Technical Appendix 1

FORECAST MODEL DESCRIPTIONS, EQUATIONS, STATISTICAL TEST RESULTS & FORECAST RESULTS

Kentucky Utilities Company

2005 IRP

Kentucky
Utilities
Company

A SUBSIDIARY OF
LG&ENERGY

2005 – 2019
Energy Forecast

April 2005

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KENTUCKY UTILITIES COMPANY
ENERGY FORECAST
2005-2019

INTRODUCTION

Kentucky Utilities Company provides electrical service to customers in seventy-seven counties throughout the Commonwealth of Kentucky and to customers in five counties in Southwestern Virginia through its Old Dominion Power operating unit. In addition, the Company sells electricity to 11 municipally-owned utilities in Kentucky as well as Berea College. The Company serves a diverse group of retail customer classes, which includes Industrial, Commercial, Residential, Mine Power, and Street Lighting.

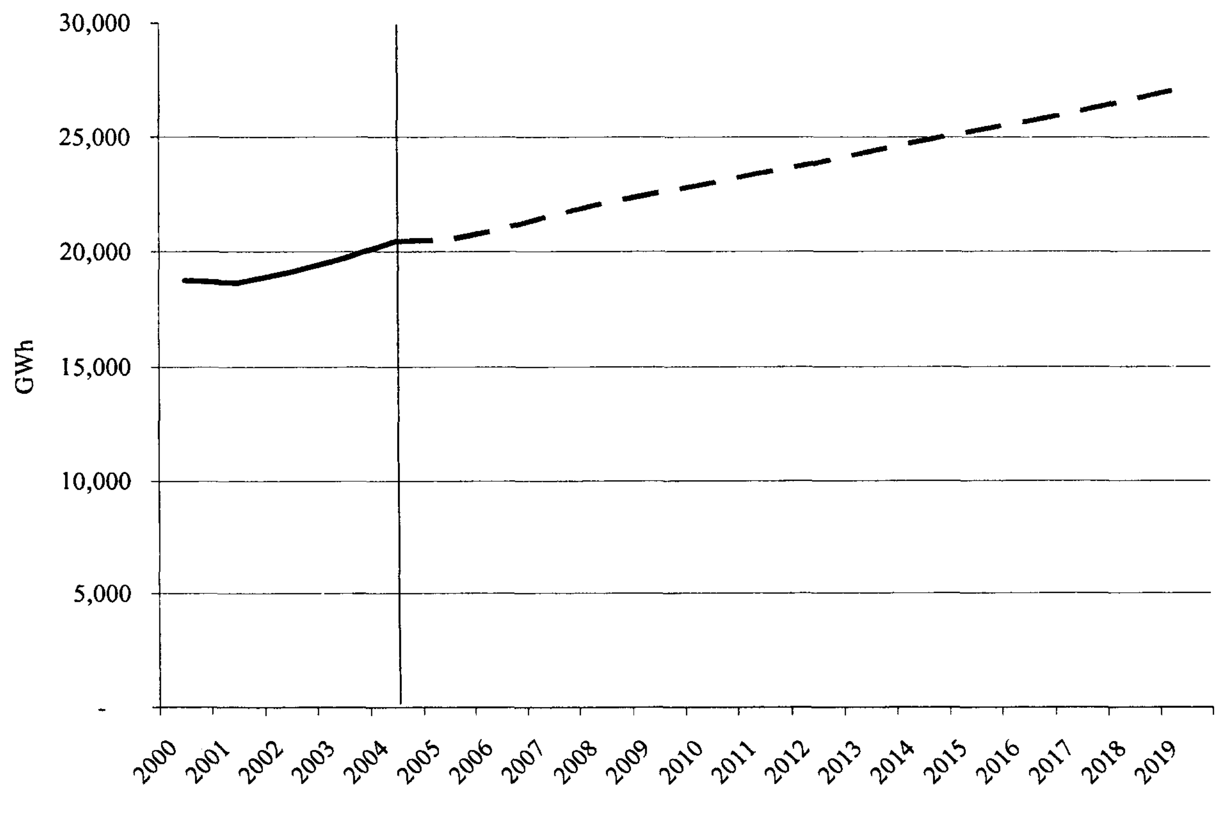
Forecasting energy sales is essential for the planning and control of the Company's operations. The forecast becomes the basis for decisions regarding the construction of facilities such as power plants, transmission and distribution lines, and substations, all of which are key to providing reliable service. The energy forecast also becomes the basis for estimating revenues, which in turn are used in the development of the annual operating budget and the five-year financial forecast.

As vital as the information is, the energy forecast remains an estimate. The desired outcome of the forecasting process is a *reasonable* estimate upon which strategies and goals can logically be based so that the Company's mission of providing adequate and reliable electric service to its customers at the lowest reasonable cost can be attained.

2005-2019 ENERGY FORECAST SUMMARY

Graph KU-1 presents weather-normalized sales since 2000 along with the 2005-2019 energy forecast. Over 2000-2004, weather-normalized sales have grown at an average annual rate of 2.2 percent. Recent growth has been most pronounced in the Residential sector, which has grown at an average annual rate of 3.3 percent. This is fueled by the All-Electric, or FERS class, which increased at a compound average growth rate of 4.1 percent over the 2000–2004 period. The RS class, which is the non All-Electric Residential class, experienced an annual increase of 2.4 percent over that same period. Both Commercial and Industrial sales increased at annual rates of 1.9 percent and 2.2 percent, respectively. Virginia retail sales growth averaged 1.8 percent annually, and Wholesale sales have grown at an average 1.5 percent over the 2000 – 2004 period.

GRAPH: KU - 1
KU TOTAL ENERGY SALES: 2000-2004 WEATHER-NORMALIZED ACTUALS AND 2005-2019 FORECAST



Total KU energy sales over the first five years (2005 to 2009) of the forecast are predicted to rise at a 2.4 percent average annual rate. The forecast averages 2.1 percent growth over the fifteen-year forecast horizon. Table KU-1 shows the five-year and fifteen-year forecast average annual growth rates for each class of sales, along with each class's share of 2004 weather-normalized sales.

TABLE: KU - 1
FIVE- AND FIFTEEN-YEAR GROWTH RATES BY SECTOR AND 2004 CLASS PERCENTAGE OF TOTAL SALES

	Percent of 2004 Sales	**Percent Annual Growth Rate 2005-2009**	**Percent Annual Growth Rate 2005-2019**
Class			
RETAIL	**90.4**	**2.4**	**2.1**
KENTUCKY	**85.9**	**2.5**	**2.1**
Residential	29.2	1.7	1.9
RS	*13.6*	*0.5*	*0.9*
FERS	*15.5*	*2.8*	*2.7*
Commercial	27.4	3.2	2.5
Industrial	26.7	2.4	1.8
General Industrial	*16.1*	*3.5*	*2.8*
Major Industrials	*10.6*	*1.1*	*0.3*
Coal Mining (MP, LMP)	*2.0*	*0.8*	*0.6*
Lighting (COLT, St. Lt.)	0.6	2.9	2.3
VIRGINIA	**4.5**	**1.3**	**1.2**
WHOLESALE	**9.6**	**2.2**	**2.0**
TOTAL COMPANY	**100.0**	**2.4**	**2.0**

Table KU-2 presents the KU Forecast values for total customers and sales with their corresponding annual growth rates through 2019. Sales increase by 2.4 percent, on average, through 2009 and by 2.0 percent on average over the full fifteen-year horizon.

TABLE: KU - 2
TOTAL KU CUSTOMER AND BILLED SALES FORECASTS

YEAR	CUSTOMERS	% GROWTH IN CUSTOMERS	ENERGY SALES (GWh)	% GROWTH IN ENERGY SALES
2005	518,045	1.3%[1]	20,506	0.2%[2]
2006	524,417	1.2%	20,945	2.1%
2007	530,617	1.2%	21,558	2.9%
2008	536,646	1.1%	22,102	2.5%
2009	542,598	1.1%	22,551	2.0%
2010	548,544	1.1%	22,968	1.8%
2011	554,169	1.0%	23,444	2.1%
2012	559,781	1.0%	23,868	1.8%
2013	565,346	1.0%	24,357	2.0%
2014	570,884	1.0%	24,829	1.9%
2015	576,422	1.0%	25,281	1.8%
2016	581,980	1.0%	25,697	1.6%
2017	587,541	1.0%	26,160	1.8%
2018	593,109	0.9%	26,687	2.0%
2019	598,697	0.9%	27,198	1.9%

1 Based on a customer count of 511,514 for 2004 that excludes lighting

2 Based on 2004 weather-normalized sales of 20,458 GWh on an as-billed basis

Over the first five years of the Energy Forecast, sales growth by sector is predicted to be fairly balanced. Kentucky Retail Residential sales are predicted to increase at a 1.7 percent annual rate from 2005-2009. Residential growth comes partly from customer growth, but primarily from continued growth in use-per-customer. Kentucky Retail Commercial sales are forecast to increase at a 3.2 percent annual rate from 2005-2009, with an increase in the number of customers being the primary driver of growth. Kentucky Retail Industrial sales are projected to average 2.4 percent growth. Sales under the Mine Power rate are expected to increase at an average annual rate of only 0.8 percent over the short run. Virginia sales are forecast to average 1.3 percent, and Wholesale sales are forecast to grow at 2.2 percent on average over the 2005-

2009 period. From 2005 to 2009, total sales are forecast to increase by 2,045 GWh, and by 6,691 GWh from 2005-2019.

KEY CHANGES/DRIVERS IN THE FORECAST

Changes in the Energy Forecast are driven by the following factors:

- updating the historical period used in the model estimation process;
- changes in the forecast of normal weather;
- changes to forecasts of the economic and demographic variables used to develop the forecast.

Sales History

The 2005 IRP forecast was completed in January 2004 and took into account the actual sales performance through October 2003.

Changes in Weather Assumptions

To forecast electricity sales, assumptions must be made regarding weather conditions over the forecast horizon. KU assumes a twenty-year (1983-2002) average of heating degree days (HDD) and cooling degree days (CDD) to be a reasonable representation of the likely weather conditions over the forecast horizon. Lexington, Kentucky is the primary measuring point for weather data, although KU's geographic diversity requires the use of Bristol, Tennessee for the ODP portion of the forecast. For the 2005 Energy Forecast, 4,572 HDD (on a 65-degree base) have been assumed as representing normal heating weather. At the time of the 2002 IRP, the normal Lexington weather assumption was 4,562 HDD. For cooling, the 2005 Energy Forecast assumed 1,240 CDD (on a 65-degree base) for normal weather. At the time of the 2002 IRP, the normal Lexington weather assumption was 1,224 CDD.

Changes in Economic and Demographic Assumptions

National Macroeconomic Assumptions

Key assumptions used by the Companies as macroeconomic background for the energy sales forecast in the 2005 IRP are summarized below. A report from Global Insight detailing these assumptions is attached as part of Technical Appendix 4, 'Supporting Documents,' in Volume II.

1. *Trend Scenario:* At the time of the report, Global Insight assumed that the economy suffered no major mishaps or exogenous shocks. Economic output was forecast to grow smoothly, with actual output following potential output relatively closely.

2. *Demographics:* The population projection in the Global Insight trend scenario is consistent with the Census Bureau's 2000 "middle" projection for the U.S. population. Based on specific assumptions about immigration, fertility and mortality rates, U.S. population was forecasted to achieve average annual growth of 0.9 percent from 2005 to 2019.

3. *Energy:* Except for temporary spikes, Global Insight forecasted that the average price of foreign oil would remain below $31 per barrel until 2009. In the longer term, GI projected that scarcity would begin to drive the real price of imported oil upward to $45 a barrel in 2019.

4. *Output:* Annual real U.S. Gross Domestic Product was projected to average 3.1 percent growth over the fifteen-year period from 2005 to 2019.

Kentucky Utilities Service Territory Economic and Demographic Forecasts

Service territory level economic and demographic forecasts are derived for KU via the STEM (Service Territory Econometric Model). STEM was developed by the Center for Business and Economic Research (CBER) at the University of Kentucky. It is an employment-driven model in which forecasts of sector level value-added, employment, income, and population are generated for several regions that correspond to KU service territories, including Old Dominion Power. The national forecast received from Global Insight provides the inputs for CBER to generate a state forecast. This forecast in turn provides the inputs to five regional models specific to geographic areas that influence economic activity in the KU service area.

Demographic Forecasts

Demographic forecasts of population and households are critical to the accurate forecasting of Residential sales and indirectly contribute to the forecasting of Commercial sales through their influence on Commercial customer growth. KU utilizes the population and household forecast generated by the STEM model.

Population forecasts in the STEM model were made using a cohort-component model, the same type of model utilized by the Bureau of the Census. The model utilizes birth, survival, and migration rates to forecast population. The STEM model uses birth and survival data from the Center for Urban and Economic Research (CUER) at the University of Louisville. The major difference between the Bureau of Census and STEM approaches is in the estimation of migration rates. Migration behavior in the Census models is based on past migration rates, while migration behavior in STEM is a function of economic growth in the service territory. The forecasts of population are developed by county, and as such are an estimate of population specific to KU's service territory.

Population forecasts from the STEM call for annual population growth to average 0.7 percent over the next five years in KU's service territory counties, and to continue to average 0.8 percent growth over the fifteen-year forecast horizon. As nationally, the KU service territory is forecast to have an aging population. Since older persons tend to live in smaller households, this aging of the population implies fewer persons per household. This drop in household size implies that the number of households should grow even more quickly than the population. This is the case in the 2005 Energy Forecast, with KU service territory households predicted to rise at a 1.3 percent annual rate in the short term, and a 1.1 percent annual rate through 2019.

ENERGY FORECAST DESCRIPTION

KENTUCKY RETAIL RESIDENTIAL

The Residential sales forecast is developed in two parts:

- a projection of the number of customers by rate class
- a projection of use-per-customer by rate class.

METHODOLOGY

CUSTOMER FORECAST METHODOLOGY

The 2005 KU Retail Residential customer forecast is developed using a combination of medium- and long-term modeling. The primary driver for each model is the KU service territory population forecast converted to a service territory household forecast. Customer numbers are linked to household numbers to develop the forecast.

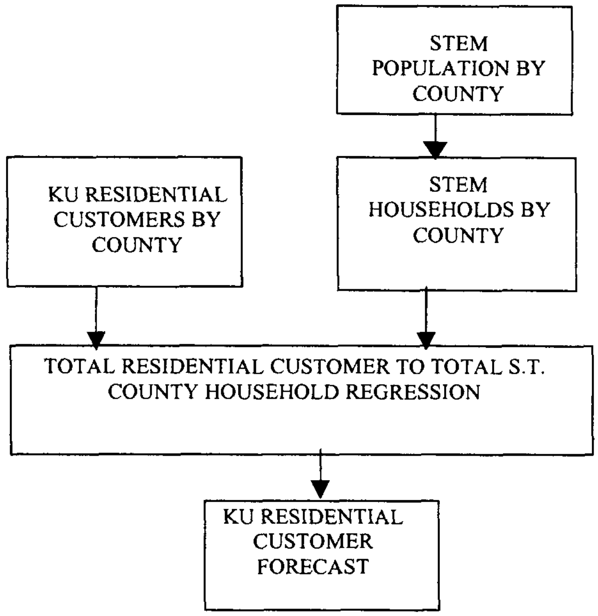
The forecast of total Residential customers begins with a county-level population forecast that is generated using STEM, which utilizes birth and mortality rate data from the Center for Urban and Economic Studies (CUER) at the University of Louisville.

Migration is also an important factor in the Kentucky population forecast. The native population increase for Kentucky is declining because birth rates are stabilizing or declining, and death rates are increasing as the population ages. Migration has also proven more challenging to forecast than the components of the native growth rate. Historically, Kentucky has witnessed periods of out-migration of young adults as well as influxes of workers and families or the settling of retirees.

From the population forecast, the STEM develops a forecast of households by county. This forecast depends upon assumed trends in population per household at the county level derived from the CUER.

For the medium-term model, monthly customer numbers from January 1998 through October 2003 are regressed against estimated monthly service territory county household numbers. While every customer is assumed to represent a household, the household series in the model is at an aggregated county level, thus the customer series is regarded as a share of the total county households, rather than as a one-to-one relationship. An autoregressive disturbance term of order 1 (AR(1) correction) is added to account for serial correlation. Figure KU-1 illustrates the process used to forecast Residential customers.

FIGURE: KU - 1
RESIDENTIAL CUSTOMER MODEL



Customer numbers are forecast using a model that relates increases in the number of customers to growth in the number of households in the Company's service territory. These projected customers are apportioned between the All-Electric (FERS) and non-All-Electric (RS) rate classes through the use of a customer allocation model. The rate class disaggregation accounts for differences in usage levels. In the customer allocation model, a discrete choice modeling framework is used to derive an estimate of the net annual change in All-Electric households. The results are then calibrated to the actual net annual change in FERS customers over the last few years. The net annual change in RS customers is calculated by subtracting the FERS customer forecast from the total Residential customer forecast.

