Southeast Alaska Power Agency

2016 Electric Load Forecast

April 13, 2017

D. Hittle & Associates, Inc.

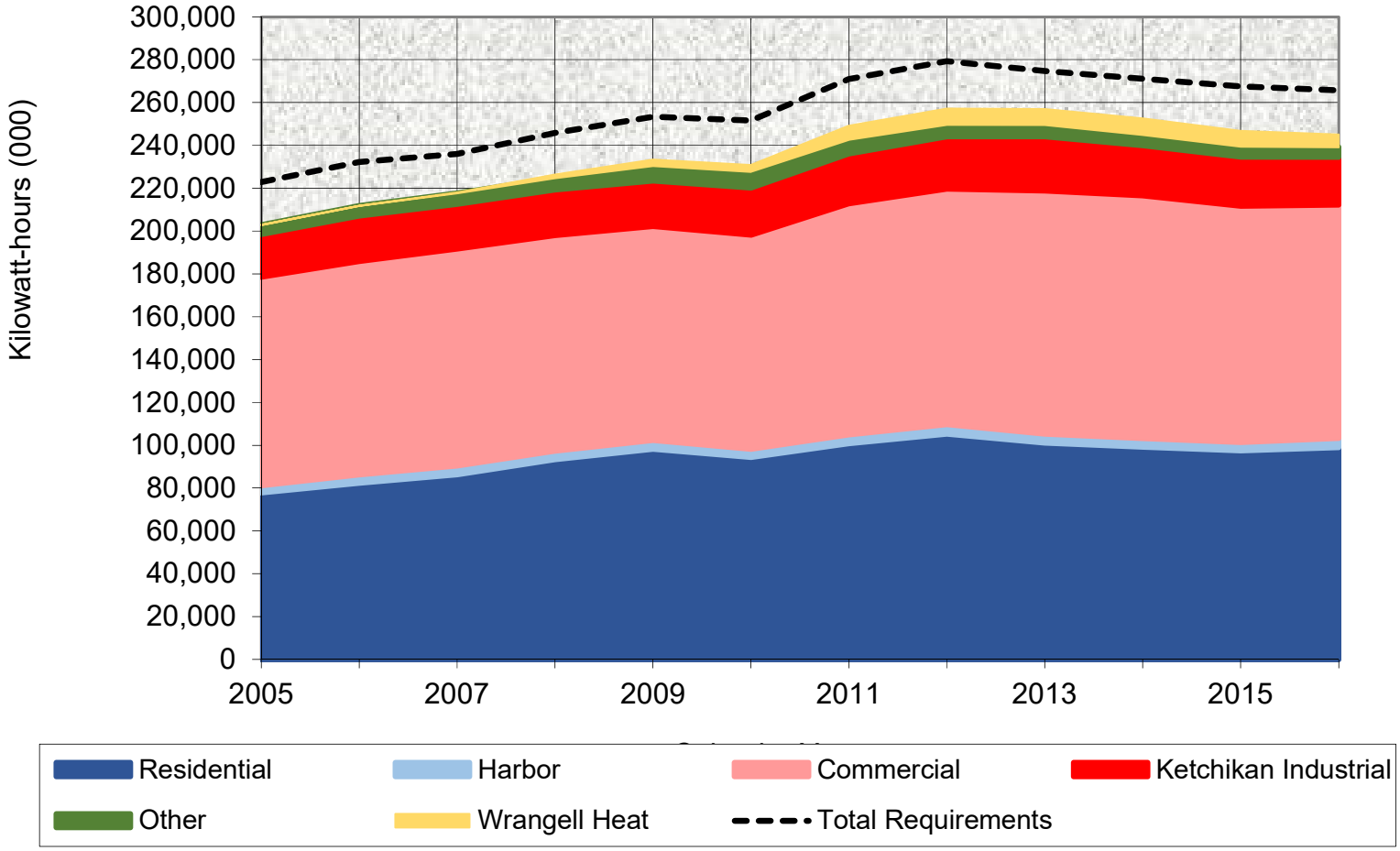
Overview

- Introduction
- Methodology of analysis
- Basic Assumptions
- Results
- Questions

