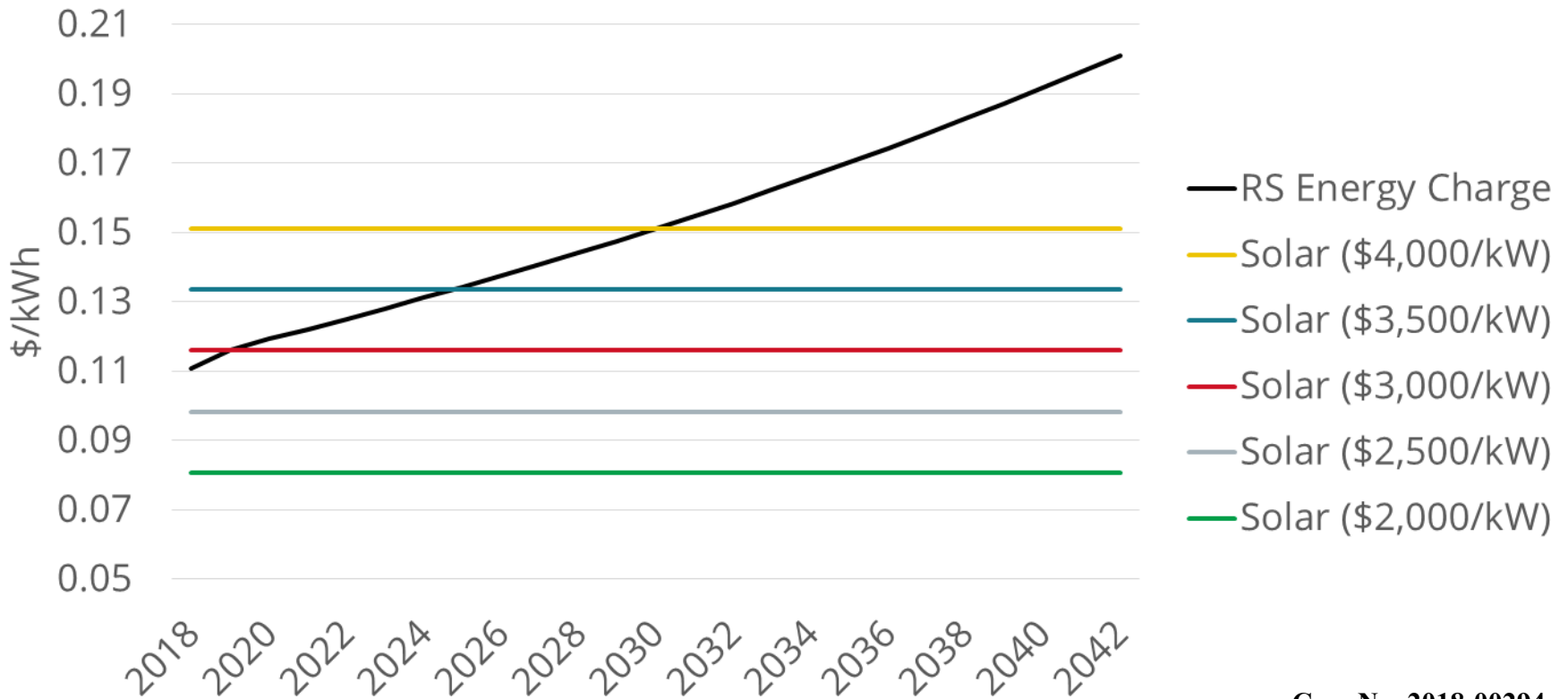
Attachment 4 to Response to KIUC-1 Question No.17c

Solar assumptions

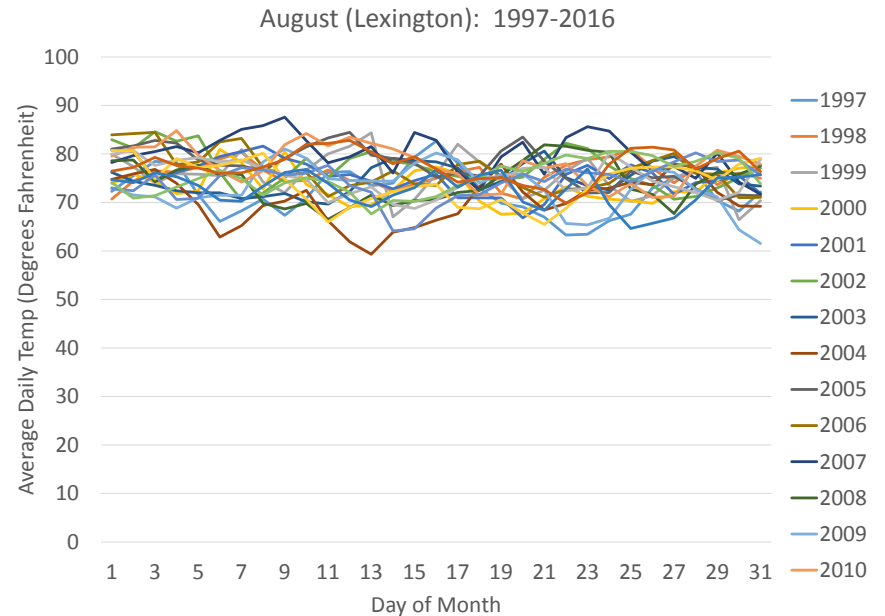
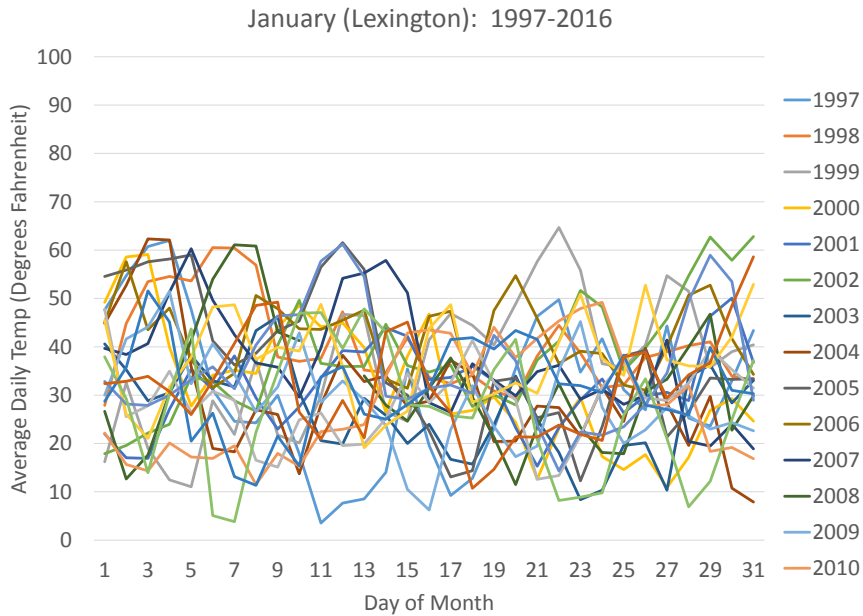
- PV adoption projections from NREL (National Renewable Energy Laboratory) for the state of Kentucky at the utility service territory level
- Adjusted to match current net metering installations
- Sized to provide 95% of annual consumption; constrained by available roof area
- 16% Capacity Factor, 0.5%/year Module Degradation
- Full retail net metering is assumed through the duration of the analysis

Penetration of distributed solar generation largely depends on cost of solar, variable energy charge, customer's opinion about future rate increases, and customer's appetite for owning solar array

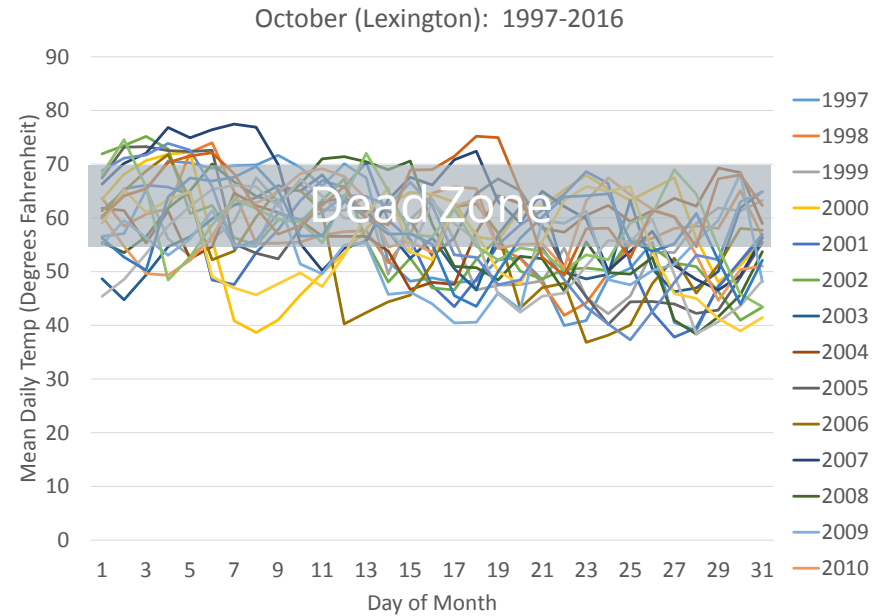
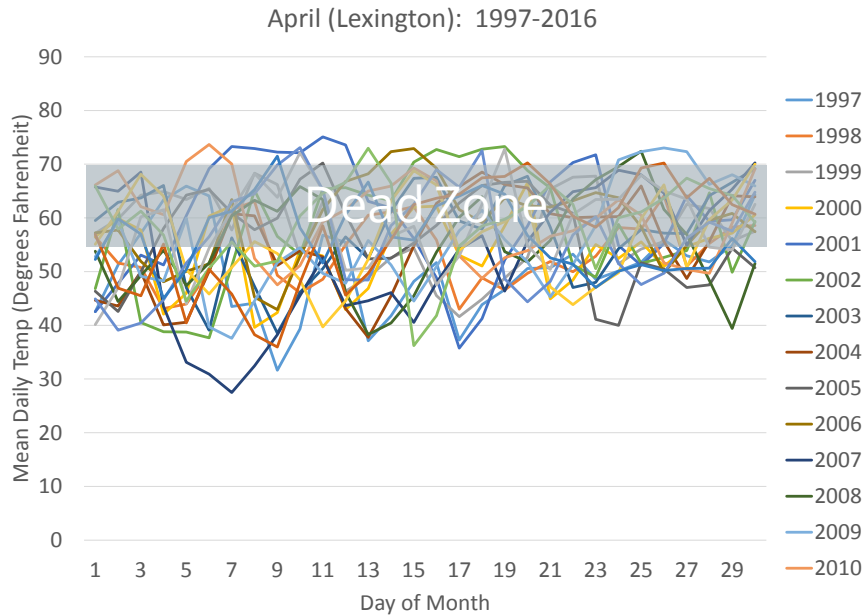
Levelized Cost of Solar vs. LG&E/KU Residential Energy Charge



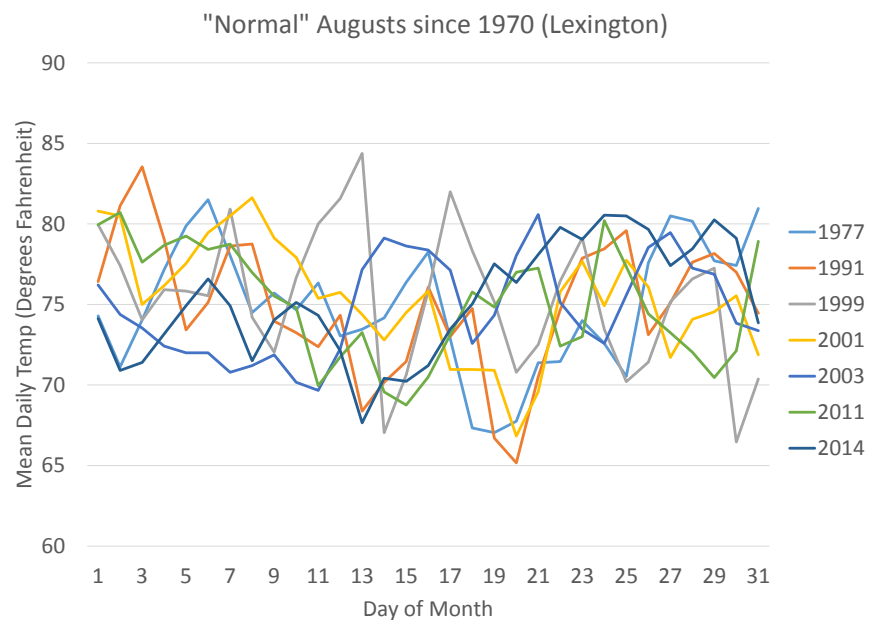
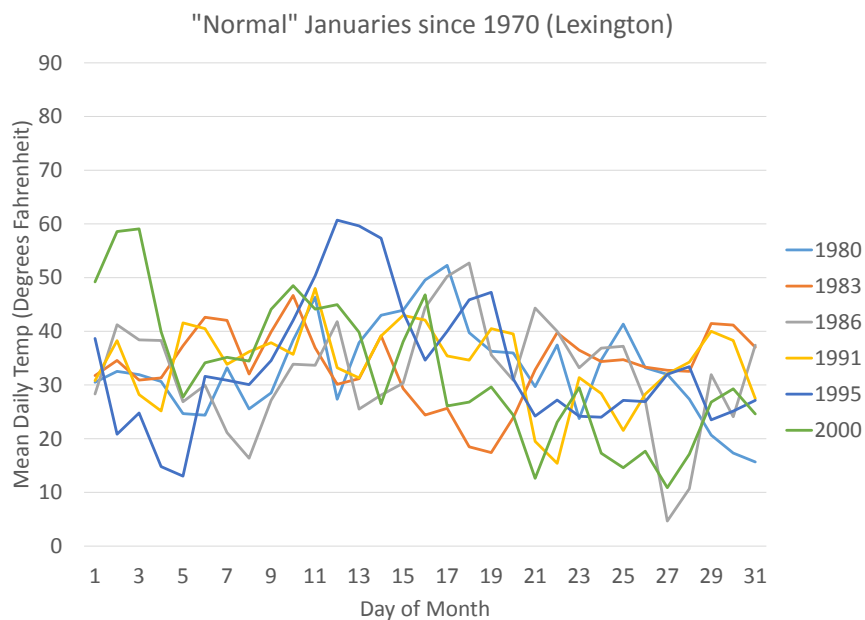
Daily weather can take many paths; variability of weather in winter is greater than variability of weather in summer



Warmer-than-normal temperatures in shoulder months fall into “dead zone” where load’s sensitivity to weather is limited



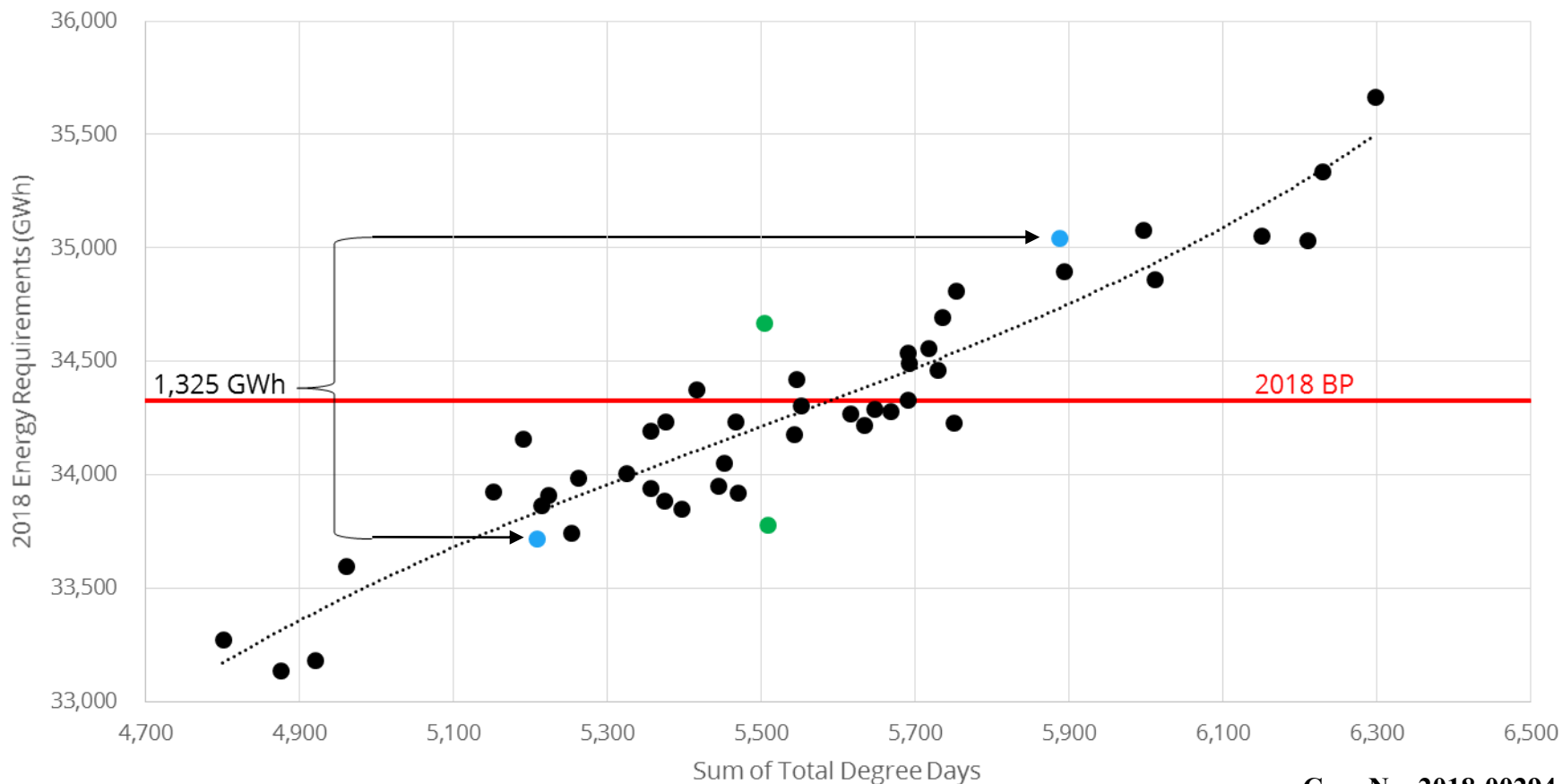
Daily temperature trends in “normal” months can also be very different



“Normal” defined as months with monthly average temperature within 0.25 standard deviations of 20-year average temperature.

Ignoring likelihood of extreme weather, annual energy requirements can vary by over 1,000 GWh due to weather

Modeled 2018 Energy Requirements Based on Last 40+ Annual Weather Patterns



Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

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Sinclair

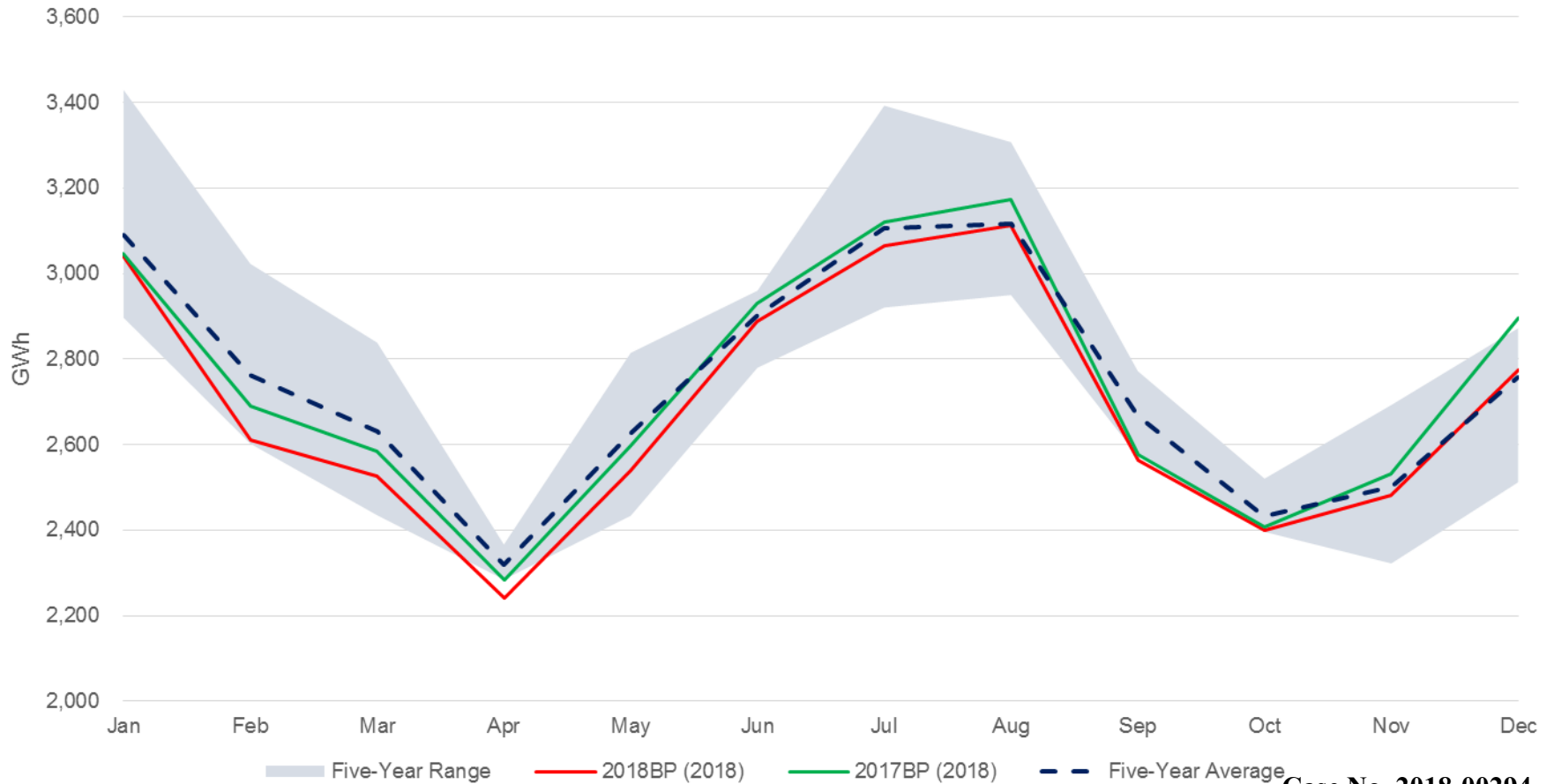
Conclusion

- Decreases in Residential and Commercial forecasts in line with recent trends
- Distributed solar PV generation becomes increasingly economic with rising residential energy charges
- Weather risk remains a significant source of short-term volatility

Appendix

Future summer cooling load expectations reduced

2018BP Fcast (2018) vs Historical Actual Sales



Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

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Sinclair

Plan over plan Major Account changes in 2018

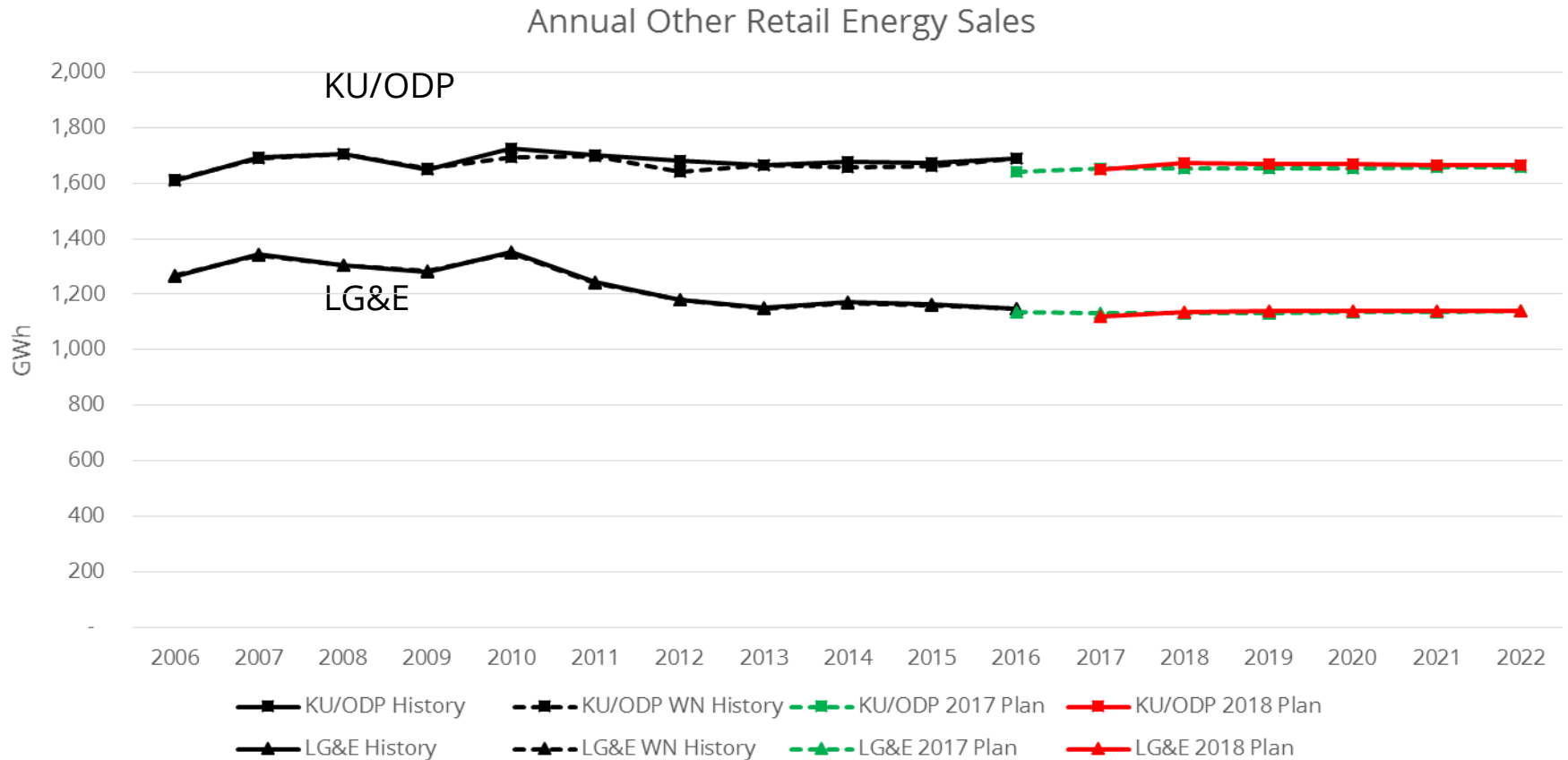
CONFIDENTIAL INFORMATION REDACTED

Major Account	2018 Plan (GWh)	2017 Plan (GWh)	Delta (GWh)	Notes
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[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

Other sales remain flat



In 2018 Plan forecast, 2017 value is a weather-normalized 5+7 forecast

Case No. 2018-00294

Attachment 4 to Response to KIUC-1 Question No.17c

The attachment is
provided in a separate
file in Excel format.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 18

Responding Witness: David S. Sinclair

- Q.1-18. With regard to Mr. Sinclair's testimony on page 6 at line 21, please provide any analyses, reports, emails or other writings that discuss the need to "improve our models."
- a. What criteria do the Companies' utilize to assess the need to improve its models?
 - b. What criteria do the Companies' utilize to determine if their models have been improved?

A.1-18.

Load forecast models are reviewed throughout each month. In addition to the attachments to KIUC 1-17 c., see attached monthly reports and key performance indicators. Monthly meetings with Energy Supply and Analysis and Finance provide in-person review of forecast performance.

See attached being provided in Excel format.

See attached. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

- a. The Companies utilize a number of traditional metrics to assess the need to improve its forecasting models. These include metrics such as Mean Absolute Percent Error (MAPE), R-squared values, and Durbin Watson tests for serial correlation. Recent model residuals are assessed to determine model accuracy in the most recent timeframe. Further, forecasts of exogenous variables are analyzed to determine if forecasting errors were a result of model specification or variation in forecasts of explanatory variables.
- b. The Companies analyze potential improvements in the aforementioned forecasting metrics as one way to determine model improvement. However,

model overfitting is not desired so improvement in these metrics are only considered if supported by sound theoretical underpinnings. Additionally, the Companies hold forecasting data out of sample to assess model predictions. For example, for the 2019 Load Forecast, 2017 data was held out of sample and predicted using the new model specifications as one part of the analysis. Last, the Companies rely on subject matter expertise to thoroughly assess the reasonableness of both model inputs and outputs.

The attachment is
provided in a separate
file in Excel format.

Sales Analysis & Forecasting Monthly Report



Jul-Aug 2017

In this Issue...

Feature Article — 2018 Business Plan Sales Forecast Overview Page 1,5-10

- Sales forecasts have been revised lower for the new Business Plan

Weather Statistics and Outlook Page 2

- Extremely mild temperatures have reduced load thus far in September

Economic Outlook Page 3

- Kentucky housing growth remains strong in urban areas

Sales Growth Trends Page 4

- Sales were below budget in both July and August

2018 Business Plan Sales Forecast Overview

This article will provide an overview of the 2018 Business Plan forecast of electricity sales. Total sales are expected to increase marginally in 2018 from weather-normalized 2017 levels, but then are expected to decline by three percent in 2019 and 1.5 percent in 2020 due to the termination of eight wholesale contracts with Municipal customers April 30, 2019. Despite persistent strong customer growth in the residential and commercial classes, retail sales are expected to show a small decline over the first five years, a change from last year's plan. Key factors causing a plan over plan decline in retail load through 2022 are:

- Faster adoption of LED Lighting among residential and commercial customers
- A flattening of load for miscellaneous usage moving forward, particularly in the LG&E portion of the service territory
- Greater efficiency projections in commercial office spaces due to the release of a new EIA benchmarking study
- A slower pace of customer growth in the secondary rate classes (large commercial/small industrial) as compared to previous forecasts.

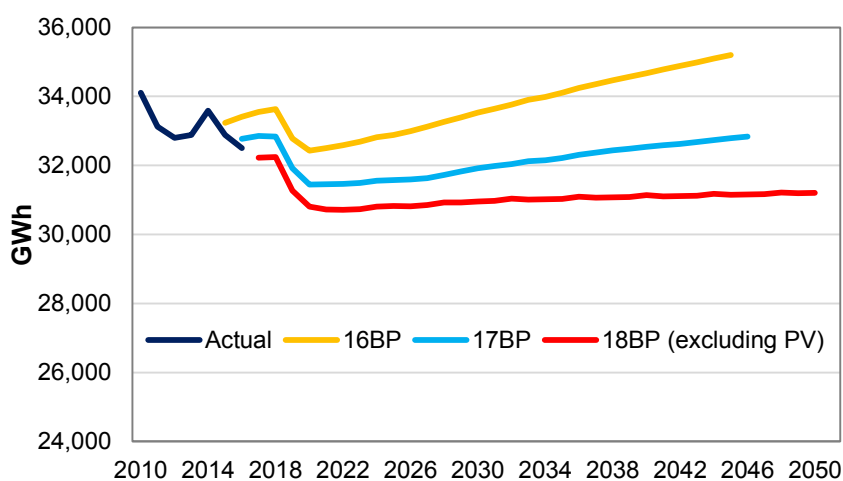


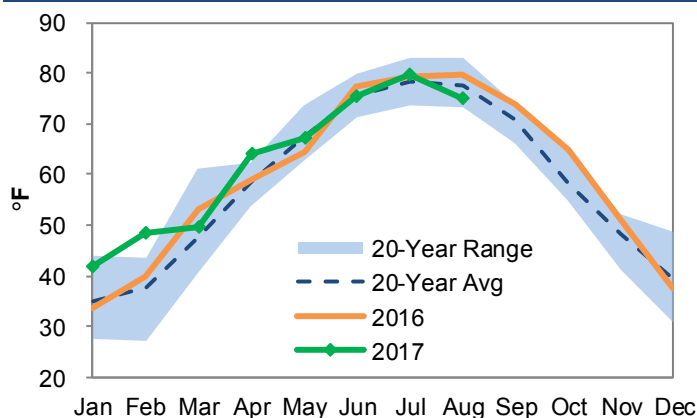
Figure 1: Electricity Sales Forecast in 2018BP Compared to Prior Plans

Note: 2017 data is forecasted with normal weather (no actual volumes)

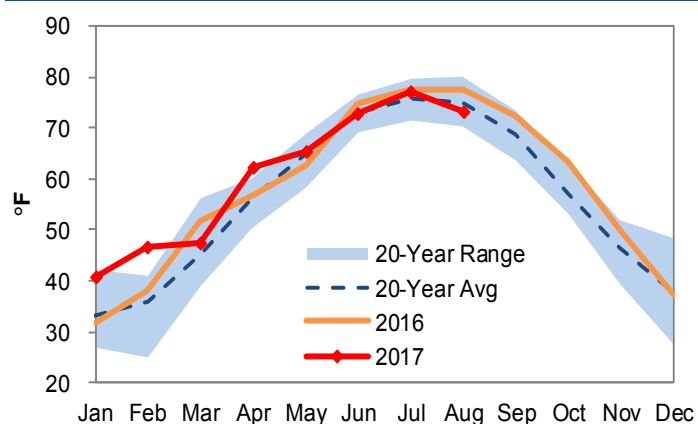
After 2022, sales trend higher at a compound annual growth rate (CAGR) of just 0.08 percent through 2040. This compares to CAGRs of 0.34 percent in the 2016BP and 0.19 percent in the 2017BP over the same time period.

Weather Statistics and Outlook

LOU Average Temperatures



LEX Average Temperatures

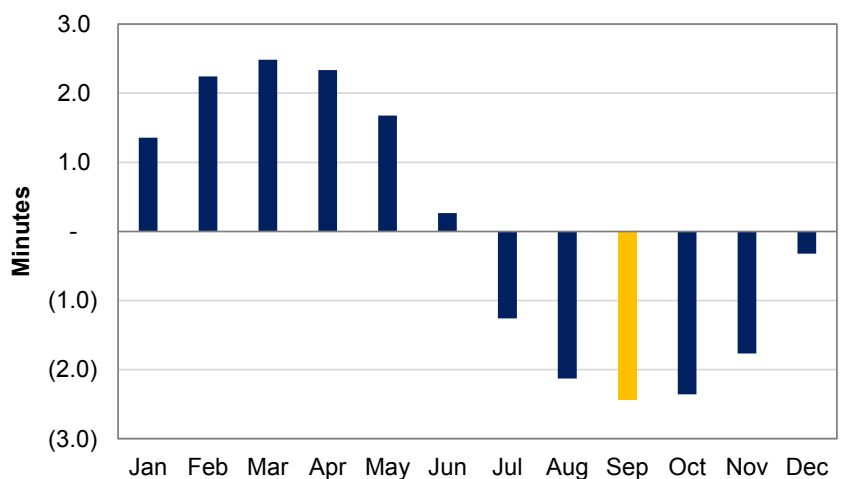


- The average hourly temperature at Louisville’s Bowman field was 79.7°F in July, 1.3 degrees above the 20-year average and 0.5 degrees below last year’s average temperature in July. The average hourly temperature at Lexington’s Blue Grass Airport (LEX) was 77.0°F in July, 1.2 degrees above the 20-year average and 0.4 degrees below last July.
- The average hourly temperature at Louisville’s Bowman field was 74.9°F in August, 2.7 degrees below the 20-year average and nearly five degrees below last year’s average temperature in August. The average hourly temperature at Lexington’s Blue Grass Airport (LEX) was 73.1°F in August, 2.1 degrees below the 20-year average and 4.5 degrees below last August.

Temperature Outlook

- The trend of colder-than-normal temperatures in August has continued in September. During the first half of the month, temperatures are on pace to average eight degrees below average in Louisville and Lexington, resulting in a negative budget variance of approximately 230 GWh.
- The aftermath of Hurricane Irma helped keep temperatures seasonally cool of late, but warmer-than-normal temperatures are on tap for the coming weeks according to [short-term NOAA forecasts](#).
- However, the impact on load from above-normal temperatures is typically much lower by this time of year as compared to the prior summer months. Daylight hours decline faster in September than any other time of the year, and cooler overnight lows quash any potential for significant heat buildup. As a result, energy sales typically fall off sharply between the first and second half of September.

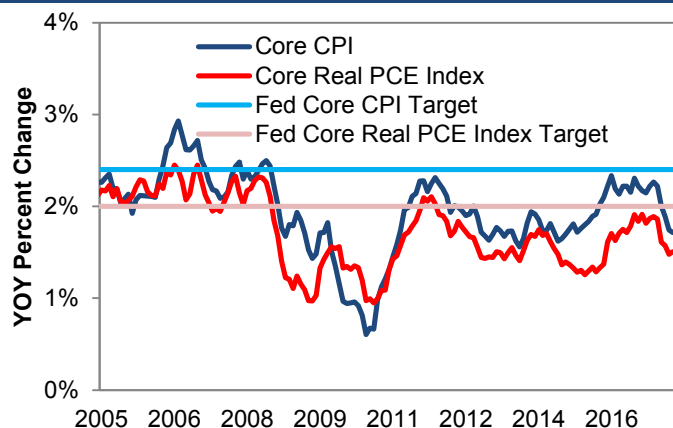
Average Daily Change in Daylight Minutes – Louisville, KY



Daylight hours decline faster in September than any other time of the year, and cooler overnight lows quash any potential for significant heat buildup. As a result, energy sales typically fall off sharply between the first and second half of September.

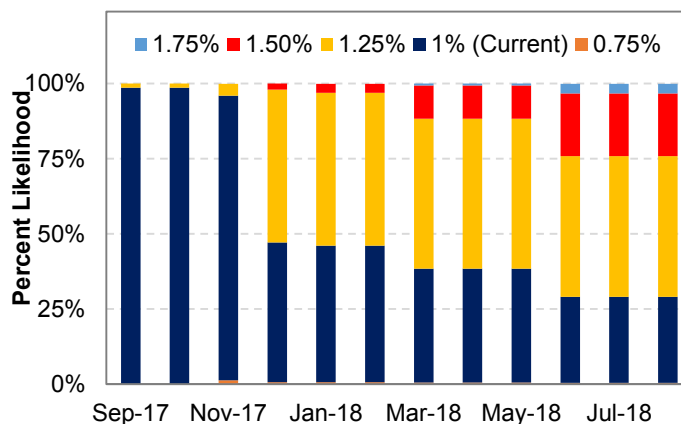
Economic Outlook

US Inflation Metrics



Source: Federal Reserve Economic Data (FRED)

Market Implied Benchmark Interest Rate Odds



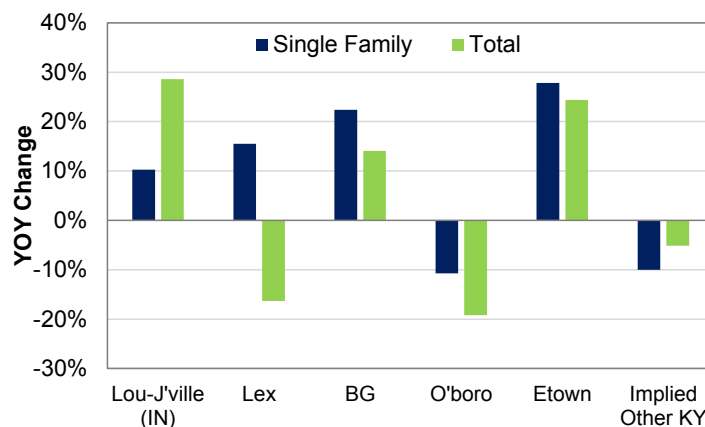
Source: CME (9/14/17)

- The US economy added 156k jobs during August, below the Bloomberg consensus estimate of 180k. Further, the July number was revised lower by 20k jobs.
- There is growing concern among some Federal Reserve [members](#) that interest rate increases over the past year may be [slowing the pace of growth](#) in the US economy. Additionally, inflation remains well below target, providing little reason to hike rates further in the immediate future. As a result, no increases to the benchmark rate are expected until December at the earliest.
- Tax reform has finally moved towards the top of the agenda in Washington, with President Trump scheduled to tour the country over the next several weeks to promote the plan. Odds of a corporate or individual tax cut by the end of 2017 currently stand at around 35 percent in both PredictIt markets.

Kentucky and Service Territory

- Housing growth has been strong in the urban portion of the LG&E and KU service territory in recent years, precipitating a material increase in residential customers.
- The graph (right) shows year-over-year growth (Jan-July year to date) in single-family and total housing permits in Kentucky's metro areas as well as an implied figure for the rest of Kentucky (state total minus metros). Housing permits are a forward indicator for housing and typically result in a higher number of new starts in future months.
- As has been the case in the past, growth in most metro areas* has been much stronger than in the rest of Kentucky as a whole.

YOY (Jan-Jul) Housing Permit Growth



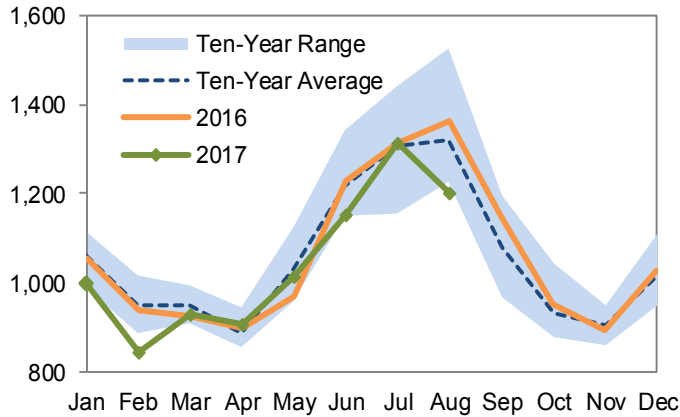
Source: State of the Cities Data Systems (SOCDS)

- The continued strength in new housing and customer growth in the urban regions remains a key assumption in our 2018BP forecast. As a result, any slowdown in this pace of growth could present a downside risk to our residential consumption forecast.

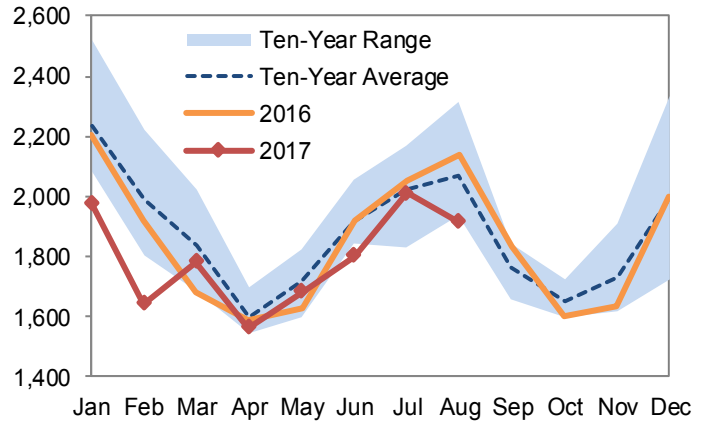
*: LG&E and KU have little-to-no presence in Owensboro and Bowling Green; The decline in Lexington total permit growth this year has been the result of declines in multi-family units. This series is quite volatile as filings for large complexes may be registered all at once.

Sales Trends

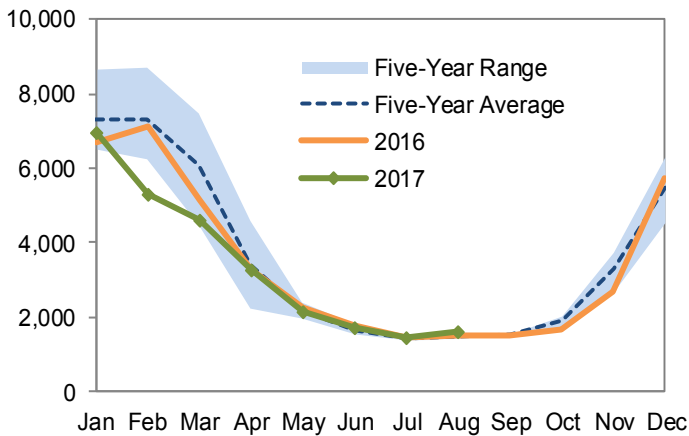
LGE EMS Energy Requirements (GWh)



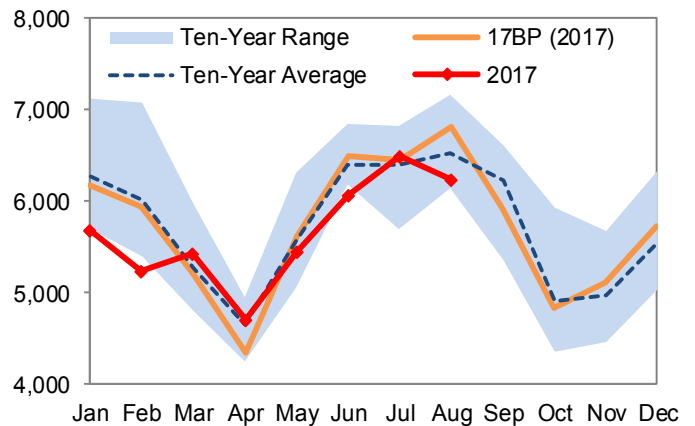
KU EMS Energy Requirements (GWh)



LGE Gas Sales and Transportation (Mcf)



Combined Company Peak Demand (MW)



- July Combined Company EMS energy requirements were 0.3 percent below the 10-year average, with KU/ODP 0.7 percent below and LGE 0.3 percent above. Compared to budget, KU/ODP was 0.3 percent below while LGE was 1.9 percent below. Combined Company EMS requirements were one percent below budget.
- July Combined Company load peaked at 6,503 MW, the highest summer peak since 2012. This was above both the ten-year average of 6,408 MW and the 2017 Plan of 6,453 MW.
- August Combined Company EMS energy requirements were eight percent below the 10-year average, with KU/ODP 7.4 percent below and LGE 8.9 percent below. Compared to budget, KU/ODP was 7.5 percent below while LGE was 11.1 percent below. Combined Company EMS requirements were nine percent below budget.
- August Combined Company load peaked at 6,233 MW, significantly below both the ten-year average of 6,535 MW and the 2017 Plan of 6,806 MW.
- Billed LGE Gas Sales and Transport volumes were two percent above the five-year average in July and 7.3 percent above in August. There is no gas weather-normalization adjustment during the peak summer months (June—August).

2018 Business Plan Sales Forecast Overview (continued)

Residential

A relatively quick pace of efficiency gains and technology adoption precipitates annual declines in residential electricity consumption over the first five years of the forecast period in the 2018BP forecast. For the remainder of the forecast horizon (2023-2050), residential sales trend ever-so-slightly higher (0.03 percent CAGR) due to saturation of current technologies and persistently strong customer growth. The risk remains to the downside if there are additional technological breakthroughs that further increase end-use efficiencies.

Customers

Residential customer growth is projected to remain strong in the LG&E and KU service territories for the foreseeable future due to urban [household growth in Louisville and Lexington](#). However, in recent years new customer growth has been somewhat offset by an increase in multi-family units, which typically result in lower electricity usage than single-family homes. The rural portion of the Companies' service territory (KU service territory excluding Lexington region and ODP) is expected to continue to see customer declines. While these numbers are much smaller than the gains expected in the urban centers, the customers in these regions are the largest electricity users in the service territory on average.

Use per Customer

Efficiency gains in the cooling and lighting sectors have a large impact on the decline in residential use-per-customer forecasts in the 2018BP.

The reduction in air conditioning energy intensity was seen in the 2017BP, resulting in a large drop in summertime load projections. These changes were larger for the LG&E portion of the service territory due to the high saturation of natural gas as a winter heating fuel. This year, the forecast has been revised lower as the EIA projections have fallen. This reduction in load during the summer months has the impact of moving the utility closer to dual peaking.

In 2009, lighting was the second largest end use* for electricity in the average US home after miscellaneous consumption. This has changed significantly over time with the rapid price decline in LEDs and subsequent growth in saturation levels. We expect electricity consumption for lighting to continue to decline at a relatively rapid pace during the first five years of the forecast before slowing thereafter.

The last major factor in lower use per customer is a projection for plateauing electricity sales for miscellaneous consumption. Miscellaneous consumption is by far the largest component of demand in the average US household, consisting of pool pumps, cable boxes, security systems, dehumidifiers, plug-in gadgets, and many more. The Energy Information Agency (EIA) continues to project growth in miscellaneous consumption for the East South Central region (of which Kentucky is a part) moving forward, but this is largely due to the rural nature of the region. We have adjusted this in the case of LG&E. Since this part of the service territory is heavily urbanized, we expect this area to behave much more like the US as a whole, resulting in flat rather than increasing growth in the sector moving forward. For KU, the growth projection has been revised lower as well (but still slightly increasing) due to the importance of Lexington as a proportion of KU load overall.**

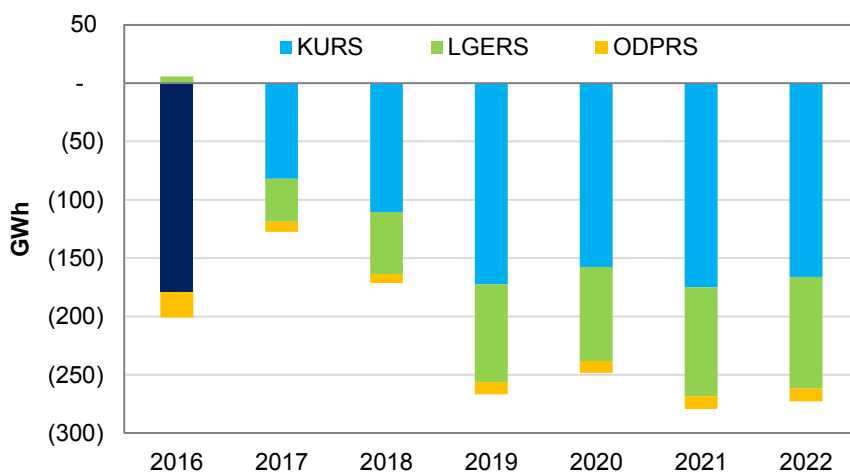


Figure 2: Plan-over-Plan Change in Residential Electricity Sales Forecast

Note: 2016 Data is Actual

* Cooling and heating end-use intensities are broken out into subcomponents

** Fayette County accounted for 28 percent of total KU residential sales in 2016; the Lexington economic region (includes many surrounding counties) accounted for 59 percent of KU sales in 2016

2018 Business Plan Sales Forecast Overview (continued)

EV/PV

The potential growth in electric vehicle (EV) and solar photovoltaic (PV) adoption provides significant risk in both directions to the 2018 Plan. The forecast shown in Figure 1 assumes only marginal impact from either, but scenario analysis shows a significant potential.

EV

Electric vehicles are currently not competitive on an economic basis, and the infrastructure for mass market consumption remains underdeveloped. As a result, there is much uncertainty regarding the pace of EV growth. An analysis to measure the potential impact of EVs uses an adoption curve provided by BNEF (Bloomberg New Energy Finance), adjusted for the fact that EV adoption is lagging in the service territory as compared to the national average. Under this scenario, the increase in sales from electric vehicle adoption measures 15 GWh in 2018, 976 GWh in 2035, and 3,819 GWh in 2050.

PV

Contrary to EVs, PV adoption has a negative impact on electricity sales. SAF uses NREL's (National Renewable Energy Laboratory) forecast for installed capacity into the LG&E and KU service territory to create our forecast for PV electricity volumes. The rate and company splits are apportioned by current installs (75/25 split between residential/commercial, 57/42/1 split between LG&E/KU/ODP on residential). Total lost sales due to PV energy consumed in the territory is projected at a modest 6 GWh in 2018, rising to 327 GWh in 2035, and 1,449 GWh in 2050. By 2050, approximately a quarter of the residential service territory would have solar PV installed (at a current national average of 5 kWdc) to account

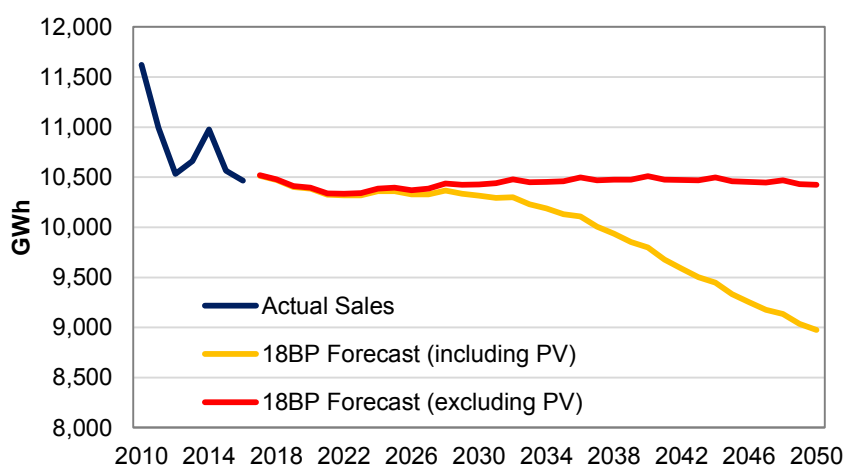


Figure 3: Potential Impact of Solar PV on Residential Sales Forecast

Note: 2017 volumes are forecasted with normal weather (no actual volumes); Potential EV load is not included

for this volume. This is the base case NREL scenario, so there is risk to both the upside and downside. Additionally, this projection assumes that net metering rate structures will remain the same as they are today, which is more favorable for customers as compared to the new post-net metering rate structure soon to be [implemented in Arizona](#).

Commercial

Similar to last year's plan, customers on commercial rates are expected to increase moving forward. Despite this, the billed sales forecast for commercial rates has declined versus the previous forecast. This continues the downward trend seen since the recession and is primarily the result of increases in lighting and cooling efficiencies. Prices for the commercial rates are forecasted to be slightly higher than in the previous plan, so that also contributes to lower sales plan-over-plan.

Small Commercial

Approximately 95% of commercial customers are on a General Service (GS) rate, but the GS rates (single-phase and three-phase) combine to account for only one-third of the commercial revenue class usage. Because of this, it is important to look at trends in end-use efficiencies and customer count when forecasting billed sales for the GS rates.

SAF uses end-use efficiency indices, both historical and projected, from EIA's Annual Energy Outlook (AEO). The EIA's projections for commercial end-uses by region are based upon the Commercial Buildings Energy Consumption Survey (CBECS) that is conducted every 5 to 10 years. The 2016 AEO was based upon the 2003 CBECS, while the 2017 AEO is based upon the most recent CBECS of 2012. While this "new" survey is already 5 years old, it conveys changes in how commercial buildings

2018 Business Plan Sales Forecast Overview (continued)

are using energy. Most notably, lighting’s contribution to commercial energy consumption has decreased significantly with LEDs and CFLs taking the place of incandescent bulbs. For the commercial sector nationally, lighting’s share of total electricity consumption has decreased from 38% to 17% survey to survey (Figure 4).

Like the RS forecasts, another key component that contributed to the reduction in the GS sales forecasts is the impact of PV adoptions. Of the current net metering installs in the service territory, the split is approximately 75% residential and 25% commercial. While the GS billed sales reduction due to PVs is minimal in the next 15 years, it becomes much more significant in the back half of the forecast.

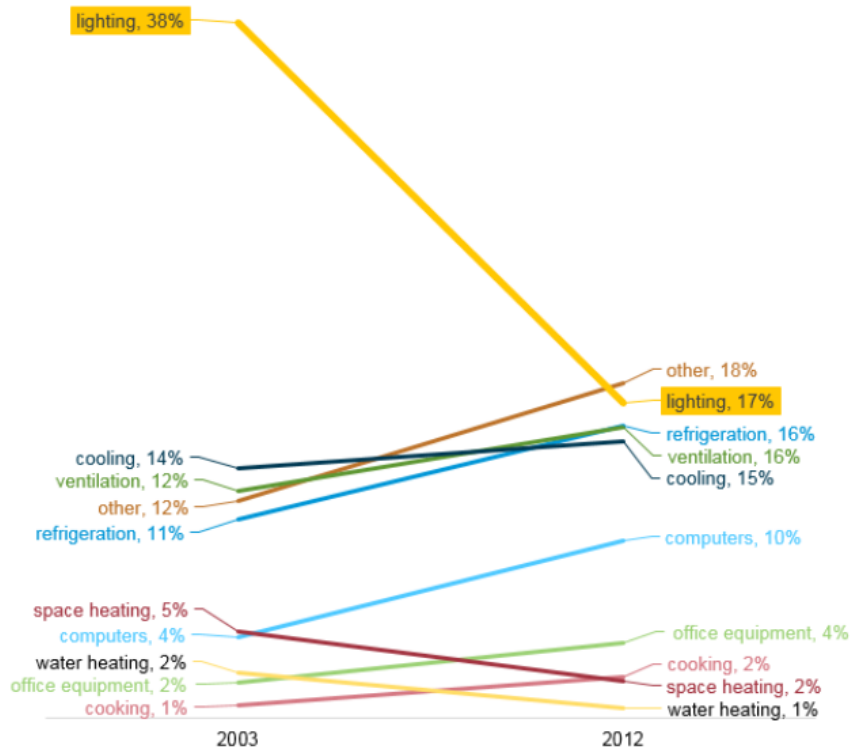


Figure 4: Lighting as a Percent of US Commercial Electricity Usage

Source: EIA

Large Commercial

In contrast to GS, the secondary rates are made up of fewer and more diverse customers as discussed in [last year’s monthly article](#). At the secondary level, the most significant changes versus last year’s forecast were on the KU side. Due to company efforts over recent years to ensure commercial customers were on the correct rate, there has been a lot of switching between the Primary Service (PS) and Time-of-Day (TOD) rates in the past. As a result, SAF forecasted these rates combined for each Company for the 2018BP. As mentioned previously, this methodology did not lead to a significant change for LG&E and ODP, but it decreased KU secondary significantly as the previous year’s forecast attributed the decline in PS-Sec more to switching than UPC declines (Figure 5).

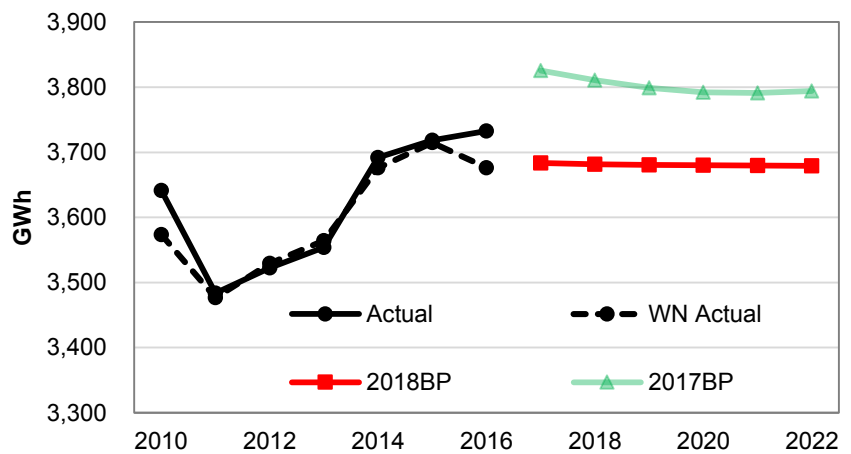


Figure 5: 2018BP KU Secondary Rate Forecast

Note: Secondary rates include PS-Secondary and TOD Secondary

Figure 6 shows how each commercial rate breaks down to revenue class. The small commercial rates primarily go to the commercial class with the remainder going to public authority. While the secondary rates are still predominantly commercial as a whole, a decent portion go to industrial and public authority as well, particularly in KU. Because KU secondary rates declined a material amount in this year’s forecast, many of those losses are attributed to the industrial sector on a revenue class basis.

2018 Business Plan Sales Forecast Overview (continued)

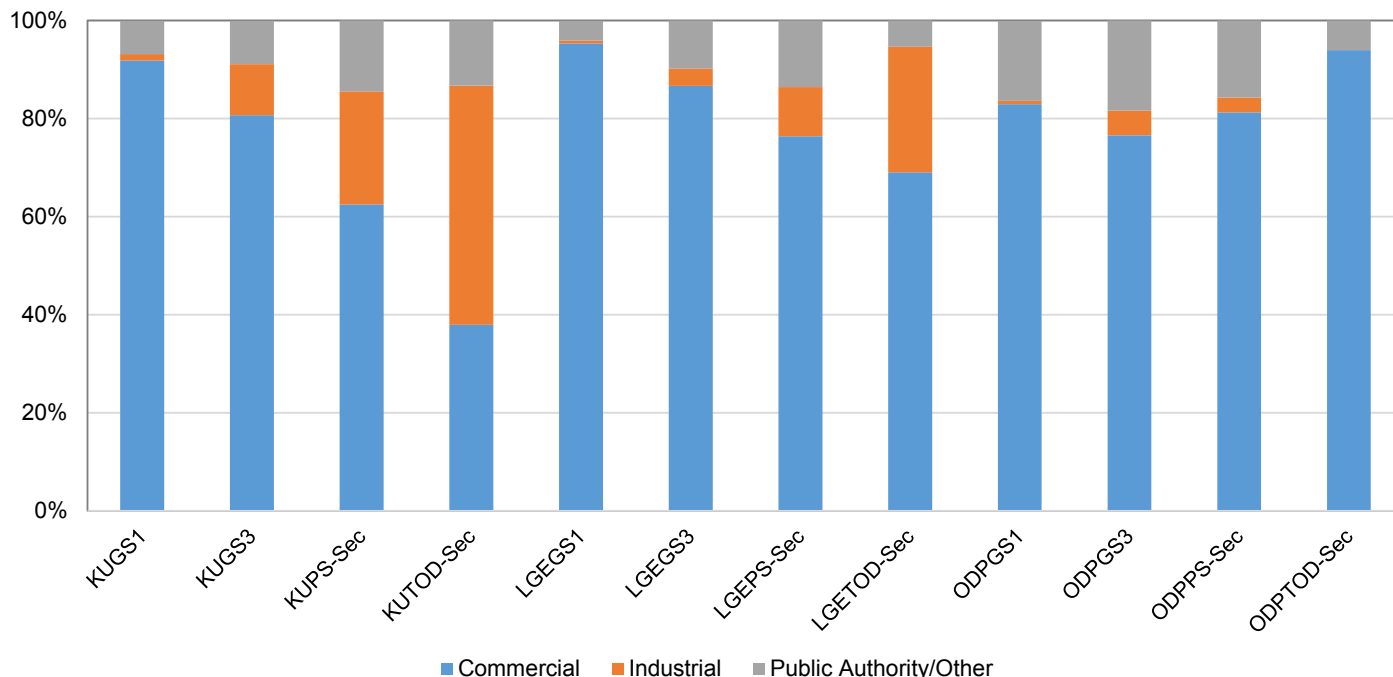


Figure 6: Rate to Revenue Class Allocation—GS and Secondary Rates

CONFIDENTIAL INFORMATION REDACTED

Industrial

Industrial customers, hereby defined as those on primary and transmission rates, account for about 30% of total energy sales. Major Accounts, the largest 27 customers that SAF individually forecasts, are almost exclusively on these rates and make up over 50% of industrial volumes. Overall, Major Account volumes are forecast at 5,559 GWh in 2018, a decrease of 1% compared to the 2017 BP. Even with the plan-over-plan decrease, Major Accounts are contributing rising volumes; the 2018 total is a 2.9% forecasted increase over the most recent full year of 2016. Most of the increase can be attributed to KU RTS (Retail Transmission Service) and KU TOD-Primary in the near term, with LG&E TOD-Primary contributing in the intermediate.

Plan over plan, some areas of expected sales growth are as follow:

- [REDACTED]
- an increase in load at [REDACTED] enabled by an upgrade in wiring KU is performing throughout the service territory
- several new buildings at [REDACTED] that were added in 2016 but not fully incorporated into the 2017 BP
- the strong performance of [REDACTED]

On the negative side,

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED] while increasing production did not increase energy usage concurrently

2018 Business Plan Sales Forecast Overview (continued)

LG&E RTS is negative plan over plan due to the aforementioned declines at ██████████. ██████████ KU RTS, on the other hand, is a mixed bag. Together, the KU RTS Major accounts are slightly negative in the near term plan over plan and the opposite in the intermediate, but positive to history. ██████████ are pulling the Major Accounts lower while ██████████ and ██████████ are counteracting them. On the non-Major Account side of KU RTS, coal is the main driver in both the western and eastern parts of the state. Compared to the 2017 BP the 2018 BP incorporates a more precipitous decline in near term coal production and does not display the small bounce back in coal production seen in the 2017 BP between 2027 and 2030. Adding all these parts together results in a lower KU RTS forecast the next ten years and a higher one thereafter.

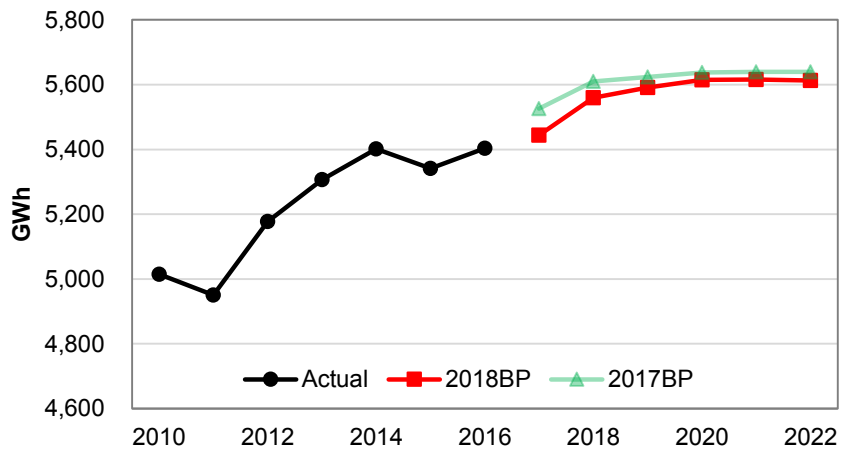


Figure 7: 2018BP Major Accounts Sales Forecast

Little has changed for LG&E primary rates in the 2018 BP. Long-term volumes are about 99.5% of the 2017 BP, with around 0.5% of growth forecasted per year. ██████████, is in the process of a major expansion at ██████████ that will see an expected increase of 10 MVA. The KU primary forecast looks significantly different from the prior plan due to a change in the forecast methodology. For the 2018 BP, Major Accounts were forecasted separately from the rest of the primary customers. Removing the Major Accounts from the influence of the economic driver in the model resulted in lower forecasted growth in the long term, eventually getting down to 89% of the 2017 BP at the end of the plan. The next couple years have the greatest growth in primary KU Major Accounts, with energy volumes tailing off afterwards. The main driver of that near-term growth is ██████████, whose addition of load is expected to be mostly complete at the beginning of 2020. Despite the lower forecast plan over plan, a 30-year compound annual growth rate of 0.13% is still forecasted.

