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# ERCOT Long-Term Demand and Energy Forecasting

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# ERCOT Load Forecasts

- ERCOT uses three primary load forecasts
  - Long Term
  - Mid-Term
  - Short Term
- Each forecast has its own specific application, purpose and methodology

# Long-Term Load Forecast

- Period covered – 1 to 15 years
- Process and tools developed internally by ERCOT
- Used for:
  - Annual budget development - Energy
  - System Planning studies
  - Resource adequacy assessments
    - Capacity, Demand and Reserve (CDR) report
    - Seasonal and long-term assessments
  - Weekly forecast for outage coordination
  - Statement of Opportunities report
  - PUC/NERC/DOE/FERC reporting

# Forecasting Methodology History

- 1999 to 2004: Simple trend from historical peak and energy data applying engineering judgment
- 2005 to present: Econometric techniques that consider long-term economic growth trends, weather profiles, and calendar variables that capture the hourly, weekly, monthly and annual load patterns
  - Methodology reviewed by various ERCOT market participants in 2005 per TAC request

# Forecasting Inputs and Sources

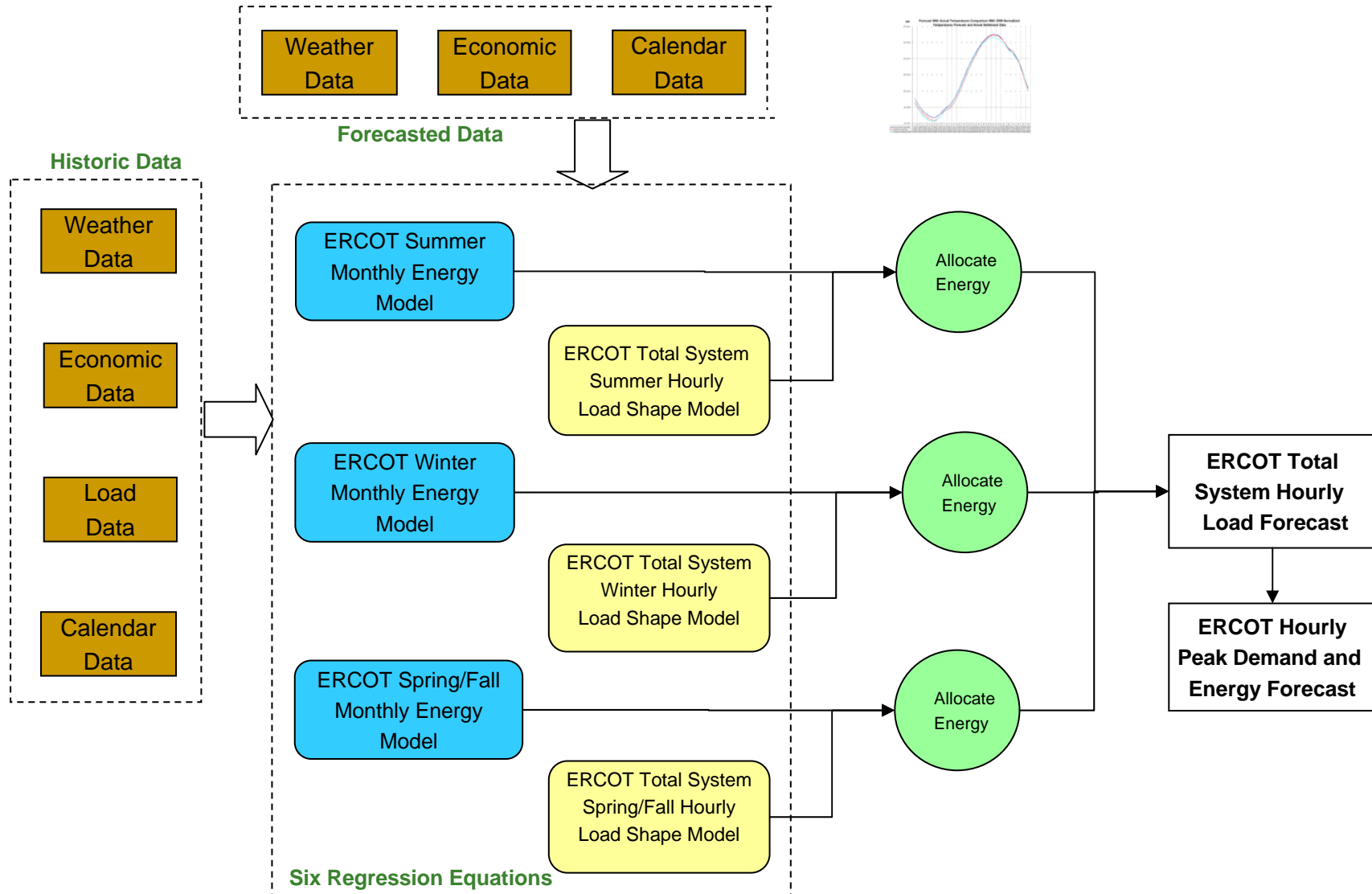
- Economic history and forecast for Texas
  - Source is Moody's Economy.com
  - Proprietary data
    - Population
    - Income
    - Other economic variables
- Historic weather data from each ERCOT weather zone
  - Source is WeatherBank
  - Not a weather forecast
    - Temperature
    - Humidity
    - Cooling Degree Days (CDD)
    - Heating Degree Days (HDD)
- Calendar Data
  - Seasonal Variation
  - Daily Variation
  - Weekly Variation
  - Holidays

