



Nuclear Regulatory Commission
Exhibit # - NRC000044-00-BD01
Docket # - 05200012 | 05200013
Identified: 08/18/2011

Admitted: 08/18/2011
Rejected:

Withdrawn:
Stricken:

NRC000044
05/09/2011

Long Term Demand and Energy Forecasting - Planning

2007 Load Forecasting Forum

Austin Control Center

January 24, 2007

Kenneth A. Donohoo, P.E.

Manager

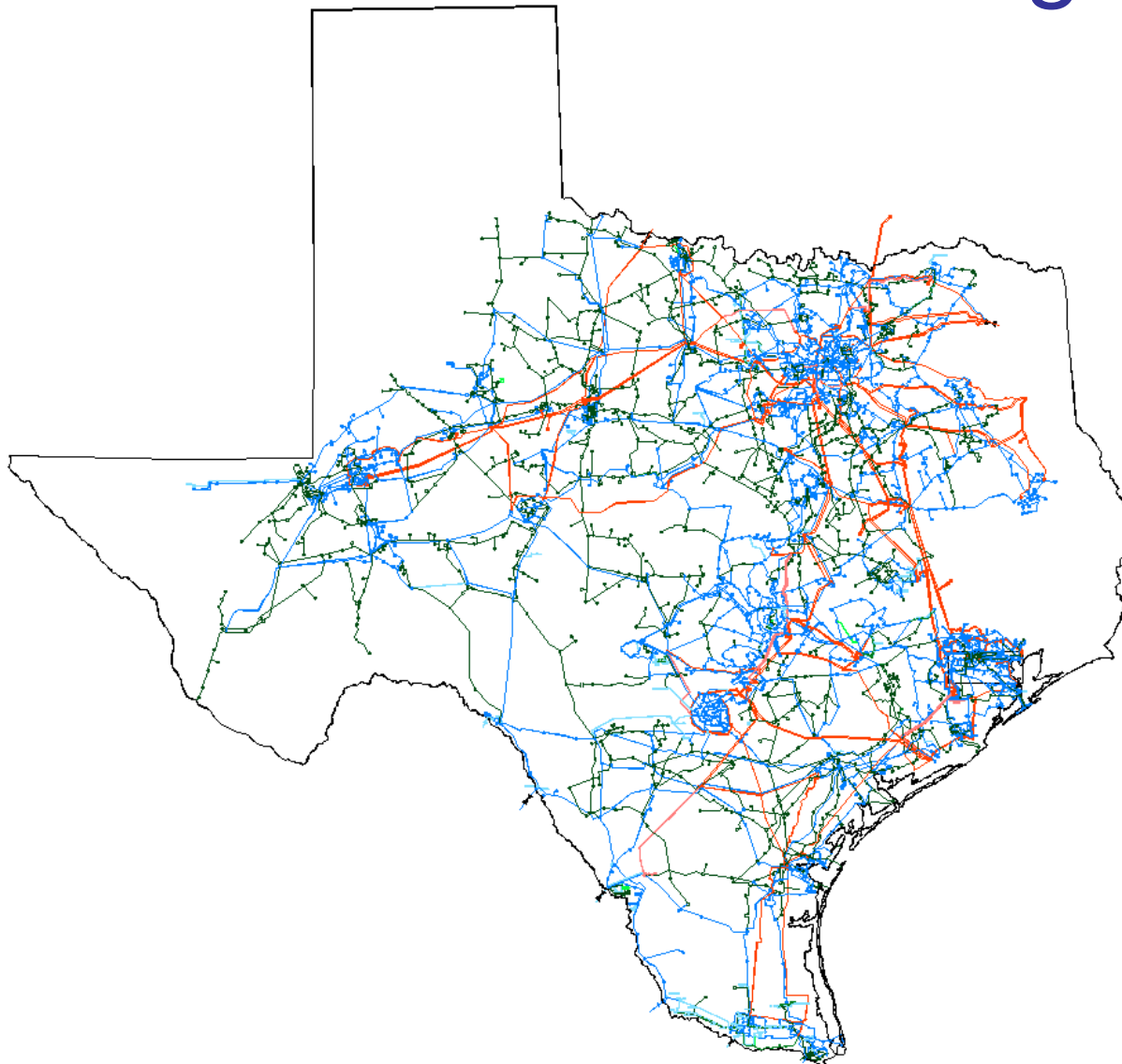
Transmission Services

System Planning

kdonohoo@ercot.com



ERCOT Region



- **ERCOT grid covers 75% of Texas and serves 85% of Texas load**
 - Assets owned by transmission providers and generators, including municipal utilities and cooperatives
- **38,000 miles of transmission lines**
 - 8,000 miles of 345kV lines
 - 16,000 miles of 138 kV lines
 - 700 miles of 345 kV lines added since 1999

