Connecticut Department of
Energy & Environmental Protection
Public Utilities Regulatory Authority

ORIGINAL
N.H.P.U.C. Case No. DG 11-250
Exhibit No. #37 TransCanada
Witness William H. Smagula
DO NOT REMOVE FROM FILE

# Motion

| | |
|---|---|
| **Docket Number:** 08-10-02 | |
| **Docket Title:** DPUC Review of The Connecticut Gas Utilities Forecasts of Demand and Supply 2009-2013 and Joint Conservation Plans | |
| **Official Filer(s) Name:** | Janet Palmer |
| **Filing Firm's Name:** | Northeast Utilities |
| **Company Name:** (If different than Filing Firm) | Yankee Gas Services |
| **Date Filed:** | 11/13/2008 03:39:04 PM |

| | |
|---|---|
| **Brief Description:** | Request for Extension fo File Supporting Material |

| | |
|---|---|
| **Comments:** **(Are all documents included in the attachments? If not, please explain.)** | |

File a Motion Objection or Comment

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Nov. 13 D&S Filing Extension Letter.doc

November 13, 2008

Nicholas E. Neeley
Acting Executive Secretary
Department of Public Utility Control
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 08-10-02 – DPUC Review of Connecticut Gas Utilities' Forecast of Supply and Demand for Period 2009-2013 – Request for Extension to File Supporting Material

Dear Mr. Neeley:

On October 1, 2008, Yankee Gas Services Company ("Yankee Gas" or the "Company") submitted its Biennial Forecast of Natural Gas Demand and Supply required by Section 16-32f of the General Statutes of the State of Connecticut. At that time the Company indicated it would provide a complete updated forecast with supporting material by December 19, 2008.

Due to the significant economic and energy price market changes and outlooks since that original filing, Yankee is in the process of evaluating the impact of these market drivers on its most recent sales forecast, with the expectation of developing an additional forecast by the end of 2008.

In order to provide the Department of Public Utility Control and parties with the benefit of this new forecast for use in this docket, Yankee respectfully requests it be allowed to file its updated forecast and supporting material no later than March 1, 2009. This additional time will enable the Company to complete its sales forecast update, integrate the results into the remaining portions of the planning process, and complete the detailed supporting materials required for the filing.

Questions related to this request can be directed to either Charles Goodwin at 860-665-3597, or Christine Gibson at 860-665-3322.

Very truly yours,

Janet R. Palmer
Manager – Regulatory Policy, CT
NUSCO
As Agent for Yankee Gas Services Company

c: Service List
Municipal Chief Executive Officers, Gas Service Territory
Regional Planning Agencies
Attorneys General
President Pro Tempore of the Senate
Speaker of the House of Representatives
Energy and Technology Committee

# Docketed Correspondence

## Docket 08-10-02

**Filer Information**

**Official Filer(s) Name: Janet R. Palmer**
**Filing Firm's Name: Northeast Utilities**
**Company Name(If different than Filing Firm): YGS**
**Date Filed: 03/02/2009 02:50:33 PM**
Individual (If any): YGS
Type: Other

Brief Description: YGS Forecast of Demand and Supply for Period 2009-2013

Date: 03/02/2009

Attached Correspondence: - Cover - Forecast of Natural Gas.doc
- Exhibit IV-5 Peak Day Forecast.Final.xls - Table of Contents & Index of Exhibits.doc
- Exhibit IV-6 Supply Disposition Normal.Final.xls - Section I - Final.doc
- Exhibit IV-7 Supply Disposition Design.Final.xls - Section II - Final.doc
- Exhibit IV-8 Incremental vs Rolled in Price.Final.xls - Section III -Final.doc
- Submittal Letter-Final.doc - Section IV - Final.doc
- Exhibit IV-1.1 to IV-1.4 Contracts.Final.xls - Exhibit IV-2 Historic Peaking.Final.xls
- Exhibit IV-3 TopTen Sendout 1999-2008.Final.xls
- Exhibit IV-4 Schematic Diagram.Final.xls

Comment:

March 2, 2009

Ms. Kimberley J. Santopietro
Executive Secretary
Department of Public Utility Control
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 08-10-02 – DPUC Review of Connecticut Gas Utilities' Forecast of Demand and Supply for Period 2009-2013
Docket No. 06-10-03 - DPUC Review of Connecticut Gas Utilities' Forecast of Demand and Supply for Period 2007-2011 – Compliance Order Nos. 2 and 3

Dear Ms. Santopietro:

On October 1, 2008 in Docket No. 08-10-02, *DPUC Review of Connecticut Gas Utilities' Forecast of Demand and Supply for Period 2009-2013*, Yankee Gas Services Company ("Yankee Gas" or the "Company") submitted its Biennial Forecast of Natural Gas Demand and Supply for the period 2009 through 2013 as required by Section 16-32f of the General Statutes of the State of Connecticut. On November 13, 2008, the Company requested an extension of time to March 1, 2009 to allow the Company to assess recent energy and market changes, to incorporate those impacts into a new forecast, and to develop detailed support for the updated forecast. On November 20, 2008 the Department of Public Utility Control granted the Company's request.

Yankee Gas submits herewith the new forecast and supporting materials. The forecast report and supporting material will be available to the public during normal business hours at the Company's offices, located at 107 Selden St., Berlin, Ct. 06037, or by requesting a copy by contacting Ms. Christine Gibson at (860) 665-3322. Copies of this report and supporting materials are also being furnished to the municipal, state and regional officials and agencies as required by CGS 16-32f.

Sincerely,

Janet R. Palmer
Manager, State Policy - CT
NUSCO - As Agent for Yankee Gas Services Company

Attachment
cc: Municipal Chief Executive Officers, Yankee Gas Service Area
Regional Planning Agencies
Attorney General
President Pro Tempore of the Senate
Speaker of the House of Representatives
Committee on Energy and Public Utilities

# Table of Contents

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## Table of Contents

## SECTION III -- DEMAND

Section III presents the overall demand forecast, including the results of the class-specific firm and nonfirm forecasts, as well as information concerning the assumptions and methodologies used to generate these forecasts. The section is comprised of the following subsections, which detail the various components of the total demand forecast. Detailed model information is contained in the Appendix at the end of this section.

## A. REFERENCE CASE FORECAST RESULTS

**Background**

Total firm gas volumes include sales and transportation gas for the residential, firm commercial and industrial classes, and six special contract customers. The nonfirm volumes are composed of seasonal (nonheating season) and interruptible services to commercial, industrial and electric generation customers. The overall reference case demand forecast represents the sum of separate, yet related, gas forecasts for each of the customer classes identified above.

The three firm customer class forecasts are developed independently using class-specific forecasting models. These models are described in detail later in this section. However, the basic process for the firm forecast produces forecasts of customers by class and use per customer by class. The results are multiplied together to obtain the class forecast of volumes. This is the Trend forecast which is then adjusted for the impacts of out-of-model programs. These include estimates of the Mcf reductions on the demand and supply requirements due to Company sponsored C&LM efforts. Other load impacts considered include major customer additions or losses or changes in load requirements based on documentation provided by the Yankee Gas marketing group. Lastly, the impact of Distributed Generation is incorporated into the forecast to produce the reference forecast.

The forecast of Special Contracts is developed from an examination of the recent behavior of these customers and, in the case of the Distributed Generation special contracts, from their projected load. The interruptible forecast is developed by examining the recent history of the sector and the outlook for the relative relationship between the competing prices of oil and natural gas. Excluded from the model forecasts are volumes associated with off-system sales or the New England Gas Company ("NEGASCO") special contract, since their volumes do not impact the Company's planning process. The NEGASCO special contract commenced in November, 2004.[1]

**Sales Forecast Summary**

Exhibits III-1.1 and III-1.2 provide a summary of the total firm and nonfirm forecasts, as well as their components. Below is a summary of the overall firm and nonfirm sales forecasts.

- **Firm**

  The rate of firm volume growth over the next 5 years (2009-2013) is expected to swing from the 0.8% compound annual growth rate experienced over the 2003-2008 period to a projected 1.7% annual rate. In total, firm volumes are anticipated to grow by about 3.6 Bcf from 40.5 Bcf in 2008 to 44.0 Bcf in 2013. The annual growth rate is approximately -0.2, 1.9 and 1.4 percent respectively for the residential, commercial and industrial classes.

1 *See*, Docket No. 03-09-12 – *Application of Yankee Gas Services Company for Approval of a Special Rate Contract for the Construction of Distribution Facilities and the Provision of Interconnection Service and Firm Transportation Service to New England Gas Company*, Decision (March 25, 2004).