# Econometric Forecasting Basics

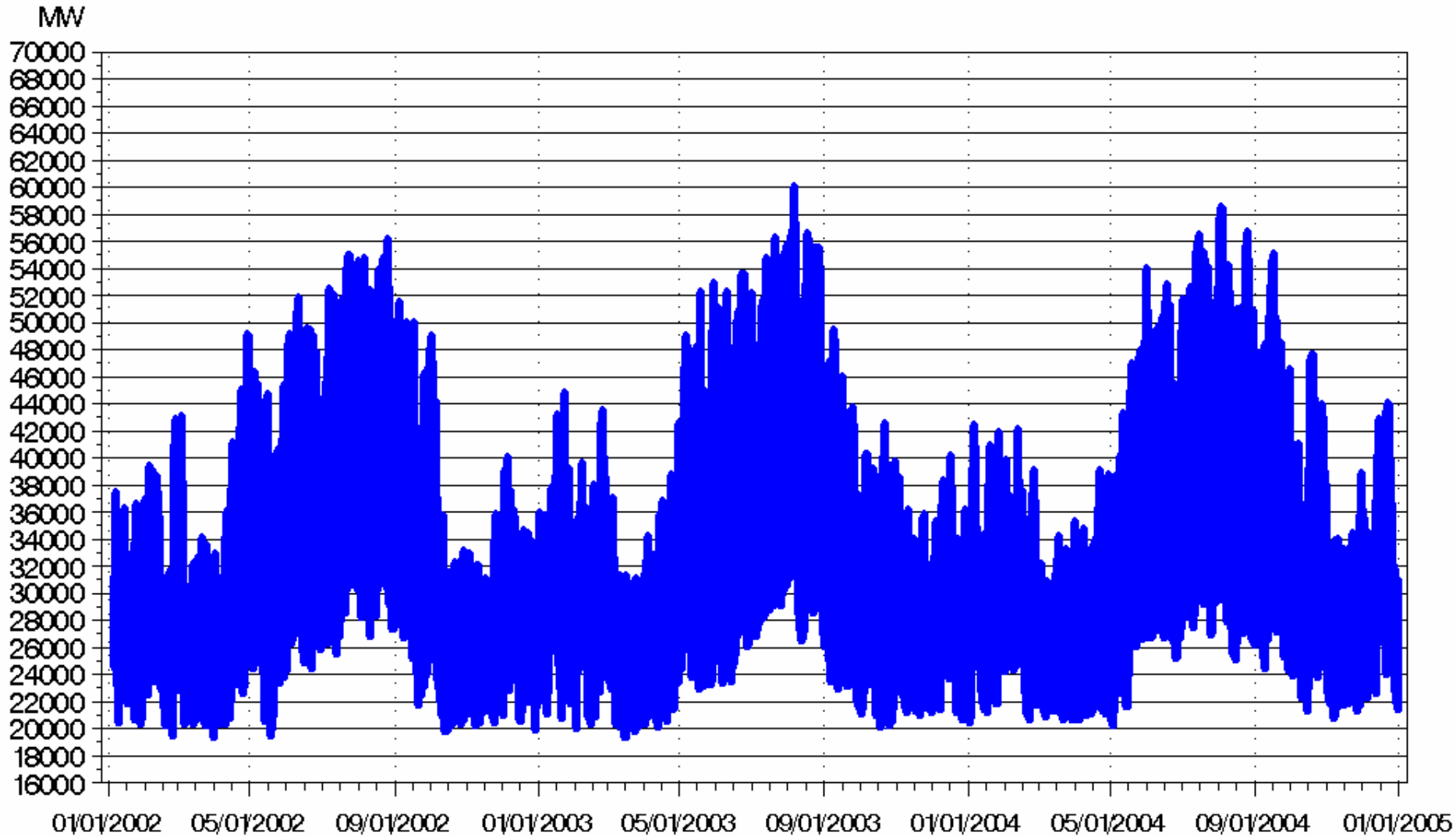
## Regression Analysis:

- Develop an equation (or equations) that describe the historic load as a function of certain independent variables
- Regression analysis is used to calculate the appropriate coefficients on each variable and to choose the best equations describing historical patterns:
  - Monthly energy
  - Hourly load shapes