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

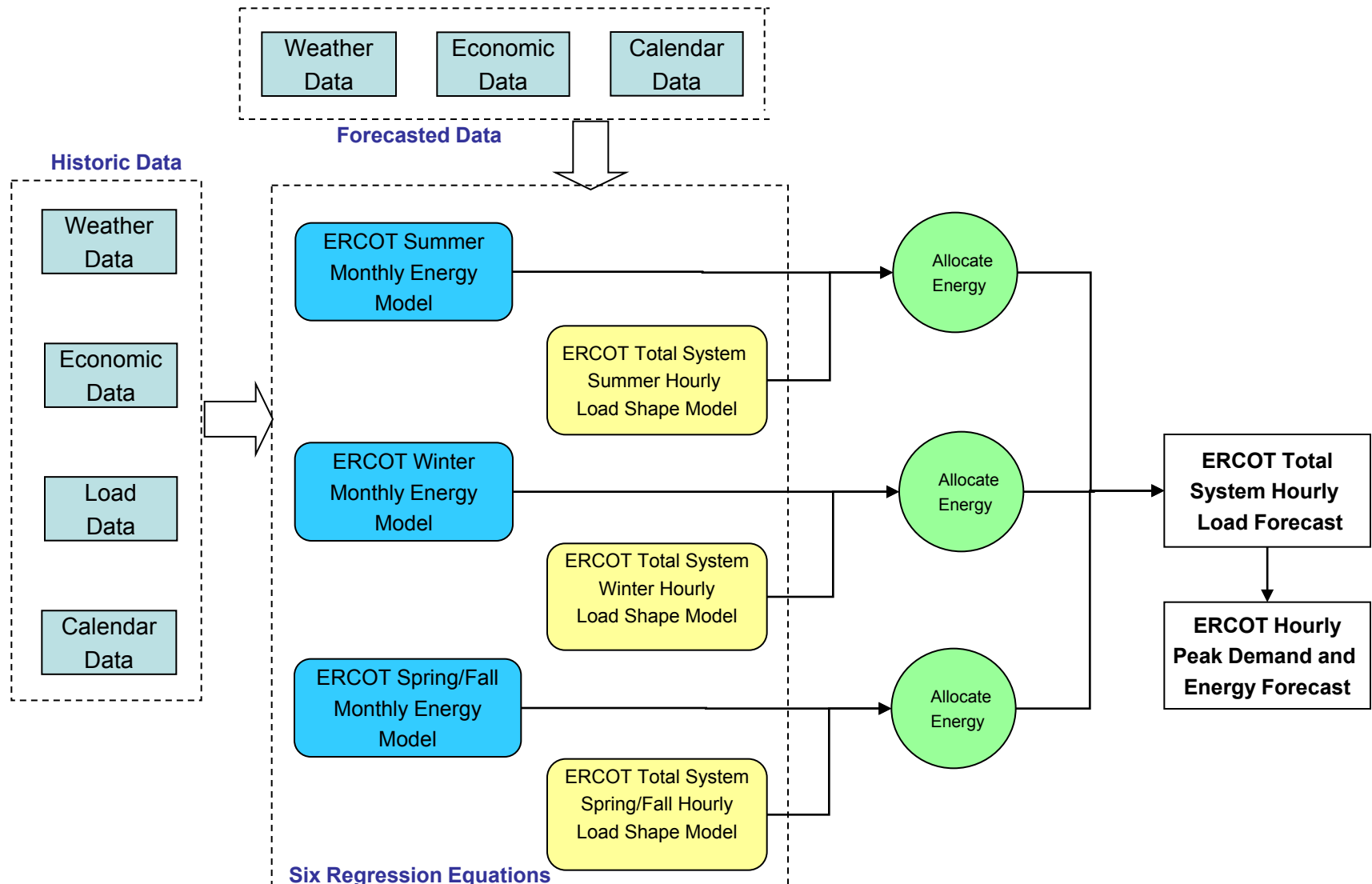
- **Economic history and forecast for Texas**
 - Source is Moody's Economy.com
 - Proprietary data
 - **Population**
 - **Income**
 - **Other economic variables**
- **Historic weather data from each ERCOT weather zone**
 - Source is WeatherBank
 - Not a weather forecast
 - **Temperature**
 - **Humidity**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

Econometric Forecasting Basics

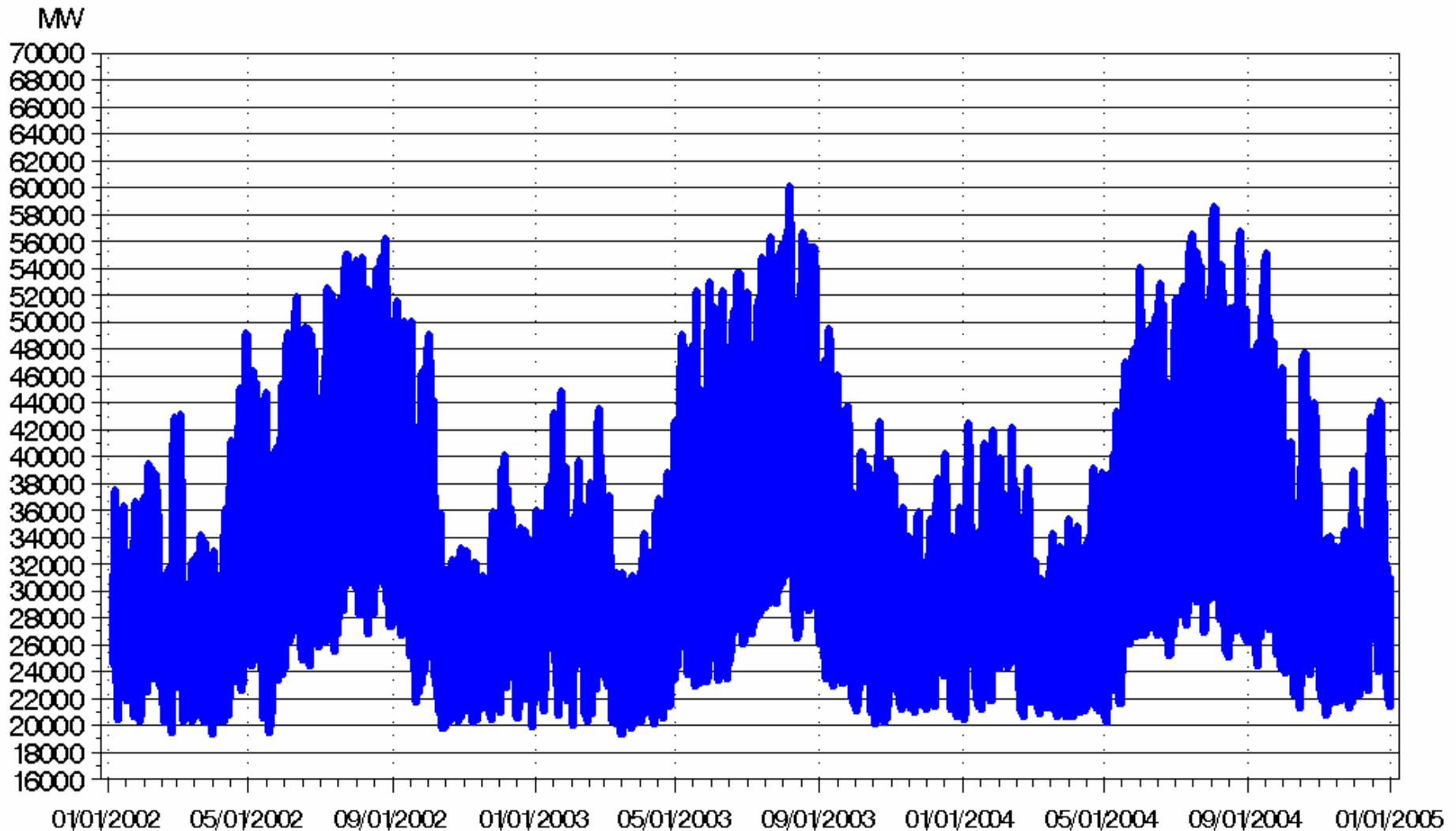
Regression Analysis:

- **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

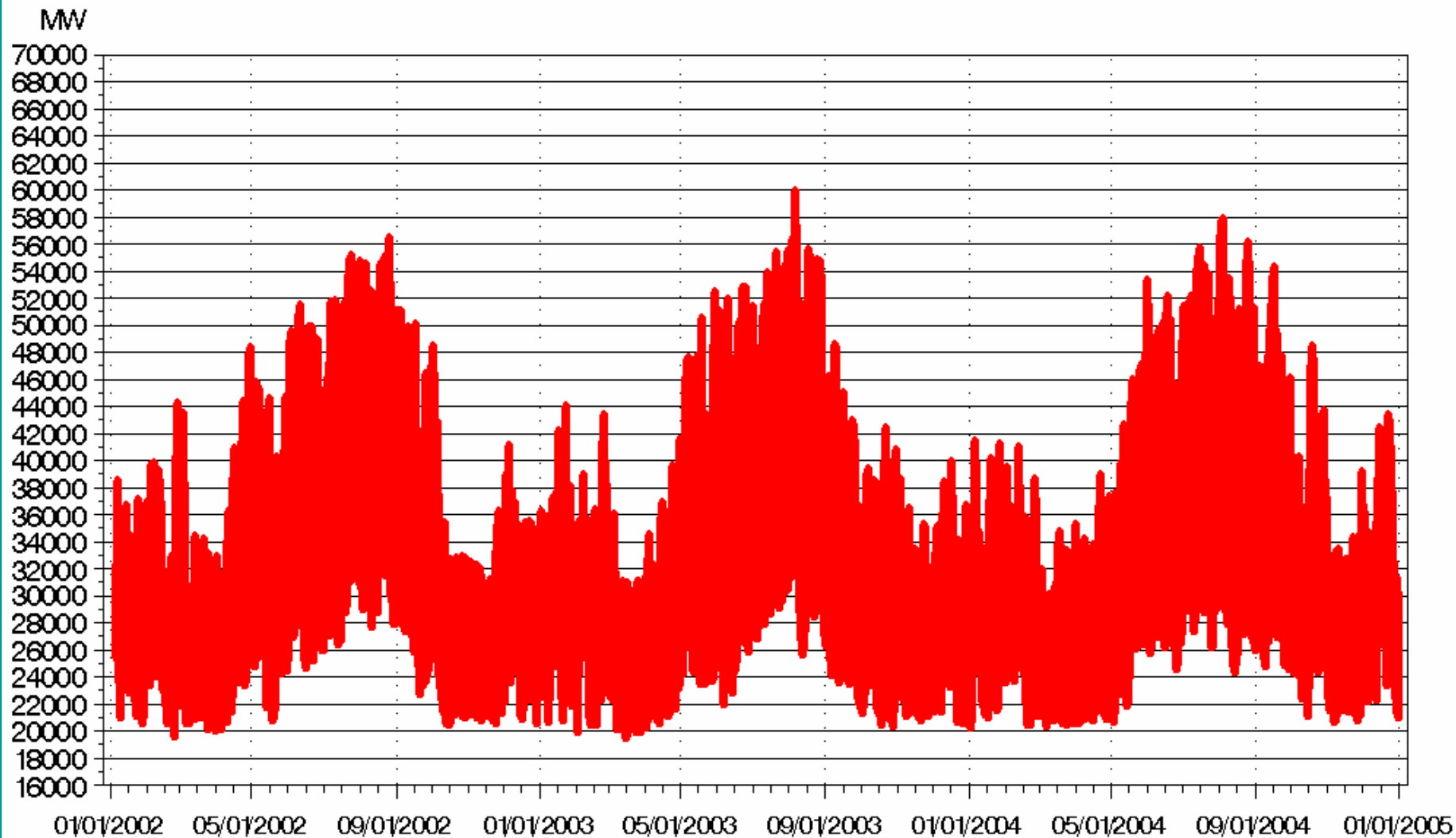
Planning Forecasting Process



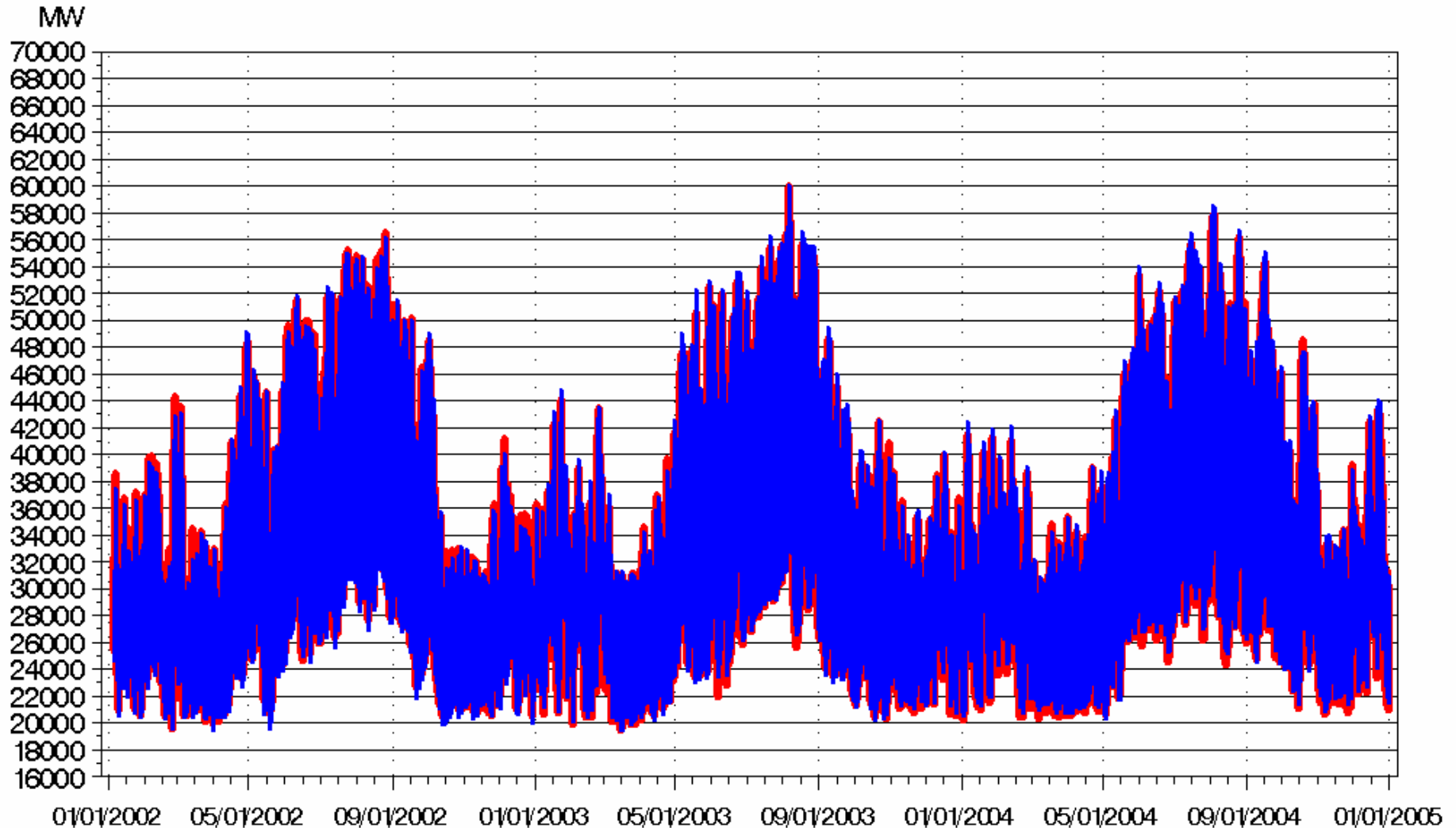