USE-PER-CUSTOMER FORECAST METHODOLOGY

Statistically-adjusted end-use (SAE) models are used to model monthly use-per-customer for each Residential class. These combine the rigor of an econometric model that relates monthly usage to weather, seasonal variables, and economic conditions, and also incorporate key aspects of traditional end-use modeling. Using these models, KU Residential monthly consumption per customer is related to heating use, cooling use, miscellaneous use, and seasonal binary variables. Heating use is dependent upon heating degree-days, heating equipment saturation levels, heating equipment operation efficiencies, average household size, household income, and energy prices. Cooling use is constructed similarly in that it is dependent upon cooling degree-days, cooling equipment saturations, cooling equipment operation efficiencies, average household size, household income, and energy prices. Other use is a monthly estimate of non-weather related sales and is derived from appliance and equipment saturation levels, appliance efficiency levels, average number of billing days per month, average household size, household income, and energy prices. Finally, seasonal binary variables are added to capture variations in energy consumption that are not reflected in the other independent variables. For example, the model does not explicitly include lighting and the winter binary variables pick up the extra lighting used during the winter. In addition, the seasonal binary variables pick up secondary space heating that is used but not explicitly modeled. The result is a forecast of monthly average use-per-customer. This average monthly usage is then multiplied by monthly class customers and summed annually. The result is a total annual sales forecast for each Residential class.

Forecast Results - Summary

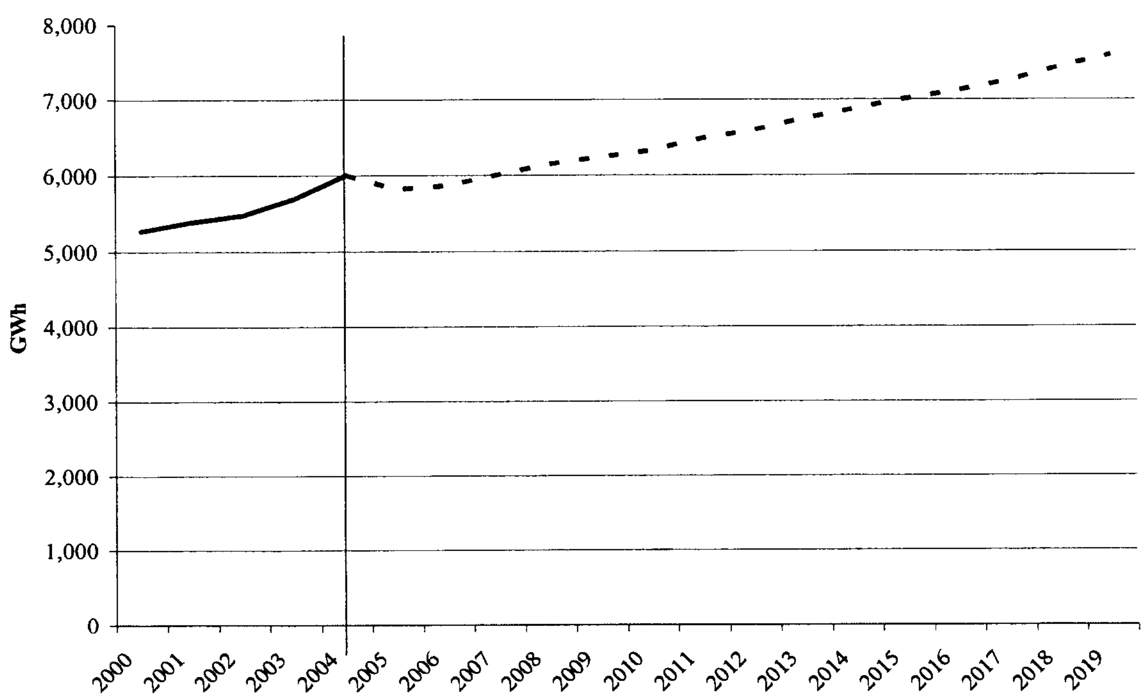
The forecasts of Residential customers, average use-per-customer, and sales for the total Kentucky Retail Residential sector are shown in Table KU-3. Graph KU-2 shows annual historic and forecasted sales. Residential sales grew at a compound average growth rate of 3.3 percent from 2000 to 2004 on a billed weather-normalized basis. The average annual growth rate forecast for total Residential sales is 1.7 percent for 2005 to 2009 and 1.9 percent for 2005 to 2019. The FERS class energy is forecast to grow at 2.8 and 2.7

percent through 2005 and 2019, respectively, while the RS class is forecast to grow at a significantly lower rate (0.5 and 0.9 percent, respectively). This is due to low growth in both the number of RS customers and use-per-customer -- 0.2 and 0.3 percent annual growth respectively in the medium term (2005-2009), and 0.2 and 0.6 percent in the longer term (through 2019).

TABLE: KU - 3
TOTAL KY-RETAIL RESIDENTIAL FORECAST

YEAR	CUSTOMERS	SALES (GWh)	kWh/CUSTOMER
2005	401,985	5,817	14,471
2006	406,549	5,867	14,432
2007	410,967	6,005	14,611
2008	415,241	6,146	14,802
2009	419,462	6,235	14,864
2010	423,682	6,322	14,922
2011	427,961	6,484	15,152
2012	432,218	6,590	15,248
2013	436,433	6,747	15,460
2014	440,625	6,880	15,615
2015	444,822	7,011	15,762
2016	449,039	7,119	15,854
2017	453,259	7,253	16,002
2018	457,488	7,437	16,257
2019	461,739	7,597	16,452

GRAPH: KU - 2
TOTAL KY-RETAIL RESIDENTIAL SALES HISTORY & FORECAST (GWh)
(2000-2004 Weather Normalized Actual)



RESIDENTIAL
RS CLASS SUMMARY

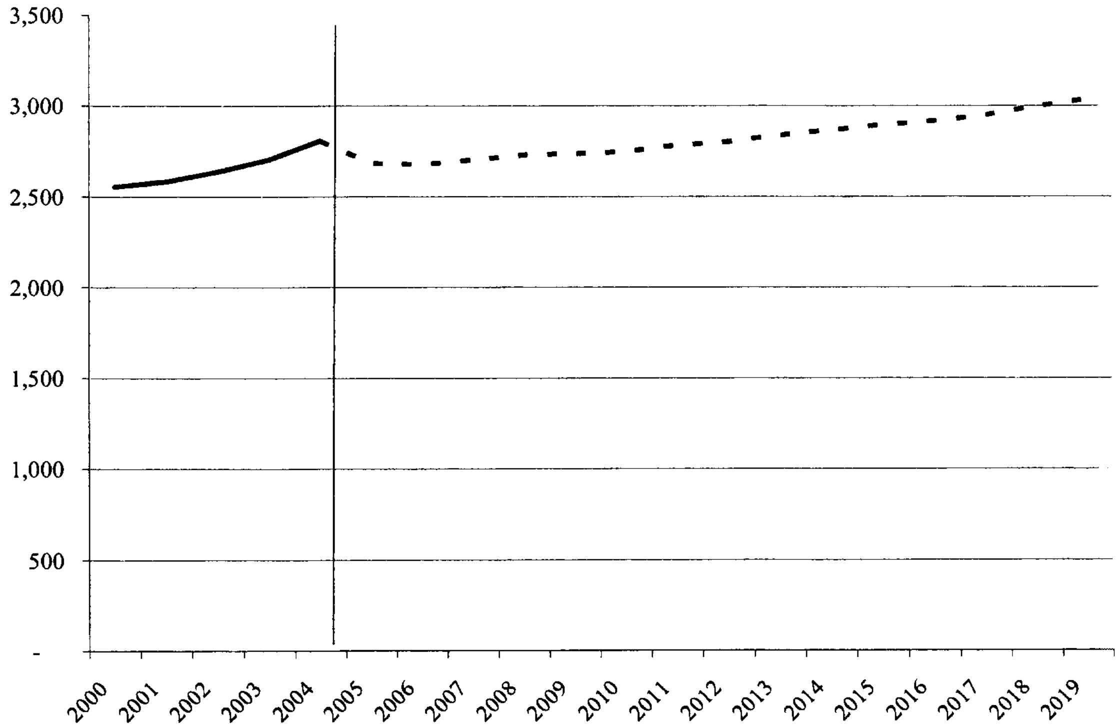
A summary of the forecast of customers, average use-per-customer and sales for the Non All-Electric (RS) class is shown in table KU-4 [1]. Weather-normalized historical and forecasted sales are shown graphically in Graph KU-3. From 2000 to 2004, weather-normalized sales grew at a compound average growth rate of 2.4 percent. The 2005 to 2009 average annual growth rate forecast for sales is 0.5 percent. For 2005 to 2019, the annual growth rate for sales is 0.9 percent.

TABLE: KU - 4
KY-RETAIL RS CLASS FORECAST

YEAR	CUSTOMERS	SALES (GWh)	USE-PER-CUSTOMER
2005	226,491	2,685	11,853
2006	226,966	2,677	11,797
2007	227,439	2,702	11,880
2008	227,899	2,729	11,975
2009	228,389	2,737	11,987
2010	228,897	2,747	12,003
2011	229,450	2,784	12,132
2012	230,020	2,801	12,180
2013	230,606	2,838	12,305
2014	231,199	2,866	12,399
2015	231,810	2,895	12,490
2016	232,444	2,917	12,552
2017	233,089	2,949	12,652
2018	233,754	2,997	12,821
2019	234,439	3,037	12,955

1 The use-per-customer forecast is on a monthly basis and the annual forecast is obtained by summing the monthly values. This yields a slightly different value to that obtained by dividing the total annual energy sales by the average annual number of customers.

GRAPH: KU - 3
KY-RETAIL RS SALES (GWh)
(2000-2004 Weather Normalized Actual)



RESIDENTIAL
FERS CLASS SUMMARY

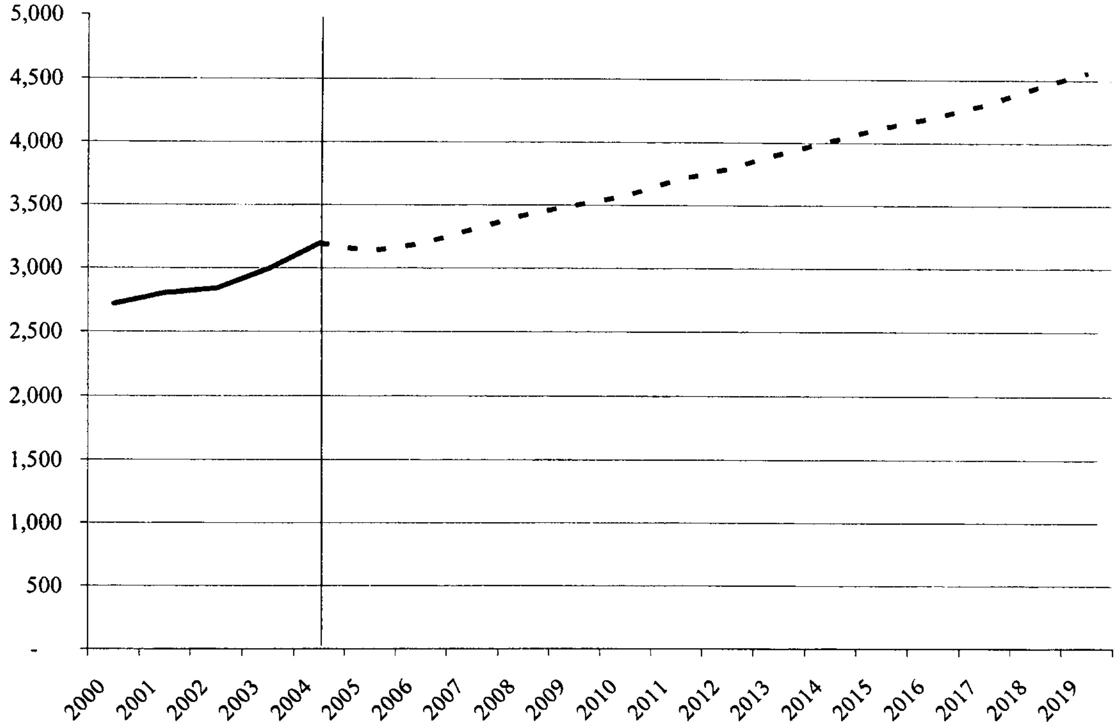
A summary of the forecast of customers, average use-per-customer and sales for the All-Electric (FERS) class is shown in Table KU-5[2]. Historical and forecast sales are shown graphically in Graph KU-4. From 2000-2004, FERS sales grew at an average growth rate of 4.1 percent on a weather-normalized basis. The 2005-2009 forecast average annual growth rate for sales is 2.8 percent. For 2005-2019, the annual growth rate for sales is 2.7 percent.

TABLE: KU - 5
KY-RETAIL FERS CLASS FORECAST

YEAR	CUSTOMERS	SALES (GWh)	USE-PER-CUSTOMER
2005	175,494	3,133	17,866
2006	179,583	3,190	17,779
2007	183,527	3,303	18,012
2008	187,342	3,417	18,257
2009	191,073	3,497	18,318
2010	194,785	3,575	18,369
2011	198,511	3,701	18,658
2012	202,199	3,789	18,754
2013	205,827	3,910	19,010
2014	209,426	4,014	19,181
2015	213,011	4,116	19,339
2016	216,595	4,202	19,415
2017	220,169	4,304	19,568
2018	223,734	4,441	19,865
2019	227,300	4,559	20,076

2 The use-per-customer forecast is on a monthly basis and the annual forecast is obtained by summing the monthly values. This yields a slightly different value to that obtained by dividing the total annual energy sales by the average annual number of customers.

GRAPH: KU - 4
KY-RETAIL FERS SALES HISTORY & FORECAST (GWh)
(2000-2004 Weather Normalized Actual)



RESIDENTIAL CUSTOMER MODEL

Results

The KU Kentucky Retail medium-term customer numbers equation is shown below (the number in parenthesis indicates the t-statistic)

$$\text{KUKYSTCM} = \underset{(8.06)}{52{,}989} + \underset{(49.83)}{0.360}\ \text{HDKUM}$$

Where:

KUKYSTCM = Monthly KU-KY Retail Service Territory Customers
HDKUM = Monthly Households in KU-KY served counties

Given the nature of the data, a Durbin-Watson test for serial correlation among the error terms was included and indicated the presence of negative serial correlation, so a first-order autoregressive correction (AR(1)) was added. This takes the form,

$$\epsilon_t = \rho^* \epsilon_{t-1} + \nu_t \qquad \text{and } \nu_t \sim IN(0,\sigma^2)$$

Where

ρ = measures the correlation structure of the errors

ν_t = presumed to be serially uncorrelated and normally distributed.

In the KU model,

$$\epsilon_t = -0.36^* \epsilon_{t-1} + \nu_t$$

Model Statistics:

Adj. R^2	= 0.98
D-W Test	= 1.24
D-W Test after AR(1)	= 2.09

For the long-term forecast, a regression of annual customer numbers against service territory households is utilized, with the incremental growth after 2009 applied to the forecast for 2009. This model was developed using historical annual customers and households from 1979 through October 2003. The Kentucky Residential long-term annual customer equation is shown below (the number in parentheses indicates the t-Statistic).

KUKYRSTCA = 45,299 + 0.369(HDKUA)
(27.44)

Where:

KUKYRSTCA = Annual KU-KY Retail Service Territory Customers
HDKUA = Annual KU-KY Service Territory Households

Model Statistics:

Adj. R^2 = 0.99
AR(2) PARMs:
$\rho_1 = -1.19$
$\rho_2 = 0.41$

t-test of ρ_1 = -5.82
t-test of ρ_2 = 2.02

DW Test after AR(1) = 1.2
DW Test after AR(2) = 1.8

CUSTOMER FORECAST RESULTS

The rate of population growth in the KU Service Territory is forecast to be below the national average over the next five years. Annual population growth is forecast to average 0.8 percent over the next fifteen years in the Kentucky Utilities Service Territory and 1.3 percent nationally. This is a continuation of past trends where population growth in Kentucky has lagged the national average.

From 2000 to 2004, the population of the 77 counties KU serves at retail increased at an estimated average annual rate of 0.7 percent. The forecast of household growth averages 1.1 percent over the 2005-2019 period. Over the same period, KU Residential customers grow at an average rate of 1.0 percent.

For the medium-term forecast, 2005-2009, the household forecast annual growth rate is 1.2 percent while the Residential customer average annual growth rate forecast is 1.0 percent. Graph KU-5 shows actual and forecast numbers of customers, while Table KU-6 shows the relationship between the number of service territory households and the number of customers.