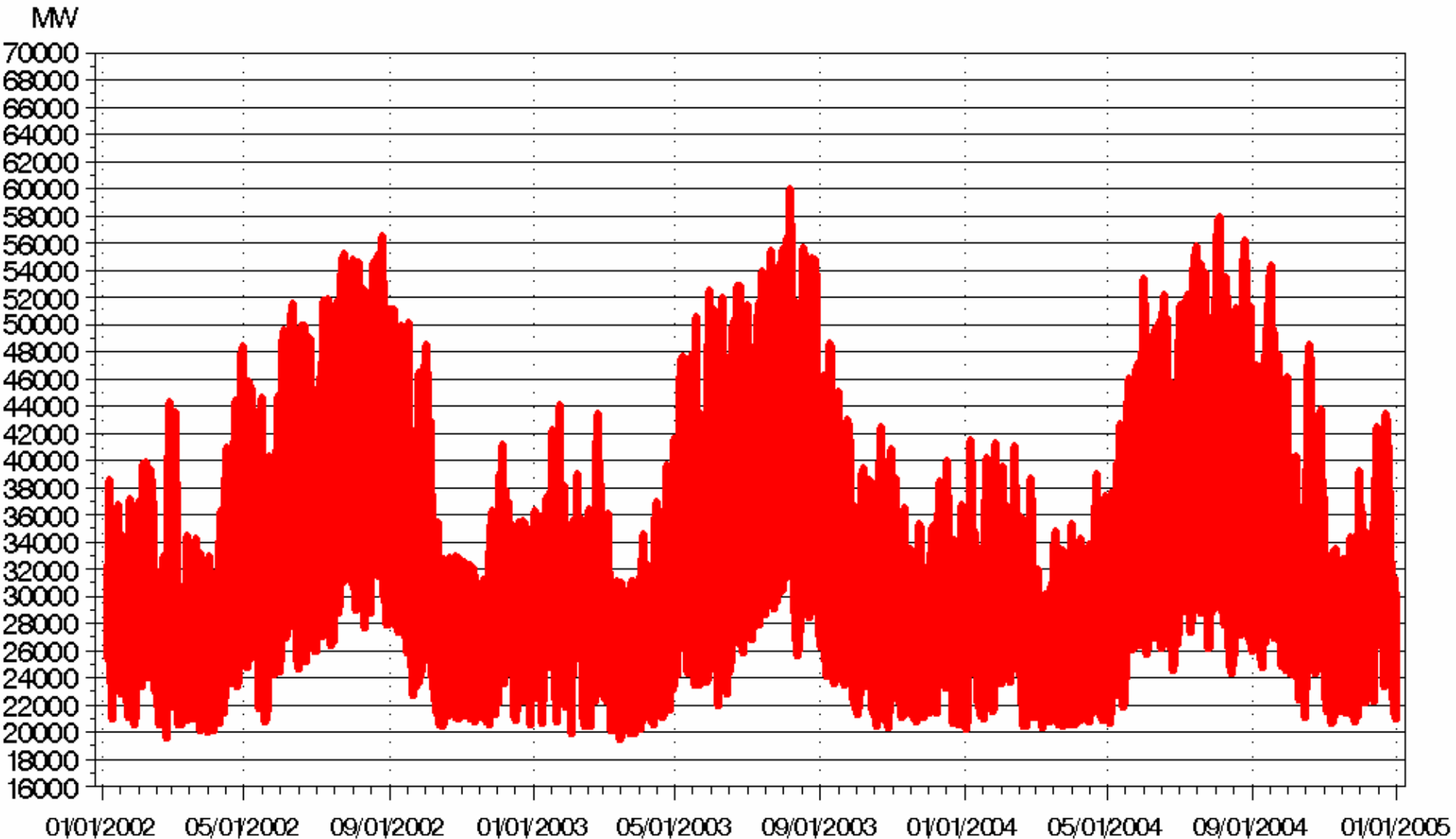
# Planning Forecasting Process



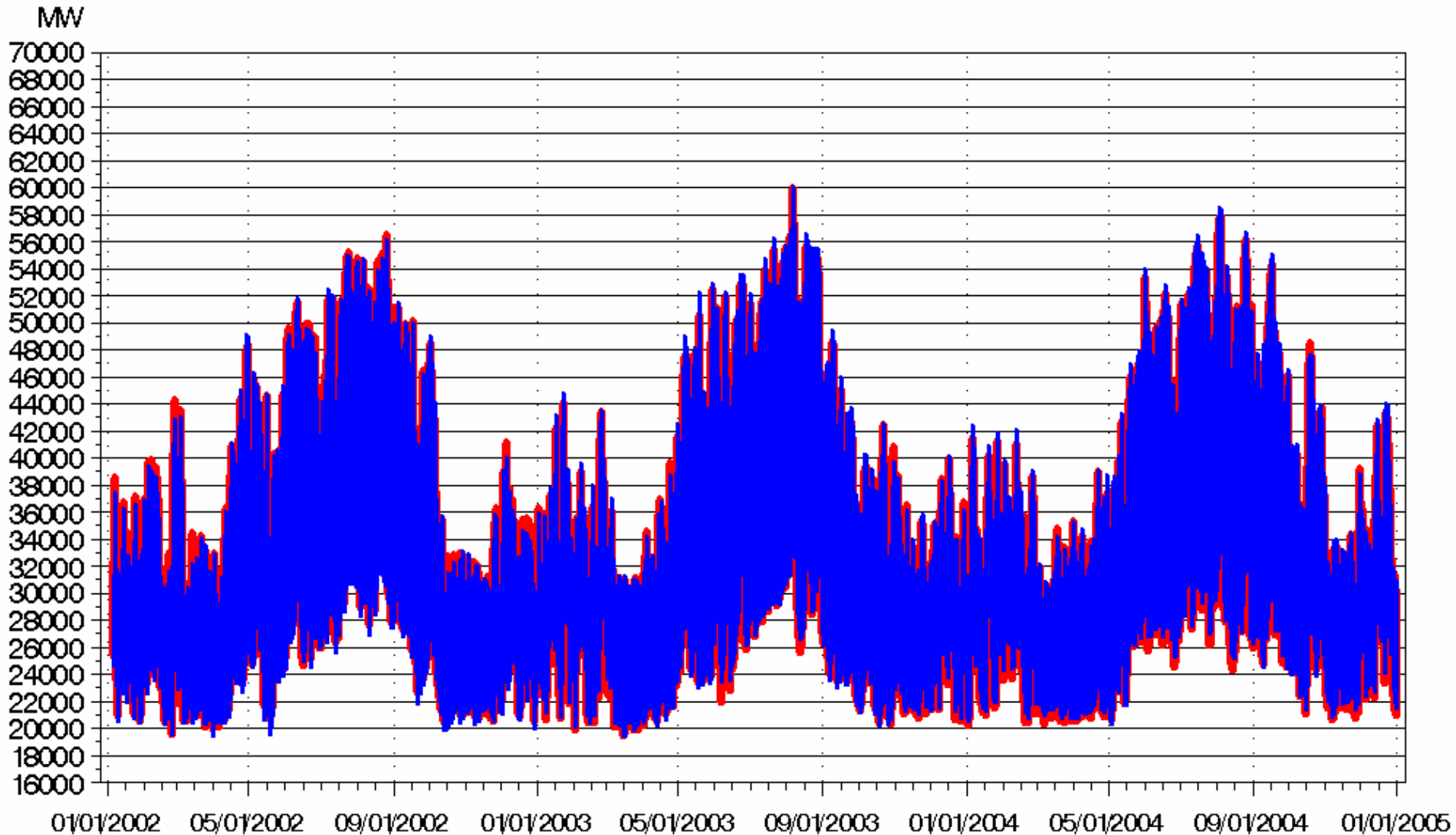
# ERCOT Actual Hourly Load Shape (2002-2005)



