SERTP – 2017 1st Quarter Meeting

First RPSG Meeting & Interactive Training Session

March 22nd, 2017

Hyatt Regency Hotel

Louisville, KY

Process Information

- **The SERTP process is a transmission planning process.**

- **Please contact the respective transmission provider for questions related to real-time operations or Open Access Transmission Tariff (OATT) transmission service.**

Purposes & Goals of Meeting

- **2017 SERTP Process Overview**
- **Form the "RPSG"**
  - Regional Planning Stakeholders Group
  - Committee Structure & Requirements
- **Economic Planning Studies**
  - Review Previous Study Selections
  - Review Requested Sensitivities for 2017
  - RPSG to Select the Five Economic Planning Studies
- **Interactive Training Session**
  - Load Forecasting
- **Public Policy Requirement Stakeholder Requests**
- **Next Meeting Activities**

SERTP

2017 SERTP Process Overview

Upcoming 2017 SERTP Process

- **SERTP 1st Quarter –** ***1st RPSG Meeting & Interactive Training Session***

  March 2017
  - Form RPSG
  - Select Economic Planning Studies
  - Interactive Training Session

- **SERTP 2nd Quarter –** ***Preliminary Expansion Plan Meeting***

  June 2017
  - Review Modeling Assumptions
  - Preliminary 10 Year Expansion Plan
  - Stakeholder Input & Feedback Regarding the Plan

Upcoming 2017 SERTP Process

- **SERTP 3rd Quarter – *2nd RPSG Meeting***

  September 2017

  – Preliminary Results of the Economic Studies
  – Stakeholder Input & Feedback Regarding the Study Results
  – Discuss Previous Stakeholder Input on the Expansion Plan

- **SERTP 4th Quarter – *Annual Transmission Planning Summit & Input Assumptions***

  December 2017

  – Final Results of the Economic Studies
  – Regional Transmission Plan
  – Regional Analyses
  – Stakeholder Input on the 2018 Transmission Model Input Assumptions

SERTP

Regional Planning Stakeholder Group

The SERTP Stakeholder Group

- **RPSG – Regional Planning Stakeholder Group**

- **Serves Two Primary Purposes**

  1) **The RPSG is charged with determining and proposing up to five (5) Economic Planning Studies on an annual basis**

  2) **The RPSG serves as stakeholder representatives for the eight (8) industry sectors in interactions with the SERTP Sponsors**

RPSG Committee Structure

- **RPSG Sector Representation**
  1) **Transmission Owners / Operators**
  2) **Transmission Service Customers**
  3) **Cooperative Utilities**
  4) **Municipal Utilities**
  5) **Power Marketers**
  6) **Generation Owner / Developers**
  7) **Independent System Operators (ISOs) / Regional Transmission Operators (RTOs)**
  8) **Demand Side Management / Demand Side Response**

RPSG Committee Structure

- **Sector Representation Requirements**
  - **Maximum of two (2) representatives per sector**
  - **Maximum of 16 total sector members**
  - **A single company, and all of its affiliates, subsidiaries, and parent company, is limited to participating in a single sector**

RPSG Committee Structure

- **Annual Reformation**
  - **Reformed annually at 1st Quarter Meeting**
  - **Sector members elected for a term of approximately one year**
  - **Term ends at start of following year's 1st Quarter SERTP Meeting**
  - **Sector Members shall be elected by the Stakeholders present at the 1st Quarter Meeting**
  - **Sector Members may serve consecutive, one-year terms if elected**
  - **No limit on the number of terms that a Sector Member may serve**

RPSG Committee Structure

- **Simple Majority Voting**
  - **RPSG decision-making that will be recognized by the Transmission Provider for purposes of Attachment K shall be those authorized by a simple majority vote by then-current Sector Members**
  - **Voting by written proxy is allowed**

RPSG Formation

- **2016 Sector Representatives**

- **2017 Sector Representatives**

SERTP

Economic Planning Studies

SERTP Regional Models

- **SERTP Sponsors developed 12 coordinated regional models***
- **Models include latest transmission planning model information within the SERTP region**

No.	Season	Year
1	SUMMER	2018
2		2020
3		2022
4		2023
5		2025
6		2027
7	SHOULDER	2020
8		2022
9		2025
10		2027
11	WINTER	2022
12		2027

* Available on the secure area of the SERTP website upon satisfying access requirements