ERCOT Actual Hourly Load Shape (2002-2005)



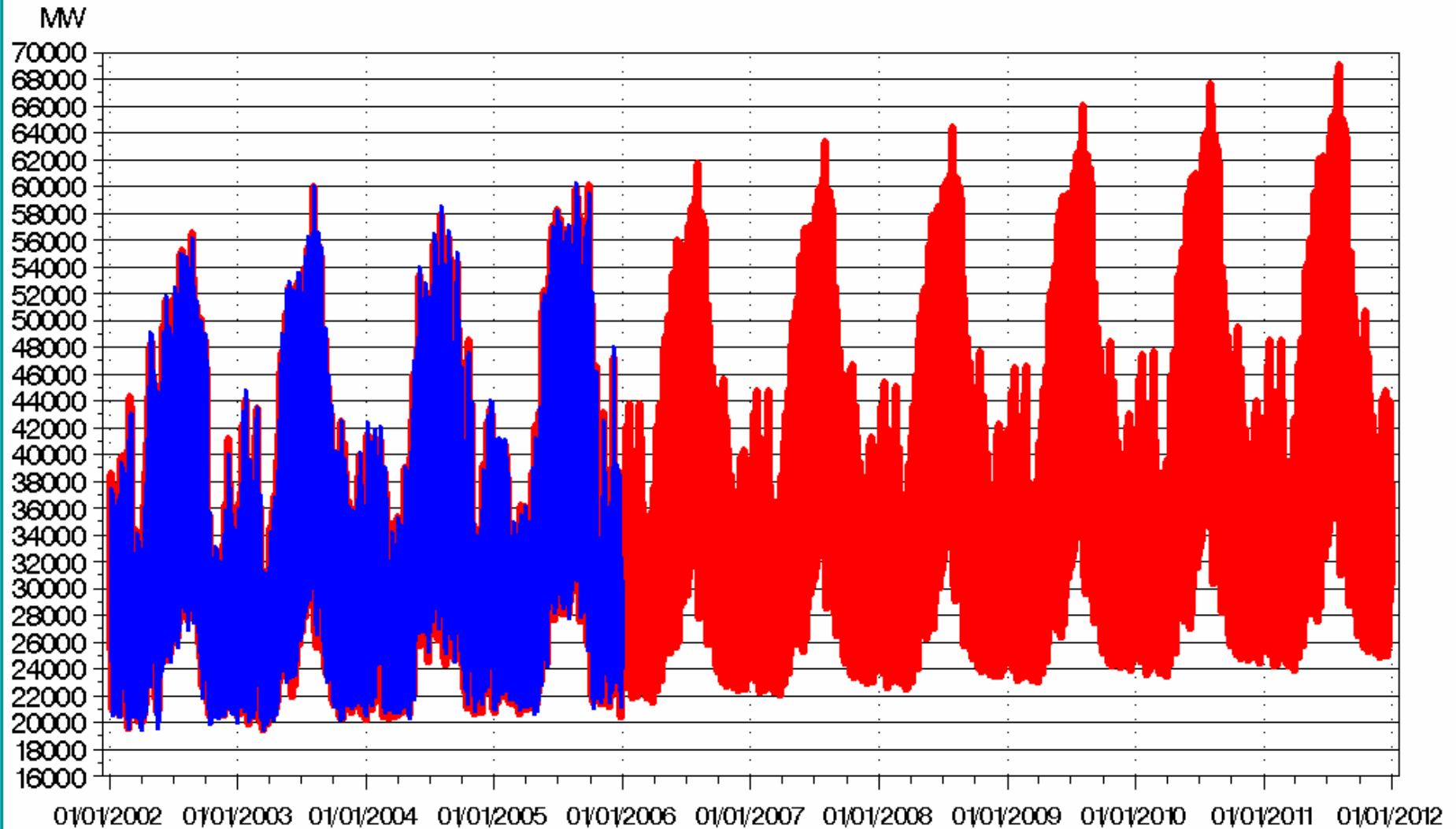
ERCOT Backcast Hourly Load Shape (2002-2005)