## Exhibit III-1.1

**2009 Forecast of Weather-Normalized Firm Volumes**

| | Residential | | Commercial | | Industrial | | Special Contracts | | Total Firm | |
|---|---|---|---|---|---|---|---|---|---|---|
| History: | Bcf | % Change | Bcf | % Change | Bcf | % Change | Bcf | % Change | Bcf | % Change |
| 2003 | 13.180 | 1.1% | 13.271 | 6.4% | 7.688 | -3.1% | 4.808 | -3.1% | 38.946 | 1.4% |
| 2004 | 13.358 | 1.4% | 13.066 | -1.5% | 7.365 | -4.2% | 4.975 | 3.5% | 38.764 | -0.5% |
| 2005 | 13.378 | 0.2% | 13.002 | -0.5% | 7.254 | -1.5% | 5.540 | 11.3% | 39.174 | 1.1% |
| 2006 | 12.984 | -2.9% | 12.655 | -2.7% | 6.975 | -3.9% | 5.322 | -3.9% | 37.936 | -3.2% |
| 2007 | 13.841 | 6.6% | 13.053 | 3.1% | 6.596 | -5.4% | 5.623 | 5.7% | 39.113 | 3.1% |
| 2008 | 13.829 | -0.1% | 13.238 | 1.4% | 6.800 | 3.1% | 6.586 | 17.1% | 40.453 | 3.4% |
| Compound Annual Growth Rate: | | | | | | | | | | |
| 2003-2008 | | 1.0% | | -0.0% | | -2.4% | | 6.5% | | 0.8% |
| Forecast: | | | | | | | | | | |
| 2009 | 13.361 | -3.4% | 13.483 | 1.8% | 7.025 | 3.3% | 7.597 | 15.4% | 41.467 | 2.5% |
| 2010 | 13.596 | 1.8% | 13.456 | -0.2% | 7.170 | 2.1% | 8.284 | 9.0% | 42.506 | 2.5% |
| 2011 | 13.691 | 0.7% | 13.898 | 3.3% | 7.226 | 0.8% | 8.465 | 2.2% | 43.280 | 1.8% |
| 2012 | 13.755 | 0.5% | 14.361 | 3.3% | 7.281 | 0.8% | 8.488 | 0.3% | 43.886 | 1.4% |
| 2013 | 13.707 | -0.3% | 14.562 | 1.4% | 7.288 | 0.1% | 8.465 | -0.3% | 44.022 | 0.3% |
| Compound Annual Growth Rate: | | | | | | | | | | |
| 2008-2013 | | -0.2% | | 1.9% | | 1.4% | | 5.1% | | 1.7% |

## Exhibit III-1.2

**2009 Forecast of Nonfirm Volumes and Total Volumes**

| | Interruptible | | Seasonal | | Total NonFirm | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| History: | Bcf | % Change | Bcf | % Change | Bcf | % Change | Bcf | % Change |
| 2003 | 10.329 | -20.4% | 0.017 | 144.1% | 10.346 | -20.3% | 49.293 | -4.1% |
| 2004 | 8.143 | -21.2% | 0.020 | 14.4% | 8.163 | -21.1% | 46.926 | -4.8% |
| 2005 | 7.964 | -2.2% | 0.032 | 62.4% | 7.996 | -2.0% | 47.170 | 0.5% |
| 2006 | 9.883 | 24.1% | 0.042 | 33.2% | 9.925 | 24.1% | 47.861 | 1.5% |
| 2007 | 10.786 | 9.1% | 0.035 | -17.6% | 10.821 | 9.0% | 49.934 | 4.3% |
| 2008 | 10.036 | -7.0% | 0.024 | -30.1% | 10.060 | -7.0% | 50.513 | 1.2% |
| Compound Annual Growth Rate: | | | | | | | | |
| 2003-2008 | | -0.6% | | 7.4% | | -0.6% | | 0.5% |
| Forecast: | | | | | | | | |
| 2009 | 10.268 | 2.3% | 0.037 | 50.6% | 10.305 | 2.4% | 51.772 | 2.5% |
| 2010 | 10.423 | 1.5% | 0.037 | 0.0% | 10.460 | 1.5% | 52.966 | 2.3% |
| 2011 | 10.423 | 0.0% | 0.037 | 0.0% | 10.460 | 0.0% | 53.740 | 1.5% |
| 2012 | 10.452 | 0.3% | 0.037 | 0.0% | 10.489 | 0.3% | 54.374 | 1.2% |
| 2013 | 10.423 | -0.3% | 0.037 | 0.0% | 10.460 | -0.3% | 54.482 | 0.2% |
| Compound Annual Growth Rate: | | | | | | | | |
| 2008-2013 | | 0.8% | | 8.5% | | 0.8% | | 1.5% |

- **Residential**

  The number of residential customers is projected to increase by about 4,700 by 2013, or 0.5% per year. This rate is significantly lower than the 1.3% rate achieved during the 2004-2008 period. Over the same period, volumes are projected to decrease at about 0.2% per year versus an average 1.0% per year increase in the five-year history. These growth rates indicate that use per customer is declining more quickly than customers are growing over the forecast period.

- **Commercial**

  The number of customers grows at a rate of 0.9% from 2008 through 2013, similar to the five year history. Use per customer is projected to increase by 1.0% annually over the forecast period as volume growth of 1.9% per year exceeds the customer growth, due in part to the influence of distributed generation and large customer additions. The combined effect of these two influences adds 0.4% to the annual growth rate.

  The commercial forecast results exclude special contract volumes. These loads have been estimated separately and are included in the sales forecast summary tables.

- **Industrial**

  Industrial customers are projected to decline at an annual rate of 0.7%. The industrial use per customer is projected to increase by 2.2% annually through 2013. This yields an average growth in volumes of 1.4% per year over the next five years. The period 2004-2008 saw volumes decline at an average annual rate of 2.4%. The net impact of conservation, large customer impacts and DG adds 1.8% to the forecasted compound annual growth rate. Absent the large customer additions and DG, the load would decline by 0.5% annually.

  The industrial forecast results exclude special contract volumes. These loads have been estimated separately and are included in the sales forecast summary tables.

- **Special Contracts**

  The number of special contracts is expected to rise from three to six over the forecast period. The volumes for the special contract loads are expected to rise to 8.5 Bcf in 2011 from 6.6 Bcf currently and be stable thereafter.

- **Nonfirm**

From 2003 through 2008, nonfirm volumes averaged about 9.6 Bcf per year. However, as history shows, this is a volatile market. In 2000, due to highly competitive natural gas prices through the midpoint of the year, nonfirm volumes spiked to an historical peak of nearly 14 Bcf. In 2001, with a strong reversal in the gas to oil price relationship, nonfirm volumes tumbled to just above 8 Bcf, a level not seen since 1992-1993 before the current nonfirm market developed. Similar scenarios played out from 2005 through 2007. In 2005, less than 8 Bcf were consumed while in 2007, as the price relationship reversed, nonfirm volumes hit nearly 11 Bcf. With the natural gas/oil price relationship expected to remain favorable, the baseline forecast for the nonfirm market expects volumes to average about 10.4 Bcf.

- **Customers**

Exhibits III-2.1 and III-2.2 report customer levels for both the historical and forecasted period. The exhibits detail the service categories at the customer class level. These customer counts are based on actual Company records. However, it should be noted that for the residential data presented here, the Company reported equivalent customers. That is, each dwelling unit was reported as a customer regardless of the number of meters. For example, if an apartment building with one meter contains four separate dwelling units, then the Company would report four equivalent customers on the one meter. The current customer reporting convention, begun in 1993, would measure only one customer. For forecasting purposes, the models convert all customer counts to equivalent. This provides a better characterization of load requirements by basing the forecast on the number of dwelling units or establishments (customers), and not on the number of meters.

About 5,700 customers are expected to be added to the system over the next 5 years. This equates to an average annual growth rate of 0.5%. Virtually all of these additions are expected to be in the firm customer categories with approximately 4,700 in the residential class and 1,100 in the commercial class. The firm industrial class is expected to lose 60 customers.

## B. MODELING APPROACH AND DEVELOPMENT

### Selection of Modeling Approach

Forecast modeling in the natural gas industry has evolved from relatively simple methodologies to fairly complex processes. The evolution began with trend forecasts, proceeded to econometric models, then to end-use models, and end-use models enhanced with econometrics adjusted for out-of-model effects. In 2006, the Company adopted a new methodology, the Statistically Adjusted End-Use ("SAE") Model. This new process meets all existing standards of the industry today, and can accommodate the forecasting needs of the future as the industry continues to evolve.

The integrated forecasting methodology provides a number of benefits. These include:

**Cost:** It is not expensive to support. The data required are generally available from

## Exhibit III-2.1

**2009 Firm Customer Forecast**

| | Residential | | Commercial | | Industrial | | Special Contracts | | Total Firm | |
|---|---|---|---|---|---|---|---|---|---|---|
| **History:** | Customers | % Change | Customers | % Change | Customers | % Change | Customers | % Change | Customers | % Change |
| 2003 | 170,994 | 0.7% | 21,562 | 2.0% | 1,949 | 1.0% | 2 | 0.0% | 194,507 | 0.9% |
| 2004 | 172,636 | 1.0% | 21,656 | 0.4% | 1,856 | -4.8% | 2 | 0.0% | 196,149 | 0.8% |
| 2005 | 175,104 | 1.4% | 21,929 | 1.3% | 1,816 | -2.1% | 2 | 0.0% | 198,850 | 1.4% |
| 2006 | 177,470 | 1.4% | 22,110 | 0.8% | 1,783 | -1.8% | 2 | 0.0% | 201,366 | 1.3% |
| 2007 | 180,616 | 1.8% | 22,372 | 1.2% | 1,731 | -3.0% | 2 | 0.0% | 204,720 | 1.7% |
| 2008 | 182,658 | 1.1% | 22,515 | 0.6% | 1,640 | -5.2% | 3 | 37.5% | 206,816 | 1.0% |
| Compound Annual Growth Rate: | | | | | | | | | | |
| 2003-2008 | | 1.3% | | 0.9% | | -3.4% | | 6.6% | | 1.2% |
| **Forecast:** | | | | | | | | | | |
| 2009 | 182,833 | 0.1% | 22,411 | -0.5% | 1,642 | 0.1% | 4 | 27.3% | 206,889 | 0.0% |
| 2010 | 183,195 | 0.2% | 22,355 | -0.2% | 1,600 | -2.5% | 5 | 52.4% | 207,156 | 0.1% |
| 2011 | 184,554 | 0.7% | 22,796 | 2.0% | 1,583 | -1.1% | 6 | 12.5% | 208,939 | 0.9% |
| 2012 | 185,947 | 0.8% | 23,302 | 2.2% | 1,581 | -0.1% | 6 | 0.0% | 210,835 | 0.9% |
| 2013 | 187,347 | 0.8% | 23,590 | 1.2% | 1,579 | -0.1% | 6 | 0.0% | 212,522 | 0.8% |
| Compound Annual Growth Rate: | | | | | | | | | | |
| 2008-2013 | | 0.5% | | 0.9% | | -0.7% | | 16.9% | | 0.5% |

N.B. - Residential Customer counts are equivalent customers.