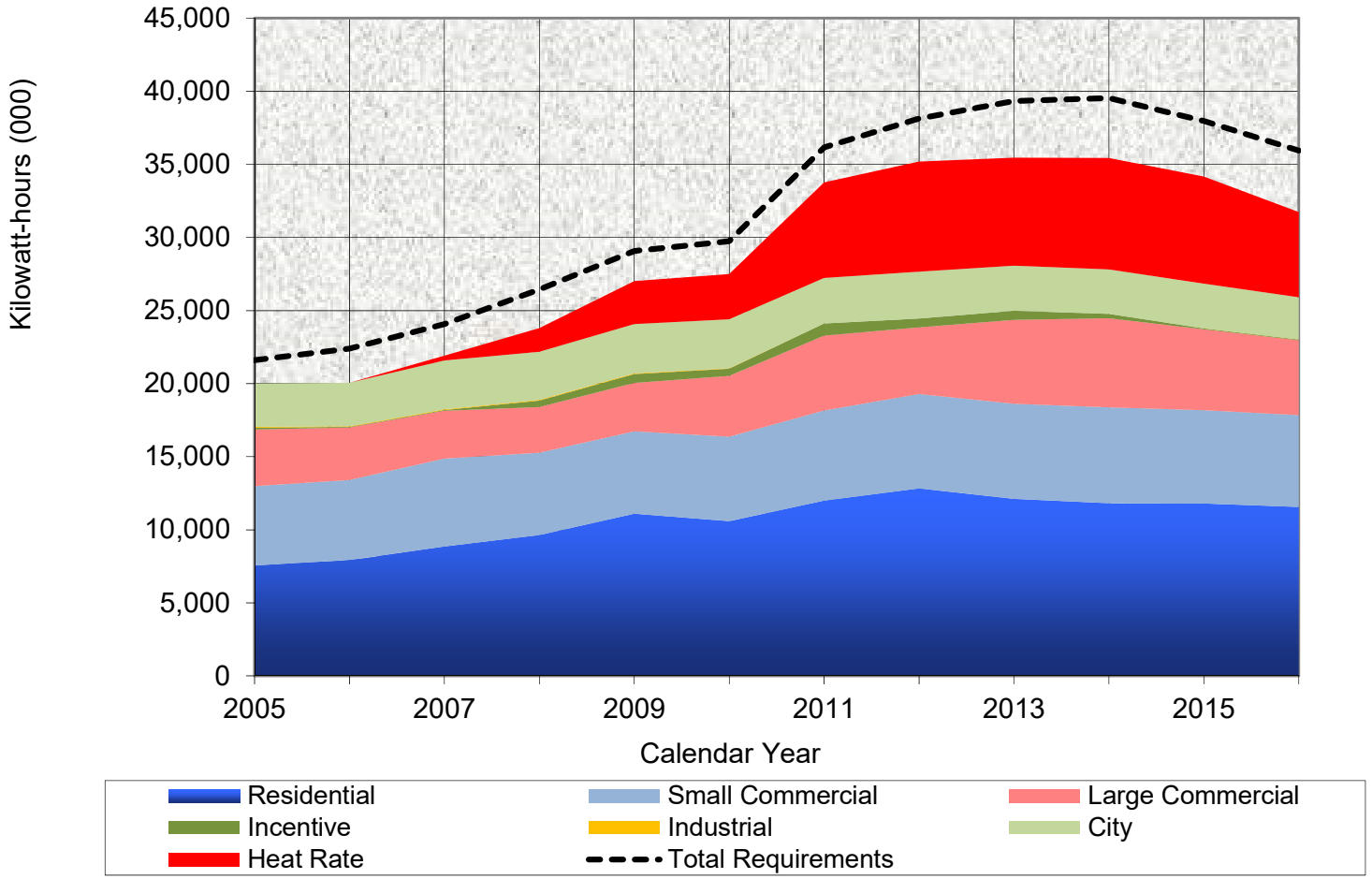
Introduction

- 20-year annual forecast of customers, energy requirements and peak demand for each utility
- Draft report completed and submitted last fall
- Model independently forecasts customers and energy consumption for each customer class for each utility
  - Residential (40% of total sales)
  - Harbor (2% of total sales)
  - Commercial and industrial (53% of total sales)
- Based on historical trends and relationships to independent variables
  - Population
  - Economic activity
  - Weather conditions
  - Price of fuel oil