GRAPH: KU - 5
KU KY-RETAIL RESIDENTIAL CUSTOMERS HISTORY & FORECAST

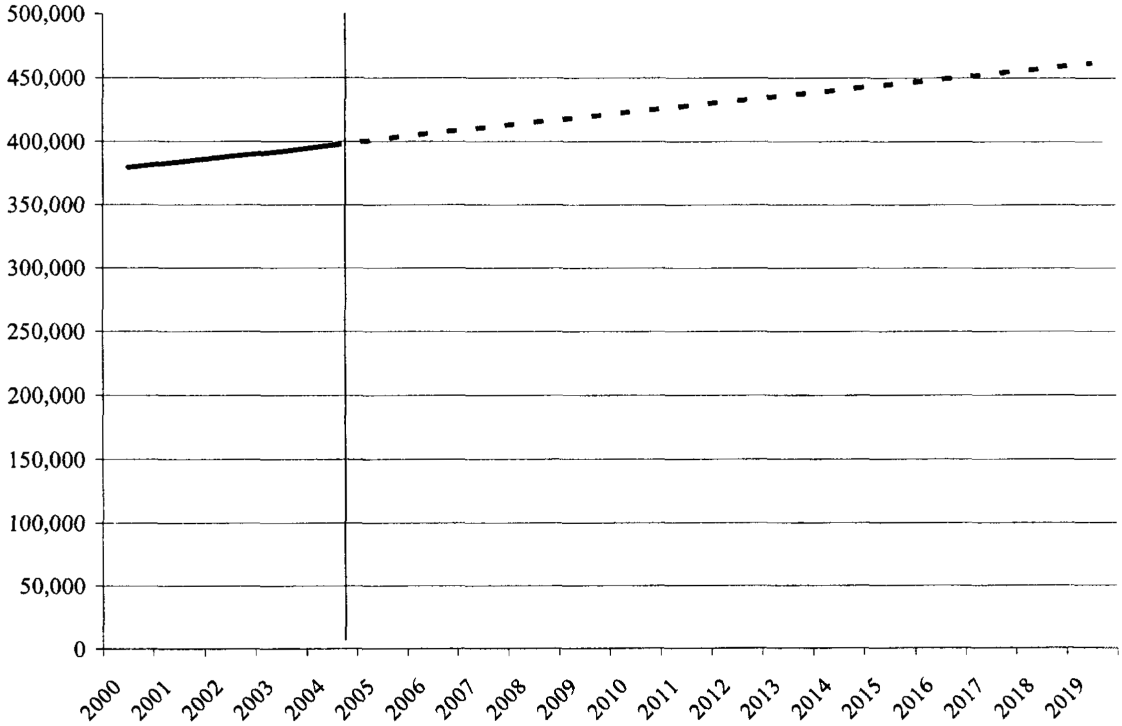


TABLE: KU - 6
TOTAL KU KY-RETAIL SERVICE TERRITORY HOUSEHOLDS AND RESIDENTIAL CUSTOMERS HISTORY & FORECAST

YEAR	RESIDENTIAL CUSTOMERS	SERVICE TERRITORY HOUSEHOLDS
2000	379,615	906,486
2001	383,814	918,399
2002	388,215	929,978
2003	391,911	942,941
2004	396,924	956,330
2005	401,985	969,362
2006	406,549	982,047
2007	410,967	994,316
2008	415,241	1,006,198
2009	419,462	1,017,667
2010	423,682	1,029,134
2011	427,961	1,040,763
2012	432,218	1,052,332
2013	436,433	1,063,784
2014	440,625	1,075,175
2015	444,822	1,086,580
2016	449,039	1,098,040
2017	453,259	1,109,507
2018	457,488	1,121,001
2019	461,739	1,132,552

RESIDENTIAL CUSTOMER ALLOCATION BY RATE CLASS

KU distinguishes between two types of Residential customers, Full-Electric Residential service (FERS) and general Residential service (RS). Once the forecasted net annual change in Residential customers is derived, the forecast is allocated by rate class. Discrete choice logic embedded in EPRI's Residential End-Use Energy Planning System (REEPS) model is used to forecast FERS customers. This discrete choice methodology specifically accounts for multiple factors such as:

- Influence of space cooling preferences on heating equipment choice
- Impact of capital and operating costs on HVAC system choice
- Impact of changing efficiency standards

The REEPS model contains discrete choice equations for each end-use that incorporate numerous factors including those mentioned above. Choice equations are maintained for eighteen HVAC systems and eight household appliances. The choice equations are used to construct a "multinomial" share system for all end-uses. Each equation relates the market share of an end-use to its economic attractiveness relative to that of alternative technologies. This reflects the notion that customer choice is dependent upon the available alternatives. These equations incorporate projected changes in energy prices, efficiency standards, equipment capital costs, structure characteristics, household income, natural gas availability, household decay rates, and other household demographics to derive the relative attractiveness of the competing end-use technologies. The equations are calibrated to known market shares for a base year and the first forecast year. Appliance market shares are estimated using the 1997 KU appliance saturation survey. A calibration term is estimated in the calibration process and represents an estimate of all the non-economic factors affecting market share of an appliance. Market share of each end-use for three housing types, single family, multifamily, and mobile home, are calculated by the discrete choice equations. Before entering the rate class allocation process, the total customer forecast is allocated to a housing type using a three-year historic average percentage of each.

The modeling approach forecasts FERS customers using the REEPS model in an iterative process. An FERS customer is defined as a household with electric space heating and electric water heating. This definition was formulated after a review of Residential survey results indicated virtually all customers with both electric space heating and electric water heating were on the FERS rate.

In the first iteration, the REEPS model predicts the percentage of Residential customers that would select electric space heating. HVAC system conversions are part of this electric space heating saturation forecast. For modeling purposes, all conversions to electric space heating are assumed to be heat pumps. It is also assumed that households will not consider converting their space heating system within eight years. Then the REEPS-forecasted percentage of electric space heating customers is multiplied by the total Residential customer forecast for each housing type. The resulting customer forecast is used as an input to a second REEPS model. This model incorporates a database of households with electric space heating and is used to predict the percentage of customers with electric space heating that will also select electric water heating. The forecasted electric water heating saturations from the second model are multiplied by the electric space heating customer forecast. The result represents the FERS new customer forecast. Subtracting the FERS customer forecast from the total Residential customer forecast derives new RS customers. Figure KU-2 provides an overview of the REEPS iterative process.

FIGURE: KU - 2
REEPS ALL ELECTRIC CUSTOMER FORECASTING APPROACH

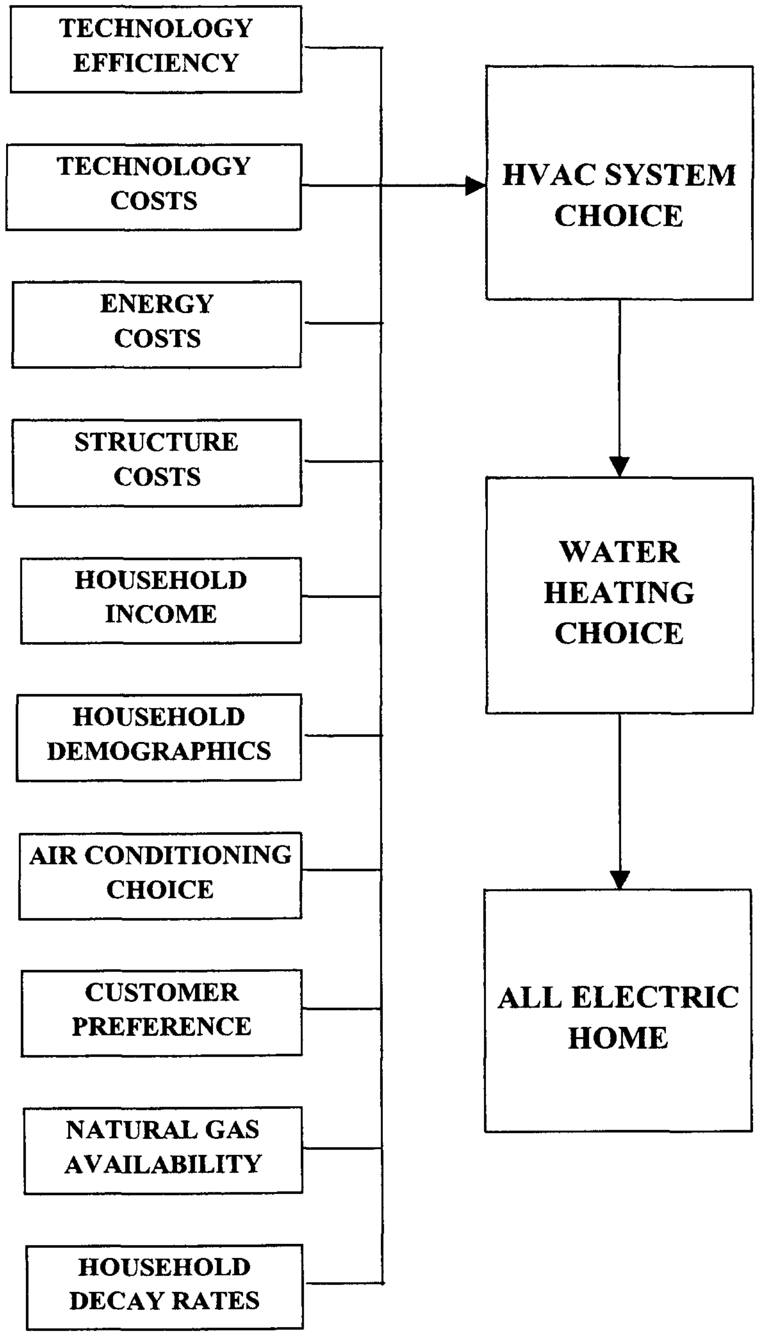


Table KU-7 shows the Residential customer forecast by rate class. FERS customers are forecast to increase at an annual rate of 2.2 percent from 2005-2009 and 1.9 percent from 2005-2019. Over the 2005-2019 period, RS customers are forecast to increase at an average annual rate of 0.2 percent.

TABLE: KU - 7
FORECAST OF RESIDENTIAL CUSTOMERS BY CLASS

YEAR	RS CUSTOMERS	FERS CUSTOMERS	TOTAL CUSTOMERS
2005	226,491	175,494	401,985
2006	226,966	179,583	406,549
2007	227,439	183,527	410,967
2008	227,899	187,342	415,241
2009	228,389	191,073	419,462
2010	228,897	194,785	423,682
2011	229,450	198,511	427,961
2012	230,020	202,199	432,218
2013	230,606	205,827	436,433
2014	231,199	209,426	440,625
2015	231,810	213,011	444,822
2016	232,444	216,595	449,039
2017	233,089	220,169	453,259
2018	233,754	223,734	457,488
2019	234,439	227,300	461,739

RESIDENTIAL
STATISTICALLY ADJUSTED END-USE MODEL

Residential sales are forecast using a Statistically-Adjusted End-Use (SAE) Model methodology. Such a model combines an econometric model -- that relates monthly sales to weather, seasonal variables, and economic conditions -- with traditional end-use modeling. The SAE approach defines energy use as the sum of energy used by heating equipment, cooling equipment, and other equipment.

Heating use is dependent upon heating degree days, heating equipment saturation levels, heating equipment operation efficiencies, thermal integrity of homes, and average household size, average household income, and electric price. The heating variable is represented as the product of an annual equipment index and a monthly usage multiplier as illustrated below:

$$XHeat_{y,m} = HeatIndex_y * HeatUse_{y,m}$$

Where:

$XHeat_{y,m}$	=	Estimated heating energy use in year and month
$HeatIndex_y$	=	Annual index of heating equipment
$HeatUse_{y,m}$	=	Monthly usage multiplier

The Heating Index variable above is defined as a weighted average across equipment type of equipment saturation levels normalized by operating efficiency levels. Heating equipment modeled includes heat pumps, electric space heating, and electric furnaces. The saturation levels are generated from the Residential End-Use Energy Planning System (REEPS) database.[3] The REEPS model is based on a discrete choice framework and is used to estimate appliance shares. The appliance efficiencies are from Energy Information Administration (EIA) data. Formally, this heating equipment index is:

$$HeatIndex_y = \sum_{Type} Wgt^{Type} X \frac{\left[HeatShare^{Type}_y \Big/ Eff^{Type}_y \right]}{\left[HeatShare^{Type}_{by} \Big/ Eff^{Type}_{by} \right]}$$

Where:

3 REEPS was originally developed by Regional Economic Research (RER) as a contractor to the Electric Power Research Institute (EPRI). RER is now Itron.

$HeatShare^{Type}_{y}$	=	Share of heating appliance for each year
$HeatShare^{Type}_{by}$	=	Share of heating appliance in base year
Eff^{Type}_{y}	=	Efficiency of heating appliance for each year
Eff^{Type}_{by}	=	Efficiency of heating appliance in base year
Wgt^{Type}	=	Base year heating appliance energy divided by total Households in base year

The HeatUse variable defined above is impacted by the following exogenous variables: heating degree-days, household size, household income, and electric price. The heating degree-days are derived using daily high/low temperature observations from the Lexington, Kentucky weather station and a 65-degree base. A ramp function is employed to align the degree-days with billing data. The household size and average household income comes from the STEM data and the average price is generated internally and deflated by the CPI from Global Insight. The elasticities are generated externally by Itron. The HeatUse variable is defined as:

$$HeatUse_{y,m} = \left(\frac{HDD_{y,m}}{NormHDD}\right)\left(\frac{HHSize_{ym}}{HHSize_{by}}\right)^{0.25}\left(\frac{Income_{ym}}{Income_{by}}\right)^{0.20}\left(\frac{Price_{y,m}}{Price_{by}}\right)^{-0.30}$$

Where:

$HDD_{y.m}$	=	Heating Degree days in year and month
NormHDD	=	Normal value of annual heating degree days
$HHSize_{ym}$	=	Average household size in a year
$HHSize_{by}$	=	Average household size in a base year
$Income_{ym}$	=	Average real income per household in a year
$Income_{by}$	=	Average real income per household in base year
$Price_{ym}$	=	Average real price of electricity in year and month
$Price_{by}$	=	Average real price of electricity in base year

Cooling use is constructed similarly in that it is dependent upon cooling degree-days, cooling equipment saturations, cooling equipment operation efficiencies, and average household size, average household income, and electric energy prices. The cooling variable is represented as the product of an annual equipment index and a monthly usage multiplier as illustrated below:

$$XCool_{y,m} = CoolIndex_{y} * CoolUse_{y,m}$$

Where:

$XCool_{y,m}$	=	Estimated heating energy use in year and month

$CoolIndex_y$	=	Annual index of heating equipment
$CoolUse_{y,m}$	=	Monthly usage multiplier

The Cooling Index variable above is defined as a weighted average across equipment type of equipment saturation levels normalized by operating efficiency levels. Cooling equipment modeled includes heat pumps, room air conditioners, and central air conditioners. The saturation levels are generated from the REEPS database. The REEPS model is based on a discrete choice framework and is used to estimate appliance shares. The appliance efficiencies are from EIA data. Formally, this Cooling equipment index is:

$$CoolIndex_y = \sum_{Type} Wgt^{Type} \times \frac{\left[CoolShare^{Type}_{y} / Eff^{Type}_{y} \right]}{\left[CoolShare^{Type}_{by} / Eff^{Type}_{by} \right]}$$

Where:

$CoolShare^{Type}_{y}$	=	Share of cooling appliance for each year
$CoolShare^{Type}_{by}$	=	Share of cooling appliance in base year
Eff^{Type}_{y}	=	Efficiency of cooling appliance for each year
Eff^{Type}_{by}	=	Efficiency of cooling appliance in base year
Wgt^{Type}	=	Base year cooling appliance energy divided by total Households in base year

The CoolUse variable defined above is impacted by the following exogenous variables: cooling degree-days, household size, household income, and electric price. The cooling degree-days are derived using daily high/low temperature observations from the Lexington, Kentucky weather station and a 65-degree base. A ramp function is employed to align the degree-days with billing data. The household size and average household income comes from the STEM data and the average electric price is generated internally and deflated by the CPI from Global Insight. The elasticities are generated externally by Itron. The CoolUse variable is defined as:

$$CoolUse_{y,m} = \left[\frac{CDD_{y,m}}{NormCDD}\right] \left[\frac{HHSize_{ym}}{HHSize_{by}}\right]^{0.25} \left[\frac{Income_{ym}}{Income_{by}}\right]^{0.20} \left[\frac{Price_{y,m}}{Price_{by}}\right]^{-0.30}$$

Where:

$CDD_{y,m}$	=	Cooling Degree days in year and month
NormCDD	=	Normal value of annual cooling degree days
$HHSize_{ym}$	=	Average household size in a year
$HHSize_{by}$	=	Average household size in base year
$Income_{ym}$	=	Average real income per household in a year
$Income_{by}$	=	Average real price of electricity in year and month
$Price_{by}$	=	Average real price of electricity in base year

Other use is a monthly estimate of non-weather sales and is derived from appliance and equipment saturation levels, appliance efficiency levels, average number of billing days per month, average household size, average household income, and electric prices. The REEPS model generates the saturation rates for the non-weather sensitive appliances. The explanatory variable for other use is defined as follows:

$$XOther_{y,m} = OtherIndex_{y,m} * OtherUse_{y,m}$$

Where:

$XOther_{y,m}$	=	Estimated heating energy use in year and month
$OtherIndex_{y}$	=	Annual index of non heating or cooling equipment
$OtherUse_{y,m}$	=	Monthly usage multiplier

The OtherIndex variable embodies information about appliance saturation levels and efficiency levels. Like the heating and cooling indices, the data is from the REEPS database. The appliances modeled include refrigerators, washing machines, electric dryers, dishwashers, water heaters, microwaves, freestanding freezers, electric cooking stoves, and an other category. The equation is defined as follows:

$$OtherIndex_{y,m} = \sum_{Type} Wgt^{Type} X \frac{\left[Sat^{Type}{}_{y} / Eff^{Type}{}_{y} \right]}{\left[Sat^{Type}{}_{by} / Eff^{Type}{}_{by} \right]}$$

Where:

$Sat^{Type}{}_{y}$	=	Share of appliance type per year
$Sat^{Type}{}_{b}$	=	Share of appliance type in base year
$Eff^{Type}{}_{y}$	=	Efficiency of appliance per year
$Eff^{Type}{}_{by}$	=	Efficiency of appliance in base year

The OtherUse variable is impacted by the following exogenous variables: billing days, household size, household income and electric price. Billing days are defined as the number of billing days per month. The household size and average household income come from the

STEM data and the average electric price is generated internally and deflated by the CPI from Global Insight. The elasticities are generated externally by Itron. The OtherUse variable is defined as:

$$OtherUse_{y,m} = \left(\frac{BillingDays_{y,m}}{365}\right)\left(\frac{HHSize_{ym}}{HHSize_{by}}\right)^{0.46}\left(\frac{Income_{ym}}{Income_{by}}\right)^{.10}\left(\frac{Price_{y,m}}{Price_{by}}\right)^{-0.15}$$