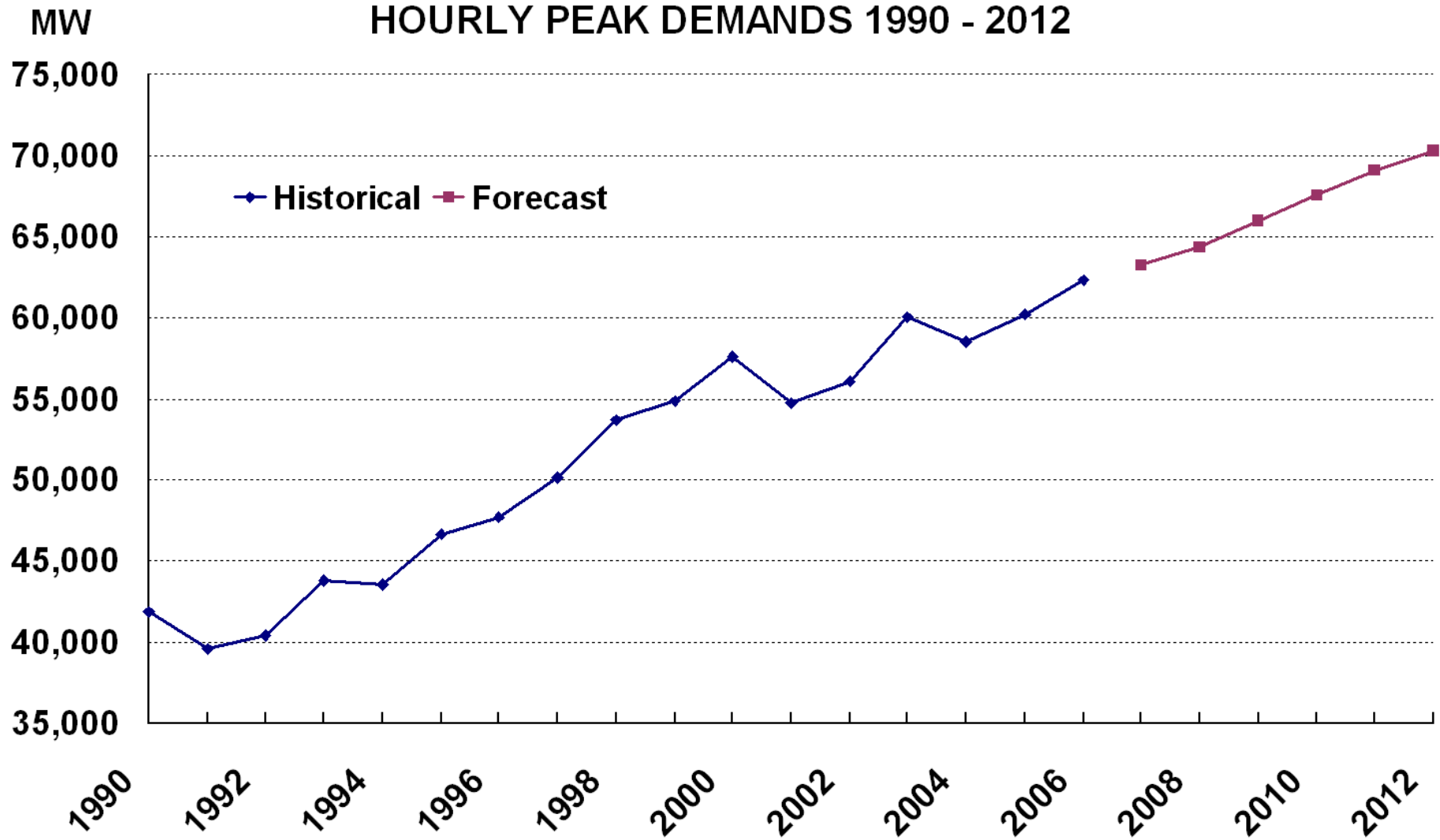
ERCOT Backcast/Fit Hourly Load Shape (2002-2005)



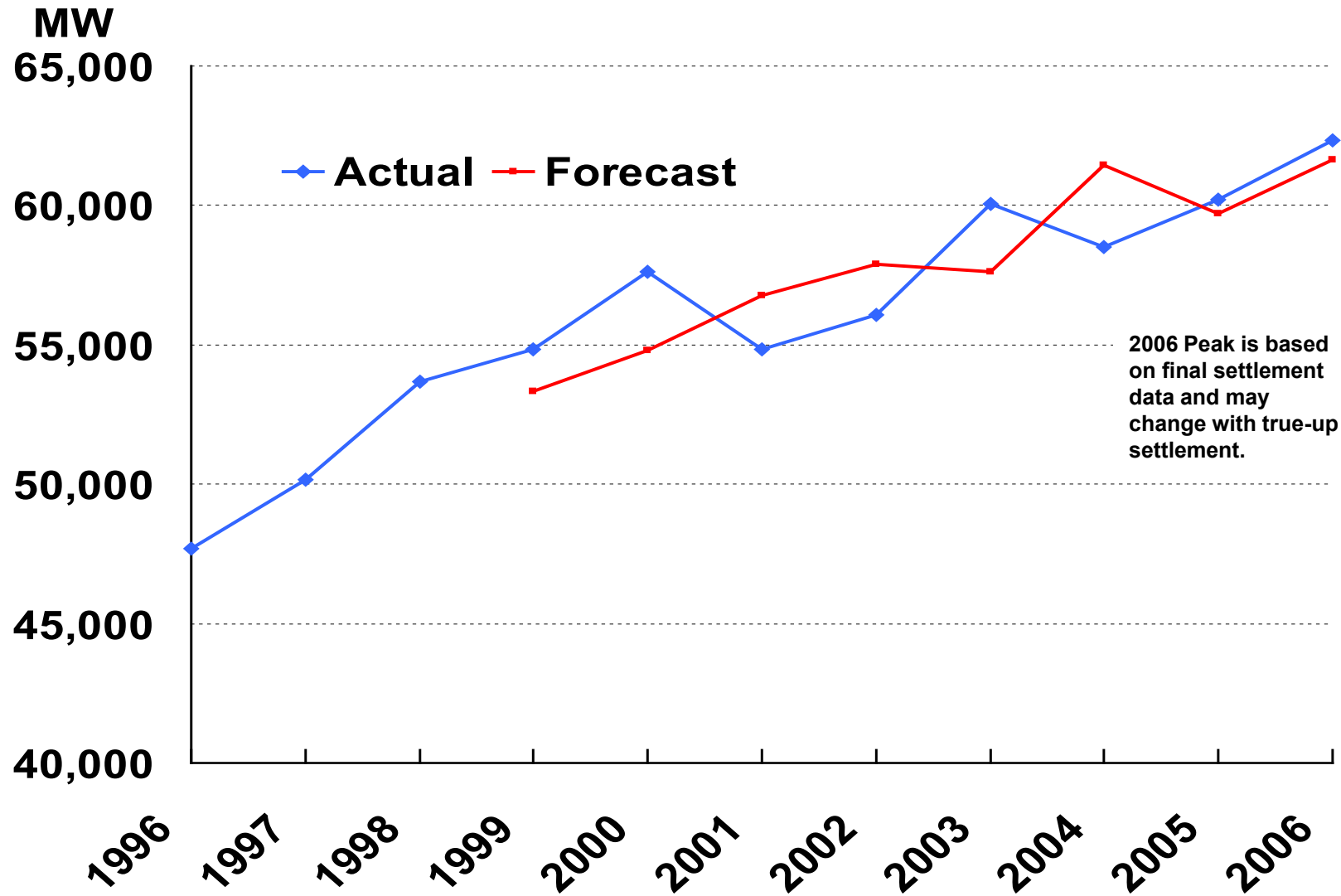
ERCOT Actual and Forecasted Hourly Load Shape (2002-2012)