Economic Planning Study Process

- **SERTP Sponsors identify the transmission requirements needed to move large amounts of power above and beyond existing long-term, firm transmission service commitments**
  - Analysis is consistent with NERC standards and company-specific planning criteria
- **Models used to perform the analysis incorporate the load forecasts and resource decisions as provided by LSEs**
  - Power flow models are made available to stakeholders to perform additional screens or analysis
- **These studies represent analyses of hypothetical scenarios requested by the stakeholders and do not represent an actual transmission need or commitment to build**
- **Scoping Meeting typically held in April/May**

Economic Planning Study Requests

- **2016 Economic Planning Studies**
- **2017 Economic Planning Study Requests**
- **Vote on 2017 Economic Planning Studies**

SERTP

Interactive Training Session

Load Forecasting

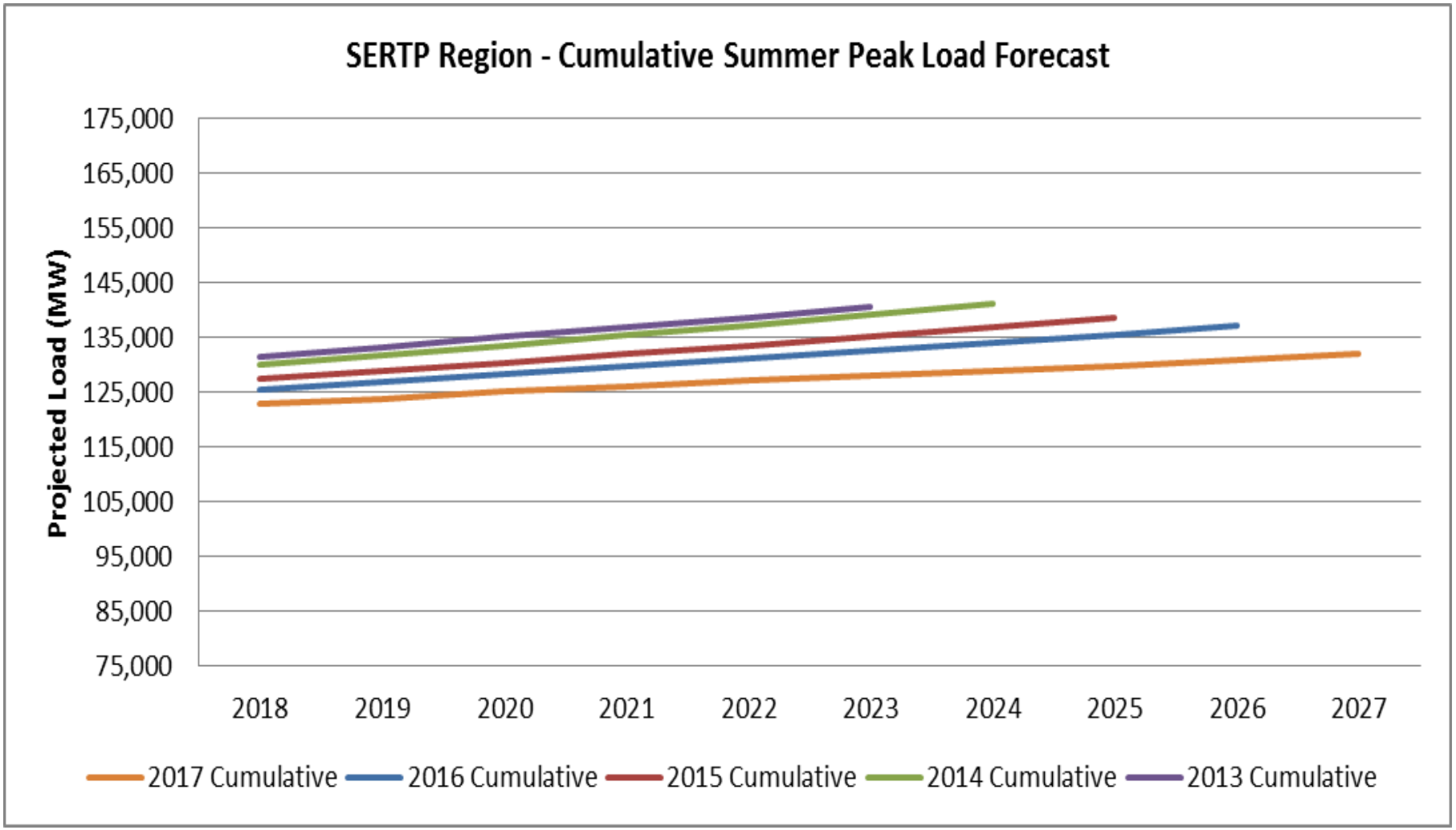
Stuart Wilson
Director - Energy Planning, Analysis & Forecasting
LG&E and KU