## Exhibit III-2.2

**2009 Nonfirm Customer Forecast**

| | Commercial | | Industrial | | Total | |
|---|---|---|---|---|---|---|
| History: | Customers | % Change | Customers | % Change | Customers | % Change |
| 2003 | 119 | -12.6% | 90 | 4.5% | 209 | -6.0% |
| 2004 | 122 | 1.8% | 91 | 1.8% | 213 | 1.8% |
| 2005 | 132 | 8.4% | 87 | -4.2% | 219 | 3.0% |
| 2006 | 130 | -1.1% | 80 | -8.4% | 210 | -4.0% |
| 2007 | 142 | 9.0% | 79 | -0.7% | 222 | 5.3% |
| 2008 | 142 | 0.0% | 76 | -4.3% | 218 | -1.5% |
| Compound Annual Growth Rate: | | | | | | |
| 2003-2008 | | 3.5% | | -3.2% | | 0.9% |
| **Forecast:** | | | | | | |
| 2009 | 144 | 1.6% | 78 | 3.1% | 223 | 2.1% |
| 2010 | 144 | 0.0% | 78 | 0.0% | 223 | 0.0% |
| 2011 | 144 | 0.0% | 78 | 0.0% | 223 | 0.0% |
| 2012 | 144 | 0.0% | 78 | 0.0% | 223 | 0.0% |
| 2013 | 144 | 0.0% | 78 | 0.0% | 223 | 0.0% |
| Compound Annual Growth Rate: | | | | | | |
| 2008-2013 | | 0.3% | | 0.6% | | 0.4% |

Company records, public documents, and established consulting firms. The software required to run models is readily available to companies like Yankee Gas.

**Detail:** The level of detail to which markets are forecast can be controlled by the Company. The model structure enables the forecasting process to incorporate specific adjustments for effects such as conservation programs, marketing related load impacts, DG, and the like. In the SAE models, the number of end uses incorporated into the model structure is controlled by the Company and determined by the availability of data to support the end use.

**Flexibility:** Because of the experience of the Company developing its forecasting models in-house utilizing software employed widely in the industry, it has the theoretical understanding and programming skills required to modify the model logic as necessary. As new market segments may develop, the model structure can be modified to adhere to the level of market detail deemed appropriate because the equations and parameters are not fixed.

**Turn-Around Time:** Because many of the models are PC based using dedicated software and standard spreadsheet applications, changes to the model assumptions, model structure or elements typically do not require a lengthy process.

## Role of Econometrics

As stated above, the basic process for the firm classes is to generate a customer forecast and a use per customer forecast for each. The forecasted customers times the forecasted use per customer yields the volume forecast. The customer models are econometric. The three classes also use econometric use per customer models. In the case of the residential and commercial models, they supply inputs to the SAE models. For these two classes, Yankee Gas utilizes the SAE modeling approach to forecast use per customer volumes. The SAE models are enhanced through the application of the econometrically derived parameters and end-use based saturation and efficiency estimates, with the end result being a methodology that attempts to combine the strengths of both sources. For the industrial class, an econometric model is used because the data to support an SAE model do not exist in sufficient detail or quality to justify its use. The output of all the econometric and SAE models is provided in the Appendix.

The resulting volume levels represent forecasted demand under "normal" calendar year conditions; i.e., each year is projected based on normal heating degree days and a typical calendar year. The normal weather year used for the demand forecast is based on weather data from Bradley Field for the years 1977 to 2006.

Econometric models use regression analysis to measure the historical relationships between a dependent variable (customers or use per customer) and other independent variables (housing, employment, prices, etc.). These estimated relationships are assumed to hold true for the forecast period and become the basis for inputs to the SAE models. The Yankee Gas customer models operate on the premise that gas customers are a function of economic activity and their own historical patterns. The economic activity variables used in the residential class were real average household income, the ratio of the price of natural gas to home heating oil and housing stock. In the commercial class, service-producing employment and retail sales were used. And, in the industrial class, manufacturing employment was used. Historical data are used to estimate the relationship of changes in these variables to changes in customers. These relationships are then applied to economic and, where appropriate, price forecasts to compute the future customer levels.

The class use-per-customer models estimate changes in use based on the natural gas price as measured by a typical bill, and an economic variable(s) such as household income, employment or manufacturing gross product. Again, in the residential and commercial classes, the result provides an estimate of the gas price and economic elasticities needed to adjust usage in the SAE models. Note, both the econometric use-per-customer models and the SAE models use actual, nonweather-normalized data as the dependent variable. Monthly heating degree days are included as independent variables in the econometric models and are incorporated into the SAE independent variables. See Tables III-3.1 & 3.2 for the heating degree day data.

**Econometric Model Development**

- **Theoretical Structure**

  Yankee Gas employs classical economic theory in its econometric demand equation estimation process. For the individual consumer, theory states that demand for a product is functionally related to price and a vector of other relevant economic variables. In the case of natural gas demand, weather is a relevant variable. The net result is that the econometric equations account for variations in both weather and economic conditions.

  Estimations of demand can be either static or dynamic. Static estimation assumes that changes in the determinants of demand (i.e., price, income, etc.) immediately affect demand. Dynamic estimation assumes that changes in determinants of demand affect demand over a number of time periods. The distinction is one of short-run versus long-run effects. Yankee Gas uses both types to estimate demand.

  The approach Yankee Gas employs in its econometric modeling activities has a sound theoretical basis. Therefore, independent variables that demonstrate a strong economic relationship are considered for analysis. Experimentation with various independent variables revolves around testing potential lagged relationships, weighted averages of variables, transformation of variables, etc.

- **Selection Criteria**

  Yankee Gas applies a systematic set of rules and criteria in assessing potential econometric solutions for use in the forecasting process. These rules are as follows:

  1. The econometric equation must adhere to sound economic theory. That is, it must

follow the theoretical structure discussed above. If it does not, the model is not considered.

2. The resulting parameter estimates must have the correct signs. For example, the own price (gas price) variable must have a negative sign as there is an inverse relationship between changes in price and changes in demand. If any incorrect signs are present, the model is rejected.
3. The resulting parameter estimates must be of reasonable magnitudes. If any parameter estimates fall outside a bound of reasonableness, the model is rejected.
4. The resulting model must produce a reasonable forecast. If the results are intuitively unsupportable, then the model is rejected.

If all of the above criteria are met, the Company will consider and evaluate econometric model statistics in the final selection process for the ultimate forecast model. Yankee Gas routinely tests a variety of model specifications to determine the ultimate econometric equation. These tests include altering the time specification of variables (e.g., lag periods, moving averages, etc.), use of separate variables versus the ratio of variables where multicollinearity may be a factor, differing time periods to insure model stability, and the like. All of these tests adhere to the selection criteria described above.

- **Data Requirements**

For the econometric models, the Company's data requirements are centered on only the types of theoretically valid variables described above. Historic data on gas prices, customers and volume levels are provided through available Company records. Historic economic and fuel price data are obtained from government agencies such as the Connecticut Department of Labor ("DOL"), the Bureau of Labor Statistics ("BLS") – U.S. Department of Labor, the Bureau of Economic Analysis ("BEA") – U.S. Department of Commerce and the Energy Information Administration ("EIA") – U.S. Department of Energy, as well as other publicly available sources. Forecasts for these historic data series are provided by the Company's economic and energy price consultants.

For the SAE models, aside from the price and economic elasticity estimates produced by the econometric models, data requirements include estimates of equipment and customer usage, equipment ownership, trends in both saturation and efficiency rates. The sources for these data requirements include Company records and survey information, and the EIA. These sources are updated at regular intervals.

- **Model Specification**

Yankee Gas uses a linear form in its econometric equation estimation. In econometric modeling, it is sometimes necessary to transform independent variables in the equations to mitigate the effects of multicollinearity. Multicollinearity occurs when two or more independent variables are correlated with one another (e.g., changes in the price of oil and changes in the price of gas) resulting in difficulty in estimating the separate effects of the affected independent variables on the dependent variable. In modeling with time series, it

Exhibit III-3.1

## Annual Heating Degree Day History

| Year | Heating Degree Days: Heating Actual | Heating Degree Days: Annual Normal | Difference from Normal | % Difference from Normal |
|---|---|---|---|---|
| 2000 | 6,161 | 6,047 | 114 | 1.9% |
| 2001 | 5,697 | 6,013 | -316 | -5.3% |
| 2002 | 5,656 | 6,013 | -357 | -5.9% |
| 2003 | 6,265 | 6,013 | 252 | 4.2% |
| 2004 | 6,066 | 6,047 | 19 | 0.3% |
| 2005 | 6,129 | 6,013 | 116 | 1.9% |
| 2006 | 5,272 | 6,013 | -741 | -12.3% |
| 2007 | 5,839 | 5,984 | -145 | -2.4% |
| 2008 | 5,792 | 6,016 | -224 | -3.7% |