When considering the aforementioned industrial rates on a billed basis, it is important to keep in mind that over 50% of PS-Primary for both KU and LG&E are classified as non-industrial revenue class, and the same is true of over 40% of LG&E TOD-Primary.

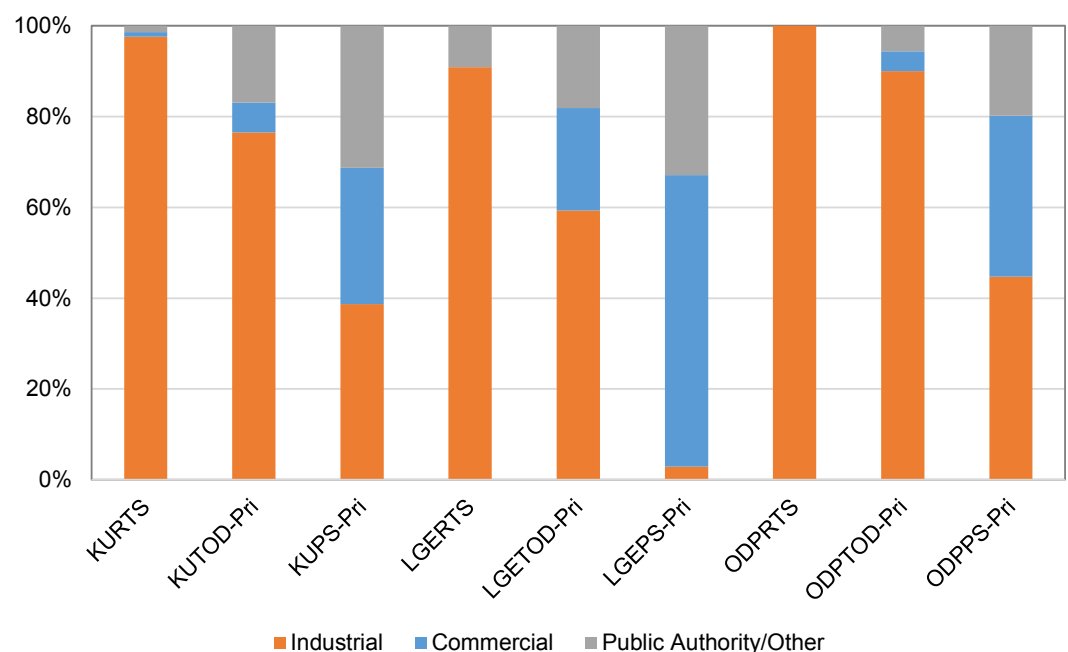


Figure 8: Rate to Revenue Class Allocation — Primary/Transmission Rates

2018 Business Plan Sales Forecast Overview (continued)

Conclusion

The sales forecast used in this year's business plan is similar to last year's with a few key changes, namely:

- Retail sales are expected to show a small decline over the first five years of the forecast
- The long-term growth rate for sales has declined further and is now only marginally positive
- Scenarios assessing the potential impact of EV and PV adoption are now available

Short-term risks are weighted to the downside due to the potential for a slowdown in residential customer growth, continued faster-than-expected efficiency gains, and the potential for a slowdown in the economy. Longer term, risks are more evenly weighted due to the potential for significant adoption of electric vehicles (positive for sales) and residential/commercial solar (negative). The difficulty in projecting the impacts these new technologies will have results in a high level of uncertainty in the long-term portion of the sales forecast.

Sales Analysis & Forecasting

Monthly Report



Dec 2017-Jan 2018

In this Issue...

Feature Article — Class-Level Customer Growth in the Service Territory Page 1,5-8

- An analysis of recent customer growth trends and projections

Weather Statistics and Outlook Page 2

- Significantly warmer-than-normal temperatures on tap for back half of February

Economic Outlook Page 3

- Volatility returns to US equity markets in February

Sales Growth Trends Page 4

- Sales were above budget during January due to well below-normal temperatures

Class-Level Customer Growth in the Service Territory

While sales forecasts have continued to decline in recent years due to improved efficiencies and lower use-per-customer projections, strong customer growth has helped stem the decline to some degree. This can largely be seen in the urban areas of the service territory, where strong population growth has precipitated increases in residential customers and commercial businesses. Total industrial customers have increased as well, with the majority of growth in the LG&E service territory. This article discusses Sales Analysis and Forecasting's (SAF) class-level customer forecasts from the 2018 Business Plan (BP), what has transpired since these forecasts were finalized, and provides a preliminary glimpse of what to expect in the 2019BP forecast.

Residential

Trend

Overall, the trend of strong residential customer growth conveyed in the 2018BP remains in place. Residential customer growth is projected to remain strong in the LG&E and KU service territories for the foreseeable future due to urban [household growth in Louisville and Lexington](#). However, in recent years new customer growth has been somewhat offset by an increase in multi-family units, which typically result in lower electricity usage than single-family homes. The rural portion of the Companies' service territory (ODP and the KU service territory excluding the Lexington region) is expected to see continued customer declines. While these numbers are much smaller than the gains expected in the urban centers, the customers in these regions are the largest electricity users in the service territory on average.

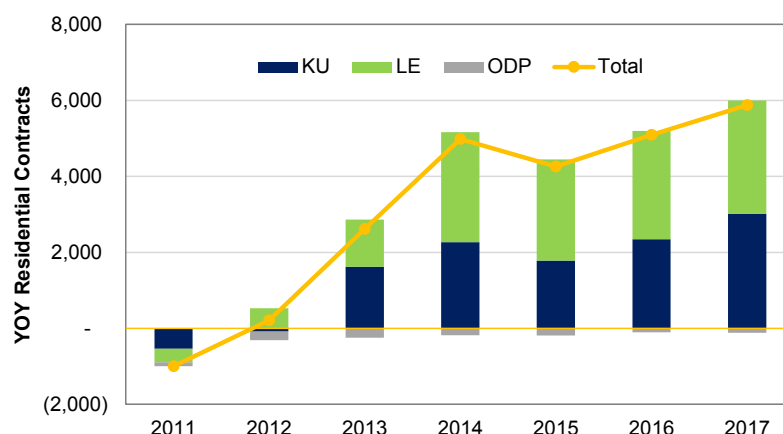
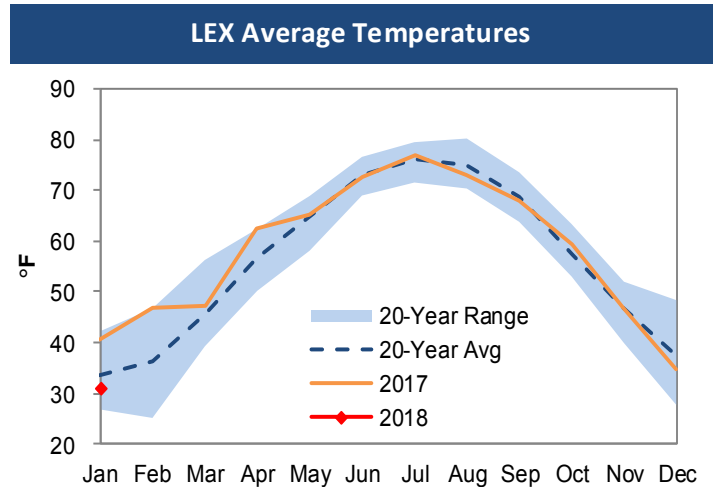
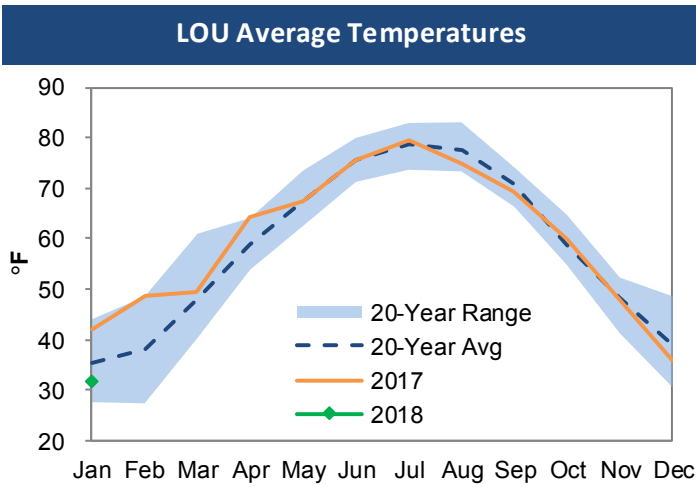


Figure 1: Annual Customer Growth by Company

Continued on page 5

Weather Statistics and Outlook



- The average hourly temperature at Louisville’s Bowman Field was 35.7°F in December, 3.7 degrees below the 20 -year average and 1.8 degrees below last year. The average hourly temperature was 31.6°F in January, 3.7 degrees below the 20-year average and 10.3 degrees below last year.
- The average hourly temperature at Lexington’s Blue Grass Airport (LEX) was 34.9°F in December, 2.9 degrees below the 20-year average and 2.2 degrees below last December. The average hourly temperature was 31.0°F in January, 2.7 degrees below the 20-year average and 9.8 degrees below last January.

Temperature Outlook

- Temperatures have been more than three degrees below normal thus far in February at Louisville’s Bowman Field. However, near-term outlooks have turned much warmer, and temperatures are expected to average nearly ten degrees above normal for the remainder of the month.

- [REDACTED]

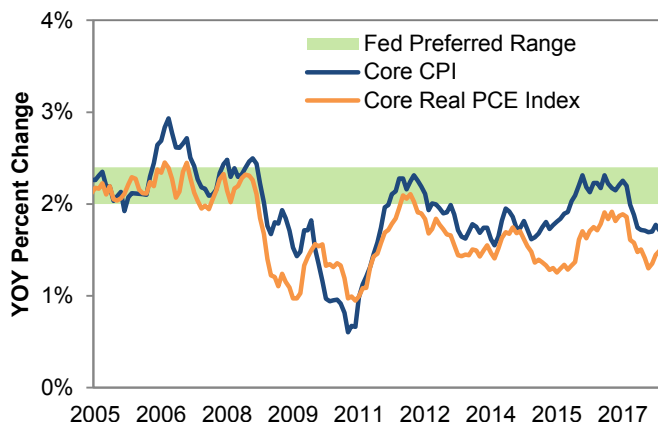
[REDACTED]

Economic Outlook

S&P 500 Index



US Consumer Price Index



Source: S&P Dow Jones Indices LLC

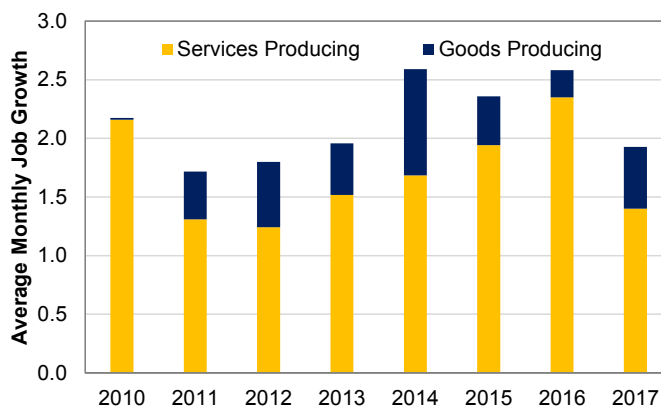
Source: Federal Reserve Economic Data

- US equity markets have experienced a degree of turmoil over the last two weeks. The Dow Jones Industrial Average and S&P 500 both made all-time highs January 26, but entered corrections (a drop of 10 percent or more) on February 8. The sell-off was prompted by a number of factors: an employment report showing wages were rising, [sparking inflation concerns](#); rising treasury yields, which have reduced the attractiveness of equities as compared to bonds; and a huge increase in the volatility index as a result of the initial stock market decline, wiping out short positions in this [“fear gauge” index](#), and likely exacerbating the downward move by spurring additional selling.
- The outlook for the US economy overall remains positive. The unemployment rate is low, industrial production has been rather strong ([though the latest print was disappointing](#)), and consumer purchases of goods and services has been robust. The market is currently pricing in three interest rate hikes from the Federal Reserve this year, though rising inflation metrics could spur additional increases. In addition to the employment report showing rising wages, the consumer price index report for January showed much larger monthly increases in both the headline and core rates than expected (though both remain shy of the Federal Reserve target on a year-over-year basis). As a result, the market implied odds for four or more rate hikes in 2018 sits near 24 percent as of February 16 as compared to 16.5 percent a month ago.

Kentucky and Service Territory

- Kentucky added 1.9k jobs per month during 2017 overall (subject to an end-of-year benchmark revision), below the post-Great Recession average of 2.2k. Goods-producing job growth was above average over this period, driven largely by gains in Construction. This sector gained 0.4k jobs in 2017, the third largest increase of any major employment category (Professional and Business Services and Leisure and Hospitality each added 0.5k jobs).
- This [post](#) by Eric Yussman contains a list of construction projects currently ongoing in the Louisville area, which will help to augment commercial and residential customer growth. However, many of these buildings will incorporate new HVAC and lighting technology, so the impact on sales will likely be smaller than in the past from each new

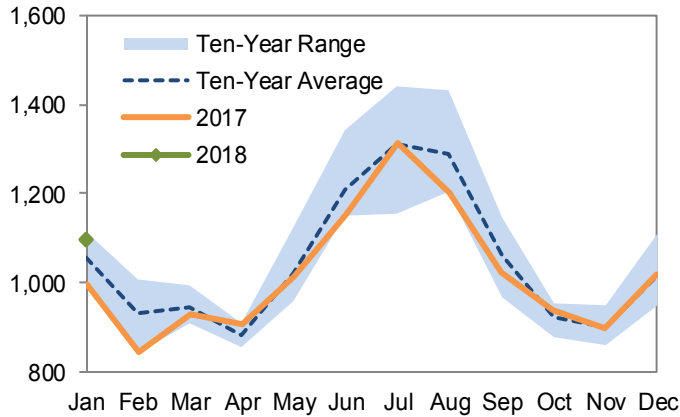
Kentucky Non-Farm Job Growth



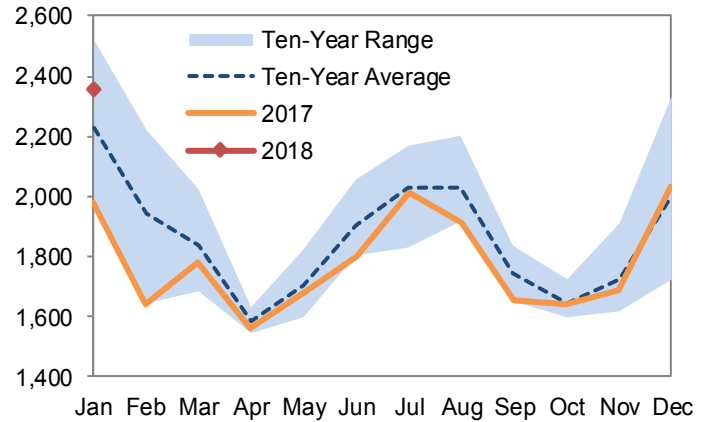
Source: US Bureau of Labor Statistics

Sales Trends

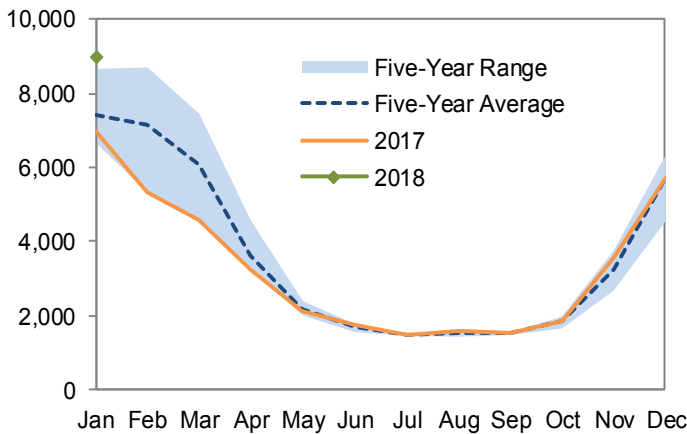
LGE EMS Energy Requirements (GWh)



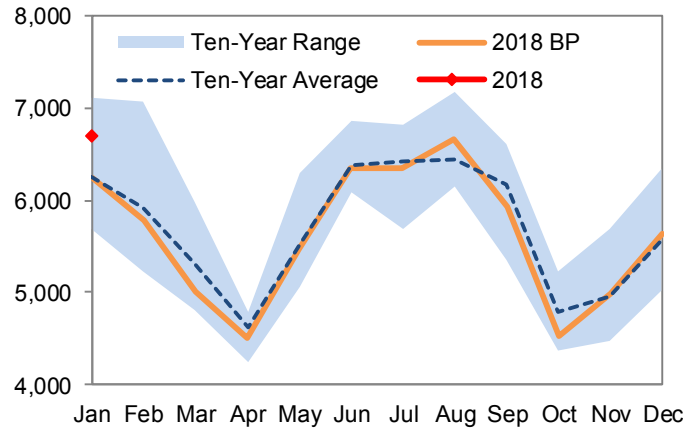
KU EMS Energy Requirements (GWh)



LGE Gas Sales and Transportation (MMcf)



Combined Company Peak Demand (MW)



- December Combined Company EMS energy requirements were 1.2 percent above the 10 -year average, with KU/ODP 1.7 percent above and LGE 0.2 percent above. Compared to budget, KU/ODP was 0.2 percent below while LGE was 3.5 percent below. Combined Company EMS requirements were 1.3 percent below budget.
- December Combined Company load peaked at 5,612 MW. This was above the ten -year average of 5,541 MW but below the 2017 Plan value of 5,723 MW.
- January Combined Company EMS energy requirements were 5.0 percent above the 10 -year average, with KU/ODP 5.8 percent above and LGE 3.4 percent above. Compared to budget, KU/ODP was 7.4 percent above while LGE was 2.6 percent above. Combined Company EMS requirements were 5.8 percent above budget.
- January Combined Company load peaked at 6,699 MW. This was above the ten -year average of 6,206 MW and the 2018 Plan value of 6,235 MW.
- Billed LGE Gas Sales and Transport volumes were 3.6 percent above the five -year average in December and 21.6 percent above the five-year average in January as temperatures were much colder than normal.

Class-Level Customer Growth in the Service Territory (continued) Sinclair

2017

Residential customers experienced more annual growth in 2017 than any prior year in the CCS (April 2009-present) era (Figure 1). Across the service territory, customer growth registered 0.72 percent, well above both the average from the previous six years (0.34 percent) and the 2018BP forecast (0.40 percent). Indeed, the 2018BP residential forecast came up shy of actual growth across both Kentucky service territories, with KU outpacing its forecast by the greatest amount (0.7 percent actual growth vs 0.3 percent forecast).

Rank	County	YOY Growth	YOY % Growth	2017 Contracts	Economic Region
1	JEFFERSON	2,645	0.8%	336,479	Louisville
2	FAYETTE	1,625	1.3%	130,591	Lexington
3	SCOTT	515	3.0%	17,940	Lexington
4	SHELBY	323	2.9%	11,579	Louisville
5	OLDHAM	287	1.2%	23,564	Louisville
6	MADISON	221	1.1%	20,247	Lexington
7	BULLITT	107	1.1%	9,634	Louisville
8	WOODFORD	87	0.8%	10,413	Lexington
9	CLARK	78	0.7%	11,936	Lexington
10	PULASKI	68	0.8%	8,166	Cumberland
74	CARROLL	-19	-0.6%	2,989	Louisville
75	CLAY	-19	-1.3%	1,478	Cumberland
76	HOPKINS	-21	-0.2%	9,857	Owensboro-Henderson
77	WEBSTER	-21	-1.0%	2,051	Owensboro-Henderson
78	ROCKCASTLE	-24	-1.0%	2,368	Lexington
79	LEE	-33	-0.6%	5,999	ODP
80	MUHLENBERG	-62	-0.6%	11,046	Owensboro-Henderson
81	WISE	-69	-0.4%	16,535	ODP
82	BELL	-108	-1.0%	10,861	Mountain
83	HARLAN	-108	-1.0%	10,764	Mountain

Figure 2: Annual Residential Customer Growth by Company

In the KU service territory, customer growth was unsurprisingly strongest in the counties near Louisville and Lexington. As discussed in a [previous article](#), these cities are sprawling outward, leading to large net customer gains in the surrounding counties. Counties in the rural regions of the service territory have seen the largest declines, particularly in the [Mountain economic region of Kentucky](#) and the ODP region in Virginia. Figure 2 shows the top and bottom 10 counties in the service territory by absolute customer growth during 2017.

Forward Outlook

Compared to the 2018BP, preliminary customer forecasts for this year’s Business Plan are more bullish for a number of reasons:

- There is a higher starting point for the forecasts to begin due to the growth in 2017.
- Population forecasts provided by IHS have been revised higher compared to last year’s for the Louisville Metro area and Kentucky as a whole.
- Housing permit growth, typically a leading indicator for new residential customers, is showing no signs of slowing in the Commonwealth’s major metros, particularly in comparison to the state overall. This is likely an indication that the state is not only adding residents, but that more of these people are taking up residence in areas served by LKE. This concept is supported in Figure 1 of this [article](#) by Patrick Kennedy, which implies the percentage of the state’s population served by LKE is anticipated to increase gradually over the coming years.

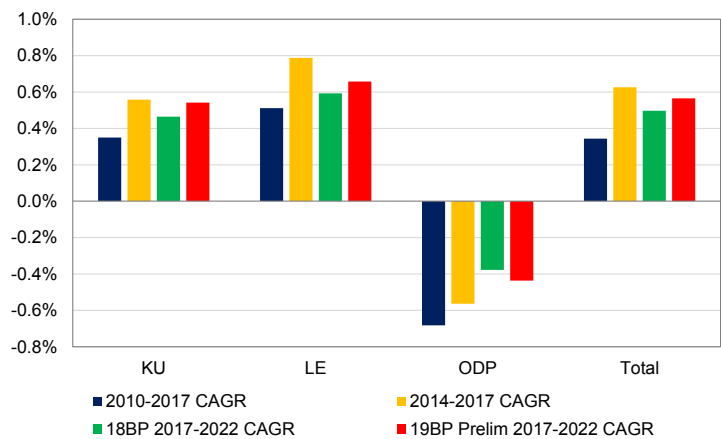


Figure 3: Historical and Forecasted Customer Growth Rates

Note: 2017 Data is actual for all comparisons except 2018 BP, which uses the Plan’s 2017 customer forecast as a base

The remaining question for this year’s Business Plan is just how high the customer growth forecast will go in the next few years. Much as with the majority of the group’s electricity consumption forecasts, SAF uses econometric regression techniques to forecast customer growth. This technique minimizes errors over the entire data set, which suggests growth fore-

Class-Level Customer Growth in the Service Territory (continued) Sinclair

casts may continue to lag the elevated rates we have seen in the last few years over the medium-to-long term. However, the strong growth of recent years in conjunction with the positive housing outlook for the Lexington and Louisville regions may warrant a more aggressive rate of growth over a shorter time horizon as compared to the preliminary numbers (Figure 3 – red bars), reverting back towards a more moderate level over the longer-term duration of the forecast.

Commercial

For purposes of this article, commercial rates are defined as general service rates (GS single- or three-phase) and power service or time-of-day (PS and TOD) rates having secondary voltage. School PS and School TOD specifically were introduced in the most recent rate case and are also included.

Trend

Commercial customers have grown at a faster rate than conveyed in the 2018BP, particularly in the LG&E service territory (Figure 4). As anticipated, GS continues to drive the majority of the growth, accounting for over 90% of commercial customer growth year over year; however, some of the customer growth in GS has been at the expense of PS due to existing customers changing rates. This was seen more in KU than LG&E in 2017. Recall from [a previous article on the small commercial class](#) that GS customers are below 50 kW and include

buildings such as banks, restaurants, bars, small retail stores, and medical offices as well as non-buildings such as telecom equipment, small farms, nurseries, wineries, and golf courses.

Driven by the continued migration of residents from rural to urban areas, commercial customer growth is projected to remain steady in the LG&E and KU service territories; however, this is at the expense of the rural areas of the Companies' service territory as shown in Figure 5.

2017

Across the service territory, customer growth relative to 2016 registered 0.55%, which is over the 2018BP predicted growth rate of 0.37%.

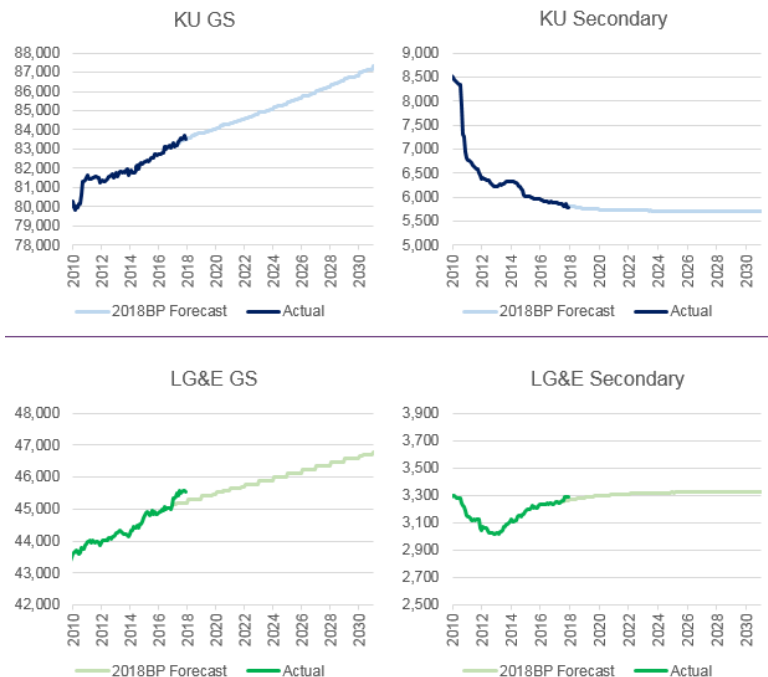


Figure 4: Actual Commercial Customers vs. 2018 BP Forecast

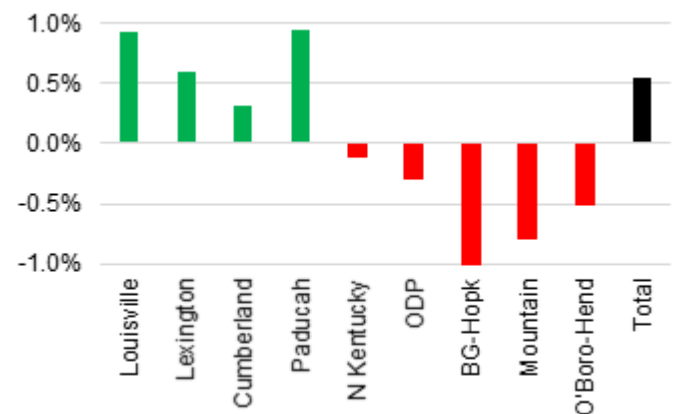


Figure 5: Commercial Customer Growth by Economic Region

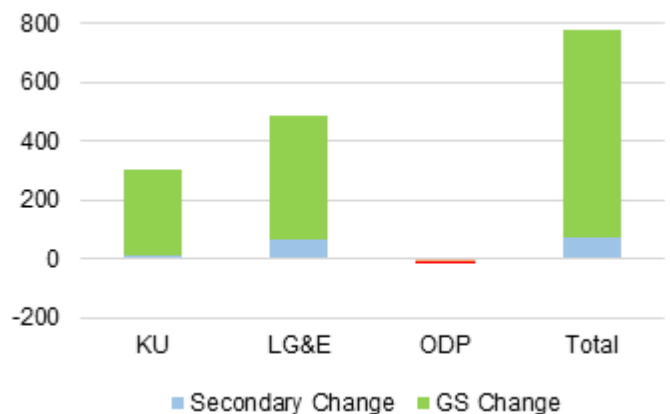


Figure 6: YOY Commercial Customer Growth by Company

Class-Level Customer Growth in the Service Territory (continued) Sinclair

Similar to the residential sector, urban sprawl also appears to have contributed to commercial customer counts with 9 of the top 10 growing counties in 2017 being in or around Louisville and Lexington. The Mountain economic region along with other rural regions of the state lost customers in 2017. Figure 7 shows the top and bottom 10 counties in the service territory by absolute customer growth during 2017.

Compared to the 2018BP, we anticipate the 2019BP customer forecast to be slightly more bullish in both

LG&E and KU, particularly in the short-term. For one, the starting point for LG&E and KU will both be slightly higher than anticipated in the 2018BP. In addition, independent variables that have explanatory value in the commercial customer model, such as population and employment, are slightly more bullish versus last year particularly in the near-term, according to IHS Markit.

Industrial

Trend

The trend from the 2018BP remains in place, as slow growth to no change in industrial customers was the norm in 2017. Very slight customer growth was expected for the primary service level customers across LG&E, KU, and ODP and did materialize in all three, with a few extra customer gains than forecasted. Transmission level customers (RTS) were expected to remain steady, and did, with the exception of the loss of a KU transmission customer.

2017

With fewer than 700 primary service customers and less than 50 transmission level customers between the three companies any gain or loss of customers can look like a substantial percent change, so we will focus on absolute numbers. KU saw the expected net gain of two primary level customers compared to the end of 2016. However, this may have a net negative impact on energy sales as one of the lost customers was a major manufacturer with demand around 4 MVA. LG&E gained four primary level customers. One addition came from the known change of a customer on a special contract, while two of the new customers combined to add over 1 MW of new demand to the Louisville area. ODP, as a whole, and LG&E transmission customers remained at a steady level as expected; with no real changes in the chemical, manufacturing, and mining companies that make up those customers. KU did lose a transmission customer, a coal mine from the eastern part of the state.

Forward Outlook

Compared to the 2018BP, customer forecasts for the 2019BP will see changes mainly from LG&E primary and KU transmission. The starting point for LG&E primary will be raised and an increase in the growth rate of customers will also be examined. KU transmission customers will start lower for the 2019BP, with a look into whether continued flat customer counts or a very small decrease is warranted. It will be important to look at which customers make up the churn of additions and subtractions to the industrial customer class, as they can have an outsized impact as individual customers. In the last several years a few examples of the large impacts individual industrial customers can have are losses of: a 50 MVA paper mill, a 4.5 MVA machinery manufacturer, a 6.5 MVA commercial vehicle equipment manufacturer, a 3.5 MVA glass plant, 6 MVA of reduction at a lighting plant, and 12 MVA of reduction at a coal mine.

Rank	County	YOY Growth	YOY % Growth	2017 Contracts	Economic Region
1	JEFFERSON	403	0.9%	44,698	Louisville
2	FAYETTE	113	0.6%	17,927	Lexington
3	OLDHAM	66	2.1%	3,149	Louisville
4	SCOTT	40	1.3%	3,182	Lexington
5	SHELBY	33	1.5%	2,201	Louisville
6	BOYLE	30	1.5%	2,028	Lexington
7	BOURBON	29	1.7%	1,780	Lexington
8	LAUREL	29	1.2%	2,470	Cumberland
9	MADISON	26	0.8%	3,303	Lexington
10	BULLITT	22	1.5%	1,474	Louisville
74	CALDWELL	-9	-3.0%	296	Bowling Green-Hopkinsville
75	MASON	-10	-0.6%	1,562	Northern Kentucky
76	WEBSTER	-10	-1.6%	629	Owensboro-Henderson
77	ADAIR	-11	-1.7%	651	Cumberland
78	CARROLL	-12	-1.2%	944	Louisville
79	ROCKCASTLE	-14	-2.3%	580	Lexington
80	MUHLENBERG	-15	-0.5%	2,873	Owensboro-Henderson
81	NICHOLAS	-15	-3.5%	426	Lexington
82	UNION	-23	-1.9%	1,163	Owensboro-Henderson
83	HARLAN	-27	-1.3%	2,133	Mountain

Figure 7: Top and Bottom 10 Counties by Absolute Commercial Customer Growth

Class-Level Customer Growth in the Service Territory (continued)

Conclusion

Strong customer growth has been a persistent theme in recent years among the residential and commercial classes, and SAF anticipates a continuation of robust growth rates in the years ahead. However, ongoing efficiency improvements will continue to exert downward pressure on use-per-customer figures among customers in these classes moving forward. Additionally, a continued trend of strong multi-family housing growth in the state's major metro areas is expected to provide further headwinds to residential sales growth.

Industrial sector growth is anticipated to remain slow from an absolute perspective. The more interesting aspect from a sales perspective will be which industries exhibit strength or weakness in the coming years. As demonstrated in 2017, though total customers may increase moving forward, sales can experience negative annual growth if the closures are in energy-intensive sectors.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 19

Responding Witness: David S. Sinclair

Q.1-19. With regard to Mr. Sinclair's Exhibit DSS-4, please explain how the KY GDP and Personal Income data are used in the Companies' sales forecast models.

A.1-19. Specifically, Kentucky GSP projections are used as an elasticity input in the small commercial end-use consumption forecast. The metric has a positive relationship with sales.

Personal Income data is used in the residential end-use econometric models as an elasticity input. This metric is directionally positive for sales volumes.

KENTUCKY UTILITIES COMPANY

**Response to First Set of Data Requests of
Kentucky Industrial Utility Customers, Inc.
Dated November 13, 2018**

Case No. 2018-00294

Question No. 20

Responding Witness: David S. Sinclair

Q.1-20. With regard to 807 KAR 5:001 Sec. 16(7)(c)B (Electric Sales & Demand Forecast Process), please provide the following:

- a. an excel spreadsheet with the “Service Territory-Specific Macroeconomic Forecasts” used in this rate case to project test year sales and demand.
- b. a copy of each of the econometric models used to develop the KU and LG&E sales forecasts by rate class (i.e., the estimated models, with coefficients).
- c. for rate classes whose forecast relies on “specific intelligence on the prospective energy requirements of the utilities largest customers, please provide the following:
 1. the identification of each rate class (by Company) whose forecast relies on individual customer surveys/analyses, etc.
 2. an explanation of how the individual customer information is incorporated into the forecast, including whether such information is combined with econometric forecast results for the rate class.

A.1-20.

- a. See the attachment being provided in Excel format. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.
- b. See attached.
- c.
 1. See Filing Requirement 807 KAR 5:001 Sec. 16(7)(c) B. Section 4 “Electric Sales and Demand Forecast Process.”
 2. See Filing Requirement 807 KAR 5:001 Sec. 16(7)(c) B. Section 4 “Electric Sales and Demand Forecast Process.”

The attachment is
Confidential and
provided under seal in
a separate file in Excel
format.

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Attachment to Response to KIUC-1 Question No. 20b
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Year	Month	KURS_UPC_exNM	XHeat	XCool	XOther4	9-Apr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
2011	1	2,017.71	491.6	0	1,007.50	0	1	0	0	0	0	0	0	0
2011	2	1,639.66	326.6	0	844.8	0	0	1	0	0	0	0	0	0
2011	3	1,262.20	237.8	2.1	895.5	0	0	0	1	0	0	0	0	0
2011	4	1,042.75	163.1	27.3	873.1	0	0	0	0	1	0	0	0	0
2011	5	856.27	73.1	93.5	869	0	0	0	0	0	1	0	0	0
2011	6	1,155.40	20.6	489.7	874.3	0	0	0	0	0	0	1	0	0
2011	7	1,284.04	0	639.1	814.7	0	0	0	0	0	0	0	1	0
2011	8	1,494.92	0	904.8	826.7	0	0	0	0	0	0	0	0	1
2011	9	1,219.25	10.8	557.3	872.4	0	0	0	0	0	0	0	0	0
2011	10	824.65	57.6	84.2	860.1	0	0	0	0	0	0	0	0	0
2011	11	878.93	130	3.9	820.2	0	0	0	0	0	0	0	0	0
2011	12	1,214.90	221.6	2.1	921.3	0	0	0	0	0	0	0	0	0
2012	1	1,594.87	345.1	0	1,007.00	0	1	0	0	0	0	0	0	0
2012	2	1,412.17	275	0	885	0	0	1	0	0	0	0	0	0
2012	3	1,170.09	197.3	19	871.8	0	0	0	1	0	0	0	0	0
2012	4	834.07	91	63.5	878.4	0	0	0	0	1	0	0	0	0
2012	5	901.86	63.4	138	865.9	0	0	0	0	0	1	0	0	0
2012	6	1,096.09	11	354.2	875.6	0	0	0	0	0	0	1	0	0
2012	7	1,446.10	0.5	876.9	830.7	0	0	0	0	0	0	0	1	0
2012	8	1,391.18	0	791.7	823.8	0	0	0	0	0	0	0	0	1
2012	9	1,182.94	6.7	525.2	861	0	0	0	0	0	0	0	0	0
2012	10	809.17	63.3	76.1	843.5	0	0	0	0	0	0	0	0	0
2012	11	997.18	169.2	7.9	866.5	0	0	0	0	0	0	0	0	0
2012	12	1,233.47	229.6	0	916.5	0	0	0	0	0	0	0	0	0
2013	1	1,628.37	347.5	0	951.9	0	1	0	0	0	0	0	0	0
2013	2	1,556.97	311.2	0	866.8	0	0	1	0	0	0	0	0	0
2013	3	1,437.85	274.6	0	842.9	0	0	0	1	0	0	0	0	0
2013	4	1,166.36	178.2	33.3	830.8	0	0	0	0	1	0	0	0	0
2013	5	827.89	62.4	95.9	824.1	0	0	0	0	0	1	0	0	0
2013	6	984.04	13.2	410.9	843.1	0	0	0	0	0	0	1	0	0
2013	7	1,200.72	0	650.3	818	0	0	0	0	0	0	0	1	0
2013	8	1,179.40	0.5	573.4	809.6	0	0	0	0	0	0	0	0	1
2013	9	1,207.54	3	620	851.4	0	0	0	0	0	0	0	0	0
2013	10	880.32	31.6	200.6	840.5	0	0	0	0	0	0	0	0	0
2013	11	936.33	145.6	13.2	841.6	0	0	0	0	0	0	0	0	0
2013	12	1,486.65	306.8	0	937.2	0	0	0	0	0	0	0	0	0
2014	1	1,973.13	427.8	0	965.1	0	1	0	0	0	0	0	0	0
2014	2	1,948.72	373.3	0	840.1	0	0	1	0	0	0	0	0	0
2014	3	1,546.72	290.2	0.2	845.1	0	0	0	1	0	0	0	0	0
2014	4	1,004.11	139.9	17	826.4	0	0	0	0	1	0	0	0	0
2014	5	831.06	49.1	154.7	825.9	0	0	0	0	0	1	0	0	0

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2014	6	1,035.00	9.8	466.9	811.9	0	0	0	0	0	0	1	0	0
2014	7	1,221.48	0.1	667.2	799.9	0	0	0	0	0	0	0	1	0
2014	8	1,073.42	0.6	508.7	762.5	0	0	0	0	0	0	0	0	1
2014	9	1,158.81	4.7	627.6	811.1	0	0	0	0	0	0	0	0	0
2014	10	822.83	38.8	144.7	817.8	0	0	0	0	0	0	0	0	0
2014	11	980.07	174	9.5	824.7	0	0	0	0	0	0	0	0	0
2014	12	1,466.22	306.5	0	901.7	0	0	0	0	0	0	0	0	0
2015	1	1,713.56	379.9	0	915.2	0	1	0	0	0	0	0	0	0
2015	2	1,775.08	357	0	828.5	0	0	1	0	0	0	0	0	0
2015	3	1,648.95	327.2	0	835.2	0	0	0	1	0	0	0	0	0
2015	4	924.16	132.5	20.4	838.9	0	0	0	0	1	0	0	0	0
2015	5	783.36	51.2	148.4	760.6	0	0	0	0	0	1	0	0	0
2015	6	1,048.12	15	471.4	823.3	0	0	0	0	0	0	1	0	0
2015	7	1,185.62	0	632.3	775	0	0	0	0	0	0	0	1	0
2015	8	1,245.12	0	629.8	773.7	0	0	0	0	0	0	0	0	1
2015	9	1,152.19	3.7	540.2	836.4	0	0	0	0	0	0	0	0	0
2015	10	821.22	39.9	142.3	796.9	0	0	0	0	0	0	0	0	0
2015	11	816.72	117.6	13	820.8	0	0	0	0	0	0	0	0	0
2015	12	1,120.14	194.7	1.2	890	0	0	0	0	0	0	0	0	0
2016	1	1,498.22	306	0	906.6	0	1	0	0	0	0	0	0	0
2016	2	1,556.92	303.8	0	822.1	0	0	1	0	0	0	0	0	0
2016	3	1,168.19	179.6	1.7	798.1	0	0	0	1	0	0	0	0	0
2016	4	900.03	128.7	19.2	829.2	0	0	0	0	1	0	0	0	0
2016	5	766.51	49.5	83.4	786.4	0	0	0	0	0	1	0	0	0
2016	6	1,037.69	19	449.9	819.6	0	0	0	0	0	0	1	0	0
2016	7	1,299.67	0.1	774.9	802.1	0	0	0	0	0	0	0	1	0
2016	8	1,352.53	0	849.9	767.8	0	0	0	0	0	0	0	0	1
2016	9	1,287.78	0.7	753.4	810.8	0	0	0	0	0	0	0	0	0
2016	10	867.35	20.9	272.1	774.3	0	0	0	0	0	0	0	0	0
2016	11	802.79	94	89.9	810.1	0	0	0	0	0	0	0	0	0
2016	12	1,281.84	267.8	1.8	877.2	0	0	0	0	0	0	0	0	0
2017	1	1,560.84	316.8	0	900.1	0	1	0	0	0	0	0	0	0
2017	2	1,228.19	213.5	7.5	803	0	0	1	0	0	0	0	0	0
2017	3	1,062.91	172.2	7.2	790.7	0	0	0	1	0	0	0	0	0
2017	4	885.43	97.7	53.5	805.4	0	0	0	0	1	0	0	0	0
2017	5	825.07	43.8	181.4	801.7	0	0	0	0	0	1	0	0	0
2017	6	1,046.92	8.4	413.6	815.1	0	0	0	0	0	0	1	0	0
2017	7	1,216.98	0.3	678.4	787.3	0	0	0	0	0	0	0	1	0
2017	8	1,172.13	0	571.3	741.9	0	0	0	0	0	0	0	0	1
2017	9	1,000.93	9.3	338.4	791.7	0	0	0	0	0	0	0	0	0
2017	10	868.54	22.6	262.8	796.7	0	0	0	0	0	0	0	0	0
2017	11	880.72	130.9	29.7	776.2	0	0	0	0	0	0	0	0	0

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2017	12	1,283.71	261.7	1.6	854.3	0	0	0	0	0	0	0	0	0
2018	1	2,004.06	369	0	891.2	0	1	0	0	0	0	0	0	0
2018	2		304.8	0	795.2	0	0	1	0	0	0	0	0	0
2018	3		244.8	1.8	787.3	0	0	0	1	0	0	0	0	0
2018	4		154.1	27.6	824.9	0	0	0	0	1	0	0	0	0
2018	5		64.7	98.8	801.6	0	0	0	0	0	1	0	0	0
2018	6		16.3	346.6	782.9	0	0	0	0	0	0	1	0	0
2018	7		0.4	644.7	782	0	0	0	0	0	0	0	1	0
2018	8		0.3	662.7	754.7	0	0	0	0	0	0	0	0	1
2018	9		3.6	534.6	779.1	0	0	0	0	0	0	0	0	0
2018	10		43.3	160.9	794.1	0	0	0	0	0	0	0	0	0
2018	11		135.3	17.8	798.1	0	0	0	0	0	0	0	0	0
2018	12		257.1	0.4	857.3	0	0	0	0	0	0	0	0	0
2019	1		359.9	0	866.5	0	1	0	0	0	0	0	0	0
2019	2		301	0	783.1	0	0	1	0	0	0	0	0	0
2019	3		251.1	1.8	805.6	0	0	0	1	0	0	0	0	0
2019	4		149.7	26.7	799.1	0	0	0	0	1	0	0	0	0
2019	5		62.3	94.9	770.5	0	0	0	0	0	1	0	0	0
2019	6		16.3	345.7	782.2	0	0	0	0	0	0	1	0	0
2019	7		0.4	627	761.8	0	0	0	0	0	0	0	1	0
2019	8		0.2	651.9	743.4	0	0	0	0	0	0	0	0	1
2019	9		3.6	529.2	772.4	0	0	0	0	0	0	0	0	0
2019	10		43	159.2	786.5	0	0	0	0	0	0	0	0	0
2019	11		135.9	17.8	799	0	0	0	0	0	0	0	0	0
2019	12		252.3	0.4	838.8	0	0	0	0	0	0	0	0	0
2020	1		356.7	0	856.5	0	1	0	0	0	0	0	0	0
2020	2		298.3	0	774.1	0	0	1	0	0	0	0	0	0
2020	3		257.1	1.9	822.8	0	0	0	1	0	0	0	0	0
2020	4		148.4	26.5	790.3	0	0	0	0	1	0	0	0	0
2020	5		61.8	94.3	762.2	0	0	0	0	0	1	0	0	0
2020	6		16.1	343.4	774.1	0	0	0	0	0	0	1	0	0
2020	7		0.4	623.2	754.3	0	0	0	0	0	0	0	1	0
2020	8		0.2	648.1	736	0	0	0	0	0	0	0	0	1
2020	9		3.6	526.1	764.6	0	0	0	0	0	0	0	0	0
2020	10		42.7	158.3	778.5	0	0	0	0	0	0	0	0	0
2020	11		134.8	17.7	790.7	0	0	0	0	0	0	0	0	0
2020	12		250.3	0.4	829.9	0	0	0	0	0	0	0	0	0
2021	1		354.3	0	847.9	0	1	0	0	0	0	0	0	0
2021	2		296.2	0	766.3	0	0	1	0	0	0	0	0	0
2021	3		247	1.8	788.1	0	0	0	1	0	0	0	0	0
2021	4		147.2	26.3	782	0	0	0	0	1	0	0	0	0
2021	5		61.3	93.5	754.2	0	0	0	0	0	1	0	0	0

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2021	6	16	340.7	766	0	0	0	0	0	0	1	0	0
2021	7	0.4	618.2	746.2	0	0	0	0	0	0	0	1	0
2021	8	0.2	642.6	727.9	0	0	0	0	0	0	0	0	1
2021	9	3.5	521.5	755.7	0	0	0	0	0	0	0	0	0
2021	10	42.3	156.9	769	0	0	0	0	0	0	0	0	0
2021	11	133.5	17.5	780.5	0	0	0	0	0	0	0	0	0
2021	12	247.8	0.4	818.8	0	0	0	0	0	0	0	0	0
2022	1	350.9	0	839.1	0	1	0	0	0	0	0	0	0
2022	2	293.4	0	758.5	0	0	1	0	0	0	0	0	0
2022	3	244.7	1.8	780.2	0	0	0	1	0	0	0	0	0
2022	4	145.9	26.1	774.4	0	0	0	0	1	0	0	0	0
2022	5	60.7	92.8	747	0	0	0	0	0	1	0	0	0
2022	6	15.9	338.1	758.9	0	0	0	0	0	0	1	0	0
2022	7	0.4	613.5	739.5	0	0	0	0	0	0	0	1	0
2022	8	0.2	637.8	721.3	0	0	0	0	0	0	0	0	1
2022	9	3.5	517.7	748.9	0	0	0	0	0	0	0	0	0
2022	10	41.9	155.7	762.1	0	0	0	0	0	0	0	0	0
2022	11	132.4	17.4	773.5	0	0	0	0	0	0	0	0	0
2022	12	245.8	0.4	811.5	0	0	0	0	0	0	0	0	0
2023	1	348.2	0	832.4	0	1	0	0	0	0	0	0	0
2023	2	291.2	0	752.5	0	0	1	0	0	0	0	0	0
2023	3	242.8	1.8	774.1	0	0	0	1	0	0	0	0	0
2023	4	144.8	26	768.5	0	0	0	0	1	0	0	0	0
2023	5	60.3	92.3	741.4	0	0	0	0	0	1	0	0	0
2023	6	15.7	336.1	753.3	0	0	0	0	0	0	1	0	0
2023	7	0.4	610.1	734.1	0	0	0	0	0	0	0	1	0
2023	8	0.2	634.2	716	0	0	0	0	0	0	0	0	1
2023	9	3.5	514.8	743.5	0	0	0	0	0	0	0	0	0
2023	10	41.6	154.9	756.4	0	0	0	0	0	0	0	0	0
2023	11	131.4	17.3	767.6	0	0	0	0	0	0	0	0	0
2023	12	243.9	0.4	805.3	0	0	0	0	0	0	0	0	0
2024	1	345.7	0	827	0	1	0	0	0	0	0	0	0
2024	2	289.1	0	747.7	0	0	1	0	0	0	0	0	0
2024	3	249.1	1.8	794.8	0	0	0	1	0	0	0	0	0
2024	4	143.8	25.9	763.8	0	0	0	0	1	0	0	0	0
2024	5	59.8	91.9	736.9	0	0	0	0	0	1	0	0	0
2024	6	15.6	334.8	748.8	0	0	0	0	0	0	1	0	0
2024	7	0.4	607.7	729.9	0	0	0	0	0	0	0	1	0
2024	8	0.2	631.8	711.9	0	0	0	0	0	0	0	0	1
2024	9	3.4	512.8	739.3	0	0	0	0	0	0	0	0	0
2024	10	41.3	154.3	752.3	0	0	0	0	0	0	0	0	0
2024	11	130.6	17.2	763.4	0	0	0	0	0	0	0	0	0

2024	12	242.4	0.4	800.9	0	0	0	0	0	0	0	0	0
2025	1	343.6	0	821	0	1	0	0	0	0	0	0	0
2025	2	287.4	0	742.3	0	0	1	0	0	0	0	0	0
2025	3	239.7	1.8	763.8	0	0	0	1	0	0	0	0	0
2025	4	142.9	25.8	758.5	0	0	0	0	1	0	0	0	0
2025	5	59.5	91.7	732	0	0	0	0	0	1	0	0	0
2025	6	15.5	334	744	0	0	0	0	0	0	1	0	0
2025	7	0.4	606.3	725.1	0	0	0	0	0	0	0	1	0
2025	8	0.2	630.3	707.2	0	0	0	0	0	0	0	0	1
2025	9	3.4	511.7	734.3	0	0	0	0	0	0	0	0	0
2025	10	41.1	153.9	747	0	0	0	0	0	0	0	0	0
2025	11	129.8	17.2	757.9	0	0	0	0	0	0	0	0	0
2025	12	241	0.4	795.1	0	0	0	0	0	0	0	0	0
2026	1	341.5	0	815.8	0	1	0	0	0	0	0	0	0
2026	2	285.6	0	737.7	0	0	1	0	0	0	0	0	0
2026	3	238.2	1.8	759.1	0	0	0	1	0	0	0	0	0
2026	4	142.1	25.8	753.9	0	0	0	0	1	0	0	0	0
2026	5	59.1	91.6	727.7	0	0	0	0	0	1	0	0	0
2026	6	15.4	333.6	739.8	0	0	0	0	0	0	1	0	0
2026	7	0.4	605.5	721	0	0	0	0	0	0	0	1	0
2026	8	0.2	629.6	703.2	0	0	0	0	0	0	0	0	1
2026	9	3.4	511.1	730.1	0	0	0	0	0	0	0	0	0
2026	10	40.8	153.8	742.6	0	0	0	0	0	0	0	0	0
2026	11	129.1	17.2	753.3	0	0	0	0	0	0	0	0	0
2026	12	239.6	0.4	790.2	0	0	0	0	0	0	0	0	0
2027	1	339.6	0	811.4	0	1	0	0	0	0	0	0	0
2027	2	284	0	733.8	0	0	1	0	0	0	0	0	0
2027	3	236.8	1.8	755.2	0	0	0	1	0	0	0	0	0
2027	4	141.2	25.8	750	0	0	0	0	1	0	0	0	0
2027	5	58.8	91.5	724	0	0	0	0	0	1	0	0	0
2027	6	15.3	333.4	736.1	0	0	0	0	0	0	1	0	0
2027	7	0.4	605.1	717.4	0	0	0	0	0	0	0	1	0
2027	8	0.2	629.2	699.7	0	0	0	0	0	0	0	0	1
2027	9	3.4	510.7	726.4	0	0	0	0	0	0	0	0	0
2027	10	40.6	153.7	738.7	0	0	0	0	0	0	0	0	0
2027	11	128.3	17.2	749.2	0	0	0	0	0	0	0	0	0
2027	12	238.1	0.4	785.8	0	0	0	0	0	0	0	0	0
2028	1	337.7	0	807.6	0	1	0	0	0	0	0	0	0
2028	2	282.4	0	730.3	0	0	1	0	0	0	0	0	0
2028	3	243.4	1.8	776.7	0	0	0	1	0	0	0	0	0
2028	4	140.5	25.8	746.5	0	0	0	0	1	0	0	0	0
2028	5	58.5	91.5	720.8	0	0	0	0	0	1	0	0	0

2028	6	15.3	333.5	732.9	0	0	0	0	0	0	1	0	0
2028	7	0.4	605.3	714.3	0	0	0	0	0	0	0	1	0
2028	8	0.2	629.3	696.6	0	0	0	0	0	0	0	0	1
2028	9	3.4	510.8	723.1	0	0	0	0	0	0	0	0	0
2028	10	40.4	153.7	735.2	0	0	0	0	0	0	0	0	0
2028	11	127.6	17.2	745.7	0	0	0	0	0	0	0	0	0
2028	12	236.8	0.4	782	0	0	0	0	0	0	0	0	0
2029	1	335.8	0	804	0	1	0	0	0	0	0	0	0
2029	2	280.9	0	727.1	0	0	1	0	0	0	0	0	0
2029	3	234.2	1.8	748.4	0	0	0	1	0	0	0	0	0
2029	4	139.7	25.8	743.4	0	0	0	0	1	0	0	0	0
2029	5	58.1	91.6	717.7	0	0	0	0	0	1	0	0	0
2029	6	15.2	333.7	729.9	0	0	0	0	0	0	1	0	0
2029	7	0.4	605.7	711.4	0	0	0	0	0	0	0	1	0
2029	8	0.2	629.8	693.8	0	0	0	0	0	0	0	0	1
2029	9	3.3	511.2	720.2	0	0	0	0	0	0	0	0	0
2029	10	40.1	153.8	732.2	0	0	0	0	0	0	0	0	0
2029	11	126.8	17.2	742.5	0	0	0	0	0	0	0	0	0
2029	12	235.5	0.4	778.7	0	0	0	0	0	0	0	0	0
2030	1	333.9	0	798.5	0	1	0	0	0	0	0	0	0
2030	2	279.3	0	722.3	0	0	1	0	0	0	0	0	0
2030	3	232.9	1.8	743.5	0	0	0	1	0	0	0	0	0
2030	4	138.9	25.8	738.7	0	0	0	0	1	0	0	0	0
2030	5	57.8	91.5	713.4	0	0	0	0	0	1	0	0	0
2030	6	15.1	333.5	725.7	0	0	0	0	0	0	1	0	0
2030	7	0.4	605.4	707.5	0	0	0	0	0	0	0	1	0
2030	8	0.2	629.4	689.8	0	0	0	0	0	0	0	0	1
2030	9	3.3	510.9	716	0	0	0	0	0	0	0	0	0
2030	10	39.9	153.7	727.7	0	0	0	0	0	0	0	0	0
2030	11	126.2	17.2	737.7	0	0	0	0	0	0	0	0	0
2030	12	234.2	0.4	773.5	0	0	0	0	0	0	0	0	0
2031	1	332.2	0	793.6	0	1	0	0	0	0	0	0	0
2031	2	277.9	0	717.9	0	0	1	0	0	0	0	0	0
2031	3	231.7	1.8	739.1	0	0	0	1	0	0	0	0	0
2031	4	138.2	25.8	734.4	0	0	0	0	1	0	0	0	0
2031	5	57.5	91.7	709.4	0	0	0	0	0	1	0	0	0
2031	6	15	334.1	721.9	0	0	0	0	0	0	1	0	0
2031	7	0.4	606.2	703.6	0	0	0	0	0	0	0	1	0
2031	8	0.2	630.3	686	0	0	0	0	0	0	0	0	1
2031	9	3.3	511.6	711.9	0	0	0	0	0	0	0	0	0
2031	10	39.7	153.9	723.3	0	0	0	0	0	0	0	0	0
2031	11	125.5	17.2	733.1	0	0	0	0	0	0	0	0	0

2031	12	232.9	0.4	768.7	0	0	0	0	0	0	0	0	0
2032	1	330.4	0	789.1	0	1	0	0	0	0	0	0	0
2032	2	276.3	0	713.9	0	0	1	0	0	0	0	0	0
2032	3	238.1	1.8	759.5	0	0	0	1	0	0	0	0	0
2032	4	137.4	25.8	730.4	0	0	0	0	1	0	0	0	0
2032	5	57.2	91.8	705.7	0	0	0	0	0	1	0	0	0
2032	6	14.9	334.4	718.3	0	0	0	0	0	0	1	0	0
2032	7	0.4	606.9	700.2	0	0	0	0	0	0	0	1	0
2032	8	0.2	631	682.5	0	0	0	0	0	0	0	0	1
2032	9	3.3	512.2	708.2	0	0	0	0	0	0	0	0	0
2032	10	39.5	154.1	719.5	0	0	0	0	0	0	0	0	0
2032	11	124.8	17.2	729	0	0	0	0	0	0	0	0	0
2032	12	231.7	0.4	764.3	0	0	0	0	0	0	0	0	0
2033	1	328.7	0	785	0	1	0	0	0	0	0	0	0
2033	2	274.9	0	710.2	0	0	1	0	0	0	0	0	0
2033	3	229.3	1.8	731.3	0	0	0	1	0	0	0	0	0
2033	4	136.7	25.9	726.7	0	0	0	0	1	0	0	0	0
2033	5	56.9	91.9	702.3	0	0	0	0	0	1	0	0	0
2033	6	14.9	334.7	715	0	0	0	0	0	0	1	0	0
2033	7	0.4	607.4	696.9	0	0	0	0	0	0	0	1	0
2033	8	0.2	631.5	679.3	0	0	0	0	0	0	0	0	1
2033	9	3.3	512.6	704.8	0	0	0	0	0	0	0	0	0
2033	10	39.3	154.2	715.8	0	0	0	0	0	0	0	0	0
2033	11	124.1	17.2	725.2	0	0	0	0	0	0	0	0	0
2033	12	230.4	0.4	760.2	0	0	0	0	0	0	0	0	0
2034	1	327	0	781	0	1	0	0	0	0	0	0	0
2034	2	273.4	0	706.7	0	0	1	0	0	0	0	0	0
2034	3	228.1	1.8	727.8	0	0	0	1	0	0	0	0	0
2034	4	136	25.9	723.2	0	0	0	0	1	0	0	0	0
2034	5	56.6	91.9	699	0	0	0	0	0	1	0	0	0
2034	6	14.8	335	711.8	0	0	0	0	0	0	1	0	0
2034	7	0.4	607.9	693.8	0	0	0	0	0	0	0	1	0
2034	8	0.2	632.1	676.3	0	0	0	0	0	0	0	0	1
2034	9	3.3	513.1	701.5	0	0	0	0	0	0	0	0	0
2034	10	39.1	154.3	712.4	0	0	0	0	0	0	0	0	0
2034	11	123.5	17.2	721.6	0	0	0	0	0	0	0	0	0
2034	12	229.2	0.4	756.4	0	0	0	0	0	0	0	0	0
2035	1	325.3	0	777.5	0	1	0	0	0	0	0	0	0
2035	2	272	0	703.6	0	0	1	0	0	0	0	0	0
2035	3	226.9	1.8	724.6	0	0	0	1	0	0	0	0	0
2035	4	135.3	25.9	720.1	0	0	0	0	1	0	0	0	0
2035	5	56.3	92	696.2	0	0	0	0	0	1	0	0	0

2035	6	14.7	335.3	709	0	0	0	0	0	0	1	0	0
2035	7	0.4	608.4	691.2	0	0	0	0	0	0	0	1	0
2035	8	0.2	632.6	673.6	0	0	0	0	0	0	0	0	1
2035	9	3.2	513.5	698.7	0	0	0	0	0	0	0	0	0
2035	10	38.9	154.5	709.4	0	0	0	0	0	0	0	0	0
2035	11	122.8	17.2	718.5	0	0	0	0	0	0	0	0	0
2035	12	228	0.4	753.1	0	0	0	0	0	0	0	0	0
2036	1	323.6	0	774.4	0	1	0	0	0	0	0	0	0
2036	2	270.6	0	700.8	0	0	1	0	0	0	0	0	0
2036	3	233.2	1.9	745.8	0	0	0	1	0	0	0	0	0
2036	4	134.6	25.9	717.4	0	0	0	0	1	0	0	0	0
2036	5	56	92.1	693.6	0	0	0	0	0	1	0	0	0
2036	6	14.6	335.5	706.5	0	0	0	0	0	0	1	0	0
2036	7	0.4	608.9	688.7	0	0	0	0	0	0	0	1	0
2036	8	0.2	633.1	671.2	0	0	0	0	0	0	0	0	1
2036	9	3.2	513.9	696.2	0	0	0	0	0	0	0	0	0
2036	10	38.7	154.6	706.8	0	0	0	0	0	0	0	0	0
2036	11	122.2	17.3	715.7	0	0	0	0	0	0	0	0	0
2036	12	226.8	0.4	750.1	0	0	0	0	0	0	0	0	0
2037	1	322	0	771.5	0	1	0	0	0	0	0	0	0
2037	2	269.3	0	698.2	0	0	1	0	0	0	0	0	0
2037	3	224.6	1.8	719.1	0	0	0	1	0	0	0	0	0
2037	4	133.9	26	714.8	0	0	0	0	1	0	0	0	0
2037	5	55.7	92.2	691.2	0	0	0	0	0	1	0	0	0
2037	6	14.6	335.8	704.1	0	0	0	0	0	0	1	0	0
2037	7	0.4	609.4	686.4	0	0	0	0	0	0	0	1	0
2037	8	0.2	633.6	668.9	0	0	0	0	0	0	0	0	1
2037	9	3.2	514.3	693.8	0	0	0	0	0	0	0	0	0
2037	10	38.5	154.7	704.2	0	0	0	0	0	0	0	0	0
2037	11	121.6	17.3	713	0	0	0	0	0	0	0	0	0
2037	12	225.7	0.4	747.3	0	0	0	0	0	0	0	0	0
2038	1	320.5	0	768.6	0	1	0	0	0	0	0	0	0
2038	2	268.1	0	695.6	0	0	1	0	0	0	0	0	0
2038	3	223.6	1.8	716.5	0	0	0	1	0	0	0	0	0
2038	4	133.3	26	712.2	0	0	0	0	1	0	0	0	0
2038	5	55.5	92.3	688.8	0	0	0	0	0	1	0	0	0
2038	6	14.5	336.1	701.7	0	0	0	0	0	0	1	0	0
2038	7	0.4	610	684.1	0	0	0	0	0	0	0	1	0
2038	8	0.2	634.2	666.6	0	0	0	0	0	0	0	0	1
2038	9	3.2	514.8	691.3	0	0	0	0	0	0	0	0	0
2038	10	38.3	154.9	701.6	0	0	0	0	0	0	0	0	0
2038	11	121	17.3	710.4	0	0	0	0	0	0	0	0	0

2038	12	224.7	0.4	744.4	0	0	0	0	0	0	0	0	0
2039	1	319	0	765.6	0	1	0	0	0	0	0	0	0
2039	2	266.8	0	693	0	0	1	0	0	0	0	0	0
2039	3	222.5	1.8	713.8	0	0	0	1	0	0	0	0	0
2039	4	132.7	26	709.6	0	0	0	0	1	0	0	0	0
2039	5	55.2	92.3	686.3	0	0	0	0	0	1	0	0	0
2039	6	14.4	336.4	699.3	0	0	0	0	0	0	1	0	0
2039	7	0.4	610.5	681.8	0	0	0	0	0	0	0	1	0
2039	8	0.2	634.7	664.3	0	0	0	0	0	0	0	0	1
2039	9	3.2	515.2	688.9	0	0	0	0	0	0	0	0	0
2039	10	38.1	155	699.1	0	0	0	0	0	0	0	0	0
2039	11	120.5	17.3	707.7	0	0	0	0	0	0	0	0	0
2039	12	223.6	0.4	741.6	0	0	0	0	0	0	0	0	0
2040	1	317.6	0	762.9	0	1	0	0	0	0	0	0	0
2040	2	265.6	0	690.5	0	0	1	0	0	0	0	0	0
2040	3	228.9	1.9	735	0	0	0	1	0	0	0	0	0
2040	4	132.1	26	707.2	0	0	0	0	1	0	0	0	0
2040	5	55	92.3	684	0	0	0	0	0	1	0	0	0
2040	6	14.4	336.3	697.1	0	0	0	0	0	0	1	0	0
2040	7	0.4	610.3	679.6	0	0	0	0	0	0	0	1	0
2040	8	0.2	634.6	662.1	0	0	0	0	0	0	0	0	1
2040	9	3.2	515.1	686.6	0	0	0	0	0	0	0	0	0
2040	10	38	154.9	696.7	0	0	0	0	0	0	0	0	0
2040	11	119.9	17.3	705.3	0	0	0	0	0	0	0	0	0
2040	12	222.6	0.4	739	0	0	0	0	0	0	0	0	0
2041	1	316.3	0	758	0	1	0	0	0	0	0	0	0
2041	2	264.5	0	686.1	0	0	1	0	0	0	0	0	0
2041	3	220.6	1.8	706.9	0	0	0	1	0	0	0	0	0
2041	4	131.5	26	702.8	0	0	0	0	1	0	0	0	0
2041	5	54.7	92.3	680	0	0	0	0	0	1	0	0	0
2041	6	14.3	336.5	693.2	0	0	0	0	0	0	1	0	0
2041	7	0.4	610.6	675.8	0	0	0	0	0	0	0	1	0
2041	8	0.2	634.8	658.4	0	0	0	0	0	0	0	0	1
2041	9	3.1	515.3	682.6	0	0	0	0	0	0	0	0	0
2041	10	37.8	155	692.5	0	0	0	0	0	0	0	0	0
2041	11	119.4	17.3	700.7	0	0	0	0	0	0	0	0	0
2041	12	221.7	0.4	734.2	0	0	0	0	0	0	0	0	0
2042	1	315	0	753.4	0	1	0	0	0	0	0	0	0
2042	2	263.4	0	682	0	0	1	0	0	0	0	0	0
2042	3	219.7	1.8	702.8	0	0	0	1	0	0	0	0	0
2042	4	131	26	698.8	0	0	0	0	1	0	0	0	0
2042	5	54.5	92.4	676.3	0	0	0	0	0	1	0	0	0