Where:

$BillingDays_{y,m}$	=	Billing days per month
$HHSize_{ym}$	=	Average household size in a year
$HHSize_{by}$	=	Average household size in base year
$Income_{ym}$	=	Average real income per household in a year
$Income_{by}$	=	Average real income per household in base year
$Price_{y}$	=	Average real price of electricity in year and month
$Price_{by}$	=	Average real price of electricity in base year

RS Use-per-Customer

The result is a forecast of monthly average use-per-customer. A seasonal autoregressive correction (SAR(1)) was made to the equation for the RS class (12-month lag). The estimated equation is given by (the number in parenthesis indicates the t-statistic):

RS Class:

$$\text{Use-per-Customer} = \underset{(9.23)}{3.142 \cdot XHeat} + \underset{(20.46)}{1.020 \cdot XCool} + \underset{(16.68)}{0.100 \cdot XOther}$$

Where:

XOther	=	Other Use-per-Customer
XHeat	=	Heat Use-per-Customer
XCool	=	Cool Use-per-Customer

Model Statistics:

Adj. R^2	=	0.973
SAR(1) PARM	=	0.773
T-test of SAR(1)	=	11.47
DW Test after AR(1)	=	1.42

FERS Use-per-Customer

Using a similar model to that of the RS, the FERS class includes binary variables for Summer, January, February, and November 2002. The estimated equation is given by (the number in parenthesis indicates the t-statistic):

FERS Class:

$$\text{Use-per-Customer} = \underset{(35.057)}{1.596 * XHeat} + \underset{(13.192)}{1.528 * XCool} + \underset{(24.545)}{0.055 * XOther}$$

$$+ \underset{(3.551)}{137.845 * January} + \underset{(4.734)}{165.164 * February}$$

$$+ \underset{(2.735)}{102.605 * Summer} - \underset{(-1.862)}{133.849 * Nov02}$$

Where:

XOther	=	Other Use-per-Customer
XHeat	=	Heat Use-per-Customer
XCool	=	Cool Use-per-Customer
January	=	January Binary Variable
February	=	February Binary Variable
Summer	=	Summer Binary Variable
Nov02	=	November 2002

Model Statistics:

Adj. R^2	=	0.979
DW Test	=	2.027

RESIDENTIAL
RS CONSUMPTION OUTLOOK

The long-term outlook for the RS class forecast shows sales growth in both the winter and summer seasons. From 2000 to 2004, summer[4] use-per-customer grew at an annual rate of 2.3 percent on a weather-normalized basis. Summer use-per-customer is expected to decrease at an average annual rate of only -0.1 percent over the 2005 to 2009 period and increase at an average annual rate of 0.5 percent over the 2005 to 2019 period. The moderate growth reflects increasing efficiencies in air conditioning and refrigeration. The average efficiency of central air conditioning and heat pumps is increasing at an annual rate of 1.6 percent while the efficiencies of refrigerators and miscellaneous electric appliances are increasing at an annual rate of 3.0 percent and 2.7 percent, respectively.[5]

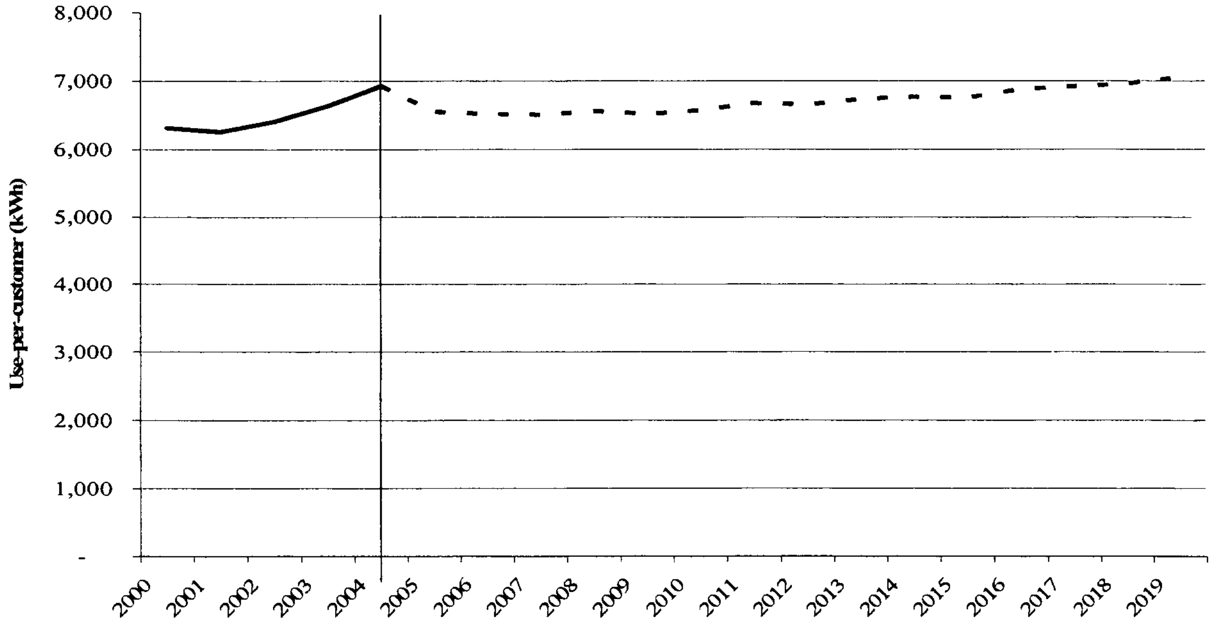
From 2000 to 2004, the actual winter use-per-customer grew at an annual rate of 3.6 percent. Winter use-per-customer is forecast to increase at an annual rate of 0.8 percent over the 2005-2009 period and to increase at an average annual rate of 0.8 percent for the 2005 to 2019 period. The number of customers, GWh sales and use-per-customer forecasts for the RS class are presented in summary annual form in Table KU-4 and Graph KU-3. Table KU-8 and Graphs KU-6 and KU-7 present the weather-normalized historical and forecast use-per-customer for the summer and winter seasons.

4 Summer includes May – October.
5 Efficiency data is from the EIA.

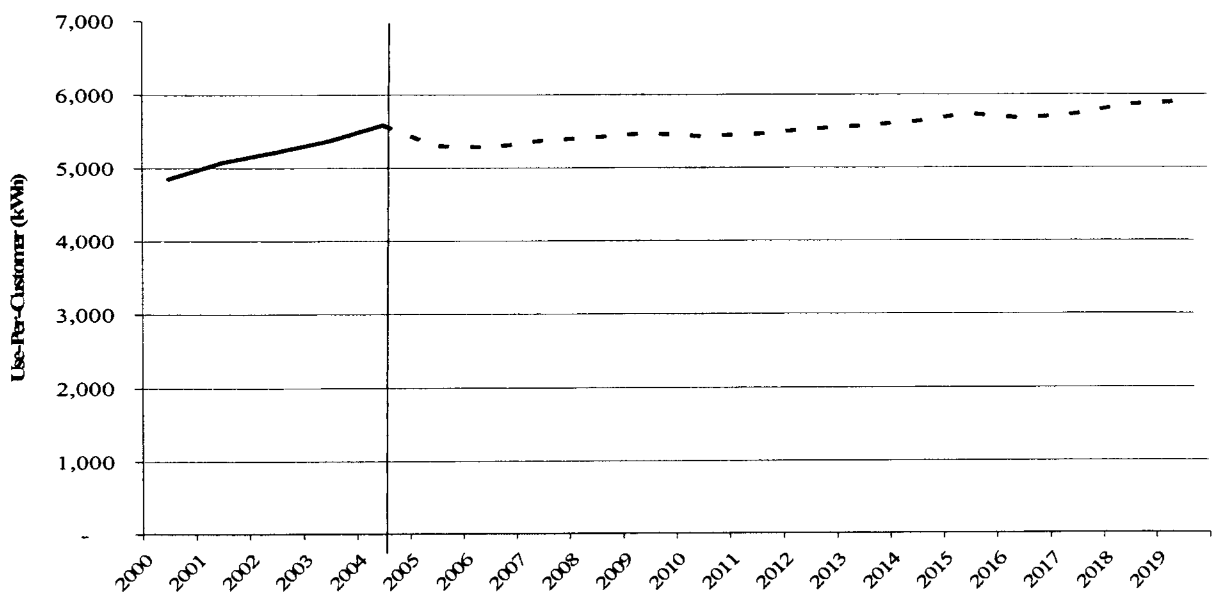
TABLE: KU - 8
RS CLASS SEASONAL USE-PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)

YEAR	SUMMER	WINTER
2000	6,317	4,854
2001	6,257	5,077
2002	6,406	5,218
2003	6,632	5,370
2004	6,924	5,586
2005	6,551	5,302
2006	6,516	5,281
2007	6,508	5,373
2008	6,556	5,420
2009	6,514	5,473
2010	6,570	5,433
2011	6,673	5,459
2012	6,653	5,527
2013	6,732	5,573
2014	6,765	5,633
2015	6,751	5,739
2016	6,876	5,676
2017	6,917	5,735
2018	6,957	5,863
2019	7,050	5,905

GRAPH: KU - 6
KU RS SUMMER USE-PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



GRAPH: KU - 7
KU RS WINTER USE-PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



RESIDENTIAL
FERS CONSUMPTION OUTLOOK

The long-term outlook for this class is for moderate increases in use-per-customer in both the summer and winter seasons. From 2000 to 2004, the actual summer use-per-customer grew at an average annual rate of 1.6 percent on a weather-normalized basis. Summer use-per-customer is forecast to increase at an average annual rate of 0.2 percent over the 2005 to 2009 period and to continue to increase at a rate of 0.7 percent over the 2005 to 2019 period. The relatively flat FERS summer season use-per-customer is due primarily to the effects of increasing efficiency standards for air conditioning and refrigerators.

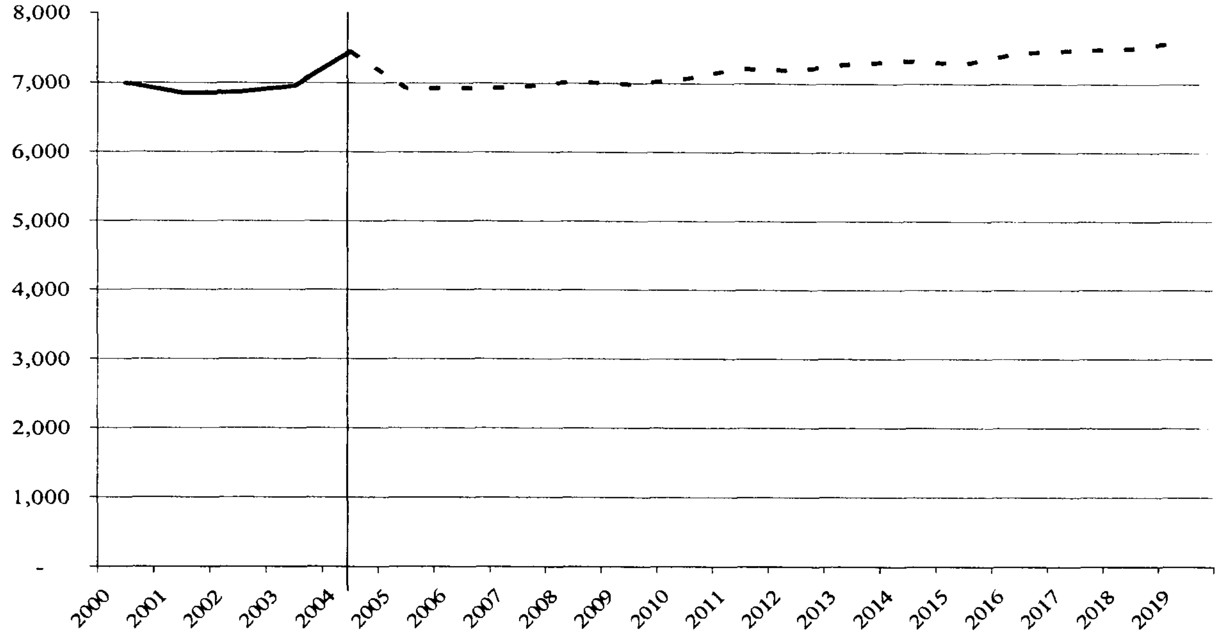
Since 1990, average winter use-per-customer has been erratic. The underlying explanatory data suggests continuing growth. From 2000 to 2004, actual winter use-per-customer increased at an average annual rate of 0.1 percent. Winter use-per-customer is forecast to increase at an average annual rate of 0.9 percent over the 2005 to 2009 period and to increase at a 0.9 percent growth rate over the 2005 to 2019 period. Growth in the long term is driven by conversions to electric heat.

The customer sales and use-per-customer forecasts for the FERS class are presented in annual summary form in Table KU-5 and Graph KU-4. Table KU-9 presents the weather-normalized actuals and forecasted use-per-customer for the summer and winter seasons. Graphs KU-8 and KU-9 plot the weather-normalized historic data along with the forecast of use-per-customer values for the summer and winter seasons.

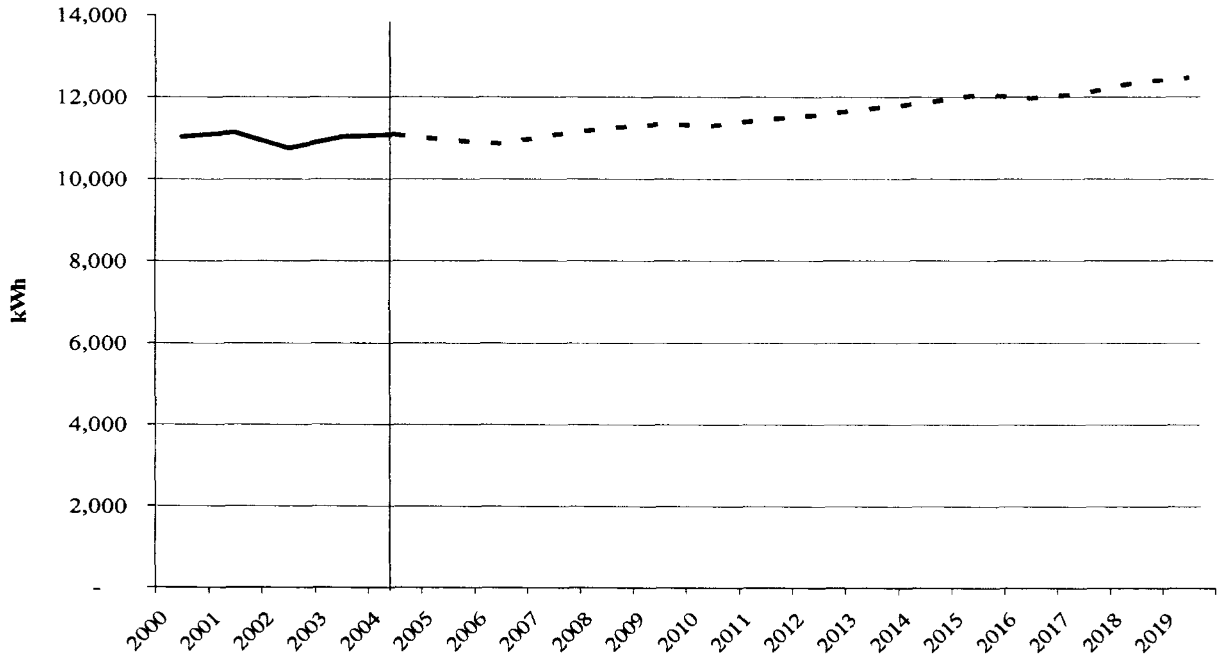
TABLE: KU - 9
FERS CLASS SEASONAL USE-PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized)

YEAR	SUMMER	WINTER
2000	6,989	11,027
2001	6,846	11,139
2002	6,864	10,747
2003	6,952	11,025
2004	7,447	11,080
2005	6,920	10,946
2006	6,921	10,858
2007	6,936	11,076
2008	7,023	11,233
2009	6,982	11,336
2010	7,064	11,304
2011	7,215	11,443
2012	7,187	11,567
2013	7,291	11,720
2014	7,325	11,856
2015	7,288	12,051
2016	7,445	11,971
2017	7,486	12,082
2018	7,512	12,354
2019	7,615	12,461

GRAPH: KU - 8
KU FERS SUMMER USE- PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized)



GRAPH: KU - 9
KU FERS WINTER USE-PER-CUSTOMER (kWh) HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



KY RETAIL COMMERCIAL

The Commercial sector is defined as an SIC code-based combination of the General Service, Light and Power, All-Electric Schools, and Municipal Water Pumping rates, along with the Commercial Space Heating and Off-Peak Water Heating Riders. Altogether, the Kentucky Retail Commercial sector accounts for around 28 percent of total KU sales.

Historically, Commercial sector sales under these rate codes have been segmented from the Industrial sector on the basis of each account's SIC code and revenue class. Accounts with a revenue class of 8 or 18 (Industrial or Mine Power), and with associated SIC codes of 20 through 39 (Industrial) or 12 through 14 (general mining), are considered to be Industrial sector sales. All other accounts were categorized as Commercial sales. Sales groups by SIC code are assumed to exhibit similar usage characteristics and to be influenced by common economic or demographic variables.

Table KU-10 presents the forecast data for the total Commercial class and Graph KU-10 plots the historical and forecast energy sales for the class. From 2000 to 2004, weather-normalized sales to the Commercial sector increased at an average annual rate of 1.9 percent. The forecast of the average annual growth rate for the 2005-2009 period is higher, at 3.2 percent.