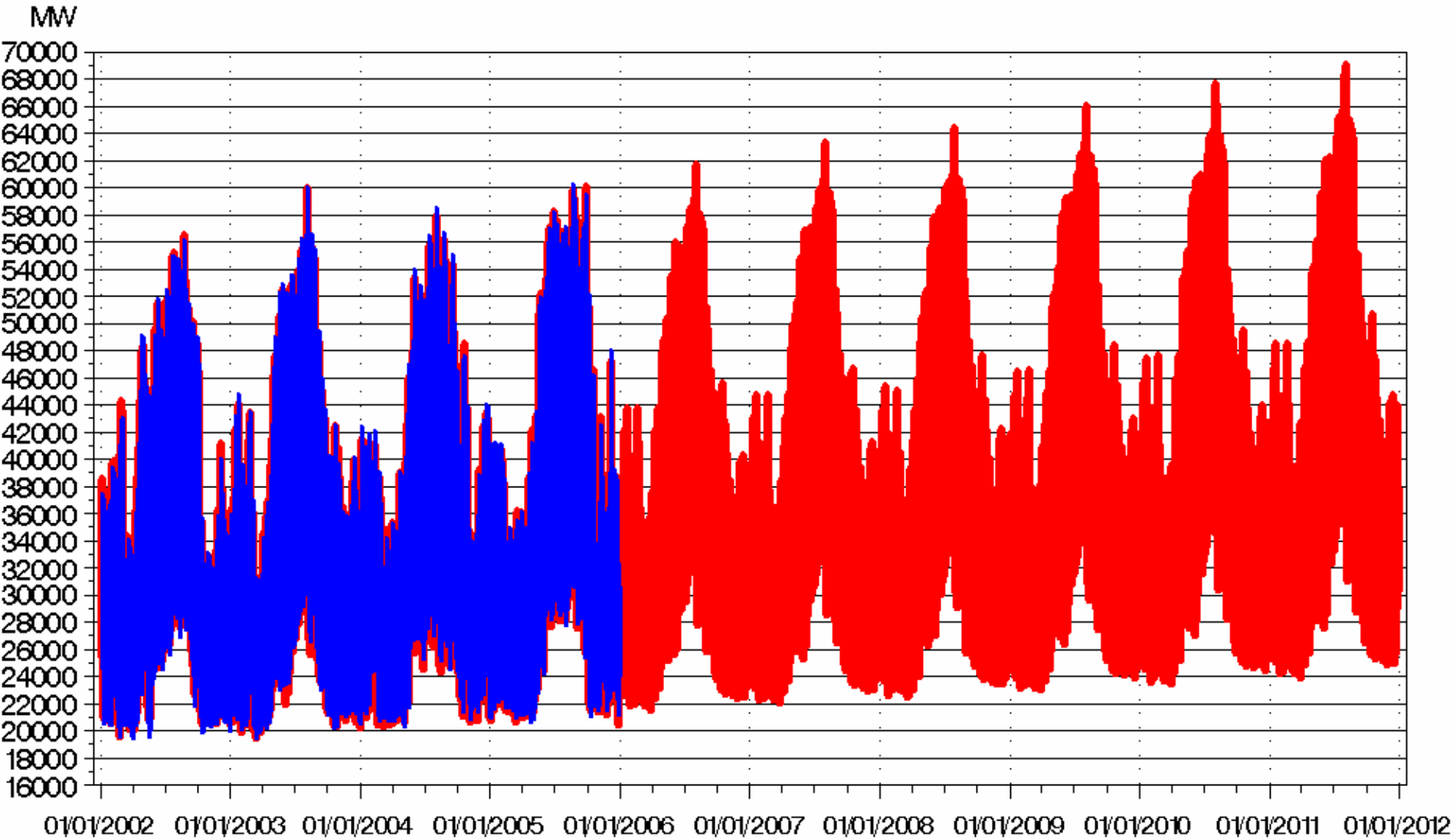
# ERCOT Backcast Hourly Load Shape (2002-2005)