SEAPA Member Utilities
Total Energy Sales and Requirements
2005-2016



Wrangell Municipal Light & Power
Total Energy Sales and Requirements
2005-2016



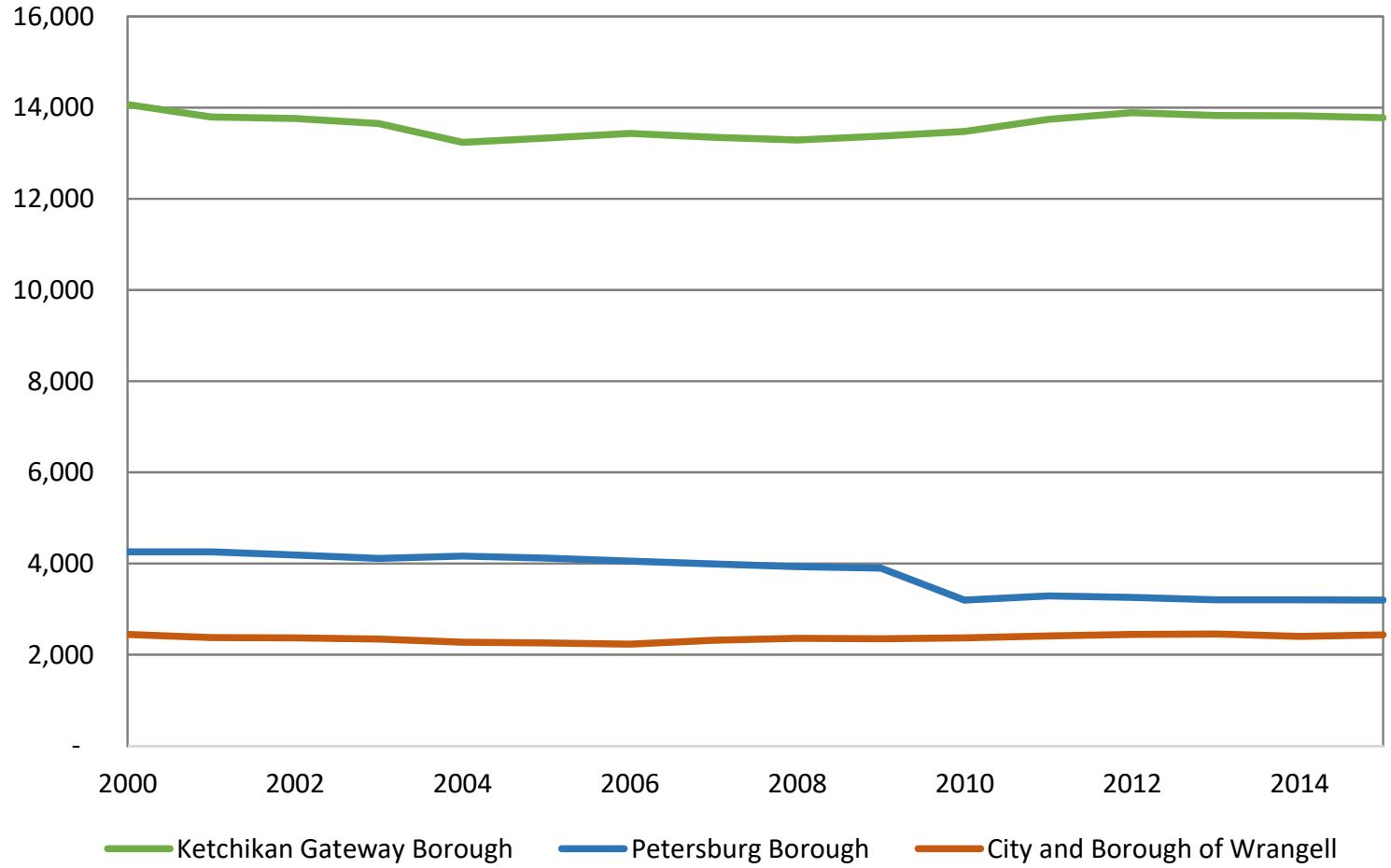
Methodology

- Establish relationship between number of accounts and population
  - Persons per residential account
  - Residential accounts per commercial account
- Obtain and review recent population projections and other projections
- Evaluate trends in electricity consumption
  - Determine affect of weather and price of oil
- Project commercial and industrial sales based on historical trends and expected economic activity

Electric Accounts

- Total electric accounts 2015 (2005-2015 average annual increase)
  - Ketchikan 7,692 (0.6% per year)
  - Petersburg 2,128 (0.3% per year)
  - Wrangell 1,904 (2.3% per year)
- Residential electric accounts 2015 (2005-2015 average annual increase)
  - Ketchikan 5,854 (0.4% per year)
  - Petersburg 1,378 (0.1% per year)
  - Wrangell 1,103 (0.5% per year)

