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

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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 Reserves (CDR) report
    - Seasonal and long-term assessments
  - Weekly forecast for outage coordination
  - Statement of Opportunities report
  - PUC/NERC/DOE/FERC reporting

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Forecasting Methodology History

- <u>1999 to 2004:</u> Simple trend from historical peak and energy data applying engineering judgment

- <u>2005 to present:</u> 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
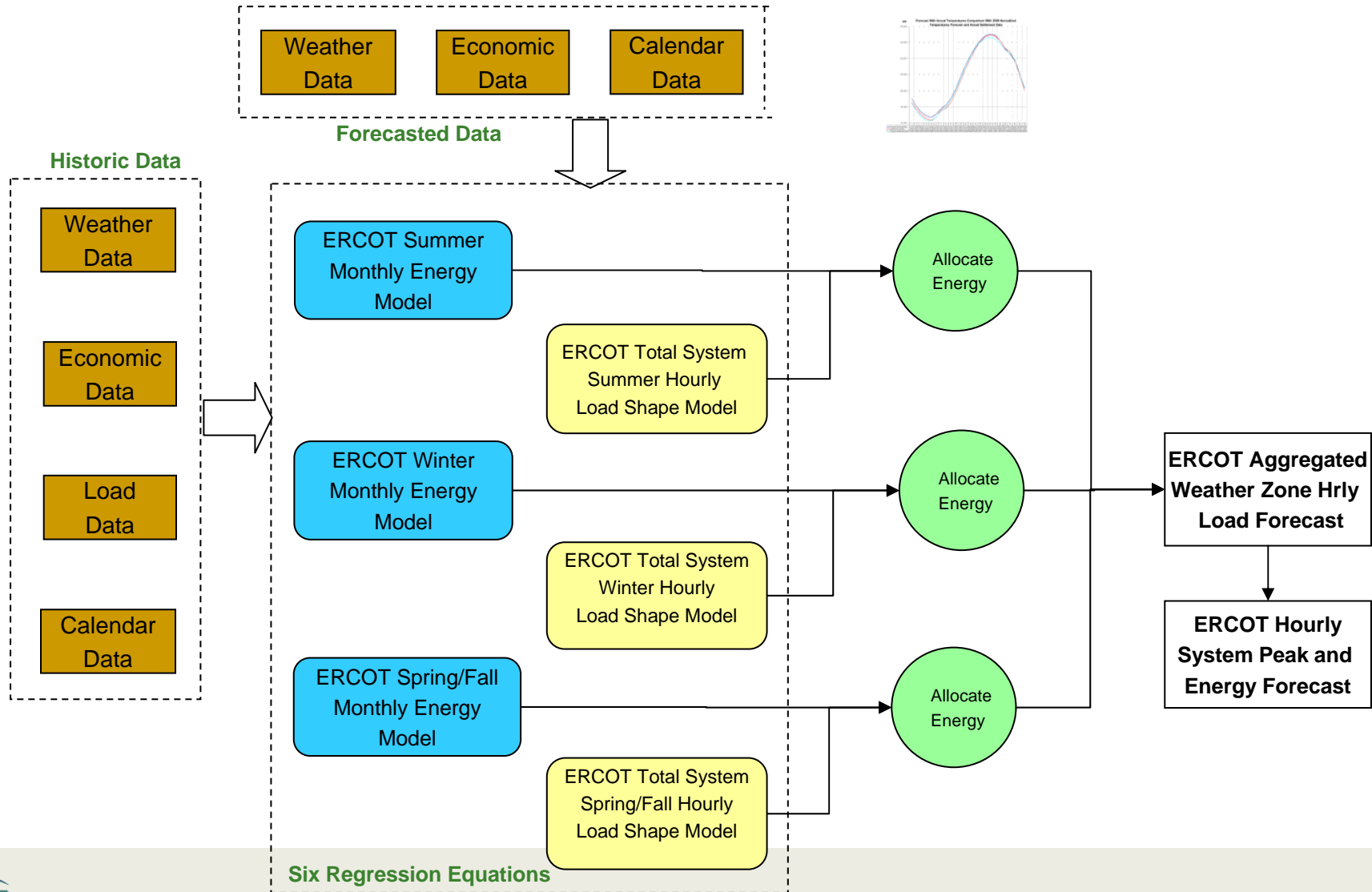
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Forecasting Inputs and Sources