2042	6	14.2	336.6	689.6	0	0	0	0	0	0	1	0	0
2042	7	0.4	610.9	672.4	0	0	0	0	0	0	0	1	0
2042	8	0.2	635.1	655	0	0	0	0	0	0	0	0	1
2042	9	3.1	515.5	678.9	0	0	0	0	0	0	0	0	0
2042	10	37.6	155.1	688.6	0	0	0	0	0	0	0	0	0
2042	11	118.9	17.3	696.7	0	0	0	0	0	0	0	0	0
2042	12	220.8	0.4	729.9	0	0	0	0	0	0	0	0	0
2043	1	313.8	0	749.5	0	1	0	0	0	0	0	0	0
2043	2	262.4	0	678.6	0	0	1	0	0	0	0	0	0
2043	3	218.9	1.8	699.3	0	0	0	1	0	0	0	0	0
2043	4	130.5	26	695.4	0	0	0	0	1	0	0	0	0
2043	5	54.3	92.5	673.1	0	0	0	0	0	1	0	0	0
2043	6	14.2	336.9	686.6	0	0	0	0	0	0	1	0	0
2043	7	0.4	611.3	669.5	0	0	0	0	0	0	0	1	0
2043	8	0.2	635.6	652	0	0	0	0	0	0	0	0	1
2043	9	3.1	515.9	675.8	0	0	0	0	0	0	0	0	0
2043	10	37.5	155.2	685.3	0	0	0	0	0	0	0	0	0
2043	11	118.5	17.3	693.2	0	0	0	0	0	0	0	0	0
2043	12	220	0.4	726.2	0	0	0	0	0	0	0	0	0
2044	1	312.7	0	746.2	0	1	0	0	0	0	0	0	0
2044	2	261.5	0	675.7	0	0	1	0	0	0	0	0	0
2044	3	225.3	1.9	719.5	0	0	0	1	0	0	0	0	0
2044	4	130	26.1	692.6	0	0	0	0	1	0	0	0	0
2044	5	54.1	92.5	670.5	0	0	0	0	0	1	0	0	0
2044	6	14.1	337.1	684	0	0	0	0	0	0	1	0	0
2044	7	0.4	611.8	666.9	0	0	0	0	0	0	0	1	0
2044	8	0.2	636.1	649.5	0	0	0	0	0	0	0	0	1
2044	9	3.1	516.3	673.1	0	0	0	0	0	0	0	0	0
2044	10	37.4	155.3	682.5	0	0	0	0	0	0	0	0	0
2044	11	118.1	17.3	690.3	0	0	0	0	0	0	0	0	0
2044	12	219.2	0.4	723.1	0	0	0	0	0	0	0	0	0
2045	1	311.5	0	743.2	0	1	0	0	0	0	0	0	0
2045	2	260.5	0	673	0	0	1	0	0	0	0	0	0
2045	3	217.3	1.8	693.6	0	0	0	1	0	0	0	0	0
2045	4	129.5	26.1	689.9	0	0	0	0	1	0	0	0	0
2045	5	53.9	92.6	668	0	0	0	0	0	1	0	0	0
2045	6	14.1	337.4	681.6	0	0	0	0	0	0	1	0	0
2045	7	0.4	612.3	664.6	0	0	0	0	0	0	0	1	0
2045	8	0.2	636.6	647.2	0	0	0	0	0	0	0	0	1
2045	9	3.1	516.8	670.7	0	0	0	0	0	0	0	0	0
2045	10	37.2	155.5	679.9	0	0	0	0	0	0	0	0	0
2045	11	117.6	17.4	687.6	0	0	0	0	0	0	0	0	0

2045	12	218.4	0.4	720.3	0	0	0	0	0	0	0	0	0
2046	1	310.4	0	740.5	0	1	0	0	0	0	0	0	0
2046	2	259.6	0	670.5	0	0	1	0	0	0	0	0	0
2046	3	216.5	1.8	691.1	0	0	0	1	0	0	0	0	0
2046	4	129.1	26.1	687.4	0	0	0	0	1	0	0	0	0
2046	5	53.7	92.7	665.7	0	0	0	0	0	1	0	0	0
2046	6	14	337.7	679.3	0	0	0	0	0	0	1	0	0
2046	7	0.3	612.9	662.4	0	0	0	0	0	0	0	1	0
2046	8	0.2	637.2	645	0	0	0	0	0	0	0	0	1
2046	9	3.1	517.3	668.3	0	0	0	0	0	0	0	0	0
2046	10	37.1	155.6	677.5	0	0	0	0	0	0	0	0	0
2046	11	117.2	17.4	685.1	0	0	0	0	0	0	0	0	0
2046	12	217.6	0.4	717.6	0	0	0	0	0	0	0	0	0
2047	1	309.4	0	737.8	0	1	0	0	0	0	0	0	0
2047	2	258.8	0	668.2	0	0	1	0	0	0	0	0	0
2047	3	215.8	1.8	688.7	0	0	0	1	0	0	0	0	0
2047	4	128.7	26.1	685.1	0	0	0	0	1	0	0	0	0
2047	5	53.6	92.8	663.5	0	0	0	0	0	1	0	0	0
2047	6	14	338.1	677.1	0	0	0	0	0	0	1	0	0
2047	7	0.3	613.6	660.3	0	0	0	0	0	0	0	1	0
2047	8	0.2	637.9	642.9	0	0	0	0	0	0	0	0	1
2047	9	3.1	517.8	666.2	0	0	0	0	0	0	0	0	0
2047	10	37	155.8	675.2	0	0	0	0	0	0	0	0	0
2047	11	116.9	17.4	682.7	0	0	0	0	0	0	0	0	0
2047	12	216.9	0.4	715.1	0	0	0	0	0	0	0	0	0
2048	1	308.4	0	735.4	0	1	0	0	0	0	0	0	0
2048	2	258	0	666	0	0	1	0	0	0	0	0	0
2048	3	222.3	1.9	709.3	0	0	0	1	0	0	0	0	0
2048	4	128.3	26.2	682.9	0	0	0	0	1	0	0	0	0
2048	5	53.4	92.9	661.4	0	0	0	0	0	1	0	0	0
2048	6	13.9	338.4	675	0	0	0	0	0	0	1	0	0
2048	7	0.3	614.3	658.3	0	0	0	0	0	0	0	1	0
2048	8	0.2	638.6	641	0	0	0	0	0	0	0	0	1
2048	9	3.1	518.4	664.1	0	0	0	0	0	0	0	0	0
2048	10	36.9	156	673.1	0	0	0	0	0	0	0	0	0
2048	11	116.5	17.4	680.5	0	0	0	0	0	0	0	0	0
2048	12	216.3	0.4	712.8	0	0	0	0	0	0	0	0	0
2049	1	307.5	0	733	0	1	0	0	0	0	0	0	0
2049	2	257.2	0	663.9	0	0	1	0	0	0	0	0	0
2049	3	214.5	1.8	684.3	0	0	0	1	0	0	0	0	0
2049	4	127.9	26.2	680.7	0	0	0	0	1	0	0	0	0
2049	5	53.2	93	659.3	0	0	0	0	0	1	0	0	0

2049	6	13.9	338.8	673	0	0	0	0	0	0	1	0	0
2049	7	0.3	615	656.3	0	0	0	0	0	0	0	1	0
2049	8	0.2	639.4	639	0	0	0	0	0	0	0	0	1
2049	9	3.1	519	662.1	0	0	0	0	0	0	0	0	0
2049	10	36.8	156.2	671	0	0	0	0	0	0	0	0	0
2049	11	116.2	17.4	678.4	0	0	0	0	0	0	0	0	0
2049	12	215.6	0.4	710.5	0	0	0	0	0	0	0	0	0
2050	1	306.6	0	730.7	0	1	0	0	0	0	0	0	0
2050	2	256.4	0	661.8	0	0	1	0	0	0	0	0	0
2050	3	213.8	1.8	682.2	0	0	0	1	0	0	0	0	0
2050	4	127.5	26.2	678.7	0	0	0	0	1	0	0	0	0
2050	5	53.1	93.1	657.4	0	0	0	0	0	1	0	0	0
2050	6	13.9	339.2	671.1	0	0	0	0	0	0	1	0	0
2050	7	0.3	615.7	654.5	0	0	0	0	0	0	0	1	0
2050	8	0.2	640.1	637.2	0	0	0	0	0	0	0	0	1
2050	9	3.1	519.6	660.1	0	0	0	0	0	0	0	0	0
2050	10	36.7	156.3	669.1	0	0	0	0	0	0	0	0	0
2050	11	115.8	17.5	676.3	0	0	0	0	0	0	0	0	0
2050	12	215	0.4	708.4	0	0	0	0	0	0	0	0	0

Sep	Oct	Nov	WinterHDD_sq	XMissing	YMissing
0	0	0	1,473,796.00	0	0
0	0	0	902,500.00	0	0
0	0	0	414,736.00	0	0
0	0	0	196,249.00	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	143,641.00	0	0
0	0	0	350,464.00	0	0
0	0	0	752,990.06	0	0
0	0	0	603,884.41	0	0
0	0	0	312,201.56	0	0
0	0	0	62,375.06	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	224,723.40	0	0
0	0	0	391,500.49	0	0
0	0	0	823,193.29	0	0
0	0	0	777,306.72	0	0
0	0	0	624,574.09	0	0
0	0	0	259,539.30	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	172,266.50	0	0
0	0	0	652,864.00	0	0
0	0	0	1,173,755.56	0	0
0	0	0	1,153,261.21	0	0
0	0	0	672,400.00	0	0
0	0	0	156,025.00	0	0
0	0	0	0	0	0

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	244,480.80	0	0
0	0	0	670,679.10	0	0
0	0	0	1,010,527.56	0	0
0	0	0	1,064,404.89	0	0
0	0	0	859,514.41	0	0
0	0	0	133,517.16	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	110,755.84	0	0
0	0	0	273,163.02	0	0
0	0	0	662,351.82	0	0
0	0	0	776,161.00	0	0
0	0	0	281,059.02	0	0
0	0	0	127,913.52	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	72,414.81	0	0
0	0	0	530,129.61	0	0
0	0	0	715,462.22	0	0
0	0	0	399,234.42	0	0
0	0	0	261,529.96	0	0
0	0	0	77,645.82	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	151,710.25	0	0

0	0	0	529,401.76	0	0
0	0	0	981,293.31	0	0
0	0	0	822,322.51	0	1
0	0	0	528,572.62	0	1
0	0	0	182,997.87	0	1
0	0	0	0	0	1
0	0	0	0	0	1
0	0	0	0	0	1
0	0	0	0	0	1
1	0	0	0	0	1
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0	0	0	528,572.62	0	1
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0	0	0	981,293.31	0	1
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0	0	0	528,572.62	0	1
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0	1	0	0	0	1
0	0	1	152,548.83	0	1
0	0	0	504,029.00	0	1

Variable	Count	Mean	StdDev	Min	Max	Skewness	Kurtosis
KURS_UPC_exNM	84	1,185.71	300.761	766.505	2,017.71	0.719	2.994
XHeat	84	130.24	132.51	0	491.61	0.729	2.323
XCool	84	229.66	282.42	0	904.82	0.896	2.324
XOther4	84	841.17	51.59	741.9	1,007.51	0.983	4.328
9-Apr	84	0	0	0	0	0	0
Jan	84	0.083	0.278	0	1	3.015	10.091
Feb	84	0.083	0.278	0	1	3.015	10.091
Mar	84	0.083	0.278	0	1	3.015	10.091
Apr	84	0.083	0.278	0	1	3.015	10.091
May	84	0.083	0.278	0	1	3.015	10.091
Jun	84	0.083	0.278	0	1	3.015	10.091
Jul	84	0.083	0.278	0	1	3.015	10.091
Aug	84	0.083	0.278	0	1	3.015	10.091
Sep	84	0.083	0.278	0	1	3.015	10.091
Oct	84	0.083	0.278	0	1	3.015	10.091
Nov	84	0.083	0.278	0	1	3.015	10.091
WinterHDD_sq	84	252,932.19	356,722.35	0	1,473,796.00	1.392	4.05

Jarque-Bera	Probability	CorrYX	Units
7.2	2.67E-02	1	
9	1.09E-02	0.681	
12.8	1.62E-03	-0.031	
19.7	5.27E-05	0.507	
31.5	1.44E-07	0	
303.3	0.00E+00	0.531	
303.3	0.00E+00	0.406	
303.3	0.00E+00	0.144	
303.3	0.00E+00	-0.222	
303.3	0.00E+00	-0.361	
303.3	0.00E+00	-0.129	
303.3	0.00E+00	0.08	
303.3	0.00E+00	0.088	
303.3	0.00E+00	-0.013	
303.3	0.00E+00	-0.347	
303.3	0.00E+00	-0.289	
31	1.88E-07	0.819	

Definition

Residential Heating Component (Actual History with Normal Weather Forecast)
Residential Cooling Component (Actual History with Normal Weather Forecast)
Residential NonHVAC Component (Actual History with Normal Weather Forecast)

	KURS_UPC_exNM	XHeat	XCool	XOther4	9-Apr	Jan	Feb	Mar	Apr
KURS_UPC_exNM	1	0.681	-0.031	0.507	0	0.531	0.406	0.144	-0.222
XHeat	0.681	1	-0.741	0.671	0	0.557	0.408	0.251	0.006
XCool	-0.031	-0.741	1	-0.437	0	-0.247	-0.246	-0.242	-0.211
XOther4	0.507	0.671	-0.437	1	0	0.643	0.002	-0.008	-0.005
9-Apr	0	0	0	0	1	0	0	0	0
Jan	0.531	0.557	-0.247	0.643	0	1	-0.091	-0.091	-0.091
Feb	0.406	0.408	-0.246	0.002	0	-0.091	1	-0.091	-0.091
Mar	0.144	0.251	-0.242	-0.008	0	-0.091	-0.091	1	-0.091
Apr	-0.222	0.006	-0.211	-0.005	0	-0.091	-0.091	-0.091	1
May	-0.361	-0.17	-0.109	-0.13	0	-0.091	-0.091	-0.091	-0.091
Jun	-0.129	-0.266	0.222	-0.021	0	-0.091	-0.091	-0.091	-0.091
Jul	0.08	-0.298	0.508	-0.219	0	-0.091	-0.091	-0.091	-0.091
Aug	0.088	-0.298	0.494	-0.321	0	-0.091	-0.091	-0.091	-0.091
Sep	-0.013	-0.285	0.361	-0.045	0	-0.091	-0.091	-0.091	-0.091
Oct	-0.347	-0.208	-0.065	-0.133	0	-0.091	-0.091	-0.091	-0.091
Nov	-0.289	0.016	-0.221	-0.108	0	-0.091	-0.091	-0.091	-0.091
WinterHDD_sq	0.819	0.962	-0.576	0.629	0	0.588	0.474	0.201	-0.092

May	Jun	Jul	Aug	Sep	Oct	Nov	WinterHDD_sq
-0.361	-0.129	0.08	0.088	-0.013	-0.347	-0.289	0.819
-0.17	-0.266	-0.298	-0.298	-0.285	-0.208	0.016	0.962
-0.109	0.222	0.508	0.494	0.361	-0.065	-0.221	-0.576
-0.13	-0.021	-0.219	-0.321	-0.045	-0.133	-0.108	0.629
0	0	0	0	0	0	0	0
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0.588
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0.474
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0.201
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.092
1	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.215
-0.091	1	-0.091	-0.091	-0.091	-0.091	-0.091	-0.215
-0.091	-0.091	1	-0.091	-0.091	-0.091	-0.091	-0.215
-0.091	-0.091	-0.091	1	-0.091	-0.091	-0.091	-0.215
-0.091	-0.091	-0.091	-0.091	1	-0.091	-0.091	-0.215
-0.091	-0.091	-0.091	-0.091	-0.091	1	-0.091	-0.215
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	1	-0.079
-0.215	-0.215	-0.215	-0.215	-0.215	-0.215	-0.079	1

Variable	Coefficient	StdErr	T-Stat	P-Value	Units	Definition
Residentia	2.055	0.597	3.446	0.10%		Residential Heating Component
Residentia	0.758	0.075	10.061	0.00%		Residential Cooling Component (
Residentia	0.672	0.099	6.807	0.00%		Residential NonHVAC Componen
BinaryVars	0	0	0	100.00%		
BinaryVars	-12.602	28.015	-0.45	65.43%		
BinaryVars	114.166	26.464	4.314	0.01%		
BinaryVars	102.345	22.308	4.588	0.00%		
BinaryVars	52.789	31.589	1.671	9.93%		
BinaryVars	64.571	49.998	1.291	20.09%		
BinaryVars	135.057	72.91	1.852	6.83%		
BinaryVars	191.477	81.086	2.361	2.11%		
BinaryVars	220.551	79.455	2.776	0.71%		
BinaryVars	171.942	78.172	2.2	3.12%		
BinaryVars	82.941	58.092	1.428	15.79%		
BinaryVars	-8.536	29.94	-0.285	77.64%		
WeatherTr	0	0	2.366	2.08%		

(Actual History with Normal Weather Forecast)
Actual History with Normal Weather Forecast)
it (Actual History with Normal Weather Forecast)

Model Statistics		Forecast Statistics	
Iterations	1	Forecast Observations	1
Adjusted Observations	84	Mean Abs. Dev. (MAD)	328.43
Deg. of Freedom for Error	68	Mean Abs. % Err. (MAPE)	16.39%
R-Squared	0.984	Avg. Forecast Error	328.43
Adjusted R-Squared	0.98	Mean % Error	16.39%
AIC	7.667	Root Mean-Square Error	328.43
BIC	8.13	Theil's Inequality Coefficient	0.0893
F-Statistic	#NA	#NAME?	100.00%
Prob (F-Statistic)	#NA	#NAME?	0.00%
Log-Likelihood	-425.2	#NAME?	0.00%
Model Sum of Squares	7,385,312.24		
Sum of Squared Errors	122,611.64		
Mean Squared Error	1,803.11		
Std. Error of Regression	42.46		
Mean Abs. Dev. (MAD)	28.23		
Mean Abs. % Err. (MAPE)	2.34%		
Durbin-Watson Statistic	1.22		
Durbin-H Statistic	#NA		
Ljung-Box Statistic	44.46		
Prob (Ljung-Box)	0.0067		
Skewness	-0.287		
Kurtosis	5.652		
Jarque-Bera	25.758		
Prob (Jarque-Bera)	0		

Year	Month	Actual	Pred	Resid	%Resid	StdResid
2011	1	2,017.71	2,171.67	-153.957	-7.63%	-3.626
2011	2	1,639.66	1,657.44	-17.779	-1.08%	-0.419
2011	3	1,262.20	1,334.49	-72.291	-5.73%	-1.702
2011	4	1,042.75	1,061.82	-19.071	-1.83%	-0.449
2011	5	856.267	869.899	-13.632	-1.59%	-0.321
2011	6	1,155.40	1,136.38	19.02	1.65%	0.448
2011	7	1,284.04	1,223.62	60.423	4.71%	1.423
2011	8	1,494.92	1,462.21	32.71	2.19%	0.77
2011	9	1,219.25	1,203.04	16.21	1.33%	0.382
2011	10	824.646	843.425	-18.78	-2.28%	-0.442
2011	11	878.929	861.437	17.492	1.99%	0.412
2011	12	1,214.90	1,194.55	20.35	1.68%	0.479
2012	1	1,594.87	1,627.45	-32.58	-2.04%	-0.767
2012	2	1,412.17	1,477.81	-65.634	-4.65%	-1.546
2012	3	1,170.09	1,213.56	-43.466	-3.71%	-1.024
2012	4	834.069	899.549	-65.48	-7.85%	-1.542
2012	5	901.856	881.604	20.252	2.25%	0.477
2012	6	1,096.09	1,014.76	81.338	7.42%	1.916
2012	7	1,446.10	1,415.77	30.333	2.10%	0.714
2012	8	1,391.18	1,374.49	16.687	1.20%	0.393
2012	9	1,182.94	1,162.68	20.261	1.71%	0.477
2012	10	809.167	837.758	-28.59	-3.53%	-0.673
2012	11	997.184	1,003.58	-6.4	-0.64%	-0.151
2012	12	1,233.47	1,220.08	13.389	1.09%	0.315
2013	1	1,628.37	1,618.91	9.455	0.58%	0.223
2013	2	1,556.97	1,598.39	-41.416	-2.66%	-0.975
2013	3	1,437.86	1,443.91	-6.057	-0.42%	-0.143
2013	4	1,166.36	1,090.32	76.036	6.52%	1.791
2013	5	827.895	819.461	8.434	1.02%	0.199
2013	6	984.038	1,040.49	-56.448	-5.74%	-1.329
2013	7	1,200.72	1,234.34	-33.619	-2.80%	-0.792
2013	8	1,179.40	1,200.60	-21.2	-1.80%	-0.499
2013	9	1,207.54	1,220.37	-12.827	-1.06%	-0.302
2013	10	880.32	865.058	15.262	1.73%	0.359
2013	11	936.327	924.59	11.737	1.25%	0.276
2013	12	1,486.65	1,480.68	5.969	0.40%	0.141
2014	1	1,973.13	1,910.84	62.286	3.16%	1.467
2014	2	1,948.72	1,834.77	113.949	5.85%	2.683
2014	3	1,546.72	1,493.69	53.032	3.43%	1.249
2014	4	1,004.11	961.413	42.694	4.25%	1.005
2014	5	831.06	838.043	-6.983	-0.84%	-0.164

2014	6	1,035.00	1,055.02	-20.018	-1.93%	-0.471
2014	7	1,221.48	1,235.24	-13.763	-1.13%	-0.324
2014	8	1,073.42	1,119.99	-46.57	-4.34%	-1.097
2014	9	1,158.81	1,202.65	-43.844	-3.78%	-1.033
2014	10	822.83	822.299	0.531	0.06%	0.013
2014	11	980.066	993.175	-13.108	-1.34%	-0.309
2014	12	1,466.22	1,462.09	4.131	0.28%	0.097
2015	1	1,713.56	1,723.95	-10.385	-0.61%	-0.245
2015	2	1,775.08	1,763.49	11.582	0.65%	0.273
2015	3	1,648.95	1,625.93	23.015	1.40%	0.542
2015	4	924.16	949.595	-25.435	-2.75%	-0.599
2015	5	783.363	793.608	-10.245	-1.31%	-0.241
2015	6	1,048.12	1,076.65	-28.531	-2.72%	-0.672
2015	7	1,185.62	1,191.80	-6.174	-0.52%	-0.145
2015	8	1,245.12	1,218.11	27.005	2.17%	0.636
2015	9	1,152.19	1,151.37	0.826	0.07%	0.019
2015	10	821.217	808.591	12.626	1.54%	0.297
2015	11	816.721	832.179	-15.458	-1.89%	-0.364
2015	12	1,120.14	1,091.51	28.625	2.56%	0.674
2016	1	1,498.22	1,449.10	49.129	3.28%	1.157
2016	2	1,556.92	1,552.82	4.107	0.26%	0.097
2016	3	1,168.19	1,104.00	64.185	5.49%	1.512
2016	4	900.03	932.416	-32.386	-3.60%	-0.763
2016	5	766.505	758.204	8.302	1.08%	0.196
2016	6	1,037.69	1,066.17	-28.478	-2.74%	-0.671
2016	7	1,299.67	1,318.23	-18.561	-1.43%	-0.437
2016	8	1,352.53	1,380.95	-28.421	-2.10%	-0.669
2016	9	1,287.78	1,289.54	-1.755	-0.14%	-0.041
2016	10	867.347	852.649	14.699	1.69%	0.346
2016	11	802.791	821.814	-19.024	-2.37%	-0.448
2016	12	1,281.85	1,320.22	-38.379	-2.99%	-0.904
2017	1	1,560.84	1,484.79	76.051	4.87%	1.791
2017	2	1,228.19	1,233.00	-4.81	-0.39%	-0.113
2017	3	1,062.91	1,081.33	-18.417	-1.73%	-0.434
2017	4	885.431	861.788	23.643	2.67%	0.557
2017	5	825.07	831.198	-6.128	-0.74%	-0.144
2017	6	1,046.92	1,013.81	33.117	3.16%	0.78
2017	7	1,216.98	1,235.62	-18.639	-1.53%	-0.439
2017	8	1,172.13	1,152.34	19.788	1.69%	0.466
2017	9	1,000.93	979.802	21.13	2.11%	0.498
2017	10	868.542	864.288	4.253	0.49%	0.1
2017	11	880.718	855.957	24.76	2.81%	0.583

2017	12	1,283.71	1,291.87	-8.159	-0.64%	-0.192
2018	1	2,004.06	1,675.63	328.426	16.39%	7.734
2018	2		1,552.30			
2018	3		1,314.18			
2018	4		1,006.81			
2018	5		811.426			
2018	6		957.524			
2018	7		1,206.70			
2018	8		1,230.79			
2018	9		1,108.36			
2018	10		827.774			
2018	11		871.067			
2018	12		1,274.92			
2019	1		1,640.32			
2019	2		1,536.41			
2019	3		1,339.60			
2019	4		979.543			
2019	5		782.547			
2019	6		956.406			
2019	7		1,179.68			
2019	8		1,215.00			
2019	9		1,099.74			
2019	10		820.778			
2019	11		872.874			
2019	12		1,252.58			
2020	1		1,626.90			
2020	2		1,524.76			
2020	3		1,363.44			
2020	4		970.844			
2020	5		775.427			
2020	6		948.958			
2020	7		1,171.80			
2020	8		1,207.14			
2020	9		1,092.12			
2020	10		814.065			
2020	11		865.021			
2020	12		1,242.61			
2021	1		1,616.15			
2021	2		1,515.18			
2021	3		1,319.34			
2021	4		962.816			
2021	5		768.482			

2021	6	941.195
2021	7	1,162.57
2021	8	1,197.49
2021	9	1,082.58
2021	10	805.731
2021	11	855.291
2021	12	1,229.95
2022	1	1,603.37
2022	2	1,504.22
2022	3	1,309.30
2022	4	954.776
2022	5	761.952
2022	6	934.097
2022	7	1,154.48
2022	8	1,189.41
2022	9	1,075.01
2022	10	799.541
2022	11	848.219
2022	12	1,220.85
2023	1	1,593.25
2023	2	1,495.53
2023	3	1,301.32
2023	4	948.355
2023	5	756.804
2023	6	928.605
2023	7	1,148.21
2023	8	1,183.14
2023	9	1,069.08
2023	10	794.405
2023	11	842.177
2023	12	1,212.93
2024	1	1,584.43
2024	2	1,488.00
2024	3	1,328.20
2024	4	943.042
2024	5	752.682
2024	6	924.392
2024	7	1,143.57
2024	8	1,178.55
2024	9	1,064.75
2024	10	790.627
2024	11	837.572

2024	12	1,206.82
2025	1	1,576.13
2025	2	1,480.85
2025	3	1,287.90
2025	4	937.684
2025	5	748.467
2025	6	920.366
2025	7	1,139.30
2025	8	1,174.30
2025	9	1,060.51
2025	10	786.339
2025	11	832.287
2025	12	1,199.97
2026	1	1,568.44
2026	2	1,474.23
2026	3	1,281.81
2026	4	932.863
2026	5	744.78
2026	6	917.029
2026	7	1,136.02
2026	8	1,171.02
2026	9	1,057.16
2026	10	782.728
2026	11	827.602
2026	12	1,193.77
2027	1	1,561.40
2027	2	1,468.17
2027	3	1,276.28
2027	4	928.464
2027	5	741.518
2027	6	914.213
2027	7	1,133.29
2027	8	1,168.32
2027	9	1,054.36
2027	10	779.504
2027	11	823.25
2027	12	1,187.88
2028	1	1,555.03
2028	2	1,462.70
2028	3	1,304.22
2028	4	924.567
2028	5	738.69

2028	6	911.941
2028	7	1,131.28
2028	8	1,166.35
2028	9	1,052.23
2028	10	776.727
2028	11	819.356
2028	12	1,182.56
2029	1	1,548.76
2029	2	1,457.31
2029	3	1,266.40
2029	4	920.826
2029	5	736.047
2029	6	909.938
2029	7	1,129.69
2029	8	1,164.80
2029	9	1,050.49
2029	10	774.312
2029	11	815.788
2029	12	1,177.60
2030	1	1,541.15
2030	2	1,450.76
2030	3	1,260.36
2030	4	916.124
2030	5	732.459
2030	6	906.823
2030	7	1,126.74
2030	8	1,161.86
2030	9	1,047.38
2030	10	770.755
2030	11	811.148
2030	12	1,171.53
2031	1	1,534.42
2031	2	1,444.96
2031	3	1,255.02
2031	4	911.749
2031	5	729.249
2031	6	904.453
2031	7	1,124.82
2031	8	1,159.98
2031	9	1,045.17
2031	10	767.568
2031	11	806.699

2031	12	1,165.66
2032	1	1,527.59
2032	2	1,439.09
2032	3	1,281.85
2032	4	907.532
2032	5	726.191
2032	6	902.145
2032	7	1,122.98
2032	8	1,158.16
2032	9	1,043.08
2032	10	764.636
2032	11	802.548
2032	12	1,160.11
2033	1	1,521.25
2033	2	1,433.64
2033	3	1,244.66
2033	4	903.582
2033	5	723.336
2033	6	899.996
2033	7	1,121.19
2033	8	1,156.41
2033	9	1,041.07
2033	10	761.809
2033	11	798.553
2033	12	1,154.74
2034	1	1,515.05
2034	2	1,428.31
2034	3	1,239.79
2034	4	899.745
2034	5	720.566
2034	6	897.886
2034	7	1,119.50
2034	8	1,154.75
2034	9	1,039.18
2034	10	759.203
2034	11	794.83
2034	12	1,149.70
2035	1	1,509.27
2035	2	1,423.34
2035	3	1,235.28
2035	4	896.275
2035	5	718.116

2035	6	896.088
2035	7	1,118.09
2035	8	1,153.37
2035	9	1,037.58
2035	10	756.894
2035	11	791.44
2035	12	1,145.05
2036	1	1,503.73
2036	2	1,418.60
2036	3	1,262.57
2036	4	893.014
2036	5	715.852
2036	6	894.449
2036	7	1,116.82
2036	8	1,152.12
2036	9	1,036.13
2036	10	754.787
2036	11	788.277
2036	12	1,140.64
2037	1	1,498.40
2037	2	1,414.03
2037	3	1,226.85
2037	4	889.899
2037	5	713.694
2037	6	892.899
2037	7	1,115.65
2037	8	1,150.99
2037	9	1,034.80
2037	10	752.789
2037	11	785.267
2037	12	1,136.45
2038	1	1,493.45
2038	2	1,409.78
2038	3	1,222.99
2038	4	886.927
2038	5	711.607
2038	6	891.409
2038	7	1,114.51
2038	8	1,149.89
2038	9	1,033.50
2038	10	750.799
2038	11	782.32

2038	12	1,132.40
2039	1	1,488.45
2039	2	1,405.49
2039	3	1,219.09
2039	4	883.913
2039	5	709.474
2039	6	889.825
2039	7	1,113.30
2039	8	1,148.71
2039	9	1,032.13
2039	10	748.784
2039	11	779.373
2039	12	1,128.35
2040	1	1,483.61
2040	2	1,401.33
2040	3	1,246.38
2040	4	881.092
2040	5	707.439
2040	6	888.143
2040	7	1,111.71
2040	8	1,147.14
2040	9	1,030.48
2040	10	746.812
2040	11	776.607
2040	12	1,124.53
2041	1	1,477.55
2041	2	1,396.09
2041	3	1,210.43
2041	4	876.994
2041	5	704.268
2041	6	885.514
2041	7	1,109.38
2041	8	1,144.82
2041	9	1,027.92
2041	10	743.664
2041	11	772.531
2041	12	1,119.35
2042	1	1,471.84
2042	2	1,391.15
2042	3	1,205.82
2042	4	873.233
2042	5	701.363

2042	6	883.121
2042	7	1,107.29
2042	8	1,142.74
2042	9	1,025.61
2042	10	740.851
2042	11	768.859
2042	12	1,114.68
2043	1	1,466.79
2043	2	1,386.79
2043	3	1,201.77
2043	4	869.946
2043	5	698.864
2043	6	881.139
2043	7	1,105.65
2043	8	1,141.12
2043	9	1,023.77
2043	10	738.423
2043	11	765.614
2043	12	1,110.50
2044	1	1,462.29
2044	2	1,382.90
2044	3	1,228.68
2044	4	867.054
2044	5	696.712
2044	6	879.484
2044	7	1,104.32
2044	8	1,139.81
2044	9	1,022.26
2044	10	736.345
2044	11	762.754
2044	12	1,106.74
2045	1	1,457.93
2045	2	1,379.15
2045	3	1,194.72
2045	4	864.322
2045	5	694.703
2045	6	877.963
2045	7	1,103.13
2045	8	1,138.66
2045	9	1,020.92
2045	10	734.44
2045	11	760.085

2045	12	1,103.20
2046	1	1,453.86
2046	2	1,375.63
2046	3	1,191.49
2046	4	861.76
2046	5	692.825
2046	6	876.58
2046	7	1,102.09
2046	8	1,137.65
2046	9	1,019.71
2046	10	732.662
2046	11	757.569
2046	12	1,099.87
2047	1	1,450.03
2047	2	1,372.33
2047	3	1,188.44
2047	4	859.345
2047	5	691.057
2047	6	875.292
2047	7	1,101.18
2047	8	1,136.78
2047	9	1,018.65
2047	10	731.037
2047	11	755.246
2047	12	1,096.79
2048	1	1,446.33
2048	2	1,369.13
2048	3	1,215.58
2048	4	857.022
2048	5	689.366
2048	6	874.073
2048	7	1,100.34
2048	8	1,135.98
2048	9	1,017.66
2048	10	729.493
2048	11	753.018
2048	12	1,093.82
2049	1	1,442.79
2049	2	1,366.08
2049	3	1,182.69
2049	4	854.798
2049	5	687.748

2049	6	872.923
2049	7	1,099.58
2049	8	1,135.25
2049	9	1,016.74
2049	10	728.023
2049	11	750.888
2049	12	1,090.98
2050	1	1,439.37
2050	2	1,363.12
2050	3	1,179.97
2050	4	852.647
2050	5	686.184
2050	6	871.815
2050	7	1,098.85
2050	8	1,134.57
2050	9	1,015.87
2050	10	726.607
2050	11	748.829
2050	12	1,088.24

Variable	Coefficient	Mean	Elast	Units
XHeat	2.055	130.24	0.226	
XCool	0.758	229.66	0.147	
XOther4	0.672	841.17	0.477	
9-Apr	0	0	0	
Jan	-12.602	0.083	-0.001	
Feb	114.166	0.083	0.008	
Mar	102.345	0.083	0.007	
Apr	52.789	0.083	0.004	
May	64.571	0.083	0.005	
Jun	135.057	0.083	0.009	
Jul	191.477	0.083	0.013	
Aug	220.551	0.083	0.016	
Sep	171.942	0.083	0.012	
Oct	82.941	0.083	0.006	
Nov	-8.536	0.083	-0.001	
WinterHDD_sq	0	252,932.19	0.072	

Definition

Residential Heating Component (Actual History with Normal Weather Forecast)

Residential Cooling Component (Actual History with Normal Weather Forecast)

Residential NonHVAC Component (Actual History with Normal Weather Forecast)

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Year	Month	Pred	XHeat	XCool	XOther4	9-Apr	Jan	Feb	Mar	Apr
2011	1	2,171.67	1,010.50	0	677.376	0	-12.602	0	0	0
2011	2	1,657.44	671.347	0	567.951	0	0	114.166	0	0
2011	3	1,334.49	488.801	1.596	602.058	0	0	0	102.345	0
2011	4	1,061.82	335.239	20.681	587.009	0	0	0	0	52.789
2011	5	869.899	150.202	70.883	584.243	0	0	0	0	0
2011	6	1,136.38	42.375	371.166	587.78	0	0	0	0	0
2011	7	1,223.62	0	484.414	547.728	0	0	0	0	0
2011	8	1,462.21	0	685.817	555.841	0	0	0	0	0
2011	9	1,203.04	22.151	422.405	586.546	0	0	0	0	0
2011	10	843.425	118.388	63.813	578.283	0	0	0	0	0
2011	11	861.437	267.191	2.964	551.438	0	0	0	0	0
2011	12	1,194.55	455.468	1.617	619.42	0	0	0	0	0
2012	1	1,627.45	709.378	0	677.059	0	-12.602	0	0	0
2012	2	1,477.81	565.218	0	595.027	0	0	114.166	0	0
2012	3	1,213.56	405.517	14.429	586.113	0	0	0	102.345	0
2012	4	899.549	187.031	48.133	590.588	0	0	0	0	52.789
2012	5	881.604	130.279	104.582	582.173	0	0	0	0	0
2012	6	1,014.76	22.598	268.438	588.663	0	0	0	0	0
2012	7	1,415.77	1.128	664.647	558.519	0	0	0	0	0
2012	8	1,374.49	0	600.101	553.839	0	0	0	0	0
2012	9	1,162.68	13.848	398.053	578.84	0	0	0	0	0
2012	10	837.758	130.032	57.676	567.109	0	0	0	0	0
2012	11	1,003.58	347.859	6.021	582.55	0	0	0	0	0
2012	12	1,220.08	472.024	0	616.192	0	0	0	0	0
2013	1	1,618.91	714.236	0	640.015	0	-12.602	0	0	0
2013	2	1,598.39	639.613	0	582.801	0	0	114.166	0	0
2013	3	1,443.91	564.526	0	566.676	0	0	0	102.345	0
2013	4	1,090.32	366.265	25.269	558.583	0	0	0	0	52.789
2013	5	819.461	128.174	72.683	554.033	0	0	0	0	0
2013	6	1,040.49	27.174	311.412	566.844	0	0	0	0	0
2013	7	1,234.34	0	492.884	549.975	0	0	0	0	0
2013	8	1,200.60	1.116	434.615	544.315	0	0	0	0	0
2013	9	1,220.37	6.072	469.925	572.427	0	0	0	0	0
2013	10	865.058	65.003	152.032	565.083	0	0	0	0	0
2013	11	924.59	299.244	10.015	565.846	0	0	0	0	0
2013	12	1,480.68	630.661	0	630.126	0	0	0	0	0
2014	1	1,910.84	879.259	0	648.851	0	-12.602	0	0	0
2014	2	1,834.77	767.364	0	564.804	0	0	114.166	0	0
2014	3	1,493.69	596.54	0.153	568.175	0	0	0	102.345	0
2014	4	961.413	287.523	12.91	555.639	0	0	0	0	52.789
2014	5	838.043	100.97	117.238	555.264	0	0	0	0	0

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2014	6	1,055.02	20.148	353.927	545.888	0	0	0	0	0
2014	7	1,235.24	0.224	505.726	537.816	0	0	0	0	0
2014	8	1,119.99	1.212	385.599	512.627	0	0	0	0	0
2014	9	1,202.65	9.692	475.715	545.304	0	0	0	0	0
2014	10	822.299	79.815	109.704	549.84	0	0	0	0	0
2014	11	993.175	357.683	7.212	554.472	0	0	0	0	0
2014	12	1,462.09	629.944	0	606.257	0	0	0	0	0
2015	1	1,723.95	780.894	0	615.295	0	-12.602	0	0	0
2015	2	1,763.49	733.79	0	557.032	0	0	114.166	0	0
2015	3	1,625.93	672.598	0	561.492	0	0	0	102.345	0
2015	4	949.595	272.38	15.457	563.999	0	0	0	0	52.789
2015	5	793.608	105.206	112.487	511.344	0	0	0	0	0
2015	6	1,076.65	30.77	357.28	553.545	0	0	0	0	0
2015	7	1,191.80	0	479.278	521.042	0	0	0	0	0
2015	8	1,218.11	0	477.352	520.209	0	0	0	0	0
2015	9	1,151.37	7.674	409.444	562.308	0	0	0	0	0
2015	10	808.591	82.067	107.833	535.75	0	0	0	0	0
2015	11	832.179	241.687	9.863	551.861	0	0	0	0	0
2015	12	1,091.51	400.279	0.873	598.354	0	0	0	0	0
2016	1	1,449.10	629.069	0	609.539	0	-12.602	0	0	0
2016	2	1,552.82	624.502	0	552.727	0	0	114.166	0	0
2016	3	1,104.00	369.146	1.289	536.559	0	0	0	102.345	0
2016	4	932.416	264.522	14.531	557.491	0	0	0	0	52.789
2016	5	758.204	101.745	63.184	528.703	0	0	0	0	0
2016	6	1,066.17	39.06	341.017	551.038	0	0	0	0	0
2016	7	1,318.23	0.151	587.32	539.279	0	0	0	0	0
2016	8	1,380.95	0	644.177	516.223	0	0	0	0	0
2016	9	1,289.54	1.471	571.024	545.101	0	0	0	0	0
2016	10	852.649	42.918	206.214	520.576	0	0	0	0	0
2016	11	821.814	193.171	68.155	544.633	0	0	0	0	0
2016	12	1,320.22	550.496	1.4	589.774	0	0	0	0	0
2017	1	1,484.79	651.239	0	605.177	0	-12.602	0	0	0
2017	2	1,233.00	438.835	5.677	539.852	0	0	114.166	0	0
2017	3	1,081.33	353.864	5.444	531.593	0	0	0	102.345	0
2017	4	861.788	200.772	40.562	541.512	0	0	0	0	52.789
2017	5	831.198	90.077	137.526	539.023	0	0	0	0	0
2017	6	1,013.81	17.219	313.518	548.012	0	0	0	0	0
2017	7	1,235.62	0.632	514.201	529.307	0	0	0	0	0
2017	8	1,152.34	0	432.991	498.799	0	0	0	0	0
2017	9	979.802	19.122	256.469	532.269	0	0	0	0	0
2017	10	864.288	46.543	199.181	535.623	0	0	0	0	0
2017	11	855.957	269.019	22.511	521.866	0	0	0	0	0

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2017	12	1,291.87	537.995	1.209	574.355	0	0	0	0	0
2018	1	1,675.63	758.568	0	599.156	0	-12.602	0	0	0
2018	2	1,552.30	626.524	0	534.643	0	0	114.166	0	0
2018	3	1,314.18	503.109	1.369	529.329	0	0	0	102.345	0
2018	4	1,006.81	316.851	20.921	554.611	0	0	0	0	52.789
2018	5	811.426	132.97	74.919	538.968	0	0	0	0	0
2018	6	957.524	33.412	262.677	526.378	0	0	0	0	0
2018	7	1,206.70	0.852	488.618	525.752	0	0	0	0	0
2018	8	1,230.79	0.519	502.331	507.386	0	0	0	0	0
2018	9	1,108.36	7.411	405.17	523.835	0	0	0	0	0
2018	10	827.774	89.024	121.929	533.88	0	0	0	0	0
2018	11	871.067	278.204	13.466	536.552	0	0	0	0	0
2018	12	1,274.92	528.454	0.337	576.369	0	0	0	0	0
2019	1	1,640.32	739.809	0	582.596	0	-12.602	0	0	0
2019	2	1,536.41	618.763	0	526.511	0	0	114.166	0	0
2019	3	1,339.60	516.201	1.399	541.623	0	0	0	102.345	0
2019	4	979.543	307.655	20.241	537.222	0	0	0	0	52.789
2019	5	782.547	128.071	71.901	518.004	0	0	0	0	0
2019	6	956.406	33.444	261.989	525.917	0	0	0	0	0
2019	7	1,179.68	0.831	475.21	512.163	0	0	0	0	0
2019	8	1,215.00	0.512	494.108	499.826	0	0	0	0	0
2019	9	1,099.74	7.364	401.125	519.309	0	0	0	0	0
2019	10	820.778	88.401	120.643	528.793	0	0	0	0	0
2019	11	872.874	279.338	13.472	537.22	0	0	0	0	0
2019	12	1,252.58	518.563	0.329	563.922	0	0	0	0	0
2020	1	1,626.90	733.163	0	575.83	0	-12.602	0	0	0
2020	2	1,524.76	613.177	0	520.45	0	0	114.166	0	0
2020	3	1,363.44	528.452	1.436	553.173	0	0	0	102.345	0
2020	4	970.844	304.991	20.111	531.317	0	0	0	0	52.789
2020	5	775.427	126.961	71.441	512.455	0	0	0	0	0
2020	6	948.958	33.153	260.304	520.445	0	0	0	0	0
2020	7	1,171.80	0.824	472.396	507.104	0	0	0	0	0
2020	8	1,207.14	0.508	491.213	494.863	0	0	0	0	0
2020	9	1,092.12	7.304	398.794	514.078	0	0	0	0	0
2020	10	814.065	87.716	119.983	523.425	0	0	0	0	0
2020	11	865.021	277.177	13.399	531.6	0	0	0	0	0
2020	12	1,242.61	514.574	0.328	557.943	0	0	0	0	0
2021	1	1,616.15	728.174	0	570.062	0	-12.602	0	0	0
2021	2	1,515.18	608.859	0	515.183	0	0	114.166	0	0
2021	3	1,319.34	507.702	1.38	529.879	0	0	0	102.345	0
2021	4	962.816	302.642	19.965	525.783	0	0	0	0	52.789
2021	5	768.482	125.937	70.896	507.078	0	0	0	0	0

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2021	6	941.195	32.877	258.249	515.012	0	0	0	0	0
2021	7	1,162.57	0.817	468.574	501.706	0	0	0	0	0
2021	8	1,197.49	0.503	487.073	489.358	0	0	0	0	0
2021	9	1,082.58	7.237	395.295	508.102	0	0	0	0	0
2021	10	805.731	86.885	118.899	517.005	0	0	0	0	0
2021	11	855.291	274.447	13.273	524.727	0	0	0	0	0
2021	12	1,229.95	509.363	0.324	550.503	0	0	0	0	0
2022	1	1,603.37	721.295	0	564.161	0	-12.602	0	0	0
2022	2	1,504.22	603.16	0	509.93	0	0	114.166	0	0
2022	3	1,309.30	502.992	1.369	524.559	0	0	0	102.345	0
2022	4	954.776	299.897	19.807	520.647	0	0	0	0	52.789
2022	5	761.952	124.805	70.339	502.237	0	0	0	0	0
2022	6	934.097	32.584	256.242	510.215	0	0	0	0	0
2022	7	1,154.48	0.81	465.031	497.159	0	0	0	0	0
2022	8	1,189.41	0.499	483.43	484.928	0	0	0	0	0
2022	9	1,075.01	7.175	392.371	503.519	0	0	0	0	0
2022	10	799.541	86.162	118.044	512.393	0	0	0	0	0
2022	11	848.219	272.186	13.178	520.011	0	0	0	0	0
2022	12	1,220.85	505.206	0.322	545.559	0	0	0	0	0
2023	1	1,593.25	715.682	0	559.663	0	-12.602	0	0	0
2023	2	1,495.53	598.486	0	505.908	0	0	114.166	0	0
2023	3	1,301.32	499.111	1.361	520.469	0	0	0	102.345	0
2023	4	948.355	297.582	19.692	516.656	0	0	0	0	52.789
2023	5	756.804	123.846	69.934	498.453	0	0	0	0	0
2023	6	928.605	32.334	254.775	506.439	0	0	0	0	0
2023	7	1,148.21	0.804	462.397	493.534	0	0	0	0	0
2023	8	1,183.14	0.495	480.708	481.383	0	0	0	0	0
2023	9	1,069.08	7.121	390.174	499.84	0	0	0	0	0
2023	10	794.405	85.51	117.378	508.577	0	0	0	0	0
2023	11	842.177	270.132	13.104	516.096	0	0	0	0	0
2023	12	1,212.93	501.41	0.32	541.434	0	0	0	0	0
2024	1	1,584.43	710.502	0	556.016	0	-12.602	0	0	0
2024	2	1,488.00	594.198	0	502.666	0	0	114.166	0	0
2024	3	1,328.20	512.041	1.4	534.38	0	0	0	102.345	0
2024	4	943.042	295.513	19.61	513.494	0	0	0	0	52.789
2024	5	752.682	122.994	69.648	495.469	0	0	0	0	0
2024	6	924.392	32.114	253.752	503.47	0	0	0	0	0
2024	7	1,143.57	0.799	460.597	490.697	0	0	0	0	0
2024	8	1,178.55	0.492	478.871	478.638	0	0	0	0	0
2024	9	1,064.75	7.075	388.71	497.023	0	0	0	0	0
2024	10	790.627	84.966	116.959	505.761	0	0	0	0	0
2024	11	837.572	268.432	13.058	513.237	0	0	0	0	0

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2024	12	1,206.82	498.29	0.319	538.443	0	0	0	0	0
2025	1	1,576.13	706.256	0	551.96	0	-12.602	0	0	0
2025	2	1,480.85	590.658	0	499.057	0	0	114.166	0	0
2025	3	1,287.90	492.628	1.352	513.541	0	0	0	102.345	0
2025	4	937.684	293.759	19.565	509.935	0	0	0	0	52.789
2025	5	748.467	122.266	69.489	492.141	0	0	0	0	0
2025	6	920.366	31.925	253.175	500.21	0	0	0	0	0
2025	7	1,139.30	0.794	459.519	487.515	0	0	0	0	0
2025	8	1,174.30	0.489	477.758	475.498	0	0	0	0	0
2025	9	1,060.51	7.033	387.814	493.72	0	0	0	0	0
2025	10	786.339	84.457	116.683	502.258	0	0	0	0	0
2025	11	832.287	266.83	13.028	509.585	0	0	0	0	0
2025	12	1,199.97	495.324	0.318	534.565	0	0	0	0	0
2026	1	1,568.44	702.05	0	548.48	0	-12.602	0	0	0
2026	2	1,474.23	587.141	0	495.95	0	0	114.166	0	0
2026	3	1,281.81	489.694	1.35	510.385	0	0	0	102.345	0
2026	4	932.863	292.026	19.541	506.871	0	0	0	0	52.789
2026	5	744.78	121.545	69.405	489.26	0	0	0	0	0
2026	6	917.029	31.736	252.867	497.369	0	0	0	0	0
2026	7	1,136.02	0.789	458.977	484.771	0	0	0	0	0
2026	8	1,171.02	0.486	477.195	472.788	0	0	0	0	0
2026	9	1,057.16	6.991	387.358	490.866	0	0	0	0	0
2026	10	782.728	83.964	116.548	499.275	0	0	0	0	0
2026	11	827.602	265.272	13.013	506.472	0	0	0	0	0
2026	12	1,193.77	492.433	0.318	531.252	0	0	0	0	0
2027	1	1,561.40	697.944	0	545.551	0	-12.602	0	0	0
2027	2	1,468.17	583.706	0	493.333	0	0	114.166	0	0
2027	3	1,276.28	486.83	1.349	507.725	0	0	0	102.345	0
2027	4	928.464	290.288	19.529	504.222	0	0	0	0	52.789
2027	5	741.518	120.822	69.362	486.764	0	0	0	0	0
2027	6	914.213	31.548	252.711	494.898	0	0	0	0	0
2027	7	1,133.29	0.785	458.676	482.352	0	0	0	0	0
2027	8	1,168.32	0.483	476.882	470.403	0	0	0	0	0
2027	9	1,054.36	6.95	387.103	488.362	0	0	0	0	0
2027	10	779.504	83.458	116.468	496.637	0	0	0	0	0
2027	11	823.25	263.674	13.004	503.728	0	0	0	0	0
2027	12	1,187.88	489.467	0.318	528.332	0	0	0	0	0
2028	1	1,555.03	694.157	0	542.966	0	-12.602	0	0	0
2028	2	1,462.70	580.539	0	491.022	0	0	114.166	0	0
2028	3	1,304.22	500.28	1.395	522.171	0	0	0	102.345	0
2028	4	924.567	288.699	19.535	501.908	0	0	0	0	52.789
2028	5	738.69	120.16	69.381	484.579	0	0	0	0	0

2028	6	911.941	31.375	252.78	492.729	0	0	0	0	0
2028	7	1,131.28	0.78	458.781	480.247	0	0	0	0	0
2028	8	1,166.35	0.481	476.991	468.33	0	0	0	0	0
2028	9	1,052.23	6.911	387.192	486.188	0	0	0	0	0
2028	10	776.727	82.987	116.48	494.319	0	0	0	0	0
2028	11	819.356	262.186	13.005	501.32	0	0	0	0	0
2028	12	1,182.56	486.704	0.318	525.771	0	0	0	0	0
2029	1	1,548.76	690.279	0	540.567	0	-12.602	0	0	0
2029	2	1,457.31	577.297	0	488.875	0	0	114.166	0	0
2029	3	1,266.40	481.484	1.351	503.189	0	0	0	102.345	0
2029	4	920.826	287.079	19.549	499.774	0	0	0	0	52.789
2029	5	736.047	119.486	69.43	482.56	0	0	0	0	0
2029	6	909.938	31.199	252.962	490.721	0	0	0	0	0
2029	7	1,129.69	0.776	459.119	478.316	0	0	0	0	0
2029	8	1,164.80	0.478	477.343	466.429	0	0	0	0	0
2029	9	1,050.49	6.873	387.477	484.199	0	0	0	0	0
2029	10	774.312	82.527	116.571	492.273	0	0	0	0	0
2029	11	815.788	260.732	13.015	499.196	0	0	0	0	0
2029	12	1,177.60	484.004	0.318	523.513	0	0	0	0	0
2030	1	1,541.15	686.37	0	536.871	0	-12.602	0	0	0
2030	2	1,450.76	574.027	0	485.595	0	0	114.166	0	0
2030	3	1,260.36	478.758	1.35	499.879	0	0	0	102.345	0
2030	4	916.124	285.524	19.537	496.639	0	0	0	0	52.789
2030	5	732.459	118.839	69.388	479.662	0	0	0	0	0
2030	6	906.823	31.03	252.806	487.931	0	0	0	0	0
2030	7	1,126.74	0.772	458.851	475.645	0	0	0	0	0
2030	8	1,161.86	0.475	477.064	463.766	0	0	0	0	0
2030	9	1,047.38	6.836	387.251	481.351	0	0	0	0	0
2030	10	770.755	82.079	116.498	489.236	0	0	0	0	0
2030	11	811.148	259.318	13.007	495.978	0	0	0	0	0
2030	12	1,171.53	481.38	0.318	520.07	0	0	0	0	0
2031	1	1,534.42	682.925	0	533.588	0	-12.602	0	0	0
2031	2	1,444.96	571.146	0	482.68	0	0	114.166	0	0
2031	3	1,255.02	476.354	1.352	496.936	0	0	0	102.345	0
2031	4	911.749	284.028	19.567	493.728	0	0	0	0	52.789
2031	5	729.249	118.216	69.496	476.967	0	0	0	0	0
2031	6	904.453	30.867	253.201	485.328	0	0	0	0	0
2031	7	1,124.82	0.768	459.507	473.072	0	0	0	0	0
2031	8	1,159.98	0.473	477.746	461.205	0	0	0	0	0
2031	9	1,045.17	6.799	387.804	478.621	0	0	0	0	0
2031	10	767.568	81.638	116.664	486.325	0	0	0	0	0
2031	11	806.699	257.924	13.026	492.905	0	0	0	0	0

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2031	12	1,165.66	478.792	0.318	516.791	0	0	0	0	0
2032	1	1,527.59	679.138	0	530.544	0	-12.602	0	0	0
2032	2	1,439.09	567.979	0	479.974	0	0	114.166	0	0
2032	3	1,281.85	489.456	1.399	510.623	0	0	0	102.345	0
2032	4	907.532	282.46	19.587	491.06	0	0	0	0	52.789
2032	5	726.191	117.563	69.569	474.488	0	0	0	0	0
2032	6	902.145	30.697	253.465	482.927	0	0	0	0	0
2032	7	1,122.98	0.763	459.995	470.745	0	0	0	0	0
2032	8	1,158.16	0.47	478.253	458.888	0	0	0	0	0
2032	9	1,043.08	6.761	388.216	476.157	0	0	0	0	0
2032	10	764.636	81.19	116.789	483.716	0	0	0	0	0
2032	11	802.548	256.507	13.04	490.156	0	0	0	0	0
2032	12	1,160.11	476.162	0.319	513.863	0	0	0	0	0
2033	1	1,521.25	675.586	0	527.757	0	-12.602	0	0	0
2033	2	1,433.64	565.008	0	477.495	0	0	114.166	0	0
2033	3	1,244.66	471.235	1.355	491.691	0	0	0	102.345	0
2033	4	903.582	280.961	19.606	488.59	0	0	0	0	52.789
2033	5	723.336	116.939	69.636	472.191	0	0	0	0	0
2033	6	899.996	30.534	253.709	480.695	0	0	0	0	0
2033	7	1,121.19	0.759	460.402	468.552	0	0	0	0	0
2033	8	1,156.41	0.468	478.677	456.709	0	0	0	0	0
2033	9	1,041.07	6.725	388.56	473.842	0	0	0	0	0
2033	10	761.809	80.746	116.884	481.238	0	0	0	0	0
2033	11	798.553	255.107	13.05	487.552	0	0	0	0	0
2033	12	1,154.74	473.562	0.319	511.09	0	0	0	0	0
2034	1	1,515.05	672.043	0	525.097	0	-12.602	0	0	0
2034	2	1,428.31	562.045	0	475.127	0	0	114.166	0	0
2034	3	1,239.79	468.764	1.356	489.292	0	0	0	102.345	0
2034	4	899.745	279.474	19.622	486.224	0	0	0	0	52.789
2034	5	720.566	116.32	69.691	469.984	0	0	0	0	0
2034	6	897.886	30.372	253.911	478.546	0	0	0	0	0
2034	7	1,119.50	0.755	460.782	466.488	0	0	0	0	0
2034	8	1,154.75	0.465	479.071	454.66	0	0	0	0	0
2034	9	1,039.18	6.69	388.88	471.667	0	0	0	0	0
2034	10	759.203	80.322	116.981	478.959	0	0	0	0	0
2034	11	794.83	253.765	13.061	485.159	0	0	0	0	0
2034	12	1,149.70	471.072	0.319	508.544	0	0	0	0	0
2035	1	1,509.27	668.598	0	522.76	0	-12.602	0	0	0
2035	2	1,423.34	559.164	0	473.046	0	0	114.166	0	0
2035	3	1,235.28	466.361	1.357	487.182	0	0	0	102.345	0
2035	4	896.275	278.038	19.639	484.173	0	0	0	0	52.789
2035	5	718.116	115.723	69.751	468.072	0	0	0	0	0

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2035	6	896.088	30.216	254.131	476.684	0	0	0	0	0
2035	7	1,118.09	0.751	461.179	464.686	0	0	0	0	0
2035	8	1,153.37	0.463	479.485	452.872	0	0	0	0	0
2035	9	1,037.58	6.655	389.216	469.769	0	0	0	0	0
2035	10	756.894	79.909	117.082	476.962	0	0	0	0	0
2035	11	791.44	252.461	13.072	483.062	0	0	0	0	0
2035	12	1,145.05	468.651	0.32	506.312	0	0	0	0	0
2036	1	1,503.73	665.155	0	520.661	0	-12.602	0	0	0
2036	2	1,418.60	556.285	0	471.176	0	0	114.166	0	0
2036	3	1,262.57	479.379	1.403	501.415	0	0	0	102.345	0
2036	4	893.014	276.609	19.654	482.326	0	0	0	0	52.789
2036	5	715.852	115.128	69.806	466.348	0	0	0	0	0
2036	6	894.449	30.061	254.328	475.003	0	0	0	0	0
2036	7	1,116.82	0.747	461.535	463.057	0	0	0	0	0
2036	8	1,152.12	0.46	479.854	451.257	0	0	0	0	0
2036	9	1,036.13	6.621	389.516	468.055	0	0	0	0	0
2036	10	754.787	79.499	117.175	475.171	0	0	0	0	0
2036	11	788.277	251.168	13.083	481.183	0	0	0	0	0
2036	12	1,140.64	466.25	0.32	504.311	0	0	0	0	0
2037	1	1,498.40	661.821	0	518.668	0	-12.602	0	0	0
2037	2	1,414.03	553.496	0	469.399	0	0	114.166	0	0
2037	3	1,226.85	461.634	1.359	483.483	0	0	0	102.345	0
2037	4	889.899	275.232	19.67	480.572	0	0	0	0	52.789
2037	5	713.694	114.555	69.862	464.706	0	0	0	0	0
2037	6	892.899	29.911	254.533	473.398	0	0	0	0	0
2037	7	1,115.65	0.744	461.92	461.506	0	0	0	0	0
2037	8	1,150.99	0.458	480.255	449.72	0	0	0	0	0
2037	9	1,034.80	6.588	389.841	466.426	0	0	0	0	0
2037	10	752.789	79.108	117.276	473.464	0	0	0	0	0
2037	11	785.267	249.931	13.094	479.397	0	0	0	0	0
2037	12	1,136.45	463.955	0.32	502.414	0	0	0	0	0
2038	1	1,493.45	658.826	0	516.716	0	-12.602	0	0	0
2038	2	1,409.78	550.991	0	467.655	0	0	114.166	0	0
2038	3	1,222.99	459.544	1.361	481.711	0	0	0	102.345	0
2038	4	886.927	273.983	19.689	478.83	0	0	0	0	52.789
2038	5	711.607	114.035	69.93	463.072	0	0	0	0	0
2038	6	891.409	29.776	254.783	471.794	0	0	0	0	0
2038	7	1,114.51	0.74	462.358	459.939	0	0	0	0	0
2038	8	1,149.89	0.456	480.71	448.169	0	0	0	0	0
2038	9	1,033.50	6.558	390.21	464.787	0	0	0	0	0
2038	10	750.799	78.742	117.381	471.736	0	0	0	0	0
2038	11	782.32	248.775	13.106	477.595	0	0	0	0	0

2038	12	1,132.40	461.809	0.32	500.504	0	0	0	0	0
2039	1	1,488.45	655.787	0	514.756	0	-12.602	0	0	0
2039	2	1,405.49	548.45	0	465.902	0	0	114.166	0	0
2039	3	1,219.09	457.425	1.362	479.926	0	0	0	102.345	0
2039	4	883.913	272.712	19.704	477.072	0	0	0	0	52.789
2039	5	709.474	113.506	69.981	461.416	0	0	0	0	0
2039	6	889.825	29.638	254.969	470.162	0	0	0	0	0
2039	7	1,113.30	0.737	462.714	458.37	0	0	0	0	0
2039	8	1,148.71	0.454	481.081	446.619	0	0	0	0	0
2039	9	1,032.13	6.528	390.512	463.152	0	0	0	0	0
2039	10	748.784	78.375	117.464	470.004	0	0	0	0	0
2039	11	779.373	247.617	13.115	475.797	0	0	0	0	0
2039	12	1,128.35	459.658	0.321	498.602	0	0	0	0	0
2040	1	1,483.61	652.761	0	512.939	0	-12.602	0	0	0
2040	2	1,401.33	545.919	0	464.271	0	0	114.166	0	0
2040	3	1,246.38	470.446	1.407	494.156	0	0	0	102.345	0
2040	4	881.092	271.496	19.7	475.47	0	0	0	0	52.789
2040	5	707.439	113	69.969	459.9	0	0	0	0	0
2040	6	888.143	29.505	254.924	468.657	0	0	0	0	0
2040	7	1,111.71	0.734	462.607	456.894	0	0	0	0	0
2040	8	1,147.14	0.452	480.969	445.163	0	0	0	0	0
2040	9	1,030.48	6.498	390.421	461.623	0	0	0	0	0
2040	10	746.812	78.02	117.434	468.416	0	0	0	0	0
2040	11	776.607	246.494	13.112	474.157	0	0	0	0	0
2040	12	1,124.53	457.574	0.321	496.873	0	0	0	0	0
2041	1	1,477.55	650.053	0	509.591	0	-12.602	0	0	0
2041	2	1,396.09	543.654	0	461.302	0	0	114.166	0	0
2041	3	1,210.43	453.425	1.362	475.265	0	0	0	102.345	0
2041	4	876.994	270.333	19.708	472.528	0	0	0	0	52.789
2041	5	704.268	112.516	69.995	457.186	0	0	0	0	0
2041	6	885.514	29.379	255.02	466.058	0	0	0	0	0
2041	7	1,109.38	0.731	462.788	454.386	0	0	0	0	0
2041	8	1,144.82	0.45	481.157	442.657	0	0	0	0	0
2041	9	1,027.92	6.471	390.574	458.931	0	0	0	0	0
2041	10	743.664	77.688	117.482	465.553	0	0	0	0	0
2041	11	772.531	245.445	13.117	471.124	0	0	0	0	0
2041	12	1,119.35	455.628	0.321	493.641	0	0	0	0	0
2042	1	1,471.84	647.425	0	506.504	0	-12.602	0	0	0
2042	2	1,391.15	541.456	0	458.558	0	0	114.166	0	0
2042	3	1,205.82	451.592	1.363	472.492	0	0	0	102.345	0
2042	4	873.233	269.247	19.717	469.844	0	0	0	0	52.789
2042	5	701.363	112.064	70.027	454.702	0	0	0	0	0