SERTP Region

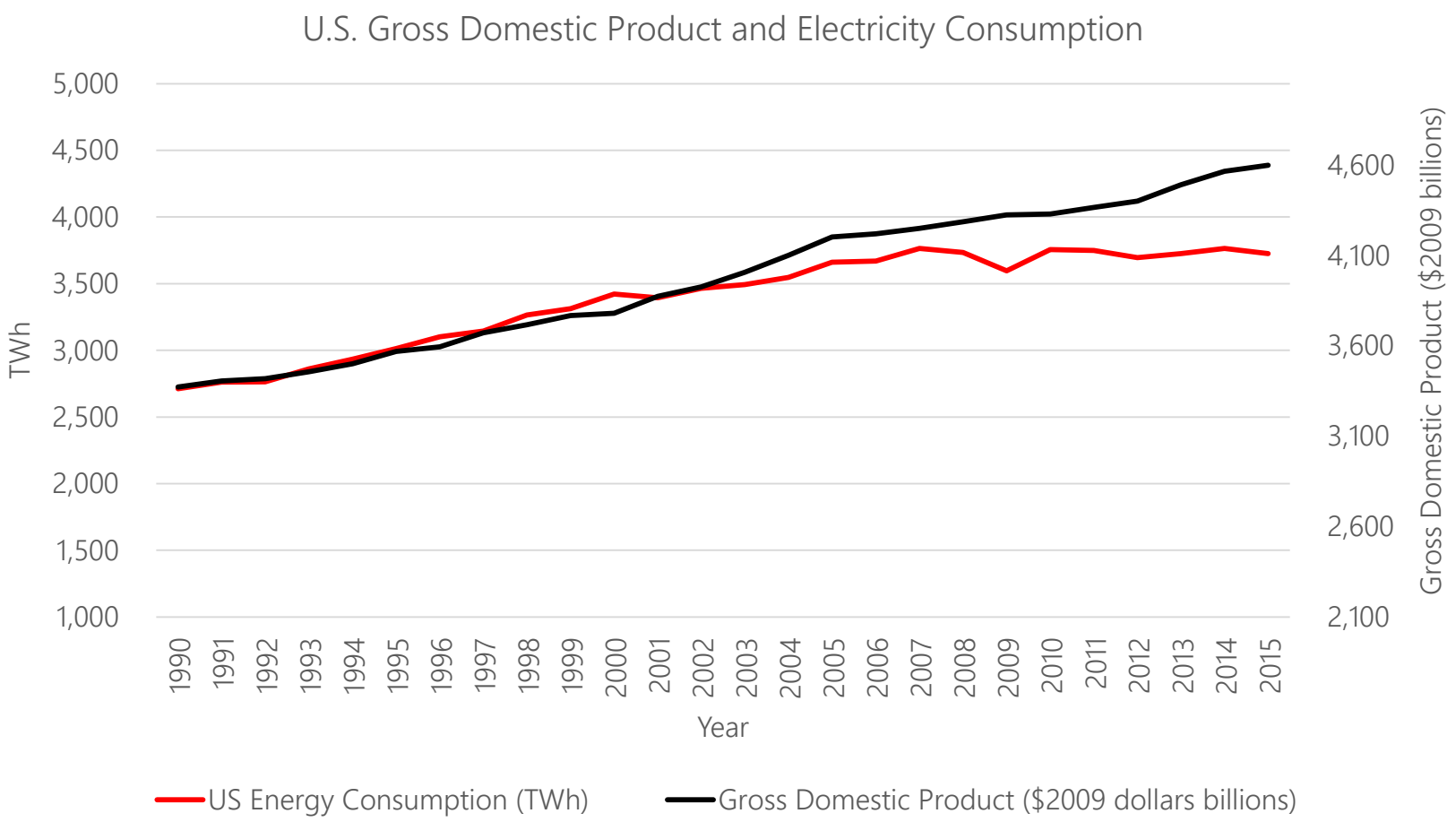
Balancing Authority Areas

- AECI
- DUKE – Carolinas
- DUKE – Progress East
- DUKE – Progress West
- LG&E/KU
- OVEC
- PowerSouth
- Southern
- TVA