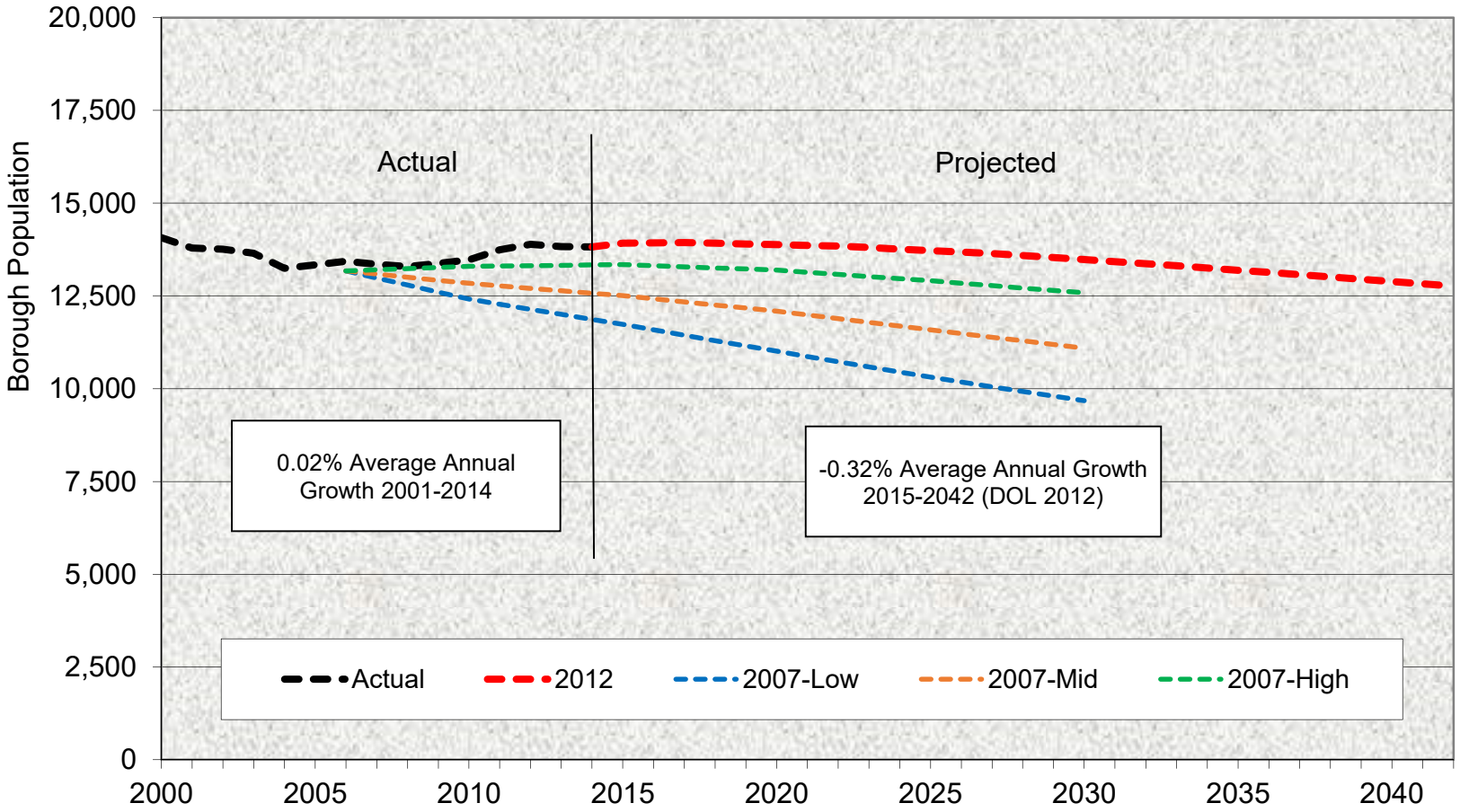
Population (2000-2015)