2042	6	883.121	29.261	255.135	463.668	0	0	0	0	0
2042	7	1,107.29	0.728	463.007	452.078	0	0	0	0	0
2042	8	1,142.74	0.448	481.385	440.353	0	0	0	0	0
2042	9	1,025.61	6.445	390.758	456.465	0	0	0	0	0
2042	10	740.851	77.385	117.549	462.975	0	0	0	0	0
2042	11	768.859	244.488	13.124	468.402	0	0	0	0	0
2042	12	1,114.68	453.851	0.321	490.745	0	0	0	0	0
2043	1	1,466.79	645.002	0	503.883	0	-12.602	0	0	0
2043	2	1,386.79	539.43	0	456.226	0	0	114.166	0	0
2043	3	1,201.77	449.902	1.364	470.13	0	0	0	102.345	0
2043	4	869.946	268.242	19.731	467.549	0	0	0	0	52.789
2043	5	698.864	111.645	70.079	452.57	0	0	0	0	0
2043	6	881.139	29.152	255.323	461.607	0	0	0	0	0
2043	7	1,105.65	0.725	463.356	450.092	0	0	0	0	0
2043	8	1,141.12	0.447	481.747	438.373	0	0	0	0	0
2043	9	1,023.77	6.421	391.053	454.352	0	0	0	0	0
2043	10	738.423	77.098	117.638	460.746	0	0	0	0	0
2043	11	765.614	243.579	13.134	466.056	0	0	0	0	0
2043	12	1,110.50	452.164	0.321	488.253	0	0	0	0	0
2044	1	1,462.29	642.666	0	501.709	0	-12.602	0	0	0
2044	2	1,382.90	537.477	0	454.287	0	0	114.166	0	0
2044	3	1,228.68	463.171	1.41	483.723	0	0	0	102.345	0
2044	4	867.054	267.261	19.747	465.621	0	0	0	0	52.789
2044	5	696.712	111.237	70.134	450.77	0	0	0	0	0
2044	6	879.484	29.045	255.526	459.856	0	0	0	0	0
2044	7	1,104.32	0.722	463.722	448.397	0	0	0	0	0
2044	8	1,139.81	0.445	482.128	436.69	0	0	0	0	0
2044	9	1,022.26	6.397	391.362	452.562	0	0	0	0	0
2044	10	736.345	76.813	117.728	458.862	0	0	0	0	0
2044	11	762.754	242.682	13.144	464.083	0	0	0	0	0
2044	12	1,106.74	450.497	0.321	486.161	0	0	0	0	0
2045	1	1,457.93	640.318	0	499.704	0	-12.602	0	0	0
2045	2	1,379.15	535.513	0	452.497	0	0	114.166	0	0
2045	3	1,194.72	446.635	1.366	466.346	0	0	0	102.345	0
2045	4	864.322	266.287	19.763	463.847	0	0	0	0	52.789
2045	5	694.703	110.832	70.192	449.109	0	0	0	0	0
2045	6	877.963	28.939	255.736	458.231	0	0	0	0	0
2045	7	1,103.13	0.72	464.11	446.826	0	0	0	0	0
2045	8	1,138.66	0.443	482.532	435.132	0	0	0	0	0
2045	9	1,020.92	6.374	391.69	450.91	0	0	0	0	0
2045	10	734.44	76.535	117.827	457.137	0	0	0	0	0
2045	11	760.085	241.803	13.156	462.282	0	0	0	0	0

2045	12	1,103.20	448.866	0.322	484.253	0	0	0	0	0
2046	1	1,453.86	638.123	0	497.829	0	-12.602	0	0	0
2046	2	1,375.63	533.677	0	450.821	0	0	114.166	0	0
2046	3	1,191.49	445.104	1.367	464.641	0	0	0	102.345	0
2046	4	861.76	265.375	19.783	462.178	0	0	0	0	52.789
2046	5	692.825	110.452	70.262	447.541	0	0	0	0	0
2046	6	876.58	28.84	255.991	456.692	0	0	0	0	0
2046	7	1,102.09	0.717	464.567	445.328	0	0	0	0	0
2046	8	1,137.65	0.442	483.006	433.649	0	0	0	0	0
2046	9	1,019.71	6.352	392.075	449.341	0	0	0	0	0
2046	10	732.662	76.274	117.946	455.502	0	0	0	0	0
2046	11	757.569	240.976	13.169	460.58	0	0	0	0	0
2046	12	1,099.87	447.331	0.322	482.452	0	0	0	0	0
2047	1	1,450.03	636.051	0	496.072	0	-12.602	0	0	0
2047	2	1,372.33	531.944	0	449.248	0	0	114.166	0	0
2047	3	1,188.44	443.659	1.369	463.039	0	0	0	102.345	0
2047	4	859.345	264.512	19.803	460.605	0	0	0	0	52.789
2047	5	691.057	110.093	70.335	446.058	0	0	0	0	0
2047	6	875.292	28.746	256.259	455.231	0	0	0	0	0
2047	7	1,101.18	0.715	465.071	443.92	0	0	0	0	0
2047	8	1,136.78	0.44	483.531	432.257	0	0	0	0	0
2047	9	1,018.65	6.332	392.501	447.872	0	0	0	0	0
2047	10	731.037	76.032	118.079	453.984	0	0	0	0	0
2047	11	755.246	240.214	13.184	459.004	0	0	0	0	0
2047	12	1,096.79	445.916	0.322	480.787	0	0	0	0	0
2048	1	1,446.33	634.011	0	494.411	0	-12.602	0	0	0
2048	2	1,369.13	530.238	0	447.759	0	0	114.166	0	0
2048	3	1,215.58	456.933	1.416	476.859	0	0	0	102.345	0
2048	4	857.022	263.662	19.824	459.111	0	0	0	0	52.789
2048	5	689.366	109.739	70.409	444.647	0	0	0	0	0
2048	6	874.073	28.654	256.528	453.834	0	0	0	0	0
2048	7	1,100.34	0.713	465.58	442.573	0	0	0	0	0
2048	8	1,135.98	0.439	484.06	430.927	0	0	0	0	0
2048	9	1,017.66	6.312	392.93	446.471	0	0	0	0	0
2048	10	729.493	75.795	118.214	452.543	0	0	0	0	0
2048	11	753.018	239.463	13.199	457.512	0	0	0	0	0
2048	12	1,093.82	444.522	0.323	479.212	0	0	0	0	0
2049	1	1,442.79	632.062	0	492.822	0	-12.602	0	0	0
2049	2	1,366.08	528.608	0	446.334	0	0	114.166	0	0
2049	3	1,182.69	440.876	1.372	460.066	0	0	0	102.345	0
2049	4	854.798	262.849	19.846	457.678	0	0	0	0	52.789
2049	5	687.748	109.401	70.488	443.289	0	0	0	0	0

2049	6	872.923	28.566	256.814	452.486	0	0	0	0	0
2049	7	1,099.58	0.71	466.118	441.271	0	0	0	0	0
2049	8	1,135.25	0.438	484.619	429.643	0	0	0	0	0
2049	9	1,016.74	6.293	393.384	445.122	0	0	0	0	0
2049	10	728.023	75.568	118.356	451.159	0	0	0	0	0
2049	11	750.888	238.746	13.215	456.083	0	0	0	0	0
2049	12	1,090.98	443.191	0.323	477.706	0	0	0	0	0
2050	1	1,439.37	630.172	0	491.291	0	-12.602	0	0	0
2050	2	1,363.12	527.027	0	444.959	0	0	114.166	0	0
2050	3	1,179.97	439.558	1.373	458.66	0	0	0	102.345	0
2050	4	852.647	262.061	19.868	456.292	0	0	0	0	52.789
2050	5	686.184	109.073	70.567	441.973	0	0	0	0	0
2050	6	871.815	28.48	257.101	451.177	0	0	0	0	0
2050	7	1,098.85	0.708	466.658	440.006	0	0	0	0	0
2050	8	1,134.57	0.436	485.181	428.398	0	0	0	0	0
2050	9	1,015.87	6.274	393.84	443.816	0	0	0	0	0
2050	10	726.607	75.348	118.498	449.821	0	0	0	0	0
2050	11	748.829	238.05	13.23	454.704	0	0	0	0	0
2050	12	1,088.24	441.9	0.323	476.253	0	0	0	0	0

May	Jun	Jul	Aug	Sep	Oct	Nov	WinterHDD_sq	X-Missing
	0	0	0	0	0	0	496.393	0
	0	0	0	0	0	0	303.973	0
	0	0	0	0	0	0	139.688	0
	0	0	0	0	0	0	66.099	0
64.571		0	0	0	0	0	0	0
	0	135.057	0	0	0	0	0	0
	0	0	191.477	0	0	0	0	0
	0	0	0	220.551	0	0	0	0
	0	0	0	0	171.942	0	0	0
	0	0	0	0	0	82.941	0	0
	0	0	0	0	0	0	-8.536	48.38
	0	0	0	0	0	0	0	118.041
	0	0	0	0	0	0	0	253.617
	0	0	0	0	0	0	0	203.396
	0	0	0	0	0	0	0	105.153
	0	0	0	0	0	0	0	21.009
64.571		0	0	0	0	0	0	0
	0	135.057	0	0	0	0	0	0
	0	0	191.477	0	0	0	0	0
	0	0	0	220.551	0	0	0	0
	0	0	0	0	171.942	0	0	0
	0	0	0	0	0	82.941	0	0
	0	0	0	0	0	0	-8.536	75.69
	0	0	0	0	0	0	0	131.862
	0	0	0	0	0	0	0	277.262
	0	0	0	0	0	0	0	261.807
	0	0	0	0	0	0	0	210.364
	0	0	0	0	0	0	0	87.416
64.571		0	0	0	0	0	0	0
	0	135.057	0	0	0	0	0	0
	0	0	191.477	0	0	0	0	0
	0	0	0	220.551	0	0	0	0
	0	0	0	0	171.942	0	0	0
	0	0	0	0	0	82.941	0	0
	0	0	0	0	0	0	-8.536	58.022
	0	0	0	0	0	0	0	219.893
	0	0	0	0	0	0	0	395.336
	0	0	0	0	0	0	0	388.433
	0	0	0	0	0	0	0	226.473
	0	0	0	0	0	0	0	52.551
64.571		0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	82.344	0
0	0	0	0	0	0	0	225.893	0
0	0	0	0	0	0	0	340.358	0
0	0	0	0	0	0	0	358.505	0
0	0	0	0	0	0	0	289.495	0
0	0	0	0	0	0	0	44.97	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	37.304	0
0	0	0	0	0	0	0	92.005	0
0	0	0	0	0	0	0	223.088	0
0	0	0	0	0	0	0	261.421	0
0	0	0	0	0	0	0	94.664	0
0	0	0	0	0	0	0	43.083	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	24.39	0
0	0	0	0	0	0	0	178.554	0
0	0	0	0	0	0	0	240.977	0
0	0	0	0	0	0	0	134.467	0
0	0	0	0	0	0	0	88.087	0
0	0	0	0	0	0	0	26.152	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.098	0

0	0	0	0	0	0	0	178.309	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0

0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0

0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0

0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	330.512	0
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64.571	0	0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	169.763	0
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0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
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0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
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0	0	0	0	0	0	0	330.512	0
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0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0

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0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
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0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
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0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0

0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0
0	0	0	0	0	0	0	330.512	0
0	0	0	0	0	0	0	276.969	0
0	0	0	0	0	0	0	178.03	0
0	0	0	0	0	0	0	61.636	0
64.571	0	0	0	0	0	0	0	0
0	135.057	0	0	0	0	0	0	0
0	0	191.477	0	0	0	0	0	0
0	0	0	220.551	0	0	0	0	0
0	0	0	0	171.942	0	0	0	0
0	0	0	0	0	82.941	0	0	0
0	0	0	0	0	0	-8.536	51.38	0
0	0	0	0	0	0	0	169.763	0

Year	Month	Actual	Pred	Upper	Lower	Sigma
2011	1	2,017.71	2,171.67	2,270.36	2,072.97	49.462
2011	2	1,639.66	1,657.44	1,748.36	1,566.52	45.564
2011	3	1,262.20	1,334.49	1,425.71	1,243.27	45.715
2011	4	1,042.75	1,061.82	1,153.70	969.936	46.046
2011	5	856.267	869.899	961.105	778.693	45.707
2011	6	1,155.40	1,136.38	1,227.36	1,045.39	45.597
2011	7	1,284.04	1,223.62	1,314.81	1,132.42	45.701
2011	8	1,494.92	1,462.21	1,557.82	1,366.60	47.913
2011	9	1,219.25	1,203.04	1,293.67	1,112.41	45.418
2011	10	824.646	843.425	935.348	751.503	46.066
2011	11	878.929	861.437	952.195	770.679	45.483
2011	12	1,214.90	1,194.55	1,286.27	1,102.82	45.966
2012	1	1,594.87	1,627.45	1,719.81	1,535.09	46.286
2012	2	1,412.17	1,477.81	1,570.31	1,385.31	46.356
2012	3	1,170.09	1,213.56	1,305.53	1,121.59	46.089
2012	4	834.069	899.549	996.367	802.732	48.52
2012	5	901.856	881.604	972.231	790.977	45.417
2012	6	1,096.09	1,014.76	1,107.31	922.206	46.381
2012	7	1,446.10	1,415.77	1,509.74	1,321.80	47.094
2012	8	1,391.18	1,374.49	1,466.25	1,282.73	45.984
2012	9	1,182.94	1,162.68	1,253.66	1,071.71	45.59
2012	10	809.167	837.758	931.293	744.222	46.875
2012	11	997.184	1,003.58	1,094.93	912.234	45.779
2012	12	1,233.47	1,220.08	1,311.50	1,128.66	45.815
2013	1	1,628.37	1,618.91	1,709.94	1,527.88	45.62
2013	2	1,556.97	1,598.39	1,689.34	1,507.43	45.581
2013	3	1,437.86	1,443.91	1,535.07	1,352.75	45.683
2013	4	1,166.36	1,090.32	1,184.44	996.205	47.166
2013	5	827.895	819.461	910.292	728.63	45.52
2013	6	984.038	1,040.49	1,131.20	949.776	45.459
2013	7	1,200.72	1,234.34	1,325.39	1,143.28	45.633
2013	8	1,179.40	1,200.60	1,293.21	1,107.99	46.41
2013	9	1,207.54	1,220.37	1,311.35	1,129.38	45.597
2013	10	880.32	865.058	956.504	773.613	45.827
2013	11	936.327	924.59	1,015.22	833.961	45.418
2013	12	1,486.65	1,480.68	1,572.59	1,388.77	46.058
2014	1	1,973.13	1,910.84	2,002.83	1,818.86	46.096
2014	2	1,948.72	1,834.77	1,930.15	1,739.38	47.8
2014	3	1,546.72	1,493.69	1,585.58	1,401.79	46.054
2014	4	1,004.11	961.413	1,052.30	870.528	45.546
2014	5	831.06	838.043	929.076	747.009	45.621

2014	6	1,035.00	1,055.02	1,145.73	964.31	45.459
2014	7	1,221.48	1,235.24	1,325.97	1,144.51	45.468
2014	8	1,073.42	1,119.99	1,214.22	1,025.76	47.224
2014	9	1,158.81	1,202.65	1,293.89	1,111.42	45.722
2014	10	822.83	822.299	912.961	731.637	45.434
2014	11	980.066	993.175	1,086.02	900.327	46.53
2014	12	1,466.22	1,462.09	1,554.03	1,370.16	46.072
2015	1	1,713.56	1,723.95	1,814.82	1,633.07	45.543
2015	2	1,775.08	1,763.49	1,856.50	1,670.49	46.609
2015	3	1,648.95	1,625.93	1,720.45	1,531.42	47.366
2015	4	924.16	949.595	1,040.23	858.965	45.419
2015	5	783.363	793.608	884.514	702.701	45.557
2015	6	1,048.12	1,076.65	1,167.56	985.747	45.556
2015	7	1,185.62	1,191.80	1,282.95	1,100.64	45.682
2015	8	1,245.12	1,218.11	1,309.10	1,127.13	45.597
2015	9	1,152.19	1,151.37	1,242.11	1,060.62	45.477
2015	10	821.217	808.591	899.329	717.853	45.473
2015	11	816.721	832.179	923.407	740.951	45.718
2015	12	1,120.14	1,091.51	1,183.97	999.05	46.336
2016	1	1,498.22	1,449.10	1,541.75	1,356.44	46.431
2016	2	1,556.92	1,552.82	1,643.72	1,461.91	45.559
2016	3	1,168.19	1,104.00	1,195.82	1,012.18	46.015
2016	4	900.03	932.416	1,023.03	841.801	45.411
2016	5	766.505	758.204	849.1	667.308	45.552
2016	6	1,037.69	1,066.17	1,157.35	974.991	45.695
2016	7	1,299.67	1,318.23	1,409.47	1,226.99	45.725
2016	8	1,352.53	1,380.95	1,475.03	1,286.87	47.148
2016	9	1,287.78	1,289.54	1,384.29	1,194.79	47.482
2016	10	867.347	852.649	944.818	760.48	46.19
2016	11	802.791	821.814	915.608	728.02	47.004
2016	12	1,281.85	1,320.22	1,410.79	1,229.66	45.384
2017	1	1,560.84	1,484.79	1,576.68	1,392.90	46.052
2017	2	1,228.19	1,233.00	1,328.15	1,137.84	47.685
2017	3	1,062.91	1,081.33	1,173.47	989.193	46.175
2017	4	885.431	861.788	953.884	769.692	46.153
2017	5	825.07	831.198	922.509	739.886	45.76
2017	6	1,046.92	1,013.81	1,104.52	923.093	45.46
2017	7	1,216.98	1,235.62	1,326.29	1,144.94	45.442
2017	8	1,172.13	1,152.34	1,244.52	1,060.17	46.193
2017	9	1,000.93	979.802	1,075.96	883.645	48.189
2017	10	868.542	864.288	956.501	772.076	46.212
2017	11	880.718	855.957	946.646	765.269	45.448

2017	12	1,283.71	1,291.87	1,382.04	1,201.70	45.186
2018	1	2,004.06	1,675.63	1,766.47	1,584.80	45.523
2018	2		1,552.30	1,642.94	1,461.66	45.425
2018	3		1,314.18	1,405.05	1,223.31	45.538
2018	4		1,006.81	1,099.09	914.524	46.247
2018	5		811.426	902.912	719.941	45.847
2018	6		957.524	1,049.45	865.601	46.066
2018	7		1,206.70	1,297.67	1,115.73	45.591
2018	8		1,230.79	1,321.59	1,139.98	45.506
2018	9		1,108.36	1,199.32	1,017.40	45.584
2018	10		827.774	918.825	736.722	45.63
2018	11		871.067	961.752	780.382	45.446
2018	12		1,274.92	1,365.09	1,184.76	45.184
2019	1		1,640.32	1,731.73	1,548.90	45.811
2019	2		1,536.41	1,627.08	1,445.74	45.437
2019	3		1,339.60	1,430.74	1,248.46	45.673
2019	4		979.543	1,071.80	887.291	46.231
2019	5		782.547	874.514	690.579	46.089
2019	6		956.406	1,048.36	864.455	46.081
2019	7		1,179.68	1,271.03	1,088.34	45.777
2019	8		1,215.00	1,305.99	1,124.01	45.6
2019	9		1,099.74	1,190.82	1,008.66	45.646
2019	10		820.778	911.943	729.613	45.687
2019	11		872.874	963.581	782.167	45.457
2019	12		1,252.58	1,342.46	1,162.70	45.042
2020	1		1,626.90	1,718.59	1,535.21	45.95
2020	2		1,524.76	1,615.48	1,434.04	45.463
2020	3		1,363.44	1,455.00	1,271.87	45.887
2020	4		970.844	1,063.14	878.549	46.253
2020	5		775.427	867.561	683.293	46.172
2020	6		948.958	1,041.10	856.82	46.174
2020	7		1,171.80	1,263.29	1,080.31	45.848
2020	8		1,207.14	1,298.26	1,116.01	45.668
2020	9		1,092.12	1,183.36	1,000.88	45.723
2020	10		814.065	905.366	722.765	45.755
2020	11		865.021	955.75	774.292	45.468
2020	12		1,242.61	1,332.38	1,152.83	44.989
2021	1		1,616.15	1,708.05	1,524.24	46.057
2021	2		1,515.18	1,605.95	1,424.40	45.491
2021	3		1,319.34	1,410.37	1,228.30	45.622
2021	4		962.816	1,055.17	870.461	46.283
2021	5		768.482	860.793	676.171	46.261

2021	6	941.195	1,033.55	848.844	46.281
2021	7	1,162.57	1,254.25	1,070.90	45.943
2021	8	1,197.49	1,288.79	1,106.18	45.758
2021	9	1,082.58	1,174.02	991.131	45.827
2021	10	805.731	897.21	714.252	45.844
2021	11	855.291	946.05	764.533	45.483
2021	12	1,229.95	1,319.60	1,140.30	44.928
2022	1	1,603.37	1,695.68	1,511.05	46.262
2022	2	1,504.22	1,595.11	1,413.34	45.548
2022	3	1,309.30	1,400.26	1,218.33	45.588
2022	4	954.776	1,047.13	862.426	46.281
2022	5	761.952	854.408	669.497	46.333
2022	6	934.097	1,026.65	841.542	46.383
2022	7	1,154.48	1,246.34	1,062.62	46.036
2022	8	1,189.41	1,280.88	1,097.94	45.842
2022	9	1,075.01	1,166.63	983.384	45.916
2022	10	799.541	891.15	707.933	45.909
2022	11	848.219	938.987	757.452	45.487
2022	12	1,220.85	1,310.43	1,131.28	44.89
2023	1	1,593.25	1,685.96	1,500.55	46.458
2023	2	1,495.53	1,586.54	1,404.51	45.611
2023	3	1,301.32	1,392.24	1,210.40	45.563
2023	4	948.355	1,040.68	856.026	46.27
2023	5	756.804	849.369	664.239	46.388
2023	6	928.605	1,021.33	835.882	46.467
2023	7	1,148.21	1,240.23	1,056.19	46.114
2023	8	1,183.14	1,274.76	1,091.52	45.914
2023	9	1,069.08	1,160.85	977.301	45.993
2023	10	794.405	886.123	702.687	45.964
2023	11	842.177	932.948	751.407	45.489
2023	12	1,212.93	1,302.45	1,123.40	44.864
2024	1	1,584.43	1,677.56	1,491.30	46.671
2024	2	1,488.00	1,579.16	1,396.83	45.686
2024	3	1,328.20	1,419.33	1,237.07	45.669
2024	4	943.042	1,035.33	850.753	46.25
2024	5	752.682	845.324	660.039	46.427
2024	6	924.392	1,017.25	831.537	46.534
2024	7	1,143.57	1,235.71	1,051.43	46.176
2024	8	1,178.55	1,270.29	1,086.82	45.972
2024	9	1,064.75	1,156.65	972.85	46.055
2024	10	790.627	882.424	698.83	46.003
2024	11	837.572	928.339	746.805	45.487

2024	12	1,206.82	1,296.31	1,117.32	44.852
2025	1	1,576.13	1,669.57	1,482.68	46.83
2025	2	1,480.85	1,572.14	1,389.57	45.747
2025	3	1,287.90	1,378.77	1,197.03	45.538
2025	4	937.684	1,029.99	845.378	46.258
2025	5	748.467	841.224	655.709	46.485
2025	6	920.366	1,013.37	827.364	46.607
2025	7	1,139.30	1,231.57	1,047.03	46.241
2025	8	1,174.30	1,266.16	1,082.43	46.039
2025	9	1,060.51	1,152.56	968.46	46.129
2025	10	786.339	878.256	694.422	46.063
2025	11	832.287	923.069	741.506	45.494
2025	12	1,199.97	1,289.44	1,110.51	44.834
2026	1	1,568.44	1,662.25	1,474.63	47.013
2026	2	1,474.23	1,565.66	1,382.79	45.82
2026	3	1,281.81	1,372.67	1,190.95	45.534
2026	4	932.863	1,025.16	840.565	46.254
2026	5	744.78	837.629	651.931	46.531
2026	6	917.029	1,010.16	823.899	46.672
2026	7	1,136.02	1,228.40	1,043.64	46.296
2026	8	1,171.02	1,263.01	1,079.04	46.098
2026	9	1,057.16	1,149.34	964.976	46.196
2026	10	782.728	874.746	690.71	46.114
2026	11	827.602	918.39	736.813	45.498
2026	12	1,193.77	1,283.21	1,104.32	44.825
2027	1	1,561.40	1,655.62	1,467.19	47.217
2027	2	1,468.17	1,559.77	1,376.57	45.905
2027	3	1,276.28	1,367.13	1,185.43	45.531
2027	4	928.464	1,020.73	836.197	46.239
2027	5	741.518	834.436	648.599	46.566
2027	6	914.213	1,007.46	820.972	46.727
2027	7	1,133.29	1,225.77	1,040.81	46.345
2027	8	1,168.32	1,260.41	1,076.23	46.151
2027	9	1,054.36	1,146.66	962.054	46.257
2027	10	779.504	871.608	687.4	46.157
2027	11	823.25	914.039	732.462	45.498
2027	12	1,187.88	1,277.33	1,098.44	44.825
2028	1	1,555.03	1,649.66	1,460.41	47.42
2028	2	1,462.70	1,554.47	1,370.92	45.993
2028	3	1,304.22	1,395.14	1,213.30	45.565
2028	4	924.567	1,016.80	832.332	46.223
2028	5	738.69	831.667	645.713	46.595

2028	6	911.941	1,005.28	818.603	46.775
2028	7	1,131.28	1,223.85	1,038.72	46.386
2028	8	1,166.35	1,258.54	1,074.17	46.199
2028	9	1,052.23	1,144.64	959.823	46.31
2028	10	776.727	868.907	684.548	46.195
2028	11	819.356	910.142	728.57	45.497
2028	12	1,182.56	1,272.02	1,093.10	44.831
2029	1	1,548.76	1,643.84	1,453.68	47.648
2029	2	1,457.31	1,549.29	1,365.33	46.096
2029	3	1,266.40	1,357.27	1,175.53	45.537
2029	4	920.826	1,013.02	828.635	46.201
2029	5	736.047	829.071	643.023	46.618
2029	6	909.938	1,003.36	816.512	46.82
2029	7	1,129.69	1,222.32	1,037.05	46.424
2029	8	1,164.80	1,257.08	1,072.53	46.243
2029	9	1,050.49	1,143.00	957.98	46.361
2029	10	774.312	866.555	682.068	46.227
2029	11	815.788	906.568	725.007	45.494
2029	12	1,177.60	1,267.09	1,088.11	44.846
2030	1	1,541.15	1,636.62	1,445.69	47.842
2030	2	1,450.76	1,542.91	1,358.60	46.184
2030	3	1,260.36	1,351.25	1,169.47	45.549
2030	4	916.124	1,008.33	823.916	46.209
2030	5	732.459	825.592	639.326	46.673
2030	6	906.823	1,000.39	813.255	46.891
2030	7	1,126.74	1,219.50	1,033.98	46.486
2030	8	1,161.86	1,254.27	1,069.45	46.311
2030	9	1,047.38	1,140.05	954.715	46.438
2030	10	770.755	863.12	678.389	46.288
2030	11	811.148	901.944	720.352	45.502
2030	12	1,171.53	1,261.02	1,082.05	44.844
2031	1	1,534.42	1,630.24	1,438.61	48.017
2031	2	1,444.96	1,537.28	1,352.64	46.266
2031	3	1,255.02	1,345.93	1,164.10	45.561
2031	4	911.749	1,003.97	819.529	46.215
2031	5	729.249	822.484	636.015	46.724
2031	6	904.453	998.149	810.757	46.955
2031	7	1,124.82	1,217.69	1,031.95	46.54
2031	8	1,159.98	1,252.52	1,067.43	46.376
2031	9	1,045.17	1,137.98	952.349	46.515
2031	10	767.568	860.055	675.082	46.349
2031	11	806.699	897.509	715.888	45.509

2031	12	1,165.66	1,255.15	1,076.18	44.846
2032	1	1,527.59	1,623.85	1,431.33	48.24
2032	2	1,439.09	1,531.62	1,346.55	46.372
2032	3	1,281.85	1,372.71	1,191.00	45.53
2032	4	907.532	999.743	815.321	46.211
2032	5	726.191	819.509	632.872	46.766
2032	6	902.145	995.963	808.328	47.016
2032	7	1,122.98	1,215.95	1,030.01	46.594
2032	8	1,158.16	1,250.83	1,065.50	46.438
2032	9	1,043.08	1,136.04	950.116	46.586
2032	10	764.636	857.228	672.044	46.402
2032	11	802.548	893.366	711.729	45.513
2032	12	1,160.11	1,249.62	1,070.60	44.858
2033	1	1,521.25	1,617.95	1,424.56	48.459
2033	2	1,433.64	1,526.38	1,340.89	46.479
2033	3	1,244.66	1,335.64	1,153.67	45.596
2033	4	903.582	995.782	811.382	46.205
2033	5	723.336	816.732	629.941	46.804
2033	6	899.996	993.929	806.062	47.074
2033	7	1,121.19	1,214.27	1,028.11	46.647
2033	8	1,156.41	1,249.19	1,063.62	46.499
2033	9	1,041.07	1,134.17	947.97	46.656
2033	10	761.809	854.502	669.116	46.452
2033	11	798.553	889.378	707.728	45.516
2033	12	1,154.74	1,244.28	1,065.19	44.875
2034	1	1,515.05	1,612.21	1,417.89	48.69
2034	2	1,428.31	1,521.28	1,335.33	46.593
2034	3	1,239.79	1,330.81	1,148.76	45.618
2034	4	899.745	991.93	807.56	46.198
2034	5	720.566	814.034	627.098	46.841
2034	6	897.886	991.935	803.837	47.132
2034	7	1,119.50	1,212.69	1,026.32	46.699
2034	8	1,154.75	1,247.65	1,061.84	46.559
2034	9	1,039.18	1,132.41	945.945	46.724
2034	10	759.203	851.989	666.417	46.499
2034	11	794.83	885.66	703.999	45.519
2034	12	1,149.70	1,239.29	1,060.11	44.897
2035	1	1,509.27	1,606.91	1,411.62	48.934
2035	2	1,423.34	1,516.56	1,330.12	46.717
2035	3	1,235.28	1,326.35	1,144.20	45.643
2035	4	896.275	988.434	804.116	46.185
2035	5	718.116	811.64	624.593	46.869

2035	6	896.088	990.236	801.94	47.182
2035	7	1,118.09	1,211.37	1,024.82	46.745
2035	8	1,153.37	1,246.38	1,060.36	46.612
2035	9	1,037.58	1,130.94	944.227	46.785
2035	10	756.894	849.759	664.03	46.538
2035	11	791.44	882.271	700.609	45.519
2035	12	1,145.05	1,234.69	1,055.40	44.926
2036	1	1,503.73	1,601.90	1,405.56	49.198
2036	2	1,418.60	1,512.09	1,325.10	46.852
2036	3	1,262.57	1,353.45	1,171.69	45.544
2036	4	893.014	985.139	800.889	46.168
2036	5	715.852	809.418	622.285	46.89
2036	6	894.449	988.688	800.211	47.227
2036	7	1,116.82	1,210.18	1,023.45	46.789
2036	8	1,152.12	1,245.24	1,059.01	46.662
2036	9	1,036.13	1,129.60	942.666	46.84
2036	10	754.787	847.718	661.856	46.572
2036	11	788.277	879.107	697.448	45.519
2036	12	1,140.64	1,230.37	1,050.92	44.963
2037	1	1,498.40	1,597.10	1,399.70	49.463
2037	2	1,414.03	1,507.80	1,320.26	46.991
2037	3	1,226.85	1,318.05	1,135.65	45.705
2037	4	889.899	981.99	797.808	46.151
2037	5	713.694	807.3	620.087	46.91
2037	6	892.899	987.225	798.573	47.271
2037	7	1,115.65	1,209.10	1,022.20	46.831
2037	8	1,150.99	1,244.19	1,057.78	46.711
2037	9	1,034.80	1,128.37	941.222	46.895
2037	10	752.789	845.785	659.794	46.604
2037	11	785.267	876.095	694.438	45.518
2037	12	1,136.45	1,226.25	1,046.65	45.002
2038	1	1,493.45	1,592.62	1,394.28	49.7
2038	2	1,409.78	1,503.80	1,315.76	47.116
2038	3	1,222.99	1,314.26	1,131.73	45.737
2038	4	886.927	978.996	794.857	46.14
2038	5	711.607	805.261	617.953	46.934
2038	6	891.409	985.825	796.993	47.316
2038	7	1,114.51	1,208.05	1,020.98	46.875
2038	8	1,149.89	1,243.20	1,056.58	46.761
2038	9	1,033.50	1,127.19	939.81	46.951
2038	10	750.799	843.865	657.734	46.639
2038	11	782.32	873.151	691.49	45.519

2038	12	1,132.40	1,222.27	1,042.52	45.039
2039	1	1,488.45	1,588.12	1,388.79	49.947
2039	2	1,405.49	1,499.77	1,311.21	47.248
2039	3	1,219.09	1,310.42	1,127.75	45.772
2039	4	883.913	975.96	791.866	46.129
2039	5	709.474	803.176	615.772	46.958
2039	6	889.825	984.335	795.315	47.363
2039	7	1,113.30	1,206.93	1,019.67	46.92
2039	8	1,148.71	1,242.12	1,055.30	46.812
2039	9	1,032.13	1,125.94	938.332	47.008
2039	10	748.784	841.921	655.648	46.675
2039	11	779.373	870.206	688.54	45.52
2039	12	1,128.35	1,218.30	1,038.39	45.079
2040	1	1,483.61	1,583.80	1,383.42	50.207
2040	2	1,401.33	1,495.89	1,306.77	47.388
2040	3	1,246.38	1,337.40	1,155.37	45.61
2040	4	881.092	973.115	789.07	46.116
2040	5	707.439	801.183	613.696	46.979
2040	6	888.143	982.744	793.543	47.408
2040	7	1,111.71	1,205.43	1,017.99	46.967
2040	8	1,147.14	1,240.65	1,053.63	46.862
2040	9	1,030.48	1,124.39	936.575	47.062
2040	10	746.812	840.01	653.613	46.706
2040	11	776.607	867.441	685.773	45.521
2040	12	1,124.53	1,214.57	1,034.49	45.124
2041	1	1,477.55	1,578.03	1,377.08	50.352
2041	2	1,396.09	1,490.80	1,301.38	47.464
2041	3	1,210.43	1,301.89	1,118.97	45.834
2041	4	876.994	969.063	784.926	46.139
2041	5	704.268	798.145	610.39	47.046
2041	6	885.514	980.286	790.742	47.494
2041	7	1,109.38	1,203.26	1,015.50	47.047
2041	8	1,144.82	1,238.50	1,051.13	46.949
2041	9	1,027.92	1,122.03	933.81	47.162
2041	10	743.664	837.019	650.31	46.784
2041	11	772.531	863.39	681.672	45.533
2041	12	1,119.35	1,209.40	1,029.31	45.124
2042	1	1,471.84	1,572.61	1,371.06	50.503
2042	2	1,391.15	1,486.02	1,296.28	47.544
2042	3	1,205.82	1,297.33	1,114.31	45.858
2042	4	873.233	965.342	781.124	46.16
2042	5	701.363	795.365	607.361	47.108

2042	6	883.121	978.054	788.187	47.575
2042	7	1,107.29	1,201.32	1,013.26	47.122
2042	8	1,142.74	1,236.59	1,048.89	47.032
2042	9	1,025.61	1,119.91	931.315	47.255
2042	10	740.851	834.35	647.352	46.856
2042	11	768.859	859.741	677.977	45.545
2042	12	1,114.68	1,204.73	1,024.64	45.125
2043	1	1,466.79	1,567.88	1,365.71	50.656
2043	2	1,386.79	1,481.82	1,291.76	47.626
2043	3	1,201.77	1,293.33	1,110.21	45.883
2043	4	869.946	962.084	777.809	46.174
2043	5	698.864	792.97	604.758	47.161
2043	6	881.139	976.213	786.065	47.646
2043	7	1,105.65	1,199.81	1,011.49	47.188
2043	8	1,141.12	1,235.11	1,047.13	47.105
2043	9	1,023.77	1,118.23	929.308	47.338
2043	10	738.423	832.046	644.8	46.919
2043	11	765.614	856.515	674.714	45.554
2043	12	1,110.50	1,200.57	1,020.44	45.135
2044	1	1,462.29	1,563.70	1,360.87	50.825
2044	2	1,382.90	1,478.12	1,287.68	47.718
2044	3	1,228.68	1,319.83	1,137.53	45.678
2044	4	867.054	959.204	774.904	46.18
2044	5	696.712	790.9	602.525	47.201
2044	6	879.484	974.677	784.291	47.705
2044	7	1,104.32	1,198.59	1,010.04	47.245
2044	8	1,139.81	1,233.94	1,045.69	47.168
2044	9	1,022.26	1,116.87	927.661	47.409
2044	10	736.345	830.069	642.62	46.969
2044	11	762.754	853.667	671.841	45.56
2044	12	1,106.74	1,196.85	1,016.64	45.155
2045	1	1,457.93	1,559.72	1,356.15	51.008
2045	2	1,379.15	1,474.56	1,283.73	47.818
2045	3	1,194.72	1,286.40	1,103.05	45.942
2045	4	864.322	956.478	772.167	46.183
2045	5	694.703	788.962	600.445	47.237
2045	6	877.963	973.268	782.659	47.761
2045	7	1,103.13	1,197.52	1,008.75	47.299
2045	8	1,138.66	1,232.90	1,044.42	47.228
2045	9	1,020.92	1,115.65	926.18	47.476
2045	10	734.44	828.257	640.624	47.015
2045	11	760.085	851.008	669.161	45.566

2045	12	1,103.20	1,193.36	1,013.05	45.18
2046	1	1,453.86	1,555.99	1,351.73	51.181
2046	2	1,375.63	1,471.24	1,280.02	47.914
2046	3	1,191.49	1,283.22	1,099.75	45.971
2046	4	861.76	953.922	769.598	46.186
2046	5	692.825	787.153	598.498	47.271
2046	6	876.58	971.991	781.168	47.815
2046	7	1,102.09	1,196.58	1,007.60	47.352
2046	8	1,137.65	1,232.01	1,043.29	47.287
2046	9	1,019.71	1,114.58	924.844	47.541
2046	10	732.662	826.567	638.756	47.06
2046	11	757.569	848.502	666.635	45.571
2046	12	1,099.87	1,190.07	1,009.67	45.204
2047	1	1,450.03	1,552.49	1,347.57	51.347
2047	2	1,372.33	1,468.12	1,276.53	48.006
2047	3	1,188.44	1,280.23	1,096.65	46
2047	4	859.345	951.512	767.177	46.189
2047	5	691.057	785.45	596.664	47.304
2047	6	875.292	970.807	779.778	47.866
2047	7	1,101.18	1,195.77	1,006.60	47.402
2047	8	1,136.78	1,231.25	1,042.31	47.343
2047	9	1,018.65	1,113.64	923.657	47.603
2047	10	731.037	825.027	637.048	47.102
2047	11	755.246	846.19	664.303	45.575
2047	12	1,096.79	1,187.04	1,006.54	45.227
2048	1	1,446.33	1,549.13	1,343.53	51.517
2048	2	1,369.13	1,465.11	1,273.15	48.101
2048	3	1,215.58	1,306.90	1,124.27	45.76
2048	4	857.022	949.192	764.851	46.191
2048	5	689.366	783.82	594.912	47.335
2048	6	874.073	969.686	778.46	47.916
2048	7	1,100.34	1,195.03	1,005.66	47.45
2048	8	1,135.98	1,230.56	1,041.40	47.398
2048	9	1,017.66	1,112.77	922.545	47.664
2048	10	729.493	823.562	635.423	47.142
2048	11	753.018	843.97	662.067	45.58
2048	12	1,093.82	1,184.12	1,003.52	45.252
2049	1	1,442.79	1,545.92	1,339.67	51.681
2049	2	1,366.08	1,462.24	1,269.91	48.192
2049	3	1,182.69	1,274.60	1,090.78	46.06
2049	4	854.798	946.972	762.625	46.192
2049	5	687.748	782.262	593.234	47.365

2049	6	872.923	968.633	777.213	47.964
2049	7	1,099.58	1,194.36	1,004.80	47.498
2049	8	1,135.25	1,229.94	1,040.57	47.451
2049	9	1,016.74	1,111.97	921.514	47.723
2049	10	728.023	822.17	633.876	47.181
2049	11	750.888	841.848	659.928	45.584
2049	12	1,090.98	1,181.33	1,000.64	45.277
2050	1	1,439.37	1,542.82	1,335.93	51.842
2050	2	1,363.12	1,459.47	1,266.78	48.283
2050	3	1,179.97	1,271.94	1,088.00	46.09
2050	4	852.647	944.824	760.47	46.194
2050	5	686.184	780.756	591.611	47.394
2050	6	871.815	967.62	776.009	48.012
2050	7	1,098.85	1,193.72	1,003.98	47.545
2050	8	1,134.57	1,229.36	1,039.78	47.504
2050	9	1,015.87	1,111.22	920.528	47.78
2050	10	726.607	820.83	632.384	47.219
2050	11	748.829	839.797	657.861	45.588
2050	12	1,088.24	1,178.64	997.843	45.302

Year	Month	KU_GS_NonPVSales	XHeat	XCool	XOther	Jan	Feb	Mar	Apr	May	Jun	Jul
2011	1	206,484,876.00	1,053.22	0	89,293.52	1	0	0	0	0	0	0
2011	2	176,714,180.00	823.21	0	75,756.82	0	1	0	0	0	0	0
2011	3	158,412,141.00	557.4	9.39	81,303.63	0	0	1	0	0	0	0
2011	4	146,370,784.00	383.09	121.96	80,963.69	0	0	0	1	0	0	0
2011	5	141,282,522.00	169.3	412.32	81,942.13	0	0	0	0	1	0	0
2011	6	169,040,601.00	46.59	2,106.07	83,855.11	0	0	0	0	0	1	0
2011	7	178,993,405.00	0	2,877.70	80,492.04	0	0	0	0	0	0	1
2011	8	199,600,899.00	0	3,998.05	81,873.52	0	0	0	0	0	0	0
2011	9	181,948,138.00	24.14	2,375.59	84,722.44	0	0	0	0	0	0	0
2011	10	145,922,887.00	135.13	375.91	81,906.99	0	0	0	0	0	0	0
2011	11	131,500,375.00	327.95	18.77	76,049.86	0	0	0	0	0	0	0
2011	12	154,918,325.00	511.7	9.38	82,934.20	0	0	0	0	0	0	0
2012	1	178,279,974.00	726.21	0	86,656.48	1	0	0	0	0	0	0
2012	2	162,789,327.00	649.29	0	77,004.59	0	1	0	0	0	0	0
2012	3	149,790,087.00	466.11	86.66	76,751.15	0	0	1	0	0	0	0
2012	4	136,740,769.00	208.01	279.7	79,096.64	0	0	0	1	0	0	0
2012	5	145,052,136.00	144.28	605.14	79,231.93	0	0	0	0	1	0	0
2012	6	167,052,221.00	24.29	1,507.30	81,439.49	0	0	0	0	0	1	0
2012	7	191,306,307.00	1.24	3,809.26	78,722.95	0	0	0	0	0	0	1
2012	8	188,984,295.00	0	3,452.64	78,217.92	0	0	0	0	0	0	0
2012	9	177,276,370.00	14.84	2,229.29	80,152.05	0	0	0	0	0	0	0
2012	10	139,101,128.00	145.02	336.07	75,847.69	0	0	0	0	0	0	0
2012	11	140,347,319.00	386.94	34.99	75,863.03	0	0	0	0	0	0	0
2012	12	151,274,789.00	509.98	0	77,912.87	0	0	0	0	0	0	0
2013	1	178,258,911.00	734.37	0	81,149.45	1	0	0	0	0	0	0
2013	2	173,352,119.00	712.82	0	74,716.77	0	1	0	0	0	0	0
2013	3	163,946,342.00	638.26	0	73,494.08	0	0	1	0	0	0	0
2013	4	150,180,060.00	409.39	148.94	73,757.49	0	0	0	1	0	0	0
2013	5	132,932,198.00	141.96	424.52	74,307.19	0	0	0	0	1	0	0
2013	6	150,860,464.00	28.91	1,746.98	77,246.55	0	0	0	0	0	1	0
2013	7	167,928,560.00	0	2,776.11	76,856.56	0	0	0	0	0	0	1
2013	8	167,127,754.00	1.2	2,462.12	76,273.14	0	0	0	0	0	0	0
2013	9	170,935,228.00	6.31	2,575.21	78,699.05	0	0	0	0	0	0	0
2013	10	144,686,345.00	70.15	865.26	75,627.99	0	0	0	0	0	0	0
2013	11	133,494,161.00	330.34	58.3	73,801.09	0	0	0	0	0	0	0
2013	12	165,127,080.00	642.42	0	79,837.43	0	0	0	0	0	0	0
2014	1	196,459,924.00	838.7	0	82,311.89	1	0	0	0	0	0	0
2014	2	191,045,837.00	830.67	0	72,439.72	0	1	0	0	0	0	0
2014	3	169,108,543.00	633.77	0.86	73,728.75	0	0	1	0	0	0	0
2014	4	135,162,201.00	305.86	72.96	73,744.26	0	0	0	1	0	0	0
2014	5	131,836,959.00	105.81	652.7	74,789.12	0	0	0	0	1	0	0

2014	6	150,480,944.00	21.14	1,973.38	74,607.50	0	0	0	0	0	1	0
2014	7	164,892,551.00	0.23	2,782.88	75,202.22	0	0	0	0	0	0	1
2014	8	151,061,888.00	1.31	2,214.93	71,966.61	0	0	0	0	0	0	0
2014	9	161,517,495.00	10.02	2,611.86	75,207.03	0	0	0	0	0	0	0
2014	10	133,029,435.00	83.65	610.86	73,811.10	0	0	0	0	0	0	0
2014	11	130,066,754.00	380.39	40.75	72,657.09	0	0	0	0	0	0	0
2014	12	161,233,941.00	629.55	0	77,230.38	0	0	0	0	0	0	0
2015	1	173,973,302.00	756.9	0	77,598.72	1	0	0	0	0	0	0
2015	2	177,243,496.00	775.85	0	70,993.67	0	1	0	0	0	0	0
2015	3	171,709,207.00	696.33	0	72,350.90	0	0	1	0	0	0	0
2015	4	130,118,673.00	274.83	84.26	74,261.16	0	0	0	1	0	0	0
2015	5	121,362,907.00	115.24	665.71	68,271.25	0	0	0	0	1	0	0
2015	6	151,603,552.00	30.65	1,922.86	74,923.98	0	0	0	0	0	1	0
2015	7	160,980,081.00	0	2,668.95	72,234.43	0	0	0	0	0	0	1
2015	8	167,160,158.00	0	2,647.75	72,389.12	0	0	0	0	0	0	0
2015	9	165,100,010.00	7.41	2,135.08	76,860.69	0	0	0	0	0	0	0
2015	10	132,220,172.00	85.26	605.28	71,512.87	0	0	0	0	0	0	0
2015	11	121,689,220.00	249.27	54.96	71,910.48	0	0	0	0	0	0	0
2015	12	138,057,305.00	391.02	4.61	75,785.20	0	0	0	0	0	0	0
2016	1	160,306,845.00	593.57	0	75,968.58	1	0	0	0	0	0	0
2016	2	163,381,609.00	642.36	0	69,677.83	0	1	0	0	0	0	0
2016	3	140,532,452.00	386.44	7.39	68,476.01	0	0	1	0	0	0	0
2016	4	127,287,304.00	261.99	78.77	72,974.95	0	0	0	1	0	0	0
2016	5	122,926,805.00	104.69	355.81	70,222.12	0	0	0	0	1	0	0
2016	6	148,311,104.00	38	1,815.65	74,241.66	0	0	0	0	0	1	0
2016	7	173,010,653.00	0.15	3,122.51	74,702.39	0	0	0	0	0	0	1
2016	8	176,952,920.00	0	3,561.00	71,823.39	0	0	0	0	0	0	0
2016	9	174,854,436.00	1.43	3,040.66	74,542.64	0	0	0	0	0	0	0
2016	10	137,084,295.00	44.79	1,177.77	69,454.90	0	0	0	0	0	0	0
2016	11	122,793,283.00	197.2	380.8	70,981.74	0	0	0	0	0	0	0
2016	12	147,054,558.00	533.42	7.42	74,766.23	0	0	0	0	0	0	0
2017	1	166,001,183.00	607.76	0	76,388.15	1	0	0	0	0	0	0
2017	2	143,120,998.00	453.61	32.51	68,869.24	0	1	0	0	0	0	0
2017	3	132,388,449.00	366.83	31.26	68,575.40	0	0	1	0	0	0	0
2017	4	125,993,610.00	200.33	224.22	71,456.60	0	0	0	1	0	0	0
2017	5	128,233,484.00	88.93	752.2	72,108.15	0	0	0	0	1	0	0
2017	6	153,275,683.00	16.47	1,661.60	74,296.90	0	0	0	0	0	1	0
2017	7	164,171,663.00	0.61	2,753.11	73,670.83	0	0	0	0	0	0	1
2017	8	160,381,309.00	0	2,446.89	69,705.70	0	0	0	0	0	0	0
2017	9	148,584,626.00	18.58	1,380.62	73,078.77	0	0	0	0	0	0	0
2017	10	138,491,207.00	46.06	1,092.02	71,838.67	0	0	0	0	0	0	0
2017	11	121,717,572.00	279.45	129.54	68,351.95	0	0	0	0	0	0	0

2017	12	144,191,367.00	521.6	6.49	73,142.36	0	0	0	0	0	0	0
2018	1		676.83	0	75,395.21	1	0	0	0	0	0	0
2018	2		622.8	1.59	68,095.85	0	1	0	0	0	0	0
2018	3		501.71	9.26	68,278.27	0	0	1	0	0	0	0
2018	4		287.5	120.24	73,291.33	0	0	0	1	0	0	0
2018	5		124.75	411.67	72,304.41	0	0	0	0	1	0	0
2018	6		32.2	1,447.83	71,669.00	0	0	0	0	0	1	0
2018	7		0.84	2,610.80	73,651.73	0	0	0	0	0	0	1
2018	8		0.5	2,771.69	71,479.87	0	0	0	0	0	0	0
2018	9		7.38	2,185.93	72,615.54	0	0	0	0	0	0	0
2018	10		82.51	710.31	72,468.09	0	0	0	0	0	0	0
2018	11		274.75	80.91	71,235.35	0	0	0	0	0	0	0
2018	12		502.71	2.12	74,516.68	0	0	0	0	0	0	0
2019	1		673.49	0	74,470.01	1	0	0	0	0	0	0
2019	2		618.49	1.58	67,974.87	0	1	0	0	0	0	0
2019	3		497.24	9.2	70,650.94	0	0	1	0	0	0	0
2019	4		284.44	119.25	71,671.11	0	0	0	1	0	0	0
2019	5		123.17	407.46	70,000.41	0	0	0	0	1	0	0
2019	6		31.73	1,430.15	71,969.57	0	0	0	0	0	1	0
2019	7		0.83	2,574.33	72,007.36	0	0	0	0	0	0	1
2019	8		0.49	2,727.52	70,550.34	0	0	0	0	0	0	0
2019	9		7.23	2,146.79	72,003.03	0	0	0	0	0	0	0
2019	10		80.67	696.13	71,682.59	0	0	0	0	0	0	0
2019	11		268.08	79.14	71,119.49	0	0	0	0	0	0	0
2019	12		489.51	2.07	72,571.17	0	0	0	0	0	0	0
2020	1		660.6	0	73,879.69	1	0	0	0	0	0	0
2020	2		607.08	1.56	67,485.44	0	1	0	0	0	0	0
2020	3		488.43	9.09	72,525.92	0	0	1	0	0	0	0
2020	4		279.38	117.83	71,202.12	0	0	0	1	0	0	0
2020	5		121.07	402.87	69,591.92	0	0	0	0	1	0	0
2020	6		31.21	1,415.06	71,600.13	0	0	0	0	0	1	0
2020	7		0.81	2,545.86	71,601.07	0	0	0	0	0	0	1
2020	8		0.48	2,699.22	70,200.95	0	0	0	0	0	0	0
2020	9		7.12	2,125.98	71,695.73	0	0	0	0	0	0	0
2020	10		79.42	689.44	71,383.35	0	0	0	0	0	0	0
2020	11		264.11	78.43	70,870.47	0	0	0	0	0	0	0
2020	12		482.6	2.05	72,365.52	0	0	0	0	0	0	0
2021	1		651.66	0	73,729.84	1	0	0	0	0	0	0
2021	2		599.15	1.55	67,380.22	0	1	0	0	0	0	0
2021	3		482.27	9.03	70,116.62	0	0	1	0	0	0	0
2021	4		275.97	117.09	71,152.53	0	0	0	1	0	0	0
2021	5		119.64	400.56	69,576.04	0	0	0	0	1	0	0

2021	6	30.86	1,407.59	71,617.29	0	0	0	0	0	1	0
2021	7	0.81	2,534.72	71,683.31	0	0	0	0	0	0	1
2021	8	0.48	2,688.67	70,314.41	0	0	0	0	0	0	0
2021	9	7.05	2,118.66	71,845.10	0	0	0	0	0	0	0
2021	10	78.7	687.31	71,557.73	0	0	0	0	0	0	0
2021	11	261.83	78.22	71,076.67	0	0	0	0	0	0	0
2021	12	478.65	2.04	72,609.81	0	0	0	0	0	0	0
2022	1	639.14	0	73,915.77	1	0	0	0	0	0	0
2022	2	587.52	1.54	67,535.38	0	1	0	0	0	0	0
2022	3	472.8	8.95	70,262.71	0	0	1	0	0	0	0
2022	4	270.47	116	71,278.39	0	0	0	1	0	0	0
2022	5	117.23	396.72	69,683.85	0	0	0	0	1	0	0
2022	6	30.23	1,393.80	71,712.56	0	0	0	0	0	1	0
2022	7	0.79	2,508.92	71,750.80	0	0	0	0	0	0	1
2022	8	0.47	2,660.71	70,365.17	0	0	0	0	0	0	0
2022	9	6.9	2,096.17	71,881.19	0	0	0	0	0	0	0
2022	10	77.02	679.92	71,583.26	0	0	0	0	0	0	0
2022	11	256.19	77.36	71,086.41	0	0	0	0	0	0	0
2022	12	468.23	2.02	72,603.80	0	0	0	0	0	0	0
2023	1	635.96	0	73,845.93	1	0	0	0	0	0	0
2023	2	584.49	1.53	67,459.45	0	1	0	0	0	0	0
2023	3	470.28	8.88	70,171.15	0	0	1	0	0	0	0
2023	4	268.91	115.14	71,155.25	0	0	0	1	0	0	0
2023	5	116.54	393.7	69,551.06	0	0	0	0	1	0	0
2023	6	30.05	1,382.95	71,563.16	0	0	0	0	0	1	0
2023	7	0.78	2,488.96	71,589.18	0	0	0	0	0	0	1
2023	8	0.47	2,639.08	70,194.23	0	0	0	0	0	0	0
2023	9	6.85	2,078.76	71,693.89	0	0	0	0	0	0	0
2023	10	76.49	674.13	71,381.64	0	0	0	0	0	0	0
2023	11	254.39	76.69	70,873.71	0	0	0	0	0	0	0
2023	12	464.87	2	72,373.84	0	0	0	0	0	0	0
2024	1	630.55	0	73,747.02	1	0	0	0	0	0	0
2024	2	579.51	1.52	67,369.10	0	1	0	0	0	0	0
2024	3	466.28	8.83	72,406.08	0	0	1	0	0	0	0
2024	4	266.65	114.42	71,068.43	0	0	0	1	0	0	0
2024	5	115.56	391.25	69,466.19	0	0	0	0	1	0	0
2024	6	29.8	1,374.32	71,475.84	0	0	0	0	0	1	0
2024	7	0.78	2,472.91	71,486.88	0	0	0	0	0	0	1
2024	8	0.46	2,622.06	70,093.93	0	0	0	0	0	0	0
2024	9	6.8	2,065.36	71,591.45	0	0	0	0	0	0	0
2024	10	75.82	669.62	71,261.98	0	0	0	0	0	0	0
2024	11	252.14	76.18	70,754.90	0	0	0	0	0	0	0

2024	12	460.75	1.99	72,252.52	0	0	0	0	0	0	0
2025	1	624.86	0	73,617.79	1	0	0	0	0	0	0
2025	2	574.28	1.51	67,251.05	0	1	0	0	0	0	0
2025	3	462.07	8.77	69,954.36	0	0	1	0	0	0	0
2025	4	264.23	113.63	70,940.65	0	0	0	1	0	0	0
2025	5	114.51	388.56	69,341.30	0	0	0	0	1	0	0
2025	6	29.52	1,364.88	71,347.33	0	0	0	0	0	1	0
2025	7	0.77	2,456.22	71,366.98	0	0	0	0	0	0	1
2025	8	0.46	2,604.37	69,976.36	0	0	0	0	0	0	0
2025	9	6.73	2,051.42	71,471.37	0	0	0	0	0	0	0
2025	10	75.14	665.12	71,144.61	0	0	0	0	0	0	0
2025	11	249.89	75.67	70,638.37	0	0	0	0	0	0	0
2025	12	456.65	1.98	72,133.52	0	0	0	0	0	0	0
2026	1	616.9	0	73,507.38	1	0	0	0	0	0	0
2026	2	566.97	1.49	67,150.19	0	1	0	0	0	0	0
2026	3	456.18	8.7	69,849.45	0	0	1	0	0	0	0
2026	4	260.88	112.75	70,836.49	0	0	0	1	0	0	0
2026	5	113.06	385.54	69,239.49	0	0	0	0	1	0	0
2026	6	29.15	1,354.29	71,242.58	0	0	0	0	0	1	0
2026	7	0.76	2,437.28	71,265.82	0	0	0	0	0	0	1
2026	8	0.45	2,584.29	69,877.17	0	0	0	0	0	0	0
2026	9	6.65	2,035.60	71,370.06	0	0	0	0	0	0	0
2026	10	74.21	660.17	71,063.54	0	0	0	0	0	0	0
2026	11	246.8	75.1	70,557.87	0	0	0	0	0	0	0
2026	12	450.99	1.96	72,051.32	0	0	0	0	0	0	0
2027	1	609.57	0	73,473.70	1	0	0	0	0	0	0
2027	2	560.23	1.48	67,119.42	0	1	0	0	0	0	0
2027	3	450.76	8.64	69,817.44	0	0	1	0	0	0	0
2027	4	257.79	111.98	70,808.27	0	0	0	1	0	0	0
2027	5	111.72	382.9	69,211.90	0	0	0	0	1	0	0
2027	6	28.81	1,344.99	71,214.19	0	0	0	0	0	1	0
2027	7	0.75	2,420.65	71,240.38	0	0	0	0	0	0	1
2027	8	0.45	2,566.65	69,852.22	0	0	0	0	0	0	0
2027	9	6.57	2,021.71	71,344.58	0	0	0	0	0	0	0
2027	10	73.33	655.66	71,037.27	0	0	0	0	0	0	0
2027	11	243.89	74.59	70,531.78	0	0	0	0	0	0	0
2027	12	445.67	1.95	72,024.68	0	0	0	0	0	0	0
2028	1	602.39	0	73,478.31	1	0	0	0	0	0	0
2028	2	553.64	1.47	67,123.63	0	1	0	0	0	0	0
2028	3	445.46	8.58	72,142.26	0	0	1	0	0	0	0
2028	4	254.77	111.25	70,816.99	0	0	0	1	0	0	0
2028	5	110.41	380.41	69,220.42	0	0	0	0	1	0	0

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2028	6	28.47	1,336.26	71,222.96	0	0	0	0	0	1	0
2028	7	0.74	2,405.17	71,255.97	0	0	0	0	0	0	1
2028	8	0.44	2,550.23	69,867.52	0	0	0	0	0	0	0
2028	9	6.49	2,008.78	71,360.20	0	0	0	0	0	0	0
2028	10	72.49	651.52	71,058.46	0	0	0	0	0	0	0
2028	11	241.07	74.12	70,552.83	0	0	0	0	0	0	0
2028	12	440.53	1.94	72,046.17	0	0	0	0	0	0	0
2029	1	594.96	0	73,523.98	1	0	0	0	0	0	0
2029	2	546.8	1.46	67,165.35	0	1	0	0	0	0	0
2029	3	439.96	8.53	69,865.23	0	0	1	0	0	0	0
2029	4	251.64	110.59	70,865.48	0	0	0	1	0	0	0
2029	5	109.05	378.15	69,267.82	0	0	0	0	1	0	0
2029	6	28.12	1,328.30	71,271.73	0	0	0	0	0	1	0
2029	7	0.73	2,390.96	71,307.95	0	0	0	0	0	0	1
2029	8	0.44	2,535.16	69,918.49	0	0	0	0	0	0	0
2029	9	6.42	1,996.90	71,412.26	0	0	0	0	0	0	0
2029	10	71.61	647.73	71,117.34	0	0	0	0	0	0	0
2029	11	238.15	73.69	70,611.29	0	0	0	0	0	0	0
2029	12	435.18	1.93	72,105.87	0	0	0	0	0	0	0
2030	1	588.09	0	73,423.73	1	0	0	0	0	0	0
2030	2	540.49	1.46	67,073.77	0	1	0	0	0	0	0
2030	3	434.88	8.48	69,769.96	0	0	1	0	0	0	0
2030	4	248.8	110.02	70,785.31	0	0	0	1	0	0	0
2030	5	107.82	376.21	69,189.46	0	0	0	0	1	0	0
2030	6	27.8	1,321.52	71,191.11	0	0	0	0	0	1	0
2030	7	0.73	2,378.26	71,212.54	0	0	0	0	0	0	1
2030	8	0.43	2,521.70	69,824.94	0	0	0	0	0	0	0
2030	9	6.34	1,986.30	71,316.71	0	0	0	0	0	0	0
2030	10	70.78	644.29	71,022.10	0	0	0	0	0	0	0
2030	11	235.41	73.3	70,516.73	0	0	0	0	0	0	0
2030	12	430.17	1.91	72,009.31	0	0	0	0	0	0	0
2031	1	581.36	0	73,367.43	1	0	0	0	0	0	0
2031	2	534.31	1.45	67,022.34	0	1	0	0	0	0	0
2031	3	429.91	8.44	69,716.46	0	0	1	0	0	0	0
2031	4	245.86	109.43	70,705.09	0	0	0	1	0	0	0
2031	5	106.55	374.18	69,111.05	0	0	0	0	1	0	0
2031	6	27.47	1,314.38	71,110.43	0	0	0	0	0	1	0
2031	7	0.72	2,365.56	71,136.19	0	0	0	0	0	0	1
2031	8	0.43	2,508.23	69,750.07	0	0	0	0	0	0	0
2031	9	6.27	1,975.69	71,240.24	0	0	0	0	0	0	0
2031	10	69.94	640.72	70,931.09	0	0	0	0	0	0	0
2031	11	232.59	72.89	70,426.37	0	0	0	0	0	0	0

2031	12	425.03	1.9	71,917.03	0	0	0	0	0	0	0
2032	1	574.51	0	73,308.84	1	0	0	0	0	0	0
2032	2	528.01	1.44	66,968.82	0	1	0	0	0	0	0
2032	3	424.84	8.4	71,975.87	0	0	1	0	0	0	0
2032	4	243.01	108.86	70,661.54	0	0	0	1	0	0	0
2032	5	105.31	372.26	69,068.48	0	0	0	0	1	0	0
2032	6	27.15	1,307.62	71,066.62	0	0	0	0	0	1	0
2032	7	0.71	2,353.43	71,093.71	0	0	0	0	0	0	1
2032	8	0.42	2,495.37	69,708.41	0	0	0	0	0	0	0
2032	9	6.19	1,965.56	71,197.69	0	0	0	0	0	0	0
2032	10	69.13	637.43	70,888.57	0	0	0	0	0	0	0
2032	11	229.89	72.52	70,384.15	0	0	0	0	0	0	0
2032	12	420.1	1.89	71,873.92	0	0	0	0	0	0	0
2033	1	568.12	0	73,286.86	1	0	0	0	0	0	0
2033	2	522.13	1.43	66,948.74	0	1	0	0	0	0	0
2033	3	420.11	8.35	69,639.91	0	0	1	0	0	0	0
2033	4	240.28	108.31	70,633.32	0	0	0	1	0	0	0
2033	5	104.13	370.35	69,040.89	0	0	0	0	1	0	0
2033	6	26.85	1,300.93	71,038.24	0	0	0	0	0	1	0
2033	7	0.7	2,342.18	71,089.24	0	0	0	0	0	0	1
2033	8	0.42	2,483.44	69,704.03	0	0	0	0	0	0	0
2033	9	6.13	1,956.17	71,193.22	0	0	0	0	0	0	0
2033	10	68.39	634.5	70,896.87	0	0	0	0	0	0	0
2033	11	227.43	72.18	70,392.39	0	0	0	0	0	0	0
2033	12	415.6	1.89	71,882.33	0	0	0	0	0	0	0
2034	1	562.15	0	73,335.60	1	0	0	0	0	0	0
2034	2	516.65	1.43	66,993.26	0	1	0	0	0	0	0
2034	3	415.7	8.32	69,686.22	0	0	1	0	0	0	0
2034	4	237.78	107.86	70,687.94	0	0	0	1	0	0	0
2034	5	103.05	368.81	69,094.28	0	0	0	0	1	0	0
2034	6	26.57	1,295.49	71,093.17	0	0	0	0	0	1	0
2034	7	0.69	2,331.91	71,129.38	0	0	0	0	0	0	1
2034	8	0.41	2,472.55	69,743.39	0	0	0	0	0	0	0
2034	9	6.06	1,947.59	71,233.42	0	0	0	0	0	0	0
2034	10	67.65	631.65	70,929.57	0	0	0	0	0	0	0
2034	11	225	71.86	70,424.85	0	0	0	0	0	0	0
2034	12	411.15	1.88	71,915.49	0	0	0	0	0	0	0
2035	1	556.33	0	73,401.89	1	0	0	0	0	0	0
2035	2	511.3	1.42	67,053.82	0	1	0	0	0	0	0
2035	3	411.4	8.28	69,749.21	0	0	1	0	0	0	0
2035	4	235.3	107.39	70,745.14	0	0	0	1	0	0	0
2035	5	101.97	367.21	69,150.19	0	0	0	0	1	0	0