- 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
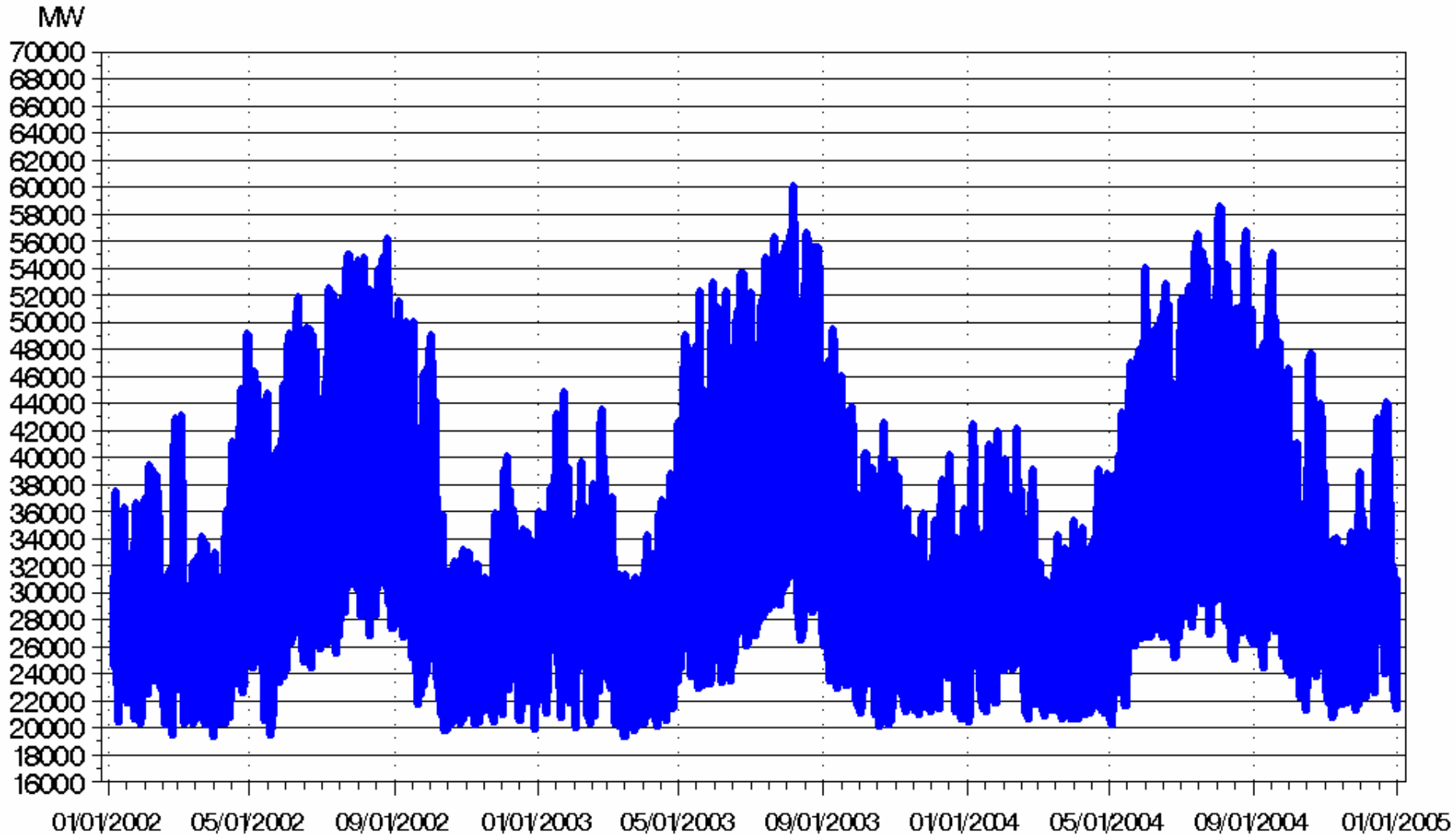 - Daily Variation
  - Weekly Variation
  - Holidays

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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
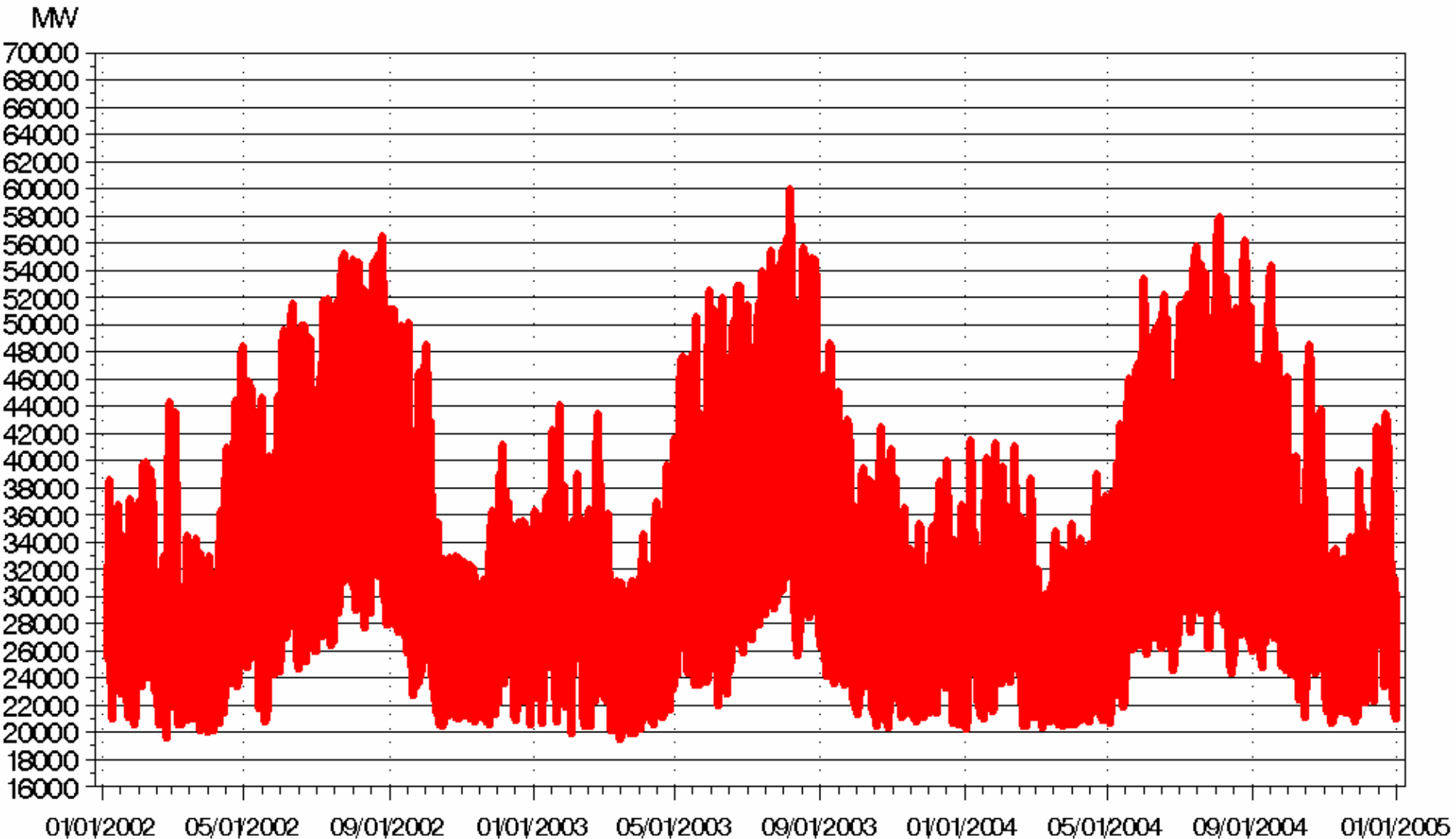 - Hourly load shapes