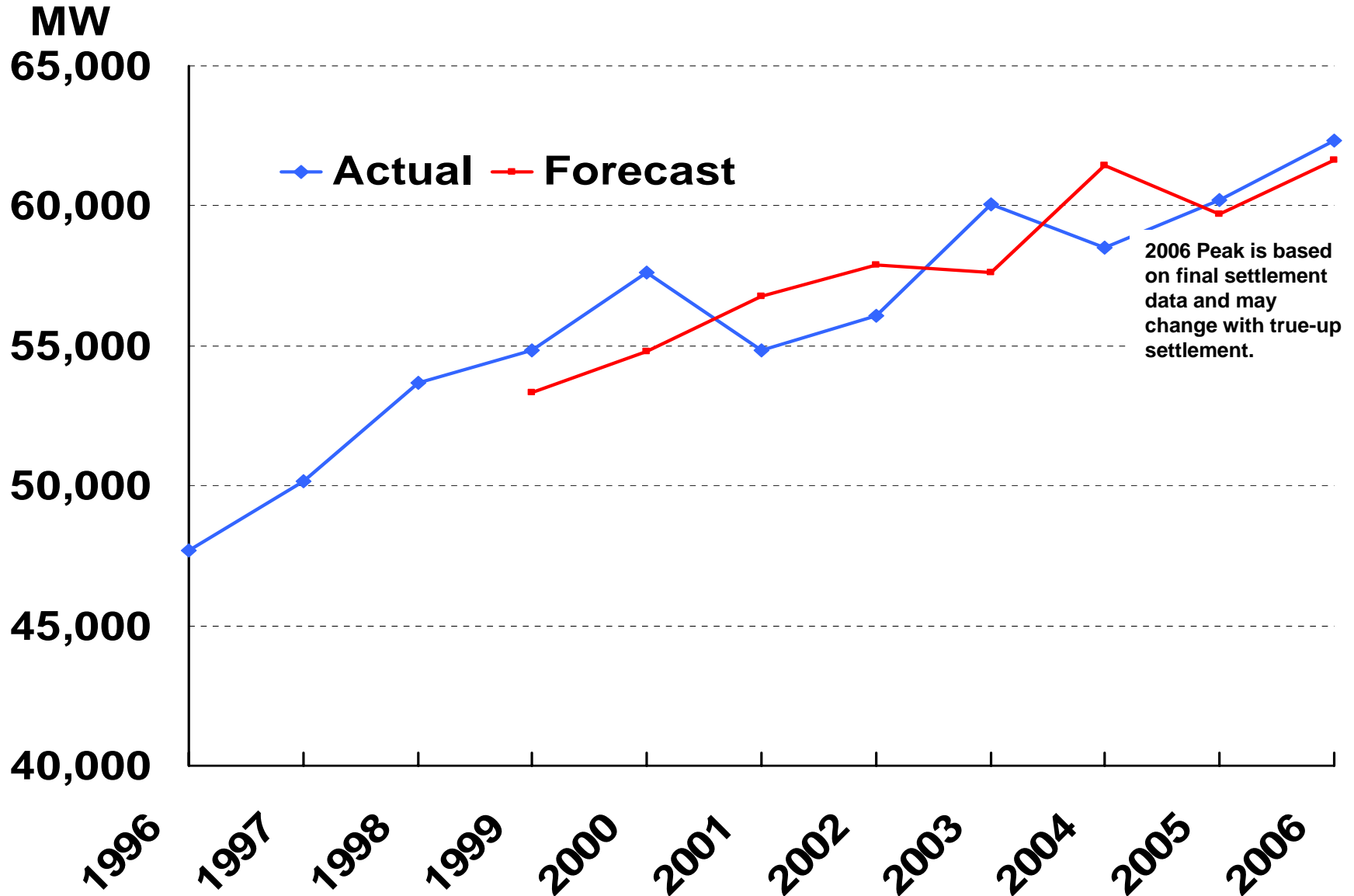
# ERCOT Backcast/Fit Hourly Load Shape (2002-2005)



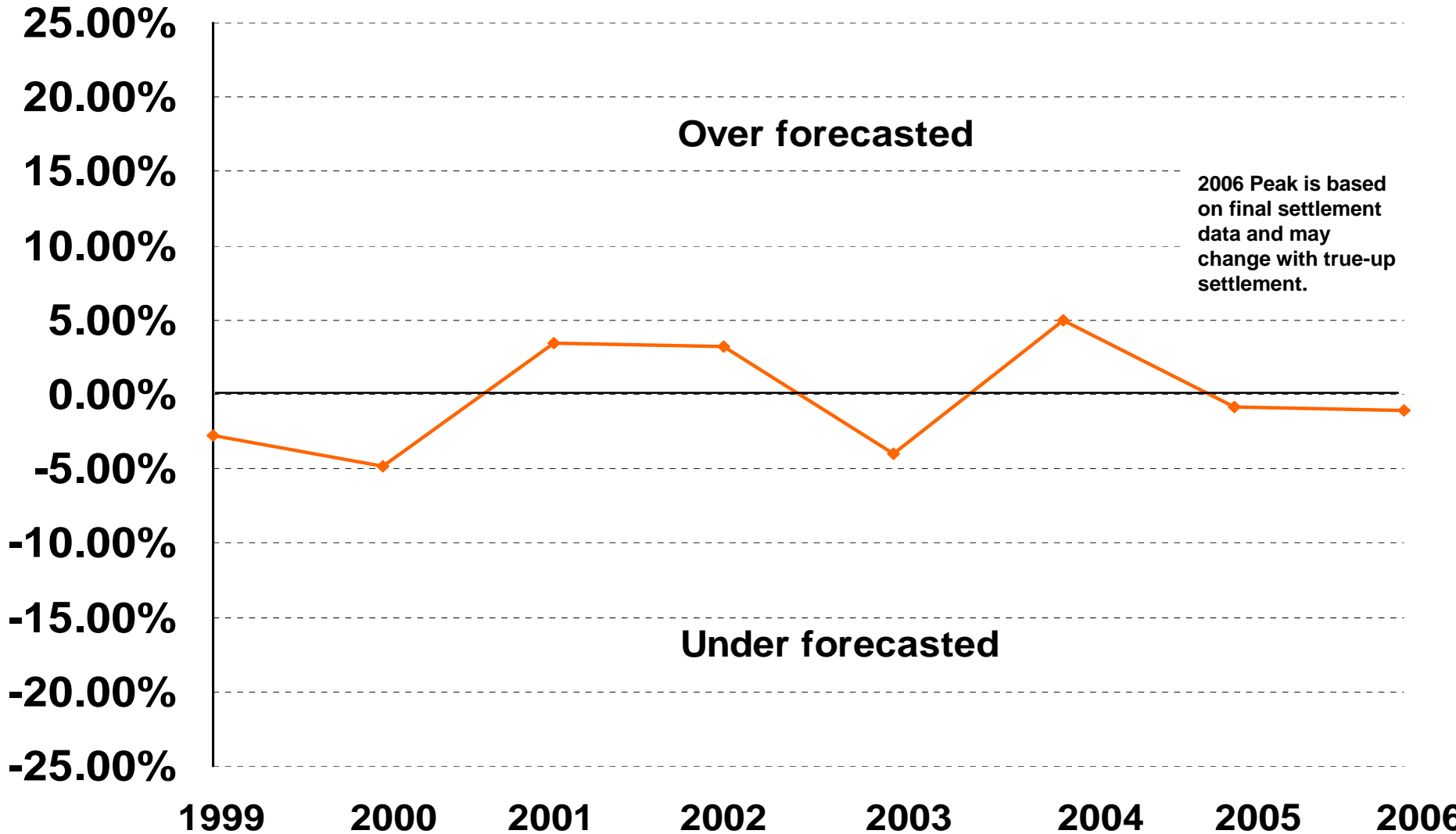
# ERCOT Actual and Forecasted Hourly Load Shape (2002-2012)