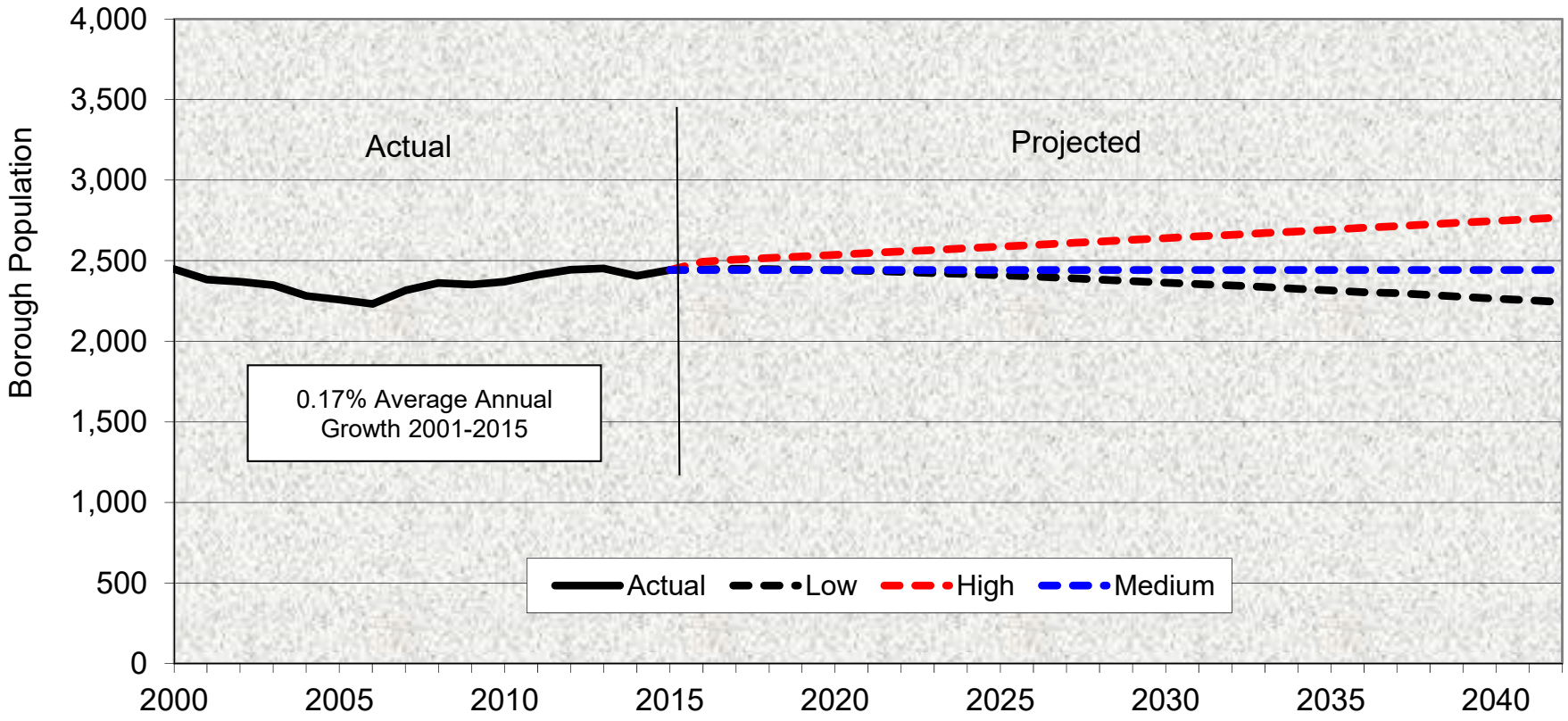
Population Projections

- Alaska Department of Labor
- Average annual change (2012-2042)
  - Ketchikan -0.4%
  - Petersburg -0.9%
  - Wrangell -0.4%
- Medium and high forecasts (assumed)
  - Medium No change
  - High 0.4% per year

Population (Ketchikan DOL 2007 vs 2012)



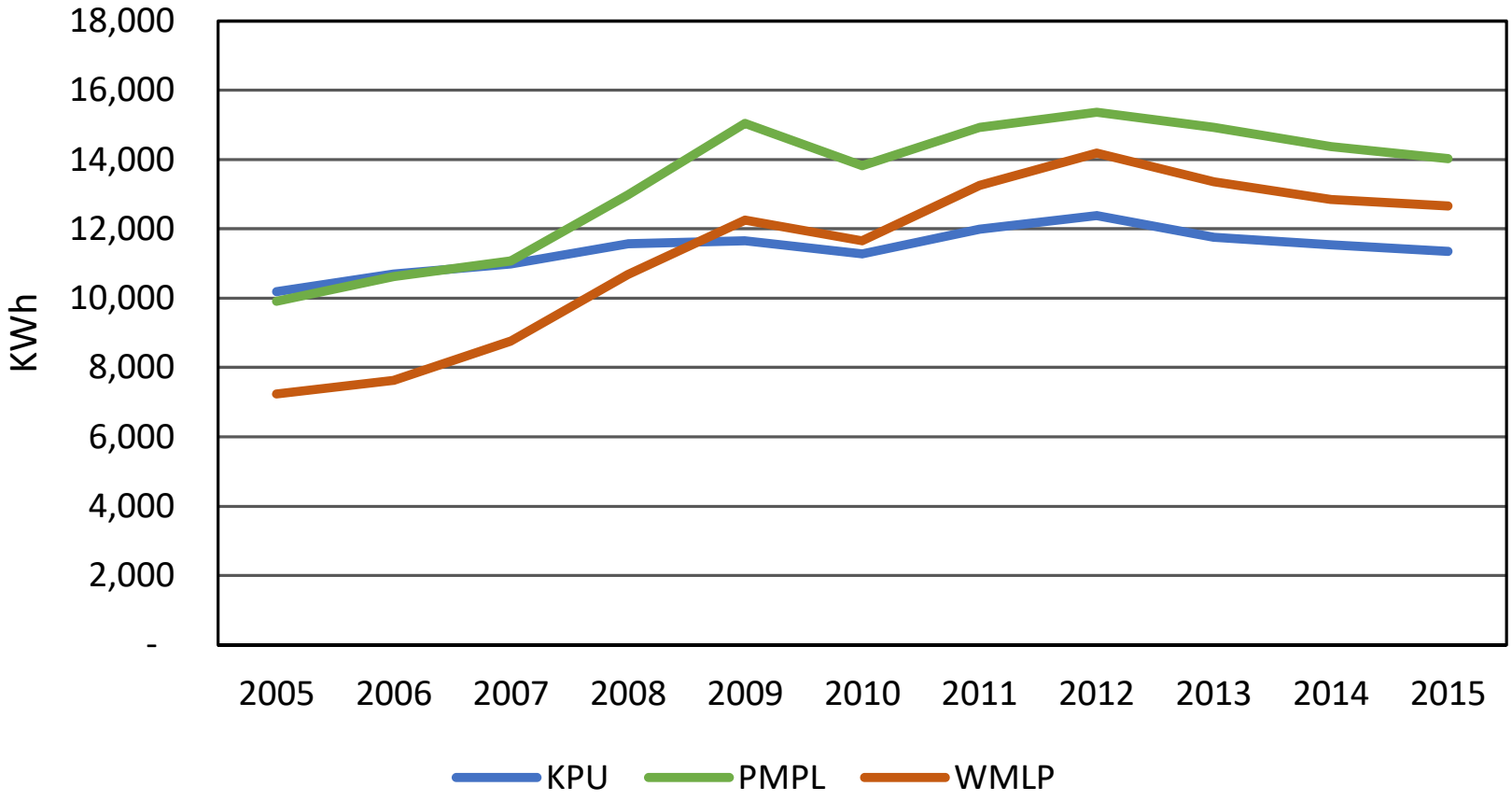
Population (City & Borough of Wrangell)