Over the forecast period, sales growth for the Commercial sector is the result of growth in both number of customers and use-per-customer. Growth in customer numbers provides the greatest impetus to near-term growth, driven by continuing Residential customer growth. Commercial customers are forecast to grow at a 2.0 percent average annual rate through 2009 after having grown at an average annual rate of 2.2 percent from 2000 to 2004. Weather-normalized use-per-customer declined from 2000 to 2004 at a -0.3 percent average annual growth rate, but is projected to grow at an average annual rate of 1.1 percent over the next five years. Over the fifteen-year forecast horizon, the energy forecast reflects a 2.5 percent annual average growth rate.

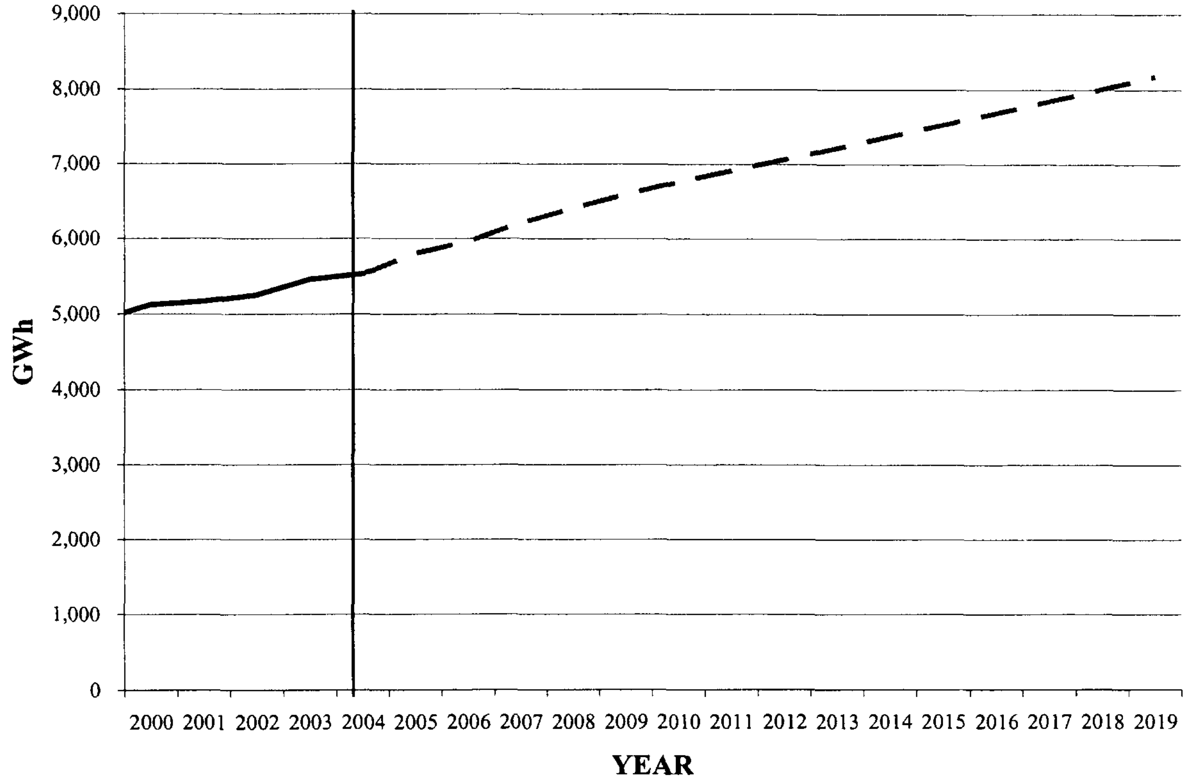
The Commercial sector sales forecasting process employs a combination of medium-term and long-term econometric modeling methodologies. Medium-term and long-term sales were forecast as the product of customer and use-per-customer forecasts. In addition to this, medium-term use-per-customer is further broken down into the product of a billing cycle forecast and a use-per-customer-per-bill day forecast. The medium-term econometric model uses monthly data from January, 1992 through October, 2003. Two seasonal econometric models are used for the long-term use-per-customer forecast, one each for the summer and winter seasons. The summer season is considered to be May through October and the winter season is November through

April. The medium-term econometric forecast generates use-per-customer for the 2005 through 2010 period. The remainder of the outlook for use-per-customer is derived using estimated annual growth rates calculated in the seasonal econometric models. The growth rate forecast for each year beyond 2010 is applied to the annual use-per-customer forecast for the preceding year in order to calculate the forecast for the long-term period. Heating and cooling degree-days for both the medium-term and long-term models are calculated on a 65-degree base. Both use Lexington as the source of the weather data.

TABLE: KU - 10
KY-RETAIL COMMERCIAL FORECAST

YEAR	CUSTOMERS	SALES (GWh)	USE-PER-CUSTOMER
2005	82,737	5,800	70,567
2006	84,431	5,956	71,151
2007	86,104	6,207	72,143
2008	87,756	6,405	73,095
2009	89,399	6,587	73,676
2010	91,042	6,760	74,253
2011	92,306	6,909	74,842
2012	93,576	7,060	75,444
2013	94,843	7,216	76,072
2014	96,105	7,374	76,718
2015	97,365	7,530	77,329
2016	98,624	7,687	77,931
2017	99,886	7,846	78,542
2018	101,147	8,009	79,178
2019	102,410	8,176	79,829

GRAPH: KU - 10
KU COMMERCIAL SALES: HISTORY & FORECAST
(2000-2004 Weather Normalized)



Commercial customers are forecast using a combination of a medium-term monthly and a long-term annual econometric model. Medium-term Commercial customers are forecasted monthly as a function of monthly Residential customers. The medium-term model is based on historic monthly customers from January, 1997 to October, 2003. An AR(2) correction was performed on the model to correct for serial correlation. The equation for medium-term Commercial customers is shown below, with the t-statistic for each variable shown beneath in parentheses.

MCOMCUST = 1,603,454 + 0.141(MRESCUST)
(7.22)

WHERE:

MCOMCUST	=	Monthly KU-KY Commercial Customers
MRESCUST	=	Monthly KU-KY Residential Customers

MONTHLY MODEL STATISTICS:

Adj. R^2	=	0.998
AR(1)PARM	=	0.460

T-Test of AR(1)	=	4.763
D-W Test before AR(1)	=	0.349
D-W Test After AR(1)	=	3.052
AR(2)PARM	=	0.540
T-Test of AR(2)	=	5.578
D-W Test After AR(2)	=	2.267

Long-term Commercial customers are forecast on an annual basis as a function of Residential customers since 1971 and a binary term starting in 1987 to capture the effect of a shift in historic data due to the use of SIC codes to segment Commercial and Industrial customers. This shift caused an upward adjustment in 1987, from which the series continued to grow at a relatively steady rate. An AR(1) correction was also included in the model to correct for serial correlation. The resulting equation for annual Commercial customers is shown below (the number in parenthesis is the t-statistic for that variable).

ACOMCUST = 2,059,555 + 0.1(ARESCUST) +1,349(BIN)
(9.36) (3.42)

WHERE:

ACOMCUST	=	Annual KU KY Commercial Customers
BIN	=	Binary Variable for SIC Code Reclassification
ARESCUST	=	Annual KU KY Residential Customers

ANNUAL MODEL STATISTICS:

Adj. R^2	=	0.999
AR(1)PARM	=	1.000
T-Test of AR(1)	=	104.7
D-W Test Before AR(1)	=	0.251
D-W Test After AR(1)	=	0.908

The monthly and annual customer forecasts are then combined by applying the annual growth rates calculated in the long-term model to the values beyond 2010, thus generating a long-term forecast through 2019.

The short-term usage model uses monthly use-per-customer-per-billing day as the dependent variable. Monthly use-per-customer-per-bill day is forecast using Commercial service territory employment, January, February, March, April and December heating degree days, and May, June, July, August, September, and October cooling degree days. Because the dependent variable is divided by the number of monthly billing days, each of the independent variables is also divided by the number of billing days in each month. The model also combined an AR(1) with a MA(1) to correct for serial correlation. (The number in parenthesis indicates the t-statistic).

$$
\begin{aligned}
\text{Monthly KPC} = 81.647 &+ \underset{(10.6)}{0.004(\text{ENGO})} + \underset{(8.058)}{0.687(\text{JANHDD})} + \underset{(10.398)}{0.797(\text{FEBHDD})} \\
&+ \underset{(3.706)}{0.377(\text{MARHDD})} + \underset{(1.037)}{0.162(\text{APRHDD})} + \underset{(4.430)}{0.450(\text{DECHDD})} \\
&+ \underset{(2.506)}{3.401(\text{MAYCDD})} + \underset{(8.881)}{4.140(\text{JUNCDD})} + \underset{(19.838)}{4.658(\text{JULCDD})} \\
&+ \underset{(20.938)}{4.355(\text{AUGCDD})} + \underset{(18.751)}{5.335(\text{SEPTCDD})} + \underset{(5.410)}{5.052(\text{OCTCDD})}
\end{aligned}
$$

Where:

ENGO	=	Monthly Commercial Employment per Billing Day
JANHDD	=	January Heating Degree Days per Billing Day
FEBHDD	=	February Heating Degree Days per Billing Day
MARHDD	=	March Heating Degree Days per Billing Day
APRHDD	=	April Heating Degree Days per Billing Day
DECHDD	=	December Heating Degree Days per Billing Day
MAYCDD	=	May Cooling Degree Days per Billing Day
JUNCDD	=	June Cooling Degree Days per Billing Day
JULCDD	=	July Cooling Degree Days per Billing Day
AUGCDD	=	August Cooling Degree Days per Billing Day
SEPTCDD	=	September Cooling Degree Days per Billing Day
OCTCDD	=	October Cooling Degree Days per Billing Day

Model Statistics:

Adj. R^2	=	0.89
F Test	=	78.9
D-W Test before adj.	=	1.81
AR(1)PARM	=	-0.719
T-Test of AR(1)	=	-5.104
MA(1)PARM	=	0.768
T-Test of MA(1)	=	5.367
D-W Test after adj.	=	1.85

The dependent variable in both long-term models is use-per-customer. For the summer model, the explanatory variables are service territory Commercial employment, cooling degree days, and the real average price of electricity, and an AR(1) term. For the winter model, the explanatory variables are service territory employment, the real average price of electricity lagged one period, and a binary variable to make up for an outlier in the year 1996.

The forecast of service territory employment is obtained from STEM. The historical real average price is drawn from FERC Form 1. The price forecast is generated internally.

The resulting equations are shown below (the number in parentheses indicates the t-statistic).

SUMMER MODEL:

Use-per- customer = 24,910 + 3.907(CDD) – 112,766(RACP) + 0.015(COMEMP)
(8.574) (-1.652) (0.669)

WINTER MODEL:

Use-per- customer = 25,213 + 0.012(COMEMP) – 37,610(RACP, L1) + 1,699(BIN)
(2.641) (-0.688) (2.987)

Where:

COMEMP	=	Service Territory Commercial Employment
CDD	=	Cooling Degree Days
BIN	=	Binary Variable for 1996 Outlier
RACP	=	Real Average Commercial Price of Electricity
RACP, L1	=	Real Average Commercial Price of Electricity, lagged 1 period

Model Statistics:

Summer:			Winter:		
Adj. R^2	=	0.983	Adj. R^2	=	0.808
AR(1) PARM	=	0.861	D-W Test	=	1.673
T-test of AR(1)	=	6.093			
D-W Test Before AR(1)	=	0.276			
D-W Test after AR(1)	=	1.481			

KY-RETAIL INDUSTRIAL

The Industrial sector is an aggregation of sales under the General Service, Light & Power, Large Commercial/Industrial, and High Load Factor rate classifications with SIC codes 20 through 39 plus an additional category for mining sales, including sales not covered by the Company's Mine Power rate. The Industrial sector accounts for approximately 27 percent of total KU sales. The forecast for sales to the Industrial sector is produced using a monthly econometric model through 2009 and an annual econometric model (2004-2019) along with a small number of individual customer forecasts. The growth rates from the annual model are applied to the monthly model after 2009.

The monthly model uses monthly energy sales as the dependent variable and is based on history from 1989 to October, 2003. The explanatory variables are real service territory Industrial value-added, a seasonal binary for January, June cooling degree-days, July cooling degree-days, August cooling degree-days, and September cooling degree-days. A binary term is included from 1999 to account for the removal from the historic data series of several large customers, which are forecast separately. An AR(1) correction is made for serial correlation. The resulting equation is shown below (the numbers in parentheses are the t-statistic for each variable).

$$\begin{aligned}\text{Use-per-customer} = 75{,}824{,}931 &+ \underset{(28.81)}{0.014(\text{RGSP})} - \underset{(-3.19)}{8{,}449{,}444(\text{JANBIN})} + \underset{(5.01)}{79{,}634(\text{JUNCDD})}\\ &+ \underset{(3.53)}{29{,}163(\text{JULCDD})} + \underset{(5.72)}{45{,}952(\text{AUGCDD})} + \underset{(8.55)}{88{,}258(\text{SEPCDD})}\\ &- \underset{(-12.83)}{33{,}125{,}706(\text{RECLASBIN})}\end{aligned}$$

Where:

RGSP	=	Real Service Territory Industrial Value-Added
JANBIN	=	January Binary Variable
JUNCDD	=	June Cooling Degree Day Interaction Variable
JULCDD	=	July Cooling Degree Day Interaction Variable
AUGCDD	=	August Cooling Degree Day Interaction Variable
SEPCDD	=	September Cooling Degree Day Interaction Variable
RECLASBIN	=	Reclassification Binary for Removal of New Large Customers
RECBIN	=	Recession Binary

Model Statistics:

Adj. R^2	=	0.90
AR(1) PARM	=	0.17
T-Test of AR(1)	=	2.21

D-W Test After AR(1) = 2.06

The dependent variable in the annual model is energy sales. The explanatory variables are real service territory Industrial value-added, the real average price of electricity for the sector, cooling degree-days using a 65-degree base, and a reclassification binary for the removal of Large Industrial customers lacking sufficient billing history, starting in 1999. The resulting equation is shown below (the numbers in parentheses are the t-statistic for each variable).

$$\text{Annual Industrial kWh} = 2.54E{+}09 + \underset{(10.65)}{0.134(RGSPRE)} - \underset{(-4.81)}{4.66E{+}10(REPRICE)}$$
$$+ \underset{(0.88)}{81{,}842(CDD65)} - \underset{(-9.68)}{4.74E{+}08(RECLASBIN)}$$

Where:

RGSPRE	=	Real Service Territory Industrial Value-Added
REPRICE	=	Real Average Industrial Price of Electricity
CDD65	=	Cooling Degree Days (65 Degree Base)
RECLASBIN	=	Reclassification Binary for Removal of New Large Industrials

Model Statistics:

Adjusted R^2	=	0.979
D-W Test	=	1.27

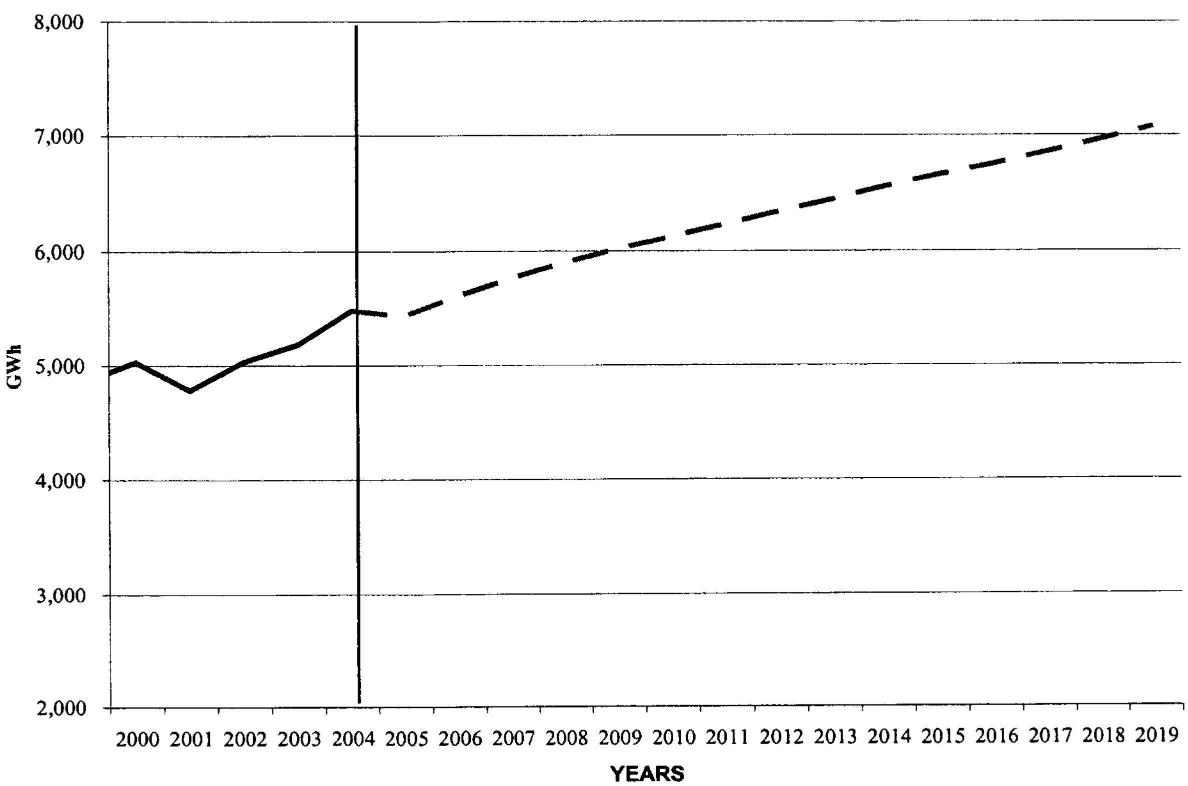
Nine Large Industrial KU customers are individually forecasted. The forecasts for these customers are based on recent history in sales and demand and include information from each customer regarding its outlook for growth and expansion. In total, the sales forecast of these large customers is 2,132 GWh for 2005, rising annually at an average growth rate of 1.1 percent to 2,225 GWh in 2009, and remaining constant thereafter.