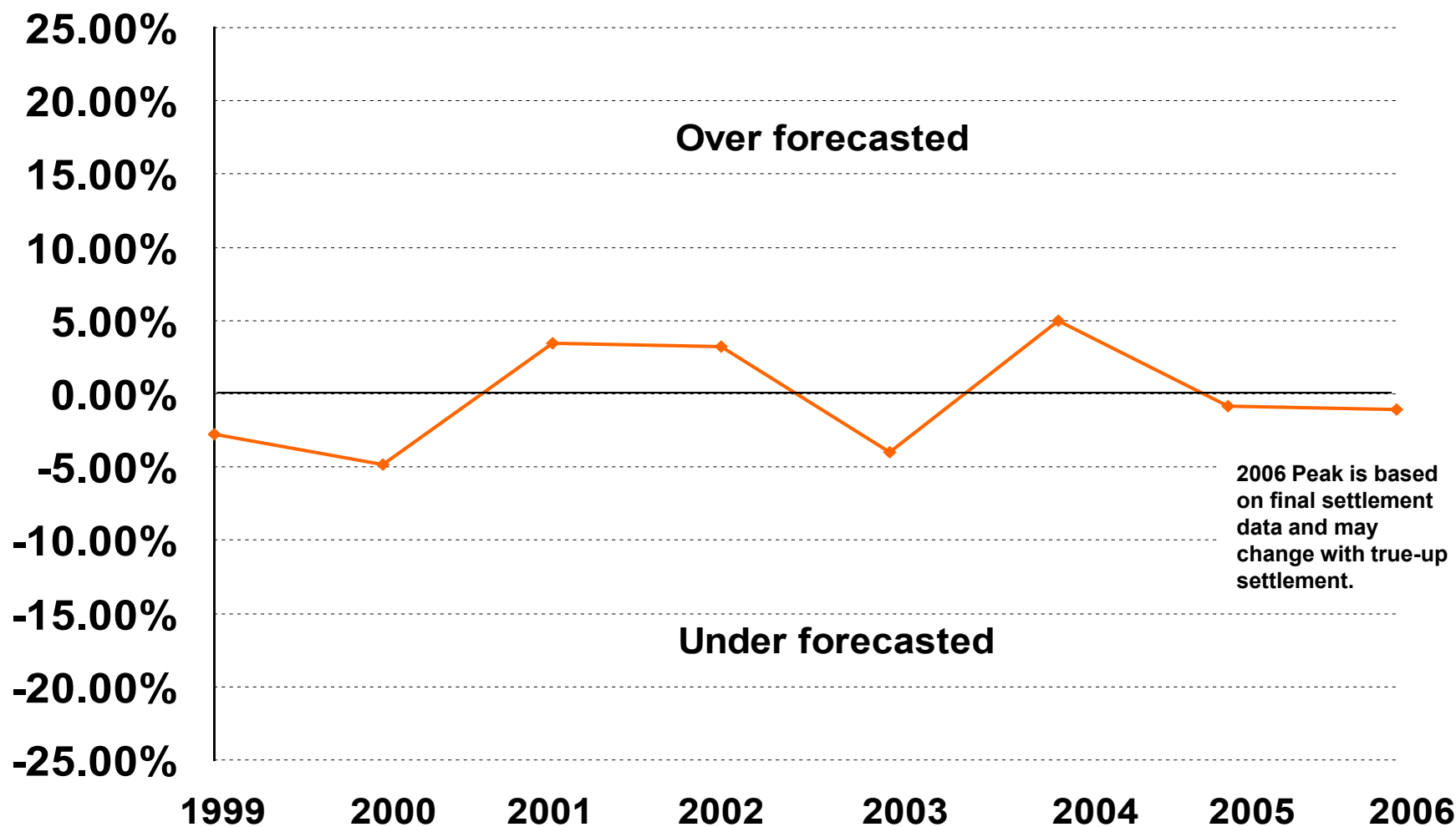
HOURLY PEAK DEMANDS 1990 - 2012



Historical Actual and Forecast Peaks



Historical Actual and Forecast Peaks

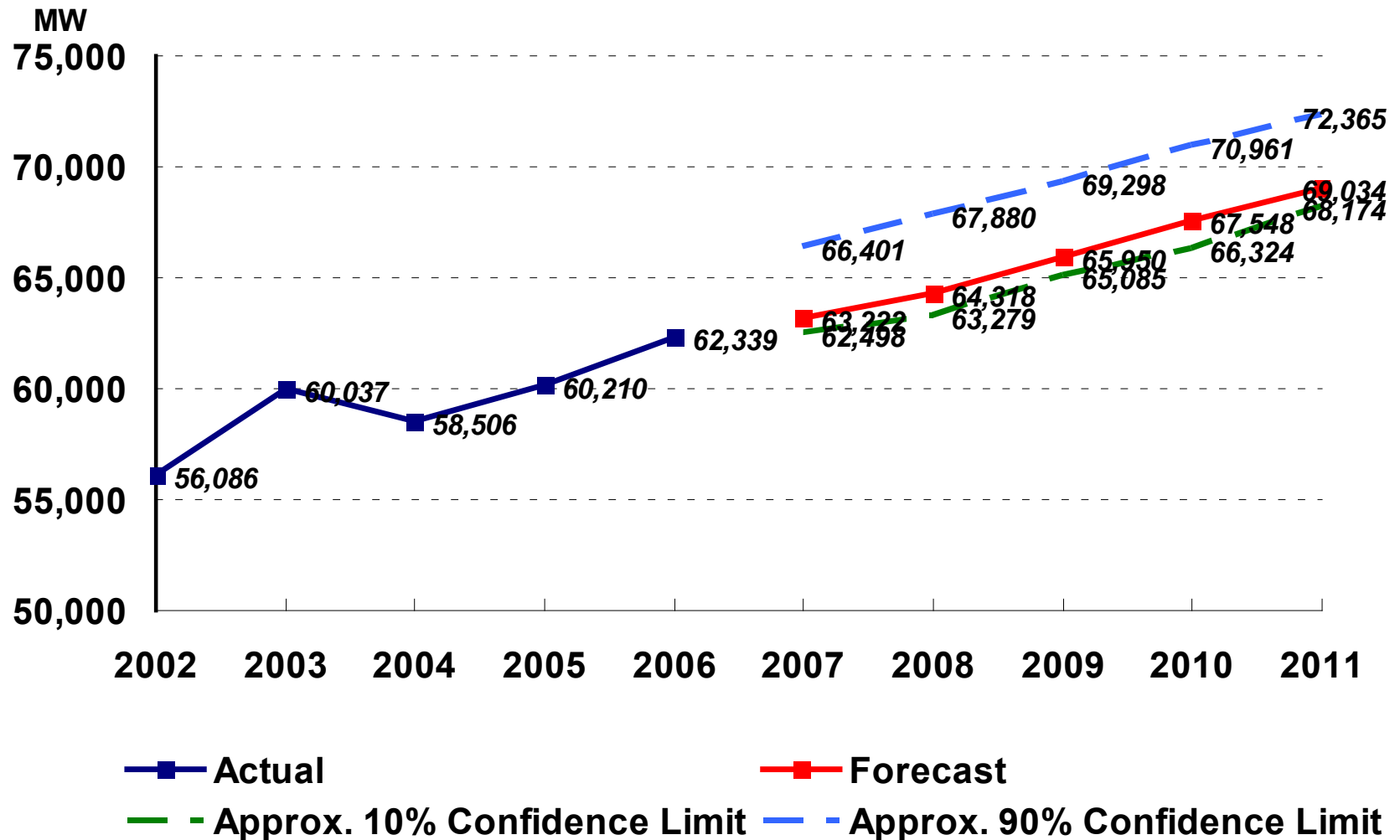


ERCOT Peak Demand Sensitivity

- **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 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.**

Peak Demand and 90% Confidence Limits

Actual and Forecasted Annual Peak Demands



ERCOT August 17, 2006 Peak Data

ACTUAL

Instantaneous EMS Peak Value
Settlement 15 Minute Value
Settlement Hourly Value (Initial)