# Historical Actual and Forecast Peaks



# Historical Actual and Forecast Peaks

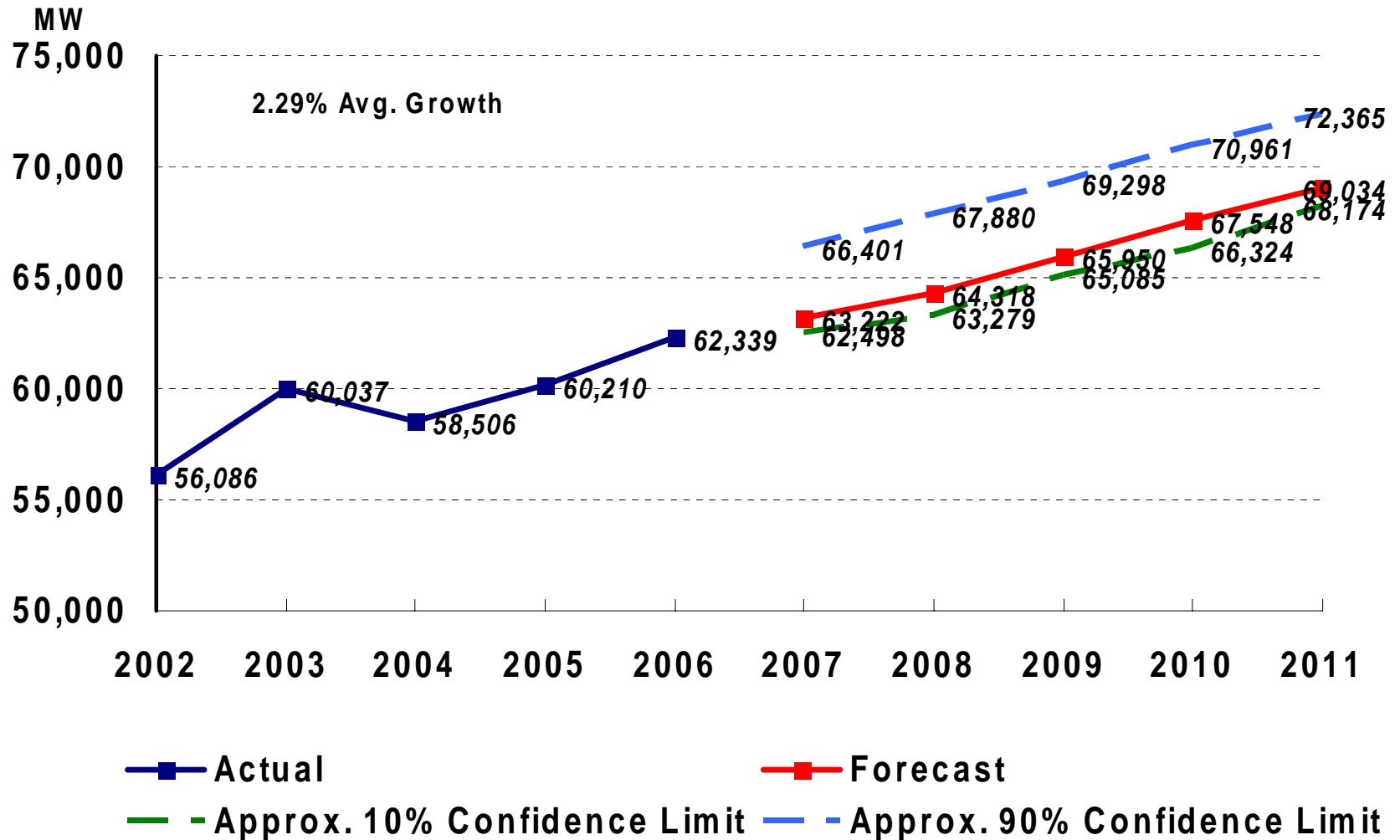


# ERCOT Peak Demand Sensitivity

- Peak demand is calculated based on NORMAL (average) weather.
- 90% confidence bands are obtained by Monte Carlo simulation using a temperature profile ranking above 90% of all temperatures in the historical database. This calculation yields the upper limit of the load forecast sensitivity.
- The 90<sup>th</sup> confidence band is about 5.5 percent higher than the normal.
- The ERCOT target reserve margin is intended to cover such scenarios – no need to calculate reserves over the 90<sup>th</sup> percentile forecast.