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Planning Forecasting Process
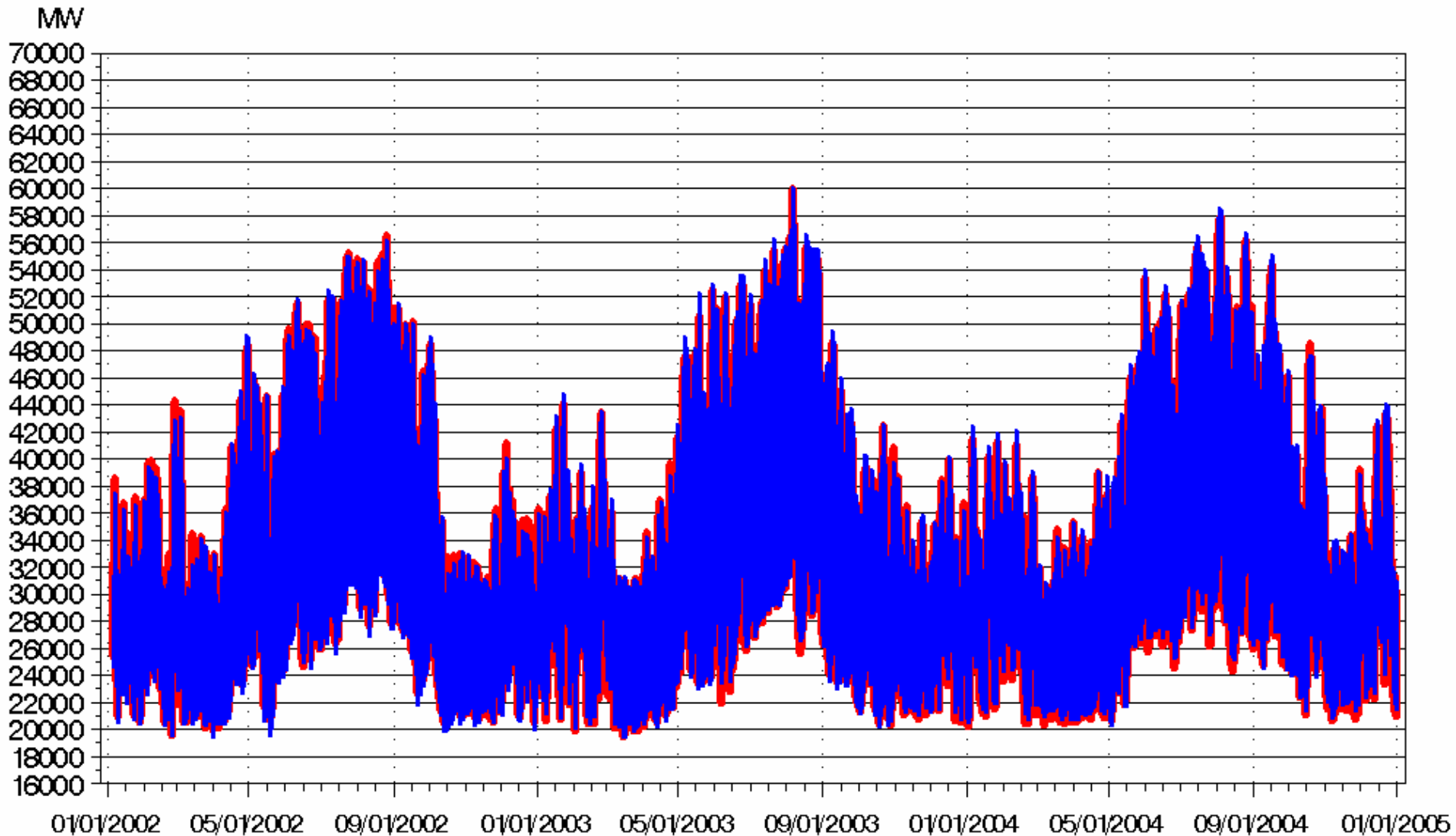