## Annual Heating Season* Degree Day History

| Year | Heating Degree Days: Heating Actual | Heating Degree Days: Annual Normal | Difference from Normal | % Difference from Normal |
|---|---|---|---|---|
| 2000 | 5,317 | 5,688 | -371 | -6.5% |
| 2001 | 5,933 | 5,654 | 279 | 4.9% |
| 2002 | 4,763 | 5,654 | -891 | -15.8% |
| 2003 | 6,157 | 5,654 | 503 | 8.9% |
| 2004 | 5,705 | 5,688 | 17 | 0.3% |
| 2005 | 5,737 | 5,654 | 83 | 1.5% |
| 2006 | 5,305 | 5,654 | -349 | -6.2% |
| 2007 | 5,315 | 5,651 | -336 | -5.9% |
| 2008 | 5,324 | 5,660 | -336 | -5.9% |
| 2009 † | 3,450 | 3,318 | 132 | 4.0% |

* Heating Season from October through April
† November through January

## Exhibit III-3.2
## Annual Heating Degree Day History

| Mon-Yr | Heating Degree Days Actual | Heating Degree Days Normal | Difference from Normal | % Difference from Normal |
|---|---|---|---|---|
| Jan-00 | 1,258 | 1,202 | 56 | 4.7% |
| Feb-00 | 979 | 1,040 | -61 | -5.9% |
| Mar-00 | 659 | 834 | -175 | -21.0% |
| Apr-00 | 507 | 478 | 29 | 6.1% |
| May-00 | 210 | 191 | 19 | 9.9% |
| Jun-00 | 62 | 38 | 24 | 63.2% |
| Jul-00 | 3 | 0 | 3 | --- |
| Aug-00 | 14 | 11 | 3 | 27.3% |
| Sep-00 | 150 | 119 | 31 | 26.1% |
| Oct-00 | 399 | 408 | -9 | -2.2% |
| Nov-00 | 705 | 682 | 23 | 3.4% |
| Dec-00 | 1,215 | 1,044 | 171 | 16.4% |
| Jan-01 | 1,194 | 1,202 | -8 | -0.7% |
| Feb-01 | 1,017 | 1,006 | 11 | 1.1% |
| Mar-01 | 940 | 834 | 106 | 12.7% |
| Apr-01 | 463 | 478 | -15 | -3.1% |
| May-01 | 194 | 191 | 3 | 1.6% |
| Jun-01 | 27 | 38 | -11 | -28.9% |
| Jul-01 | 11 | 0 | 11 | --- |
| Aug-01 | 0 | 11 | -11 | -100.0% |
| Sep-01 | 98 | 119 | -21 | -17.6% |
| Oct-01 | 352 | 408 | -56 | -13.7% |
| Nov-01 | 550 | 682 | -132 | -19.4% |
| Dec-01 | 851 | 1,044 | -193 | -18.5% |
| Jan-02 | 949 | 1,202 | -253 | -21.0% |
| Feb-02 | 834 | 1,006 | -172 | -17.1% |
| Mar-02 | 800 | 834 | -34 | -4.1% |
| Apr-02 | 427 | 478 | -51 | -10.7% |
| May-02 | 265 | 191 | 74 | 38.7% |
| Jun-02 | 67 | 38 | 29 | 76.3% |
| Jul-02 | 1 | 0 | 1 | --- |
| Aug-02 | 11 | 11 | 0 | 0.0% |
| Sep-02 | 42 | 119 | -77 | -64.7% |
| Oct-02 | 464 | 408 | 56 | 13.7% |
| Nov-02 | 724 | 682 | 42 | 6.2% |
| Dec-02 | 1,072 | 1,044 | 28 | 2.7% |
| Jan-03 | 1,345 | 1,202 | 143 | 11.9% |
| Feb-03 | 1,141 | 1,006 | 135 | 13.4% |
| Mar-03 | 858 | 834 | 24 | 2.9% |
| Apr-03 | 553 | 478 | 75 | 15.7% |
| May-03 | 245 | 191 | 54 | 28.3% |
| Jun-03 | 51 | 38 | 13 | 34.2% |
| Jul-03 | 0 | 0 | 0 | --- |
| Aug-03 | 4 | 11 | -7 | -63.6% |
| Sep-03 | 53 | 119 | -66 | -55.5% |
| Oct-03 | 441 | 408 | 33 | 8.1% |
| Nov-03 | 602 | 682 | -80 | -11.7% |
| Dec-03 | 972 | 1,044 | -72 | -6.9% |
| Jan-04 | 1,415 | 1,202 | 213 | 17.7% |
| Feb-04 | 1,025 | 1,040 | -15 | -1.4% |
| Mar-04 | 797 | 834 | -37 | -4.4% |
| Apr-04 | 453 | 478 | -25 | -5.2% |
| May-04 | 145 | 191 | -46 | -24.1% |
| Jun-04 | 46 | 38 | 8 | 21.1% |
| Jul-04 | 2 | 0 | 2 | --- |
| Aug-04 | 4 | 11 | -7 | -63.6% |
| Sep-04 | 62 | 119 | -57 | -47.9% |
| Oct-04 | 408 | 408 | 0 | 0.0% |
| Nov-04 | 659 | 682 | -23 | -3.4% |
| Dec-04 | 1,050 | 1,044 | 6 | 0.6% |

| Mon-Yr | Heating Degree Days Actual | Heating Degree Days Normal | Difference from Normal | % Difference from Normal |
|---|---|---|---|---|
| Jan-05 | 1,273 | 1,202 | 71 | 5.9% |
| Feb-05 | 969 | 1,006 | -37 | -3.7% |
| Mar-05 | 977 | 834 | 143 | 17.1% |
| Apr-05 | 401 | 478 | -77 | -16.1% |
| May-05 | 314 | 191 | 123 | 64.4% |
| Jun-05 | 16 | 38 | -22 | -57.9% |
| Jul-05 | 4 | 0 | 4 | --- |
| Aug-05 | 0 | 11 | -11 | -100.0% |
| Sep-05 | 47 | 119 | -72 | -60.5% |
| Oct-05 | 365 | 408 | -43 | -10.5% |
| Nov-05 | 643 | 682 | -39 | -5.7% |
| Dec-05 | 1,120 | 1,044 | 76 | 7.3% |
| Jan-06 | 974 | 1,202 | -228 | -19.0% |
| Feb-06 | 967 | 1,006 | -39 | -3.9% |
| Mar-06 | 833 | 834 | -1 | -0.1% |
| Apr-06 | 403 | 478 | -75 | -15.7% |
| May-06 | 228 | 191 | 37 | 19.4% |
| Jun-06 | 36 | 38 | -2 | -5.3% |
| Jul-06 | 0 | 0 | 0 | --- |
| Aug-06 | 8 | 11 | -3 | -27.3% |
| Sep-06 | 96 | 119 | -23 | -19.3% |
| Oct-06 | 382 | 408 | -26 | -6.4% |
| Nov-06 | 538 | 682 | -144 | -21.1% |
| Dec-06 | 807 | 1,044 | -237 | -22.7% |
| Jan-07 | 1,028 | 1,207 | -179 | -14.8% |
| Feb-07 | 1,138 | 1,002 | 136 | 13.6% |
| Mar-07 | 879 | 838 | 41 | 4.9% |
| Apr-07 | 543 | 470 | 73 | 15.5% |
| May-07 | 156 | 196 | -40 | -20.4% |
| Jun-07 | 30 | 39 | -9 | -23.1% |
| Jul-07 | 2 | 0 | 2 | --- |
| Aug-07 | 14 | 11 | 3 | 27.3% |
| Sep-07 | 51 | 110 | -59 | -53.6% |
| Oct-07 | 215 | 406 | -191 | -47.0% |
| Nov-07 | 716 | 675 | 41 | 6.1% |
| Dec-07 | 1,067 | 1,030 | 37 | 3.6% |
| Jan-08 | 1,078 | 1,207 | -129 | -10.7% |
| Feb-08 | 1,018 | 1,034 | -16 | -1.5% |
| Mar-08 | 841 | 838 | 3 | 0.4% |
| Apr-08 | 389 | 470 | -81 | -17.2% |
| May-08 | 239 | 196 | 43 | 21.9% |
| Jun-08 | 13 | 39 | -26 | -66.7% |
| Jul-08 | 0 | 0 | 0 | --- |
| Aug-08 | 4 | 11 | -7 | -63.6% |
| Sep-08 | 83 | 110 | -27 | -24.5% |
| Oct-08 | 425 | 406 | 19 | 4.7% |
| Nov-08 | 702 | 675 | 27 | 4.0% |
| Dec-08 | 1,000 | 1,030 | -30 | -2.9% |
| Jan-09 | 1,323 | 1,207 | 116 | 9.6% |

is almost inevitable that some degree of multicollinearity will exist among the explanatory variables. The issue with multicollinearity is whether its presence indicates an estimation problem since only when a problem becomes significant should steps be taken to ameliorate its effects. Should it be determined that multicollinearity is harming the model, several steps can be taken. Among them are dropping one of the offending variables, using extraneous information, obtaining more data, or transforming variables. Of the options, dropping a variable is the least preferred. For example, in the industrial sector, the price of gas and manufacturing gross product, although correlated, are important determinants of natural gas demand. Yankee Gas will generally choose to use transformed variables or extraneous information rather than dropping a variable.

Another econometric model specification issue is the appropriate time period over which the models run. The Company believes, as a general rule, that use of all available data is preferable. However, when there are structural changes in the data or events that significantly impact customer behavior, consideration should be given to limiting the time period over which analysis is performed. Previously, the Company accounted for such factors in its annual econometric models by utilizing dummy variables to capture structural change or shifts in customer response. However, with the annual models, maintaining sufficient degrees of freedom to obtain reasonably robust results was always a concern. The models generally required as many years of times series data as could be gathered. Although the Company has customer data back beyond 1985, by switching to monthly models rather than the annual models, it can limit its examination of model specification to more recent periods. With monthly models, there are sufficient data points to allow estimation over much shorter time frames without the need for the use of dummy variables to capture the impact on the dependent variable of changes in the response of the economic and price variables.