2035	6	26.29	1,289.88	71,150.70	0	0	0	0	0	1	0
2035	7	0.69	2,321.87	71,188.77	0	0	0	0	0	0	1
2035	8	0.41	2,461.91	69,801.63	0	0	0	0	0	0	0
2035	9	6	1,939.20	71,292.90	0	0	0	0	0	0	0
2035	10	66.95	628.92	70,988.01	0	0	0	0	0	0	0
2035	11	222.65	71.55	70,482.88	0	0	0	0	0	0	0
2035	12	406.86	1.87	71,974.74	0	0	0	0	0	0	0
2036	1	550.87	0	73,480.81	1	0	0	0	0	0	0
2036	2	506.28	1.42	67,125.91	0	1	0	0	0	0	0
2036	3	407.36	8.25	72,144.72	0	0	1	0	0	0	0
2036	4	233	106.95	70,826.77	0	0	0	1	0	0	0
2036	5	100.98	365.73	69,229.98	0	0	0	0	1	0	0
2036	6	26.04	1,284.68	71,232.80	0	0	0	0	0	1	0
2036	7	0.68	2,312.37	71,266.66	0	0	0	0	0	0	1
2036	8	0.4	2,451.83	69,878.00	0	0	0	0	0	0	0
2036	9	5.94	1,931.27	71,370.90	0	0	0	0	0	0	0
2036	10	66.3	626.39	71,070.06	0	0	0	0	0	0	0
2036	11	220.48	71.26	70,564.34	0	0	0	0	0	0	0
2036	12	402.9	1.86	72,057.93	0	0	0	0	0	0	0
2037	1	545.25	0	73,587.28	1	0	0	0	0	0	0
2037	2	501.12	1.41	67,223.18	0	1	0	0	0	0	0
2037	3	403.2	8.22	69,925.38	0	0	1	0	0	0	0
2037	4	230.64	106.55	70,931.28	0	0	0	1	0	0	0
2037	5	99.95	364.36	69,332.13	0	0	0	0	1	0	0
2037	6	25.77	1,279.86	71,337.91	0	0	0	0	0	1	0
2037	7	0.67	2,303.98	71,381.04	0	0	0	0	0	0	1
2037	8	0.4	2,442.94	69,990.15	0	0	0	0	0	0	0
2037	9	5.88	1,924.27	71,485.45	0	0	0	0	0	0	0
2037	10	65.63	624.13	71,186.19	0	0	0	0	0	0	0
2037	11	218.28	71	70,679.65	0	0	0	0	0	0	0
2037	12	398.87	1.86	72,175.68	0	0	0	0	0	0	0
2038	1	539.9	0	73,713.56	1	0	0	0	0	0	0
2038	2	496.2	1.41	67,338.54	0	1	0	0	0	0	0
2038	3	399.25	8.19	70,045.37	0	0	1	0	0	0	0
2038	4	228.35	106.19	71,045.76	0	0	0	1	0	0	0
2038	5	98.96	363.1	69,444.04	0	0	0	0	1	0	0
2038	6	25.52	1,275.44	71,453.05	0	0	0	0	0	1	0
2038	7	0.67	2,295.85	71,490.85	0	0	0	0	0	0	1
2038	8	0.4	2,434.32	70,097.82	0	0	0	0	0	0	0
2038	9	5.82	1,917.47	71,595.42	0	0	0	0	0	0	0
2038	10	64.97	621.88	71,289.50	0	0	0	0	0	0	0
2038	11	216.08	70.75	70,782.22	0	0	0	0	0	0	0

2038	12	394.85	1.85	72,280.42	0	0	0	0	0	0	0
2039	1	534.51	0	73,830.00	1	0	0	0	0	0	0
2039	2	491.25	1.4	67,444.90	0	1	0	0	0	0	0
2039	3	395.26	8.16	70,156.01	0	0	1	0	0	0	0
2039	4	226.05	105.8	71,151.65	0	0	0	1	0	0	0
2039	5	97.96	361.8	69,547.53	0	0	0	0	1	0	0
2039	6	25.26	1,270.87	71,559.54	0	0	0	0	0	1	0
2039	7	0.66	2,287.48	71,592.97	0	0	0	0	0	0	1
2039	8	0.39	2,425.45	70,197.95	0	0	0	0	0	0	0
2039	9	5.76	1,910.49	71,697.69	0	0	0	0	0	0	0
2039	10	64.33	619.75	71,407.47	0	0	0	0	0	0	0
2039	11	213.94	70.51	70,899.35	0	0	0	0	0	0	0
2039	12	390.94	1.84	72,400.03	0	0	0	0	0	0	0
2040	1	529.21	0	73,966.16	1	0	0	0	0	0	0
2040	2	486.38	1.4	67,569.29	0	1	0	0	0	0	0
2040	3	391.34	8.14	72,621.24	0	0	1	0	0	0	0
2040	4	223.91	105.52	71,315.05	0	0	0	1	0	0	0
2040	5	97.04	360.83	69,707.25	0	0	0	0	1	0	0
2040	6	25.02	1,267.49	71,723.88	0	0	0	0	0	1	0
2040	7	0.65	2,280.95	71,743.28	0	0	0	0	0	0	1
2040	8	0.39	2,418.52	70,345.33	0	0	0	0	0	0	0
2040	9	5.71	1,905.03	71,848.22	0	0	0	0	0	0	0
2040	10	63.71	618.04	71,564.38	0	0	0	0	0	0	0
2040	11	211.89	70.31	71,055.15	0	0	0	0	0	0	0
2040	12	387.2	1.84	72,559.12	0	0	0	0	0	0	0
2041	1	524.13	0	74,082.88	1	0	0	0	0	0	0
2041	2	481.71	1.39	67,675.92	0	1	0	0	0	0	0
2041	3	387.58	8.11	70,396.31	0	0	1	0	0	0	0
2041	4	221.73	105.2	71,419.57	0	0	0	1	0	0	0
2041	5	96.09	359.71	69,809.42	0	0	0	0	1	0	0
2041	6	24.78	1,263.55	71,829.00	0	0	0	0	0	1	0
2041	7	0.65	2,273.66	71,842.24	0	0	0	0	0	0	1
2041	8	0.38	2,410.80	70,442.36	0	0	0	0	0	0	0
2041	9	5.65	1,898.94	71,947.32	0	0	0	0	0	0	0
2041	10	63.06	615.77	71,628.93	0	0	0	0	0	0	0
2041	11	209.71	70.05	71,119.24	0	0	0	0	0	0	0
2041	12	383.22	1.83	72,624.57	0	0	0	0	0	0	0
2042	1	518.84	0	74,145.36	1	0	0	0	0	0	0
2042	2	476.84	1.39	67,732.99	0	1	0	0	0	0	0
2042	3	383.67	8.08	70,455.68	0	0	1	0	0	0	0
2042	4	219.41	104.8	71,452.49	0	0	0	1	0	0	0
2042	5	95.09	358.35	69,841.59	0	0	0	0	1	0	0

2042	6	24.52	1,258.76	71,862.10	0	0	0	0	0	1	0
2042	7	0.64	2,266.31	71,915.51	0	0	0	0	0	0	1
2042	8	0.38	2,403.00	70,514.20	0	0	0	0	0	0	0
2042	9	5.59	1,892.80	72,020.70	0	0	0	0	0	0	0
2042	10	62.45	613.95	71,721.84	0	0	0	0	0	0	0
2042	11	207.69	69.85	71,211.49	0	0	0	0	0	0	0
2042	12	379.52	1.82	72,718.77	0	0	0	0	0	0	0
2043	1	513.99	0	74,227.77	1	0	0	0	0	0	0
2043	2	472.39	1.38	67,808.28	0	1	0	0	0	0	0
2043	3	380.09	8.06	70,533.99	0	0	1	0	0	0	0
2043	4	217.45	104.51	71,559.26	0	0	0	1	0	0	0
2043	5	94.23	357.38	69,945.96	0	0	0	0	1	0	0
2043	6	24.3	1,255.37	71,969.49	0	0	0	0	0	1	0
2043	7	0.63	2,259.64	72,004.72	0	0	0	0	0	0	1
2043	8	0.38	2,395.93	70,601.67	0	0	0	0	0	0	0
2043	9	5.54	1,887.23	72,110.04	0	0	0	0	0	0	0
2043	10	61.87	612.13	71,809.28	0	0	0	0	0	0	0
2043	11	205.77	69.64	71,298.31	0	0	0	0	0	0	0
2043	12	376.02	1.82	72,807.43	0	0	0	0	0	0	0
2044	1	510.01	0	74,352.37	1	0	0	0	0	0	0
2044	2	468.73	1.38	67,922.10	0	1	0	0	0	0	0
2044	3	377.14	8.04	73,000.43	0	0	1	0	0	0	0
2044	4	215.77	104.28	71,681.98	0	0	0	1	0	0	0
2044	5	93.51	356.59	70,065.91	0	0	0	0	1	0	0
2044	6	24.11	1,252.59	72,092.91	0	0	0	0	0	1	0
2044	7	0.63	2,254.73	72,131.48	0	0	0	0	0	0	1
2044	8	0.37	2,390.72	70,725.97	0	0	0	0	0	0	0
2044	9	5.5	1,883.13	72,236.99	0	0	0	0	0	0	0
2044	10	61.4	610.83	71,939.15	0	0	0	0	0	0	0
2044	11	204.2	69.49	71,427.25	0	0	0	0	0	0	0
2044	12	373.16	1.82	72,939.10	0	0	0	0	0	0	0
2045	1	506.08	0	74,500.60	1	0	0	0	0	0	0
2045	2	465.12	1.38	68,057.51	0	1	0	0	0	0	0
2045	3	374.24	8.03	70,793.24	0	0	1	0	0	0	0
2045	4	214.07	104.08	71,813.32	0	0	0	1	0	0	0
2045	5	92.77	355.9	70,194.29	0	0	0	0	1	0	0
2045	6	23.92	1,250.16	72,225.00	0	0	0	0	0	1	0
2045	7	0.62	2,250.02	72,252.36	0	0	0	0	0	0	1
2045	8	0.37	2,385.72	70,844.49	0	0	0	0	0	0	0
2045	9	5.46	1,879.19	72,358.04	0	0	0	0	0	0	0
2045	10	60.9	609.49	72,051.79	0	0	0	0	0	0	0
2045	11	202.55	69.34	71,539.09	0	0	0	0	0	0	0

2045	12	370.12	1.81	73,053.31	0	0	0	0	0	0	0
2046	1	501.54	0	74,556.30	1	0	0	0	0	0	0
2046	2	460.95	1.37	68,108.39	0	1	0	0	0	0	0
2046	3	370.88	8.01	70,846.18	0	0	1	0	0	0	0
2046	4	212.15	103.81	71,867.10	0	0	0	1	0	0	0
2046	5	91.94	354.97	70,246.86	0	0	0	0	1	0	0
2046	6	23.71	1,246.91	72,279.10	0	0	0	0	0	1	0
2046	7	0.62	2,244.14	72,306.03	0	0	0	0	0	0	1
2046	8	0.37	2,379.49	70,897.11	0	0	0	0	0	0	0
2046	9	5.41	1,874.28	72,411.79	0	0	0	0	0	0	0
2046	10	60.35	607.88	72,103.30	0	0	0	0	0	0	0
2046	11	200.72	69.15	71,590.24	0	0	0	0	0	0	0
2046	12	366.79	1.81	73,105.54	0	0	0	0	0	0	0
2047	1	497.14	0	74,601.43	1	0	0	0	0	0	0
2047	2	456.9	1.37	68,149.62	0	1	0	0	0	0	0
2047	3	367.62	7.99	70,889.06	0	0	1	0	0	0	0
2047	4	210.26	103.55	71,901.66	0	0	0	1	0	0	0
2047	5	91.12	354.07	70,280.64	0	0	0	0	1	0	0
2047	6	23.49	1,243.73	72,313.85	0	0	0	0	0	1	0
2047	7	0.61	2,238.22	72,334.20	0	0	0	0	0	0	1
2047	8	0.36	2,373.21	70,924.74	0	0	0	0	0	0	0
2047	9	5.36	1,869.34	72,440.00	0	0	0	0	0	0	0
2047	10	59.81	606.22	72,125.47	0	0	0	0	0	0	0
2047	11	198.9	68.97	71,612.25	0	0	0	0	0	0	0
2047	12	363.46	1.8	73,128.01	0	0	0	0	0	0	0
2048	1	492.77	0	74,629.35	1	0	0	0	0	0	0
2048	2	452.89	1.37	68,175.12	0	1	0	0	0	0	0
2048	3	364.39	7.97	73,272.37	0	0	1	0	0	0	0
2048	4	208.39	103.29	71,919.61	0	0	0	1	0	0	0
2048	5	90.31	353.2	70,298.19	0	0	0	0	1	0	0
2048	6	23.28	1,240.69	72,331.91	0	0	0	0	0	1	0
2048	7	0.61	2,232.55	72,345.67	0	0	0	0	0	0	1
2048	8	0.36	2,367.20	70,935.98	0	0	0	0	0	0	0
2048	9	5.31	1,864.60	72,451.48	0	0	0	0	0	0	0
2048	10	59.26	604.64	72,130.98	0	0	0	0	0	0	0
2048	11	197.09	68.79	71,617.71	0	0	0	0	0	0	0
2048	12	360.16	1.8	73,133.60	0	0	0	0	0	0	0
2049	1	488.29	0	74,642.67	1	0	0	0	0	0	0
2049	2	448.77	1.36	68,187.29	0	1	0	0	0	0	0
2049	3	361.08	7.95	70,928.25	0	0	1	0	0	0	0
2049	4	206.47	102.99	71,923.51	0	0	0	1	0	0	0
2049	5	89.48	352.16	70,302.00	0	0	0	0	1	0	0

2049	6	23.07	1,237.04	72,335.83	0	0	0	0	0	1	0
2049	7	0.6	2,225.77	72,342.99	0	0	0	0	0	0	1
2049	8	0.36	2,360.01	70,933.35	0	0	0	0	0	0	0
2049	9	5.26	1,858.94	72,448.80	0	0	0	0	0	0	0
2049	10	58.71	602.75	72,122.38	0	0	0	0	0	0	0
2049	11	195.24	68.57	71,609.18	0	0	0	0	0	0	0
2049	12	356.78	1.79	73,124.88	0	0	0	0	0	0	0
2050	1	483.85	0	74,640.54	1	0	0	0	0	0	0
2050	2	444.68	1.36	68,185.34	0	1	0	0	0	0	0
2050	3	357.79	7.93	70,926.22	0	0	1	0	0	0	0
2050	4	204.57	102.82	71,912.50	0	0	0	1	0	0	0
2050	5	88.65	351.58	70,291.24	0	0	0	0	1	0	0
2050	6	22.86	1,235.00	72,324.76	0	0	0	0	0	1	0
2050	7	0.6	2,221.90	72,325.32	0	0	0	0	0	0	1
2050	8	0.35	2,355.91	70,916.03	0	0	0	0	0	0	0
2050	9	5.21	1,855.71	72,431.11	0	0	0	0	0	0	0
2050	10	58.16	601.66	72,098.85	0	0	0	0	0	0	0
2050	11	193.41	68.45	71,585.81	0	0	0	0	0	0	0
2050	12	353.43	1.79	73,101.02	0	0	0	0	0	0	0

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	Count	Mean	StdDev	Min	Max
KU_GS_NonPVSales	84	155,073,512.46	20,305,618.38	121,362,907.00	206,484,876.00
XHeat	84	281.574	283.85	0	1,053.22
XCool	84	970.387	1,193.86	0	3,998.05
XOther	84	75,593.58	4,366.35	68,271.25	89,293.52
Jan	84	0.083	0.278	0	1
Feb	84	0.083	0.278	0	1
Mar	84	0.083	0.278	0	1
Apr	84	0.083	0.278	0	1
May	84	0.083	0.278	0	1
Jun	84	0.083	0.278	0	1
Jul	84	0.083	0.278	0	1
Aug	84	0.083	0.278	0	1
Sep	84	0.083	0.278	0	1
Oct	84	0.083	0.278	0	1
Dec	84	0.083	0.278	0	1
BTWMay12Apr14	84	0.143	0.352	0	1
AftMay2014	84	0.512	0.503	0	1

Skewness	Kurtosis	Jarque-Bera	Probability	CorrYX	Units	Definition
0.256	2.365	2.3	3.12E-01	1		
0.69	2.245	8.7	1.31E-02	0.244		
0.922	2.427	13	1.47E-03	0.418		
0.653	3.286	6.2	4.40E-02	0.538		
3.015	10.091	303.3	0.00E+00	0.372		
3.015	10.091	303.3	0.00E+00	0.218		
3.015	10.091	303.3	0.00E+00	0.001		
3.015	10.091	303.3	0.00E+00	-0.285		
3.015	10.091	303.3	0.00E+00	-0.345		
3.015	10.091	303.3	0.00E+00	0.011		
3.015	10.091	303.3	0.00E+00	0.247		
3.015	10.091	303.3	0.00E+00	0.268		
3.015	10.091	303.3	0.00E+00	0.202		
3.015	10.091	303.3	0.00E+00	-0.245		
3.015	10.091	303.3	0.00E+00	-0.05		
2.041	5.167	74.8	1.11E-16	0.221		
-0.048	1.002	14	9.12E-04	-0.335		

	KU_GS_NonPVSales	XHeat	XCool	XOther	Jan	Feb	Mar	Apr
KU_GS_NonPVSales	1	0.244	0.418	0.538	0.372	0.218	0.001	-0.285
XHeat	0.244	1	-0.747	0.165	0.51	0.445	0.271	0.011
XCool	0.418	-0.747	1	0.087	-0.247	-0.245	-0.242	-0.21
XOther	0.538	0.165	0.087	1	0.399	-0.195	-0.144	-0.029
Jan	0.372	0.51	-0.247	0.399	1	-0.091	-0.091	-0.091
Feb	0.218	0.445	-0.245	-0.195	-0.091	1	-0.091	-0.091
Mar	0.001	0.271	-0.242	-0.144	-0.091	-0.091	1	-0.091
Apr	-0.285	0.011	-0.21	-0.029	-0.091	-0.091	-0.091	1
May	-0.345	-0.168	-0.106	-0.082	-0.091	-0.091	-0.091	-0.091
Jun	0.011	-0.269	0.216	0.114	-0.091	-0.091	-0.091	-0.091
Jul	0.247	-0.301	0.508	0.027	-0.091	-0.091	-0.091	-0.091
Aug	0.268	-0.301	0.508	-0.069	-0.091	-0.091	-0.091	-0.091
Sep	0.202	-0.288	0.347	0.14	-0.091	-0.091	-0.091	-0.091
Oct	-0.245	-0.208	-0.063	-0.091	-0.091	-0.091	-0.091	-0.091
Dec	-0.05	0.27	-0.246	0.124	-0.091	-0.091	-0.091	-0.091
BTWMay12Apr14	0.221	0.055	0.012	0.176	0	0	0	0
AftMay2014	-0.335	-0.185	0.067	-0.666	-0.05	-0.05	-0.05	-0.05

May	Jun	Jul	Aug	Sep	Oct	Dec	BTWMay12Apr14	AftMay2014
-0.345	0.011	0.247	0.268	0.202	-0.245	-0.05	0.221	-0.335
-0.168	-0.269	-0.301	-0.301	-0.288	-0.208	0.27	0.055	-0.185
-0.106	0.216	0.508	0.508	0.347	-0.063	-0.246	0.012	0.067
-0.082	0.114	0.027	-0.069	0.14	-0.091	0.124	0.176	-0.666
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0	-0.05
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0	-0.05
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0	-0.05
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0	-0.05
1	-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	0	-0.05
-0.091	1	-0.091	-0.091	-0.091	-0.091	-0.091	0	0.036
-0.091	-0.091	1	-0.091	-0.091	-0.091	-0.091	0	0.036
-0.091	-0.091	-0.091	1	-0.091	-0.091	-0.091	0	0.036
-0.091	-0.091	-0.091	-0.091	1	-0.091	-0.091	0	0.036
-0.091	-0.091	-0.091	-0.091	-0.091	1	-0.091	0	0.036
-0.091	-0.091	-0.091	-0.091	-0.091	-0.091	1	0	0.036
0	0	0	0	0	0	0	1	-0.418
-0.05	0.036	0.036	0.036	0.036	0.036	0.036	-0.418	1

Variable	Coefficient	StdErr	T-Stat	P-Value	Units	Definition
CommercialVars.XHeat	81861.538	5991.585	13.663	0.00%		
CommercialVars.XCool	15656.831	1466.417	10.677	0.00%		
CommercialVars.XOther	1372.135	33.464	41.003	0.00%		
BinaryVars.Jan	4654214.698	3192447.933	1.458	14.95%		
BinaryVars.Feb	10967657.78	3016017.794	3.636	0.05%		
BinaryVars.Mar	8539572.341	2361496.758	3.616	0.06%		
BinaryVars.Apr	5065081.798	2004833.689	2.526	1.39%		
BinaryVars.May	9417624.463	2343214.261	4.019	0.02%		
BinaryVars.Jun	17118475.81	3484840.856	4.912	0.00%		
BinaryVars.Jul	19001373.21	4769773.258	3.984	0.02%		
BinaryVars.Aug	22328626.51	4754065.297	4.697	0.00%		
BinaryVars.Sep	22755307.67	4048300.752	5.621	0.00%		
BinaryVars.Oct	16435257.52	2501221.552	6.571	0.00%		
BinaryVars.Dec	-91553.98	2366327.088	-0.039	96.92%		
BinaryVars.BTWMay12Apr14	6483182.488	1269484.577	5.107	0.00%		
BinaryVars.AftMay2014	1570332.614	874303.544	1.796	7.69%		

Model Statistics		Forecast Statistics	
Iterations		1	Forecast Observations
Adjusted Observations		84	Mean Abs. Dev. (MAD)
Deg. of Freedom for Error		68	Mean Abs. % Err. (MAPE)
R-Squared		0.973	Avg. Forecast Error
Adjusted R-Squared		0.967	Mean % Error
AIC		30.417	Root Mean-Square Error
BIC		30.88	Theil's Inequality Coefficient
F-Statistic	#NA		#NAME?
Prob (F-Statistic)	#NA		#NAME?
Log-Likelihood		-1,380.69	#NAME?
Model Sum of Squares	33,292,073,644,377,800.00		
Sum of Squared Errors	930,331,784,321,815.00		
Mean Squared Error	13,681,349,769,438.40		
Std. Error of Regression	3,698,830.87		
Mean Abs. Dev. (MAD)	2,650,334.39		
Mean Abs. % Err. (MAPE)	1.70%		
Durbin-Watson Statistic	1.16		
Durbin-H Statistic	#NA		
Ljung-Box Statistic	63.45		
Prob (Ljung-Box)	0		
Skewness	-0.17		
Kurtosis	2.819		
Jarque-Bera	0.518		
Prob (Jarque-Bera)	0.7717		

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Year	Month	Actual	Pred	Resid	%Resid	StdResid
2011	1	206,484,876.00	213,394,891.95	-6,910,015.95	-3.35%	-1.868
2011	2	176,714,180.00	182,305,890.17	-5,591,710.17	-3.16%	-1.512
2011	3	158,412,141.00	165,876,125.14	-7,463,984.14	-4.71%	-2.018
2011	4	146,370,784.00	149,428,325.61	-3,057,541.61	-2.09%	-0.827
2011	5	141,282,522.00	142,168,178.43	-885,656.43	-0.63%	-0.239
2011	6	169,040,601.00	168,967,454.58	73,146.42	0.04%	0.02
2011	7	178,993,405.00	174,502,986.69	4,490,418.31	2.51%	1.214
2011	8	199,600,899.00	197,267,003.62	2,333,895.38	1.17%	0.631
2011	9	181,948,138.00	178,176,201.74	3,771,936.26	2.07%	1.02
2011	10	145,922,887.00	145,770,439.76	152,447.24	0.10%	0.041
2011	11	131,500,375.00	131,490,748.93	9,626.07	0.01%	0.003
2011	12	154,918,325.00	155,740,392.50	-822,067.50	-0.53%	-0.222
2012	1	178,279,974.00	183,007,250.61	-4,727,276.61	-2.65%	-1.278
2012	2	162,789,327.00	169,780,457.15	-6,991,130.15	-4.29%	-1.89
2012	3	149,790,087.00	153,365,449.75	-3,575,362.75	-2.39%	-0.967
2012	4	136,740,769.00	135,003,432.21	1,737,336.79	1.27%	0.47
2012	5	145,052,136.00	145,902,904.63	-850,768.63	-0.59%	-0.23
2012	6	167,052,221.00	160,935,288.28	6,116,932.72	3.66%	1.654
2012	7	191,306,307.00	193,245,311.65	-1,939,004.65	-1.01%	-0.524
2012	8	188,984,295.00	190,194,695.61	-1,210,400.61	-0.64%	-0.327
2012	9	177,276,370.00	175,336,624.88	1,939,745.12	1.09%	0.524
2012	10	139,101,128.00	144,124,731.15	-5,023,603.15	-3.61%	-1.358
2012	11	140,347,319.00	142,800,815.94	-2,453,496.94	-1.75%	-0.663
2012	12	151,274,789.00	155,045,992.79	-3,771,203.79	-2.49%	-1.02
2013	1	178,258,911.00	176,118,997.94	2,139,913.06	1.20%	0.579
2013	2	173,352,119.00	171,841,597.26	1,510,521.74	0.87%	0.408
2013	3	163,946,342.00	161,632,189.27	2,314,152.73	1.41%	0.626
2013	4	150,180,060.00	142,115,212.23	8,064,847.77	5.37%	2.18
2013	5	132,932,198.00	129,644,780.28	3,287,417.72	2.47%	0.889
2013	6	150,860,464.00	152,829,692.46	-1,969,228.46	-1.31%	-0.532
2013	7	167,928,560.00	167,924,034.41	4,525.59	0.00%	0.001
2013	8	167,127,754.00	165,632,912.66	1,494,841.34	0.89%	0.404
2013	9	170,935,228.00	171,577,230.00	-642,002.00	-0.38%	-0.174
2013	10	144,686,345.00	139,496,961.44	5,189,383.56	3.59%	1.403
2013	11	133,494,161.00	129,219,688.28	4,274,472.73	3.20%	1.156
2013	12	165,127,080.00	162,045,550.84	3,081,529.16	1.87%	0.833
2014	1	196,459,924.00	192,737,398.77	3,722,525.23	1.89%	1.006
2014	2	191,045,837.00	184,847,914.70	6,197,922.30	3.24%	1.676
2014	3	169,108,543.00	168,083,252.86	1,025,290.14	0.61%	0.277
2014	4	135,162,201.00	138,916,138.74	-3,753,937.74	-2.78%	-1.015
2014	5	131,836,959.00	130,919,145.59	917,813.41	0.70%	0.248

2014	6	150,480,944.00	153,688,126.99	-3,207,182.99	-2.13%	-0.867
2014	7	164,892,551.00	167,349,363.27	-2,456,812.27	-1.49%	-0.664
2014	8	151,061,888.00	157,433,018.04	-6,371,130.04	-4.22%	-1.722
2014	9	161,517,495.00	169,233,274.45	-7,715,779.45	-4.78%	-2.086
2014	10	133,029,435.00	135,696,302.11	-2,666,867.11	-2.00%	-0.721
2014	11	130,066,754.00	133,043,060.16	-2,976,306.16	-2.29%	-0.805
2014	12	161,233,941.00	158,985,443.88	2,248,497.12	1.39%	0.608
2015	1	173,973,302.00	174,661,286.41	-687,984.41	-0.40%	-0.186
2015	2	177,243,496.00	173,463,086.40	3,780,409.60	2.13%	1.022
2015	3	171,709,207.00	166,387,805.66	5,321,401.34	3.10%	1.439
2015	4	130,118,673.00	132,349,303.33	-2,230,630.33	-1.71%	-0.603
2015	5	121,362,907.00	124,521,875.72	-3,158,968.72	-2.60%	-0.854
2015	6	151,603,552.00	154,109,623.42	-2,506,071.42	-1.65%	-0.678
2015	7	160,980,081.00	161,474,375.21	-494,294.21	-0.31%	-0.134
2015	8	167,160,158.00	164,682,026.11	2,478,131.89	1.48%	0.67
2015	9	165,100,010.00	163,823,724.10	1,276,285.90	0.77%	0.345
2015	10	132,220,172.00	132,587,185.78	-367,013.78	-0.28%	-0.099
2015	11	121,689,220.00	121,507,290.29	181,929.71	0.15%	0.049
2015	12	138,057,305.00	137,547,889.87	509,415.13	0.37%	0.138
2016	1	160,306,845.00	159,053,941.99	1,252,903.01	0.78%	0.339
2016	2	163,381,609.00	160,730,269.24	2,651,339.77	1.62%	0.717
2016	3	140,532,452.00	135,818,636.16	4,713,815.84	3.35%	1.274
2016	4	127,287,304.00	129,447,320.12	-2,160,016.12	-1.70%	-0.584
2016	5	122,926,805.00	121,482,916.20	1,443,888.80	1.17%	0.39
2016	6	148,311,104.00	152,096,254.77	-3,785,150.77	-2.55%	-1.023
2016	7	173,010,653.00	171,974,177.57	1,036,475.44	0.60%	0.28
2016	8	176,952,920.00	178,204,369.93	-1,251,449.93	-0.71%	-0.338
2016	9	174,854,436.00	174,332,406.20	522,029.80	0.30%	0.141
2016	10	137,084,295.00	135,413,680.51	1,670,614.49	1.22%	0.452
2016	11	122,793,283.00	121,072,201.78	1,721,081.22	1.40%	0.465
2016	12	147,054,558.00	147,851,195.81	-796,637.81	-0.54%	-0.215
2017	1	166,001,183.00	160,791,247.33	5,209,935.67	3.14%	1.409
2017	2	143,120,998.00	144,678,351.08	-1,557,353.08	-1.09%	-0.421
2017	3	132,388,449.00	134,723,762.16	-2,335,313.16	-1.76%	-0.631
2017	4	125,993,610.00	124,593,668.78	1,399,941.23	1.11%	0.378
2017	5	128,233,484.00	128,987,210.16	-753,726.16	-0.59%	-0.204
2017	6	153,275,683.00	147,998,128.51	5,277,554.49	3.44%	1.427
2017	7	164,171,663.00	164,812,971.21	-641,308.21	-0.39%	-0.173
2017	8	160,381,309.00	157,855,197.03	2,526,111.97	1.58%	0.683
2017	9	148,584,626.00	147,736,841.64	847,784.37	0.57%	0.229
2017	10	138,491,207.00	137,446,168.24	1,045,038.76	0.75%	0.283
2017	11	121,717,572.00	120,262,629.11	1,454,942.89	1.20%	0.393

2017	12	144,191,367.00	144,640,899.31	-449,532.31	-0.31%	-0.122
2018	1		165,083,366.46			
2018	2		156,982,708.93			
2018	3		145,012,643.56			
2018	4		132,619,108.94			
2018	5		126,856,756.63			
2018	6		142,333,036.64			
2018	7		162,577,556.49			
2018	8		165,415,965.32			
2018	9		158,792,755.51			
2018	10		135,317,299.85			
2018	11		123,073,258.41			
2018	12		144,911,151.95			
2019	1		163,540,702.03			
2019	2		156,463,578.75			
2019	3		147,901,256.55			
2019	4		130,129,703.99			
2019	5		123,500,411.77			
2019	6		142,430,152.02			
2019	7		159,749,201.69			
2019	8		163,448,116.62			
2019	9		157,327,238.97			
2019	10		133,866,452.44			
2019	11		122,339,924.34			
2019	12		141,160,500.21			
2020	1		161,674,840.99			
2020	2		154,858,447.49			
2020	3		149,750,975.55			
2020	4		129,049,785.85			
2020	5		122,695,886.47			
2020	6		141,644,367.42			
2020	7		158,744,807.99			
2020	8		162,525,074.89			
2020	9		156,570,604.17			
2020	10		133,249,262.97			
2020	11		121,662,919.34			
2020	12		140,312,422.82			
2021	1		160,737,422.64			
2021	2		154,064,435.54			
2021	3		145,940,164.63			
2021	4		128,690,887.85			
2021	5		122,521,368.49			

2021	6	141,522,093.63
2021	7	158,682,553.48
2021	8	162,515,093.26
2021	9	156,655,347.80
2021	10	133,395,950.35
2021	11	121,755,573.05
2021	12	140,323,972.95
2022	1	159,968,087.86
2022	2	153,324,676.65
2022	3	145,364,222.43
2022	4	128,395,937.14
2022	5	122,411,815.23
2022	6	141,385,430.33
2022	7	158,369,718.55
2022	8	162,146,175.55
2022	9	156,340,499.47
2022	10	133,177,831.46
2022	11	121,293,870.69
2022	12	139,463,050.72
2023	1	159,611,915.65
2023	2	152,972,439.39
2023	3	145,031,223.18
2023	4	128,086,038.81
2023	5	122,125,405.12
2023	6	140,995,413.78
2023	7	157,835,103.51
2023	8	161,572,705.68
2023	9	155,807,186.11
2023	10	132,767,410.03
2023	11	120,844,373.96
2023	12	138,871,666.04
2024	1	159,032,922.88
2024	2	152,440,909.95
2024	3	147,769,173.79
2024	4	127,770,831.86
2024	5	121,890,405.24
2024	6	140,719,864.44
2024	7	157,442,974.52
2024	8	161,168,383.62
2024	9	155,451,978.43
2024	10	132,477,175.11
2024	11	120,489,037.59

2024	12	138,368,235.52
2025	1	158,389,991.99
2025	2	151,850,838.08
2025	3	144,059,832.34
2025	4	127,385,310.52
2025	5	121,591,192.38
2025	6	140,373,607.44
2025	7	157,016,561.47
2025	8	160,729,645.40
2025	9	155,063,985.59
2025	10	132,190,342.20
2025	11	120,137,089.58
2025	12	137,868,449.70
2026	1	157,586,877.63
2026	2	151,113,382.68
2026	3	143,432,947.44
2026	4	126,953,705.48
2026	5	121,285,157.67
2026	6	140,033,305.42
2026	7	156,580,430.38
2026	8	160,278,657.62
2026	9	154,670,340.92
2026	10	131,925,514.72
2026	11	119,764,521.15
2026	12	137,292,539.76
2027	1	156,940,575.72
2027	2	150,519,485.56
2027	3	142,944,335.05
2027	4	126,650,358.41
2027	5	121,096,435.48
2027	6	139,820,566.58
2027	7	156,284,361.87
2027	8	159,967,859.19
2027	9	154,411,461.08
2027	10	131,747,139.05
2027	11	119,482,384.39
2027	12	136,820,312.22
2028	1	156,359,650.54
2028	2	149,985,392.09
2028	3	145,699,147.07
2028	4	126,403,842.92
2028	5	120,962,130.14

2028	6	139,668,297.96
2028	7	156,062,654.13
2028	8	159,731,403.73
2028	9	154,224,200.70
2028	10	131,642,126.13
2028	11	119,273,573.90
2028	12	136,428,746.19
2029	1	155,813,569.24
2029	2	149,483,023.16
2029	3	142,123,783.28
2029	4	126,203,850.12
2029	5	120,880,695.97
2029	6	139,582,031.12
2029	7	155,910,698.04
2029	8	159,564,936.98
2029	9	154,103,262.35
2029	10	131,591,596.93
2029	11	119,107,457.04
2029	12	136,072,668.46
2030	1	155,113,871.91
2030	2	148,840,598.43
2030	3	141,576,665.39
2030	4	125,851,984.24
2030	5	120,641,958.18
2030	6	139,339,166.80
2030	7	155,580,229.17
2030	8	159,225,304.87
2030	9	153,800,019.77
2030	10	131,339,513.36
2030	11	118,747,036.16
2030	12	135,529,695.98
2031	1	154,485,643.33
2031	2	148,263,531.00
2031	3	141,095,151.84
2031	4	125,492,132.46
2031	5	120,398,344.64
2031	6	139,089,860.81
2031	7	155,275,941.83
2031	8	158,911,349.82
2031	9	153,522,945.52
2031	10	131,089,407.31
2031	11	118,386,322.47

2031	12	134,981,967.62
2032	1	153,844,074.65
2032	2	147,674,214.50
2032	3	143,779,681.80
2032	4	125,189,860.43
2032	5	120,208,504.58
2032	6	138,897,734.54
2032	7	155,027,052.48
2032	8	158,652,416.91
2032	9	153,300,003.92
2032	10	130,913,223.65
2032	11	118,101,775.46
2032	12	134,519,240.36
2033	1	153,290,831.01
2033	2	147,165,803.32
2033	3	140,186,950.06
2033	4	124,919,203.75
2033	5	120,044,110.44
2033	6	138,729,135.76
2033	7	154,844,169.74
2033	8	158,459,286.78
2033	9	153,141,248.55
2033	10	130,818,080.77
2033	11	117,906,290.17
2033	12	134,162,317.36
2034	1	152,869,209.10
2034	2	146,777,839.54
2034	3	139,888,702.11
2034	4	124,782,561.98
2034	5	120,004,514.65
2034	6	138,696,564.24
2034	7	154,737,832.76
2034	8	158,342,423.64
2034	9	153,056,785.18
2034	10	130,758,432.33
2034	11	117,746,456.87
2034	12	133,843,465.39
2035	1	152,483,980.04
2035	2	146,423,190.99
2035	3	139,622,450.57
2035	4	124,650,497.11
2035	5	119,968,149.54

2035	6	138,664,952.18
2035	7	154,661,558.75
2035	8	158,255,320.68
2035	9	153,001,957.52
2035	10	130,738,186.76
2035	11	117,629,168.56
2035	12	133,573,697.75
2036	1	152,144,955.66
2036	2	146,110,914.46
2036	3	142,578,094.63
2036	4	124,568,033.92
2036	5	119,973,109.94
2036	6	138,675,194.92
2036	7	154,619,135.33
2036	8	158,202,065.90
2036	9	152,979,942.12
2036	10	130,757,689.66
2036	11	117,558,866.78
2036	12	133,363,244.85
2037	1	151,831,571.78
2037	2	145,822,001.20
2037	3	139,192,599.16
2037	4	124,511,292.91
2037	5	120,007,764.51
2037	6	138,722,229.25
2037	7	154,644,245.62
2037	8	158,216,426.19
2037	9	153,022,595.81
2037	10	130,827,466.13
2037	11	117,532,476.22
2037	12	133,194,689.31
2038	1	151,566,521.38
2038	2	145,577,368.42
2038	3	139,032,686.52
2038	4	124,475,306.64
2038	5	120,060,426.08
2038	6	138,790,049.04
2038	7	154,667,005.74
2038	8	158,228,791.43
2038	9	153,062,305.22
2038	10	130,879,689.85
2038	11	117,489,038.94

2038	12	133,009,098.32
2039	1	151,285,322.07
2039	2	145,317,965.91
2039	3	138,857,968.51
2039	4	124,426,488.11
2039	5	120,100,540.11
2039	6	138,843,631.71
2039	7	154,675,633.67
2039	8	158,227,014.68
2039	9	153,088,444.67
2039	10	130,955,621.45
2039	11	117,470,814.91
2039	12	132,853,039.25
2040	1	151,038,389.91
2040	2	145,089,915.57
2040	3	141,919,432.41
2040	4	124,471,121.60
2040	5	120,228,716.14
2040	6	138,996,630.59
2040	7	154,779,073.07
2040	8	158,320,477.15
2040	9	153,205,006.70
2040	10	131,093,792.63
2040	11	117,514,041.17
2040	12	132,765,172.68
2041	1	150,782,101.99
2041	2	144,853,417.33
2041	3	138,558,198.33
2041	4	124,431,166.78
2041	5	120,274,093.99
2041	6	139,059,254.43
2041	7	154,800,234.41
2041	8	158,332,322.75
2041	9	153,241,113.16
2041	10	131,093,224.98
2041	11	117,419,606.73
2041	12	132,528,986.61
2042	1	150,434,895.16
2042	2	144,533,762.94
2042	3	138,319,079.27
2042	4	124,280,068.46
2042	5	120,214,539.81

2042	6	139,008,440.65
2042	7	154,785,090.72
2042	8	158,308,487.15
2042	9	153,241,032.30
2042	10	131,142,415.76
2042	11	117,377,422.44
2042	12	132,355,699.21
2043	1	150,151,143.08
2043	2	144,272,283.31
2043	3	138,132,695.04
2043	4	124,261,153.48
2043	5	120,272,881.44
2043	6	139,084,797.95
2043	7	154,802,607.60
2043	8	158,317,517.33
2043	9	153,272,196.62
2043	10	131,186,695.09
2043	11	117,336,272.82
2043	12	132,190,296.89
2044	1	149,996,421.04
2044	2	144,129,087.17
2044	3	141,275,849.58
2044	4	124,288,759.50
2044	5	120,365,611.06
2044	6	139,195,186.30
2044	7	154,899,221.82
2044	8	158,406,263.23
2044	9	153,378,665.66
2044	10	131,305,955.16
2044	11	117,382,665.48
2044	12	132,136,611.57
2045	1	149,878,287.42
2045	2	144,019,348.75
2045	3	138,009,313.35
2045	4	124,326,968.31
2045	5	120,470,795.20
2045	6	139,322,997.77
2045	7	154,990,897.47
2045	8	158,490,424.89
2045	9	153,479,544.72
2045	10	131,398,643.30
2045	11	117,397,913.57

2045	12	132,045,066.09
2046	1	149,582,782.40
2046	2	143,747,281.19
2046	3	137,806,573.81
2046	4	124,239,218.54
2046	5	120,460,242.91
2046	6	139,328,643.50
2046	7	154,972,070.78
2046	8	158,464,799.42
2046	9	153,472,436.30
2046	10	131,399,211.01
2046	11	117,315,828.89
2046	12	131,843,653.85
2047	1	149,284,292.52
2047	2	143,472,554.90
2047	3	137,598,593.75
2047	4	124,127,897.31
2047	5	120,425,436.69
2047	6	139,309,332.56
2047	7	154,917,584.93
2047	8	158,404,154.24
2047	9	153,429,757.21
2047	10	131,358,912.17
2047	11	117,193,995.22
2047	12	131,601,976.22
2048	1	148,964,948.53
2048	2	143,178,795.79
2048	3	140,604,050.62
2048	4	123,995,183.76
2048	5	120,369,498.69
2048	6	139,269,393.50
2048	7	154,844,061.69
2048	8	158,325,151.14
2048	9	153,367,395.12
2048	10	131,297,166.70
2048	11	117,050,778.20
2048	12	131,339,307.43
2049	1	148,616,942.20
2049	2	142,858,794.55
2049	3	137,116,384.90
2049	4	123,838,757.48
2049	5	120,290,393.47

2049	6	139,200,015.04
2049	7	154,733,803.67
2049	8	158,208,751.20
2049	9	153,271,042.80
2049	10	131,210,371.75
2049	11	116,884,443.78
2049	12	131,050,843.78
2050	1	148,249,792.18
2050	2	142,521,344.66
2050	3	136,844,077.61
2050	4	123,664,910.67
2050	5	120,198,911.14
2050	6	139,135,502.15
2050	7	154,648,567.70
2050	8	158,120,522.00
2050	9	153,192,191.60
2050	10	131,115,703.97
2050	11	116,700,081.15
2050	12	130,743,312.14

Variable	Coefficient	Mean	Elast	Units	Definition
XHeat	81861.538	281.574	0.149		
XCool	15656.831	970.387	0.098		
XOther	1372.135	75,593.58	0.669		
Jan	4654214.698	0.083	0.003		
Feb	10967657.78	0.083	0.006		
Mar	8539572.341	0.083	0.005		
Apr	5065081.798	0.083	0.003		
May	9417624.463	0.083	0.005		
Jun	17118475.81	0.083	0.009		
Jul	19001373.21	0.083	0.01		
Aug	22328626.51	0.083	0.012		
Sep	22755307.67	0.083	0.012		
Oct	16435257.52	0.083	0.009		
Dec	-91553.98	0.083	0		
BTWMay12Apr14	6483182.488	0.143	0.006		
AftMay2014	1570332.614	0.512	0.005		

Year	Month	Pred	XHeat	XCool	XOther	Jan
2011	1	213,394,891.95	86,217,908.86		0 122,522,768.40	4,654,214.70
2011	2	182,305,890.17	67,389,645.13		0 103,948,587.27	0
2011	3	165,876,125.14	45,629,966.18	147,017.80	111,559,568.81	0
2011	4	149,428,325.61	31,360,577.03	1,909,542.46	111,093,124.32	0
2011	5	142,168,178.43	13,859,221.14	6,455,666.38	112,435,666.45	0
2011	6	168,967,454.58	3,814,017.83	32,974,416.98	115,060,543.97	0
2011	7	174,502,986.69		0 45,055,666.03	110,445,947.46	0
2011	8	197,267,003.62		0 62,596,852.06	112,341,525.05	0
2011	9	178,176,201.74	1,976,032.97	37,194,225.53	116,250,635.57	0
2011	10	145,770,439.76	11,062,229.19	5,885,504.47	112,387,448.59	0
2011	11	131,490,748.93	26,846,118.38	293,953.03	104,350,677.52	0
2011	12	155,740,392.50	41,888,198.64	146,816.76	113,796,931.08	0
2012	1	183,007,250.61	59,448,638.66		0 118,904,397.26	4,654,214.70
2012	2	169,780,457.15	53,152,094.82		0 105,660,704.55	0
2012	3	153,365,449.75	38,156,165.21	1,356,771.29	105,312,940.91	0
2012	4	135,003,432.21	17,027,879.96	4,379,191.61	108,531,278.84	0
2012	5	145,902,904.63	11,810,623.99	9,474,558.99	108,716,914.71	0
2012	6	160,935,288.28	1,988,037.52	23,599,615.86	111,745,976.61	0
2012	7	193,245,311.65	101,287.42	59,640,952.60	108,018,515.94	0
2012	8	190,194,695.61		0 54,057,340.12	107,325,546.49	0
2012	9	175,336,624.88	1,215,139.53	34,903,555.15	109,979,440.03	0
2012	10	144,124,731.15	11,871,164.15	5,261,855.86	104,073,271.14	0
2012	11	142,800,815.94	31,675,421.47	547,886.39	104,094,325.60	0
2012	12	155,045,992.79	41,747,379.27		0 106,906,985.02	0
2013	1	176,118,997.94	60,116,774.67		0 111,348,008.58	4,654,214.70
2013	2	171,841,597.26	58,352,440.95		0 102,521,498.53	0
2013	3	161,632,189.27	52,248,808.60		0 100,843,808.33	0
2013	4	142,115,212.23	33,512,890.22	2,331,995.79	101,205,244.43	0
2013	5	129,644,780.28	11,621,010.68	6,646,648.52	101,959,496.61	0
2013	6	152,829,692.46	2,366,333.83	27,352,184.37	105,992,698.45	0
2013	7	167,924,034.41		0 43,465,084.26	105,457,576.94	0
2013	8	165,632,912.66	98,179.16	38,549,058.17	104,657,048.82	0
2013	9	171,577,230.00	516,531.66	40,319,669.52	107,985,721.15	0
2013	10	139,496,961.44	5,742,705.74	13,547,183.26	103,771,814.93	0
2013	11	129,219,688.28	27,041,810.32	912,809.71	101,265,068.24	0
2013	12	162,045,550.84	52,589,368.83		0 109,547,735.99	0
2014	1	192,737,398.77	68,656,968.30		0 112,943,033.29	4,654,214.70
2014	2	184,847,914.70	67,999,992.06		0 99,397,082.38	0
2014	3	168,083,252.86	51,881,196.01	13,494.08	101,165,807.94	0
2014	4	138,916,138.74	25,038,400.38	1,142,387.37	101,187,086.70	0
2014	5	130,919,145.59	8,661,470.37	10,219,282.88	102,620,767.88	0

2014	6	153,688,126.99	1,730,924.97	30,896,828.74	102,371,564.85	0
2014	7	167,349,363.27	18,951.02	43,571,098.42	103,187,608.01	0
2014	8	157,433,018.04	107,305.11	34,678,839.69	98,747,914.11	0
2014	9	169,233,274.45	819,930.08	40,893,497.18	103,194,206.90	0
2014	10	135,696,302.11	6,847,811.04	9,564,100.73	101,278,800.22	0
2014	11	133,043,060.16	31,139,372.74	638,011.18	99,695,343.63	0
2014	12	158,985,443.88	51,536,155.40	0	105,970,509.85	0
2015	1	174,661,286.41	61,960,809.94	0	106,475,929.15	4,654,214.70
2015	2	173,463,086.40	63,512,197.58	0	97,412,898.43	0
2015	3	166,387,805.66	57,002,699.54	0	99,275,201.17	0
2015	4	132,349,303.33	22,498,261.94	1,319,283.59	101,896,343.39	0
2015	5	124,521,875.72	9,433,645.66	10,422,896.31	93,677,376.67	0
2015	6	154,109,623.42	2,509,136.29	30,105,859.28	102,805,819.43	0
2015	7	161,474,375.21	0	41,787,280.23	99,115,389.16	0
2015	8	164,682,026.11	0	41,455,418.15	99,327,648.84	0
2015	9	163,823,724.10	606,290.58	33,428,551.12	105,463,242.11	0
2015	10	132,587,185.78	6,979,545.39	9,476,727.44	98,125,322.81	0
2015	11	121,507,290.29	20,405,539.86	860,525.62	98,670,892.20	0
2015	12	137,547,889.87	32,009,409.58	72,175.06	103,987,526.60	0
2016	1	159,053,941.99	48,590,240.13	0	104,239,154.55	4,654,214.70
2016	2	160,730,269.24	52,584,884.25	0	95,607,394.60	0
2016	3	135,818,636.16	31,634,744.80	115,652.30	93,958,334.11	0
2016	4	129,447,320.12	21,447,138.74	1,233,277.19	100,131,489.78	0
2016	5	121,482,916.20	8,569,910.45	5,570,819.90	96,354,228.78	0
2016	6	152,096,254.77	3,110,575.10	28,427,288.98	101,869,582.27	0
2016	7	171,974,177.57	12,022.72	48,888,681.29	102,501,767.74	0
2016	8	178,204,369.93	0	55,754,017.78	98,551,393.03	0
2016	9	174,332,406.20	117,157.68	47,607,035.36	102,282,572.88	0
2016	10	135,413,680.51	3,666,375.48	18,440,211.47	95,301,503.43	0
2016	11	121,072,201.78	16,143,277.43	5,962,054.09	97,396,537.64	0
2016	12	147,851,195.81	43,666,817.23	116,238.29	102,589,361.66	0
2017	1	160,791,247.33	49,751,837.14	0	104,814,862.87	4,654,214.70
2017	2	144,678,351.08	37,133,491.48	508,966.94	94,497,902.27	0
2017	3	134,723,762.16	30,029,670.66	489,472.57	94,094,713.97	0
2017	4	124,593,668.78	16,399,610.99	3,510,539.69	98,048,103.68	0
2017	5	128,987,210.16	7,280,097.09	11,777,037.14	98,942,118.85	0
2017	6	147,998,128.51	1,348,475.94	26,015,465.91	101,945,378.25	0
2017	7	164,812,971.21	50,000.41	43,104,932.66	101,086,332.31	0
2017	8	157,855,197.03	0	38,310,596.78	95,645,641.13	0
2017	9	147,736,841.64	1,521,079.77	21,616,179.29	100,273,942.29	0
2017	10	137,446,168.24	3,770,645.68	17,097,575.11	98,572,357.32	0
2017	11	120,262,629.11	22,875,994.30	2,028,200.99	93,788,101.21	0

2017	12	144,640,899.31	42,699,274.42	101,647.24	100,361,199.01	0
2018	1	165,083,366.46	55,406,404.86	0	103,452,414.29	4,654,214.70
2018	2	156,982,708.93	50,983,154.95	24,856.26	93,436,707.32	0
2018	3	145,012,643.56	41,070,805.21	144,926.55	93,687,006.84	0
2018	4	132,619,108.94	23,535,460.92	1,882,631.55	100,565,602.06	0
2018	5	126,856,756.63	10,211,944.04	6,445,441.12	99,211,414.40	0
2018	6	142,333,036.64	2,636,230.77	22,668,446.19	98,339,551.25	0
2018	7	162,577,556.49	68,892.02	40,876,840.52	101,060,118.13	0
2018	8	165,415,965.32	41,058.10	43,395,917.29	98,080,030.80	0
2018	9	158,792,755.51	604,040.20	34,224,741.70	99,638,333.33	0
2018	10	135,317,299.85	6,754,504.67	11,121,194.40	99,436,010.64	0
2018	11	123,073,258.41	22,491,620.56	1,266,783.34	97,744,521.89	0
2018	12	144,911,151.95	41,152,279.94	33,137.78	102,246,955.59	0
2019	1	163,540,702.03	55,133,245.19	0	102,182,909.53	4,654,214.70
2019	2	156,463,578.75	50,630,136.63	24,744.19	93,270,707.54	0
2019	3	147,901,256.55	40,704,738.15	143,984.18	96,942,629.27	0
2019	4	130,129,703.99	23,284,738.56	1,867,106.31	98,342,444.70	0
2019	5	123,500,411.77	10,082,942.78	6,379,499.08	96,050,012.83	0
2019	6	142,430,152.02	2,597,722.97	22,391,656.26	98,751,964.37	0
2019	7	159,749,201.69	67,764.97	40,305,908.33	98,803,822.57	0
2019	8	163,448,116.62	40,305.67	42,704,259.38	96,804,592.46	0
2019	9	157,327,238.97	591,785.23	33,611,934.76	98,797,878.70	0
2019	10	133,866,452.44	6,603,560.35	10,899,112.47	98,358,189.49	0
2019	11	122,339,924.34	21,945,037.98	1,239,004.80	97,585,548.95	0
2019	12	141,160,500.21	40,071,932.17	32,346.32	99,577,443.09	0
2020	1	161,674,840.99	54,077,381.76	0	101,372,911.92	4,654,214.70
2020	2	154,858,447.49	49,696,889.17	24,432.19	92,599,135.74	0
2020	3	149,750,975.55	39,983,442.39	142,271.89	99,515,356.33	0
2020	4	129,049,785.85	22,870,656.13	1,844,783.53	97,698,931.77	0
2020	5	122,695,886.47	9,910,692.78	6,307,719.86	95,489,516.75	0
2020	6	141,644,367.42	2,555,149.01	22,155,355.51	98,245,054.49	0
2020	7	158,744,807.99	66,620.26	39,860,145.55	98,246,336.36	0
2020	8	162,525,074.89	39,652.31	42,261,278.75	96,325,184.71	0
2020	9	156,570,604.17	582,592.75	33,286,150.71	98,376,220.42	0
2020	10	133,249,262.97	6,501,593.91	10,794,485.07	97,947,593.86	0
2020	11	121,662,919.34	21,620,785.34	1,227,940.21	97,243,861.17	0
2020	12	140,312,422.82	39,506,296.04	32,078.94	99,295,269.21	0
2021	1	160,737,422.64	53,345,581.89	0	101,167,293.43	4,654,214.70
2021	2	154,064,435.54	49,047,419.74	24,259.49	92,454,765.91	0
2021	3	145,940,164.63	39,479,447.75	141,332.59	96,209,479.34	0
2021	4	128,690,887.85	22,591,267.70	1,833,326.11	97,630,879.62	0
2021	5	122,521,368.49	9,794,210.94	6,271,481.87	95,467,718.61	0

2021	6	141,522,093.63	2,526,299.89	22,038,383.11	98,268,602.21	0
2021	7	158,682,553.48	65,927.93	39,685,730.62	98,359,189.10	0
2021	8	162,515,093.26	39,258.56	42,096,007.66	96,480,867.92	0
2021	9	156,655,347.80	577,076.74	33,171,445.80	98,581,184.97	0
2021	10	133,395,950.35	6,442,346.34	10,761,145.23	98,186,868.64	0
2021	11	121,755,573.05	21,433,731.98	1,224,717.40	97,526,791.06	0
2021	12	140,323,972.95	39,182,714.96	32,009.62	99,630,469.74	0
2022	1	159,968,087.86	52,321,119.38	0	101,422,421.17	4,654,214.70
2022	2	153,324,676.65	48,094,983.11	24,045.15	92,667,658.00	0
2022	3	145,364,222.43	38,704,340.50	140,053.19	96,409,923.78	0
2022	4	128,395,937.14	22,140,778.93	1,816,160.08	97,803,583.71	0
2022	5	122,411,815.23	9,596,804.29	6,211,399.49	95,615,654.37	0
2022	6	141,385,430.33	2,474,838.87	21,822,467.76	98,399,315.28	0
2022	7	158,369,718.55	64,559.90	39,281,664.62	98,451,788.21	0
2022	8	162,146,175.55	38,435.50	41,658,262.50	96,550,518.42	0
2022	9	156,340,499.47	564,854.24	32,819,301.38	98,630,703.56	0
2022	10	133,177,831.46	6,304,980.27	10,645,357.78	98,221,903.28	0
2022	11	121,293,870.69	20,972,106.06	1,211,273.58	97,540,158.44	0
2022	12	139,463,050.72	38,330,396.30	31,651.29	99,622,224.50	0
2023	1	159,611,915.65	52,060,781.97	0	101,326,586.36	4,654,214.70
2023	2	152,972,439.39	47,847,086.16	23,880.87	92,563,481.97	0
2023	3	145,031,223.18	38,497,950.85	139,071.42	96,284,295.95	0
2023	4	128,086,038.81	22,013,350.71	1,802,662.03	97,634,611.65	0
2023	5	122,125,405.12	9,539,869.82	6,164,135.87	95,433,442.35	0
2023	6	140,995,413.78	2,459,718.77	21,652,563.36	98,194,323.22	0
2023	7	157,835,103.51	64,154.59	38,969,217.46	98,230,025.63	0
2023	8	161,572,705.68	38,187.43	41,319,589.36	96,315,969.77	0
2023	9	155,807,186.11	561,109.36	32,546,731.54	98,373,704.93	0
2023	10	132,767,410.03	6,261,854.82	10,554,713.65	97,945,251.44	0
2023	11	120,844,373.96	20,824,991.63	1,200,748.25	97,248,301.46	0
2023	12	138,871,666.04	38,054,830.16	31,370.74	99,306,686.50	0
2024	1	159,032,922.88	51,617,501.92	0	101,190,873.64	4,654,214.70
2024	2	152,440,909.95	47,439,684.32	23,729.05	92,439,506.20	0
2024	3	147,769,173.79	38,170,153.75	138,187.30	99,350,927.79	0
2024	4	127,770,831.86	21,828,519.63	1,791,415.73	97,515,482.09	0
2024	5	121,890,405.24	9,459,770.04	6,125,679.56	95,316,998.57	0
2024	6	140,719,864.44	2,439,066.19	21,517,479.10	98,074,510.73	0
2024	7	157,442,974.52	63,602.63	38,718,004.52	98,089,661.56	0
2024	8	161,168,383.62	37,858.88	41,053,224.87	96,178,340.75	0
2024	9	155,451,978.43	556,281.80	32,336,920.81	98,233,135.54	0
2024	10	132,477,175.11	6,206,442.58	10,484,075.59	97,781,066.81	0
2024	11	120,489,037.59	20,640,707.67	1,192,712.17	97,085,285.12	0

2024	12	138,368,235.52	37,718,076.38	31,160.79	99,140,219.71	0
2025	1	158,389,991.99	51,151,895.46	0	101,013,549.22	4,654,214.70
2025	2	151,850,838.08	47,011,763.11	23,567.12	92,277,517.46	0
2025	3	144,059,832.34	37,825,846.68	137,244.30	95,986,836.40	0
2025	4	127,385,310.52	21,630,631.87	1,779,109.73	97,340,154.52	0
2025	5	121,591,192.38	9,374,011.93	6,083,599.63	95,145,623.75	0
2025	6	140,373,607.44	2,416,954.69	21,369,666.27	97,898,178.05	0
2025	7	157,016,561.47	63,033.66	38,456,682.71	97,925,139.28	0
2025	8	160,729,645.40	37,520.21	40,776,141.81	96,017,024.26	0
2025	9	155,063,985.59	551,305.44	32,118,667.24	98,068,372.62	0
2025	10	132,190,342.20	6,151,107.32	10,413,629.77	97,620,014.98	0
2025	11	120,137,089.58	20,456,679.70	1,184,697.96	96,925,379.30	0
2025	12	137,868,449.70	37,381,790.38	30,951.41	98,976,929.27	0
2026	1	157,586,877.63	50,500,272.41	0	100,862,057.90	4,654,214.70
2026	2	151,113,382.68	46,412,881.14	23,383.48	92,139,127.68	0
2026	3	143,432,947.44	37,343,983.93	136,174.85	95,842,883.71	0
2026	4	126,953,705.48	21,355,752.85	1,765,302.05	97,197,236.17	0
2026	5	121,285,157.67	9,254,888.31	6,036,384.79	95,005,927.49	0
2026	6	140,033,305.42	2,386,240.37	21,203,816.23	97,754,440.40	0
2026	7	156,580,430.38	62,235.80	38,160,158.91	97,786,329.85	0
2026	8	160,278,657.62	37,045.29	40,461,733.62	95,880,919.59	0
2026	9	154,670,340.92	544,327.18	31,871,013.30	97,929,360.15	0
2026	10	131,925,514.72	6,074,939.09	10,336,211.06	97,508,774.45	0
2026	11	119,764,521.15	20,203,367.73	1,175,890.49	96,814,930.32	0
2026	12	137,292,539.76	36,918,897.32	30,721.31	98,864,142.50	0
2027	1	156,940,575.72	49,900,192.06	0	100,815,836.34	4,654,214.70
2027	2	150,519,485.56	45,861,370.09	23,221.55	92,096,903.53	0
2027	3	142,944,335.05	36,900,236.00	135,231.83	95,798,962.26	0
2027	4	126,650,358.41	21,103,251.77	1,753,182.20	97,158,510.03	0
2027	5	121,096,435.48	9,145,462.56	5,994,941.42	94,968,074.43	0
2027	6	139,820,566.58	2,358,026.51	21,058,239.40	97,715,492.25	0
2027	7	156,284,361.87	61,502.49	37,899,736.28	97,751,417.28	0
2027	8	159,967,859.19	36,608.80	40,185,603.97	95,846,687.31	0
2027	9	154,411,461.08	537,913.57	31,653,510.71	97,894,396.52	0
2027	10	131,747,139.05	6,003,284.06	10,265,541.60	97,472,723.26	0
2027	11	119,482,384.39	19,965,065.28	1,167,850.84	96,779,135.66	0
2027	12	136,820,312.22	36,483,432.12	30,511.27	98,827,590.20	0
2028	1	156,359,650.54	49,312,939.16	0	100,822,164.07	4,654,214.70
2028	2	149,985,392.09	45,321,648.27	23,069.42	92,102,684.01	0
2028	3	145,699,147.07	36,465,973.74	134,345.94	98,988,922.43	0
2028	4	126,403,842.92	20,856,155.40	1,741,802.39	97,170,470.72	0
2028	5	120,962,130.14	9,038,379.03	5,956,028.57	94,979,765.47	0

2028	6	139,668,297.96	2,330,416.56	20,921,551.48	97,727,521.51	0
2028	7	156,062,654.13	60,788.19	37,657,339.73	97,772,820.39	0
2028	8	159,731,403.73	36,183.61	39,928,587.62	95,867,673.37	0
2028	9	154,224,200.70	531,666.13	31,451,063.35	97,915,830.94	0
2028	10	131,642,126.13	5,934,031.90	10,200,696.00	97,501,808.10	0
2028	11	119,273,573.90	19,734,754.01	1,160,473.73	96,808,013.54	0
2028	12	136,428,746.19	36,062,569.71	30,318.53	98,857,079.32	0
2029	1	155,813,569.24	48,704,185.87	0	100,884,836.06	4,654,214.70
2029	2	149,483,023.16	44,762,166.25	22,930.62	92,159,935.89	0
2029	3	142,123,783.28	36,015,812.34	133,537.63	95,864,528.36	0
2029	4	126,203,850.12	20,599,992.88	1,731,431.80	97,237,011.02	0
2029	5	120,880,695.97	8,927,366.53	5,920,566.74	95,044,805.62	0
2029	6	139,582,031.12	2,301,793.58	20,796,985.86	97,794,443.26	0
2029	7	155,910,698.04	60,044.25	37,434,802.93	97,844,145.04	0
2029	8	159,564,936.98	35,740.79	39,692,628.84	95,937,608.23	0
2029	9	154,103,262.35	525,159.49	31,265,202.66	97,987,259.91	0
2029	10	131,591,596.93	5,861,990.40	10,141,418.96	97,582,597.43	0
2029	11	119,107,457.04	19,495,166.30	1,153,730.13	96,888,228.00	0
2029	12	136,072,668.46	35,624,755.86	30,142.35	98,938,991.62	0
2030	1	155,113,871.91	48,142,051.83	0	100,747,272.77	4,654,214.70
2030	2	148,840,598.43	44,245,530.22	22,808.23	92,034,269.59	0
2030	3	141,576,665.39	35,600,124.99	132,824.84	95,733,810.60	0
2030	4	125,851,984.24	20,366,968.61	1,722,590.58	97,127,010.63	0
2030	5	120,641,958.18	8,826,381.39	5,890,334.52	94,937,285.18	0
2030	6	139,339,166.80	2,275,756.00	20,690,790.11	97,683,812.27	0
2030	7	155,580,229.17	59,352.75	37,235,940.97	97,713,229.62	0
2030	8	159,225,304.87	35,329.18	39,481,772.81	95,809,243.76	0
2030	9	153,800,019.77	519,111.49	31,099,114.99	97,856,153.01	0
2030	10	131,339,513.36	5,794,473.92	10,087,533.48	97,451,915.83	0
2030	11	118,747,036.16	19,270,627.37	1,147,599.89	96,758,476.29	0
2030	12	135,529,695.98	35,214,441.61	29,982.19	98,806,493.55	0
2031	1	154,485,643.33	47,591,077.06	0	100,670,018.96	4,654,214.70
2031	2	148,263,531.00	43,739,150.25	22,693.38	91,963,696.98	0
2031	3	141,095,151.84	35,192,689.70	132,156.03	95,660,401.16	0
2031	4	125,492,132.46	20,126,489.51	1,713,288.28	97,016,940.27	0
2031	5	120,398,344.64	8,722,165.58	5,858,525.63	94,829,696.35	0
2031	6	139,089,860.81	2,248,885.45	20,579,056.03	97,573,110.91	0
2031	7	155,275,941.83	58,655.54	37,037,122.64	97,608,457.83	0
2031	8	158,911,349.82	34,914.17	39,270,963.04	95,706,513.49	0
2031	9	153,522,945.52	513,013.52	30,933,063.74	97,751,227.97	0
2031	10	131,089,407.31	5,725,207.45	10,031,570.78	97,327,038.95	0
2031	11	118,386,322.47	19,040,268.52	1,141,233.34	96,634,488.00	0