SERTP Cumulative Summer Peak Load Forecast



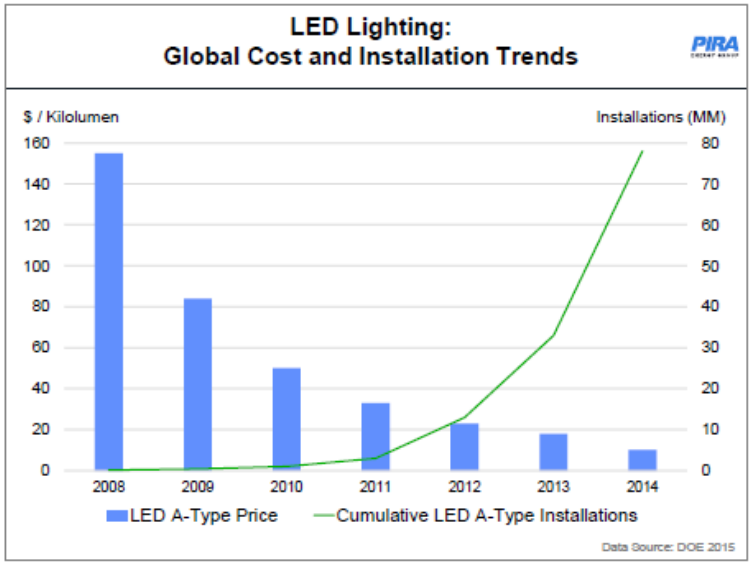
US Electricity Demand has Remained Flat From 2010-2015



Source: Energy Information Administration and Bureau of Economic Analysis

End-Use Efficiencies Drive Reductions in PIRA Forecast

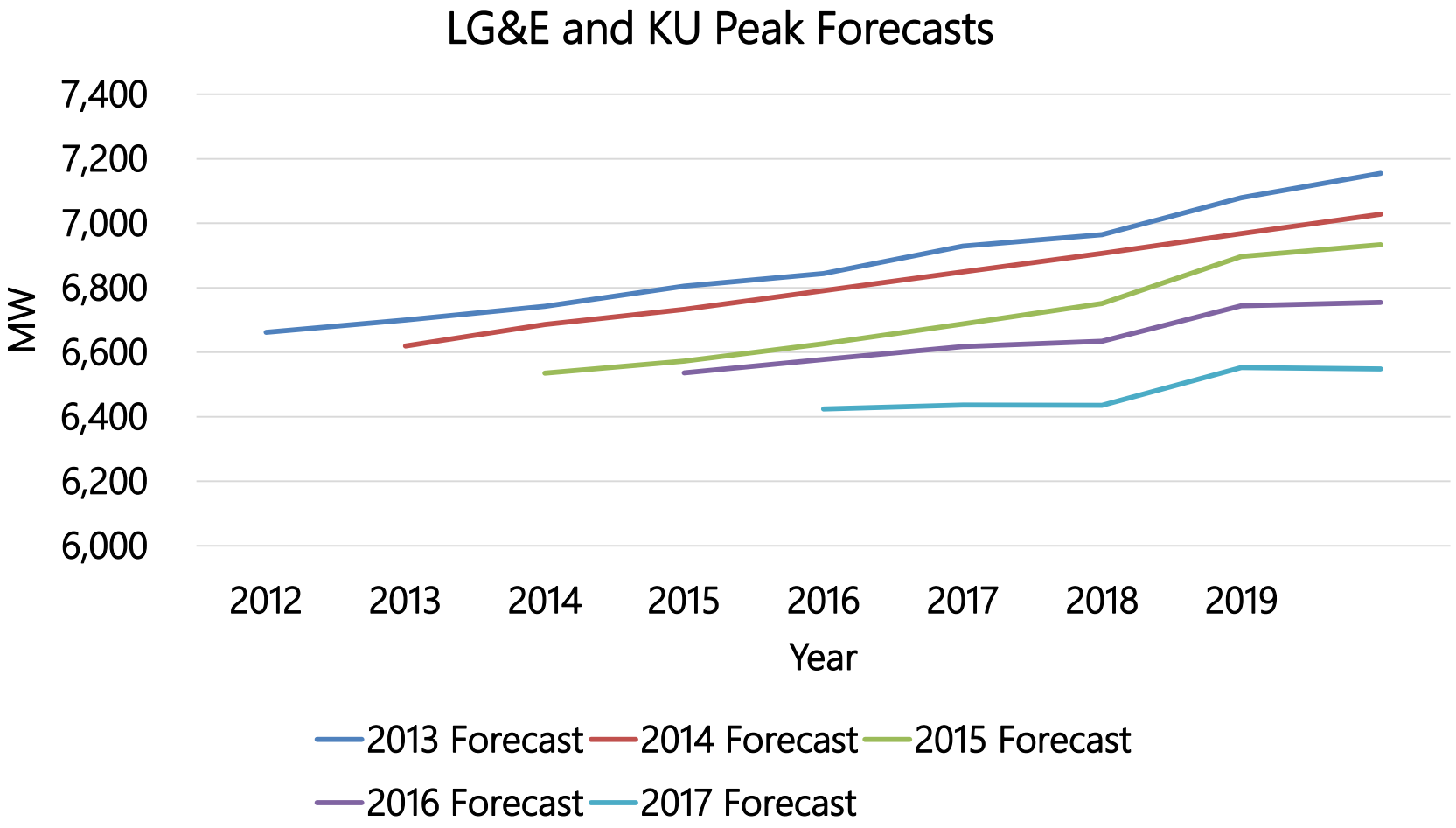
- **LED Lighting**
  - Costs have fallen 90% since 2008; efficiency expected to double by 2025.
  - Department of Energy forecasts 48% market share by 2020; 84% in 2030, up from 2% in 2013. This would reduce lighting consumption by 15% in 2020 and 40% in 2030.
- **Space Cooling**
  - New standard for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