Persons per Residential Account

- Slight decrease over time (2015)
  - Ketchikan 2.35
  - Petersburg 2.32 (3.04 in 2005)
  - Wrangell 2.22
- Assumed to remain constant until 2020
  - Slight decrease thereafter (0.1% per year)

Energy per Residential customer

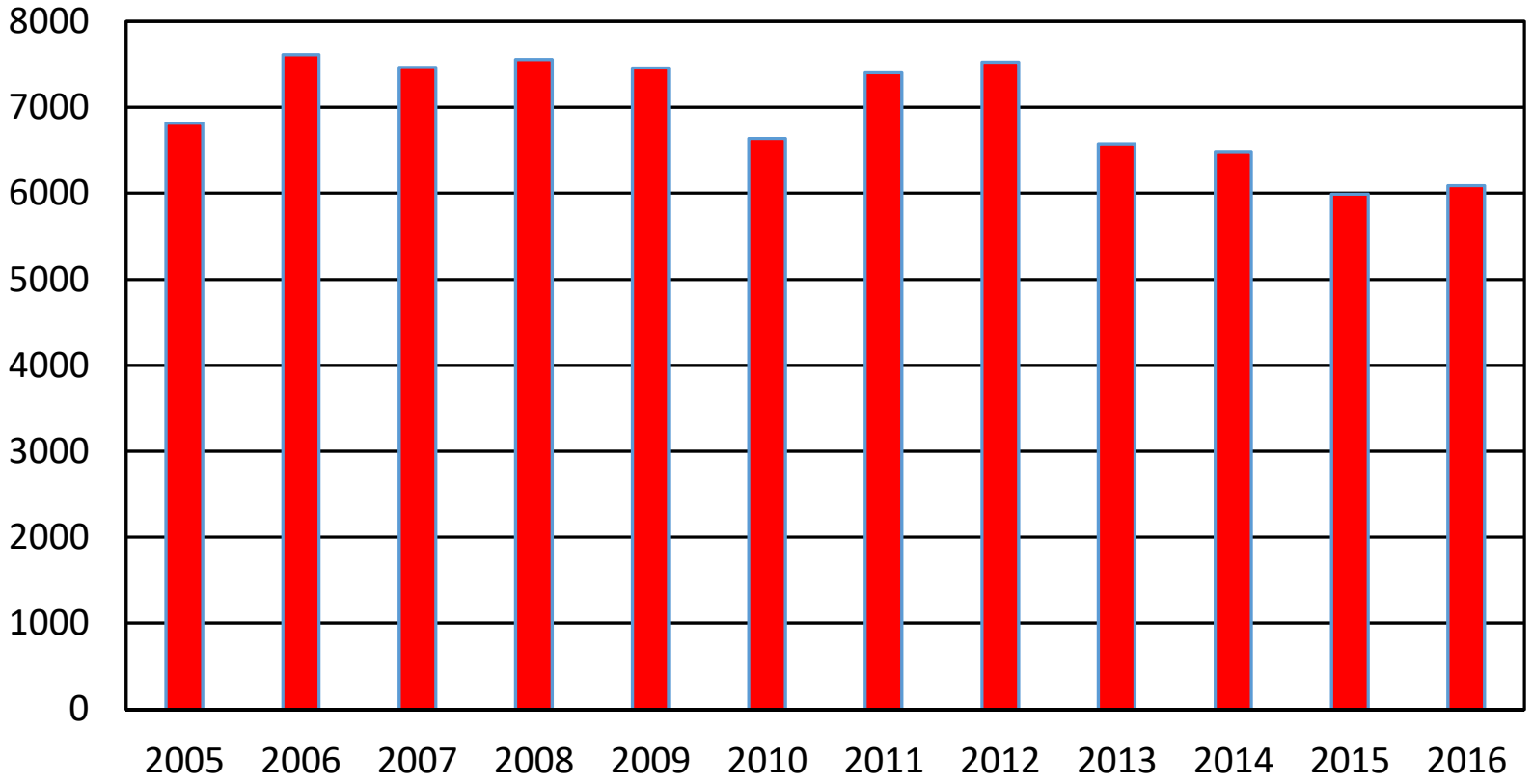


Evaluation of energy consumption
(Regression Analysis)