2031	12	134,981,967.62	34,793,492.24	29,815.86	98,679,880.89	0
2032	1	153,844,074.65	47,029,895.66	0	100,589,631.68	4,654,214.70
2032	2	147,674,214.50	43,223,389.75	22,572.47	91,890,261.90	0
2032	3	143,779,681.80	34,777,706.80	131,451.88	98,760,618.16	0
2032	4	125,189,860.43	19,892,796.54	1,704,470.87	96,957,178.61	0
2032	5	120,208,504.58	8,620,890.65	5,828,374.84	94,771,282.01	0
2032	6	138,897,734.54	2,222,773.16	20,473,146.32	97,513,006.65	0
2032	7	155,027,052.48	57,975.57	36,847,204.76	97,550,166.34	0
2032	8	158,652,416.91	34,509.43	39,069,590.53	95,649,357.83	0
2032	9	153,300,003.92	507,066.35	30,774,446.08	97,692,851.21	0
2032	10	130,913,223.65	5,658,824.71	9,980,109.04	97,268,699.76	0
2032	11	118,101,775.46	18,819,500.07	1,135,378.84	96,576,563.93	0
2032	12	134,519,240.36	34,390,068.04	29,662.90	98,620,730.79	0
2033	1	153,290,831.01	46,506,807.10	0	100,559,476.60	4,654,214.70
2033	2	147,165,803.32	42,742,638.94	22,459.25	91,862,714.74	0
2033	3	140,186,950.06	34,390,892.84	130,792.58	95,555,359.69	0
2033	4	124,919,203.75	19,669,579.83	1,695,753.11	96,918,456.40	0
2033	5	120,044,110.44	8,524,155.79	5,798,564.77	94,733,432.80	0
2033	6	138,729,135.76	2,197,831.46	20,368,433.42	97,474,062.46	0
2033	7	154,844,169.74	57,344.32	36,671,085.41	97,544,034.19	0
2033	8	158,459,286.78	34,133.68	38,882,848.80	95,643,345.17	0
2033	9	153,141,248.55	501,545.35	30,627,352.82	97,686,710.09	0
2033	10	130,818,080.77	5,598,217.55	9,934,193.42	97,280,079.67	0
2033	11	117,906,290.17	18,617,939.40	1,130,155.29	96,587,862.87	0
2033	12	134,162,317.36	34,021,743.42	29,526.43	98,632,268.88	0
2034	1	152,869,209.10	46,018,312.39	0	100,626,349.39	4,654,214.70
2034	2	146,777,839.54	42,293,682.02	22,363.01	91,923,804.12	0
2034	3	139,888,702.11	34,029,660.36	130,232.09	95,618,904.71	0
2034	4	124,782,561.98	19,465,081.10	1,688,668.85	96,993,397.62	0
2034	5	120,004,514.65	8,435,532.70	5,774,340.40	94,806,684.47	0
2034	6	138,696,564.24	2,174,981.27	20,283,341.26	97,549,433.30	0
2034	7	154,737,832.76	56,736.31	36,510,275.96	97,599,114.67	0
2034	8	158,342,423.64	33,771.77	38,712,340.36	95,697,352.39	0
2034	9	153,056,785.18	496,227.50	30,493,046.25	97,741,871.14	0
2034	10	130,758,432.33	5,538,287.31	9,889,607.54	97,324,947.35	0
2034	11	117,746,456.87	18,418,629.97	1,125,083.01	96,632,411.28	0
2034	12	133,843,465.39	33,657,532.63	29,393.91	98,677,760.21	0
2035	1	152,483,980.04	45,542,126.66	0	100,717,306.07	4,654,214.70
2035	2	146,423,190.99	41,856,037.81	22,268.26	92,006,894.52	0
2035	3	139,622,450.57	33,677,530.14	129,680.35	95,705,335.13	0
2035	4	124,650,497.11	19,261,839.32	1,681,355.62	97,071,887.77	0
2035	5	119,968,149.54	8,347,454.32	5,749,333.08	94,883,405.07	0

2035	6	138,664,952.18	2,152,271.52	20,195,498.83	97,628,373.41	0
2035	7	154,661,558.75	56,145.35	36,353,095.30	97,680,612.28	0
2035	8	158,255,320.68	33,420.01	38,545,679.58	95,777,261.98	0
2035	9	153,001,957.52	491,058.87	30,361,770.41	97,823,487.95	0
2035	10	130,738,186.76	5,480,540.44	9,846,922.32	97,405,133.87	0
2035	11	117,629,168.56	18,226,581.77	1,120,226.96	96,712,027.22	0
2035	12	133,573,697.75	33,306,590.75	29,267.04	98,759,061.32	0
2036	1	152,144,955.66	45,094,809.65	0	100,825,598.70	4,654,214.70
2036	2	146,110,914.46	41,444,925.74	22,176.73	92,105,821.61	0
2036	3	142,578,094.63	33,346,747.78	129,147.28	98,992,294.62	0
2036	4	124,568,033.92	19,074,147.23	1,674,575.76	97,183,896.52	0
2036	5	119,973,109.94	8,266,114.68	5,726,149.60	94,992,888.58	0
2036	6	138,675,194.92	2,131,299.26	20,114,062.97	97,741,024.28	0
2036	7	154,619,135.33	55,594.94	36,204,345.75	97,787,488.82	0
2036	8	158,202,065.90	33,092.38	38,387,958.41	95,882,055.98	0
2036	9	152,979,942.12	486,244.86	30,237,536.15	97,930,520.82	0
2036	10	130,757,689.66	5,427,147.30	9,807,234.94	97,517,717.30	0
2036	11	117,558,866.78	18,049,012.68	1,115,711.96	96,823,809.53	0
2036	12	133,363,244.85	32,982,107.48	29,149.09	98,873,209.65	0
2037	1	151,831,571.78	44,635,332.80	0	100,971,691.66	4,654,214.70
2037	2	145,822,001.20	41,022,638.03	22,092.88	92,239,279.90	0
2037	3	139,192,599.16	33,006,973.45	128,658.96	95,947,061.79	0
2037	4	124,511,292.91	18,880,298.57	1,668,288.19	97,327,291.74	0
2037	5	120,007,764.51	8,182,106.98	5,704,649.49	95,133,050.96	0
2037	6	138,722,229.25	2,109,639.08	20,038,540.21	97,885,241.54	0
2037	7	154,644,245.62	55,037.04	36,073,070.30	97,944,432.45	0
2037	8	158,216,426.19	32,760.30	38,248,765.28	96,035,941.49	0
2037	9	153,022,595.81	481,365.41	30,127,896.11	98,087,694.01	0
2037	10	130,827,466.13	5,372,842.64	9,771,959.07	97,677,074.29	0
2037	11	117,532,476.22	17,868,412.19	1,111,698.83	96,982,032.58	0
2037	12	133,194,689.31	32,652,084.73	29,044.24	99,034,781.70	0
2038	1	151,566,521.38	44,197,008.68	0	101,144,965.39	4,654,214.70
2038	2	145,577,368.42	40,619,790.99	22,018.78	92,397,568.26	0
2038	3	139,032,686.52	32,682,841.16	128,227.46	96,111,712.95	0
2038	4	124,475,306.64	18,692,987.64	1,662,523.66	97,484,380.93	0
2038	5	120,060,426.08	8,100,932.52	5,684,937.90	95,286,598.58	0
2038	6	138,790,049.04	2,088,709.40	19,969,299.94	98,043,231.28	0
2038	7	154,667,005.74	54,486.91	35,945,708.54	98,095,104.47	0
2038	8	158,228,791.43	32,432.83	38,113,721.87	96,183,677.61	0
2038	9	153,062,305.22	476,553.78	30,021,524.74	98,238,586.42	0
2038	10	130,879,689.85	5,318,673.66	9,736,609.68	97,818,816.38	0
2038	11	117,489,038.94	17,688,262.91	1,107,677.33	97,122,766.09	0

2038	12	133,009,098.32	32,322,886.50	28,939.17	99,178,494.01	0
2039	1	151,285,322.07	43,756,045.17	0	101,304,729.59	4,654,214.70
2039	2	145,317,965.91	40,214,518.19	21,941.88	92,543,515.45	0
2039	3	138,857,968.51	32,356,757.09	127,779.63	96,263,526.83	0
2039	4	124,426,488.11	18,504,835.50	1,656,569.83	97,629,668.36	0
2039	5	120,100,540.11	8,019,393.50	5,664,579.02	95,428,610.51	0
2039	6	138,843,631.71	2,067,685.74	19,897,785.96	98,189,351.60	0
2039	7	154,675,633.67	53,935.14	35,814,765.21	98,235,227.49	0
2039	8	158,227,014.68	32,104.40	37,974,880.89	96,321,070.26	0
2039	9	153,088,444.67	471,727.91	29,912,162.08	98,378,914.39	0
2039	10	130,955,621.45	5,266,003.95	9,703,334.48	97,980,692.90	0
2039	11	117,470,814.91	17,513,099.76	1,103,891.81	97,283,490.73	0
2039	12	132,853,039.25	32,002,799.75	28,840.27	99,342,620.59	0
2040	1	151,038,389.91	43,322,280.80	0	101,491,561.79	4,654,214.70
2040	2	145,089,915.57	39,815,861.84	21,873.64	92,714,189.70	0
2040	3	141,919,432.41	32,035,996.65	127,382.25	99,646,148.55	0
2040	4	124,471,121.60	18,329,663.86	1,652,163.66	97,853,879.67	0
2040	5	120,228,716.14	7,943,479.82	5,649,512.27	95,647,766.98	0
2040	6	138,996,630.59	2,048,112.48	19,844,861.45	98,414,848.24	0
2040	7	154,779,073.07	53,414.07	35,712,481.73	98,441,471.44	0
2040	8	158,320,477.15	31,794.24	37,866,428.33	96,523,295.46	0
2040	9	153,205,006.70	467,170.54	29,826,735.86	98,585,460.01	0
2040	10	131,093,792.63	5,215,638.59	9,676,568.07	98,195,995.85	0
2040	11	117,514,041.17	17,345,600.16	1,100,846.75	97,497,261.65	0
2040	12	132,765,172.68	31,696,717.09	28,760.72	99,560,916.25	0
2041	1	150,782,101.99	42,905,833.96	0	101,651,720.72	4,654,214.70
2041	2	144,853,417.33	39,433,121.38	21,808.08	92,860,497.48	0
2041	3	138,558,198.33	31,728,042.19	127,000.45	96,593,250.73	0
2041	4	124,431,166.78	18,151,427.63	1,647,026.81	97,997,297.92	0
2041	5	120,274,093.99	7,866,238.04	5,631,947.01	95,787,951.87	0
2041	6	139,059,254.43	2,028,196.79	19,783,160.54	98,559,088.67	0
2041	7	154,800,234.41	52,890.12	35,598,379.28	98,577,259.19	0
2041	8	158,332,322.75	31,482.36	37,745,443.95	96,656,437.32	0
2041	9	153,241,113.16	462,587.96	29,731,438.54	98,721,446.37	0
2041	10	131,093,224.98	5,162,015.16	9,641,052.72	98,284,566.97	0
2041	11	117,419,606.73	17,167,265.22	1,096,806.38	97,585,202.52	0
2041	12	132,528,986.61	31,370,834.32	28,655.16	99,650,718.50	0
2042	1	150,434,895.16	42,472,903.15	0	101,737,444.70	4,654,214.70
2042	2	144,533,762.94	39,035,231.12	21,733.70	92,938,807.73	0
2042	3	138,319,079.27	31,407,898.15	126,567.31	96,674,708.85	0
2042	4	124,280,068.46	17,961,409.19	1,640,782.34	98,042,462.51	0
2042	5	120,214,539.81	7,783,890.23	5,610,594.27	95,832,098.23	0

2042	6	139,008,440.65	2,006,964.59	19,708,155.46	98,604,512.18	0
2042	7	154,785,090.72	52,365.68	35,483,226.73	98,677,792.49	0
2042	8	158,308,487.15	31,170.19	37,623,346.15	96,755,011.68	0
2042	9	153,241,032.30	458,001.10	29,635,264.19	98,822,126.72	0
2042	10	131,142,415.76	5,112,245.98	9,612,527.83	98,412,051.82	0
2042	11	117,377,422.44	17,001,748.33	1,093,561.27	97,711,780.23	0
2042	12	132,355,699.21	31,068,374.80	28,570.38	99,779,975.39	0
2043	1	150,151,143.08	42,076,064.83	0	101,850,530.94	4,654,214.70
2043	2	144,272,283.31	38,670,512.11	21,666.97	93,042,113.84	0
2043	3	138,132,695.04	31,114,443.82	126,178.67	96,782,167.60	0
2043	4	124,261,153.48	17,800,394.21	1,636,369.55	98,188,975.31	0
2043	5	120,272,881.44	7,714,111.57	5,595,504.89	95,975,307.90	0
2043	6	139,084,797.95	1,988,973.16	19,655,151.47	98,751,864.89	0
2043	7	154,802,607.60	51,883.09	35,378,823.24	98,800,195.44	0
2043	8	158,317,517.33	30,882.93	37,512,645.71	96,875,029.56	0
2043	9	153,272,196.62	453,780.26	29,548,067.36	98,944,708.71	0
2043	10	131,186,695.09	5,065,025.29	9,584,041.56	98,532,038.11	0
2043	11	117,336,272.82	16,844,706.93	1,090,320.55	97,830,912.73	0
2043	12	132,190,296.89	30,781,403.07	28,485.71	99,901,629.48	0
2044	1	149,996,421.04	41,750,381.12	0	102,021,492.61	4,654,214.70
2044	2	144,129,087.17	38,371,188.58	21,618.08	93,198,290.11	0
2044	3	141,275,849.58	30,873,606.95	125,894.00	100,166,443.68	0
2044	4	124,288,759.50	17,663,252.93	1,632,736.93	98,357,355.23	0
2044	5	120,365,611.06	7,654,679.00	5,583,083.28	96,139,891.70	0
2044	6	139,195,186.30	1,973,649.33	19,611,518.47	98,921,210.09	0
2044	7	154,899,221.82	51,485.71	35,301,894.32	98,974,135.97	0
2044	8	158,406,263.23	30,646.40	37,431,076.93	97,045,580.78	0
2044	9	153,378,665.66	450,304.69	29,483,817.03	99,118,903.66	0
2044	10	131,305,955.16	5,026,472.18	9,563,659.64	98,710,233.21	0
2044	11	117,382,665.48	16,716,491.20	1,088,001.82	98,007,839.85	0
2044	12	132,136,611.57	30,547,106.32	28,425.13	100,082,301.49	0
2045	1	149,878,287.42	41,428,854.15	0	102,224,885.96	4,654,214.70
2045	2	144,019,348.75	38,075,685.37	21,579.76	93,384,093.23	0
2045	3	138,009,313.35	30,635,843.92	125,670.79	97,137,893.69	0
2045	4	124,326,968.31	17,524,402.41	1,629,579.65	98,537,571.84	0
2045	5	120,470,795.20	7,594,505.71	5,572,287.08	96,316,045.33	0
2045	6	139,322,997.77	1,958,134.51	19,573,595.02	99,102,459.83	0
2045	7	154,990,897.47	51,073.00	35,228,125.77	99,139,992.87	0
2045	8	158,490,424.89	30,400.74	37,352,859.14	97,208,205.89	0
2045	9	153,479,544.72	446,695.06	29,422,206.22	99,285,003.16	0
2045	10	131,398,643.30	4,985,632.73	9,542,627.24	98,864,793.20	0
2045	11	117,397,913.57	16,580,671.84	1,085,609.08	98,161,300.04	0

2045	12	132,045,066.09	30,298,914.98	28,362.62	100,239,009.86	0
2046	1	149,582,782.40	41,056,917.81	0	102,301,317.28	4,654,214.70
2046	2	143,747,281.19	37,733,852.81	21,523.50	93,453,914.49	0
2046	3	137,806,573.81	30,360,804.12	125,343.16	97,210,521.57	0
2046	4	124,239,218.54	17,367,095.99	1,625,333.43	98,611,374.70	0
2046	5	120,460,242.91	7,526,334.23	5,557,767.30	96,388,184.31	0
2046	6	139,328,643.50	1,940,557.47	19,522,591.83	99,176,685.78	0
2046	7	154,972,070.78	50,614.24	35,136,114.92	99,213,635.80	0
2046	8	158,464,799.42	30,127.66	37,255,298.79	97,280,413.85	0
2046	9	153,472,436.30	442,682.61	29,345,359.60	99,358,753.80	0
2046	10	131,399,211.01	4,940,711.33	9,517,437.76	98,935,471.79	0
2046	11	117,315,828.89	16,431,277.16	1,082,743.42	98,231,475.70	0
2046	12	131,843,653.85	30,025,916.59	28,287.75	100,310,670.88	0
2047	1	149,284,292.52	40,696,502.48	0	102,363,242.72	4,654,214.70
2047	2	143,472,554.90	37,402,608.78	21,471.35	93,510,484.38	0
2047	3	137,598,593.75	30,094,283.89	125,039.47	97,269,365.43	0
2047	4	124,127,897.31	17,212,498.45	1,621,193.67	98,658,790.78	0
2047	5	120,425,436.69	7,459,336.68	5,543,611.54	96,434,531.40	0
2047	6	139,309,332.56	1,923,283.11	19,472,867.35	99,224,373.68	0
2047	7	154,917,584.93	50,159.11	35,043,427.48	99,252,292.51	0
2047	8	158,404,154.24	29,856.75	37,157,021.05	97,318,317.32	0
2047	9	153,429,757.21	438,701.96	29,267,947.91	99,397,467.06	0
2047	10	131,358,912.17	4,895,881.70	9,491,551.36	98,965,888.97	0
2047	11	117,193,995.22	16,282,187.69	1,079,798.48	98,261,676.44	0
2047	12	131,601,976.22	29,753,475.92	28,210.81	100,341,510.86	0
2048	1	148,964,948.53	40,338,859.39	0	102,401,541.83	4,654,214.70
2048	2	143,178,795.79	37,073,912.61	21,421.56	93,545,471.24	0
2048	3	140,604,050.62	29,829,813.68	124,749.50	100,539,582.49	0
2048	4	123,995,183.76	17,059,111.47	1,617,232.82	98,683,425.05	0
2048	5	120,369,498.69	7,392,863.76	5,530,067.57	96,458,610.29	0
2048	6	139,269,393.50	1,906,144.02	19,425,291.89	99,249,149.18	0
2048	7	154,844,061.69	49,707.59	34,954,623.69	99,268,024.59	0
2048	8	158,325,151.14	29,587.99	37,062,861.18	97,333,742.85	0
2048	9	153,367,395.12	434,752.89	29,193,779.80	99,413,222.14	0
2048	10	131,297,166.70	4,851,411.73	9,466,720.96	98,973,443.88	0
2048	11	117,050,778.20	16,134,294.33	1,076,973.67	98,269,177.59	0
2048	12	131,339,307.43	29,483,221.01	28,137.01	100,349,170.78	0
2049	1	148,616,942.20	39,972,566.39	0	102,419,828.50	4,654,214.70
2049	2	142,858,794.55	36,737,266.63	21,361.13	93,562,176.41	0
2049	3	137,116,384.90	29,558,947.02	124,397.58	97,323,135.34	0
2049	4	123,838,757.48	16,902,104.83	1,612,469.97	98,688,768.27	0
2049	5	120,290,393.47	7,324,822.19	5,513,781.16	96,463,833.04	0

2049	6	139,200,015.04	1,888,600.47	19,368,083.12	99,254,523.02	0
2049	7	154,733,803.67	49,245.61	34,848,502.84	99,264,349.40	0
2049	8	158,208,751.20	29,313.00	36,950,339.80	97,330,139.28	0
2049	9	153,271,042.80	430,712.29	29,105,148.64	99,409,541.58	0
2049	10	131,210,371.75	4,805,927.83	9,437,205.00	98,961,648.80	0
2049	11	116,884,443.78	15,983,028.93	1,073,615.81	98,257,466.43	0
2049	12	131,050,843.78	29,206,804.12	28,049.28	100,337,211.74	0
2050	1	148,249,792.18	39,608,346.51	0	102,416,898.36	4,654,214.70
2050	2	142,521,344.66	36,402,525.98	21,328.61	93,559,499.68	0
2050	3	136,844,077.61	29,289,613.40	124,208.24	97,320,351.01	0
2050	4	123,664,910.67	16,746,013.50	1,609,815.49	98,673,667.27	0
2050	5	120,198,911.14	7,257,177.29	5,504,704.28	96,449,072.49	0
2050	6	139,135,502.15	1,871,159.20	19,336,199.08	99,239,335.45	0
2050	7	154,648,567.70	48,786.37	34,787,963.02	99,240,112.49	0
2050	8	158,120,522.00	29,039.64	36,886,148.61	97,306,374.63	0
2050	9	153,192,191.60	426,695.75	29,054,586.34	99,385,269.21	0
2050	10	131,115,703.97	4,760,719.75	9,420,036.45	98,929,357.64	0
2050	11	116,700,081.15	15,832,680.85	1,071,662.64	98,225,405.05	0
2050	12	130,743,312.14	28,932,063.52	27,998.25	100,304,471.74	0

Feb	Mar	Apr	May	Jun	Jul	
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10,967,657.78		0	0	0	0	0
0	8,539,572.34		0	0	0	0
0	0	5,065,081.80		0	0	0
0	0	0	9,417,624.46		0	0
0	0	0	0	17,118,475.81		0
0	0	0	0	0	19,001,373.21	
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10,967,657.78	0	0	0	0	0
0	8,539,572.34	0	0	0	0
0	0	5,065,081.80	0	0	0
0	0	0	9,417,624.46	0	0
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10,967,657.78	0	0	0	0	0
0	8,539,572.34	0	0	0	0
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Aug	Sep	Oct	Dec	BTWMay12Apr14	AftMay2014	X-Missing
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22,328,626.51		0	0	0	0	0
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	0	0	0	0	6,483,182.49	0
	0	0	0	0	6,483,182.49	0
	0	0	0	0	6,483,182.49	0
22,328,626.51		0	0	0	6,483,182.49	0
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	0	0	0	0	6,483,182.49	0
	0	0	0	0	6,483,182.49	0
	0	0	0	0	6,483,182.49	0
	0	0	0	0	6,483,182.49	0
	0	0	0	0	0	0

0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
22,328,626.51	0	0	0	0	1,570,332.61	0
0	22,755,307.67	0	0	0	1,570,332.61	0
0	0	16,435,257.52	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	-91,553.98	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
22,328,626.51	0	0	0	0	1,570,332.61	0
0	22,755,307.67	0	0	0	1,570,332.61	0
0	0	16,435,257.52	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	-91,553.98	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
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0	0	0	0	0	1,570,332.61	0
22,328,626.51	0	0	0	0	1,570,332.61	0
0	22,755,307.67	0	0	0	1,570,332.61	0
0	0	16,435,257.52	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	-91,553.98	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
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0	0	0	0	0	1,570,332.61	0
0	0	0	0	0	1,570,332.61	0
22,328,626.51	0	0	0	0	1,570,332.61	0
0	22,755,307.67	0	0	0	1,570,332.61	0
0	0	16,435,257.52	0	0	1,570,332.61	0
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	0	0	0 -91,553.98	0 1,570,332.61	0
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	0	0	0 0	0 1,570,332.61	0
	0	0	0 0	0 1,570,332.61	0
22,328,626.51	0	0	0 0	0 1,570,332.61	0
	0	22,755,307.67	0 0	0 1,570,332.61	0
	0	0	16,435,257.52 0	0 1,570,332.61	0
	0	0	0 0	0 1,570,332.61	0
	0	0	0 -91,553.98	0 1,570,332.61	0
	0	0	0 0	0 1,570,332.61	0
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	0	0	0 0	0 1,570,332.61	0
22,328,626.51	0	0	0 0	0 1,570,332.61	0
	0	22,755,307.67	0 0	0 1,570,332.61	0
	0	0	16,435,257.52 0	0 1,570,332.61	0
	0	0	0 0	0 1,570,332.61	0
	0	0	0 -91,553.98	0 1,570,332.61	0
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	0	0	0 0	0 1,570,332.61	0
22,328,626.51	0	0	0 0	0 1,570,332.61	0
	0	22,755,307.67	0 0	0 1,570,332.61	0
	0	0	16,435,257.52 0	0 1,570,332.61	0
	0	0	0 0	0 1,570,332.61	0
	0	0	0 -91,553.98	0 1,570,332.61	0
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	0	0	0	0	0	1,570,332.61	0
22,328,626.51		0	0	0	0	1,570,332.61	0
	0	22,755,307.67	0	0	0	1,570,332.61	0
	0		0	16,435,257.52	0	0	1,570,332.61
	0	0	0	0	0	0	1,570,332.61
	0	0	0	-91,553.98	0	0	1,570,332.61
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22,328,626.51		0	0	0	0	0	1,570,332.61
	0	22,755,307.67	0	0	0	0	1,570,332.61
	0		0	16,435,257.52	0	0	1,570,332.61
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	0	0	0	-91,553.98	0	0	1,570,332.61
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22,328,626.51		0	0	0	0	0	1,570,332.61
	0	22,755,307.67	0	0	0	0	1,570,332.61
	0		0	16,435,257.52	0	0	1,570,332.61
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22,328,626.51		0	0	0	0	0	1,570,332.61
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	0		0	16,435,257.52	0	0	1,570,332.61
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	0	0	-91,553.98	0	1,570,332.61	0
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	0	0	0	0	1,570,332.61	0
22,328,626.51		0	0	0	1,570,332.61	0
	0	22,755,307.67	0	0	1,570,332.61	0
	0	16,435,257.52	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	-91,553.98	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
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	0	0	0	0	1,570,332.61	0
22,328,626.51		0	0	0	1,570,332.61	0
	0	22,755,307.67	0	0	1,570,332.61	0
	0	16,435,257.52	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	-91,553.98	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
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	0	0	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
22,328,626.51		0	0	0	1,570,332.61	0
	0	22,755,307.67	0	0	1,570,332.61	0
	0	16,435,257.52	0	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
	0	0	-91,553.98	0	1,570,332.61	0
	0	0	0	0	1,570,332.61	0
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22,328,626.51	0	0	0	0	0 1,570,332.61	0
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	0	0 16,435,257.52		0	0 1,570,332.61	0
	0	0	0	0	0 1,570,332.61	0
	0	0	0 -91,553.98		0 1,570,332.61	0
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	0	0	0	0	0 1,570,332.61	0
22,328,626.51	0	0	0	0	0 1,570,332.61	0
	0 22,755,307.67		0	0	0 1,570,332.61	0
	0	0 16,435,257.52		0	0 1,570,332.61	0
	0	0	0	0	0 1,570,332.61	0
	0	0	0 -91,553.98		0 1,570,332.61	0
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22,328,626.51	0	0	0	0	0 1,570,332.61	0
	0 22,755,307.67		0	0	0 1,570,332.61	0
	0	0 16,435,257.52		0	0 1,570,332.61	0
	0	0	0	0	0 1,570,332.61	0
	0	0	0 -91,553.98		0 1,570,332.61	0
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22,328,626.51	0	0	0	0	0 1,570,332.61	0
	0 22,755,307.67		0	0	0 1,570,332.61	0
	0	0 16,435,257.52		0	0 1,570,332.61	0
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22,328,626.51	0	0	0	0 1,570,332.61	0
0	22,755,307.67	0	0	0 1,570,332.61	0
0	0	16,435,257.52	0	0 1,570,332.61	0
0	0	0	0	0 1,570,332.61	0
0	0	0	-91,553.98	0 1,570,332.61	0
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22,328,626.51	0	0	0	0 1,570,332.61	0
0	22,755,307.67	0	0	0 1,570,332.61	0
0	0	16,435,257.52	0	0 1,570,332.61	0
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0	0	0	-91,553.98	0 1,570,332.61	0

Year	Month	Actual	Pred	Upper	Lower	Sigma
2011	1	206,484,876.00	213,394,891.95	221,899,930.96	204,889,852.95	4,262,236.14
2011	2	176,714,180.00	182,305,890.17	190,350,615.44	174,261,164.91	4,031,553.38
2011	3	158,412,141.00	165,876,125.14	173,843,270.49	157,908,979.79	3,992,674.80
2011	4	146,370,784.00	149,428,325.61	157,413,643.79	141,443,007.43	4,001,781.97
2011	5	141,282,522.00	142,168,178.43	150,143,365.24	134,192,991.61	3,996,704.71
2011	6	169,040,601.00	168,967,454.58	176,997,917.81	160,936,991.35	4,024,406.07
2011	7	178,993,405.00	174,502,986.69	182,507,695.51	166,498,277.88	4,011,499.44
2011	8	199,600,899.00	197,267,003.62	205,773,688.84	188,760,318.39	4,263,061.13
2011	9	181,948,138.00	178,176,201.74	186,178,293.75	170,174,109.73	4,010,188.05
2011	10	145,922,887.00	145,770,439.76	153,838,179.37	137,702,700.15	4,043,086.85
2011	11	131,500,375.00	131,490,748.93	139,467,180.60	123,514,317.25	3,997,328.57
2011	12	154,918,325.00	155,740,392.50	163,761,732.90	147,719,052.11	4,019,834.23
2012	1	178,279,974.00	183,007,250.61	191,001,504.53	175,012,996.69	4,006,260.05
2012	2	162,789,327.00	169,780,457.15	177,787,257.99	161,773,656.32	4,012,547.84
2012	3	149,790,087.00	153,365,449.75	161,390,452.22	145,340,447.27	4,021,669.46
2012	4	136,740,769.00	135,003,432.21	143,062,815.25	126,944,049.16	4,038,899.02
2012	5	145,052,136.00	145,902,904.63	154,041,166.98	137,764,642.29	4,078,428.79
2012	6	167,052,221.00	160,935,288.28	169,171,347.01	152,699,229.56	4,127,438.70
2012	7	191,306,307.00	193,245,311.65	201,704,872.87	184,785,750.43	4,239,445.29
2012	8	188,984,295.00	190,194,695.61	198,437,320.67	181,952,070.54	4,130,729.38
2012	9	177,276,370.00	175,336,624.88	183,498,246.99	167,175,002.76	4,090,135.36
2012	10	139,101,128.00	144,124,731.15	152,349,837.22	135,899,625.08	4,121,949.86
2012	11	140,347,319.00	142,800,815.94	150,954,222.31	134,647,409.57	4,086,018.10
2012	12	151,274,789.00	155,045,992.79	163,213,055.69	146,878,929.90	4,092,861.96
2013	1	178,258,911.00	176,118,997.94	184,074,161.13	168,163,834.76	3,986,670.02
2013	2	173,352,119.00	171,841,597.26	179,790,726.31	163,892,468.20	3,983,646.07
2013	3	163,946,342.00	161,632,189.27	169,656,910.79	153,607,467.75	4,021,528.66
2013	4	150,180,060.00	142,115,212.23	150,177,533.53	134,052,890.92	4,040,371.51
2013	5	132,932,198.00	129,644,780.28	137,600,292.84	121,689,267.72	3,986,845.11
2013	6	150,860,464.00	152,829,692.46	160,812,308.54	144,847,076.37	4,000,427.84
2013	7	167,928,560.00	167,924,034.41	175,929,756.59	159,918,312.22	4,012,007.28
2013	8	167,127,754.00	165,632,912.66	173,766,338.70	157,499,486.62	4,076,005.11
2013	9	170,935,228.00	171,577,230.00	179,584,603.29	163,569,856.71	4,012,834.72
2013	10	144,686,345.00	139,496,961.44	147,493,049.65	131,500,873.24	4,007,179.29
2013	11	133,494,161.00	129,219,688.28	137,157,737.37	121,281,639.19	3,978,093.42
2013	12	165,127,080.00	162,045,550.84	170,090,057.24	154,001,044.44	4,031,443.70
2014	1	196,459,924.00	192,737,398.77	200,892,438.82	184,582,358.72	4,086,836.81
2014	2	191,045,837.00	184,847,914.70	193,082,254.56	176,613,574.85	4,126,577.30
2014	3	169,108,543.00	168,083,252.86	176,261,839.06	159,904,666.66	4,098,636.78
2014	4	135,162,201.00	138,916,138.74	147,060,910.31	130,771,367.16	4,081,690.84
2014	5	131,836,959.00	130,919,145.59	138,875,852.33	122,962,438.85	3,987,443.56

2014	6	150,480,944.00	153,688,126.99	161,630,146.97	145,746,107.00	3,980,083.41
2014	7	164,892,551.00	167,349,363.27	175,285,927.14	159,412,799.40	3,977,349.12
2014	8	151,061,888.00	157,433,018.04	165,635,468.25	149,230,567.83	4,110,596.05
2014	9	161,517,495.00	169,233,274.45	177,210,104.25	161,256,444.65	3,997,528.08
2014	10	133,029,435.00	135,696,302.11	143,621,722.30	127,770,881.93	3,971,764.54
2014	11	130,066,754.00	133,043,060.16	141,053,315.11	125,032,805.21	4,014,278.85
2014	12	161,233,941.00	158,985,443.88	167,014,036.11	150,956,851.66	4,023,468.43
2015	1	173,973,302.00	174,661,286.41	182,617,351.07	166,705,221.75	3,987,121.79
2015	2	177,243,496.00	173,463,086.40	181,502,816.79	165,423,356.01	4,029,050.24
2015	3	171,709,207.00	166,387,805.66	174,630,237.02	158,145,374.31	4,130,632.30
2015	4	130,118,673.00	132,349,303.33	140,292,451.61	124,406,155.05	3,980,648.84
2015	5	121,362,907.00	124,521,875.72	132,497,434.11	116,546,317.33	3,996,890.93
2015	6	151,603,552.00	154,109,623.42	162,046,473.15	146,172,773.68	3,977,492.37
2015	7	160,980,081.00	161,474,375.21	169,442,136.50	153,506,613.92	3,992,983.47
2015	8	167,160,158.00	164,682,026.11	172,652,956.21	156,711,096.02	3,994,571.49
2015	9	165,100,010.00	163,823,724.10	171,762,028.03	155,885,420.17	3,978,221.13
2015	10	132,220,172.00	132,587,185.78	140,517,795.16	124,656,576.40	3,974,365.07
2015	11	121,689,220.00	121,507,290.29	129,462,246.70	113,552,333.87	3,986,566.40
2015	12	138,057,305.00	137,547,889.87	145,600,551.24	129,495,228.51	4,035,530.50
2016	1	160,306,845.00	159,053,941.99	167,136,682.14	150,971,201.85	4,050,604.25
2016	2	163,381,609.00	160,730,269.24	168,680,230.57	152,780,307.91	3,984,063.15
2016	3	140,532,452.00	135,818,636.16	143,870,673.57	127,766,598.76	4,035,217.81
2016	4	127,287,304.00	129,447,320.12	137,392,129.85	121,502,510.39	3,981,481.47
2016	5	122,926,805.00	121,482,916.20	129,446,054.01	113,519,778.40	3,990,666.44
2016	6	148,311,104.00	152,096,254.77	160,030,027.22	144,162,482.33	3,975,950.22
2016	7	173,010,653.00	171,974,177.57	179,915,186.07	164,033,169.06	3,979,576.51
2016	8	176,952,920.00	178,204,369.93	186,340,913.89	170,067,825.98	4,077,567.63
2016	9	174,854,436.00	174,332,406.20	182,543,034.25	166,121,778.15	4,114,694.31
2016	10	137,084,295.00	135,413,680.51	143,457,195.12	127,370,165.90	4,030,946.67
2016	11	122,793,283.00	121,072,201.78	129,096,350.32	113,048,053.23	4,021,241.51
2016	12	147,054,558.00	147,851,195.81	155,778,634.03	139,923,757.60	3,972,775.86
2017	1	166,001,183.00	160,791,247.33	168,847,837.25	152,734,657.40	4,037,499.27
2017	2	143,120,998.00	144,678,351.08	153,004,082.61	136,352,619.56	4,172,377.55
2017	3	132,388,449.00	134,723,762.16	142,816,031.09	126,631,493.23	4,055,379.53
2017	4	125,993,610.00	124,593,668.78	132,570,405.24	116,616,932.32	3,997,481.31
2017	5	128,233,484.00	128,987,210.16	136,956,253.41	121,018,166.90	3,993,625.92
2017	6	153,275,683.00	147,998,128.51	155,930,734.79	140,065,522.23	3,975,365.80
2017	7	164,171,663.00	164,812,971.21	172,757,631.29	156,868,311.12	3,981,406.47
2017	8	160,381,309.00	157,855,197.03	165,912,803.30	149,797,590.75	4,038,008.60
2017	9	148,584,626.00	147,736,841.64	156,107,977.68	139,365,705.59	4,195,131.68
2017	10	138,491,207.00	137,446,168.24	145,445,410.90	129,446,925.58	4,008,760.12
2017	11	121,717,572.00	120,262,629.11	128,159,089.52	112,366,168.71	3,957,251.57

2017	12	144,191,367.00	144,640,899.31	152,568,380.71	136,713,417.90	3,972,797.51
2018	1		165,083,366.46	173,045,452.77	157,121,280.15	3,990,139.49
2018	2		156,982,708.93	164,941,922.76	149,023,495.09	3,988,699.98
2018	3		145,012,643.56	152,961,671.00	137,063,616.11	3,983,595.14
2018	4		132,619,108.94	140,566,495.05	124,671,722.82	3,982,772.60
2018	5		126,856,756.63	134,812,630.74	118,900,882.53	3,987,026.29
2018	6		142,333,036.64	150,329,123.89	134,336,949.38	4,007,178.81
2018	7		162,577,556.49	170,561,372.29	154,593,740.68	4,001,029.07
2018	8		165,415,965.32	173,358,751.11	157,473,179.53	3,980,467.19
2018	9		158,792,755.51	166,732,172.64	150,853,338.39	3,978,779.00
2018	10		135,317,299.85	143,240,659.95	127,393,939.75	3,970,732.15
2018	11		123,073,258.41	131,004,025.83	115,142,490.98	3,974,444.27
2018	12		144,911,151.95	152,833,025.61	136,989,278.28	3,969,987.23
2019	1		163,540,702.03	171,504,221.30	155,577,182.77	3,990,857.61
2019	2		156,463,578.75	164,425,579.15	148,501,578.35	3,990,096.44
2019	3		147,901,256.55	155,846,185.14	139,956,327.96	3,981,541.03
2019	4		130,129,703.99	138,081,041.78	122,178,366.20	3,984,752.95
2019	5		123,500,411.77	131,463,887.15	115,536,936.38	3,990,835.62
2019	6		142,430,152.02	150,431,373.86	134,428,930.18	4,009,751.97
2019	7		159,749,201.69	167,749,073.39	151,749,329.99	4,009,075.36
2019	8		163,448,116.62	171,401,991.47	155,494,241.78	3,986,024.38
2019	9		157,327,238.97	165,274,038.75	149,380,439.20	3,982,478.76
2019	10		133,866,452.44	141,790,971.99	125,941,932.89	3,971,313.19
2019	11		122,339,924.34	130,271,281.42	114,408,567.26	3,974,739.77
2019	12		141,160,500.21	149,085,416.43	133,235,584.00	3,971,511.98
2020	1		161,674,840.99	169,647,243.41	153,702,438.57	3,995,309.33
2020	2		154,858,447.49	162,828,695.25	146,888,199.74	3,994,229.54
2020	3		149,750,975.55	157,698,395.94	141,803,555.17	3,982,789.78
2020	4		129,049,785.85	137,000,541.77	121,099,029.92	3,984,461.36
2020	5		122,695,886.47	130,660,317.03	114,731,455.92	3,991,314.29
2020	6		141,644,367.42	149,652,074.79	133,636,660.06	4,013,002.14
2020	7		158,744,807.99	166,756,746.66	150,732,869.32	4,015,122.63
2020	8		162,525,074.89	170,486,466.92	154,563,682.85	3,989,791.56
2020	9		156,570,604.17	164,521,902.39	148,619,305.95	3,984,733.12
2020	10		133,249,262.97	141,174,127.46	125,324,398.48	3,971,486.06
2020	11		121,662,919.34	129,592,471.81	113,733,366.86	3,973,835.41
2020	12		140,312,422.82	148,238,913.62	132,385,932.02	3,972,301.07
2021	1		160,737,422.64	168,717,624.95	152,757,220.32	3,999,218.19
2021	2		154,064,435.54	162,041,945.84	146,086,925.23	3,997,869.11
2021	3		145,940,164.63	153,888,829.60	137,991,499.66	3,983,413.49
2021	4		128,690,887.85	136,640,502.49	120,741,273.20	3,983,889.41
2021	5		122,521,368.49	130,485,345.34	114,557,391.64	3,991,086.93

2021	6	141,522,093.63	149,532,458.32	133,511,728.94	4,014,333.84
2021	7	158,682,553.48	166,698,934.92	150,666,172.04	4,017,349.09
2021	8	162,515,093.26	170,478,813.03	154,551,373.50	3,990,958.09
2021	9	156,655,347.80	164,607,404.15	148,703,291.45	3,985,113.05
2021	10	133,395,950.35	141,320,164.79	125,471,735.90	3,971,160.29
2021	11	121,755,573.05	129,689,005.58	113,822,140.52	3,975,779.87
2021	12	140,323,972.95	148,251,663.88	132,396,282.02	3,972,902.51
2022	1	159,968,087.86	167,962,448.48	151,973,727.24	4,006,313.52
2022	2	153,324,676.65	161,315,732.91	145,333,620.39	4,004,657.57
2022	3	145,364,222.43	153,317,117.12	137,411,327.74	3,985,533.18
2022	4	128,395,937.14	136,343,546.99	120,448,327.29	3,982,884.73
2022	5	122,411,815.23	130,374,613.53	114,449,016.93	3,990,496.30
2022	6	141,385,430.33	149,400,708.12	133,370,152.53	4,016,796.00
2022	7	158,369,718.55	166,397,165.44	150,342,271.67	4,022,894.45
2022	8	162,146,175.55	170,117,356.56	154,174,994.54	3,994,697.24
2022	9	156,340,499.47	164,296,795.02	148,384,203.92	3,987,237.50
2022	10	133,177,831.46	141,101,596.39	125,254,066.53	3,970,935.02
2022	11	121,293,870.69	129,230,450.56	113,357,290.81	3,977,357.14
2022	12	139,463,050.72	147,395,419.53	131,530,681.91	3,975,246.79
2023	1	159,611,915.65	167,609,984.53	151,613,846.76	4,008,171.89
2023	2	152,972,439.39	160,967,013.48	144,977,865.29	4,006,420.50
2023	3	145,031,223.18	152,985,413.75	137,077,032.60	3,986,182.61
2023	4	128,086,038.81	136,033,608.58	120,138,469.04	3,982,864.64
2023	5	122,125,405.12	130,088,723.82	114,162,086.41	3,990,757.10
2023	6	140,995,413.78	149,015,466.29	132,975,361.26	4,019,188.82
2023	7	157,835,103.51	165,871,980.09	149,798,226.92	4,027,620.07
2023	8	161,572,705.68	169,550,771.03	153,594,640.33	3,998,147.27
2023	9	155,807,186.11	163,767,888.41	147,846,483.82	3,989,445.90
2023	10	132,767,410.03	140,691,595.05	124,843,225.02	3,971,145.55
2023	11	120,844,373.96	128,778,963.94	112,909,783.98	3,976,359.91
2023	12	138,871,666.04	146,805,697.88	130,937,634.20	3,976,080.21
2024	1	159,032,922.88	167,037,716.04	151,028,129.72	4,011,541.71
2024	2	152,440,909.95	160,441,688.62	144,440,131.28	4,009,529.88
2024	3	147,769,173.79	155,730,251.22	139,808,096.36	3,989,633.90
2024	4	127,770,831.86	135,718,155.94	119,823,507.79	3,982,741.51
2024	5	121,890,405.24	129,853,880.13	113,926,930.35	3,990,835.37
2024	6	140,719,864.44	148,743,665.67	132,696,063.21	4,021,067.46
2024	7	157,442,974.52	165,487,668.79	149,398,280.26	4,031,537.85
2024	8	161,168,383.62	169,152,110.31	153,184,656.93	4,000,984.41
2024	9	155,451,978.43	163,416,133.07	147,487,823.80	3,991,176.02
2024	10	132,477,175.11	140,401,558.80	124,552,791.43	3,971,245.11
2024	11	120,489,037.59	128,423,298.70	112,554,776.47	3,976,195.11

2024	12	138,368,235.52	146,304,656.90	130,431,814.15	3,977,277.71
2025	1	158,389,991.99	166,402,215.11	150,377,768.87	4,015,265.18
2025	2	151,850,838.08	159,858,426.92	143,843,249.23	4,012,942.75
2025	3	144,059,832.34	152,018,935.01	136,100,729.67	3,988,644.27
2025	4	127,385,310.52	135,332,526.20	119,438,094.85	3,982,687.19
2025	5	121,591,192.38	129,554,980.97	113,627,403.78	3,990,992.58
2025	6	140,373,607.44	148,401,690.30	132,345,524.58	4,023,213.17
2025	7	157,016,561.47	165,069,684.14	148,963,438.80	4,035,761.68
2025	8	160,729,645.40	168,719,607.86	152,739,682.95	4,004,109.42
2025	9	155,063,985.59	163,031,972.35	147,095,998.83	3,993,096.46
2025	10	132,190,342.20	140,114,943.50	124,265,740.90	3,971,354.16
2025	11	120,137,089.58	128,071,110.33	112,203,068.82	3,976,074.65
2025	12	137,868,449.70	145,807,492.00	129,929,407.39	3,978,591.16
2026	1	157,586,877.63	165,610,600.47	149,563,154.78	4,021,028.18
2026	2	151,113,382.68	159,131,482.80	143,095,282.56	4,018,210.39
2026	3	143,432,947.44	151,396,255.50	135,469,639.38	3,990,751.77
2026	4	126,953,705.48	134,900,723.71	119,006,687.25	3,982,588.24
2026	5	121,285,157.67	129,249,060.07	113,321,255.26	3,991,049.62
2026	6	140,033,305.42	148,066,160.03	132,000,450.81	4,025,604.50
2026	7	156,580,430.38	164,643,388.37	148,517,472.39	4,040,690.57
2026	8	160,278,657.62	168,275,995.57	152,281,319.66	4,007,805.59
2026	9	154,670,340.92	162,642,792.85	146,697,888.98	3,995,334.15
2026	10	131,925,514.72	139,850,231.20	124,000,798.23	3,971,411.89
2026	11	119,764,521.15	127,699,488.15	111,829,554.15	3,976,548.85
2026	12	137,292,539.76	145,235,733.17	129,349,346.35	3,980,671.46
2027	1	156,940,575.72	164,976,106.53	148,905,044.90	4,026,945.65
2027	2	150,519,485.56	158,548,342.34	142,490,628.77	4,023,601.01
2027	3	142,944,335.05	150,912,136.98	134,976,533.13	3,993,003.83
2027	4	126,650,358.41	134,597,204.84	118,703,511.99	3,982,502.14
2027	5	121,096,435.48	129,060,228.89	113,132,642.06	3,990,995.00
2027	6	139,820,566.58	147,857,525.15	131,783,608.01	4,027,661.16
2027	7	156,284,361.87	164,356,142.46	148,212,581.28	4,045,111.96
2027	8	159,967,859.19	167,971,863.08	151,963,855.30	4,011,146.17
2027	9	154,411,461.08	162,387,836.95	146,435,085.22	3,997,300.60
2027	10	131,747,139.05	139,671,885.62	123,822,392.48	3,971,426.96
2027	11	119,482,384.39	127,419,117.03	111,545,651.75	3,977,433.69
2027	12	136,820,312.22	144,767,992.19	128,872,632.24	3,982,919.87
2028	1	156,359,650.54	164,407,823.66	148,311,477.42	4,033,281.25
2028	2	149,985,392.09	158,025,720.50	141,945,063.69	4,029,349.93
2028	3	145,699,147.07	153,680,044.88	137,718,249.25	3,999,566.74
2028	4	126,403,842.92	134,350,617.50	118,457,068.33	3,982,466.14
2028	5	120,962,130.14	128,925,722.34	112,998,537.93	3,990,894.16

2028	6	139,668,297.96	147,709,096.10	131,627,499.82	4,029,585.33
2028	7	156,062,654.13	164,142,834.43	147,982,473.83	4,049,321.41
2028	8	159,731,403.73	167,741,812.96	151,720,994.50	4,014,356.16
2028	9	154,224,200.70	162,204,284.70	146,244,116.70	3,999,158.90
2028	10	131,642,126.13	139,566,832.84	123,717,419.41	3,971,406.99
2028	11	119,273,573.90	127,212,857.20	111,334,290.59	3,978,711.94
2028	12	136,428,746.19	144,381,357.01	128,476,135.37	3,985,390.92
2029	1	155,813,569.24	163,876,056.19	147,751,082.29	4,040,454.52
2029	2	149,483,023.16	157,536,293.36	141,429,752.96	4,035,835.61
2029	3	142,123,783.28	150,102,390.55	134,145,176.02	3,998,418.85
2029	4	126,203,850.12	134,150,676.93	118,257,023.32	3,982,492.31
2029	5	120,880,695.97	128,843,959.90	112,917,432.04	3,990,729.65
2029	6	139,582,031.12	147,626,284.55	131,537,777.68	4,031,316.93
2029	7	155,910,698.04	163,998,750.32	147,822,645.77	4,053,266.39
2029	8	159,564,936.98	167,581,395.90	151,548,478.06	4,017,387.92
2029	9	154,103,262.35	162,086,789.63	146,119,735.06	4,000,884.48
2029	10	131,591,596.93	139,516,207.99	123,666,985.86	3,971,359.06
2029	11	119,107,457.04	127,050,124.53	111,164,789.55	3,980,407.90
2029	12	136,072,668.46	144,031,052.65	128,114,284.27	3,988,284.21
2030	1	155,113,871.91	163,189,488.24	147,038,255.58	4,047,034.21
2030	2	148,840,598.43	156,905,649.36	140,775,547.50	4,041,739.44
2030	3	141,576,665.39	149,560,662.08	133,592,668.70	4,001,119.72
2030	4	125,851,984.24	133,799,176.07	117,904,792.40	3,982,675.24
2030	5	120,641,958.18	128,605,321.68	112,678,594.67	3,990,779.55
2030	6	139,339,166.80	147,386,723.60	131,291,610.00	4,032,972.39
2030	7	155,580,229.17	163,675,705.17	147,484,753.17	4,056,986.73
2030	8	159,225,304.87	167,247,678.39	151,202,931.36	4,020,351.97
2030	9	153,800,019.77	161,787,189.01	145,812,850.53	4,002,709.62
2030	10	131,339,513.36	139,264,340.90	123,414,685.82	3,971,467.54
2030	11	118,747,036.16	126,690,676.83	110,803,395.50	3,980,895.60
2030	12	135,529,695.98	143,493,433.75	127,565,958.21	3,990,967.11
2031	1	154,485,643.33	162,575,124.18	146,396,162.48	4,053,982.31
2031	2	148,263,531.00	156,341,000.58	140,186,061.42	4,047,962.95
2031	3	141,095,151.84	149,084,965.32	133,105,338.36	4,004,034.76
2031	4	125,492,132.46	133,439,819.00	117,544,445.93	3,982,923.15
2031	5	120,398,344.64	128,361,831.35	112,434,857.93	3,990,841.29
2031	6	139,089,860.81	147,140,935.53	131,038,786.08	4,034,735.37
2031	7	155,275,941.83	163,378,968.67	147,172,914.99	4,060,770.78
2031	8	158,911,349.82	166,939,777.80	150,882,921.84	4,023,386.12
2031	9	153,522,945.52	161,513,811.40	145,532,079.63	4,004,562.16
2031	10	131,089,407.31	139,014,466.41	123,164,348.20	3,971,583.59
2031	11	118,386,322.47	126,331,171.66	110,441,473.28	3,981,501.24

2031	12	134,981,967.62	142,951,614.28	127,012,320.95	3,993,928.31
2032	1	153,844,074.65	161,948,404.27	145,739,745.03	4,061,423.66
2032	2	147,674,214.50	155,764,948.82	139,583,480.19	4,054,610.47
2032	3	143,779,681.80	151,787,510.32	135,771,853.29	4,013,062.86
2032	4	125,189,860.43	133,138,119.07	117,241,601.80	3,983,209.86
2032	5	120,208,504.58	128,172,027.21	112,244,981.96	3,990,859.29
2032	6	138,897,734.54	146,952,108.15	130,843,360.94	4,036,388.58
2032	7	155,027,052.48	163,137,394.64	146,916,710.32	4,064,436.80
2032	8	158,652,416.91	166,686,734.55	150,618,099.27	4,026,337.68
2032	9	153,300,003.92	161,294,414.58	145,305,593.26	4,006,338.60
2032	10	130,913,223.65	138,838,435.85	122,988,011.44	3,971,660.31
2032	11	118,101,775.46	126,048,599.43	110,154,951.49	3,982,490.89
2032	12	134,519,240.36	142,495,122.77	126,543,357.95	3,997,053.30
2033	1	153,290,831.01	161,409,938.35	145,171,723.67	4,068,829.40
2033	2	147,165,803.32	155,269,717.88	139,061,888.76	4,061,215.65
2033	3	140,186,950.06	148,189,508.21	132,184,391.92	4,010,421.65
2033	4	124,919,203.75	132,868,123.14	116,970,284.36	3,983,540.99
2033	5	120,044,110.44	128,007,664.98	112,080,555.89	3,990,875.29
2033	6	138,729,135.76	146,786,785.88	130,671,485.64	4,038,030.58
2033	7	154,844,169.74	162,961,376.17	146,726,963.32	4,067,876.77
2033	8	158,459,286.78	166,499,144.82	150,419,428.74	4,029,114.21
2033	9	153,141,248.55	161,138,936.39	145,143,560.71	4,007,980.93
2033	10	130,818,080.77	138,743,367.59	122,892,793.96	3,971,697.70
2033	11	117,906,290.17	125,855,781.30	109,956,799.04	3,983,827.51
2033	12	134,162,317.36	142,144,467.01	126,180,167.71	4,000,194.09
2034	1	152,869,209.10	161,003,330.11	144,735,088.08	4,076,353.39
2034	2	146,777,839.54	154,895,136.52	138,660,542.55	4,067,922.15
2034	3	139,888,702.11	147,897,930.92	131,879,473.30	4,013,764.60
2034	4	124,782,561.98	132,732,167.07	116,832,956.89	3,983,884.63
2034	5	120,004,514.65	127,967,876.64	112,041,152.66	3,990,778.79
2034	6	138,696,564.24	146,756,717.76	130,636,410.72	4,039,285.14
2034	7	154,737,832.76	162,861,358.91	146,614,306.61	4,071,043.85
2034	8	158,342,423.64	166,387,381.94	150,297,465.34	4,031,670.17
2034	9	153,056,785.18	161,057,416.38	145,056,153.98	4,009,455.97
2034	10	130,758,432.33	138,683,773.49	122,833,091.17	3,971,724.94
2034	11	117,746,456.87	125,699,098.73	109,793,815.01	3,985,406.48
2034	12	133,843,465.39	141,832,297.29	125,854,633.48	4,003,542.85
2035	1	152,483,980.04	160,633,530.72	144,334,429.37	4,084,085.85
2035	2	146,423,190.99	154,554,219.08	138,292,162.90	4,074,803.39
2035	3	139,622,450.57	147,638,642.10	131,606,259.04	4,017,253.92
2035	4	124,650,497.11	132,600,920.52	116,700,073.71	3,984,294.72
2035	5	119,968,149.54	127,931,359.55	112,004,939.54	3,990,702.63

2035	6	138,664,952.18	146,727,734.66	130,602,169.69	4,040,602.62
2035	7	154,661,558.75	162,791,344.40	146,531,773.09	4,074,180.76
2035	8	158,255,320.68	166,305,350.01	150,205,291.35	4,034,211.48
2035	9	153,001,957.52	161,005,488.93	144,998,426.10	4,010,909.39
2035	10	130,738,186.76	138,663,564.40	122,812,809.12	3,971,743.22
2035	11	117,629,168.56	125,585,408.38	109,672,928.74	3,987,209.57
2035	12	133,573,697.75	141,569,471.37	125,577,924.12	4,007,021.64
2036	1	152,144,955.66	160,309,733.24	143,980,178.09	4,091,716.69
2036	2	146,110,914.46	154,255,473.60	137,966,355.32	4,081,584.38
2036	3	142,578,094.63	150,616,382.03	134,539,807.22	4,028,327.10
2036	4	124,568,033.92	132,519,339.47	116,616,728.38	3,984,736.80
2036	5	119,973,109.94	127,936,145.33	112,010,074.55	3,990,615.12
2036	6	138,675,194.92	146,740,391.49	130,609,998.36	4,041,812.42
2036	7	154,619,135.33	162,754,920.17	146,483,350.49	4,077,187.20
2036	8	158,202,065.90	166,256,970.83	150,147,160.96	4,036,654.85
2036	9	152,979,942.12	160,986,234.72	144,973,649.52	4,012,293.14
2036	10	130,757,689.66	138,683,090.37	122,832,288.95	3,971,754.78
2036	11	117,558,866.78	125,519,014.99	109,598,718.58	3,989,168.23
2036	12	133,363,244.85	141,365,928.24	125,360,561.46	4,010,484.41
2037	1	151,831,571.78	160,012,837.36	143,650,306.19	4,099,979.53
2037	2	145,822,001.20	153,981,194.39	137,662,808.00	4,088,918.12
2037	3	139,192,599.16	147,223,421.24	131,161,777.08	4,024,585.91
2037	4	124,511,292.91	132,463,652.83	116,558,932.99	3,985,265.19
2037	5	120,007,764.51	127,970,589.88	112,044,939.14	3,990,509.87
2037	6	138,722,229.25	146,789,634.50	130,654,824.00	4,042,919.29
2037	7	154,644,245.62	162,785,360.48	146,503,130.75	4,079,858.30
2037	8	158,216,426.19	166,275,652.76	150,157,199.62	4,038,820.60
2037	9	153,022,595.81	161,031,265.39	145,013,926.23	4,013,484.35
2037	10	130,827,466.13	138,752,854.98	122,902,077.28	3,971,748.84
2037	11	117,532,476.22	125,497,274.79	109,567,677.65	3,991,498.72
2037	12	133,194,689.31	141,204,947.10	125,184,431.51	4,014,280.27
2038	1	151,566,521.38	159,764,353.93	143,368,688.83	4,108,281.94
2038	2	145,577,368.42	153,751,249.04	137,403,487.80	4,096,278.61
2038	3	139,032,686.52	147,071,318.62	130,994,054.41	4,028,499.84
2038	4	124,475,306.64	132,428,834.61	116,521,778.67	3,985,850.55
2038	5	120,060,426.08	128,023,053.31	112,097,798.85	3,990,410.57
2038	6	138,790,049.04	146,859,476.18	130,720,621.90	4,043,932.54
2038	7	154,667,005.74	162,813,375.85	146,520,635.63	4,082,491.93
2038	8	158,228,791.43	166,292,306.53	150,165,276.34	4,040,969.76
2038	9	153,062,305.22	161,073,349.01	145,051,261.43	4,014,674.17
2038	10	130,879,689.85	138,805,119.58	122,954,260.12	3,971,769.32
2038	11	117,489,038.94	125,458,392.36	109,519,685.52	3,993,781.35

2038	12	133,009,098.32	141,027,192.07	124,991,004.56	4,018,207.20
2039	1	151,285,322.07	159,500,287.92	143,070,356.22	4,116,868.17
2039	2	145,317,965.91	153,507,012.37	137,128,919.45	4,103,878.86
2039	3	138,857,968.51	146,904,745.04	130,811,191.98	4,032,581.36
2039	4	124,426,488.11	132,381,327.70	116,471,648.52	3,986,507.85
2039	5	120,100,540.11	128,063,039.89	112,138,040.33	3,990,346.70
2039	6	138,843,631.71	146,915,213.77	130,772,049.66	4,045,012.46
2039	7	154,675,633.67	162,827,500.78	146,523,766.55	4,085,246.71
2039	8	158,227,014.68	166,295,050.87	150,158,978.48	4,043,235.48
2039	9	153,088,444.67	161,102,023.19	145,074,866.15	4,015,944.43
2039	10	130,955,621.45	138,881,100.79	123,030,142.11	3,971,794.19
2039	11	117,470,814.91	125,445,026.61	109,496,603.22	3,996,216.04
2039	12	132,853,039.25	140,879,215.73	124,826,862.77	4,022,257.80
2040	1	151,038,389.91	159,271,019.69	142,805,760.12	4,125,720.31
2040	2	145,089,915.57	153,294,582.39	136,885,248.76	4,111,706.88
2040	3	141,919,432.41	149,993,455.18	133,845,409.63	4,046,235.61
2040	4	124,471,121.60	132,427,381.52	116,514,861.67	3,987,219.64
2040	5	120,228,716.14	128,190,977.61	112,266,454.66	3,990,227.28
2040	6	138,996,630.59	147,069,671.41	130,923,589.77	4,045,743.51
2040	7	154,779,073.07	162,935,239.11	146,622,907.03	4,087,401.09
2040	8	158,320,477.15	166,392,013.18	150,248,941.12	4,044,989.40
2040	9	153,205,006.70	161,220,441.99	145,189,571.41	4,016,874.93
2040	10	131,093,792.63	139,019,286.64	123,168,298.62	3,971,801.54
2040	11	117,514,041.17	125,493,799.96	109,534,282.37	3,998,995.93
2040	12	132,765,172.68	140,799,731.85	124,730,613.52	4,026,458.72
2041	1	150,782,101.99	159,032,058.78	142,532,145.20	4,134,403.61
2041	2	144,853,417.33	153,073,385.89	136,633,448.77	4,119,375.24
2041	3	138,558,198.33	146,621,874.41	130,494,522.25	4,041,050.44
2041	4	124,431,166.78	132,388,944.74	116,473,388.82	3,987,980.40
2041	5	120,274,093.99	128,236,298.36	112,311,889.63	3,990,198.66
2041	6	139,059,254.43	147,134,193.24	130,984,315.62	4,046,694.67
2041	7	154,800,234.41	162,961,315.06	146,639,153.75	4,089,864.01
2041	8	158,332,322.75	166,407,933.68	150,256,711.83	4,047,031.50
2041	9	153,241,113.16	161,258,837.60	145,223,388.72	4,018,022.12
2041	10	131,093,224.98	139,018,897.67	123,167,552.28	3,971,891.09
2041	11	117,419,606.73	125,403,577.73	109,435,635.73	4,001,106.84
2041	12	132,528,986.61	140,572,047.70	124,485,925.53	4,030,719.39
2042	1	150,434,895.16	158,702,671.19	142,167,119.13	4,143,333.59
2042	2	144,533,762.94	152,769,439.83	136,298,086.06	4,127,247.35
2042	3	138,319,079.27	146,391,363.97	130,246,794.56	4,045,364.59
2042	4	124,280,068.46	132,239,481.03	116,320,655.88	3,988,799.57
2042	5	120,214,539.81	128,176,879.23	112,252,200.38	3,990,266.34

2042	6	139,008,440.65	147,085,883.55	130,930,997.74	4,047,949.58
2042	7	154,785,090.72	162,951,212.11	146,618,969.33	4,092,390.14
2042	8	158,308,487.15	166,388,316.95	150,228,657.35	4,049,145.76
2042	9	153,241,032.30	161,261,176.79	145,220,887.81	4,019,234.91
2042	10	131,142,415.76	139,068,228.69	123,216,602.83	3,971,961.36
2042	11	117,377,422.44	125,365,997.70	109,388,847.18	4,003,414.23
2042	12	132,355,699.21	140,407,203.69	124,304,194.73	4,034,950.74
2043	1	150,151,143.08	158,436,013.11	141,866,273.05	4,151,900.12
2043	2	144,272,283.31	152,523,021.56	136,021,545.05	4,134,795.24
2043	3	138,132,695.04	146,213,334.90	130,052,055.17	4,049,551.71
2043	4	124,261,153.48	132,222,177.90	116,300,129.05	3,989,607.34
2043	5	120,272,881.44	128,235,208.66	112,310,554.22	3,990,260.22
2043	6	139,084,797.95	147,163,895.48	131,005,700.41	4,048,778.79
2043	7	154,802,607.60	162,973,341.35	146,631,873.85	4,094,701.58
2043	8	158,317,517.33	166,401,207.51	150,233,827.15	4,051,080.36
2043	9	153,272,196.62	161,294,529.00	145,249,864.23	4,020,331.36
2043	10	131,186,695.09	139,112,676.04	123,260,714.14	3,972,045.57
2043	11	117,336,272.82	125,329,302.38	109,343,243.26	4,005,646.47
2043	12	132,190,296.89	140,250,077.82	124,130,515.96	4,039,098.42
2044	1	149,996,421.04	158,296,396.68	141,696,445.40	4,159,470.18
2044	2	144,129,087.17	152,393,136.46	135,865,037.87	4,141,465.97
2044	3	141,275,849.58	149,385,896.03	133,165,803.13	4,064,288.60
2044	4	124,288,759.50	132,251,307.83	116,326,211.17	3,990,371.03
2044	5	120,365,611.06	128,327,910.08	112,403,312.04	3,990,246.09
2044	6	139,195,186.30	147,275,616.80	131,114,755.81	4,049,446.79
2044	7	154,899,221.82	163,073,363.71	146,725,079.92	4,096,409.55
2044	8	158,406,263.23	166,492,773.46	150,319,753.01	4,052,493.60
2044	9	153,378,665.66	161,402,514.01	145,354,817.32	4,021,091.07
2044	10	131,305,955.16	139,232,048.51	123,379,861.81	3,972,101.89
2044	11	117,382,665.48	125,380,486.07	109,384,844.88	4,008,047.46
2044	12	132,136,611.57	140,203,858.38	124,069,364.77	4,042,839.88
2045	1	149,878,287.42	158,193,841.16	141,562,733.69	4,167,277.03
2045	2	144,019,348.75	152,297,120.60	135,741,576.90	4,148,342.92
2045	3	138,009,313.35	146,105,327.35	129,913,299.35	4,057,256.35
2045	4	124,326,968.31	132,291,167.97	116,362,768.65	3,991,198.58
2045	5	120,470,795.20	128,433,071.12	112,508,519.29	3,990,234.51
2045	6	139,322,997.77	147,404,570.47	131,241,425.08	4,050,019.20
2045	7	154,990,897.47	163,168,343.98	146,813,450.95	4,098,065.64
2045	8	158,490,424.89	166,579,679.87	150,401,169.91	4,053,869.11
2045	9	153,479,544.72	161,504,878.00	145,454,211.44	4,021,835.23
2045	10	131,398,643.30	139,324,889.15	123,472,397.45	3,972,178.32
2045	11	117,397,913.57	125,400,431.64	109,395,395.50	4,010,401.57