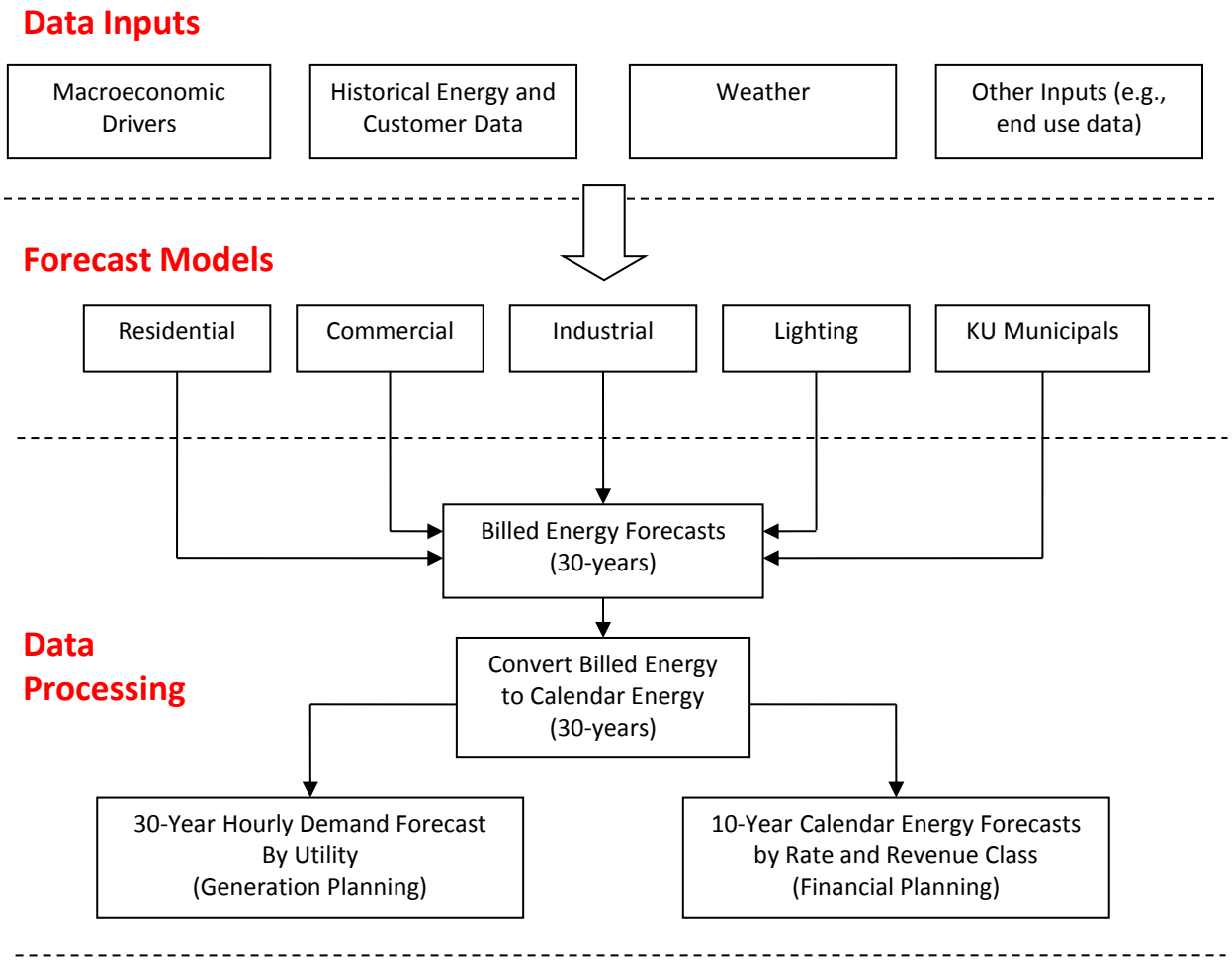
Structural Headwinds May Lead to Declining US Electricity Growth