- **Econometric Model Variables**

The specific variables used in each of the Company's econometric models are described below. The model results are presented in the Appendix. Additionally, required model tests and other pertinent econometric model information are included in this Appendix.

<u>Residential Customer Model</u>

| | | |
|---|---|---|
| Dependent Variable | = | Number of Residential Customers |
| Independent Variables | = | - 1-Period Lagged Dependent Variable |
| | | - Connecticut Housing Stock |
| | | - Connecticut Real Average Household Income |
| | | - 12-Month Moving Average of the ratio of Natural Gas to #2 Oil (home heating oil) |

Residential Use per Customer Model

| | | |
|---|---|---|
| Dependent Variable | = | Use per Residential Customer |
| Independent Variables | = | - 12-Month Moving Average of Real Typical Bill per MMBtu<br>- Connecticut Real Average Household Income<br>- Monthly HDD Slope Dummy Variables |

Commercial Customer Model

| | | |
|---|---|---|
| Dependent Variable | = | Number of Firm Commercial Customers |
| Independent Variables | = | - 1-Period Lagged Dependent Variable<br>- Connecticut Service Producing Employment<br>- Connecticut Retail Sales |

Commercial Use per Customer Model

| | | |
|---|---|---|
| Dependent Variable | = | Use per Firm Commercial Customer |
| Independent Variables | = | - 12-Month Moving Average of the Real Typical Bill per MMBtu<br>- Connecticut Service-Producing Employment<br>- Monthly HDD Slope Dummy Variables |

Industrial Customer Model

| | | |
|---|---|---|
| Dependent Variable | = | Firm Industrial Customers |
| Independent Variables | = | - 1-Period Lagged Dependent Variable<br>- Connecticut Manufacturing Employment |

Industrial Use per Customer Model

| | | |
|---|---|---|
| Dependent Variable | = | Use per Firm Industrial Customer |
| Independent Variables | = | - 12-Month Moving Average of the Real Typical Bill<br>- Ct. Real Manufacturing Gross Product<br>- Reading Days adjusted for End-of-Month Reads<br>- Monthly HDD Slope Dummy Variables |

**Statistically Adjusted End-Use Models**

The SAE models are monthly models. The traditional approach to forecasting monthly volumes for a customer class is to develop an econometric model that relates monthly volumes to weather, seasonal variables, and economic conditions. From a forecasting perspective, the strength of econometric models is that they are well suited to identifying historical trends and to projecting these trends into the future. In contrast, the strength of the end-use modeling approach is the ability to identify the end-use factors that are driving energy use. By incorporating end-use structure into an econometric model, the SAE modeling framework exploits the strengths of both approaches.

There are several advantages to this approach.

- The equipment efficiency trends and saturations changes, and, in the residential sector, dwelling square footage and thermal integrity, embodied in the long-run end-use forecasts are introduced explicitly into the short-term monthly volume forecast. This provides a strong bridge between the two forecasts.
- By explicitly introducing trends in equipment saturations, equipment efficiency, and dwelling square footage and thermal integrity levels in the residential class, it is easier to explain changes in usage levels and changes in weather-sensitivity over time.
- Data for short-term models are often not sufficiently robust to support estimation of a full set of price, economic and demographic effects. By bundling these factors with equipment-oriented drivers, a rich set of elasticities can be built into the final model.

The statistically adjusted end-use modeling framework begins by defining energy use ($USE_{y,m}$) in year (y) and month (m) as the sum of energy used by heating equipment ($Heat_{y,m}$) and other equipment ($Other_{y,m}$). Formally,

$$USE_{y,m} = Heat_{y,m} + Other_{y,m}$$

Although monthly volumes are measured for individual customers, the end-use components are not. Substituting estimates for the end-use elements gives the following econometric equation.

$$USE_m = a + b_1 \times XHeat_m + b_2 \times XOther_m + \varepsilon_m$$

Here, $XHeat_m$ and $XOther_m$ are explanatory variables constructed from end-use information, dwelling or output data, weather data, and market data. As is shown below, the equations used to construct these X-variables are simplified end-use models, and the X-variables are the estimated usage levels for each of the major end uses based on these models. The estimated model can then be thought of as a statistically adjusted end-use model, where the estimated slopes are the adjustment factors.

**Constructing *XHeat***

As represented in end-use models, energy use by space heating systems depends on the following types of variables.

- Heating degree days,
- Heating equipment saturation levels,
- Heating equipment operating efficiencies,
- Average number of days in the billing cycle for each month,
- In the residential class, thermal integrity and square footage of homes, average household size, and household income,
- In the commercial class, a commercial output measure, and
- Real energy price.

The heating variable is represented as the product of an annual equipment index and a monthly usage multiplier. That is,

$$XHeat_{y,m} = HeatIndex_{y} \times HeatUse_{y,m}$$

where, $XHeat_{y,m}$ is estimated heating energy use in year (y) and month (m),
$HeatIndex_{y}$ is the annual index of heating equipment, and
$HeatUse_{y,m}$ is the monthly usage multiplier.

The heating equipment index is defined as a weighted average across equipment types of equipment saturation levels normalized by operating efficiency levels. Given a set of fixed weights, the index will change over time with changes in equipment saturations, operating efficiencies, and other class specific measures such as a structural index in the residential model.

The heating usage levels ($HeatUse_{y,m}$) are impacted on a monthly basis by several factors, including billing weather, structural or output measures, economic drivers and price. The heat use measure is modeled as a composite index where the components are all indexed to a base measure; i.e., one. Thus, in the base period the index sums approximately to one. The billing weather term serves to allocate annual values to months of the year. In other years, the component values will reflect changes in the economic and price drivers as transformed through the end-use elasticity parameters. For example, if the real price of natural gas goes up 10% relative to the base value, the price component of the Heat Use index will contribute a multiplier of less than 1.0 as the positive price change is raised to the power of the negative price elasticity. Similarly, if the real income measure goes up 10% relative to the base value, the income component of the Heat Use index will contribute a multiplier greater than 1.0 as the positive income change is raised to the power of the positive income elasticity.

**Constructing *XOther***

Similarly, monthly estimates of non-weather sensitive sales can be derived as was space heating. Based on end-use concepts, other volumes are driven by:

- Appliance and equipment saturation levels,
- Appliance and equipment efficiency levels,
- Number of days in the billing cycle for each month,
- Household size, or other output measure, and
- Real energy prices.

The explanatory variable for other uses is defined as follows:

$$XOther_{y,m} = OtherEqpIndex_{y,m} \times OtherUse_{y,m}$$

The first term on the right hand side of this expression (*OtherEqpIndex*$_{y}$) embodies information about appliance saturation and efficiency levels and monthly usage multipliers. The second term (*OtherUse*) captures the impact of changes in price, economic driver measures, and number of billing days on appliance utilization.

## C. MAJOR FORECAST INPUTS

The demand forecasting process utilizes a set of projected economic/demographic assumptions as one of the primary driving forces behind the volume projections. The economic consulting firm of Moody's|Economy.com provides the basic economic/demographic forecasts for the State of Connecticut, consistent with its national forecast. These forecasts provide the assumptions used in the Company's econometric modeling phase to produce both the customer forecast and the price and economic elasticities for use in the SAE modeling phase. The economic forecast used for the forecast of volumes was produced in December, 2008. Since then the economic outlook has become more pessimistic as more sectors of the macro economy stumble. Were the forecast of volumes be revisited now, it would be reasonable to assume that the forecast would be lower.

Another major input to the forecast models is energy prices. The Company uses Energy Ventures Analysis, Inc. ("EVA") forecasts of retail and wholesale energy prices in its forecasting process. EVA uses the Moody's|Economy.com U.S. outlook to drive its forecasts providing further consistency in the forecasting process. Highlights of the Economy.com and EVA forecasts for the U. S. and Connecticut as well as corresponding economic and price data used in Yankee Gas' sales models are presented on the following pages and in Exhibits III-4 through III-9.

Finally, with the Trend forecast finalized, other factors that influence the volume levels are incorporated to produce the Reference forecast. These include large customer impacts such as the gain or loss of a customer or large additions or reductions in load, the reduction in volumes due to Company-sponsored conservation, and DG programs.

Nonfirm volume projections for interruptible customers are based on a blend of expected economic outcomes, capacity availability and expert judgment. In the forecasting process, assumptions about changes in the base of interruptible customers are made. The future load requirements of these customers are based on an analysis of historical load data for the interruptible class. The ultimate load is driven by the competitive opportunities of natural gas versus alternate fuels (primarily fuel oil), and the capacity available on the Yankee Gas system once firm volume customer requirements are met.

Additionally, the Company develops forecasts outside the traditional modeling process for two categories: special contracts and seasonal. The seasonal projections are based on a judgmental analysis of expected gas demand for these customers. The special contracts use a similar approach to the seasonal, supplemented with additional information on new special contract load supplied by Yankee Gas Marketing.

- **Economic Forecast**

<u>**Overview**</u>

The Yankee Gas forecast of gas sales is driven by forecasts of the state and national economies because of the close relationship between the sales of energy (e.g., natural gas) and economic activity. Those historical linkages which have determined the past relationship between the economy and sales of gas volumes would also be expected to determine the future path, barring unforeseen major technological innovation or a geopolitical event that would fundamentally alter the energy mix. The forecasts for the national and state economies are long-term trend forecasts based on the more fundamental forces at work in the economy such as population, labor force and capital stocks. The long-term trend is regarded as the most likely outcome of all the forces operating upon the economy. Near-term perturbations around the trend reflect current economic influences such as the position of the economy in the business cycle or outside influences on the system, and manifest themselves in the early years of the forecast.