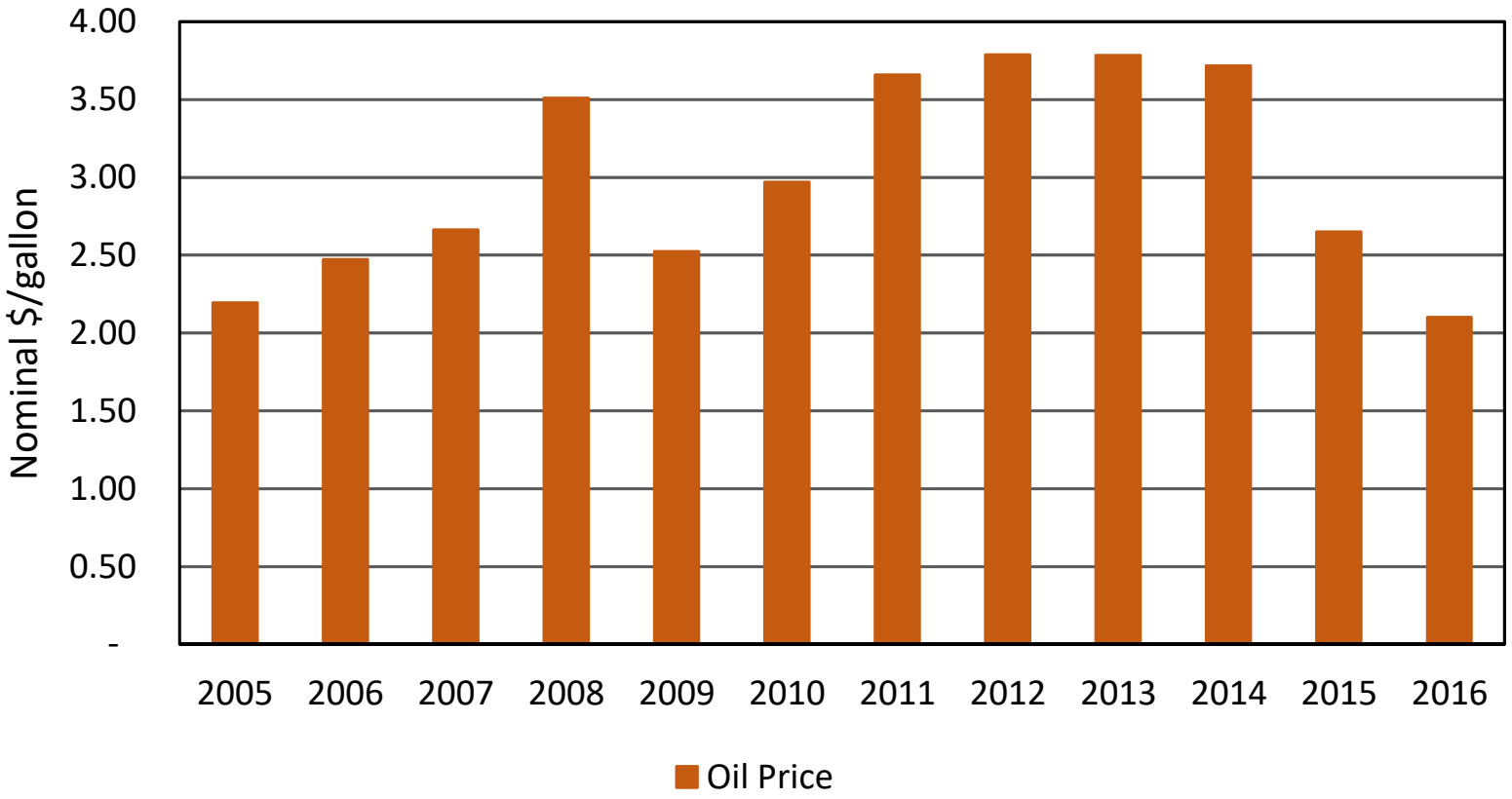
- Heating degree days
  - Good relationship in all communities for residential
- Precipitation
  - No significant relationship
- Price of heating oil
  - Limited relationship

Evaluation of energy consumption

(Heating Degree Days HDD – Ketchikan average 7,262)



Evaluation of energy consumption
(Price of heating oil)



Forecast assumptions

- Return to average HDD by 2018
- Population projections
  - DOL estimate for low case
  - 0.4% average increase for high case
- Number of Harbor and Commercial accounts related to residential

Commercial Forecasts

- Number of residential customers per commercial customer
  - Based on historical relationship
  - Fairly consistent decrease over time
  - Projected to continue to decrease slightly
- Energy consumption
  - Evaluated relationship to HDD and other variables

Large Commercial Forecasts

- Number of accounts assumed to remain relatively constant
- Energy consumption
  - Assumed to increase slightly in Ketchikan through 2020 – hold constant after that
  - Assumed to increase slightly each year in Wrangell
- Ketchikan Shipyard
  - Energy consumption assumed to remain constant

Wrangell Heat Rate

- Number of accounts projected to increase somewhat over time
  - 1.5% annual increase through 2020
  - 0.5% annual increase thereafter
- Energy consumption
  - Related to HDD
  - Projected to increase over time