- **Morgan Stanley forecasts US electricity consumption to decrease by ~0.3% annually over the next decade**
  - Forecast uncertainty skewed to the downside given the potential for efficiency breakthroughs and / or incremental government regulations
  - Gross domestic product, population, computing, and electric vehicles provide the most upside
- **Energy Information Administration (EIA) forecasts 0.3% compound annual growth rate for residential sales (2015-2040)**
  - Reduced from 0.5% in previous Annual Energy Outlook
- **Petroleum Industry Research Associates (PIRA) forecasts 0.54% compound annual growth rate in electricity sales through 2035**
  - Reduced from 0.83% in previous forecast

LG&E and KU Energy Expects Slower Load Growth



Load Forecasting Process



Summary of Forecast Data Inputs

Data	***Source***	***Format***
State Macroeconomic and Demographic Drivers (e.g., Employment, Wages, Households, Population)	IHS Global Insight, Kentucky Data Center	Annual or Quarterly by County – History and Forecast
National Macroeconomic Drivers	IHS Global Insight	Annual or Quarterly – History and Forecast
Personal Income	IHS Global Insight	Annual by County
Weather	NOAA	Daily HDD/CDD Data by Weather Station – History
Bill Cycle Schedule	Internal Records	Monthly Collection Dates – History and Forecast
Appliance Saturations/Efficiencies	EIA, 2010 LG&E/KU Residential Customer Survey	Annual – History and Forecast
Structural Variables (e.g., dwelling size, age, and type)	EIA, 2010 LG&E/KU Residential Customer Survey	Annual – History and Forecast
Elasticities of Demand	EIA / Historical Trend	Annual – History
Billed Sales History	Billing System	LG&E, KU and ODP – Monthly by Rate Group
Number of Customers History	Billing System	LG&E, KU and ODP – Monthly by Rate Group

Models and Methods

- Residential & Small Commercial forecasts utilize a statistically adjusted end-use framework
- Econometric models for all other forecasts
- Industrial forecasts developed as a function of production indices
- Direct input from large customers and major account managers