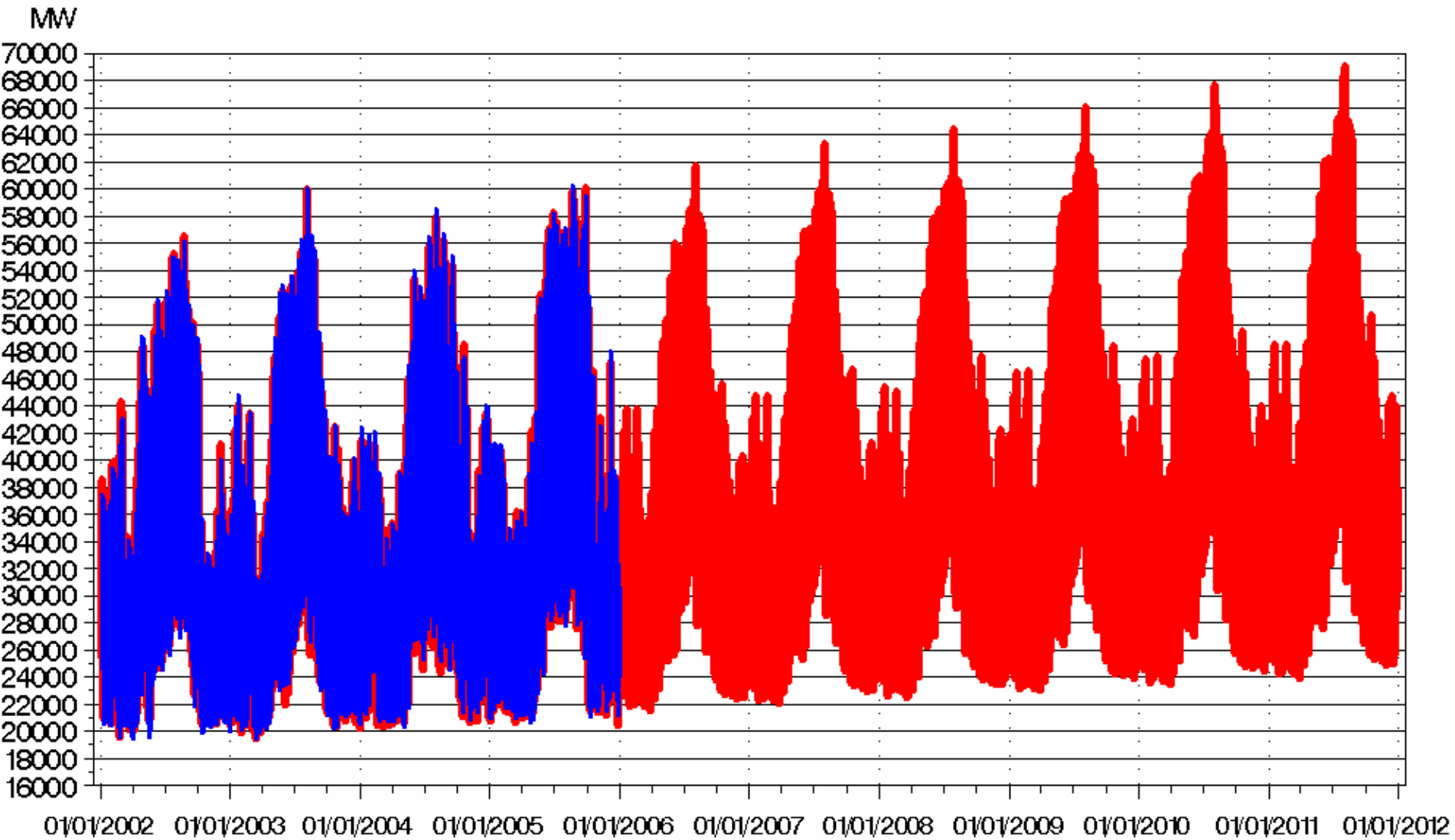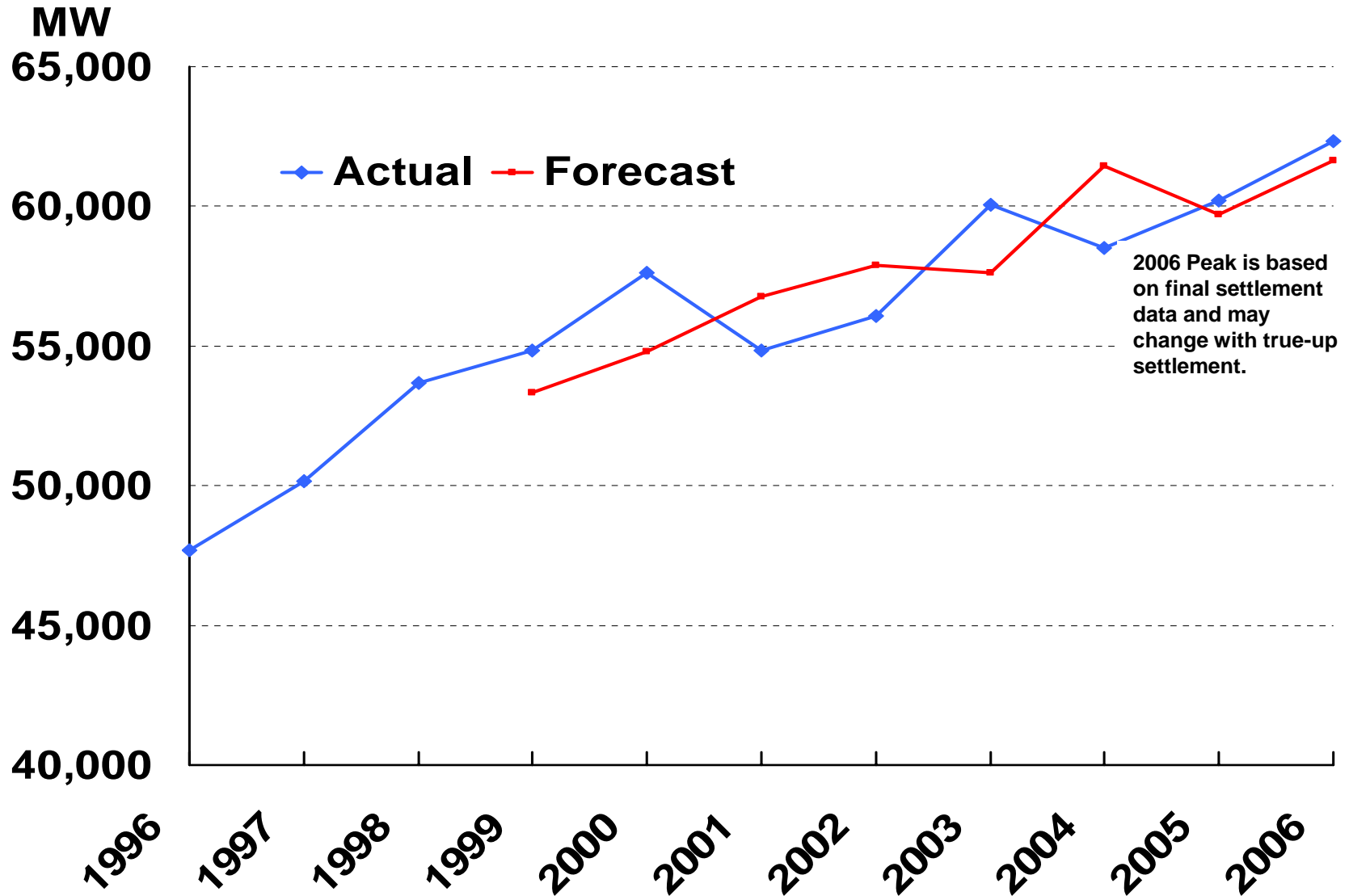
ERCOT **Actual** Hourly Load Shape (2002-2005)