## Long-Run Growth Potential

In the long run, the potential growth of the economy can be divided into two major parts: (1) growth in the supply of resources; i.e., labor force, capital stocks, and energy, and (2) growth in productivity, the ability to produce more output at the same level of input, which can ebb and flow with movements in research and development, and the age and composition of the capital stock.

All of these forces represent potential constraints on economic growth. The rate of capital stock formation in the forecast period is expected to suffer initially, not regaining solid footing until some time in 2010 when business investment should return to a healthy pace. Energy prices, as measured by the price of crude oil, are forecasted to remain very depressed through 2009 before stabilizing and resuming growth in 2010 as demand recovers with an expanding world economy. Natural gas prices, as measured by Henry Hub, also saw a plunge in 2008 and are expected to remain below recent history for the next several years for reasons similar to those affecting oil. But, also, and perhaps more importantly, prices are likely to remain depressed because of the newly discovered and exploitable supply response available from the unconventional sources (shale plays). LNG is expected to play a greater role in the coming years adding additional downward pressure on price. The efficiency gains to capital stocks induced by the price run up over the last few years will not go away with an easing of price pressures. These forces and the expectation of sufficient supply are forecasted to keep the real prices of energy relatively stable even as worldwide energy demand accelerates.

Productivity growth has been volatile over the last several years and off from its performance earlier in the decade. It is expected to slow from its pace over the past decade in the forecast period. The apparent driver for much of the recent past improvement was the spread of information technology and the use of such modes of information sharing as the Internet. These influences appear to have been assimilated into the measurements. Growth will have to rely on the more traditional forces of competition and future technology advancements.

The forecasted growth in the national labor force is expected to be 0.8% annually through 2013. This represents the most limiting factor for growth. The growth in the labor force is determined by two forces, population and the participation rate. From the early 1970s to the mid-1980s, the growth in the labor force was about twice the growth in population. This period saw the assimilation of the "baby boomers" into the workforce. Amplifying the natural gain in the labor force was an increase in participation rates, especially among women.

The slowing of population growth from the late 1960s on will exert a strong influence on the growth of the labor force during the 2008-2013 period. Helping to lift the rate in the recent past has been such forces as the baby boom echo and immigration. But, absent such forces as immigration, what will begin to be felt is a flattening of population growth only somewhat offset by an uptick in participation rates. This is a constraint on economic growth. The growth in the overall female labor force participation rate has tapered off as the participation rates for many age groups approach those for males. And, by forecast end, the exodus of the boomers from the work force will begin to accelerate. The outlook for slow growth in the labor force will limit real GDP growth while the expected gains in productivity will work to counter this force.

The following table provides insight into the changing impact of labor force growth and productivity on the U.S. economy.

| | 1968-78 | 1978-88 | 1988-98 | 1998-08 | 2008-13 |
|---|---|---|---|---|---|
| Population | 1.1% | 1.0% | 1.0% | 1.2% | 1.0% |
| Labor Force | 2.6% | 1.8% | 1.2% | 1.1% | 0.8% |
| Productivity | 1.9% | 1.3% | 1.7% | 2.6% | 1.4% |

## Economic Outlook

As mentioned above, the economic/demographic forecasts for the Yankee Gas service territory are developed from a model provided to Yankee Gas by Moody's|Economy.com which provides state-specific information for Connecticut. The state model forecast is in turn driven by a national forecast. The Connecticut economy is closely tied to, and dependent on, the national economy. Therefore, acknowledging regional differences, a higher/lower national forecast generally would imply a higher/lower regional forecast.

Highlights of the national outlook through 2013:

- The nation's economy is currently suffering through what could be the worst downturn in the post-WWII period. A recovery is not expected to begin before the third quarter of 2009.

- Inflation, not long ago a growing concern, has been replaced by the fear of a deflationary cycle. The general price level, as measured by the CPI, will almost certainly decline in 2009. The economy's overall measure of inflation, the Implicit Price Deflator for GDP, is expected to average only about 1.6% through 2013.

- Labor markets are already suffering from the recession. The unemployment rate is expected to peak in this forecast at 7.8%. But there are scenarios that could have it go over 9%. Participation rates will begin to decline as the work force ages. This will act as a brake on potential GDP growth, especially after 2013 as the retirement of the boomer generation begins in earnest.

- Interest rates are expected to remain at historic lows through much of 2009 with the Federal Funds rate near 0%. As the economy begins to recover, rates will begin to rise. By 2011, they should be back into normal ranges. The prime rate, however, should hover in the neighborhood of where it is currently.

- Given the instability of the current economy, the risks to this particular forecast are significant. In the near term, they are clearly on the downside. They include, most notably, the housing and the credit markets. These highlight the precarious position of the consumers' balance sheet. In an economy predominately consumption oriented, the consumer choosing not to spend, but rather to repair balance sheets or simply to save out of fear of the future, has serious negative consequence for the economy. Fortunately, the price of all forms of energy has retreated. This has provided some breathing room and is likely to last through 2010 if not longer.

Highlights of the Connecticut outlook through 2013:

- The Connecticut economy is slowly contracting. Real Gross State Product is expected to continue to decline through early 2009 before resuming growth. 2009 will be a very weak year with 2010 only slightly better. More typical growth resumes in late 2010 with 2011 showing a bounce effect. 2012-2013 will settle into a more typical pattern.

- Real Personal Income should expand at a 2.1% rate over the 2008-2013 period, well below its recent history.

- Manufacturing will continue to shed employment, declining about 0.4% annually with a big decline in 2009. In 2011 and 2012, employment is expected to show some growth before returning to declines in 2013. This will occur even as real manufacturing gross product rises about 3.5% annually through 2013.

- Nonmanufacturing employment is expected to expand about 0.7% annually with 2009 being a negative year. The service sector will lift the rate growing 1.3% annually through 2013. Health services will lead growing, 2.4% annually. Utilities will be a drag on growth. Information will grow about 1.7% annually, while the Trades and Finance and Insurance show little or no growth.

- Population is expected to expand only 0.2% annually through 2013. Households should grow 0.7% annually over that time frame as the demographics shift. Net-migration is negative throughout the forecast, strong in the first few years before moderating, as retirees and young, mobile labor leave for better situations elsewhere.

Exhibit III-4

## YANKEE GAS SERVICES COMPANY
## ECONOMIC FORECAST
## RESIDENTIAL

**Forecast:**

| | | | | | Retail Market Energy Prices | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Nominal | | Real | |
| Year | Implicit Price Deflator for GDP | Ct. Real Personal Income ($millions) | Ct. Real Average Household Income | Ct. Housing Stock | NGas $/MMBtu | #2 Oil $/MMBtu | NGas $/MMBtu | #2 Oil $/MMBtu |
| **Level:** | | | | | | | | |
| 2008 | 1.228 | $161,397 | $120,240 | 1,462,263 | $17.35 | $25.31 | $14.13 | $20.61 |
| 2009 | 1.249 | $161,862 | $120,088 | 1,466,903 | $15.37 | $17.48 | $12.30 | $13.99 |
| 2010 | 1.268 | $165,588 | $122,253 | 1,471,983 | $15.53 | $19.18 | $12.25 | $15.13 |
| 2011 | 1.288 | $170,494 | $125,006 | 1,478,303 | $16.13 | $20.56 | $12.52 | $15.96 |
| 2012 | 1.308 | $175,004 | $127,114 | 1,485,510 | $16.61 | $21.95 | $12.70 | $16.78 |
| 2013 | 1.329 | $178,996 | $129,051 | 1,493,273 | $16.96 | $22.73 | $12.76 | $17.10 |
| **Percent Change:** | | | | | | | | |
| 2009 | 1.8% | 0.3% | -0.1% | 0.3% | -11.4% | -30.9% | -13.0% | -32.1% |
| 2010 | 1.5% | 2.3% | 1.8% | 0.3% | 1.1% | 9.7% | -0.4% | 8.1% |
| 2011 | 1.6% | 3.0% | 2.3% | 0.4% | 3.8% | 7.2% | 2.2% | 5.5% |
| 2012 | 1.5% | 2.6% | 1.7% | 0.5% | 3.0% | 6.7% | 1.5% | 5.1% |
| 2013 | 1.6% | 2.3% | 1.5% | 0.5% | 2.1% | 3.5% | 0.5% | 1.9% |
| **Compound Annual Growth Rates (2008-2013):** | | | | | | | | |
| | 1.6% | 2.1% | 1.4% | 0.4% | -0.5% | -2.1% | -2.0% | -3.7% |