From 2000-2004, weather-normalized Industrial sales grew at an average annual rate of 2.2 percent. The forecast growth rate for the Industrial sector from 2005-2009 is 2.6 percent. Over the 2005-2019 forecast horizon, the growth rate is 1.9 percent.

TABLE: KU - 11
KY-RETAIL INDUSTRIAL FORECAST

YEAR	SALES (GWh)
2005	5,435
2006	5,608
2007	5,764
2008	5,897
2009	6,017
2010	6,118
2011	6,231
2012	6,336
2013	6,444
2014	6,557
2015	6,657
2016	6,750
2017	6,853
2018	6,960
2019	7,075

GRAPH: KU - 11
KY INDUSTRIAL SALES: HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



MINE POWER SERVICE (MP)

The KU Mine Power class is made up of the large mining customers that are kept separate from the SIC Industrial group. The majority of these customers are located in Western Kentucky. For that reason, the Mine Power forecast reflects the dependence of this class on the general outlook for the coal industry in the Western Kentucky region. For the current forecast, the company employed a coal production forecast prepared by Hill & Associates. Table KU-12 presents Hill & Associates' outlook for coal production in Western Kentucky.

Hill & Associates predicts a gradual increase in Western Kentucky production over the forecast period of approximately 3.5 million tons in the medium term, an average annual growth rate of 3.0 percent. Over the full fifteen-year forecast horizon, Western Kentucky production is forecast to increase by approximately eleven million tons from 2005 to 2019, an average annual growth rate of 2.3 percent.

The customer forecast is based on the relationship between Western Kentucky coal production and Mine Power customers, on a tons-per-customer basis. In recent history, the relationship has been, on average, 618,000 tons-per-Mine Power customer.

TABLE: KU - 12
WESTERN KENTUCKY COAL OUTPUT FORECAST

YEAR	COAL (MM TONS)
2005	28.3
2006	29.1
2007	29.7
2008	30.9
2009	31.8
2010	32.6
2011	31.6
2012	32.5
2013	33.4
2014	34.4
2015	35.2
2016	36.2
2017	37.1
2018	38.0
2019	39.1

The sales forecast is generated using an econometric model that includes Mine Power customers, heating degree days and a trend term that starts in 1985. The trend term is used to capture the decline in the amount of energy sales to Mine Power customers that has occurred in recent history. The equation for Mine Power energy sales is shown below, with the t-statistic for each variable shown beneath in parentheses.

$$MPSALES = \underset{}{110{,}571{,}320} + \underset{(2.03)}{30{,}506(HDD65)} + \underset{(3.67)}{6{,}267{,}095(MPCUSTS)} - \underset{(-2.27)}{4{,}876{,}766(TREND85)}$$

WHERE:

MPSALES	=	Energy Sales to Mine Power Customers
HDD65	=	Lexington Heating Degree Days
MPCUSTS	=	Number of Mine Power Customers
TREND85	=	Trend Term Starting in 1985

MONTHLY MODEL STATISTICS:

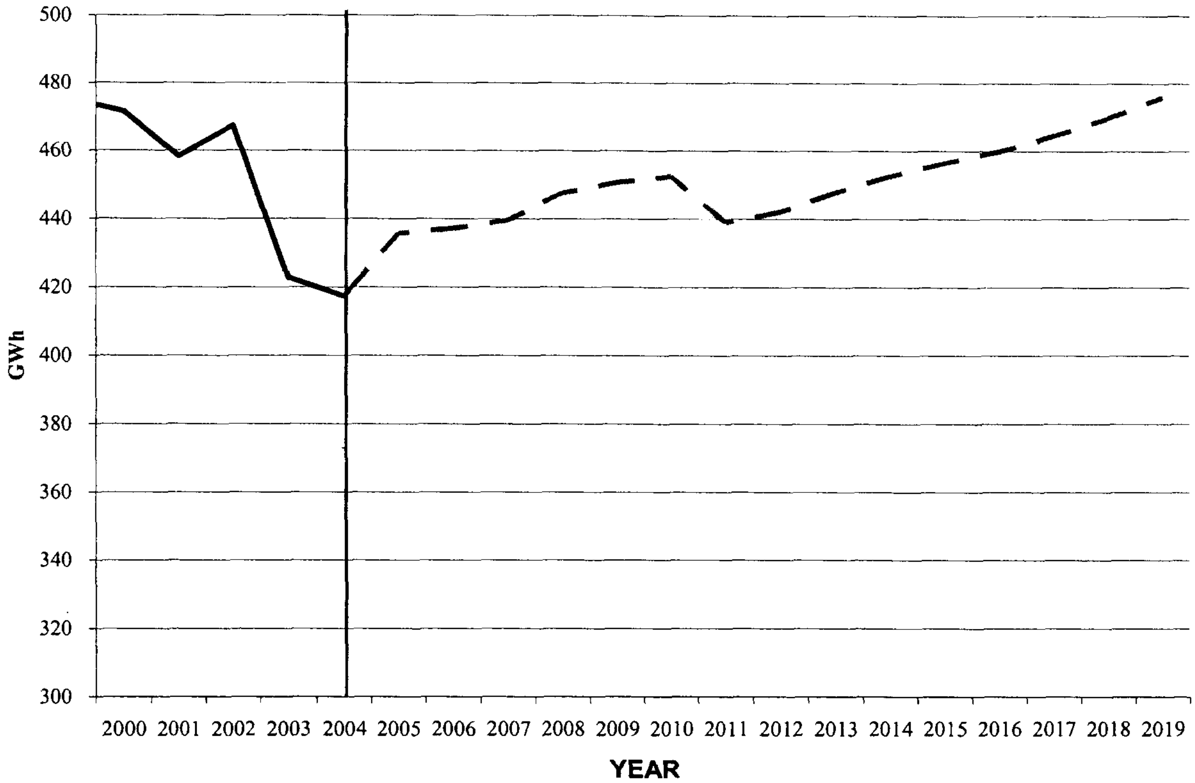
Adj. R^2	=	0.93
D-W Test	=	2.30

Historic KU Mine Power sales decreased at an average annual rate of -3.0 percent from 2000 to 2004. The forecast reverses this decline , with an average annual growth of 0.8 percent over the five-year forecast. In the long term, Mine Power sales are forecast to increase at an average annual rate of 0.6 percent.

TABLE: KU - 13
KY-RETAIL MINE POWER FORECAST

YEAR	CUSTOMERS	SALES (GWh)
2005	46	436
2006	47	437
2007	48	440
2008	50	447
2009	51	451
2010	53	452
2011	51	439
2012	53	442
2013	54	448
2014	56	453
2015	57	457
2016	59	460
2017	60	464
2018	61	470
2019	63	476

GRAPH: KU - 12
KY MINE POWER SALES: HISTORY & FORECAST



LIGHTING

The forecast for Lighting sales is separated into two groups, Outdoor Area Lighting and Street Lighting. The Outdoor Area Lighting group is projected utilizing two regression models, one for the number of fixtures and one for the average kW rating per fixture. The fixture count multiplied by the consumption rate multiplied by hours of use determines the energy forecast. The number of fixtures is regressed against service territory households, and an AR(1) correction is made for serial correlation. The average kW rating per light for outdoor area lighting is held constant at the 2002 annual average of 0.23 kW. The average hours of use is assumed to be 4,000 hours. The equation for Outdoor Lighting fixtures is shown below (the number in parenthesis indicates the t-statistic).

OUTDOOR LIGHTING:

FIXTURES = -164,561 + 0.625(HHLDS)
(19.79)

Where:

HHLDS = KU Service Territory Households

Model Statistics:

Adj. R^2	=	0.98
AR(1) PARM	=	-0.573
T-test of AR(1)	=	-1.85
DW Test after AR(1)	=	1.07

The Company provides incandescent, mercury vapor and high-pressure sodium (HPS) Street Lighting service. Incandescent lights are not available for new installations and the price differential between mercury vapor and HPS lights effectively eliminates requests for new mercury vapor systems. The forecast assumes that all new street lights will be HPS.

The forecast for Street Lighting uses a regression of fixtures against time. Following is the equation for fixtures in the Street Lighting group (the number in parenthesis indicates the t-statistic).

STREET LIGHTING:

FIXTURES = -2,327,007 +1,198(YEAR)
(27.65)

Where:

YEAR = Time

Model Statistics:

Adj. R^2	=	0.96
AR(1) PARM	=	-0.663
T-test of AR(1)	=	-4.85
DW Test after AR(1)	=	2.07

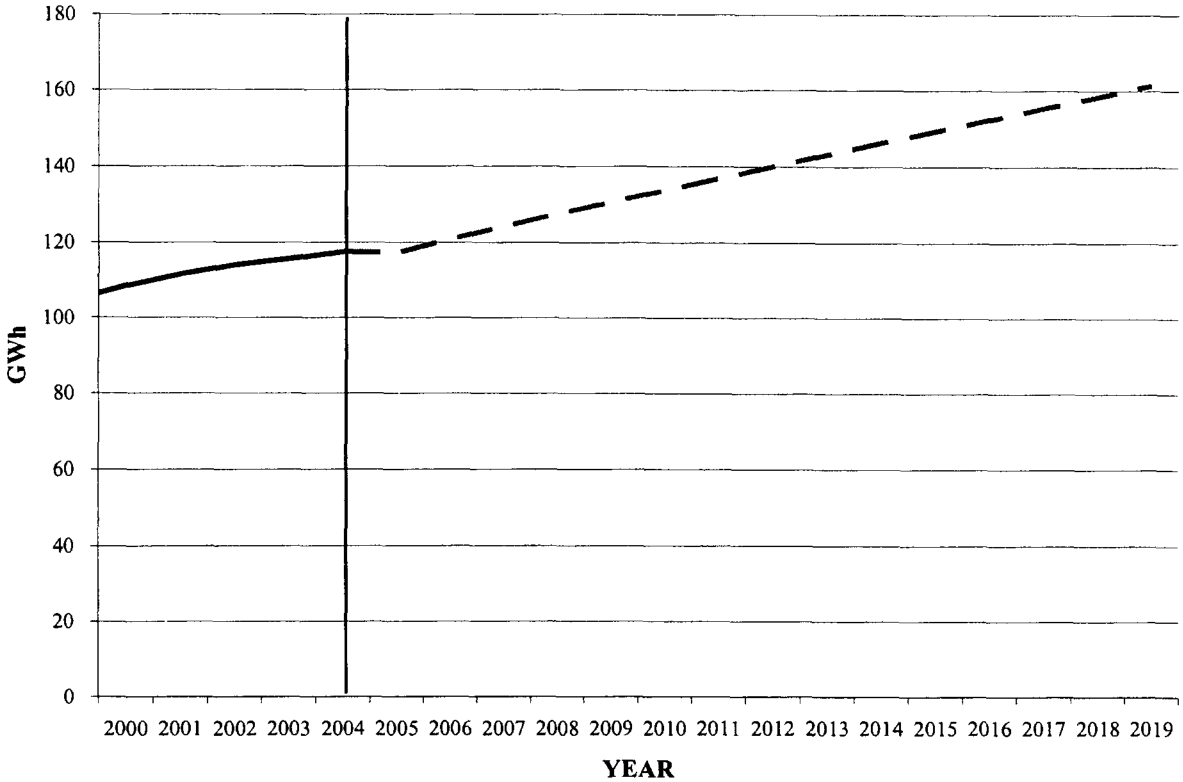
As of 2005, all non-HPS lights are assumed to be retired. For the average kW rating per fixture, the mix of HPS lighting types is held constant over the forecast period. This establishes an average kW rating for HPS fixtures of 0.12 kW. This is the factor used in the energy calculation. The Street Lighting energy is calculated in the same manner as in the outdoor lighting group assuming 4,000 hours of usage, and the two are combined to produce the energy forecast for this class.

The sales forecast is shown in Table KU-14. A plot of historical lighting sales and forecast is shown on Graph KU-13.

TABLE: KU - 14
KY RETAIL LIGHTING FORECAST

YEAR	SALES (GWh)
2005	117
2006	121
2007	124
2008	127
2009	131
2010	134
2011	137
2012	140
2013	143
2014	146
2015	149
2016	152
2017	155
2018	158
2019	161

GRAPH: KU - 13
KY LIGHTING SALES: HISTORY & FORECAST



VIRGINIA SUMMARY

The Old Dominion Power Company (ODP) operating unit of Kentucky Utilities (KU) serves five counties in southwestern Virginia. These sales fall within the jurisdiction of the Virginia SCC and are modeled separately. ODP sales are disaggregated to a rate class basis. This forecast yields an average annual growth rate of 1.3 percent for the 2005-2009 period and 1.2 percent for 2005-2019. Table KU-15 shows the growth rates forecast by class for the 2005-2019 period.

TABLE: KU - 15
GROWTH RATE FORECAST FOR ODP SALES

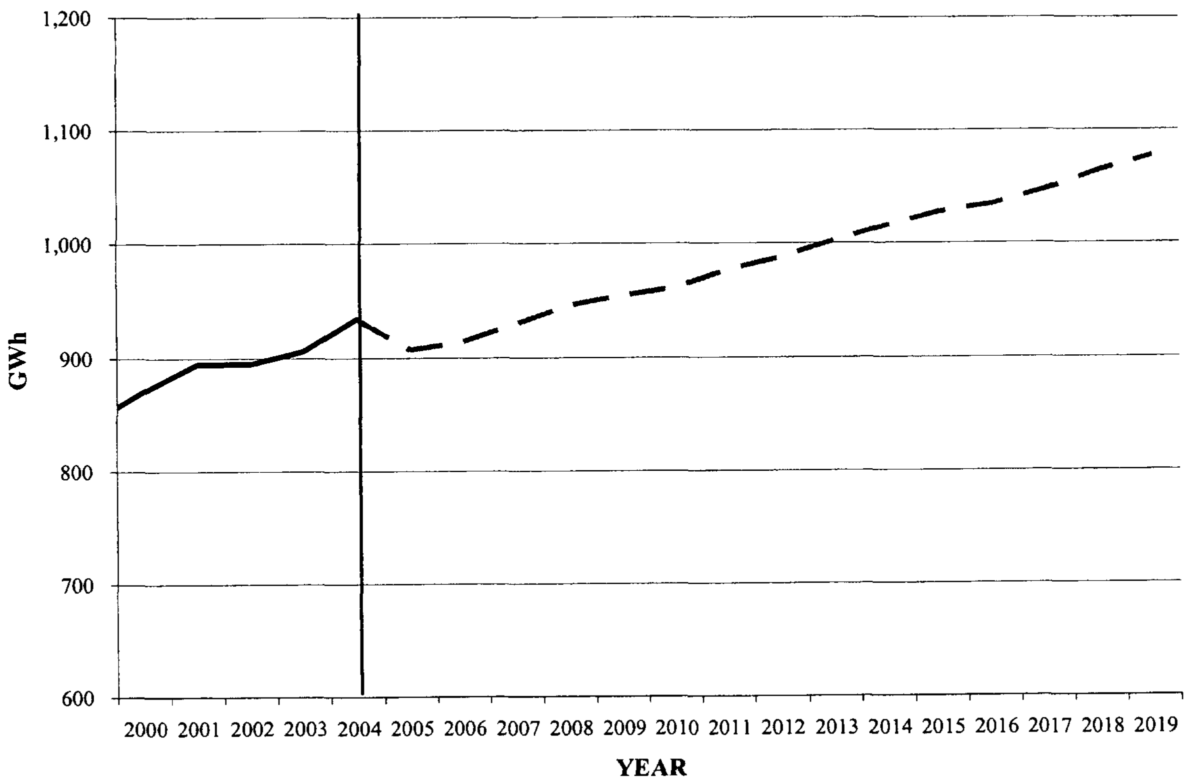
CLASS	% ANNUAL GROWTH RATE (2005-2019)	% OF TOTAL ENERGY SALES (2004)
Residential	0.8	42.7
Commercial/Industrial	1.6	53.6
All Electric Schools	-	3.0
Lighting	2.1	0.8
TOTAL	1.2	100

Table KU-16 is a tabulation of the sales forecast for the 15-year period. Graph KU-14 is a plot of the historical sales and forecast.

TABLE KU – 16
TOTAL ODP RETAIL FORECAST

YEAR	CUSTOMERS	SALES (GWh)
2005	29,388	907
2006	29,461	914
2007	29,532	929
2008	29,593	946
2009	29,641	954
2010	29,683	961
2011	29,728	976
2012	29,772	987
2013	29,816	1,002
2014	29,859	1,015
2015	29,900	1,027
2016	29,941	1,034
2017	29,979	1,047
2018	30,016	1,064
2019	30,050	1,077

GRAPH: KU - 14
TOTAL ODP SALES: HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



ODP has one Residential rate class for both all-electric and non all-electric customers. The Residential sales forecast is developed in two parts:

- a projection of customers by rate class
- a projection of use-per-customer.