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

Historical Actual and Forecast Peaks

2006 Peak is based on final settlement data and may change with true-up settlement.

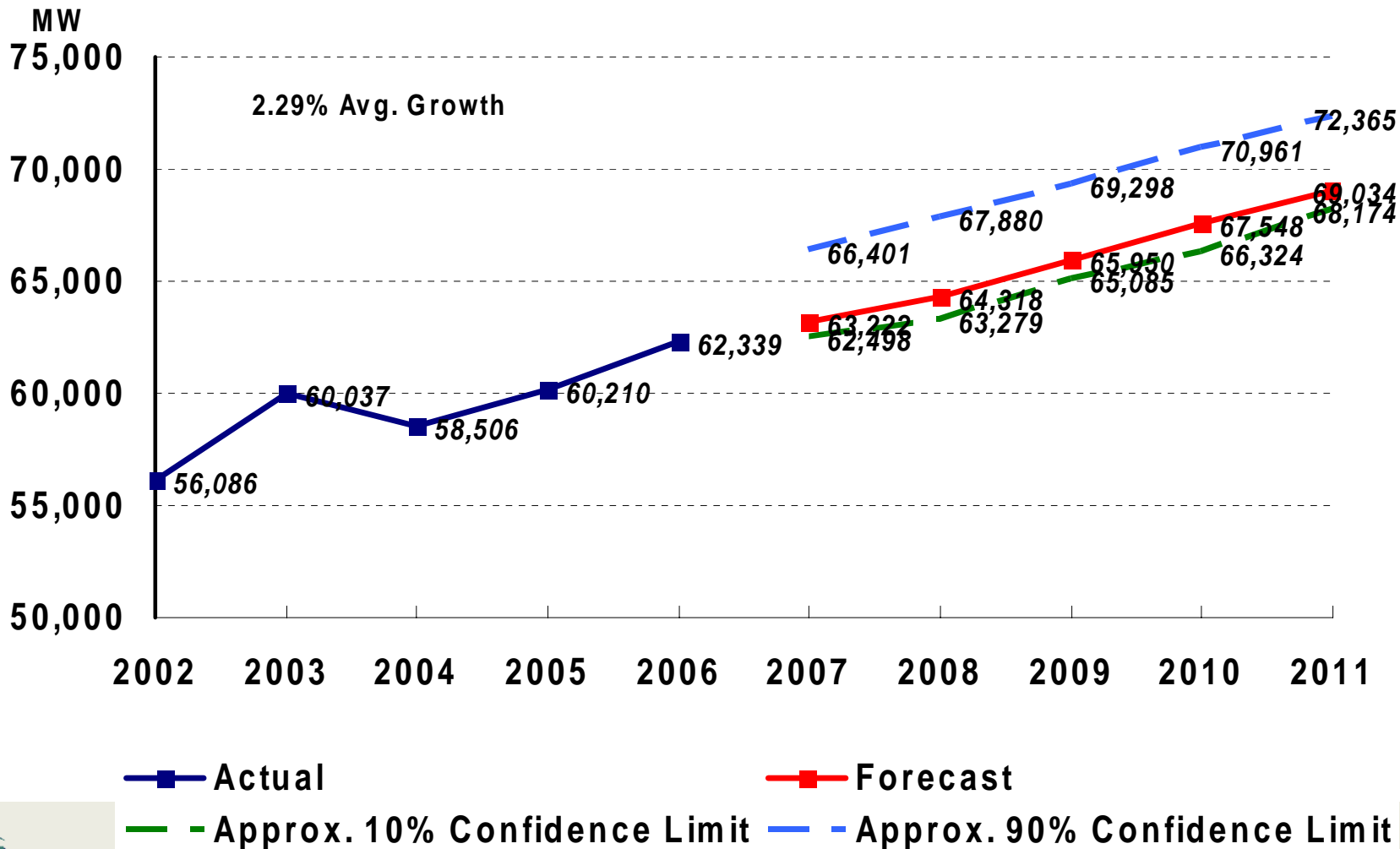# Historical Actual and Forecast Peaks
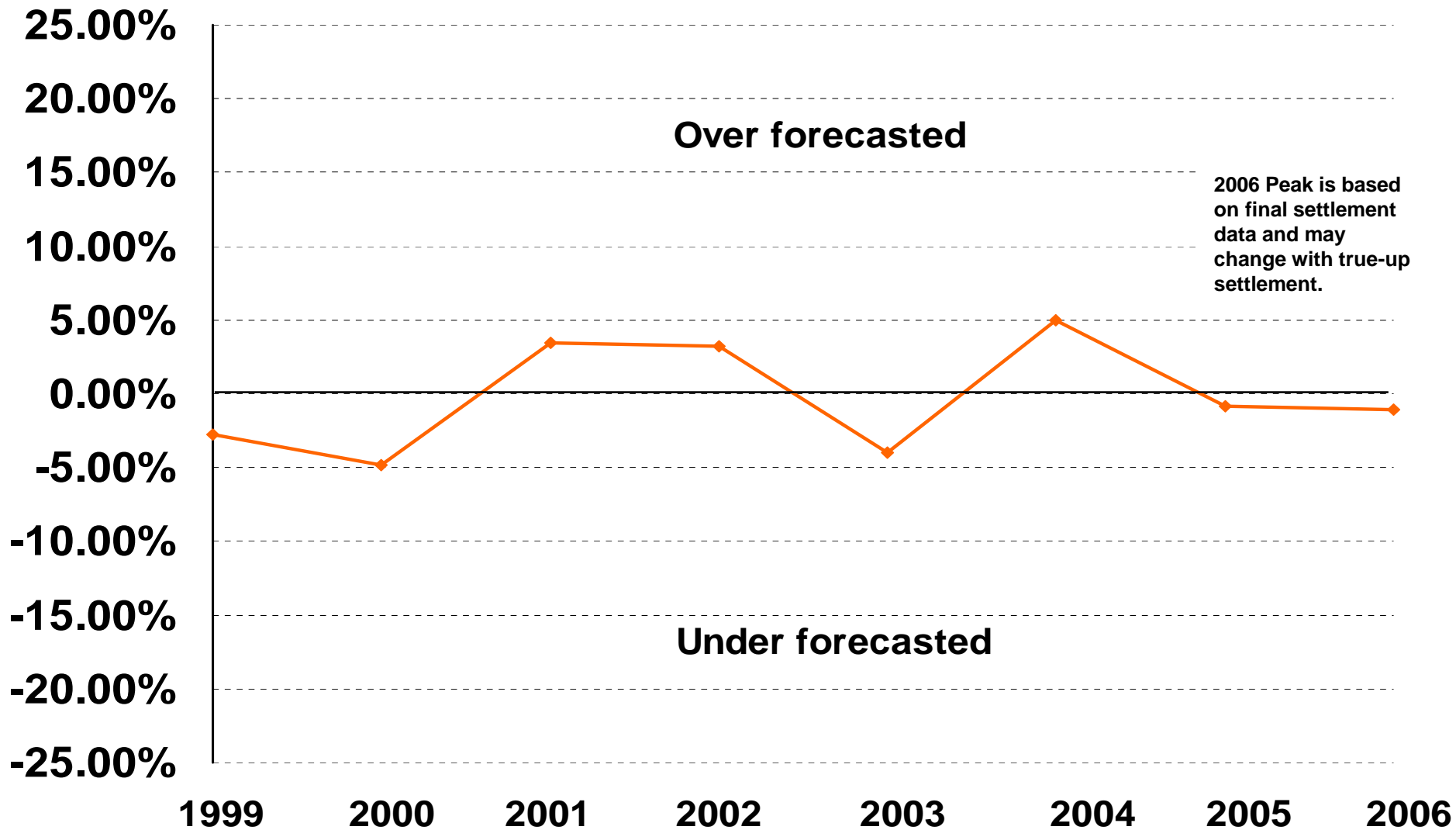
ERCOT Peak Demand Sensitivity