# Peak Demand and 90% Confidence Limits

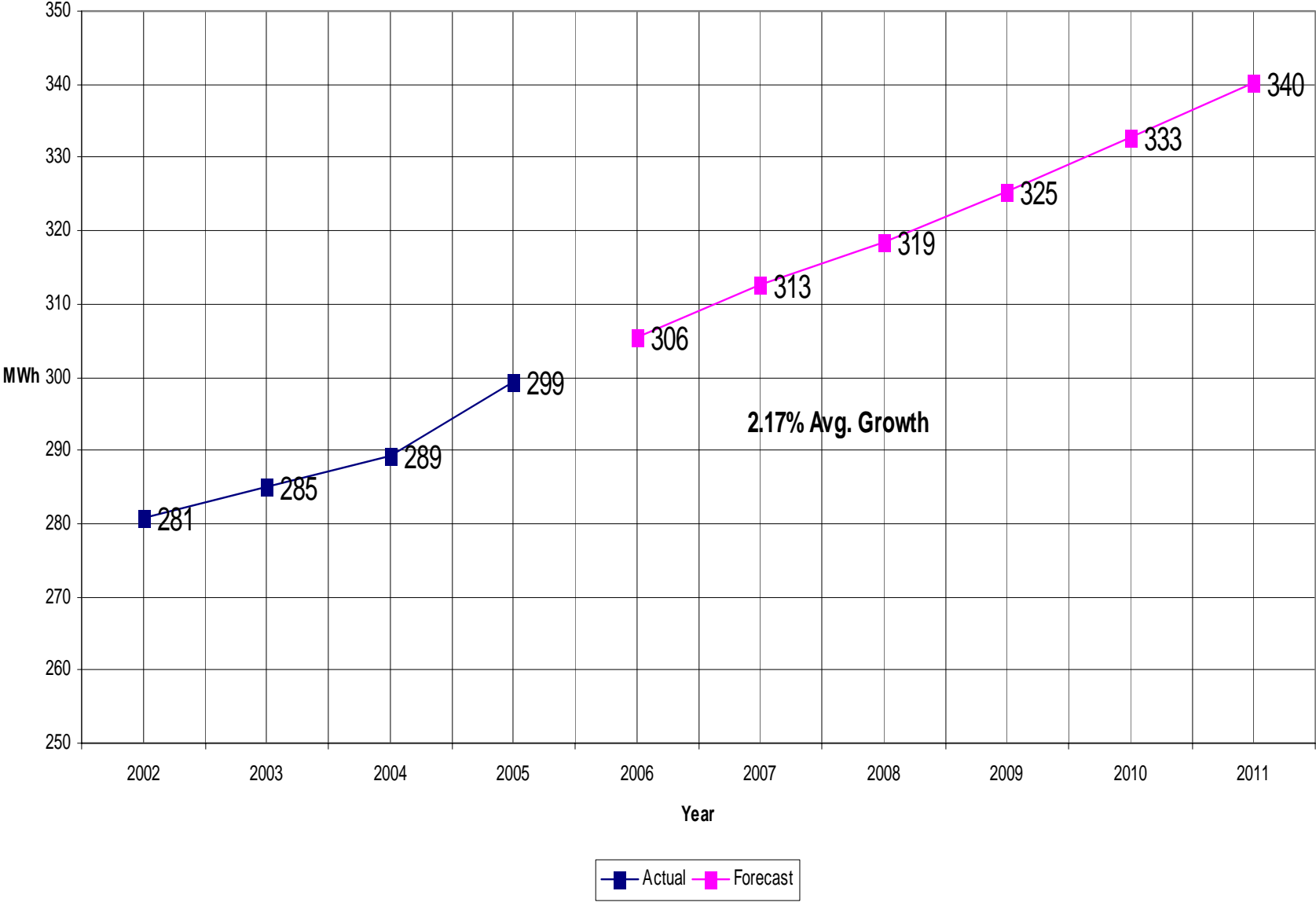
## Actual and Forecasted Annual Peak Demands



# ERCOT August 17, 2006 Peak Data

<b>Actual</b>	<b>MW</b>	<b>Comments</b>
<b>Instantaneous EMS Peak Value</b>	63,259	
<b>Settlement 15 Minute Value</b>	62,429	
<b>Settlement Hour Value</b>	62,334	+1.10% Difference from 2006 Normal Peak Projection
<b>Forecast</b>		
<b>2006 Normal Peak Projection</b>	61,656	
<b>2006 Validation w. Actual Temp</b>	62,620	+0.46% Difference from Initial Settlement Hour
<b>2007 Normal Peak Projection</b>	63,222	
<b>2007 90<sup>th</sup> Percentile Peak Projection</b>	66,027	