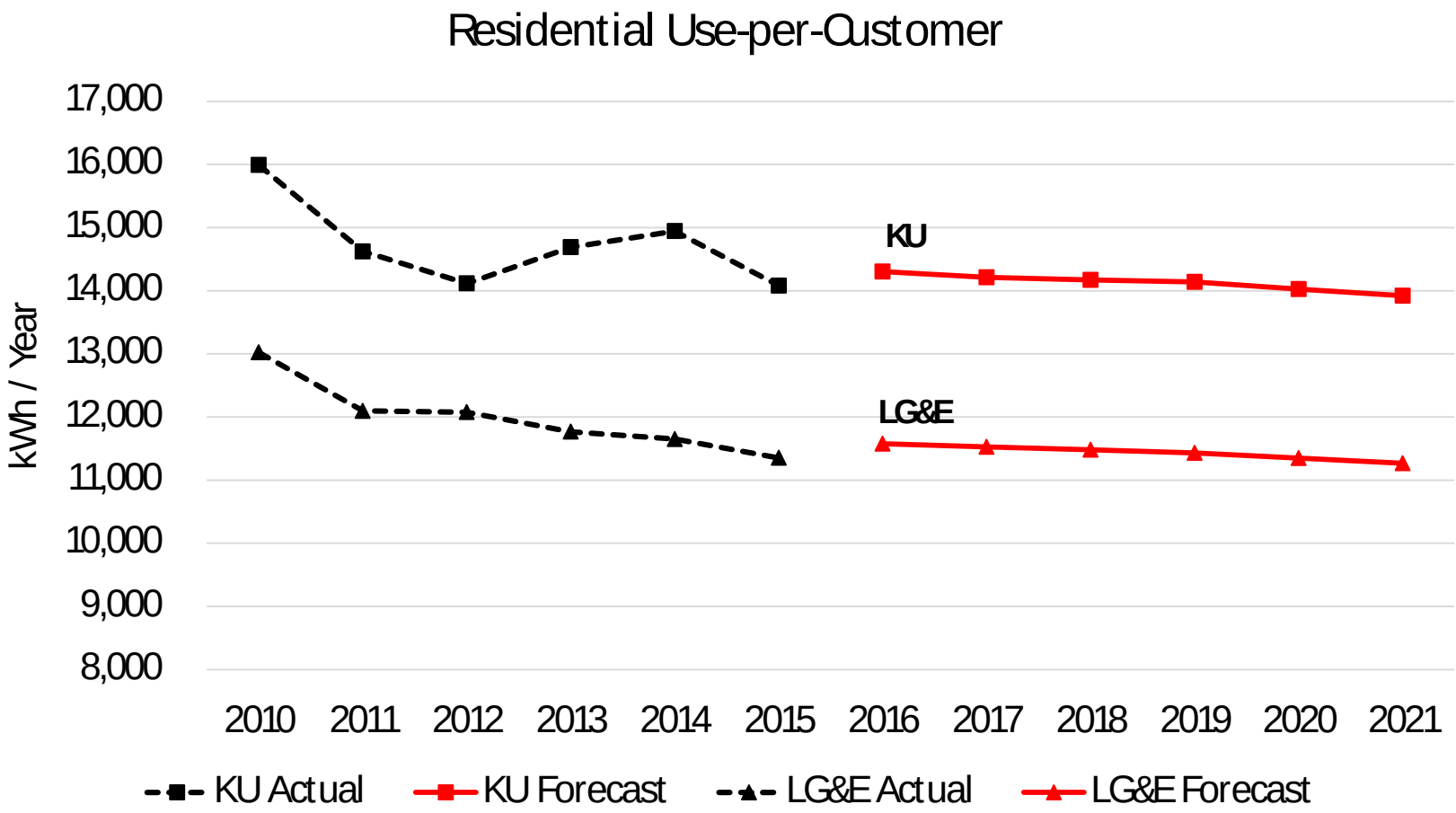
Statistically Adjusted End-Use (SAE) Modeling

- SAE models explicitly incorporate trends in equipment efficiencies and saturations, dwelling square footage, and structural characteristics into the monthly sales forecast.