- 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 90th 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 90th percentile forecast.

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Peak Demand and 90% Confidence Limits

Actual and Forecasted Annual Peak Demands

MW

2.29% Avg. Growth

Year	Value
72,365	(90% Confidence Limit)
70,961	
69,298	
69,034	
68,174	
67,880	
67,548	
66,401	
66,324	
65,950	
65,085	
64,318	
63,279	
63,222	
62,498	
62,339	
60,210	
60,037	
58,506	
56,086	

Legend:
- Actual
- Forecast
- Approx. 10% Confidence Limit
- Approx. 90% Confidence Limit

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ERCOT August 17, 2006 Peak Data

Actual	MW	Comments
Instantaneous EMS Peak Value	63,259	
Settlement 15 Minute Value	62,429	
Settlement Hour Value	62,334	**+1.10%** Difference from 2006 Normal Peak Projection

Forecast	MW	Comments
2006 Normal Peak Projection	61,656	
2006 Validation w. Actual Temp	62,620	**+0.46%** Difference from Initial Settlement Hour
2007 Normal Peak Projection	63,222	
2007 90th Percentile Peak Projection	66,027	

2006 ERCOT Energy Forecast

2.17% Avg. Growth

MWh

Data points:
- 2002: 281 (Actual)
- 2003: 285 (Actual)
- 2004: 289 (Actual)
- 2005: 299 (Actual)
- 2006: 306 (Forecast)
- 2007: 313 (Forecast)
- 2008: 319 (Forecast)
- 2009: 325 (Forecast)
- 2010: 333 (Forecast)
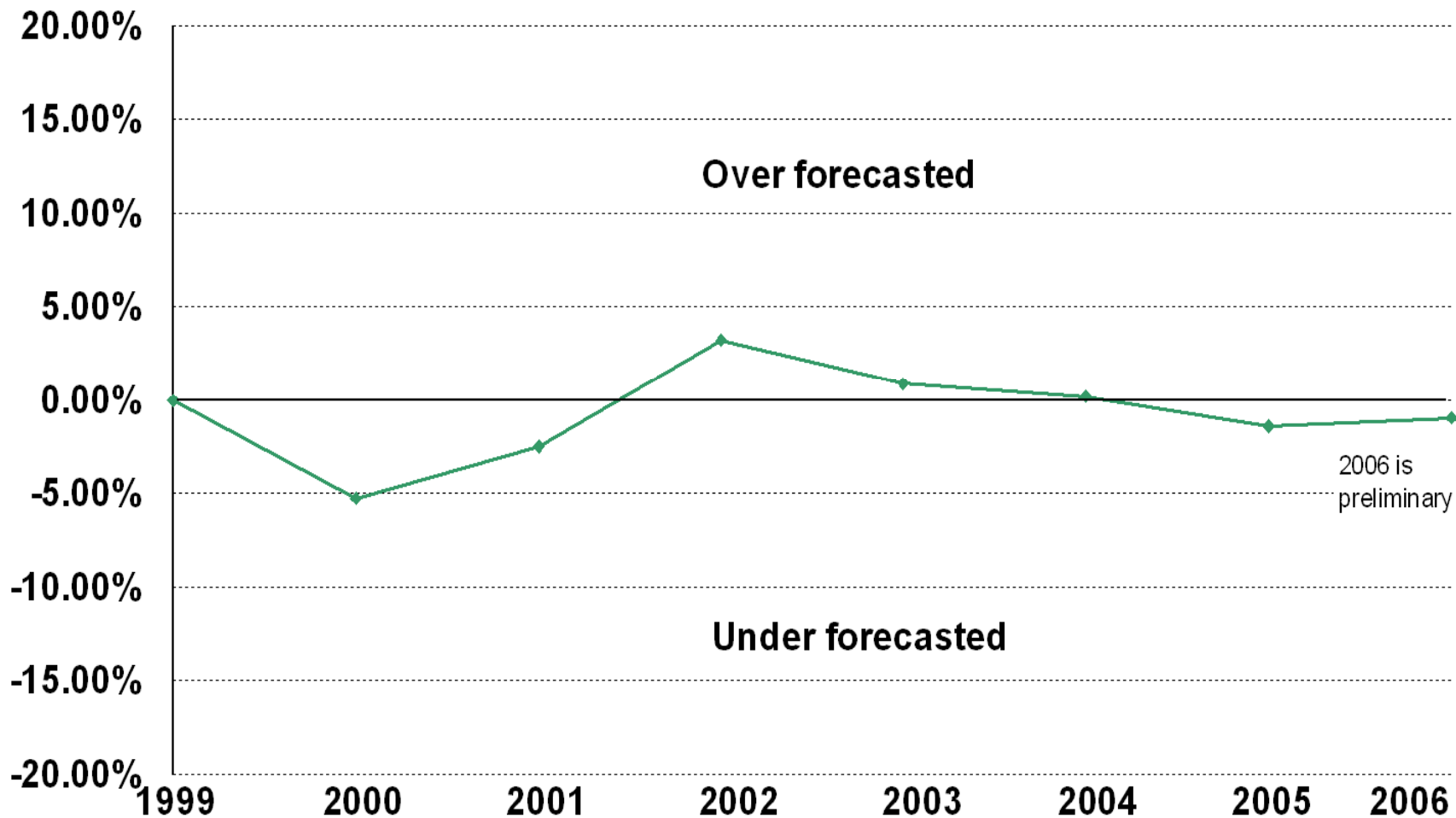- 2011: 340 (Forecast)