Exhibit III-5

**YANKEE GAS SERVICES COMPANY**

**ECONOMIC FORECAST**

**COMMERCIAL**

**Forecast:**

| | | | | Retail Market Energy Prices | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Nominal | | Real | | |
| Year | Implicit Price Deflator for GDP | Ct. Retail Sales ($millions) | Ct. Service-Producing Employment | NGas $/MMBtu | #2 Oil $/MMBtu | NGas $/MMBtu | Composite #2 & #6 Oil $/MMBtu | Gas to Oil Price Ratio |
| **Level:** | | | | | | | | |
| 2008 | 1.228 | $57,385 | 1,442,869 | $14.01 | $23.14 | $11.41 | $18.85 | 0.605 |
| 2009 | 1.249 | $54,826 | 1,425,041 | $11.98 | $15.28 | $9.58 | $12.23 | 0.784 |
| 2010 | 1.268 | $57,226 | 1,433,032 | $12.10 | $16.96 | $9.54 | $13.37 | 0.713 |
| 2011 | 1.288 | $60,634 | 1,460,534 | $12.65 | $18.31 | $9.82 | $14.21 | 0.691 |
| 2012 | 1.308 | $62,595 | 1,485,837 | $13.10 | $19.67 | $10.01 | $15.04 | 0.666 |
| 2013 | 1.329 | $63,556 | 1,497,864 | $13.40 | $20.42 | $10.09 | $15.37 | 0.656 |
| **Percent Change:** | | | | | | | | |
| 2009 | 1.8% | -4.5% | -1.2% | -14.5% | -34.0% | -16.0% | -35.1% | 29.4% |
| 2010 | 1.5% | 4.4% | 0.6% | 1.0% | 11.0% | -0.5% | 9.3% | -9.0% |
| 2011 | 1.6% | 6.0% | 1.9% | 4.6% | 8.0% | 2.9% | 6.3% | -3.2% |
| 2012 | 1.5% | 3.2% | 1.7% | 3.5% | 7.4% | 2.0% | 5.8% | -3.6% |
| 2013 | 1.6% | 1.5% | 0.8% | 2.3% | 3.8% | 0.7% | 2.2% | -1.4% |
| **Compound Annual Growth Rates (2008-2013):** | | | | | | | | |
| | 1.6% | 2.1% | 0.8% | -0.9% | -2.5% | -2.4% | -4.0% | 1.6% |

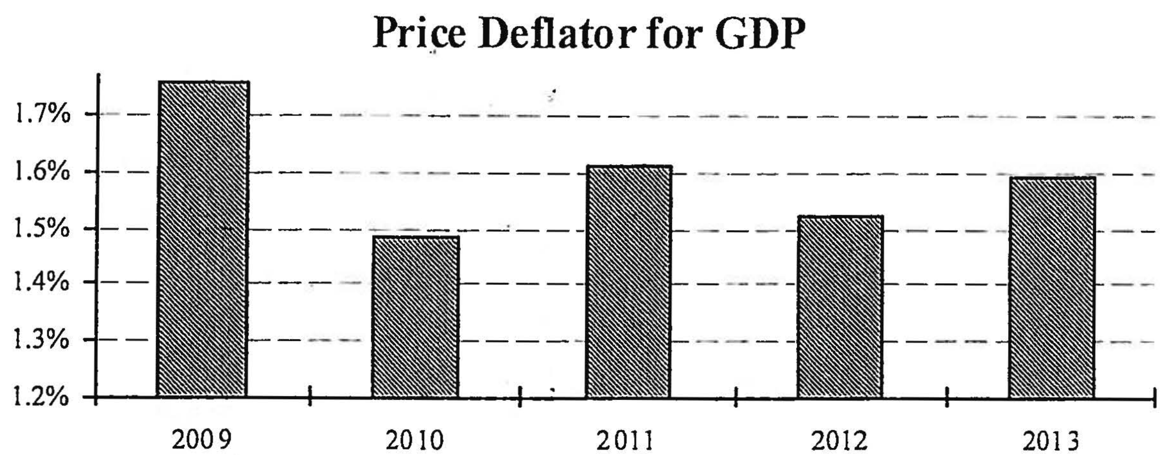
Exhibit III-6

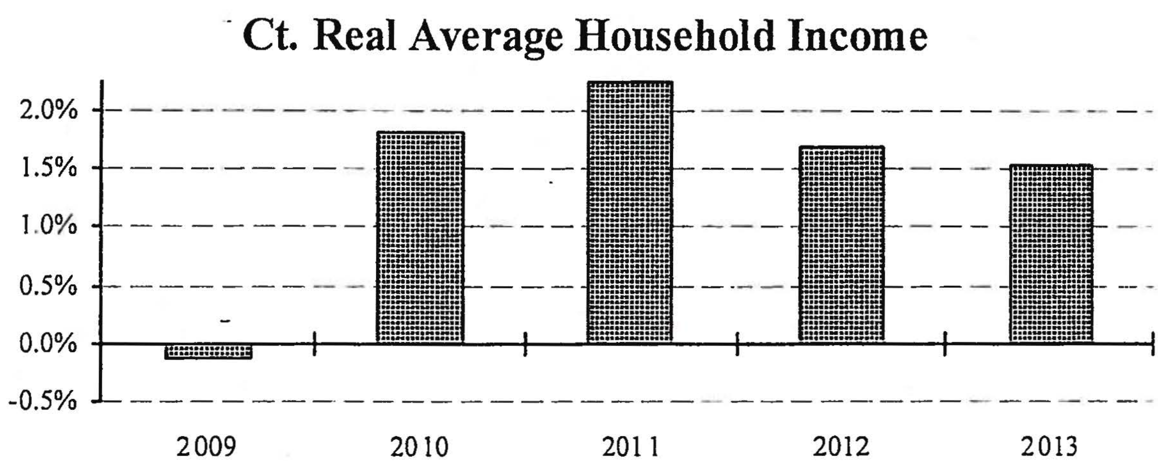
**YANKEE GAS SERVICES COMPANY**
**ECONOMIC FORECAST**
**INDUSTRIAL**

**Forecast:**

| Year | Implicit Price Deflator for GDP | Ct. Total Mfg Employment | Ct. Mfg Gross Product ($00 millions) | Retail Market Energy Prices: Nominal NGas $/MMBtu | Retail Market Energy Prices: Nominal Composite #2 & #6 Oil $/MMBtu | Retail Market Energy Prices: Real NGas $/MMBtu | Retail Market Energy Prices: Real Composite #2 & #6 Oil $/MMBtu | Gas to Oil Price Ratio |
|---|---|---|---|---|---|---|---|---|
| **Level:** | | | | | | | | |
| 2008 | 1.228 | 188,642 | $25,156 | $11.35 | $17.28 | $9.25 | $14.07 | 0.657 |
| 2009 | 1.249 | 183,431 | $25,679 | $9.28 | $11.32 | $7.43 | $9.06 | 0.820 |
| 2010 | 1.268 | 182,529 | $26,859 | $9.37 | $12.80 | $7.39 | $10.09 | 0.732 |
| 2011 | 1.288 | 184,330 | $28,129 | $9.89 | $13.61 | $7.68 | $10.57 | 0.726 |
| 2012 | 1.308 | 185,490 | $29,078 | $10.31 | $14.64 | $7.88 | $11.19 | 0.704 |
| 2013 | 1.329 | 184,709 | $29,828 | $10.58 | $15.21 | $7.96 | $11.44 | 0.695 |
| **Percent Change:** | | | | | | | | |
| 2009 | 1.8% | -2.8% | 2.1% | -18.3% | -34.5% | -19.7% | -35.6% | 24.8% |
| 2010 | 1.5% | -0.5% | 4.6% | 1.0% | 13.1% | -0.5% | 11.5% | -10.7% |
| 2011 | 1.6% | 1.0% | 4.7% | 5.6% | 6.4% | 3.9% | 4.7% | -0.7% |
| 2012 | 1.5% | 0.6% | 3.4% | 4.2% | 7.5% | 2.6% | 5.9% | -3.1% |
| 2013 | 1.6% | -0.4% | 2.6% | 2.6% | 3.9% | 1.0% | 2.2% | -1.2% |
| **Compound Annual Growth Rates (2008-2013):** | | | | | | | | |
| | 1.6% | -0.4% | 3.5% | -1.4% | -2.5% | -3.0% | -4.0% | 1.1% |