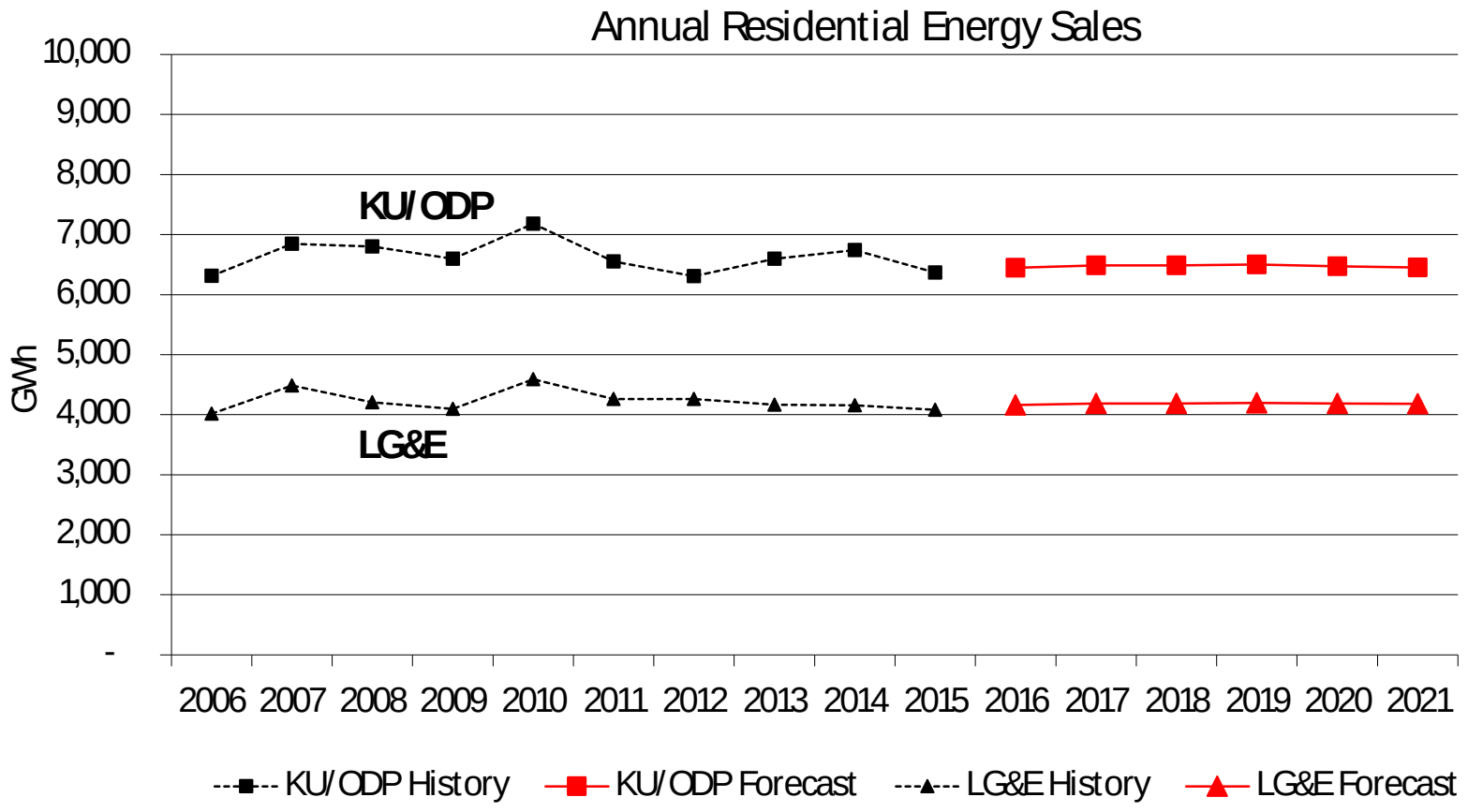
- By explicitly incorporating these trends, SAE model provides framework for estimating changes in usage levels and changes in weather-sensitivity over time.

- SAE model also incorporates price and economic elasticity inputs.

Residential Use-Per-Customer is Declining



Energy Efficiency Offsets Residential Customer Growth



Downside Uncertainty likely Outweighs Upside Uncertainty

- **Downside Uncertainty**
  - Faster LED adoption
  - General US recession

- **Upside Uncertainty**
  - Rapid Electric Vehicle (EV) expansion
  - Major economic development

Summary

- Relationship between US electricity demand and GDP has changed
- Industrial growth appears limited based on history
- Declining residential use-per-customer offsets impact of residential customer growth
- Forecasted growth in total load is limited

SERTP

Public Policy Requirements Stakeholder Proposal

SERTP Evaluation

Transmission Needs Driven by Public Policy Requirements (PPRs)

- **Two (2) stakeholder proposals submitted for the 2017 planning cycle for the following proposed PPRs:**
  1) *North Carolina Renewable Energy and Energy Efficiency Portfolio Standard*
  2) *Hazardous and Solid Waste Management Systems, National Primary Ambient Air Quality Standards for Sulfur Dioxide, National Ambient Air Quality Standards for Ozone, Clean Water Act Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, Cross-State Air Pollution Rule*
- **No transmission needs for the proposed Public Policy Requirements have been identified for further evaluation of potential transmission solutions in the 2017 planning cycle.**
- **Response posted on the SERTP website.**

Next Meeting Activities

- **2017 SERTP 2nd Quarter Meeting**
  - **Location: TBD**
  - **Date: June 2017**
  - **Purpose:**
    - Review Modeling Assumptions
    - Discuss Preliminary 10 Year Expansion Plan
    - Stakeholder Input & Feedback Regarding the Plan

Questions?

www.southeasternrtp.com