Year

Legend: Actual — Forecast
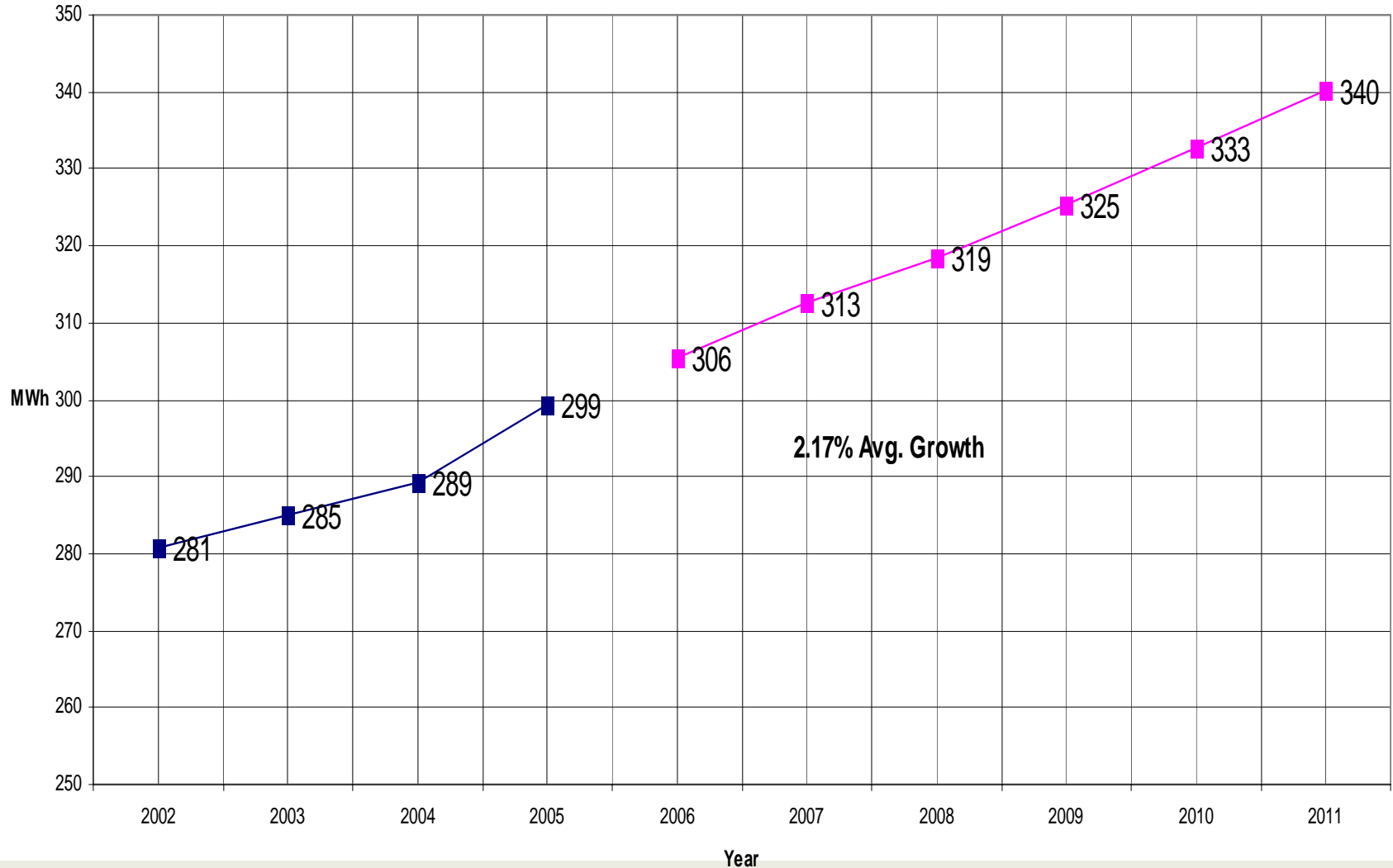
Historical and Forecasted Annual Energy
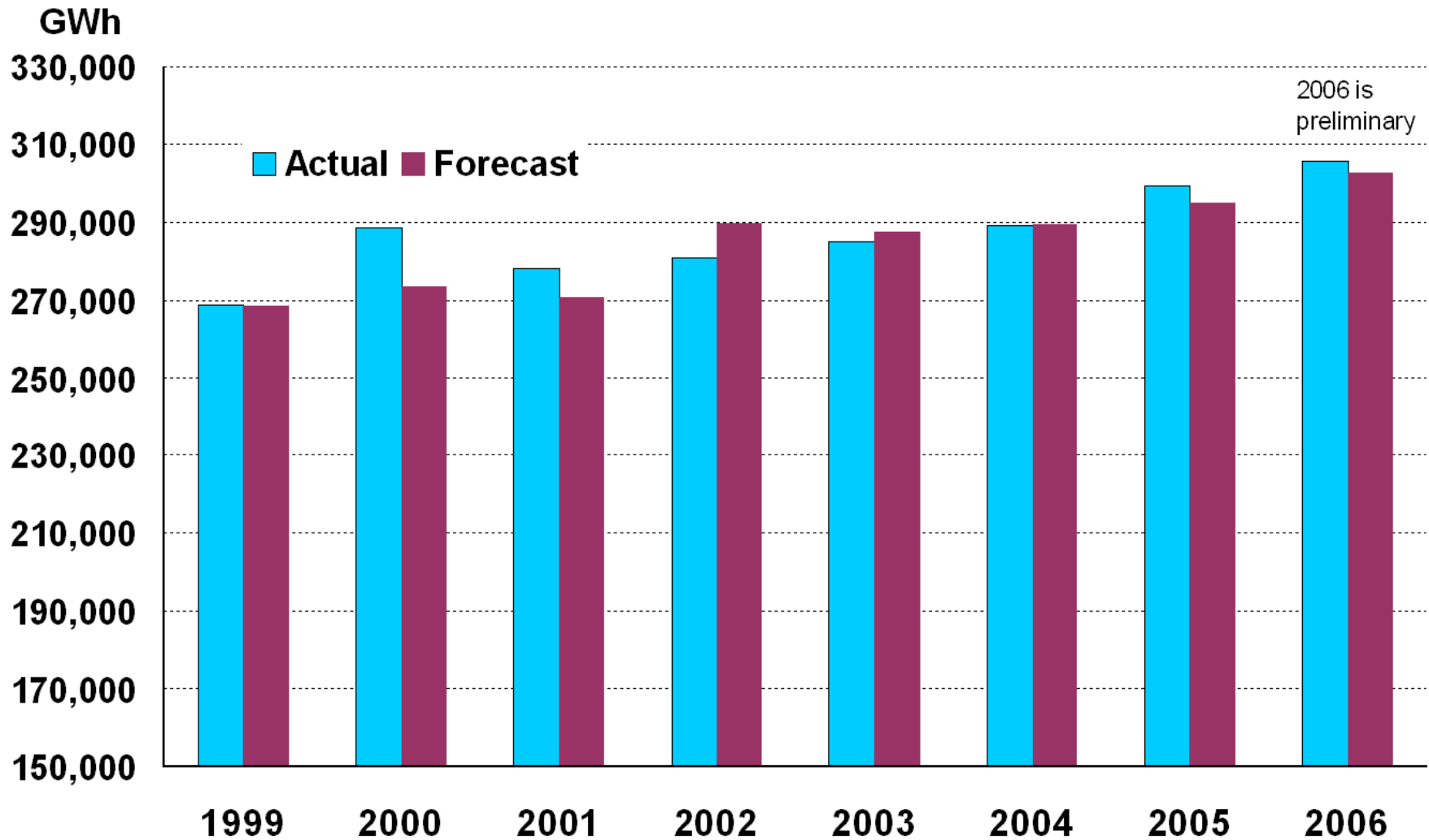
Historical and Forecasted Annual Energy

Questions?