# 2006 ERCOT Energy Forecast



# Historical and Forecasted Annual Energy

GWh

310,000

290,000

270,000

250,000

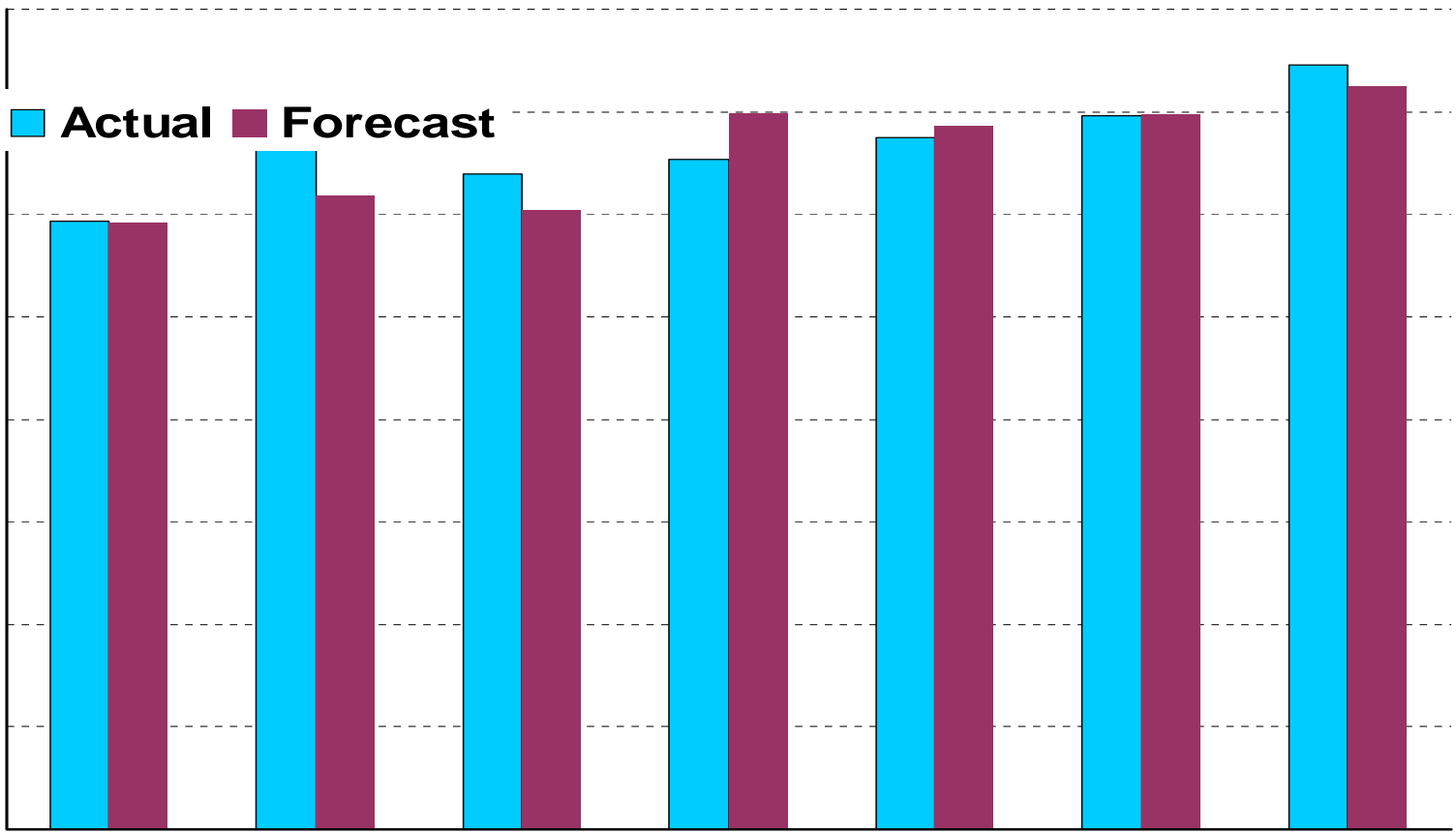
230,000

210,000

190,000

170,000

150,000



1999

2000

2001

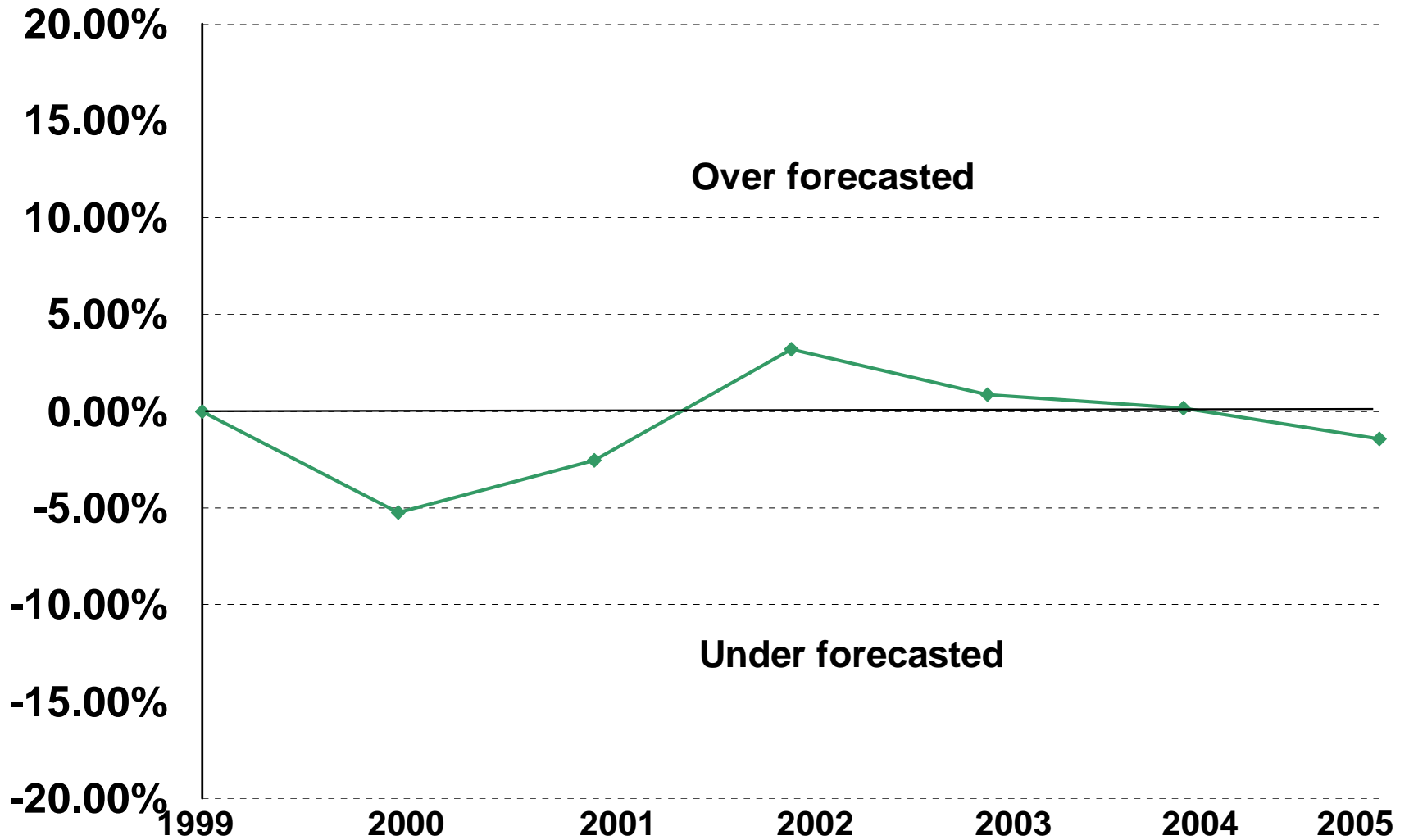
2002

2003

2004

2005

# Historical and Forecasted Annual Energy



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# Questions?