Other factors

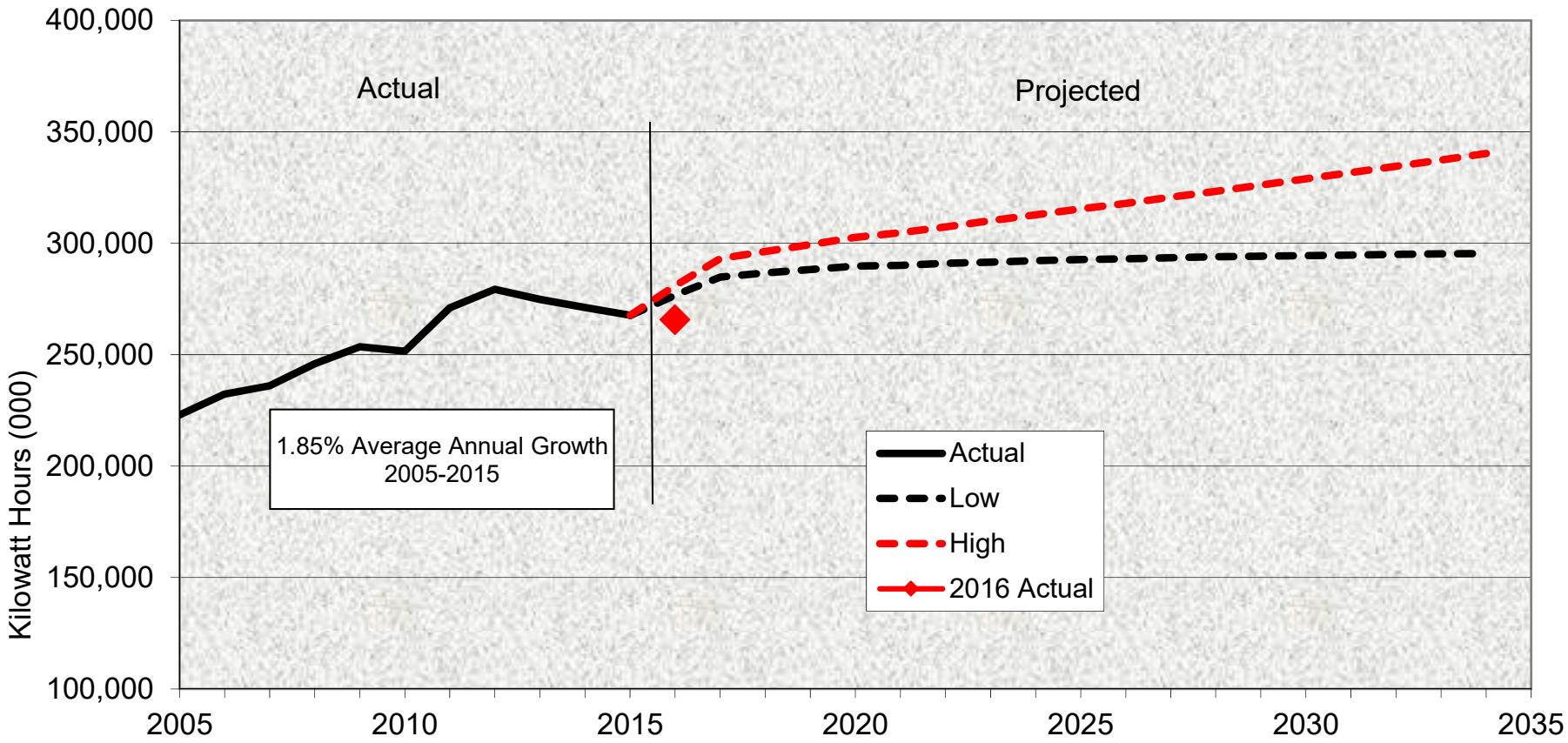
- Utility own use
  - Based on historical usage
- Losses
  - Based on recent historical average
- Total energy requirements
  - Total sales plus losses and own use

Forecasted Energy Requirements

- Low case average growth 2015-2035
  - Ketchikan 0.53%
  - Petersburg 0.0%
  - Wrangell 0.99%
- High case average growth 2015-2035
  - Ketchikan 1.35%
  - Petersburg 1.13%
  - Wrangell 1.68%

Forecasted Energy Sales and Requirements

SEAPA Member Utilities Total Requirements



Peak Demand

- Forecast based on typical annual loadfactor
- Peak affected by short-term conditions
- Annual forecast misses impact of significant conditions
- Actual peak 2015 - 2016
  - Ketchikan 30,000 - 31,900 KW
  - Petersburg 9,990 – 11,870 KW
  - Wrangell 7,820 – 8,670 KW

Other Elements of Study

- Monthly loads
- Typical variance between daily minimums and maximums
  - About 12 MW for SEAPA system, varies seasonally
- Short term forecast of daily loads
  - Established relationship between average temperature and week before load
  - Non-summer months correlate fairly well

Questions