MW

63,259
62,429
62,334

Comments

+1.09% Difference from 2006
Normal Peak Projection

FORECAST

2006 Normal Peak Projection
2006 Validation w. Actual Temp

Seasonal Normal Peak Projection
Seasonal Validation w. Actual Temp

2007 Normal Peak Projection
2007 90th Percentile Peak Projection

61,656
61,846

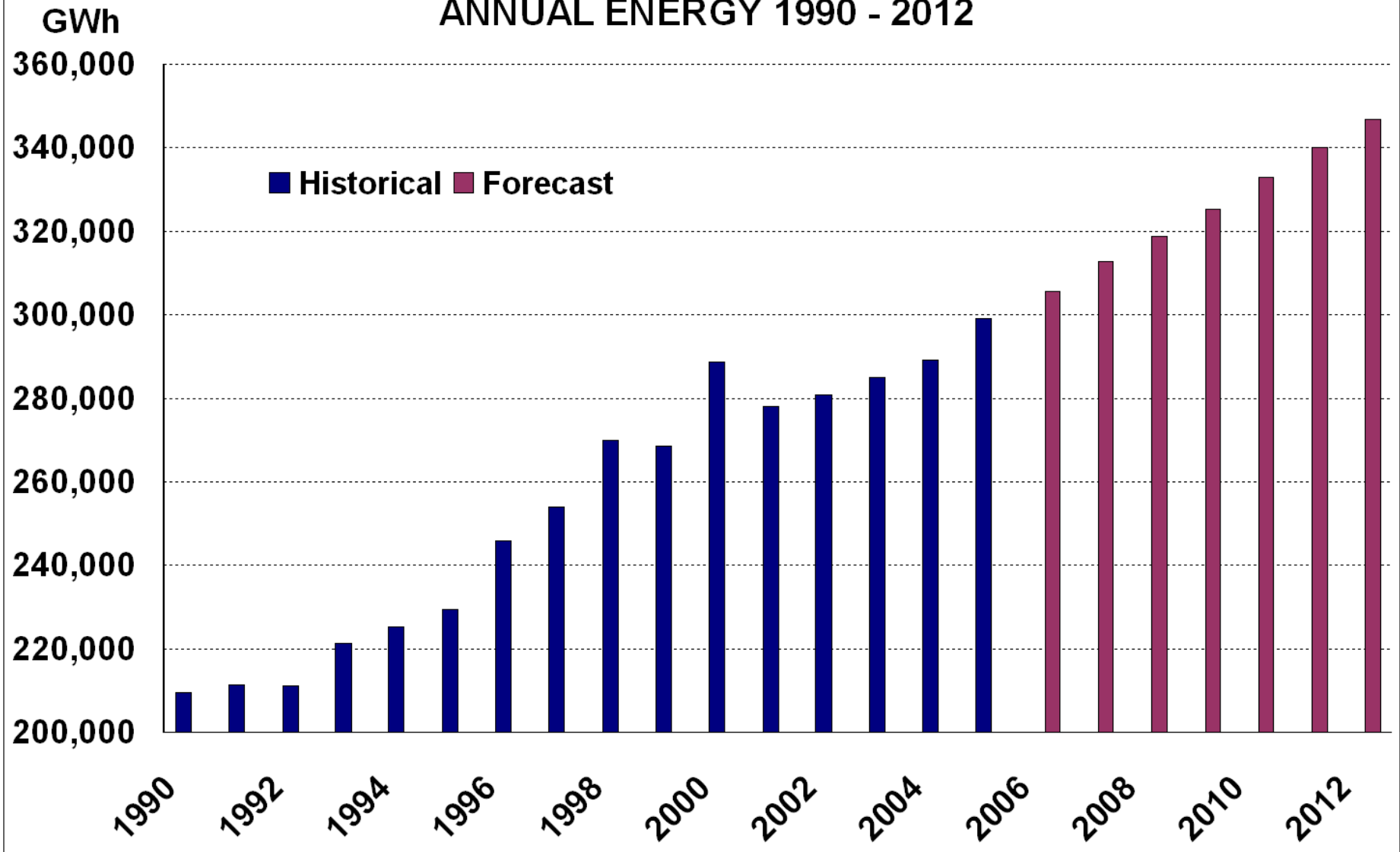