2045	12	132,045,066.09	140,120,220.89	123,969,911.30	4,046,802.91
2046	1	149,582,782.40	157,915,161.61	141,250,403.19	4,175,708.99
2046	2	143,747,281.19	152,039,843.66	135,454,718.71	4,155,755.13
2046	3	137,806,573.81	145,910,915.23	129,702,232.40	4,061,429.57
2046	4	124,239,218.54	132,205,175.81	116,273,261.26	3,992,079.40
2046	5	120,460,242.91	128,422,663.01	112,497,822.82	3,990,306.77
2046	6	139,328,643.50	147,411,941.56	131,245,345.44	4,050,883.85
2046	7	154,972,070.78	163,153,710.11	146,790,431.44	4,100,166.84
2046	8	158,464,799.42	166,557,615.51	150,371,983.33	4,055,653.74
2046	9	153,472,436.30	161,499,841.41	145,445,031.19	4,022,873.52
2046	10	131,399,211.01	139,325,681.39	123,472,740.62	3,972,290.84
2046	11	117,315,828.89	125,322,240.05	109,309,417.73	4,012,352.56
2046	12	131,843,653.85	139,927,076.61	123,760,231.08	4,050,946.34
2047	1	149,284,292.52	157,633,193.38	140,935,391.66	4,183,988.69
2047	2	143,472,554.90	151,779,631.11	135,165,478.70	4,163,028.58
2047	3	137,598,593.75	145,711,134.32	129,486,053.18	4,065,538.51
2047	4	124,127,897.31	132,095,616.98	116,160,177.65	3,992,962.61
2047	5	120,425,436.69	128,388,037.99	112,462,835.40	3,990,397.57
2047	6	139,309,332.56	147,394,350.36	131,224,314.75	4,051,745.69
2047	7	154,917,584.93	163,103,492.03	146,731,677.83	4,102,305.59
2047	8	158,404,154.24	166,500,623.77	150,307,684.70	4,057,484.63
2047	9	153,429,757.21	161,459,326.33	145,400,188.09	4,023,958.00
2047	10	131,358,912.17	139,285,632.13	123,432,192.20	3,972,415.92
2047	11	117,193,995.22	125,203,808.21	109,184,182.23	4,014,057.36
2047	12	131,601,976.22	139,693,583.96	123,510,368.49	4,055,048.18
2048	1	148,964,948.53	157,330,324.27	140,599,572.79	4,192,244.95
2048	2	143,178,795.79	151,500,334.22	134,857,257.36	4,170,276.21
2048	3	140,604,050.62	148,749,355.58	132,458,745.65	4,081,958.14
2048	4	123,995,183.76	131,964,680.99	116,025,686.52	3,993,853.42
2048	5	120,369,498.69	128,332,307.60	112,406,689.79	3,990,501.62
2048	6	139,269,393.50	147,356,086.54	131,182,700.46	4,052,585.22
2048	7	154,844,061.69	163,034,094.52	146,654,028.87	4,104,373.17
2048	8	158,325,151.14	166,425,172.90	150,225,129.39	4,059,264.80
2048	9	153,367,395.12	161,399,090.63	145,335,699.61	4,025,023.62
2048	10	131,297,166.70	139,224,141.54	123,370,191.87	3,972,543.64
2048	11	117,050,778.20	125,063,712.41	109,037,844.00	4,015,621.53
2048	12	131,339,307.43	139,439,067.87	123,239,546.98	4,059,133.85
2049	1	148,616,942.20	156,999,287.47	140,234,596.93	4,200,749.10
2049	2	142,858,794.55	151,195,219.94	134,522,369.16	4,177,736.70
2049	3	137,116,384.90	145,245,529.78	128,987,240.01	4,073,859.64
2049	4	123,838,757.48	131,810,105.89	115,867,409.08	3,994,781.12
2049	5	120,290,393.47	128,253,473.09	112,327,313.84	3,990,637.29

2049	6	139,200,015.04	147,288,763.11	131,111,266.96	4,053,615.08
2049	7	154,733,803.67	162,928,811.31	146,538,796.03	4,106,866.26
2049	8	158,208,751.20	166,313,079.49	150,104,422.90	4,061,422.99
2049	9	153,271,042.80	161,305,341.53	145,236,744.07	4,026,328.20
2049	10	131,210,371.75	139,137,648.29	123,283,095.21	3,972,694.84
2049	11	116,884,443.78	124,900,358.88	108,868,528.69	4,017,115.39
2049	12	131,050,843.78	139,158,991.44	122,942,696.11	4,063,337.04
2050	1	148,249,792.18	156,649,089.87	139,850,494.49	4,209,244.68
2050	2	142,521,344.66	150,872,632.87	134,170,056.46	4,185,185.09
2050	3	136,844,077.61	144,981,638.25	128,706,516.97	4,078,077.13
2050	4	123,664,910.67	131,638,112.92	115,691,708.43	3,995,710.16
2050	5	120,198,911.14	128,162,199.65	112,235,622.63	3,990,741.97
2050	6	139,135,502.15	147,225,404.05	131,045,600.26	4,054,193.31
2050	7	154,648,567.70	162,846,435.37	146,450,700.04	4,108,299.54
2050	8	158,120,522.00	166,227,342.39	150,013,701.62	4,062,671.88
2050	9	153,192,191.60	161,228,013.46	145,156,369.73	4,027,091.51
2050	10	131,115,703.97	139,043,198.85	123,188,209.09	3,972,804.26
2050	11	116,700,081.15	124,718,715.70	108,681,446.61	4,018,478.21
2050	12	130,743,312.14	138,859,825.63	122,626,798.66	4,067,529.51

Year	Month	KU_Sec_NonPVSales	JanHDD	FebHDD	MarHDD	AprHDD	JunCDD	JulCDD2
2010	12	281,756,489.00	0	0	0	0	0	0
2011	1	296,314,564.00	0.26	0	0	0	0	0
2011	2	265,272,390.00	0	0.21	0	0	0	0
2011	3	271,422,014.00	0	0	0.14	0	0	0
2011	4	266,861,060.00	0	0	0	0.1	0	0
2011	5	274,636,088.00	0	0	0	0	0	0
2011	6	311,481,843.00	0	0	0	0	0.18	0
2011	7	317,558,559.00	0	0	0	0	0	0.06
2011	8	341,905,650.00	0	0	0	0	0	0
2011	9	331,447,378.00	0	0	0	0	0	0
2011	10	283,794,461.00	0	0	0	0	0	0
2011	11	248,989,325.00	0	0	0	0	0	0
2011	12	270,017,581.00	0	0	0	0	0	0
2012	1	288,458,095.00	0.19	0	0	0	0	0
2012	2	271,969,601.00	0	0.17	0	0	0	0
2012	3	267,472,995.00	0	0	0.12	0	0	0
2012	4	274,137,678.00	0	0	0	0.05	0	0
2012	5	289,517,802.00	0	0	0	0	0	0
2012	6	314,713,499.00	0	0	0	0	0.13	0
2012	7	332,775,823.00	0	0	0	0	0	0.11
2012	8	335,429,401.00	0	0	0	0	0	0
2012	9	331,345,251.00	0	0	0	0	0	0
2012	10	276,502,863.00	0	0	0	0	0	0
2012	11	264,412,947.00	0	0	0	0	0	0
2012	12	269,982,121.00	0	0	0	0	0	0
2013	1	285,566,935.00	0.2	0	0	0	0	0
2013	2	278,381,835.00	0	0.19	0	0	0	0
2013	3	270,297,414.00	0	0	0.17	0	0	0
2013	4	263,671,205.00	0	0	0	0.11	0	0
2013	5	271,391,696.00	0	0	0	0	0	0
2013	6	306,268,036.00	0	0	0	0	0.16	0
2013	7	324,792,389.00	0	0	0	0	0	0.06
2013	8	326,751,772.00	0	0	0	0	0	0
2013	9	342,557,109.00	0	0	0	0	0	0
2013	10	304,508,853.00	0	0	0	0	0	0
2013	11	274,513,033.00	0	0	0	0	0	0
2013	12	298,102,172.00	0	0	0	0	0	0
2014	1	317,319,457.00	0.23	0	0	0	0	0
2014	2	301,033,945.00	0	0.23	0	0	0	0
2014	3	293,728,845.00	0	0	0.18	0	0	0
2014	4	271,482,526.00	0	0	0	0.09	0	0

2014	5	291,867,493.00	0	0	0	0	0	0
2014	6	323,961,779.00	0	0	0	0	0.18	0
2014	7	334,259,452.00	0	0	0	0	0	0.07
2014	8	318,578,326.00	0	0	0	0	0	0
2014	9	344,980,296.00	0	0	0	0	0	0
2014	10	301,967,668.00	0	0	0	0	0	0
2014	11	279,743,005.00	0	0	0	0	0	0
2014	12	306,185,488.00	0	0	0	0	0	0
2015	1	304,170,591.00	0.22	0	0	0	0	0
2015	2	304,862,996.00	0	0.22	0	0	0	0
2015	3	298,869,569.00	0	0	0.2	0	0	0
2015	4	284,746,641.00	0	0	0	0.08	0	0
2015	5	278,020,627.00	0	0	0	0	0	0
2015	6	332,633,382.00	0	0	0	0	0.18	0
2015	7	334,143,640.00	0	0	0	0	0	0.07
2015	8	343,172,405.00	0	0	0	0	0	0
2015	9	353,647,171.00	0	0	0	0	0	0
2015	10	302,180,443.00	0	0	0	0	0	0
2015	11	283,352,720.00	0	0	0	0	0	0
2015	12	291,924,734.00	0	0	0	0	0	0
2016	1	303,576,356.00	0.18	0	0	0	0	0
2016	2	289,419,610.00	0	0.19	0	0	0	0
2016	3	278,274,769.00	0	0	0.11	0	0	0
2016	4	282,073,750.00	0	0	0	0.08	0	0
2016	5	286,383,251.00	0	0	0	0	0	0
2016	6	323,469,400.00	0	0	0	0	0.18	0
2016	7	352,735,483.00	0	0	0	0	0	0.09
2016	8	355,734,989.00	0	0	0	0	0	0
2016	9	364,701,466.00	0	0	0	0	0	0
2016	10	304,722,279.00	0	0	0	0	0	0
2016	11	286,969,705.00	0	0	0	0	0	0
2016	12	298,474,461.00	0	0	0	0	0	0
2017	1	304,584,276.00	0.18	0	0	0	0	0
2017	2	281,126,579.00	0	0.14	0	0	0	0
2017	3	277,485,986.00	0	0	0.11	0	0	0
2017	4	281,516,137.00	0	0	0	0.06	0	0
2017	5	298,838,345.00	0	0	0	0	0	0
2017	6	335,054,971.00	0	0	0	0	0.16	0
2017	7	333,640,892.00	0	0	0	0	0	0.07
2017	8	328,054,447.00	0	0	0	0	0	0
2017	9	325,473,442.00	0	0	0	0	0	0
2017	10	310,759,008.00	0	0	0	0	0	0

2017	11	271,827,004.00	0	0	0	0	0	0
2017	12	284,743,354.00	0	0	0	0	0	0
2018	1		0.21	0	0	0	0	0
2018	2		0	0.19	0	0	0	0
2018	3		0	0	0.16	0	0	0
2018	4		0	0	0	0.09	0	0
2018	5		0	0	0	0	0	0
2018	6		0	0	0	0	0.15	0
2018	7		0	0	0	0	0	0.07
2018	8		0	0	0	0	0	0
2018	9		0	0	0	0	0	0
2018	10		0	0	0	0	0	0
2018	11		0	0	0	0	0	0
2018	12		0	0	0	0	0	0
2019	1		0.21	0	0	0	0	0
2019	2		0	0.19	0	0	0	0
2019	3		0	0	0.16	0	0	0
2019	4		0	0	0	0.09	0	0
2019	5		0	0	0	0	0	0
2019	6		0	0	0	0	0.15	0
2019	7		0	0	0	0	0	0.07
2019	8		0	0	0	0	0	0
2019	9		0	0	0	0	0	0
2019	10		0	0	0	0	0	0
2019	11		0	0	0	0	0	0
2019	12		0	0	0	0	0	0
2020	1		0.21	0	0	0	0	0
2020	2		0	0.19	0	0	0	0
2020	3		0	0	0.16	0	0	0
2020	4		0	0	0	0.09	0	0
2020	5		0	0	0	0	0	0
2020	6		0	0	0	0	0.15	0
2020	7		0	0	0	0	0	0.07
2020	8		0	0	0	0	0	0
2020	9		0	0	0	0	0	0
2020	10		0	0	0	0	0	0
2020	11		0	0	0	0	0	0
2020	12		0	0	0	0	0	0
2021	1		0.21	0	0	0	0	0
2021	2		0	0.19	0	0	0	0
2021	3		0	0	0.16	0	0	0
2021	4		0	0	0	0.09	0	0

2021	5	0	0	0	0	0	0
2021	6	0	0	0	0	0.15	0
2021	7	0	0	0	0	0	0.07
2021	8	0	0	0	0	0	0
2021	9	0	0	0	0	0	0
2021	10	0	0	0	0	0	0
2021	11	0	0	0	0	0	0
2021	12	0	0	0	0	0	0
2022	1	0.21	0	0	0	0	0
2022	2	0	0.19	0	0	0	0
2022	3	0	0	0.16	0	0	0
2022	4	0	0	0	0.09	0	0
2022	5	0	0	0	0	0	0
2022	6	0	0	0	0	0.15	0
2022	7	0	0	0	0	0	0.07
2022	8	0	0	0	0	0	0
2022	9	0	0	0	0	0	0
2022	10	0	0	0	0	0	0
2022	11	0	0	0	0	0	0
2022	12	0	0	0	0	0	0
2023	1	0.21	0	0	0	0	0
2023	2	0	0.19	0	0	0	0
2023	3	0	0	0.16	0	0	0
2023	4	0	0	0	0.09	0	0
2023	5	0	0	0	0	0	0
2023	6	0	0	0	0	0.15	0
2023	7	0	0	0	0	0	0.07
2023	8	0	0	0	0	0	0
2023	9	0	0	0	0	0	0
2023	10	0	0	0	0	0	0
2023	11	0	0	0	0	0	0
2023	12	0	0	0	0	0	0
2024	1	0.21	0	0	0	0	0
2024	2	0	0.19	0	0	0	0
2024	3	0	0	0.16	0	0	0
2024	4	0	0	0	0.09	0	0
2024	5	0	0	0	0	0	0
2024	6	0	0	0	0	0.15	0
2024	7	0	0	0	0	0	0.07
2024	8	0	0	0	0	0	0
2024	9	0	0	0	0	0	0
2024	10	0	0	0	0	0	0

2024	11	0	0	0	0	0	0
2024	12	0	0	0	0	0	0
2025	1	0.21	0	0	0	0	0
2025	2	0	0.19	0	0	0	0
2025	3	0	0	0.16	0	0	0
2025	4	0	0	0	0.09	0	0
2025	5	0	0	0	0	0	0
2025	6	0	0	0	0	0.15	0
2025	7	0	0	0	0	0	0.07
2025	8	0	0	0	0	0	0
2025	9	0	0	0	0	0	0
2025	10	0	0	0	0	0	0
2025	11	0	0	0	0	0	0
2025	12	0	0	0	0	0	0
2026	1	0.21	0	0	0	0	0
2026	2	0	0.19	0	0	0	0
2026	3	0	0	0.16	0	0	0
2026	4	0	0	0	0.09	0	0
2026	5	0	0	0	0	0	0
2026	6	0	0	0	0	0.15	0
2026	7	0	0	0	0	0	0.07
2026	8	0	0	0	0	0	0
2026	9	0	0	0	0	0	0
2026	10	0	0	0	0	0	0
2026	11	0	0	0	0	0	0
2026	12	0	0	0	0	0	0
2027	1	0.21	0	0	0	0	0
2027	2	0	0.19	0	0	0	0
2027	3	0	0	0.16	0	0	0
2027	4	0	0	0	0.09	0	0
2027	5	0	0	0	0	0	0
2027	6	0	0	0	0	0.15	0
2027	7	0	0	0	0	0	0.07
2027	8	0	0	0	0	0	0
2027	9	0	0	0	0	0	0
2027	10	0	0	0	0	0	0
2027	11	0	0	0	0	0	0
2027	12	0	0	0	0	0	0
2028	1	0.21	0	0	0	0	0
2028	2	0	0.19	0	0	0	0
2028	3	0	0	0.16	0	0	0
2028	4	0	0	0	0.09	0	0

2028	5	0	0	0	0	0	0
2028	6	0	0	0	0	0.15	0
2028	7	0	0	0	0	0	0.07
2028	8	0	0	0	0	0	0
2028	9	0	0	0	0	0	0
2028	10	0	0	0	0	0	0
2028	11	0	0	0	0	0	0
2028	12	0	0	0	0	0	0
2029	1	0.21	0	0	0	0	0
2029	2	0	0.19	0	0	0	0
2029	3	0	0	0.16	0	0	0
2029	4	0	0	0	0.09	0	0
2029	5	0	0	0	0	0	0
2029	6	0	0	0	0	0.15	0
2029	7	0	0	0	0	0	0.07
2029	8	0	0	0	0	0	0
2029	9	0	0	0	0	0	0
2029	10	0	0	0	0	0	0
2029	11	0	0	0	0	0	0
2029	12	0	0	0	0	0	0
2030	1	0.21	0	0	0	0	0
2030	2	0	0.19	0	0	0	0
2030	3	0	0	0.16	0	0	0
2030	4	0	0	0	0.09	0	0
2030	5	0	0	0	0	0	0
2030	6	0	0	0	0	0.15	0
2030	7	0	0	0	0	0	0.07
2030	8	0	0	0	0	0	0
2030	9	0	0	0	0	0	0
2030	10	0	0	0	0	0	0
2030	11	0	0	0	0	0	0
2030	12	0	0	0	0	0	0
2031	1	0.21	0	0	0	0	0
2031	2	0	0.19	0	0	0	0
2031	3	0	0	0.16	0	0	0
2031	4	0	0	0	0.09	0	0
2031	5	0	0	0	0	0	0
2031	6	0	0	0	0	0.15	0
2031	7	0	0	0	0	0	0.07
2031	8	0	0	0	0	0	0
2031	9	0	0	0	0	0	0
2031	10	0	0	0	0	0	0

2031	11	0	0	0	0	0	0
2031	12	0	0	0	0	0	0
2032	1	0.21	0	0	0	0	0
2032	2	0	0.19	0	0	0	0
2032	3	0	0	0.16	0	0	0
2032	4	0	0	0	0.09	0	0
2032	5	0	0	0	0	0	0
2032	6	0	0	0	0	0.15	0
2032	7	0	0	0	0	0	0.07
2032	8	0	0	0	0	0	0
2032	9	0	0	0	0	0	0
2032	10	0	0	0	0	0	0
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2032	12	0	0	0	0	0	0
2033	1	0.21	0	0	0	0	0
2033	2	0	0.19	0	0	0	0
2033	3	0	0	0.16	0	0	0
2033	4	0	0	0	0.09	0	0
2033	5	0	0	0	0	0	0
2033	6	0	0	0	0	0.15	0
2033	7	0	0	0	0	0	0.07
2033	8	0	0	0	0	0	0
2033	9	0	0	0	0	0	0
2033	10	0	0	0	0	0	0
2033	11	0	0	0	0	0	0
2033	12	0	0	0	0	0	0
2034	1	0.21	0	0	0	0	0
2034	2	0	0.19	0	0	0	0
2034	3	0	0	0.16	0	0	0
2034	4	0	0	0	0.09	0	0
2034	5	0	0	0	0	0	0
2034	6	0	0	0	0	0.15	0
2034	7	0	0	0	0	0	0.07
2034	8	0	0	0	0	0	0
2034	9	0	0	0	0	0	0
2034	10	0	0	0	0	0	0
2034	11	0	0	0	0	0	0
2034	12	0	0	0	0	0	0
2035	1	0.21	0	0	0	0	0
2035	2	0	0.19	0	0	0	0
2035	3	0	0	0.16	0	0	0
2035	4	0	0	0	0.09	0	0

2035	5	0	0	0	0	0	0
2035	6	0	0	0	0	0.15	0
2035	7	0	0	0	0	0	0.07
2035	8	0	0	0	0	0	0
2035	9	0	0	0	0	0	0
2035	10	0	0	0	0	0	0
2035	11	0	0	0	0	0	0
2035	12	0	0	0	0	0	0
2036	1	0.21	0	0	0	0	0
2036	2	0	0.19	0	0	0	0
2036	3	0	0	0.16	0	0	0
2036	4	0	0	0	0.09	0	0
2036	5	0	0	0	0	0	0
2036	6	0	0	0	0	0.15	0
2036	7	0	0	0	0	0	0.07
2036	8	0	0	0	0	0	0
2036	9	0	0	0	0	0	0
2036	10	0	0	0	0	0	0
2036	11	0	0	0	0	0	0
2036	12	0	0	0	0	0	0
2037	1	0.21	0	0	0	0	0
2037	2	0	0.19	0	0	0	0
2037	3	0	0	0.16	0	0	0
2037	4	0	0	0	0.09	0	0
2037	5	0	0	0	0	0	0
2037	6	0	0	0	0	0.15	0
2037	7	0	0	0	0	0	0.07
2037	8	0	0	0	0	0	0
2037	9	0	0	0	0	0	0
2037	10	0	0	0	0	0	0
2037	11	0	0	0	0	0	0
2037	12	0	0	0	0	0	0
2038	1	0.21	0	0	0	0	0
2038	2	0	0.19	0	0	0	0
2038	3	0	0	0.16	0	0	0
2038	4	0	0	0	0.09	0	0
2038	5	0	0	0	0	0	0
2038	6	0	0	0	0	0.15	0
2038	7	0	0	0	0	0	0.07
2038	8	0	0	0	0	0	0
2038	9	0	0	0	0	0	0
2038	10	0	0	0	0	0	0

2038	11	0	0	0	0	0	0
2038	12	0	0	0	0	0	0
2039	1	0.21	0	0	0	0	0
2039	2	0	0.19	0	0	0	0
2039	3	0	0	0.16	0	0	0
2039	4	0	0	0	0.09	0	0
2039	5	0	0	0	0	0	0
2039	6	0	0	0	0	0.15	0
2039	7	0	0	0	0	0	0.07
2039	8	0	0	0	0	0	0
2039	9	0	0	0	0	0	0
2039	10	0	0	0	0	0	0
2039	11	0	0	0	0	0	0
2039	12	0	0	0	0	0	0
2040	1	0.21	0	0	0	0	0
2040	2	0	0.19	0	0	0	0
2040	3	0	0	0.16	0	0	0
2040	4	0	0	0	0.09	0	0
2040	5	0	0	0	0	0	0
2040	6	0	0	0	0	0.15	0
2040	7	0	0	0	0	0	0.07
2040	8	0	0	0	0	0	0
2040	9	0	0	0	0	0	0
2040	10	0	0	0	0	0	0
2040	11	0	0	0	0	0	0
2040	12	0	0	0	0	0	0
2041	1	0.21	0	0	0	0	0
2041	2	0	0.19	0	0	0	0
2041	3	0	0	0.16	0	0	0
2041	4	0	0	0	0.09	0	0
2041	5	0	0	0	0	0	0
2041	6	0	0	0	0	0.15	0
2041	7	0	0	0	0	0	0.07
2041	8	0	0	0	0	0	0
2041	9	0	0	0	0	0	0
2041	10	0	0	0	0	0	0
2041	11	0	0	0	0	0	0
2041	12	0	0	0	0	0	0
2042	1	0.21	0	0	0	0	0
2042	2	0	0.19	0	0	0	0
2042	3	0	0	0.16	0	0	0
2042	4	0	0	0	0.09	0	0

2042	5	0	0	0	0	0	0
2042	6	0	0	0	0	0.15	0
2042	7	0	0	0	0	0	0.07
2042	8	0	0	0	0	0	0
2042	9	0	0	0	0	0	0
2042	10	0	0	0	0	0	0
2042	11	0	0	0	0	0	0
2042	12	0	0	0	0	0	0
2043	1	0.21	0	0	0	0	0
2043	2	0	0.19	0	0	0	0
2043	3	0	0	0.16	0	0	0
2043	4	0	0	0	0.09	0	0
2043	5	0	0	0	0	0	0
2043	6	0	0	0	0	0.15	0
2043	7	0	0	0	0	0	0.07
2043	8	0	0	0	0	0	0
2043	9	0	0	0	0	0	0
2043	10	0	0	0	0	0	0
2043	11	0	0	0	0	0	0
2043	12	0	0	0	0	0	0
2044	1	0.21	0	0	0	0	0
2044	2	0	0.19	0	0	0	0
2044	3	0	0	0.16	0	0	0
2044	4	0	0	0	0.09	0	0
2044	5	0	0	0	0	0	0
2044	6	0	0	0	0	0.15	0
2044	7	0	0	0	0	0	0.07
2044	8	0	0	0	0	0	0
2044	9	0	0	0	0	0	0
2044	10	0	0	0	0	0	0
2044	11	0	0	0	0	0	0
2044	12	0	0	0	0	0	0
2045	1	0.21	0	0	0	0	0
2045	2	0	0.19	0	0	0	0
2045	3	0	0	0.16	0	0	0
2045	4	0	0	0	0.09	0	0
2045	5	0	0	0	0	0	0
2045	6	0	0	0	0	0.15	0
2045	7	0	0	0	0	0	0.07
2045	8	0	0	0	0	0	0
2045	9	0	0	0	0	0	0
2045	10	0	0	0	0	0	0

2045	11	0	0	0	0	0	0
2045	12	0	0	0	0	0	0
2046	1	0.21	0	0	0	0	0
2046	2	0	0.19	0	0	0	0
2046	3	0	0	0.16	0	0	0
2046	4	0	0	0	0.09	0	0
2046	5	0	0	0	0	0	0
2046	6	0	0	0	0	0.15	0
2046	7	0	0	0	0	0	0.07
2046	8	0	0	0	0	0	0
2046	9	0	0	0	0	0	0
2046	10	0	0	0	0	0	0
2046	11	0	0	0	0	0	0
2046	12	0	0	0	0	0	0
2047	1	0.21	0	0	0	0	0
2047	2	0	0.19	0	0	0	0
2047	3	0	0	0.16	0	0	0
2047	4	0	0	0	0.09	0	0
2047	5	0	0	0	0	0	0
2047	6	0	0	0	0	0.15	0
2047	7	0	0	0	0	0	0.07
2047	8	0	0	0	0	0	0
2047	9	0	0	0	0	0	0
2047	10	0	0	0	0	0	0
2047	11	0	0	0	0	0	0
2047	12	0	0	0	0	0	0
2048	1	0.21	0	0	0	0	0
2048	2	0	0.19	0	0	0	0
2048	3	0	0	0.16	0	0	0
2048	4	0	0	0	0.09	0	0
2048	5	0	0	0	0	0	0
2048	6	0	0	0	0	0.15	0
2048	7	0	0	0	0	0	0.07
2048	8	0	0	0	0	0	0
2048	9	0	0	0	0	0	0
2048	10	0	0	0	0	0	0
2048	11	0	0	0	0	0	0
2048	12	0	0	0	0	0	0
2049	1	0.21	0	0	0	0	0
2049	2	0	0.19	0	0	0	0
2049	3	0	0	0.16	0	0	0
2049	4	0	0	0	0.09	0	0

2049	5	0	0	0	0	0	0
2049	6	0	0	0	0	0.15	0
2049	7	0	0	0	0	0	0.07
2049	8	0	0	0	0	0	0
2049	9	0	0	0	0	0	0
2049	10	0	0	0	0	0	0
2049	11	0	0	0	0	0	0
2049	12	0	0	0	0	0	0
2050	1	0.21	0	0	0	0	0
2050	2	0	0.19	0	0	0	0
2050	3	0	0	0.16	0	0	0
2050	4	0	0	0	0.09	0	0
2050	5	0	0	0	0	0	0
2050	6	0	0	0	0	0.15	0
2050	7	0	0	0	0	0	0.07
2050	8	0	0	0	0	0	0
2050	9	0	0	0	0	0	0
2050	10	0	0	0	0	0	0
2050	11	0	0	0	0	0	0
2050	12	0	0	0	0	0	0

AugCDD2	SepCDD2	OctCDD	NovCDD	DecHDD	CoolingIntensityMA	Before2013	XMissing
0	0	0	0	0.18	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0.15	1	0
0	0	0	0	0	0.15	1	0
0	0	0	0	0	0.15	1	0
0.12	0	0	0	0	0.15	1	0
0	0.04	0	0	0	0.15	1	0
0	0	0.03	0	0	0.15	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0.13	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0.15	1	0
0	0	0	0	0	0.15	1	0
0	0	0	0	0	0.15	1	0
0.09	0	0	0	0	0.15	1	0
0	0.04	0	0	0	0.14	1	0
0	0	0.03	0	0	0.14	1	0
0	0	0	0	0	0	1	0
0	0	0	0	0.14	0	1	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0.05	0	0	0	0	0.14	0	0
0	0.05	0	0	0	0.14	0	0
0	0	0.08	0	0	0.14	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.17	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0.04	0	0	0	0	0.14	0	0
0	0.06	0	0	0	0.14	0	0
0	0	0.06	0	0	0.14	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0.18	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0.06	0	0	0	0	0.14	0	0
0	0.04	0	0	0	0.14	0	0
0	0	0.06	0	0	0.14	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.11	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0.12	0	0	0	0	0.14	0	0
0	0.09	0	0	0	0.14	0	0
0	0	0.11	0	0	0.14	0	0
0	0	0	0.04	0	0	0	0
0	0	0	0	0.16	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0	0	0	0	0	0.14	0	0
0.06	0	0	0	0	0.14	0	0
0	0.02	0	0	0	0.14	0	0
0	0	0.11	0	0	0.14	0	0

0	0	0	0.01	0	0	0	0
0	0	0	0	0.16	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0.08	0	0	0	0	0.13	0	0
0	0.05	0	0	0	0.13	0	0
0	0	0.07	0	0	0.13	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0.08	0	0	0	0	0.13	0	0
0	0.05	0	0	0	0.13	0	0
0	0	0.07	0	0	0.13	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0.08	0	0	0	0	0.13	0	0
0	0.05	0	0	0	0.13	0	0
0	0	0.07	0	0	0.13	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0.08	0	0	0	0	0.13	0	0
0	0.05	0	0	0	0.13	0	0
0	0	0.07	0	0	0.13	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0	0	0	0	0	0.13	0	0
0.08	0	0	0	0	0.13	0	0
0	0.05	0	0	0	0.13	0	0
0	0	0.07	0	0	0.13	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0

0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0

0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.12	0	0
0.08	0	0	0	0	0.12	0	0
0	0.05	0	0	0	0.12	0	0
0	0	0.07	0	0	0.12	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.12	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0

0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
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0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0

0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.11	0	0
0	0.05	0	0	0	0.11	0	0
0	0	0.07	0	0	0.11	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0	0	0	0	0	0.11	0	0
0.08	0	0	0	0	0.1	0	0
0	0.05	0	0	0	0.1	0	0
0	0	0.07	0	0	0.1	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0.1	0	0
0	0	0	0	0	0.1	0	0
0	0	0	0	0	0.1	0	0
0.08	0	0	0	0	0.1	0	0
0	0.05	0	0	0	0.1	0	0
0	0	0.07	0	0	0.1	0	0
0	0	0	0.01	0	0	0	0
0	0	0	0	0.15	0	0	0

Commercial Secondary is a combination of the following rates:

PS Secondary
TOD Secondary

Variable	Count	Mean	StdDev	Min	Max
KU_Sec_NonPVSales	85	300,958,248.07	26,612,310.52	248,989,325.00	364,701,466.00
JanHDD	85	0.017	0.058	0	0.263
FebHDD	85	0.016	0.054	0	0.232
MarHDD	85	0.012	0.042	0	0.201
AprHDD	85	0.007	0.023	0	0.11
JunCDD	85	0.014	0.047	0	0.184
JulCDD2	85	0.006	0.022	0	0.114
AugCDD2	85	0.006	0.023	0	0.12
SepCDD2	85	0.004	0.015	0	0.087
OctCDD	85	0.006	0.021	0	0.115
NovCDD	85	0.001	0.004	0	0.037
DecHDD	85	0.014	0.045	0	0.178
CoolingIntensityMA	85	0.07	0.071	0	0.147
Before2013	85	0.294	0.458	0	1

Skewness	Kurtosis	Jarque-Bera	Probability	CorrYX	Units	Definition
0.417	2.202	4.7	9.42E-02	1		
3.159	11.288	384.6	0.00E+00	-0.007		
3.172	11.337	388.7	0.00E+00	-0.17		
3.317	12.647	485.5	0.00E+00	-0.217		
3.315	12.607	482.6	0.00E+00	-0.299		
3.096	10.701	345.8	0.00E+00	0.231		
3.391	13.507	553.9	0.00E+00	0.363		
3.766	16.561	852.2	0.00E+00	0.403		
3.876	18.042	1014.2	0.00E+00	0.474		
3.983	18.457	1070.9	0.00E+00	0.013		
7.382	60.73	12575.2	0.00E+00	-0.145		
2.899	9.637	275.1	0.00E+00	-0.149		
0.027	1.005	14.1	8.67E-04	0.666		
0.904	1.817	16.5	2.58E-04	-0.24		

	KU_Sec_NonPVSales	JanHDD	FebHDD	MarHDD	AprHDD	JunCDD	JulCDD2
KU_Sec_NonPVSales	1	-0.007	-0.17	-0.217	-0.299	0.231	0.363
JanHDD	-0.007	1	-0.088	-0.087	-0.086	-0.088	-0.086
FebHDD	-0.17	-0.088	1	-0.086	-0.086	-0.088	-0.086
MarHDD	-0.217	-0.087	-0.086	1	-0.085	-0.087	-0.085
AprHDD	-0.299	-0.086	-0.086	-0.085	1	-0.087	-0.085
JunCDD	0.231	-0.088	-0.088	-0.087	-0.087	1	-0.087
JulCDD2	0.363	-0.086	-0.086	-0.085	-0.085	-0.087	1
AugCDD2	0.403	-0.083	-0.082	-0.081	-0.081	-0.083	-0.081
SepCDD2	0.474	-0.082	-0.082	-0.081	-0.081	-0.082	-0.08
OctCDD	0.013	-0.08	-0.08	-0.079	-0.079	-0.081	-0.079
NovCDD	-0.145	-0.056	-0.056	-0.055	-0.055	-0.056	-0.055
DecHDD	-0.149	-0.094	-0.094	-0.093	-0.093	-0.095	-0.093
CoolingIntensityMA	0.666	-0.293	-0.292	-0.288	-0.288	0.302	0.294
Before2013	-0.24	0.01	-0.011	-0.027	-0.018	-0.019	0.02

AugCDD2	SepCDD2	OctCDD	NovCDD	DecHDD	CoolingIntensityMA	Before2013
0.403	0.474	0.013	-0.145	-0.149	0.666	-0.24
-0.083	-0.082	-0.08	-0.056	-0.094	-0.293	0.01
-0.082	-0.082	-0.08	-0.056	-0.094	-0.292	-0.011
-0.081	-0.081	-0.079	-0.055	-0.093	-0.288	-0.027
-0.081	-0.081	-0.079	-0.055	-0.093	-0.288	-0.018
-0.083	-0.082	-0.081	-0.056	-0.095	0.302	-0.019
-0.081	-0.08	-0.079	-0.055	-0.093	0.294	0.02
1	-0.077	-0.075	-0.053	-0.089	0.283	0.057
-0.077	1	-0.075	-0.052	-0.088	0.278	-0.035
-0.075	-0.075	1	-0.051	-0.086	0.267	-0.097
-0.053	-0.052	-0.051	1	-0.06	-0.187	-0.094
-0.089	-0.088	-0.086	-0.06	1	-0.314	0.047
0.283	0.278	0.267	-0.187	-0.314	1	0
0.057	-0.035	-0.097	-0.094	0.047	0	1

Variable	Coefficient	StdErr	T-Stat	P-Value	Units
CONST	272803080.3	3966611.376	68.775	0.00%	
WeatherTrans.JanHDD	149412834	22358186.83	6.683	0.00%	
WeatherTrans.FebHDD	86072764.41	24875409.97	3.46	0.09%	
WeatherTrans.MarHDD	82944422.38	32033707.6	2.589	1.17%	
WeatherTrans.AprHDD	94831457.04	57673391.72	1.644	10.47%	
WeatherTrans.JunCDD	192860465.9	20032288.94	9.627	0.00%	
WeatherTrans.JulCDD2	540098922.2	48639228.57	11.104	0.00%	
WeatherTrans.AugCDD2	541766206.5	46917525.14	11.547	0.00%	
WeatherTrans.SepCDD2	969613915.6	74601160.52	12.997	0.00%	
WeatherTrans.OctCDD	117964001.4	53412332.11	2.209	3.05%	
WeatherTrans.NovCDD	343712818.9	242975319.5	1.415	16.17%	
WeatherTrans.DecHDD	133058661.2	27572339.22	4.826	0.00%	
FcstTransform.CoolingIntensityMA	143930472.7	30482971.61	4.722	0.00%	
BinaryVars.Before2013	-13125936.44	3522223.632	-3.727	0.04%	
AR(1)	0.453	0.111	4.092	0.01%	

Definition
Constant term

Model Statistics		Forecast Statistics	
Iterations	15	Forecast Observations	
Adjusted Observations	84	Mean Abs. Dev. (MAD)	
Deg. of Freedom for Error	69	Mean Abs. % Err. (MAPE)	
R-Squared	0.921	Avg. Forecast Error	
Adjusted R-Squared	0.905	Mean % Error	
AIC	32.01	Root Mean-Square Error	
BIC	32.444	Theil's Inequality Coefficient	
F-Statistic	57.237		#NAME?
Prob (F-Statistic)	0		#NAME?
Log-Likelihood	-1,448.61		#NAME?
Model Sum of Squares	54,430,109,033,839,000.00		
Sum of Squared Errors	4,686,860,035,365,470.00		
Mean Squared Error	67,925,507,758,919.90		
Std. Error of Regression	8,241,693.26		
Mean Abs. Dev. (MAD)	6,287,462.42		
Mean Abs. % Err. (MAPE)	2.09%		
Durbin-Watson Statistic	2.001		
Durbin-H Statistic	#NA		
Ljung-Box Statistic	13.35		
Prob (Ljung-Box)	0.9601		
Skewness	-0.193		
Kurtosis	2.22		
Jarque-Bera	2.649		
Prob (Jarque-Bera)	0.2659		

0
0
0.00%
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Year	Month	Actual	Pred	Resid	%Resid	StdResid
2010	12	281,756,489.00				
2011	1	296,314,564.00	298,190,632.95	-1,876,068.95	-0.63%	-0.228
2011	2	265,272,390.00	276,188,503.22	-10,916,113.22	-4.12%	-1.324
2011	3	271,422,014.00	265,759,103.27	5,662,910.73	2.09%	0.687
2011	4	266,861,060.00	268,851,329.73	-1,990,269.73	-0.75%	-0.241
2011	5	274,636,088.00	280,017,188.97	-5,381,100.97	-1.96%	-0.653
2011	6	311,481,843.00	312,869,692.23	-1,387,849.23	-0.45%	-0.168
2011	7	317,558,559.00	311,738,258.03	5,820,300.97	1.83%	0.706
2011	8	341,905,650.00	346,253,717.97	-4,348,067.97	-1.27%	-0.528
2011	9	331,447,378.00	319,944,035.95	11,503,342.06	3.47%	1.396
2011	10	283,794,461.00	289,232,476.23	-5,438,015.23	-1.92%	-0.66
2011	11	248,989,325.00	259,885,377.36	-10,896,052.36	-4.38%	-1.322
2011	12	270,017,581.00	271,632,013.72	-1,614,432.72	-0.60%	-0.196
2012	1	288,458,095.00	284,694,460.71	3,763,634.29	1.30%	0.457
2012	2	271,969,601.00	274,478,844.48	-2,509,243.48	-0.92%	-0.304
2012	3	267,472,995.00	268,717,889.59	-1,244,894.59	-0.47%	-0.151
2012	4	274,137,678.00	263,791,451.56	10,346,226.44	3.77%	1.255
2012	5	289,517,802.00	284,838,924.86	4,678,877.14	1.62%	0.568
2012	6	314,713,499.00	310,193,946.83	4,519,552.18	1.44%	0.548
2012	7	332,775,823.00	345,881,015.27	-13,105,192.27	-3.94%	-1.59
2012	8	335,429,401.00	327,154,151.36	8,275,249.64	2.47%	1.004
2012	9	331,345,251.00	320,388,167.53	10,957,083.47	3.31%	1.329
2012	10	276,502,863.00	289,846,792.60	-13,343,929.60	-4.83%	-1.619
2012	11	264,412,947.00	257,338,079.94	7,074,867.07	2.68%	0.858
2012	12	269,982,121.00	279,345,879.70	-9,363,758.70	-3.47%	-1.136
2013	1	285,566,935.00	298,643,726.40	-13,076,791.40	-4.58%	-1.587
2013	2	278,381,835.00	281,723,385.03	-3,341,550.03	-1.20%	-0.405
2013	3	270,297,414.00	282,079,056.51	-11,781,642.51	-4.36%	-1.43
2013	4	263,671,205.00	275,702,240.01	-12,031,035.01	-4.56%	-1.46
2013	5	271,391,696.00	284,634,560.06	-13,242,864.06	-4.88%	-1.607
2013	6	306,268,036.00	313,869,522.36	-7,601,486.36	-2.48%	-0.922
2013	7	324,792,389.00	319,490,721.23	5,301,667.77	1.63%	0.643
2013	8	326,751,772.00	319,118,599.39	7,633,172.61	2.34%	0.926
2013	9	342,557,109.00	349,077,983.24	-6,520,874.24	-1.90%	-0.791
2013	10	304,508,853.00	301,040,091.67	3,468,761.33	1.14%	0.421
2013	11	274,513,033.00	275,454,323.56	-941,290.56	-0.34%	-0.114
2013	12	298,102,172.00	296,012,980.48	2,089,191.52	0.70%	0.253
2014	1	317,319,457.00	308,747,595.69	8,571,861.31	2.70%	1.04
2014	2	301,033,945.00	297,098,725.14	3,935,219.86	1.31%	0.477
2014	3	293,728,845.00	291,244,411.71	2,484,433.29	0.85%	0.301
2014	4	271,482,526.00	283,718,375.56	-12,235,849.56	-4.51%	-1.485

2014	5	291,867,493.00	288,998,148.05	2,869,344.95	0.98%	0.348
2014	6	323,961,779.00	328,053,154.66	-4,091,375.66	-1.26%	-0.496
2014	7	334,259,452.00	327,493,851.56	6,765,600.44	2.02%	0.821
2014	8	318,578,326.00	318,466,907.77	111,418.23	0.03%	0.014
2014	9	344,980,296.00	351,935,860.69	-6,955,564.69	-2.02%	-0.844
2014	10	301,967,668.00	297,198,520.06	4,769,147.94	1.58%	0.579
2014	11	279,743,005.00	275,052,069.16	4,690,935.84	1.68%	0.569
2014	12	306,185,488.00	298,926,461.92	7,259,026.08	2.37%	0.881
2015	1	304,170,591.00	309,737,333.32	-5,566,742.32	-1.83%	-0.675
2015	2	304,862,996.00	291,504,870.66	13,358,125.34	4.38%	1.621
2015	3	298,869,569.00	295,255,136.76	3,614,432.24	1.21%	0.439
2015	4	284,746,641.00	284,567,964.68	178,676.32	0.06%	0.022
2015	5	278,020,627.00	295,019,356.69	-16,998,729.69	-6.11%	-2.063
2015	6	332,633,382.00	321,621,957.32	11,011,424.68	3.31%	1.336
2015	7	334,143,640.00	330,016,637.28	4,127,002.72	1.24%	0.501
2015	8	343,172,405.00	330,448,703.89	12,723,701.11	3.71%	1.544
2015	9	353,647,171.00	340,478,687.26	13,168,483.74	3.72%	1.598
2015	10	302,180,443.00	308,851,007.86	-6,670,564.86	-2.21%	-0.809
2015	11	283,352,720.00	275,722,449.78	7,630,270.22	2.69%	0.926
2015	12	291,924,734.00	291,805,734.77	118,999.23	0.04%	0.014
2016	1	303,576,356.00	300,956,210.54	2,620,145.46	0.86%	0.318
2016	2	289,419,610.00	291,229,999.27	-1,810,389.27	-0.63%	-0.22
2016	3	278,274,769.00	282,412,014.68	-4,137,245.68	-1.49%	-0.502
2016	4	282,073,750.00	278,311,504.99	3,762,245.01	1.33%	0.456
2016	5	286,383,251.00	293,628,511.46	-7,245,260.46	-2.53%	-0.879
2016	6	323,469,400.00	323,952,957.93	-483,557.93	-0.15%	-0.059
2016	7	352,735,483.00	340,839,432.26	11,896,050.74	3.37%	1.443
2016	8	355,734,989.00	362,195,851.92	-6,460,862.92	-1.82%	-0.784
2016	9	364,701,466.00	376,487,499.08	-11,786,033.08	-3.23%	-1.43
2016	10	304,722,279.00	300,468,295.19	4,253,983.81	1.40%	0.516
2016	11	286,969,705.00	284,885,412.10	2,084,292.90	0.73%	0.253
2016	12	298,474,461.00	294,411,137.23	4,063,323.77	1.36%	0.493
2017	1	304,584,276.00	302,278,200.72	2,306,075.28	0.76%	0.28
2017	2	281,126,579.00	286,578,330.79	-5,451,751.79	-1.94%	-0.661
2017	3	277,485,986.00	280,421,959.07	-2,935,973.07	-1.06%	-0.356
2017	4	281,516,137.00	276,485,939.91	5,030,197.09	1.79%	0.61
2017	5	298,838,345.00	293,864,245.75	4,974,099.25	1.66%	0.604
2017	6	335,054,971.00	327,018,023.00	8,036,948.01	2.40%	0.975
2017	7	333,640,892.00	337,281,268.33	-3,640,376.33	-1.09%	-0.442
2017	8	328,054,447.00	324,683,375.40	3,371,071.60	1.03%	0.409
2017	9	325,473,442.00	312,281,393.80	13,192,048.20	4.05%	1.601
2017	10	310,759,008.00	311,913,748.12	-1,154,740.12	-0.37%	-0.14

2017	11	271,827,004.00	279,751,354.56	-7,924,350.56	-2.92%	-0.961
2017	12	284,743,354.00	291,314,884.67	-6,571,530.67	-2.31%	-0.797
2018	1		300,031,907.87			
2018	2		287,536,593.50			
2018	3		284,825,489.29			
2018	4		280,824,664.79			
2018	5		291,991,060.27			
2018	6		320,122,521.20			
2018	7		329,052,479.60			
2018	8		333,778,299.37			
2018	9		338,379,575.76			
2018	10		300,313,359.95			
2018	11		275,573,553.71			
2018	12		293,168,124.86			
2019	1		304,107,678.58			
2019	2		289,381,369.10			
2019	3		285,660,471.74			
2019	4		281,202,594.60			
2019	5		291,712,890.33			
2019	6		319,759,704.74			
2019	7		328,656,270.02			
2019	8		333,371,895.00			
2019	9		337,973,476.61			
2019	10		299,912,318.55			
2019	11		275,575,024.49			
2019	12		293,168,790.57			
2020	1		304,107,979.90			
2020	2		289,381,505.48			
2020	3		285,660,533.46			
2020	4		281,202,622.54			
2020	5		291,416,872.79			
2020	6		319,481,737.41			
2020	7		328,396,356.68			
2020	8		333,130,037.37			
2020	9		337,749,675.46			
2020	10		299,706,574.24			
2020	11		275,575,024.60			
2020	12		293,168,790.62			
2021	1		304,107,979.92			
2021	2		289,381,505.49			
2021	3		285,660,533.47			
2021	4		281,202,622.54			

2021	5	291,247,242.50
2021	6	319,312,107.11
2021	7	328,226,726.39
2021	8	332,960,407.07
2021	9	337,580,045.17
2021	10	299,536,943.95
2021	11	275,575,024.60
2021	12	293,168,790.62
2022	1	304,107,979.92
2022	2	289,381,505.49
2022	3	285,660,533.47
2022	4	281,202,622.54
2022	5	291,030,817.78
2022	6	319,086,323.52
2022	7	327,991,583.90
2022	8	332,715,905.71
2022	9	337,326,184.92
2022	10	299,273,724.81
2022	11	275,575,024.60
2022	12	293,168,790.62
2023	1	304,107,979.92
2023	2	289,381,505.49
2023	3	285,660,533.47
2023	4	281,202,622.54
2023	5	290,786,393.22
2023	6	318,849,401.42
2023	7	327,762,164.27
2023	8	332,493,988.54
2023	9	337,111,770.22
2023	10	299,066,812.58
2023	11	275,575,024.60
2023	12	293,168,790.62
2024	1	304,107,979.92
2024	2	289,381,505.49
2024	3	285,660,533.47
2024	4	281,202,622.54
2024	5	290,614,755.54
2024	6	318,681,817.67
2024	7	327,598,634.45
2024	8	332,334,512.64
2024	9	336,956,348.25
2024	10	298,915,444.53

2024	11	275,575,024.60
2024	12	293,168,790.62
2025	1	304,107,979.92
2025	2	289,381,505.49
2025	3	285,660,533.47
2025	4	281,202,622.54
2025	5	290,471,495.35
2025	6	318,538,557.47
2025	7	327,455,374.25
2025	8	332,191,252.45
2025	9	336,813,088.05
2025	10	298,772,184.34
2025	11	275,575,024.60
2025	12	293,168,790.62
2026	1	304,107,979.92
2026	2	289,381,505.49
2026	3	285,660,533.47
2026	4	281,202,622.54
2026	5	290,320,606.68
2026	6	318,386,143.11
2026	7	327,301,434.20
2026	8	332,035,786.70
2026	9	336,656,096.61
2026	10	298,613,667.20
2026	11	275,575,024.60
2026	12	293,168,790.62
2027	1	304,107,979.92
2027	2	289,381,505.49
2027	3	285,660,533.47
2027	4	281,202,622.54
2027	5	290,162,673.90
2027	6	318,228,937.48
2027	7	327,144,955.71
2027	8	331,880,035.36
2027	9	336,501,072.42
2027	10	298,459,370.15
2027	11	275,575,024.60
2027	12	293,168,790.62
2028	1	304,107,979.92
2028	2	289,381,505.49
2028	3	285,660,533.47
2028	4	281,202,622.54

2028	5	290,013,020.17
2028	6	318,079,921.55
2028	7	326,996,577.59
2028	8	331,732,295.05
2028	9	336,353,969.91
2028	10	298,312,905.45
2028	11	275,575,024.60
2028	12	293,168,790.62
2029	1	304,107,979.92
2029	2	289,381,505.49
2029	3	285,660,533.47
2029	4	281,202,622.54
2029	5	289,870,672.08
2029	6	317,938,141.66
2029	7	326,855,365.90
2029	8	331,591,651.55
2029	9	336,213,894.61
2029	10	298,173,398.35
2029	11	275,575,024.60
2029	12	293,168,790.62
2030	1	304,107,979.92
2030	2	289,381,505.49
2030	3	285,660,533.47
2030	4	281,202,622.54
2030	5	289,734,324.72
2030	6	317,802,198.98
2030	7	326,719,827.88
2030	8	331,456,518.21
2030	9	336,079,165.94
2030	10	298,039,074.35
2030	11	275,575,024.60
2030	12	293,168,790.62
2031	1	304,107,979.92
2031	2	289,381,505.49
2031	3	285,660,533.47
2031	4	281,202,622.54
2031	5	289,603,336.20
2031	6	317,671,715.68
2031	7	326,589,849.81
2031	8	331,327,045.36
2031	9	335,950,198.32
2031	10	297,910,611.96

2031	11	275,575,024.60
2031	12	293,168,790.62
2032	1	304,107,979.92
2032	2	289,381,505.49
2032	3	285,660,533.47
2032	4	281,202,622.54
2032	5	289,478,254.26
2032	6	317,547,107.74
2032	7	326,465,715.87
2032	8	331,203,385.42
2032	9	335,827,012.38
2032	10	297,787,900.02
2032	11	275,575,024.60
2032	12	293,168,790.62
2033	1	304,107,979.92
2033	2	289,381,505.49
2033	3	285,660,533.47
2033	4	281,202,622.54
2033	5	289,358,647.32
2033	6	317,427,932.20
2033	7	326,346,971.74
2033	8	331,085,072.69
2033	9	335,709,131.05
2033	10	297,670,450.09
2033	11	275,575,024.60
2033	12	293,168,790.62
2034	1	304,107,979.92
2034	2	289,381,505.49
2034	3	285,660,533.47
2034	4	281,202,622.54
2034	5	289,244,018.07
2034	6	317,313,694.53
2034	7	326,233,125.64
2034	8	330,971,618.17
2034	9	335,596,068.10
2034	10	297,557,778.72
2034	11	275,575,024.60
2034	12	293,168,790.62
2035	1	304,107,979.92
2035	2	289,381,505.49
2035	3	285,660,533.47
2035	4	281,202,622.54

2035	5	289,133,970.96
2035	6	317,204,015.63
2035	7	326,123,814.96
2035	8	330,862,675.71
2035	9	335,487,493.87
2035	10	297,449,572.70
2035	11	275,575,024.60
2035	12	293,168,790.62
2036	1	304,107,979.92
2036	2	289,381,505.49
2036	3	285,660,533.47
2036	4	281,202,622.54
2036	5	289,028,267.34
2036	6	317,098,665.20
2036	7	326,018,817.73
2036	8	330,758,031.67
2036	9	335,383,203.01
2036	10	297,345,635.04
2036	11	275,575,024.60
2036	12	293,168,790.62
2037	1	304,107,979.92
2037	2	289,381,505.49
2037	3	285,660,533.47
2037	4	281,202,622.54
2037	5	288,926,727.68
2037	6	316,997,463.88
2037	7	325,917,954.73
2037	8	330,657,506.99
2037	9	335,283,016.66
2037	10	297,245,787.01
2037	11	275,575,024.60
2037	12	293,168,790.62
2038	1	304,107,979.92
2038	2	289,381,505.49
2038	3	285,660,533.47
2038	4	281,202,622.54
2038	5	288,828,934.56
2038	6	316,899,946.40
2038	7	325,820,712.90
2038	8	330,560,540.81
2038	9	335,186,326.14
2038	10	297,149,372.14

2038	11	275,575,024.60
2038	12	293,168,790.62
2039	1	304,107,979.92
2039	2	289,381,505.49
2039	3	285,660,533.47
2039	4	281,202,622.54
2039	5	288,734,460.53
2039	6	316,805,750.28
2039	7	325,726,794.69
2039	8	330,466,900.51
2039	9	335,092,963.74
2039	10	297,056,287.66
2039	11	275,575,024.60
2039	12	293,168,790.62
2040	1	304,107,979.92
2040	2	289,381,505.49
2040	3	285,660,533.47
2040	4	281,202,622.54
2040	5	288,643,178.24
2040	6	316,714,717.27
2040	7	325,636,010.96
2040	8	330,376,366.05
2040	9	335,002,678.56
2040	10	296,966,251.75
2040	11	275,575,024.60
2040	12	293,168,790.62
2041	1	304,107,979.92
2041	2	289,381,505.49
2041	3	285,660,533.47
2041	4	281,202,622.54
2041	5	288,554,965.03
2041	6	316,626,768.89
2041	7	325,548,327.40
2041	8	330,288,947.32
2041	9	334,915,524.66
2041	10	296,879,362.68
2041	11	275,575,024.60
2041	12	293,168,790.62
2042	1	304,107,979.92
2042	2	289,381,505.49
2042	3	285,660,533.47
2042	4	281,202,622.54

2042	5	288,469,770.15
2042	6	316,541,806.92
2042	7	325,463,598.34
2042	8	330,204,451.17
2042	9	334,831,261.42
2042	10	296,795,332.34
2042	11	275,575,024.60
2042	12	293,168,790.62
2043	1	304,107,979.92
2043	2	289,381,505.49
2043	3	285,660,533.47
2043	4	281,202,622.54
2043	5	288,387,204.83
2043	6	316,459,441.43
2043	7	325,381,432.69
2043	8	330,122,485.36
2043	9	334,749,495.45
2043	10	296,713,766.21
2043	11	275,575,024.60
2043	12	293,168,790.62
2044	1	304,107,979.92
2044	2	289,381,505.49
2044	3	285,660,533.47
2044	4	281,202,622.54
2044	5	288,307,014.60
2044	6	316,379,446.44
2044	7	325,301,632.95
2044	8	330,042,880.86
2044	9	334,670,086.19
2044	10	296,634,552.20
2044	11	275,575,024.60
2044	12	293,168,790.62
2045	1	304,107,979.92
2045	2	289,381,505.49
2045	3	285,660,533.47
2045	4	281,202,622.54
2045	5	288,229,076.56
2045	6	316,301,685.51
2045	7	325,224,049.11
2045	8	329,965,474.13
2045	9	334,592,856.55
2045	10	296,557,499.66

2045	11	275,575,024.60
2045	12	293,168,790.62
2046	1	304,107,979.92
2046	2	289,381,505.49
2046	3	285,660,533.47
2046	4	281,202,622.54
2046	5	288,153,361.15
2046	6	316,226,166.68
2046	7	325,148,726.86
2046	8	329,890,348.46
2046	9	334,517,927.47
2046	10	296,482,767.17
2046	11	275,575,024.60
2046	12	293,168,790.62
2047	1	304,107,979.92
2047	2	289,381,505.49
2047	3	285,660,533.47
2047	4	281,202,622.54
2047	5	288,079,870.74
2047	6	316,152,846.05
2047	7	325,075,576.02
2047	8	329,817,367.41
2047	9	334,445,116.20
2047	10	296,410,125.68
2047	11	275,575,024.60
2047	12	293,168,790.62
2048	1	304,107,979.92
2048	2	289,381,505.49
2048	3	285,660,533.47
2048	4	281,202,622.54
2048	5	288,008,368.93
2048	6	316,081,504.27
2048	7	325,004,394.26
2048	8	329,746,345.67
2048	9	334,374,254.48
2048	10	296,339,423.98
2048	11	275,575,024.60
2048	12	293,168,790.62
2049	1	304,107,979.92
2049	2	289,381,505.49
2049	3	285,660,533.47
2049	4	281,202,622.54

2049	5	287,934,958.46
2049	6	316,007,488.04
2049	7	324,929,772.27
2049	8	329,671,117.91
2049	9	334,298,420.96
2049	10	296,262,984.69
2049	11	275,575,024.60
2049	12	293,168,790.62
2050	1	304,107,979.92
2050	2	289,381,505.49
2050	3	285,660,533.47
2050	4	281,202,622.54
2050	5	287,865,620.18
2050	6	315,939,812.26
2050	7	324,863,759.00
2050	8	329,606,767.15
2050	9	334,235,732.71
2050	10	296,201,958.95
2050	11	275,575,024.60
2050	12	293,168,790.62

Variable	Coefficient	Mean	Elast	Units	Definition
JanHDD	149412834	0.017	0.009		
FebHDD	86072764.41	0.016	0.005		
MarHDD	82944422.38	0.012	0.003		
AprHDD	94831457.04	0.007	0.002		
JunCDD	192860465.9	0.014	0.009		
JulCDD2	540098922.2	0.006	0.011		
AugCDD2	541766206.5	0.006	0.012		
SepCDD2	969613915.6	0.004	0.013		
OctCDD	117964001.4	0.006	0.002		
NovCDD	343712818.9	0.001	0.001		
DecHDD	133058661.2	0.014	0.006		
CoolingIntensityMA	143930472.7	0.07	0.033		
Before2013	-13125936.44	0.294	-0.013		

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Year	Month	Pred	CONST	JanHDD	FebHDD	MarHDD	
2010	12		272,803,080.26		0	0	0
2011	1	298,190,632.95	272,803,080.26	39,243,456.54		0	0
2011	2	276,188,503.22	272,803,080.26		0 17,690,903.74		0
2011	3	265,759,103.27	272,803,080.26		0	0 11,556,696.74	
2011	4	268,851,329.73	272,803,080.26		0	0	0
2011	5	280,017,188.97	272,803,080.26		0	0	0
2011	6	312,869,692.23	272,803,080.26		0	0	0
2011	7	311,738,258.03	272,803,080.26		0	0	0
2011	8	346,253,717.97	272,803,080.26		0	0	0
2011	9	319,944,035.95	272,803,080.26		0	0	0
2011	10	289,232,476.23	272,803,080.26		0	0	0
2011	11	259,885,377.36	272,803,080.26		0	0	0
2011	12	271,632,013.72	272,803,080.26		0	0	0
2012	1	284,694,460.71	272,803,080.26	28,050,666.73		0	0
2012	2	274,478,844.48	272,803,080.26		0 14,471,159.26		0
2012	3	268,717,889.59	272,803,080.26		0	0 10,026,870.04	
2012	4	263,791,451.56	272,803,080.26		0	0	0
2012	5	284,838,924.86	272,803,080.26		0	0	0
2012	6	310,193,946.83	272,803,080.26		0	0	0
2012	7	345,881,015.27	272,803,080.26		0	0	0
2012	8	327,154,151.36	272,803,080.26		0	0	0
2012	9	320,388,167.53	272,803,080.26		0	0	0
2012	10	289,846,792.60	272,803,080.26		0	0	0
2012	11	257,338,079.94	272,803,080.26		0	0	0
2012	12	279,345,879.70	272,803,080.26		0	0	0
2013	1	298,643,726.40	272,803,080.26	29,329,150.02		0	0
2013	2	281,723,385.03	272,803,080.26		0 16,418,089.77		0
2013	3	282,079,056.51	272,803,080.26		0	0 14,182,076.76	
2013	4	275,702,240.01	272,803,080.26		0	0	0
2013	5	284,634,560.06	272,803,080.26		0	0	0
2013	6	313,869,522.36	272,803,080.26		0	0	0
2013	7	319,490,721.23	272,803,080.26		0	0	0
2013	8	319,118,599.39	272,803,080.26		0	0	0
2013	9	349,077,983.24	272,803,080.26		0	0	0
2013	10	301,040,091.67	272,803,080.26		0	0	0
2013	11	275,454,323.56	272,803,080.26		0	0	0
2013	12	296,012,980.48	272,803,080.26		0	0	0
2014	1	308,747,595.69	272,803,080.26	35,021,714.02		0	0
2014	2	297,098,725.14	272,803,080.26		0 19,998,170.03		0
2014	3	291,244,411.71	272,803,080.26		0	0 14,715,048.65	
2014	4	283,718,375.56	272,803,080.26		0	0	0

2014	5	288,998,148.05	272,803,080.26	0	0	0
2014	6	328,053,154.66	272,803,080.26	0	0	0
2014	7	327,493,851.56	272,803,080.26	0	0	0
2014	8	318,466,907.77	272,803,080.26	0	0	0
2014	9	351,935,860.69	272,803,080.26	0	0	0
2014	10	297,198,520.06	272,803,080.26	0	0	0
2014	11	275,052,069.16	272,803,080.26	0	0	0
2014	12	298,926,461.92	272,803,080.26	0	0	0
2015	1	309,737,333.32	272,803,080.26	32,495,456.91	0	0
2015	2	291,504,870.66	272,803,080.26	0	19,212,321.46	0
2015	3	295,255,136.76	272,803,080.26	0	0	16,636,977.56
2015	4	284,567,964.68	272,803,080.26	0	0	0
2015	5	295,019,356.69	272,803,080.26	0	0	0
2015	6	321,621,957.32	272,803,080.26	0	0	0
2015	7	330,016,637.28	272,803,080.26	0	0	0
2015	8	330,448,703.89	272,803,080.26	0	0	0
2015	9	340,478,687.26	272,803,080.26	0	0	0
2015	10	308,851,007.86	272,803,080.26	0	0	0
2015	11	275,722,449.78	272,803,080.26	0	0	0
2015	12	291,805,734.77	272,803,080.26	0	0	0
2016	1	300,956,210.54	272,803,080.26	26,308,308.98	0	0
2016	2	291,229,999.27	272,803,080.26	0	16,405,985.47	0
2016	3	282,412,014.68	272,803,080.26	0	0	9,513,637.85
2016	4	278,311,504.99	272,803,080.26	0	0	0
2016	5	293,628,511.46	272,803,080.26	0	0	0
2016	6	323,952,957.93	272,803,080.26	0	0	0
2016	7	340,839,432.26	272,803,080.26	0	0	0
2016	8	362,195,851.92	272,803,080.26	0	0	0
2016	9	376,487,499.08	272,803,080.26	0	0	0
2016	10	300,468,295.19	272,803,080.26	0	0	0
2016	11	284,885,412.10	272,803,080.26	0	0	0
2016	12	294,411,137.23	272,803,080.26	0	0	0
2017	1	302,278,200.72	272,803,080.26	27,342,732.88	0	0
2017	2	286,578,330.79	272,803,080.26	0	11,766,313.19	0
2017	3	280,421,959.07	272,803,080.26	0	0	9,177,165.71
2017	4	276,485,939.91	272,803,080.26	0	0	0
2017	5	293,864,245.75	272,803,080.26	0	0	0
2017	6	327,018,023.00	272,803,080.26	0	0	0
2017	7	337,281,268.33	272,803,080.26	0	0	0
2017	8	324,683,375.40	272,803,080.26	0	0	0
2017	9	312,281,393.80	272,803,080.26	0	0	0
2017	10	311,913,748.12	272,803,080.26	0	0	0

2017	11	279,751,354.56	272,803,080.26	0	0	0
2017	12	291,314,884.67	272,803,080.26	0	0	0
2018	1	300,031,907.87	272,803,080.26	31,304,899.66	0	0
2018	2	287,536,593.50	272,803,080.26	0	16,578,425.23	0
2018	3	284,825,489.29	272,803,080.26	0	0	12,857,453.21
2018	4	280,824,664.79	272,803,080.26	0	0	0
2018	5	291,991,060.27	272,803,080.26	0	0	0
2018	6	320,122,521.20	272,803,080.26	0	0	0
2018	7	329,052,479.60	272,803,080.26	0	0	0
2018	8	333,778,299.37	272,803,080.26	0	0	0
2018	9	338,379,575.76	272,803,080.26	0	0	0
2018	10	300,313,359.95	272,803,080.26	0	0	0
2018	11	275,573,553.71	272,803,080.26	0	0	0
2018	12	293,168,124.86	272,803,080.26	0	0	0
2019	1	304,107,678.58	272,803,080.26	31,304,899.66	0	0
2019	2	289,381,369.10	272,803,080.26	0	16,578,425.23	0
2019	3	285,660,471.74	272,803,080.26	0	0	12,857,453.21
2019	4	281,202,594.60	272,803,080.26	0	0	0
2019	5	291,712,890.33	272,803,080.26	0	0	0
2019	6	319,759,704.74	272,803,080.26	0	0	0
2019	7	328,656,270.02	272,803,080.26	0	0	0
2019	8	333,371,895.00	272,803,080.26	0	0	0
2019	9	337,973,476.61	272,803,080.26	0	0	0
2019	10	299,912,318.55	272,803,080.26	0	0	0
2019	11	275,575,024.49	272,803,080.26	0	0	0
2019	12	293,168,790.57	272,803,080.26	0	0	0
2020	1	304,107,979.90	272,803,080.26	31,304,899.66	0	0
2020	2	289,381,505.48	272,803,080.26	0	16,578,425.23	0
2020	3	285,660,533.46	272,803,080.26	0	0	12,857,453.21
2020	4	281,202,622.54	272,803,080.26	0	0	0
2020	5	291,416,872.79	272,803,080.26	0	0	0
2020	6	319,481,737.41	272,803,080.26	0	0	0
2020	7	328,396,356.68	272,803,080.26	0	0	0
2020	8	333,130,037.37	272,803,080.26	0	0	0
2020	9	337,749,675.46	272,803,080.26	0	0	0
2020	10	299,706,574.24	272,803,080.26	0	0	0
2020	11	275,575,024.60	272,803,080.26	0	0	0
2020	12	293,168,790.62	272,803,080.26	0	0	0
2021	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2021	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2021	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2021	4	281,202,622.54	272,803,080.26	0	0	0