The cooling season is June through September and the heating season is October through May. Degree-day data are based on 65-degrees and derived from data from the Bristol, Tennessee weather station.

The forecast of total Residential customers begins with a county-level population forecast that is generated by the STEM.

The primary driver of the ODP customer forecast is the county-level household forecast from the STEM model.

STATISTICALLY-ADJUSTED END-USE MODEL

The Residential sales forecast uses a Statistically Adjusted End-Use Model (SAE) methodology. Please see KU Residential for a complete description.

Results

In addition to the 'X' variables (XOther, XHeat, XCool), the final equation also includes binary variables for February, February 2003, December 2002, June 2002, January 2001, and December 1998. A first-order autoregressive term is included to correct for serial correlation. The estimated equation is listed below (the number is parenthesis indicates the t-statistic):

$$
\begin{aligned}
\text{Use-per-Customer} = \; & \underset{(34.346)}{1.128*XHEAT} + \underset{(11.914)}{0.582*XCOOL} + *\underset{(34.390)}{0.994*XOTHER} \\
& + \underset{(2.393)}{177.544*FEB03} + \underset{(5.743)}{197.241*FEB} - \underset{(-6.596)}{465.100*DEC02} \\
& - \underset{(-2.502)}{169.146*JUN02} + \underset{(5.508)}{397.122*JAN01} - \underset{(-1.766)}{120.664*DEC98}
\end{aligned}
$$

Where:

XOther	=	Other Use-per-Customer
XHeat	=	Heat Use-per-Customer

XCool	=	Cool Use-per-Customer
FEB03	=	February 2003 Binary Variable
FEB	=	February Binary Variable
DEC02	=	December 2002 Binary Variable
JUN02	=	June 2002 Binary Variable
JAN01	=	January 2001 Binary Variable
DEC98	=	December 1998 Binary Variable

Model Statistics:

Adj. R^2	=	0.977
AR(1) parm	=	-0.315
t-test AR(1)	=	-2.92
D-W test	=	1.93

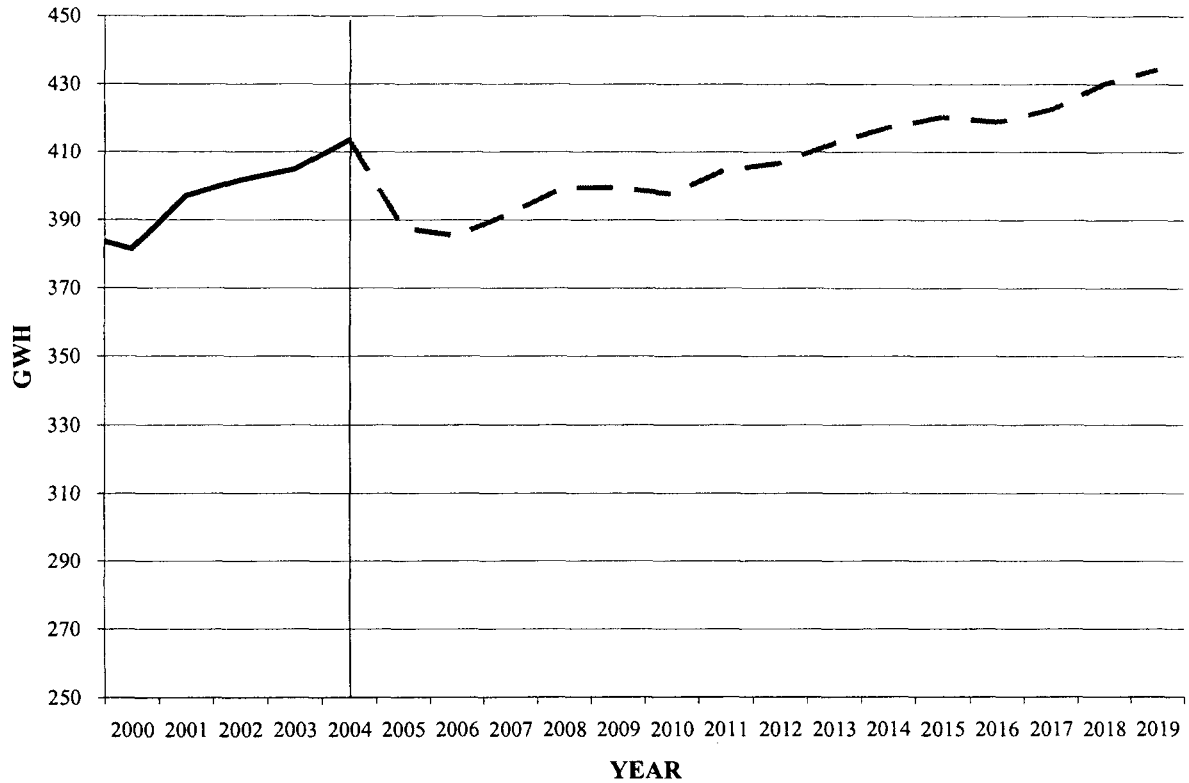
ODP RESIDENTIAL FORECAST

The resultant annual forecast of total Residential customers, use-per-customer and GWh sales is tabulated in Table KU-17. Graph KU-15 shows annual historical energy sales and forecast. Since 2000, Residential weather-normalized use-per-customer in ODP has increased at an average annual growth rate of 1.9 percent. It is anticipated that over the next five years use-per-customer will remain relatively flat and over the entire forecast period use-per-customer will grow at a modest 0.8 percent average annual rate. With very little customer growth (0.04 percent) in the ODP Service Territory projected over the next five years, Residential sales are forecast to increase at an average annual rate of 0.8 percent per year through 2009 and at an average annual rate of 0.8 percent per year through 2019.

TABLE: KU - 17
ODP RETAIL RESIDENTIAL FORECAST

YEAR	CUSTOMERS	SALES (GWH)	USE-PER-CUSTOMER
2005	25,005	388	15,501
2006	25,028	385	15,395
2007	25,048	392	15,651
2008	25,059	399	15,940
2009	25,057	399	15,936
2010	25,050	398	15,870
2011	25,045	405	16,153
2012	25,040	407	16,237
2013	25,034	413	16,475
2014	25,028	417	16,659
2015	25,020	420	16,794
2016	25,012	419	16,739
2017	25,002	422	16,890
2018	24,989	430	17,201
2019	24,975	434	17,384

GRAPH: KU - 15
ODP RESIDENTIAL SALES: HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



ODP COMMERCIAL/INDUSTRIAL FORECAST

Four models are used in the ODP Commercial-Industrial forecast process: two customer models and two energy models. Commercial-Industrial customers are segmented by the GS and LP rate classes. LP customers are forecast as a function of time since 1971 (including a dummy variable that accounts for reclassification in 1981) and the model is adjusted for serial correlation using an autoregression with a two-period lag. GS customers are forecast as a function of time since 1988. The equations are listed below (the number in parenthesis indicates the t-statistic):

LP CUSTOMERS:

CUSTOMERS = -3,326 + 1.82(YEAR) + 25.59(DUMMY)
(0.81) (3.21)

Where:

YEAR = Time Variable
DUMMY = Binary Variable for reclassification in 1981

Model Statistics:

Adj. R^2 = 0.982
AR(1) PARM = 1.37
T-test of AR(1) = 8.59
DW Test after AR(1) = 1.05
AR(2) PARM = -0.48
T-test of AR(2) = -3.09
DW Test after AR(2) = 2.18

GS CUSTOMERS:

CUSTOMERS = -101,297 + 52.48(YEAR)
(43.69)

Where:

YEAR = Time since 1988

Model Statistics:

Adj. R^2 = 0.99
DW Test = 1.45

Commercial-Industrial energy sales are split into two portions: Mining energy in SIC 12 and all other Commercial-Industrial sales. The two energy forecast models are a Mining model that consists of energy in SIC 12 and a non-Mining model that is the difference between the total

GS-LP and all Mining energy. The SIC 12 Mining sales forecast is based on history back to 1978 and is corrected for serial correlation using an autoregression with a one-period lag. Mining sales are a function of value-added in SIC 12 for the five ODP Virginia counties and a dummy variable that accounts for a revision in value-added that was not applied to the years prior to 1995. The non-Mining sales forecast is also corrected for serial correlation using an AR(1) and is a function of time since 1970. The equations are listed below (the number in parenthesis indicates the t-statistic):

MINING MODEL:

$$\underset{}{KWH} = 3.02E{+}07 + \underset{(8.28)}{0.157(RGSP)} + \underset{(4.06)}{5.90E{+}07(D1995)}$$

Where:

RGSP = VA Mining RGSP
D1995 = Binary variable for RGSP history revision

Model Statistics:

Adj. R^2	=	0.94
AR(1) PARM	=	0.53
T-test of AR(1)	=	3.37
DW Test after AR(1)	=	1.78

NON-MINING COMMERCIAL/INDUSTRIAL MODEL:

$$KWH = -1.26E{+}10 + \underset{(17.21)}{6.42E{+}06(YEAR)}$$

Where:

YEAR = Time since 1970

Model Statistics:

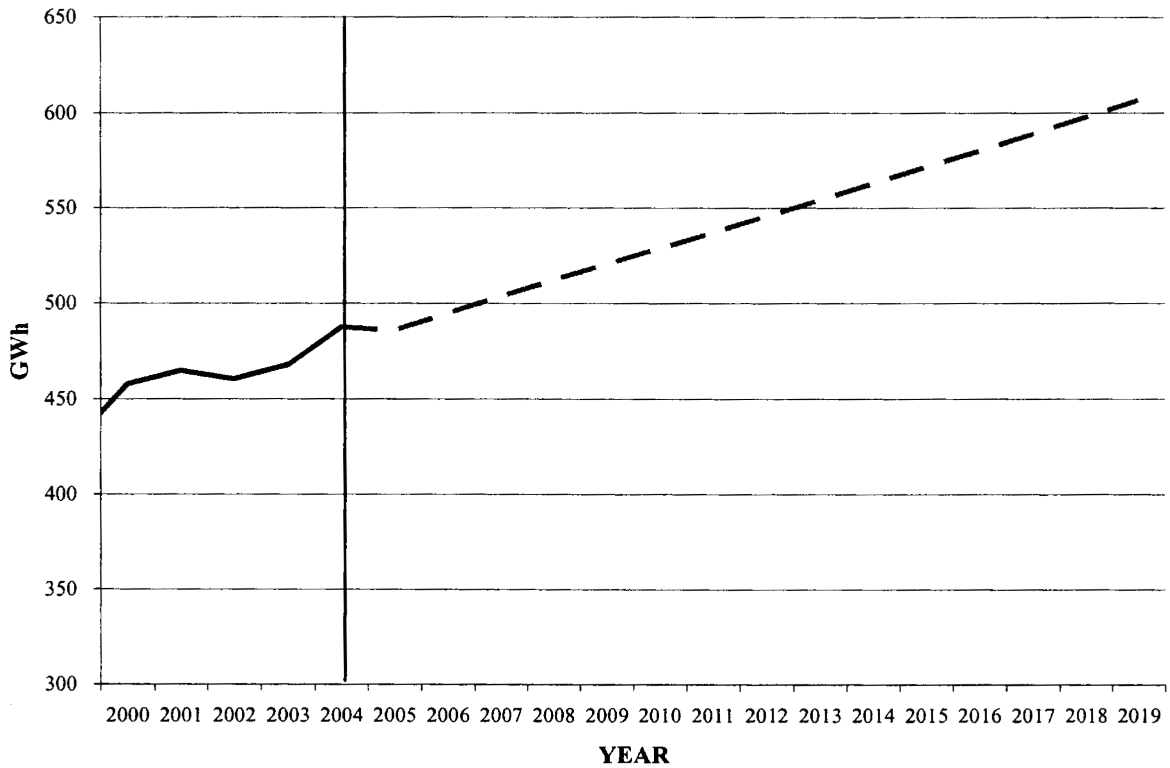
Adj. R^2	=	0.995
AR(1) PARM	=	0.71
T-test of AR(1)	=	5.39
DW Test after AR(1)	=	1.96

Sales to the ODP Commercial/Industrial sector are forecast to increase at an average annual rate of 1.7 percent through 2009 and at 1.6 percent through 2019. A tabulation of the customer and sales forecast for the joint LP and GS rate classes is presented in Table KU-18. Graph KU-16 plots historical GWh sales and forecast sales. The aggregated Commercial and Industrial sales are disaggregated into Commercial and Industrial groups based upon the same criteria as in the Kentucky models and the most recent calendar year of actual sales.

TABLE: KU - 18
ODP RETAIL COMMERCIAL/INDUSTRIAL FORECAST

YEAR	CUSTOMERS	SALES (GWh)
2005	4,214	486
2006	4,264	495
2007	4,314	503
2008	4,365	512
2009	4,415	520
2010	4,464	528
2011	4,514	537
2012	4,563	545
2013	4,613	554
2014	4,662	563
2015	4,711	571
2016	4,760	580
2017	4,809	589
2018	4,858	598
2019	4,906	606

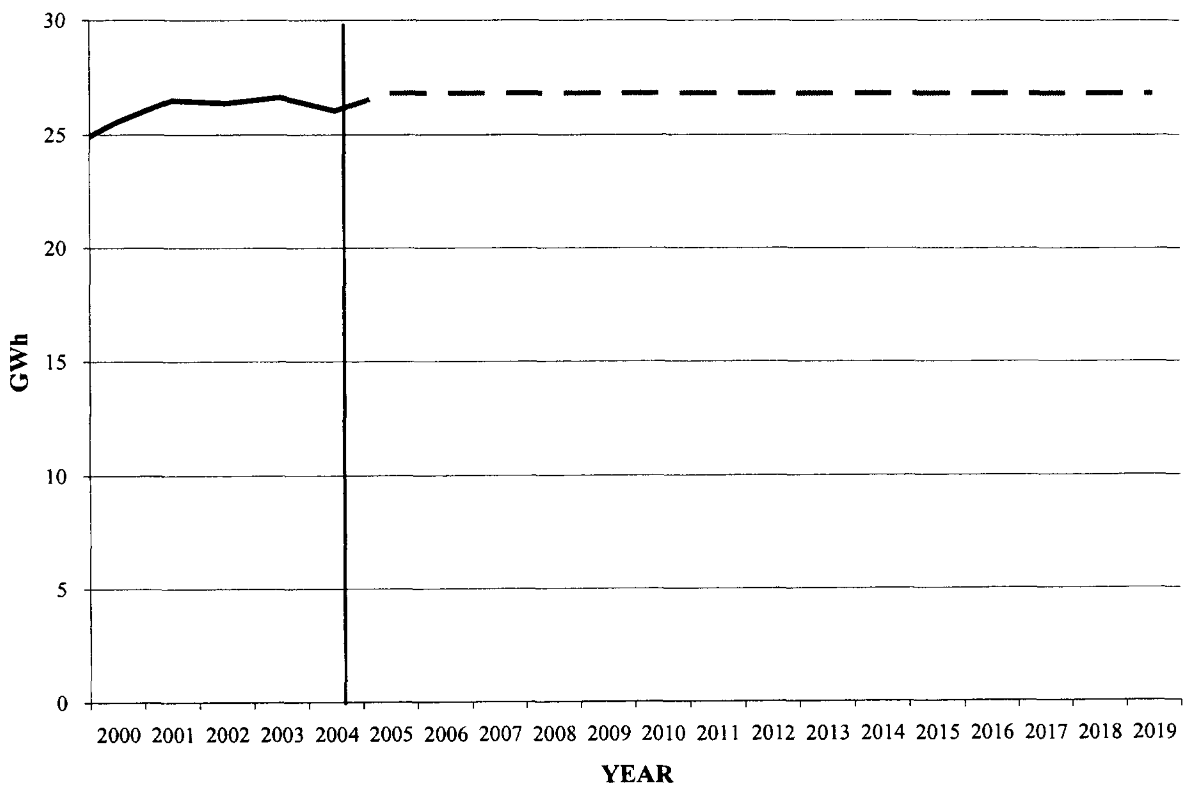
GRAPH: KU - 16
ODP COMMERCIAL/INDUSTRIAL SALES: HISTORY & FORECAST



ODP SCHOOLS FORECAST

Since there has been little growth in the number of customers and a decline in usage on the school rates since 1990, sales for this class are held constant at a value of 27 GWh, which was the 2003 sales level. Graph KU-17 shows historical sales and forecast for the school rate classes.

GRAPH: KU - 17
ODP ALL ELECTRIC SCHOOLS SALES: HISTORY & FORECAST



ODP LIGHTING FORECAST

The forecast for Outdoor Area and Street Lighting for Old Dominion Power is developed using a process identical to that employed for KU-Retail lighting. The Outdoor Area group is projected utilizing a regression model, corrected for serial correlation, for the number of fixtures and a five year average of kW rating per fixture. The fixture count multiplied by the consumption rate multiplied by hours of use determines the energy forecast. Fixtures are regressed against time. The equation for fixtures is shown (the number in parenthesis indicates the t-statistic):

OUTDOOR AREA:

$$\text{FIXTURES} = -3.58\text{E}+05 + \underset{(25.68)}{181.5}(\text{YEAR})$$

Where:

YEAR = Time

Model Statistics:

Adj. R^2	=	0.98
DW Test	=	0.88
AR(1) PARM	=	-0.656
T-test of AR(1)	=	-3.01

The Company provides incandescent, mercury vapor and high-pressure sodium (HPS) Street Lighting service. Incandescent lights are not available for new installations and the price differential between mercury vapor and HPS lights effectively eliminates requests for new mercury vapor systems. The forecast assumes that all new street lights will be HPS.