61,688
62,054

63,222
66,027

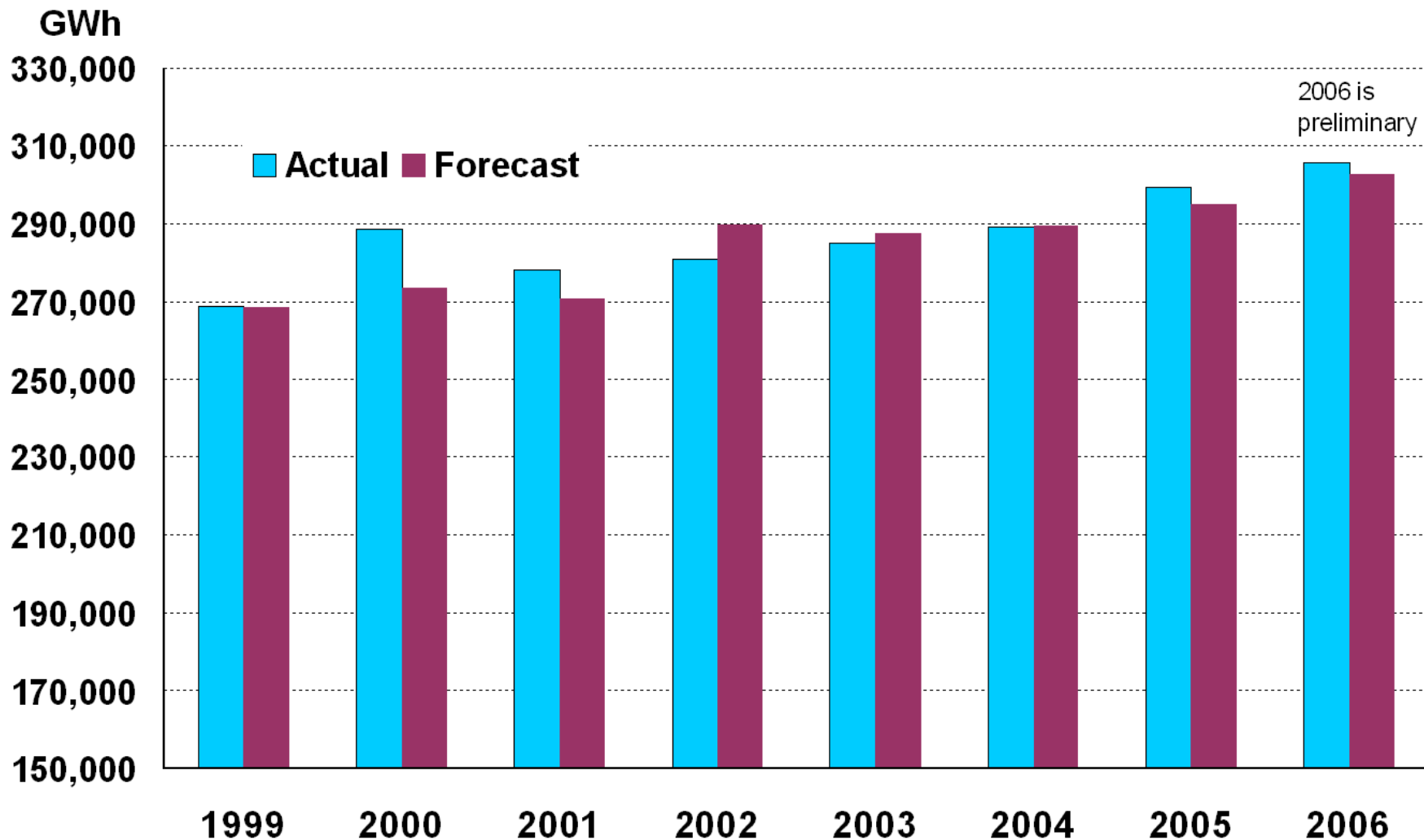
Input all 2006 actual weather
-0.78% Difference from Initial
Settlement Hour

Input 2006 summer season weather
-0.45% Difference from Initial
Settlement Hour

ANNUAL ENERGY 1990 - 2012



Historical and Forecasted Annual Energy



Historical and Forecasted Annual Energy