2021	5	291,247,242.50	272,803,080.26	0	0	0
2021	6	319,312,107.11	272,803,080.26	0	0	0
2021	7	328,226,726.39	272,803,080.26	0	0	0
2021	8	332,960,407.07	272,803,080.26	0	0	0
2021	9	337,580,045.17	272,803,080.26	0	0	0
2021	10	299,536,943.95	272,803,080.26	0	0	0
2021	11	275,575,024.60	272,803,080.26	0	0	0
2021	12	293,168,790.62	272,803,080.26	0	0	0
2022	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2022	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2022	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2022	4	281,202,622.54	272,803,080.26	0	0	0
2022	5	291,030,817.78	272,803,080.26	0	0	0
2022	6	319,086,323.52	272,803,080.26	0	0	0
2022	7	327,991,583.90	272,803,080.26	0	0	0
2022	8	332,715,905.71	272,803,080.26	0	0	0
2022	9	337,326,184.92	272,803,080.26	0	0	0
2022	10	299,273,724.81	272,803,080.26	0	0	0
2022	11	275,575,024.60	272,803,080.26	0	0	0
2022	12	293,168,790.62	272,803,080.26	0	0	0
2023	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2023	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2023	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2023	4	281,202,622.54	272,803,080.26	0	0	0
2023	5	290,786,393.22	272,803,080.26	0	0	0
2023	6	318,849,401.42	272,803,080.26	0	0	0
2023	7	327,762,164.27	272,803,080.26	0	0	0
2023	8	332,493,988.54	272,803,080.26	0	0	0
2023	9	337,111,770.22	272,803,080.26	0	0	0
2023	10	299,066,812.58	272,803,080.26	0	0	0
2023	11	275,575,024.60	272,803,080.26	0	0	0
2023	12	293,168,790.62	272,803,080.26	0	0	0
2024	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2024	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2024	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2024	4	281,202,622.54	272,803,080.26	0	0	0
2024	5	290,614,755.54	272,803,080.26	0	0	0
2024	6	318,681,817.67	272,803,080.26	0	0	0
2024	7	327,598,634.45	272,803,080.26	0	0	0
2024	8	332,334,512.64	272,803,080.26	0	0	0
2024	9	336,956,348.25	272,803,080.26	0	0	0
2024	10	298,915,444.53	272,803,080.26	0	0	0

2024	11	275,575,024.60	272,803,080.26	0	0	0
2024	12	293,168,790.62	272,803,080.26	0	0	0
2025	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2025	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2025	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2025	4	281,202,622.54	272,803,080.26	0	0	0
2025	5	290,471,495.35	272,803,080.26	0	0	0
2025	6	318,538,557.47	272,803,080.26	0	0	0
2025	7	327,455,374.25	272,803,080.26	0	0	0
2025	8	332,191,252.45	272,803,080.26	0	0	0
2025	9	336,813,088.05	272,803,080.26	0	0	0
2025	10	298,772,184.34	272,803,080.26	0	0	0
2025	11	275,575,024.60	272,803,080.26	0	0	0
2025	12	293,168,790.62	272,803,080.26	0	0	0
2026	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2026	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2026	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2026	4	281,202,622.54	272,803,080.26	0	0	0
2026	5	290,320,606.68	272,803,080.26	0	0	0
2026	6	318,386,143.11	272,803,080.26	0	0	0
2026	7	327,301,434.20	272,803,080.26	0	0	0
2026	8	332,035,786.70	272,803,080.26	0	0	0
2026	9	336,656,096.61	272,803,080.26	0	0	0
2026	10	298,613,667.20	272,803,080.26	0	0	0
2026	11	275,575,024.60	272,803,080.26	0	0	0
2026	12	293,168,790.62	272,803,080.26	0	0	0
2027	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2027	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2027	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2027	4	281,202,622.54	272,803,080.26	0	0	0
2027	5	290,162,673.90	272,803,080.26	0	0	0
2027	6	318,228,937.48	272,803,080.26	0	0	0
2027	7	327,144,955.71	272,803,080.26	0	0	0
2027	8	331,880,035.36	272,803,080.26	0	0	0
2027	9	336,501,072.42	272,803,080.26	0	0	0
2027	10	298,459,370.15	272,803,080.26	0	0	0
2027	11	275,575,024.60	272,803,080.26	0	0	0
2027	12	293,168,790.62	272,803,080.26	0	0	0
2028	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2028	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2028	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2028	4	281,202,622.54	272,803,080.26	0	0	0

2028	5	290,013,020.17	272,803,080.26	0	0	0
2028	6	318,079,921.55	272,803,080.26	0	0	0
2028	7	326,996,577.59	272,803,080.26	0	0	0
2028	8	331,732,295.05	272,803,080.26	0	0	0
2028	9	336,353,969.91	272,803,080.26	0	0	0
2028	10	298,312,905.45	272,803,080.26	0	0	0
2028	11	275,575,024.60	272,803,080.26	0	0	0
2028	12	293,168,790.62	272,803,080.26	0	0	0
2029	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2029	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2029	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2029	4	281,202,622.54	272,803,080.26	0	0	0
2029	5	289,870,672.08	272,803,080.26	0	0	0
2029	6	317,938,141.66	272,803,080.26	0	0	0
2029	7	326,855,365.90	272,803,080.26	0	0	0
2029	8	331,591,651.55	272,803,080.26	0	0	0
2029	9	336,213,894.61	272,803,080.26	0	0	0
2029	10	298,173,398.35	272,803,080.26	0	0	0
2029	11	275,575,024.60	272,803,080.26	0	0	0
2029	12	293,168,790.62	272,803,080.26	0	0	0
2030	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2030	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2030	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2030	4	281,202,622.54	272,803,080.26	0	0	0
2030	5	289,734,324.72	272,803,080.26	0	0	0
2030	6	317,802,198.98	272,803,080.26	0	0	0
2030	7	326,719,827.88	272,803,080.26	0	0	0
2030	8	331,456,518.21	272,803,080.26	0	0	0
2030	9	336,079,165.94	272,803,080.26	0	0	0
2030	10	298,039,074.35	272,803,080.26	0	0	0
2030	11	275,575,024.60	272,803,080.26	0	0	0
2030	12	293,168,790.62	272,803,080.26	0	0	0
2031	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2031	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2031	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2031	4	281,202,622.54	272,803,080.26	0	0	0
2031	5	289,603,336.20	272,803,080.26	0	0	0
2031	6	317,671,715.68	272,803,080.26	0	0	0
2031	7	326,589,849.81	272,803,080.26	0	0	0
2031	8	331,327,045.36	272,803,080.26	0	0	0
2031	9	335,950,198.32	272,803,080.26	0	0	0
2031	10	297,910,611.96	272,803,080.26	0	0	0

2031	11	275,575,024.60	272,803,080.26	0	0	0
2031	12	293,168,790.62	272,803,080.26	0	0	0
2032	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2032	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2032	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2032	4	281,202,622.54	272,803,080.26	0	0	0
2032	5	289,478,254.26	272,803,080.26	0	0	0
2032	6	317,547,107.74	272,803,080.26	0	0	0
2032	7	326,465,715.87	272,803,080.26	0	0	0
2032	8	331,203,385.42	272,803,080.26	0	0	0
2032	9	335,827,012.38	272,803,080.26	0	0	0
2032	10	297,787,900.02	272,803,080.26	0	0	0
2032	11	275,575,024.60	272,803,080.26	0	0	0
2032	12	293,168,790.62	272,803,080.26	0	0	0
2033	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2033	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2033	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2033	4	281,202,622.54	272,803,080.26	0	0	0
2033	5	289,358,647.32	272,803,080.26	0	0	0
2033	6	317,427,932.20	272,803,080.26	0	0	0
2033	7	326,346,971.74	272,803,080.26	0	0	0
2033	8	331,085,072.69	272,803,080.26	0	0	0
2033	9	335,709,131.05	272,803,080.26	0	0	0
2033	10	297,670,450.09	272,803,080.26	0	0	0
2033	11	275,575,024.60	272,803,080.26	0	0	0
2033	12	293,168,790.62	272,803,080.26	0	0	0
2034	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2034	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2034	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2034	4	281,202,622.54	272,803,080.26	0	0	0
2034	5	289,244,018.07	272,803,080.26	0	0	0
2034	6	317,313,694.53	272,803,080.26	0	0	0
2034	7	326,233,125.64	272,803,080.26	0	0	0
2034	8	330,971,618.17	272,803,080.26	0	0	0
2034	9	335,596,068.10	272,803,080.26	0	0	0
2034	10	297,557,778.72	272,803,080.26	0	0	0
2034	11	275,575,024.60	272,803,080.26	0	0	0
2034	12	293,168,790.62	272,803,080.26	0	0	0
2035	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2035	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2035	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2035	4	281,202,622.54	272,803,080.26	0	0	0

2035	5	289,133,970.96	272,803,080.26	0	0	0
2035	6	317,204,015.63	272,803,080.26	0	0	0
2035	7	326,123,814.96	272,803,080.26	0	0	0
2035	8	330,862,675.71	272,803,080.26	0	0	0
2035	9	335,487,493.87	272,803,080.26	0	0	0
2035	10	297,449,572.70	272,803,080.26	0	0	0
2035	11	275,575,024.60	272,803,080.26	0	0	0
2035	12	293,168,790.62	272,803,080.26	0	0	0
2036	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2036	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2036	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2036	4	281,202,622.54	272,803,080.26	0	0	0
2036	5	289,028,267.34	272,803,080.26	0	0	0
2036	6	317,098,665.20	272,803,080.26	0	0	0
2036	7	326,018,817.73	272,803,080.26	0	0	0
2036	8	330,758,031.67	272,803,080.26	0	0	0
2036	9	335,383,203.01	272,803,080.26	0	0	0
2036	10	297,345,635.04	272,803,080.26	0	0	0
2036	11	275,575,024.60	272,803,080.26	0	0	0
2036	12	293,168,790.62	272,803,080.26	0	0	0
2037	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2037	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2037	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2037	4	281,202,622.54	272,803,080.26	0	0	0
2037	5	288,926,727.68	272,803,080.26	0	0	0
2037	6	316,997,463.88	272,803,080.26	0	0	0
2037	7	325,917,954.73	272,803,080.26	0	0	0
2037	8	330,657,506.99	272,803,080.26	0	0	0
2037	9	335,283,016.66	272,803,080.26	0	0	0
2037	10	297,245,787.01	272,803,080.26	0	0	0
2037	11	275,575,024.60	272,803,080.26	0	0	0
2037	12	293,168,790.62	272,803,080.26	0	0	0
2038	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2038	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2038	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2038	4	281,202,622.54	272,803,080.26	0	0	0
2038	5	288,828,934.56	272,803,080.26	0	0	0
2038	6	316,899,946.40	272,803,080.26	0	0	0
2038	7	325,820,712.90	272,803,080.26	0	0	0
2038	8	330,560,540.81	272,803,080.26	0	0	0
2038	9	335,186,326.14	272,803,080.26	0	0	0
2038	10	297,149,372.14	272,803,080.26	0	0	0

2038	11	275,575,024.60	272,803,080.26	0	0	0
2038	12	293,168,790.62	272,803,080.26	0	0	0
2039	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2039	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2039	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2039	4	281,202,622.54	272,803,080.26	0	0	0
2039	5	288,734,460.53	272,803,080.26	0	0	0
2039	6	316,805,750.28	272,803,080.26	0	0	0
2039	7	325,726,794.69	272,803,080.26	0	0	0
2039	8	330,466,900.51	272,803,080.26	0	0	0
2039	9	335,092,963.74	272,803,080.26	0	0	0
2039	10	297,056,287.66	272,803,080.26	0	0	0
2039	11	275,575,024.60	272,803,080.26	0	0	0
2039	12	293,168,790.62	272,803,080.26	0	0	0
2040	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2040	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2040	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2040	4	281,202,622.54	272,803,080.26	0	0	0
2040	5	288,643,178.24	272,803,080.26	0	0	0
2040	6	316,714,717.27	272,803,080.26	0	0	0
2040	7	325,636,010.96	272,803,080.26	0	0	0
2040	8	330,376,366.05	272,803,080.26	0	0	0
2040	9	335,002,678.56	272,803,080.26	0	0	0
2040	10	296,966,251.75	272,803,080.26	0	0	0
2040	11	275,575,024.60	272,803,080.26	0	0	0
2040	12	293,168,790.62	272,803,080.26	0	0	0
2041	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2041	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2041	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2041	4	281,202,622.54	272,803,080.26	0	0	0
2041	5	288,554,965.03	272,803,080.26	0	0	0
2041	6	316,626,768.89	272,803,080.26	0	0	0
2041	7	325,548,327.40	272,803,080.26	0	0	0
2041	8	330,288,947.32	272,803,080.26	0	0	0
2041	9	334,915,524.66	272,803,080.26	0	0	0
2041	10	296,879,362.68	272,803,080.26	0	0	0
2041	11	275,575,024.60	272,803,080.26	0	0	0
2041	12	293,168,790.62	272,803,080.26	0	0	0
2042	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2042	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2042	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2042	4	281,202,622.54	272,803,080.26	0	0	0

2042	5	288,469,770.15	272,803,080.26	0	0	0
2042	6	316,541,806.92	272,803,080.26	0	0	0
2042	7	325,463,598.34	272,803,080.26	0	0	0
2042	8	330,204,451.17	272,803,080.26	0	0	0
2042	9	334,831,261.42	272,803,080.26	0	0	0
2042	10	296,795,332.34	272,803,080.26	0	0	0
2042	11	275,575,024.60	272,803,080.26	0	0	0
2042	12	293,168,790.62	272,803,080.26	0	0	0
2043	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2043	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2043	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2043	4	281,202,622.54	272,803,080.26	0	0	0
2043	5	288,387,204.83	272,803,080.26	0	0	0
2043	6	316,459,441.43	272,803,080.26	0	0	0
2043	7	325,381,432.69	272,803,080.26	0	0	0
2043	8	330,122,485.36	272,803,080.26	0	0	0
2043	9	334,749,495.45	272,803,080.26	0	0	0
2043	10	296,713,766.21	272,803,080.26	0	0	0
2043	11	275,575,024.60	272,803,080.26	0	0	0
2043	12	293,168,790.62	272,803,080.26	0	0	0
2044	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2044	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2044	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2044	4	281,202,622.54	272,803,080.26	0	0	0
2044	5	288,307,014.60	272,803,080.26	0	0	0
2044	6	316,379,446.44	272,803,080.26	0	0	0
2044	7	325,301,632.95	272,803,080.26	0	0	0
2044	8	330,042,880.86	272,803,080.26	0	0	0
2044	9	334,670,086.19	272,803,080.26	0	0	0
2044	10	296,634,552.20	272,803,080.26	0	0	0
2044	11	275,575,024.60	272,803,080.26	0	0	0
2044	12	293,168,790.62	272,803,080.26	0	0	0
2045	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2045	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2045	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2045	4	281,202,622.54	272,803,080.26	0	0	0
2045	5	288,229,076.56	272,803,080.26	0	0	0
2045	6	316,301,685.51	272,803,080.26	0	0	0
2045	7	325,224,049.11	272,803,080.26	0	0	0
2045	8	329,965,474.13	272,803,080.26	0	0	0
2045	9	334,592,856.55	272,803,080.26	0	0	0
2045	10	296,557,499.66	272,803,080.26	0	0	0

2045	11	275,575,024.60	272,803,080.26	0	0	0
2045	12	293,168,790.62	272,803,080.26	0	0	0
2046	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2046	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2046	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2046	4	281,202,622.54	272,803,080.26	0	0	0
2046	5	288,153,361.15	272,803,080.26	0	0	0
2046	6	316,226,166.68	272,803,080.26	0	0	0
2046	7	325,148,726.86	272,803,080.26	0	0	0
2046	8	329,890,348.46	272,803,080.26	0	0	0
2046	9	334,517,927.47	272,803,080.26	0	0	0
2046	10	296,482,767.17	272,803,080.26	0	0	0
2046	11	275,575,024.60	272,803,080.26	0	0	0
2046	12	293,168,790.62	272,803,080.26	0	0	0
2047	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2047	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2047	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2047	4	281,202,622.54	272,803,080.26	0	0	0
2047	5	288,079,870.74	272,803,080.26	0	0	0
2047	6	316,152,846.05	272,803,080.26	0	0	0
2047	7	325,075,576.02	272,803,080.26	0	0	0
2047	8	329,817,367.41	272,803,080.26	0	0	0
2047	9	334,445,116.20	272,803,080.26	0	0	0
2047	10	296,410,125.68	272,803,080.26	0	0	0
2047	11	275,575,024.60	272,803,080.26	0	0	0
2047	12	293,168,790.62	272,803,080.26	0	0	0
2048	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2048	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2048	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2048	4	281,202,622.54	272,803,080.26	0	0	0
2048	5	288,008,368.93	272,803,080.26	0	0	0
2048	6	316,081,504.27	272,803,080.26	0	0	0
2048	7	325,004,394.26	272,803,080.26	0	0	0
2048	8	329,746,345.67	272,803,080.26	0	0	0
2048	9	334,374,254.48	272,803,080.26	0	0	0
2048	10	296,339,423.98	272,803,080.26	0	0	0
2048	11	275,575,024.60	272,803,080.26	0	0	0
2048	12	293,168,790.62	272,803,080.26	0	0	0
2049	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2049	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2049	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2049	4	281,202,622.54	272,803,080.26	0	0	0

2049	5	287,934,958.46	272,803,080.26	0	0	0
2049	6	316,007,488.04	272,803,080.26	0	0	0
2049	7	324,929,772.27	272,803,080.26	0	0	0
2049	8	329,671,117.91	272,803,080.26	0	0	0
2049	9	334,298,420.96	272,803,080.26	0	0	0
2049	10	296,262,984.69	272,803,080.26	0	0	0
2049	11	275,575,024.60	272,803,080.26	0	0	0
2049	12	293,168,790.62	272,803,080.26	0	0	0
2050	1	304,107,979.92	272,803,080.26	31,304,899.66	0	0
2050	2	289,381,505.49	272,803,080.26	0	16,578,425.23	0
2050	3	285,660,533.47	272,803,080.26	0	0	12,857,453.21
2050	4	281,202,622.54	272,803,080.26	0	0	0
2050	5	287,865,620.18	272,803,080.26	0	0	0
2050	6	315,939,812.26	272,803,080.26	0	0	0
2050	7	324,863,759.00	272,803,080.26	0	0	0
2050	8	329,606,767.15	272,803,080.26	0	0	0
2050	9	334,235,732.71	272,803,080.26	0	0	0
2050	10	296,201,958.95	272,803,080.26	0	0	0
2050	11	275,575,024.60	272,803,080.26	0	0	0
2050	12	293,168,790.62	272,803,080.26	0	0	0

AprHDD	JunCDD	JulCDD2	AugCDD2	SepCDD2	OctCDD	
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	0	0	0	0	0	0
	0	0	0	0	0	0
9,089,014.84		0	0	0	0	0
	0	0	0	0	0	0
	0 34,838,910.39		0	0	0	0
	0	0 32,811,624.25		0	0	0
	0	0	0 63,671,536.42		0	0
	0	0	0	0 40,322,174.14		0
	0	0	0	0	0 3,788,334.52	
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
5,124,111.64		0	0	0	0	0
	0	0	0	0	0	0
	0 25,571,760.22		0	0	0	0
	0	0 61,440,726.39		0	0	0
	0	0	0 50,785,189.94		0	0
	0	0	0	0 38,006,917.85		0
	0	0	0	0	0 3,542,092.77	
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	0	0	0	0	0	0
	0	0	0	0	0	0
10,452,367.06		0	0	0	0	0
	0	0	0	0	0	0
	0 30,395,013.82		0	0	0	0
	0	0 33,997,816.21		0	0	0
	0	0	0 26,881,842.85		0	0
	0	0	0	0 52,743,480.00		0
	0	0	0	0	0 9,267,213.31	
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
8,104,200.59		0	0	0	0	0

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0	35,442,784.83	0	0	0	0
0	0	36,410,866.11	0	0	0
0	0	0	23,172,948.53	0	0
0	0	0	0	57,759,533.21	0
0	0	0	0	0	6,738,500.02
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0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
7,496,898.47	0	0	0	0	0
0	0	0	0	0	0
0	35,419,558.89	0	0	0	0
0	0	35,138,677.18	0	0	0
0	0	0	34,771,701.97	0	0
0	0	0	0	40,560,648.77	0
0	0	0	0	0	6,823,737.55
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
7,337,892.00	0	0	0	0	0
0	0	0	0	0	0
0	34,103,422.28	0	0	0	0
0	0	49,651,223.70	0	0	0
0	0	0	64,809,842.93	0	0
0	0	0	0	84,616,317.73	0
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0	0	0	0	0	0
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0	0	0	0	0	0
5,717,051.88	0	0	0	0	0
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0	31,664,698.55	0	0	0	0
0	0	39,878,610.29	0	0	0
0	0	0	31,649,499.22	0	0
0	0	0	0	18,062,354.03	0
0	0	0	0	0	12,724,068.56

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0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0

0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74

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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
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0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0

0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74

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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0

0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74

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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
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8,399,542.28	0	0	0	0	0

0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74

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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
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0	0	0	0	0	0
8,399,542.28	0	0	0	0	0

0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
8,399,542.28	0	0	0	0	0
0	0	0	0	0	0
0	28,079,000.48	0	0	0	0
0	0	37,007,755.61	0	0	0
0	0	0	41,755,572.15	0	0
0	0	0	0	46,389,346.10	0
0	0	0	0	0	8,360,380.74
0	0	0	0	0	0
0	0	0	0	0	0

NovCDD	DecHDD	CoolingIntensityMA	Before2013	ARMA	X-Missing
	0 23,692,104.92		0 -13,125,936.44		0
	0	0	0 -13,125,936.44	-729,967.42	0
	0	0	0 -13,125,936.44	-1,179,544.35	0
	0	0	0 -13,125,936.44	-5,474,737.30	0
	0	0	0 -13,125,936.44	85,171.07	0
	0	0	21,202,331.02 -13,125,936.44	-862,285.88	0
	0	0	21,179,520.17 -13,125,936.44	-2,825,882.15	0
	0	0	21,156,709.32 -13,125,936.44	-1,907,219.37	0
	0	0	21,133,898.48 -13,125,936.44	1,771,139.25	0
	0	0	21,111,087.63 -13,125,936.44	-1,166,369.64	0
	0	0	21,088,276.78 -13,125,936.44	4,678,721.11	0
551,905.29	0		0 -13,125,936.44	-343,671.75	0
	0 17,042,194.55		0 -13,125,936.44	-5,087,324.65	0
	0	0	0 -13,125,936.44	-3,033,349.85	0
	0	0	0 -13,125,936.44	330,541.39	0
	0	0	0 -13,125,936.44	-986,124.28	0
	0	0	0 -13,125,936.44	-1,009,803.90	0
	0	0	20,935,928.88 -13,125,936.44	4,225,852.16	0
	0	0	20,914,583.64 -13,125,936.44	4,030,459.14	0
	0	0	20,893,238.39 -13,125,936.44	3,869,906.67	0
	0	0	20,871,893.15 -13,125,936.44	-4,180,075.56	0
	0	0	20,850,547.91 -13,125,936.44	1,853,557.95	0
	0	0	20,829,202.67 -13,125,936.44	5,798,353.34	0
1,076,215.32	0		0 -13,125,936.44	-3,415,279.21	0
	0 18,012,332.98		0 -13,125,936.44	1,656,402.89	0
	0	0	0	0 -3,488,503.88	0
	0	0	0	0 -7,497,785.00	0
	0	0	0	0 -4,906,100.51	0
	0	0	0	0 -7,553,207.31	0
	0	0	20,695,700.80	0 -8,864,221.01	0
	0	0	20,677,538.53	0 -10,006,110.25	0
	0	0	20,659,376.25	0 -7,969,551.50	0
	0	0	20,641,213.97	0 -1,207,537.70	0
	0	0	20,623,051.70	0 2,908,371.28	0
	0	0	20,604,889.42	0 -1,635,091.32	0
1,821,287.47	0		0	0 829,955.84	0
	0 23,260,292.55		0	0 -50,392.33	0
	0	0	0	0 922,801.42	0
	0	0	0	0 4,297,474.85	0
	0	0	0	0 3,726,282.80	0
	0	0	0	0 2,811,094.71	0

0	0	20,460,900.93	0	-4,265,833.14	0
0	0	20,439,368.14	0	-632,078.57	0
0	0	20,417,835.35	0	-2,137,930.16	0
0	0	20,396,302.56	0	2,094,576.42	0
0	0	20,374,769.77	0	998,477.44	0
0	0	20,353,236.99	0	-2,696,297.21	0
1,310,775.07	0	0	0	938,213.83	0
0	23,575,515.58	0	0	2,547,866.08	0
0	0	0	0	4,438,796.15	0
0	0	0	0	-510,531.07	0
0	0	0	0	5,815,078.94	0
0	0	0	0	4,267,985.95	0
0	0	20,203,627.86	0	2,012,648.56	0
0	0	20,182,319.15	0	-6,783,000.99	0
0	0	20,161,010.44	0	1,913,869.40	0
0	0	20,139,701.74	0	2,734,219.92	0
0	0	20,118,393.03	0	6,996,565.20	0
0	0	20,097,084.32	0	9,127,105.74	0
1,807,489.84	0	0	0	1,111,879.69	0
0	15,045,782.06	0	0	3,956,872.45	0
0	0	0	0	1,844,821.30	0
0	0	0	0	2,020,933.54	0
0	0	0	0	95,296.56	0
0	0	0	0	-1,829,467.27	0
0	0	19,950,617.21	0	874,813.98	0
0	0	19,929,847.28	0	-2,883,391.89	0
0	0	19,909,077.34	0	-1,523,949.04	0
0	0	19,888,307.40	0	4,694,621.33	0
0	0	19,867,537.47	0	-799,436.38	0
0	0	19,846,767.53	0	-5,696,435.99	0
12,735,214.64	0	0	0	-652,882.80	0
0	20,960,172.04	0	0	647,884.93	0
0	0	0	0	2,132,387.58	0
0	0	0	0	2,008,937.34	0
0	0	0	0	-1,558,286.90	0
0	0	0	0	-2,034,192.23	0
0	0	19,705,113.58	0	1,356,051.91	0
0	0	19,685,090.76	0	2,865,153.42	0
0	0	19,665,067.94	0	4,934,509.84	0
0	0	19,645,045.13	0	585,750.79	0
0	0	19,625,022.31	0	1,790,937.20	0
0	0	19,604,999.50	0	6,781,599.80	0

4,401,444.71	0	0	0	2,546,829.59	0
0	20,945,778.30	0	0	-2,433,973.89	0
0	0	0	0	-4,076,072.05	0
0	0	0	0	-1,844,911.99	0
0	0	0	0	-835,044.18	0
0	0	0	0	-377,957.75	0
0	0	19,359,051.27	0	-171,071.26	0
0	0	19,317,870.75	0	-77,430.29	0
0	0	19,276,690.23	0	-35,046.50	0
0	0	19,235,509.71	0	-15,862.75	0
0	0	19,194,329.20	0	-7,179.80	0
0	0	19,153,148.68	0	-3,249.72	0
2,771,944.34	0	0	0	-1,470.89	0
0	20,365,710.36	0	0	-665.754	0
0	0	0	0	-301.334	0
0	0	0	0	-136.39	0
0	0	0	0	-61.733	0
0	0	0	0	-27.941	0
0	0	18,909,822.71	0	-12.647	0
0	0	18,877,629.73	0	-5.724	0
0	0	18,845,436.75	0	-2.591	0
0	0	18,813,243.76	0	-1.173	0
0	0	18,781,050.78	0	-0.531	0
0	0	18,748,857.79	0	-0.24	0
2,771,944.34	0	0	0	-0.109	0
0	20,365,710.36	0	0	-0.049	0
0	0	0	0	-0.022	0
0	0	0	0	-0.01	0
0	0	0	0	-0.005	0
0	0	0	0	-0.002	0
0	0	18,613,792.53	0	-0.001	0
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0	0	18,585,520.82	0	0	0
0	0	18,571,384.96	0	0	0
0	0	18,557,249.10	0	0	0
0	0	18,543,113.24	0	0	0
2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0	0	18,430,026.38	0	0	0
0	0	18,415,890.52	0	0	0
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0	0	18,387,618.81	0	0	0
0	0	18,373,482.95	0	0	0
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0	20,365,710.36	0	0	0	0
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0	0	18,227,737.52	0	0	0
0	0	18,204,242.78	0	0	0
0	0	18,180,748.04	0	0	0
0	0	18,157,253.30	0	0	0
0	0	18,133,758.56	0	0	0
0	0	18,110,263.81	0	0	0
2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0	0	17,903,351.58	0	0	0
2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0 20,365,710.36		0	0	0	0
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0 20,365,710.36		0	0	0	0
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0	0	17,295,909.16	0	0	0
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0 20,365,710.36		0	0	0	0
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0 20,365,710.36		0	0	0	0
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0 20,365,710.36		0	0	0	0
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0	0	16,506,989.09	0	0	0
2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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0	20,365,710.36	0	0	0	0
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2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0	0	15,985,911.14	0	0	0

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0 20,365,710.36		0	0	0	0
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0 20,365,710.36		0	0	0	0
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0	0	0	0	0	0
0	0	0	0	0	0
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2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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0	0	15,730,294.91	0	0	0
0	0	15,723,098.30	0	0	0
0	0	15,715,901.68	0	0	0
2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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0	0	15,631,871.35	0	0	0
2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0	20,365,710.36	0	0	0	0
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0	20,365,710.36	0	0	0	0
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0 20,365,710.36		0	0	0	0
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2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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2,771,944.34	0	0	0	0	0
0 20,365,710.36		0	0	0	0
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2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0
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0	0	15,052,923.13	0	0	0
0	0	15,048,114.74	0	0	0
0	0	15,043,306.35	0	0	0
0	0	15,038,497.95	0	0	0
2,771,944.34	0	0	0	0	0
0	20,365,710.36	0	0	0	0

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Attachment to Response to KIUC-1 Question No. 20b
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Sinclair

Year	Month	Actual	Pred	Upper	Lower	Sigma
2010	12	281,756,489.00				
2011	1	296,314,564.00	298,190,632.95	317,565,523.55	278,815,742.35	9,712,124.54
2011	2	265,272,390.00	276,188,503.22	294,918,181.05	257,458,825.39	9,388,696.30
2011	3	271,422,014.00	265,759,103.27	284,132,842.09	247,385,364.45	9,210,273.41
2011	4	266,861,060.00	268,851,329.73	287,705,564.95	249,997,094.51	9,451,133.65
2011	5	274,636,088.00	280,017,188.97	298,135,323.20	261,899,054.73	9,082,145.53
2011	6	311,481,843.00	312,869,692.23	331,491,205.63	294,248,178.84	9,334,476.30
2011	7	317,558,559.00	311,738,258.03	329,853,961.61	293,622,554.44	9,080,927.11
2011	8	341,905,650.00	346,253,717.97	365,757,526.45	326,749,909.48	9,776,747.69
2011	9	331,447,378.00	319,944,035.95	338,094,649.53	301,793,422.37	9,098,426.58
2011	10	283,794,461.00	289,232,476.23	307,107,903.81	271,357,048.66	8,960,483.05
2011	11	248,989,325.00	259,885,377.36	278,477,384.04	241,293,370.69	9,319,685.36
2011	12	270,017,581.00	271,632,013.72	289,981,255.41	253,282,772.04	9,197,993.64
2012	1	288,458,095.00	284,694,460.71	303,143,255.45	266,245,665.97	9,247,896.97
2012	2	271,969,601.00	274,478,844.48	292,789,752.87	256,167,936.08	9,178,778.16
2012	3	267,472,995.00	268,717,889.59	286,889,839.57	250,545,939.60	9,109,121.96
2012	4	274,137,678.00	263,791,451.56	281,776,933.49	245,805,969.63	9,015,650.41
2012	5	289,517,802.00	284,838,924.86	302,937,340.95	266,740,508.78	9,072,261.34
2012	6	314,713,499.00	310,193,946.83	328,392,453.72	291,995,439.93	9,122,434.24
2012	7	332,775,823.00	345,881,015.27	365,500,496.45	326,261,534.10	9,834,731.38
2012	8	335,429,401.00	327,154,151.36	345,866,410.48	308,441,892.24	9,379,964.76
2012	9	331,345,251.00	320,388,167.53	338,472,104.97	302,304,230.10	9,065,003.57
2012	10	276,502,863.00	289,846,792.60	307,707,094.83	271,986,490.37	8,952,901.11
2012	11	264,412,947.00	257,338,079.94	275,832,088.13	238,844,071.74	9,270,561.29
2012	12	269,982,121.00	279,345,879.70	297,754,717.44	260,937,041.95	9,227,867.58
2013	1	285,566,935.00	298,643,726.40	316,423,172.51	280,864,280.29	8,912,370.06
2013	2	278,381,835.00	281,723,385.03	299,595,737.57	263,851,032.49	8,958,941.61
2013	3	270,297,414.00	282,079,056.51	300,321,678.36	263,836,434.67	9,144,547.91
2013	4	263,671,205.00	275,702,240.01	294,536,025.99	256,868,454.03	9,440,882.98
2013	5	271,391,696.00	284,634,560.06	302,201,696.33	267,067,423.78	8,805,944.71
2013	6	306,268,036.00	313,869,522.36	331,708,407.13	296,030,637.59	8,942,165.10
2013	7	324,792,389.00	319,490,721.23	337,108,421.88	301,873,020.57	8,831,291.30
2013	8	326,751,772.00	319,118,599.39	336,487,997.80	301,749,200.98	8,706,823.90
2013	9	342,557,109.00	349,077,983.24	367,033,318.61	331,122,647.87	9,000,538.73
2013	10	304,508,853.00	301,040,091.67	318,996,997.29	283,083,186.05	9,001,325.86
2013	11	274,513,033.00	275,454,323.56	293,291,966.15	257,616,680.97	8,941,542.43
2013	12	298,102,172.00	296,012,980.48	314,222,773.95	277,803,187.02	9,128,091.90
2014	1	317,319,457.00	308,747,595.69	326,930,227.33	290,564,964.06	9,114,476.39
2014	2	301,033,945.00	297,098,725.14	315,545,168.07	278,652,282.20	9,246,718.08
2014	3	293,728,845.00	291,244,411.71	309,614,037.31	272,874,786.12	9,208,211.56
2014	4	271,482,526.00	283,718,375.56	301,657,408.66	265,779,342.46	8,992,366.83

2014	5	291,867,493.00	288,998,148.05	306,548,725.67	271,447,570.43	8,797,644.29
2014	6	323,961,779.00	328,053,154.66	346,142,614.53	309,963,694.79	9,067,771.83
2014	7	334,259,452.00	327,493,851.56	345,188,668.76	309,799,034.36	8,869,947.81
2014	8	318,578,326.00	318,466,907.77	335,778,919.74	301,154,895.81	8,678,057.58
2014	9	344,980,296.00	351,935,860.69	370,117,219.36	333,754,502.02	9,113,838.28
2014	10	301,967,668.00	297,198,520.06	314,653,084.23	279,743,955.89	8,749,515.26
2014	11	279,743,005.00	275,052,069.16	292,968,190.47	257,135,947.85	8,980,881.75
2014	12	306,185,488.00	298,926,461.92	317,170,593.54	280,682,330.30	9,145,304.72
2015	1	304,170,591.00	309,737,333.32	327,722,346.79	291,752,319.86	9,015,415.58
2015	2	304,862,996.00	291,504,870.66	309,806,908.95	273,202,832.37	9,174,331.81
2015	3	298,869,569.00	295,255,136.76	314,149,887.50	276,360,386.03	9,471,443.02
2015	4	284,746,641.00	284,567,964.68	302,342,703.43	266,793,225.92	8,910,010.38
2015	5	278,020,627.00	295,019,356.69	312,552,417.30	277,486,296.07	8,788,863.47
2015	6	332,633,382.00	321,621,957.32	339,702,230.28	303,541,684.35	9,063,166.67
2015	7	334,143,640.00	330,016,637.28	347,658,389.80	312,374,884.77	8,843,347.87
2015	8	343,172,405.00	330,448,703.89	347,982,444.18	312,914,963.60	8,789,204.17
2015	9	353,647,171.00	340,478,687.26	358,005,814.72	322,951,559.79	8,785,889.34
2015	10	302,180,443.00	308,851,007.86	326,317,576.15	291,384,439.58	8,755,532.61
2015	11	283,352,720.00	275,722,449.78	293,561,835.94	257,883,063.62	8,942,416.43
2015	12	291,924,734.00	291,805,734.77	309,439,514.69	274,171,954.84	8,839,351.42
2016	1	303,576,356.00	300,956,210.54	318,584,598.00	283,327,823.09	8,836,648.31
2016	2	289,419,610.00	291,229,999.27	309,100,783.90	273,359,214.64	8,958,155.66
2016	3	278,274,769.00	282,412,014.68	299,918,515.84	264,905,513.51	8,775,549.92
2016	4	282,073,750.00	278,311,504.99	296,048,032.85	260,574,977.14	8,890,856.26
2016	5	286,383,251.00	293,628,511.46	311,144,986.07	276,112,036.84	8,780,549.34
2016	6	323,469,400.00	323,952,957.93	341,952,258.07	305,953,657.79	9,022,577.12
2016	7	352,735,483.00	340,839,432.26	359,170,560.83	322,508,303.69	9,188,914.01
2016	8	355,734,989.00	362,195,851.92	381,321,981.40	343,069,722.45	9,587,427.11
2016	9	364,701,466.00	376,487,499.08	396,371,208.61	356,603,789.55	9,967,182.13
2016	10	304,722,279.00	300,468,295.19	319,894,863.19	281,041,727.19	9,738,029.06
2016	11	286,969,705.00	284,885,412.10	307,383,534.93	262,387,289.27	11,277,718.95
2016	12	298,474,461.00	294,411,137.23	312,396,985.04	276,425,289.42	9,015,833.82
2017	1	304,584,276.00	302,278,200.72	319,953,281.18	284,603,120.26	8,860,054.29
2017	2	281,126,579.00	286,578,330.79	304,044,230.24	269,112,431.35	8,755,197.34
2017	3	277,485,986.00	280,421,959.07	297,902,821.01	262,941,097.13	8,762,697.64
2017	4	281,516,137.00	276,485,939.91	293,950,160.46	259,021,719.36	8,754,355.75
2017	5	298,838,345.00	293,864,245.75	311,365,235.63	276,363,255.86	8,772,787.25
2017	6	335,054,971.00	327,018,023.00	344,883,346.30	309,152,699.69	8,955,418.04
2017	7	333,640,892.00	337,281,268.33	355,100,828.17	319,461,708.50	8,932,478.02
2017	8	328,054,447.00	324,683,375.40	342,119,857.26	307,246,893.55	8,740,451.07
2017	9	325,473,442.00	312,281,393.80	329,512,785.07	295,050,002.54	8,637,644.54
2017	10	310,759,008.00	311,913,748.12	331,032,983.33	292,794,512.91	9,583,971.20

2017	11	271,827,004.00	279,751,354.56	297,635,970.53	261,866,738.60	8,965,088.95
2017	12	284,743,354.00	291,314,884.67	309,299,480.56	273,330,288.78	9,015,206.26
2018	1		300,031,907.87	317,934,049.55	282,129,766.19	8,973,874.13
2018	2		287,536,593.50	306,915,762.95	268,157,424.05	9,714,269.42
2018	3		284,825,489.29	304,559,274.53	265,091,704.05	9,892,029.01
2018	4		280,824,664.79	300,676,720.89	260,972,608.69	9,951,315.09
2018	5		291,991,060.27	311,358,102.57	272,624,017.97	9,708,190.39
2018	6		320,122,521.20	339,682,907.42	300,562,134.98	9,805,108.63
2018	7		329,052,479.60	348,615,125.05	309,489,834.15	9,806,241.12
2018	8		333,778,299.37	353,411,839.89	314,144,758.86	9,841,778.96
2018	9		338,379,575.76	357,952,255.69	318,806,895.83	9,811,271.15
2018	10		300,313,359.95	319,944,242.56	280,682,477.35	9,840,446.62
2018	11		275,573,553.71	295,204,323.22	255,942,784.20	9,840,389.93
2018	12		293,168,124.86	312,950,389.17	273,385,860.56	9,916,330.29
2019	1		304,107,678.58	323,859,509.67	284,355,847.50	9,901,074.92
2019	2		289,381,369.10	309,125,245.93	269,637,492.27	9,897,087.66
2019	3		285,660,471.74	305,468,182.04	265,852,761.43	9,929,085.71
2019	4		281,202,594.60	301,069,727.59	261,335,461.60	9,958,872.74
2019	5		291,712,890.33	311,060,345.62	272,365,435.04	9,698,371.94
2019	6		319,759,704.74	339,310,182.90	300,209,226.58	9,800,141.98
2019	7		328,656,270.02	348,213,925.49	309,098,614.55	9,803,739.78
2019	8		333,371,895.00	353,003,944.52	313,739,845.48	9,841,031.56
2019	9		337,973,476.61	357,547,232.98	318,399,720.24	9,811,810.73
2019	10		299,912,318.55	319,552,540.12	280,272,096.97	9,845,128.00
2019	11		275,575,024.49	295,205,794.23	255,944,254.75	9,840,390.04
2019	12		293,168,790.57	312,951,054.92	273,386,526.21	9,916,330.32
2020	1		304,107,979.90	323,859,810.99	284,356,148.80	9,901,074.92
2020	2		289,381,505.48	309,125,382.31	269,637,628.64	9,897,087.66
2020	3		285,660,533.46	305,468,243.77	265,852,823.16	9,929,085.71
2020	4		281,202,622.54	301,069,755.53	261,335,489.54	9,958,872.74
2020	5		291,416,872.79	310,750,337.64	272,083,407.94	9,691,358.90
2020	6		319,481,737.41	339,026,462.66	299,937,012.16	9,797,258.20
2020	7		328,396,356.68	347,951,744.69	308,840,968.67	9,802,603.16
2020	8		333,130,037.37	352,761,947.73	313,498,127.00	9,840,961.81
2020	9		337,749,675.46	357,324,661.86	318,174,689.07	9,812,427.31
2020	10		299,706,574.24	319,352,116.40	280,061,032.08	9,847,795.07
2020	11		275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2020	12		293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2021	1		304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2021	2		289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2021	3		285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2021	4		281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74

2021	5	291,247,242.50	310,573,050.84	271,921,434.16	9,687,520.89
2021	6	319,312,107.11	338,853,667.67	299,770,546.56	9,795,671.82
2021	7	328,226,726.39	347,780,967.02	308,672,485.76	9,802,028.01
2021	8	332,960,407.07	352,592,537.18	313,328,276.97	9,841,071.96
2021	9	337,580,045.17	357,156,268.09	318,003,822.25	9,813,047.15
2021	10	299,536,943.95	319,187,160.91	279,886,726.98	9,850,138.42
2021	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2021	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2022	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2022	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2022	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2022	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2022	5	291,030,817.78	310,347,239.14	271,714,396.42	9,682,815.44
2022	6	319,086,323.52	338,624,078.82	299,548,568.22	9,793,764.34
2022	7	327,991,583.90	347,544,668.39	308,438,499.42	9,801,448.46
2022	8	332,715,905.71	352,348,812.87	313,082,998.54	9,841,461.48
2022	9	337,326,184.92	356,904,748.33	317,747,621.51	9,814,220.38
2022	10	299,273,724.81	318,931,710.88	279,615,738.74	9,854,032.87
2022	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2022	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2023	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2023	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2023	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2023	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2023	5	290,786,393.22	310,092,728.43	271,480,058.00	9,677,759.52
2023	6	318,849,401.42	338,383,663.84	299,315,139.00	9,792,013.45
2023	7	327,762,164.27	347,314,607.21	308,209,721.33	9,801,126.87
2023	8	332,493,988.54	352,128,071.50	312,859,905.58	9,842,050.87
2023	9	337,111,770.22	356,692,767.90	317,530,772.54	9,815,440.61
2023	10	299,066,812.58	318,731,345.18	279,402,279.98	9,857,314.48
2023	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2023	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2024	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2024	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2024	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2024	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2024	5	290,614,755.54	309,914,335.26	271,315,175.83	9,674,373.17
2024	6	318,681,817.67	338,213,918.84	299,149,716.50	9,790,930.08
2024	7	327,598,634.45	347,150,913.42	308,046,355.48	9,801,044.68
2024	8	332,334,512.64	351,969,716.99	312,699,308.29	9,842,613.00
2024	9	336,956,348.25	356,539,372.24	317,373,324.26	9,816,456.35
2024	10	298,915,444.53	318,585,011.01	279,245,878.06	9,859,837.83

2024	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2024	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2025	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2025	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2025	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2025	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2025	5	290,471,495.35	309,765,643.36	271,177,347.34	9,671,650.40
2025	6	318,538,557.47	338,069,014.41	299,008,100.54	9,790,105.86
2025	7	327,455,374.25	347,007,710.21	307,903,038.29	9,801,073.25
2025	8	332,191,252.45	351,827,661.24	312,554,843.65	9,843,216.75
2025	9	336,813,088.05	356,398,174.62	317,228,001.49	9,817,490.26
2025	10	298,772,184.34	318,446,705.35	279,097,663.32	9,862,321.41
2025	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2025	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2026	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2026	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2026	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2026	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2026	5	290,320,606.68	309,609,237.48	271,031,975.89	9,668,884.76
2026	6	318,386,143.11	337,915,056.56	298,857,229.67	9,789,332.15
2026	7	327,301,434.20	346,854,040.24	307,748,828.16	9,801,208.63
2026	8	332,035,786.70	351,673,713.56	312,397,859.85	9,843,977.72
2026	9	336,656,096.61	356,243,657.98	317,068,535.24	9,818,730.82
2026	10	298,613,667.20	318,293,885.89	278,933,448.51	9,865,177.50
2026	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2026	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2027	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2027	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2027	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2027	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2027	5	290,162,673.90	309,445,753.97	270,879,593.82	9,666,102.33
2027	6	318,228,937.48	337,756,481.25	298,701,393.70	9,788,645.57
2027	7	327,144,955.71	346,698,058.01	307,591,853.41	9,801,457.39
2027	8	331,880,035.36	351,519,703.23	312,240,367.48	9,844,850.44
2027	9	336,501,072.42	356,091,297.65	316,910,847.18	9,820,066.15
2027	10	298,459,370.15	318,145,352.10	278,773,388.21	9,868,066.47
2027	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2027	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2028	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2028	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2028	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2028	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74

2028	5	290,013,020.17	309,291,052.15	270,734,988.19	9,663,571.85
2028	6	318,079,921.55	337,606,375.51	298,553,467.60	9,788,099.28
2028	7	326,996,577.59	346,550,356.93	307,442,798.26	9,801,796.77
2028	8	331,732,295.05	351,373,818.00	312,090,772.10	9,845,780.34
2028	9	336,353,969.91	355,946,925.02	316,761,014.80	9,821,434.56
2028	10	298,312,905.45	318,004,556.20	278,621,254.71	9,870,908.09
2028	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2028	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2029	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2029	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2029	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2029	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2029	5	289,870,672.08	309,144,093.65	270,597,250.50	9,661,260.78
2029	6	317,938,141.66	337,463,747.13	298,412,536.19	9,787,673.95
2029	7	326,855,365.90	346,409,976.20	307,300,755.60	9,802,213.31
2029	8	331,591,651.55	351,235,124.60	311,948,178.50	9,846,757.88
2029	9	336,213,894.61	355,809,632.05	316,618,157.17	9,822,829.27
2029	10	298,173,398.35	317,870,627.87	278,476,168.83	9,873,704.59
2029	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2029	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2030	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2030	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2030	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2030	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2030	5	289,734,324.72	309,003,505.23	270,465,144.22	9,659,134.84
2030	6	317,802,198.98	337,327,163.44	298,277,234.51	9,787,352.63
2030	7	326,719,827.88	346,275,406.93	307,164,248.84	9,802,698.92
2030	8	331,456,518.21	351,102,034.08	311,811,002.33	9,847,781.89
2030	9	336,079,165.94	355,677,747.75	316,480,584.13	9,824,255.08
2030	10	298,039,074.35	317,741,840.51	278,336,308.19	9,876,479.96
2030	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2030	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2031	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2031	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2031	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2031	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2031	5	289,603,336.20	308,868,603.68	270,338,068.72	9,657,173.34
2031	6	317,671,715.68	337,196,223.78	298,147,207.57	9,787,123.87
2031	7	326,589,849.81	346,146,515.33	307,033,184.30	9,803,243.54
2031	8	331,327,045.36	350,974,673.92	311,679,416.80	9,848,840.93
2031	9	335,950,198.32	355,551,657.34	316,348,739.30	9,825,697.35
2031	10	297,910,611.96	317,618,824.59	278,202,399.34	9,879,210.13

2031	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2031	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2032	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2032	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2032	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2032	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2032	5	289,478,254.26	308,739,932.84	270,216,575.68	9,655,374.32
2032	6	317,547,107.74	337,071,325.33	298,022,890.15	9,786,978.24
2032	7	326,465,715.87	346,023,562.90	306,907,868.84	9,803,835.80
2032	8	331,203,385.42	350,853,173.79	311,553,597.05	9,849,923.58
2032	9	335,827,012.38	355,431,360.65	316,222,664.11	9,827,145.65
2032	10	297,787,900.02	317,501,453.44	278,074,346.59	9,881,887.33
2032	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2032	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2033	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2033	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2033	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2033	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2033	5	289,358,647.32	308,617,029.10	270,100,265.54	9,653,721.72
2033	6	317,427,932.20	336,952,004.76	297,903,859.64	9,786,905.54
2033	7	326,346,971.74	345,906,080.52	306,787,862.95	9,804,468.28
2033	8	331,085,072.69	350,737,057.27	311,433,088.10	9,851,024.49
2033	9	335,709,131.05	355,316,373.11	316,101,888.98	9,828,596.23
2033	10	297,670,450.09	317,389,241.62	277,951,658.55	9,884,513.06
2033	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2033	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2034	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2034	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2034	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2034	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2034	5	289,244,018.07	308,499,364.18	269,988,671.96	9,652,200.02
2034	6	317,313,694.53	336,837,749.96	297,789,639.10	9,786,896.96
2034	7	326,233,125.64	345,793,564.89	306,672,686.39	9,805,135.21
2034	8	330,971,618.17	350,625,827.96	311,317,408.37	9,852,139.93
2034	9	335,596,068.10	355,206,204.12	315,985,932.08	9,830,046.90
2034	10	297,557,778.72	317,281,711.26	277,833,846.18	9,887,090.11
2034	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2034	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2035	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2035	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2035	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2035	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74

2035	5	289,133,970.96	308,386,516.92	269,881,424.99	9,650,796.38
2035	6	317,204,015.63	336,728,166.89	297,679,864.37	9,786,944.99
2035	7	326,123,814.96	345,685,642.88	306,561,987.05	9,805,831.31
2035	8	330,862,675.71	350,519,132.01	311,206,219.42	9,853,266.04
2035	9	335,487,493.87	355,100,518.05	315,874,469.68	9,831,494.66
2035	10	297,449,572.70	317,178,549.37	277,720,596.04	9,889,618.60
2035	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2035	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2036	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2036	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2036	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2036	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2036	5	289,028,267.34	308,278,229.04	269,778,305.64	9,649,500.96
2036	6	317,098,665.20	336,623,012.07	297,574,318.34	9,787,043.04
2036	7	326,018,817.73	345,582,082.09	306,455,553.37	9,806,551.36
2036	8	330,758,031.67	350,416,747.05	311,099,316.28	9,854,398.46
2036	9	335,383,203.01	354,999,102.04	315,767,303.99	9,832,935.74
2036	10	297,345,635.04	317,079,555.38	277,611,714.71	9,892,096.73
2036	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2036	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2037	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2037	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2037	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2037	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2037	5	288,926,727.68	308,174,304.17	269,679,151.20	9,648,305.31
2037	6	316,997,463.88	336,522,094.19	297,472,833.56	9,787,185.13
2037	7	325,917,954.73	345,482,693.59	306,353,215.86	9,807,290.50
2037	8	330,657,506.99	350,318,485.92	310,996,528.05	9,855,533.12
2037	9	335,283,016.66	354,901,770.18	315,664,263.14	9,834,366.63
2037	10	297,245,787.01	316,984,547.34	277,507,026.69	9,894,522.89
2037	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2037	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2038	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2038	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2038	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2038	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2038	5	288,828,934.56	308,074,303.97	269,583,565.15	9,647,198.96
2038	6	316,899,946.40	336,424,938.44	297,374,954.37	9,787,366.45
2038	7	325,820,712.90	345,386,961.11	306,254,464.69	9,808,047.09
2038	8	330,560,540.81	350,223,789.85	310,897,291.78	9,856,671.06
2038	9	335,186,326.14	354,807,920.75	315,564,731.52	9,835,790.79
2038	10	297,149,372.14	316,892,890.46	277,405,853.82	9,896,907.95

2038	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2038	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2039	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2039	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2039	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2039	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2039	5	288,734,460.53	307,977,781.78	269,491,139.28	9,646,172.27
2039	6	316,805,750.28	336,331,174.26	297,280,326.31	9,787,582.97
2039	7	325,726,794.69	345,294,582.43	306,159,006.95	9,808,818.82
2039	8	330,466,900.51	350,132,422.54	310,801,378.49	9,857,810.45
2039	9	335,092,963.74	354,717,381.97	315,468,545.51	9,837,206.20
2039	10	297,056,287.66	316,804,478.25	277,308,097.06	9,899,250.04
2039	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2039	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2040	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2040	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2040	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2040	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2040	5	288,643,178.24	307,884,598.97	269,401,757.51	9,645,219.59
2040	6	316,714,717.27	336,240,635.75	297,188,798.79	9,787,830.86
2040	7	325,636,010.96	345,205,363.21	306,066,658.70	9,809,603.07
2040	8	330,376,366.05	350,044,161.10	310,708,571.01	9,858,949.86
2040	9	335,002,678.56	354,629,902.35	315,375,454.77	9,838,612.55
2040	10	296,966,251.75	316,719,035.05	277,213,468.45	9,901,552.24
2040	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2040	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2041	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2041	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2041	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2041	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2041	5	288,554,965.03	307,794,622.42	269,315,307.64	9,644,335.68
2041	6	316,626,768.89	336,153,237.06	297,100,300.72	9,788,106.40
2041	7	325,548,327.40	345,119,261.99	305,977,392.81	9,810,396.25
2041	8	330,288,947.32	349,959,007.51	310,618,887.14	9,860,085.31
2041	9	334,915,524.66	354,545,526.64	315,285,522.68	9,840,005.18
2041	10	296,879,362.68	316,636,646.59	277,122,078.76	9,903,808.28
2041	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2041	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2042	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2042	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2042	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2042	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74

2042	5	288,469,770.15	307,707,792.92	269,231,747.39	9,643,516.29
2042	6	316,541,806.92	336,068,873.25	297,014,740.59	9,788,406.24
2042	7	325,463,598.34	345,036,128.45	305,891,068.23	9,811,196.04
2042	8	330,204,451.17	349,876,766.42	310,532,135.92	9,861,215.72
2042	9	334,831,261.42	354,464,014.74	315,198,508.10	9,841,384.36
2042	10	296,795,332.34	316,557,032.70	277,033,631.99	9,906,022.13
2042	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2042	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2043	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2043	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2043	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2043	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2043	5	288,387,204.83	307,623,707.57	269,150,702.09	9,642,754.33
2043	6	316,459,441.43	335,987,150.62	296,931,732.25	9,788,728.49
2043	7	325,381,432.69	344,955,572.45	305,807,292.94	9,812,002.92
2043	8	330,122,485.36	349,797,049.80	310,447,920.93	9,862,343.17
2043	9	334,749,495.45	354,384,979.91	315,114,010.99	9,842,753.41
2043	10	296,713,766.21	316,479,813.54	276,947,718.88	9,908,201.15
2043	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2043	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2044	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2044	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2044	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2044	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2044	5	288,307,014.60	307,542,101.47	269,071,927.72	9,642,044.60
2044	6	316,379,446.44	335,907,839.32	296,851,053.57	9,789,071.20
2044	7	325,301,632.95	344,877,394.80	305,725,871.09	9,812,816.03
2044	8	330,042,880.86	349,719,687.78	310,366,073.94	9,863,467.27
2044	9	334,670,086.19	354,308,280.88	315,031,891.51	9,844,111.97
2044	10	296,634,552.20	316,404,877.73	276,864,226.67	9,910,345.70
2044	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2044	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2045	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2045	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2045	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2045	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2045	5	288,229,076.56	307,462,844.44	268,995,308.69	9,641,383.42
2045	6	316,301,685.51	335,830,799.03	296,772,571.99	9,789,432.44
2045	7	325,224,049.11	344,801,443.57	305,646,654.66	9,813,634.41
2045	8	329,965,474.13	349,644,516.50	310,286,431.75	9,864,587.85
2045	9	334,592,856.55	354,233,741.69	314,951,971.42	9,845,460.62
2045	10	296,557,499.66	316,332,040.12	276,782,959.20	9,912,458.53

2045	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2045	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2046	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2046	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2046	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2046	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2046	5	288,153,361.15	307,385,901.53	268,920,820.76	9,640,768.11
2046	6	316,226,166.68	335,756,032.93	296,696,300.42	9,789,809.77
2046	7	325,148,726.86	344,727,758.70	305,569,695.03	9,814,455.19
2046	8	329,890,348.46	349,571,612.13	310,209,084.79	9,865,701.33
2046	9	334,517,927.47	354,161,474.37	314,874,380.58	9,846,794.89
2046	10	296,482,767.17	316,261,445.97	276,704,088.36	9,914,532.98
2046	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2046	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2047	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2047	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2047	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2047	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2047	5	288,079,870.74	307,311,270.53	268,848,470.95	9,640,196.36
2047	6	316,152,846.05	335,683,492.98	296,622,199.12	9,790,201.10
2047	7	325,075,576.02	344,656,247.41	305,494,904.63	9,815,277.05
2047	8	329,817,367.41	349,500,837.74	310,133,897.07	9,866,807.47
2047	9	334,445,116.20	354,091,298.14	314,798,934.26	9,848,115.77
2047	10	296,410,125.68	316,192,874.50	276,627,376.85	9,916,573.17
2047	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2047	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2048	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2048	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2048	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2048	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2048	5	288,008,368.93	307,238,707.04	268,778,030.82	9,639,664.17
2048	6	316,081,504.27	335,612,957.93	296,550,050.60	9,790,605.50
2048	7	325,004,394.26	344,586,707.77	305,422,080.75	9,816,100.20
2048	8	329,746,345.67	349,432,009.55	310,060,681.78	9,867,907.04
2048	9	334,374,254.48	354,023,046.83	314,725,462.14	9,849,424.30
2048	10	296,339,423.98	316,126,179.06	276,552,668.90	9,918,581.40
2048	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2048	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2049	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2049	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2049	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2049	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74

2049	5	287,934,958.46	307,164,255.86	268,705,661.06	9,639,142.49
2049	6	316,007,488.04	335,539,827.81	296,475,148.26	9,791,049.68
2049	7	324,929,772.27	344,513,856.69	305,345,687.84	9,816,987.92
2049	8	329,671,117.91	349,359,154.86	309,983,080.95	9,869,096.59
2049	9	334,298,420.96	353,950,057.00	314,646,784.92	9,850,849.77
2049	10	296,262,984.69	316,054,120.95	276,471,848.44	9,920,777.57
2049	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2049	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32
2050	1	304,107,979.92	323,859,811.01	284,356,148.82	9,901,074.92
2050	2	289,381,505.49	309,125,382.32	269,637,628.65	9,897,087.66
2050	3	285,660,533.47	305,468,243.78	265,852,823.16	9,929,085.71
2050	4	281,202,622.54	301,069,755.54	261,335,489.54	9,958,872.74
2050	5	287,865,620.18	307,093,980.50	268,637,259.87	9,638,672.75
2050	6	315,939,812.26	335,473,006.02	296,406,618.51	9,791,477.76
2050	7	324,863,759.00	344,449,452.22	305,278,065.78	9,817,794.36
2050	8	329,606,767.15	349,296,874.54	309,916,659.75	9,870,134.45
2050	9	334,235,732.71	353,889,758.63	314,581,706.79	9,852,047.76
2050	10	296,201,958.95	315,996,630.07	276,407,287.83	9,922,549.51
2050	11	275,575,024.60	295,205,794.34	255,944,254.85	9,840,390.04
2050	12	293,168,790.62	312,951,054.97	273,386,526.26	9,916,330.32

KU Primary--

Forecast excludes data from individually forecasted "Major Accounts" and is a combinat

Time of Day Primary Service
Power Service Primary

Variables:

KUBCDD - Billed Cooling Degree Days from LEX Blue Grass Airport
KUBHDD - Billed Heating Degree Days from LEX Blue Grass Airport
durables_ipi - KY Industrial Production Index for Durable Goods_IHS
Jan-Nov - Monthly dummy variables

Ordinary Least Squares Estimates			
SSE	2057548775	DFE	81
MSE	25401837	Root MSE	5040
SBC	1961.42299	AIC	1922.95777
MAE	3752.85696	AICC	1928.95777
MAPE	1.63789336	HQC	1938.50604
Durbin-Watson	1.6449	Regress R-Square	0.8701
		Total R-Square	0.8701

Parameter Estimates				
Variable	DF	Estimate	Standard Error	t Value
Intercept	1	197065	7670	25.69
KUBCDD	1	90.2147	16.4643	5.48
KUBHDD	1	16.994	6.3948	2.66
durables_ipi	1	139.196	44.7637	3.11
jan	1	-7409	3043	-2.43
feb	1	-6683	2799	-2.39
mar	1	-2263	2526	-0.9
apr	1	2148	3320	0.65
may	1	5883	4352	1.35
jun	1	12052	5781	2.08
jul	1	-2598	7275	-0.36
aug	1	2606	7347	0.35
sep	1	16535	6459	2.56

oct	1	8752	4655	1.88
nov	1	167.625	3242	0.05

tion of the following rates:

data and forecast

Approx
Pr > t
<.0001
<.0001
0.0095
0.0026
0.0171
0.0193
0.373
0.5194
0.1803
0.0402
0.722
0.7237
0.0123

0.0637
0.9589

KU Retail Transmission Service (RTS)--

Forecast excludes data from individually forecasted "Major Accounts"

Variables:

KUBCDD - Billed Cooling Degree Days from LEX Blue Grass Airport
KUBHDD - Billed Heating Degree Days from LEX Blue Grass Airport
IHS_Smooth- IHS KY Mining Index_Smoothed

```
/*19 BP Mod Smooth*/
PROC AUTOREG DATA=KURTS_adj;
MODEL adjKURTS = KUBCDD KUBHDD IHS_Smooth /nlag=12;
/* KUBHDD mining_ihs mining_gsp jan feb mar apr may jun aug sep oct nov dec*/
OUTPUT OUT = outKURTSW Pred = PredKURTSW resid = ResidKURTSW;
RUN;
```

Yule-Walker Estimates			
SSE	541772716	DFE	80
MSE	6772159	Root MSE	2602
SBC	1840.43969	AIC	1799.41
MAE	1804.27486	AICC	1806.3
MAPE	5.31698152	HQC	1815.99
Durbin-Watson	1.6318	Adjusted R-Sq	0.4455
		Total R-Sq	0.8988

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > t
Intercept	1	2704	6297	0.43	0.6687
KUBCDD	1	-3.6264	3.3687	-1.08	0.2849
KUBHDD	1	4.4978	1.3239	3.4	0.0011
IHS_Smooth	1	37376	7524	4.97	<.0001

Ordinary Least Squares Estimates			
SSE	1443760011	DFE	92
MSE	15693044	Root MSE	3961
SBC	1877.20576	AIC	1866.95
MAE	3207.40236	AICC	1867.39
MAPE	9.56043287	HQC	1871.09
Durbin-Watson	0.5811	Adjusted R-Sq	0.7303
		Total R-Sq	0.7303

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > t
Intercept	1	4399	2244	1.96	0.053
KUBCDD	1	-5.0896	4.4058	-1.16	0.251
KUBHDD	1	4.3307	1.7007	2.55	0.0125
IHS_Smooth	1	37309	2619	14.25	<.0001

Estimates of Autocorrelations						
Lag	Covariance	Correlation	2	1	0	1 2 3 4 5 6 7 8 9 1
0	15039167	1				*****
1	10376074	0.68994				*****
2	8613277	0.57272				*****
3	7881978	0.5241				*****
4	7642668	0.50818				*****
5	6938495	0.46136				*****
6	6488326	0.43143				*****
7	5388520	0.3583				*****
8	5325744	0.35413				*****
9	4870228	0.32384				*****
10	4089882	0.27195				*****
11	3919527	0.26062				*****
12	6184105	0.4112				*****

Preliminary MS 6306913

Estimates of Autoregressive Parameters			
Lag	Coefficient	Standard Error	t Value
1	-0.504049	0.10471	-4.81

2	-0.101809	0.11786	-0.86
3	-0.060819	0.1179	-0.52
4	-0.095225	0.1181	-0.81
5	-0.042482	0.11854	-0.36
6	-0.052996	0.11809	-0.45
7	0.101352	0.11809	0.86
8	-0.02679	0.11854	-0.23
9	0.0065	0.1181	0.06
10	0.09805	0.1179	0.83
11	0.140881	0.11786	1.2
12	-0.350552	0.10471	-3.35