The Street Lighting group uses similar methodology as the Area Lighting group for the forecast of the number of fixtures. The number of fixtures is regressed against time. Following is the equation for fixtures in the Street Lighting group (the number in parenthesis indicates the t-statistic):

STREET LIGHTING:

$$FIXTURES = -44{,}377 + \underset{(16.88)}{23.6}(YEAR)$$

Where:

YEAR	=	Time

Model Statistics:

Adj. R^2	=	0.90
D-W test	=	2.08
AR(1) PARM	=	-0.573
T-test of AR(1)	=	-3.83

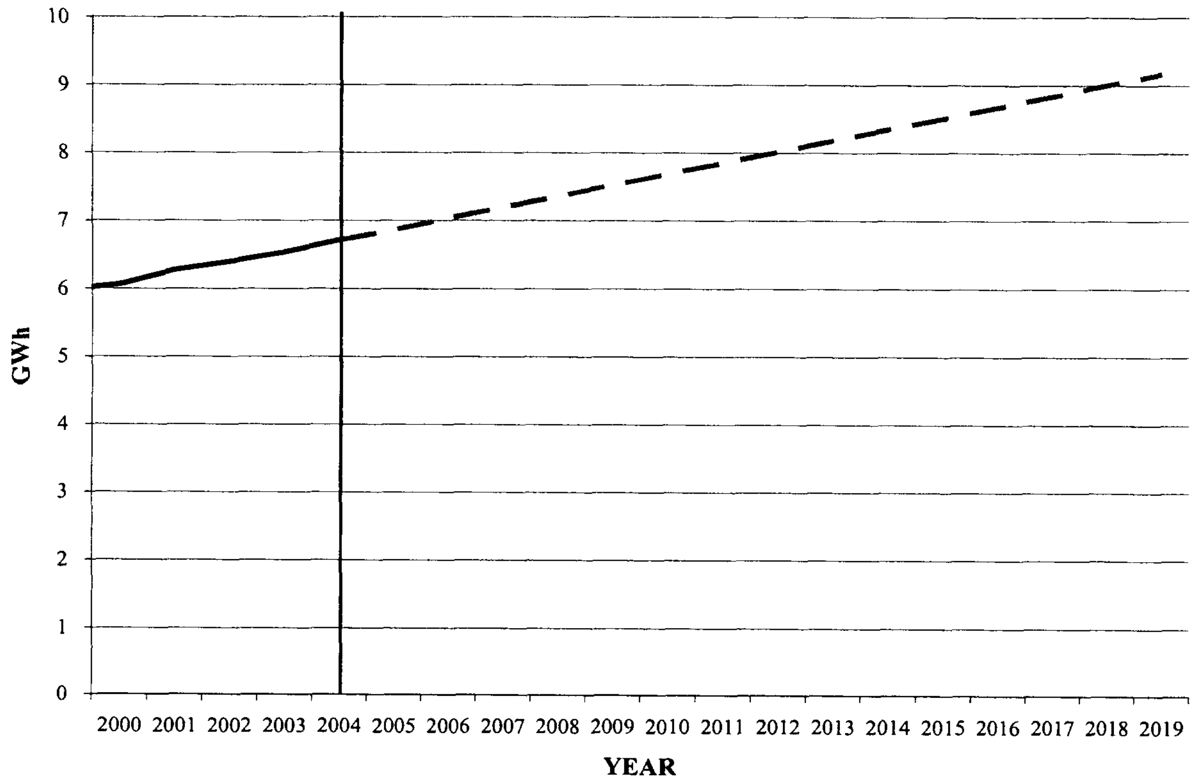
For the average kW rating-per-fixture, the mix of HPS lighting types is held constant over the forecast period. This establishes an average kW rating for HPS fixtures. The Street Lighting energy is calculated in the same manner as in the Area Lighting group and the two are combined to produce the energy for this group.

The sales forecast is shown in Table KU-19. A plot of the historical Lighting sales and forecast is shown on Graph KU-18.

TABLE: KU - 19
ODP LIGHTING FORECAST

YEAR	SALES (GWh)
2005	7
2006	7
2007	7
2008	7
2009	8
2010	8
2011	8
2012	8
2013	8
2014	8
2015	9
2016	9
2017	9
2018	9
2019	9

GRAPH: KU - 18
ODP LIGHTING SALES: HISTORY & FORECAST



WHOLESALE - MUNICIPALS

SUMMARY

The forecast of Municipal purchases from KU is developed by analyzing the Company's energy sales to Transmission-Voltage delivery customers, Primary-Voltage delivery customers, and the City of Paris, Kentucky. The sales data are evaluated to determine the time frame to be used in the models that most accurately represent the latest growth patterns.

The Primary Municipal customers are Bardstown, Bardwell, Benham, Falmouth, Madisonville, and Providence. The Transmission Municipal customers are Barbourville, Berea, Corbin, Frankfort, and Nicholasville.

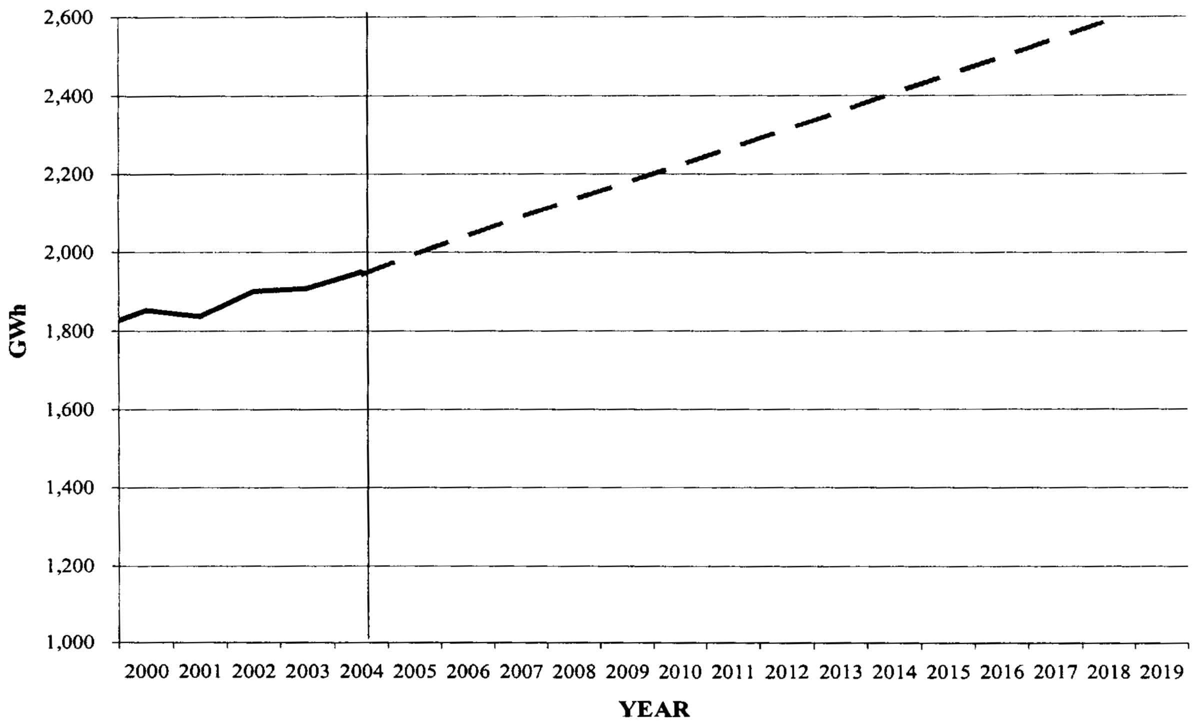
The dependent variable in the sales forecast equation is total sales. Common explanatory variables are heating and/or cooling degree-days, county-level real Industrial value-added, county summarized household forecast, and time. The county-level real Industrial value-added and household forecasts are developed from the STEM database using county specific information and an allocation of regional forecast data.

Table KU-20 shows the forecast of total Municipal sales. Municipal customers' purchases are forecast to increase at an average annual rate of 2.0 percent from 2005-2019. Graph KU-19 shows the annual historical sales and forecast.

TABLE: KU - 20
KY-WHOLESALE TOTAL MUNICIPAL FORECAST

YEAR	SALES (GWh)
2005	1,994
2006	2,042
2007	2,090
2008	2,133
2009	2,177
2010	2,221
2011	2,267
2012	2,312
2013	2,358
2014	2,404
2015	2,450
2016	2,495
2017	2,542
2018	2,589
2019	2,636

GRAPH: KU - 19
KY TOTAL MUNICIPAL SALES: HISTORY & FORECAST
(2000-2004 Weather Normalized Actual)



PRIMARY

The forecast for the Primary class is developed utilizing an econometric model. The forecast of purchases utilizes historical data from 1977. The explanatory variables are a combined county household forecast and county-level real Industrial value-added. An AR(1) correction is made for serial correlation. The counties included in the analysis are Pendleton, Harlan, Nelson, Carlisle, Webster, and Hopkins. The resulting equation is shown below (the number in parenthesis indicates the t-statistic).

Primary-Voltage energy purchases = -6.74E+08 + 18,402 (HSLD) + 0.2446(RGSP)
(12.4) (3.56)

Where:

HSLD	=	Combined county Household Forecast
RSGP	=	County Level Real Industrial Output

Model Statistics:

Adj. R^2	=	0.96
AR(1)	=	-0.453526
T-test of AR(1)	=	-2.44
DW Test after AR(1)	=	2.06

Table KU-21 shows the forecast of Primary Municipal sales. Primary customers' purchases are forecast to increase at an average annual rate of 1.6 percent from 2005-2019.

TABLE: KU - 21
KY-WHOLESALE PRIMARY-VOLTAGE MUNICIPAL FORECAST

YEAR	SALES (GWh)
2005	620
2006	631
2007	642
2008	653
2009	663
2010	673
2011	684
2012	695
2013	706
2014	717
2015	729
2016	740
2017	752
2018	765
2019	777

TRANSMISSION

The forecast for the Transmission class is developed utilizing an econometric model. The forecast of purchases utilizes historical data from 1977. The explanatory variables are cooling degree days, county-level real Industrial value-added, and time. An AR(1) correction is made for serial correlation. The equation is shown below (the t-statistic is in parentheses).

Trans. energy purchases = -4.40E+10 + 2.24E+07 (YEAR) + 32,290(CDD) + 0.556(RGSP)
(16.97) (2.36) (4.96)

Where:

YEAR	=	Time function
CDD	=	Total annual Cooling Degree Days Base 65
RGSP	=	County Real Industrial output

Model Statistics:

Adj. R^2	=	0.994
AR(1) PARM	=	-0.306
T-test of AR(1)	=	-1.48
DW Test after AR(1)	=	1.7

Table KU-22 shows the forecast of Transmission Municipal sales. Purchases are forecast to increase at an average annual rate of 2.2 percent from 2005-2019.

TABLE: KU - 22
KY-WHOLESALE TRANSMISSION MUNICIPAL FORECAST

YEAR	SALES (GWh)
2005	1,331
2006	1,368
2007	1,403
2008	1,436
2009	1,469
2010	1,502
2011	1,537
2012	1,570
2013	1,604
2014	1,639
2015	1,672
2016	1,706
2017	1,739
2018	1,773
2019	1,808

CITY OF PARIS

The forecast for the City of Paris is developed utilizing an econometric model. The forecast of purchases utilizes historical data from 1977. The explanatory variables are cooling degree-days, heating degree-days, and time. An AR(1) correction is made for serial correlation. The equation is shown below (the t-statistic is in parentheses).

Paris energy purchases = -1.111E+09 + 571,685(YEAR) + 664(HDD) + 3,289(CDD)
(20.10) (4.62) (1.39)

Where:

YEAR = Time function
CDD = Total annual Cooling Degree Days Base 65
HDD = Total annual heating Degree Days Base 65

Model Statistics:

Adj. R^2 = 0.96
AR(1) PARM = -0.385
T-test of AR(1) = -1.91
DW Test after AR(1) = 1.8

Table KU-23 shows the forecast of City of Paris sales. Purchases are forecast to increase at an average annual rate of 1.2 percent from 2005-2019.

TABLE: KU - 23
KY-WHOLESALE CITY OF PARIS FORECAST

YEAR	SALES (GWh)
2005	43
2006	44
2007	44
2008	45
2009	45
2010	46
2011	46
2012	47
2013	48
2014	48
2015	49
2016	49
2017	50
2018	50
2019	51

UNCERTAINTY ANALYSIS

To address uncertainty, a probabilistic simulation is run on the historic year-over-year growth for each utility's as-billed, weather-normalized energy sales, and a lower and an upper bound is identified based on the 33rd and 67th percentile values, respectively. To develop a "low growth" sales scenario, the year-over-year growth in the base case forecast is decreased by the percent difference between the 33rd and 50th percentile values of the historical growth rate distribution. For a "high growth" sales scenario, the base year-over-year growth is increased by the percent difference between the 67th and 50th percentile values. The low and high year-over-year growth rates are then applied to the 2003 weather-normalized actual energy sales to produce the "low" and "high" energy sales forecast cases. The distribution of monthly sales in the low and high scenarios is the same as in the base case forecast.

2005-2019 ENERGY FORECAST COMPARISONS

Graph KU-20 illustrates the forecast bandwidth created by the three scenarios for total KU energy sales. The base forecast of energy sales increases at an average annual rate of 2.4 percent over the first five years (2005-2009) and at 2.0 percent through 2019. The high scenario increases at an average annual rate of 2.9 percent over the first five years and 2.4 percent over the fifteen-year horizon. The low scenario increases at an average annual rate of 1.8 percent over the first five years and at 1.6 percent over the fifteen-year period.

In 2009, the High case is 625 GWh greater than the Base forecast while the Low case is 705 GWh below. For the year 2019, the High energy forecast is 1,644 GWh higher than the Base forecast while the Low energy forecast is 1,854 GWh below the Base forecast. Table KU-24 presents the annual Base, High, and Low energy forecast values.

GRAPH: KU - 20
BASE, HIGH AND LOW SALES COMPARISON (GWh)

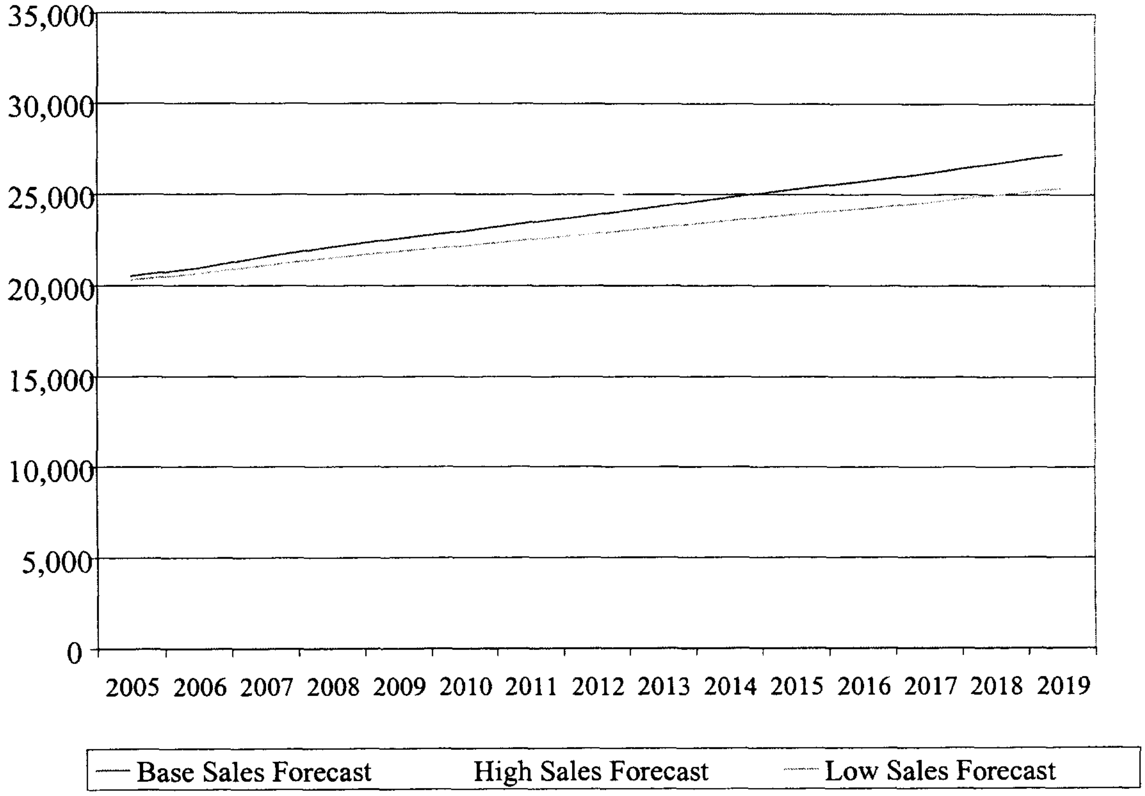


TABLE: KU - 24
BASE, HIGH AND LOW SALES COMPARISON (GWh)

YEAR	BASE	HIGH	LOW
2005	20,506	20,683	20,307
2006	20,945	21,218	20,638
2007	21,558	21,965	21,099
2008	22,102	22,628	21,508
2009	22,551	23,176	21,846
2010	22,968	23,685	22,160
2011	23,444	24,264	22,518
2012	23,868	24,781	22,837
2013	24,357	25,378	23,205
2014	24,829	25,954	23,561
2015	25,281	26,505	23,901
2016	25,697	27,012	24,214
2017	26,160	27,577	24,563
2018	26,687	28,219	24,959
2019	27,198	28,842	25,344