Exhibit III-7



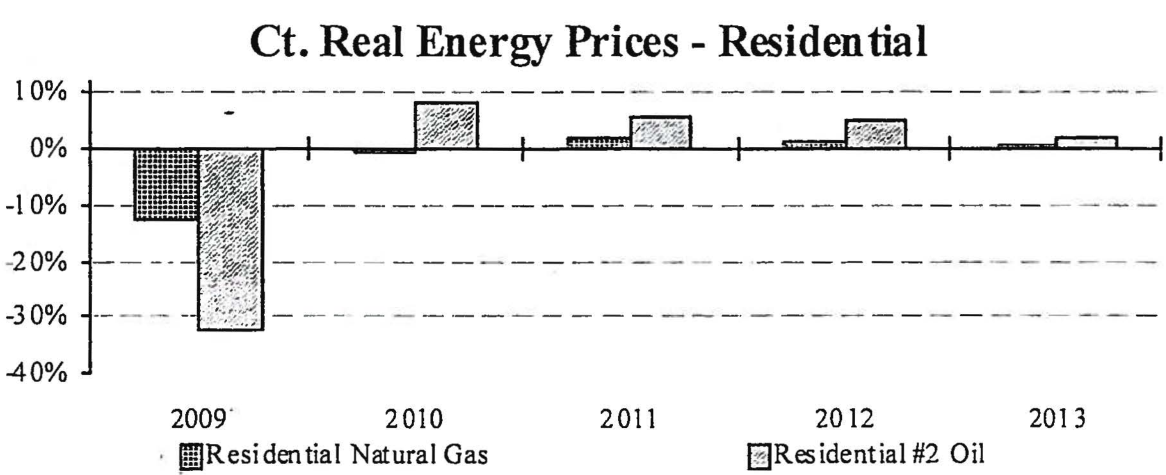
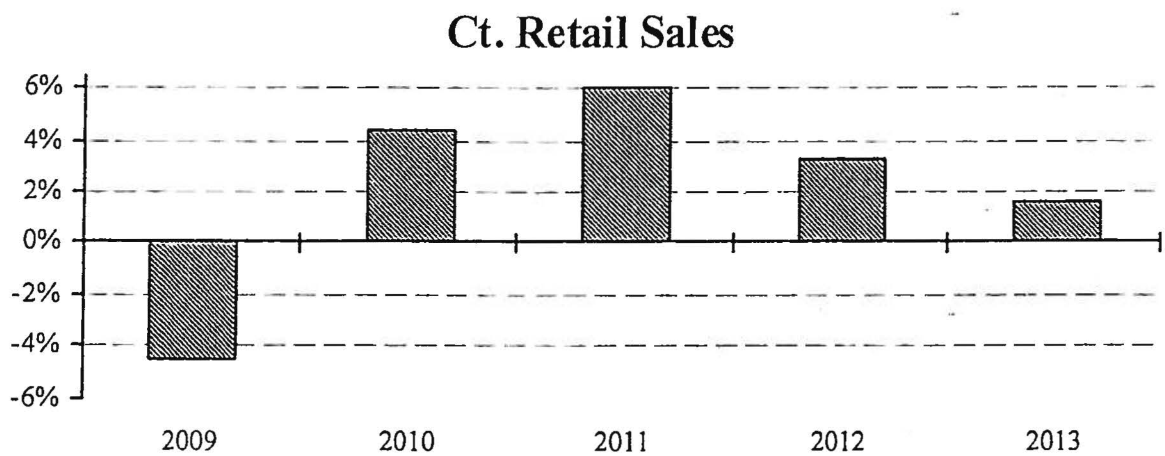
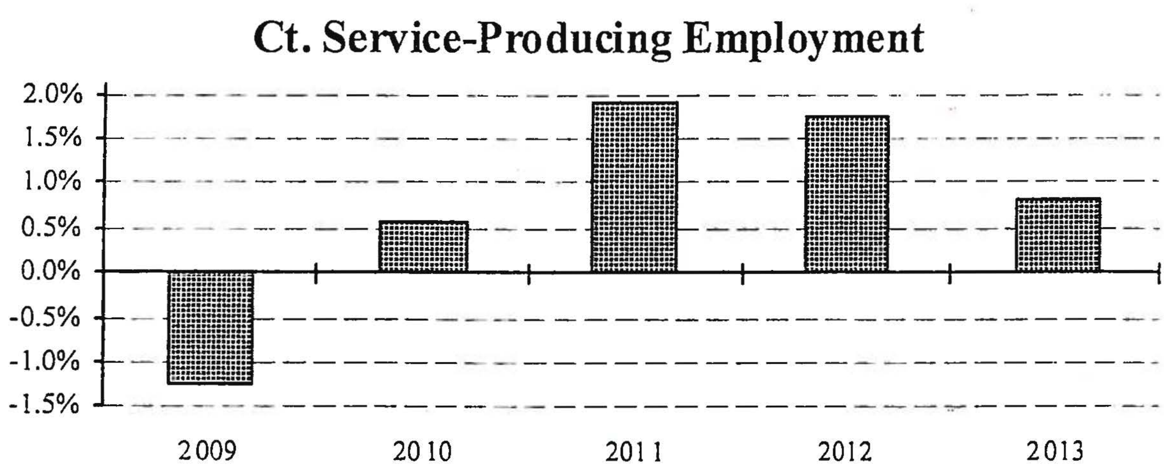



Exhibit III-8



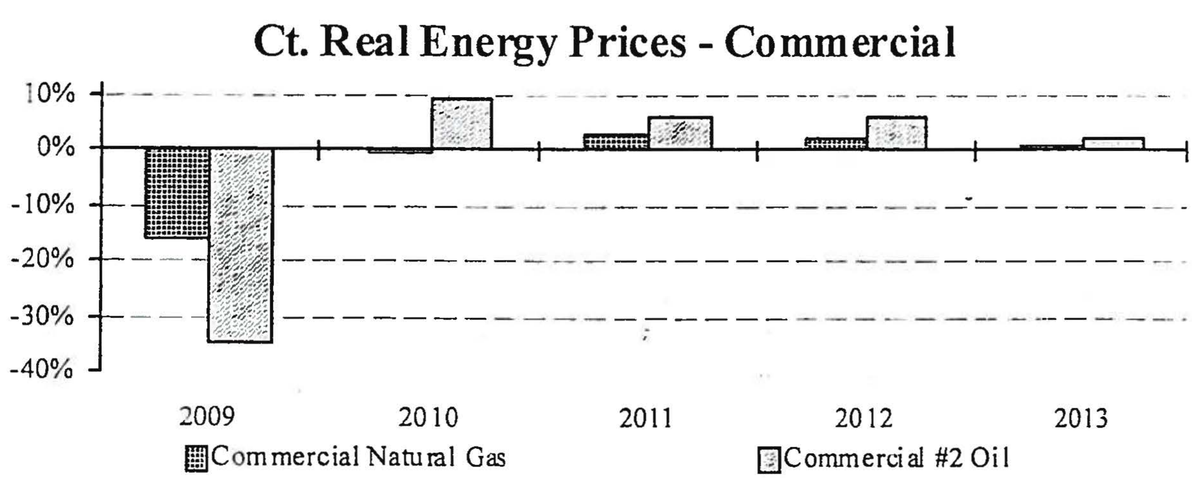
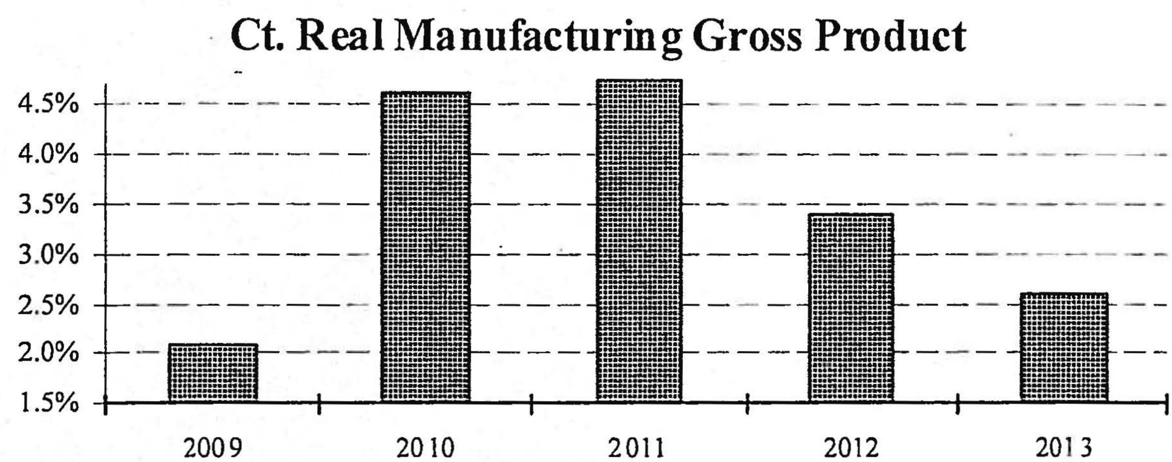
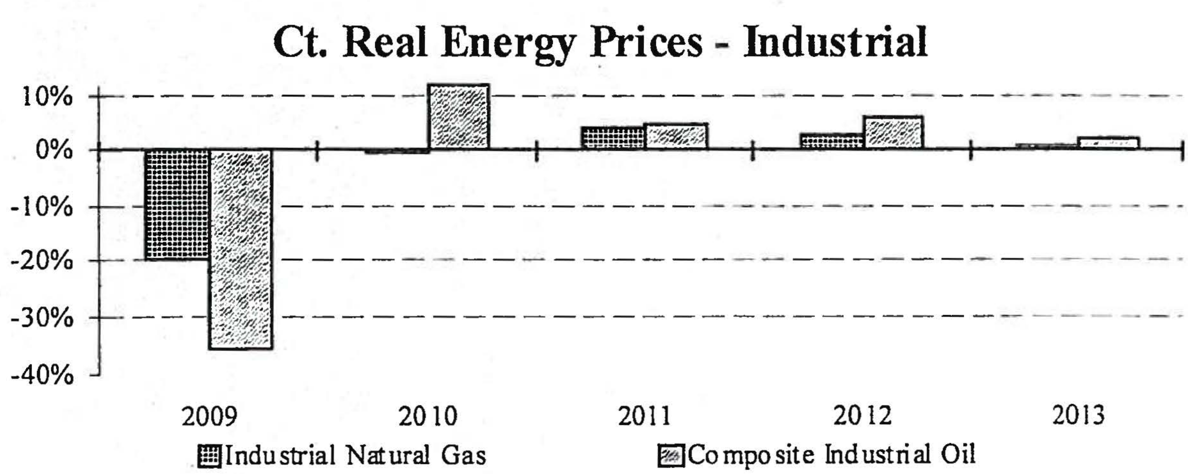



Exhibit III-9

- **The Price Response**

The run-up in the price of natural gas which began early in the decade has abated as production from nonconventional sources has significantly added to supply and the severe economic downturn has adversely impacted demand. The fundamental state of the market; i.e., the tight relationship between demand and supply, was the prime driver to the increase. The impacts of hurricanes Ivan in 2004 and Katrina and Rita in 2005 exacerbated the basic situation with further pressure added by hurricanes Gustav and Ike. At this time, more than 10% of Gulf production remains shut-in. While not able to precisely quantify the impacts of the recent run-up, a couple of observations can be made using the use per customer, the price elasticity and price. These observations can suggest the influence of price on customer demand. At the same time there are, of course, other forces exerting influences on the customer such as changes in income, employment, business cycle, etc. However, these rudimentary analyses can provide a verification of the price response and a sense of its magnitude.

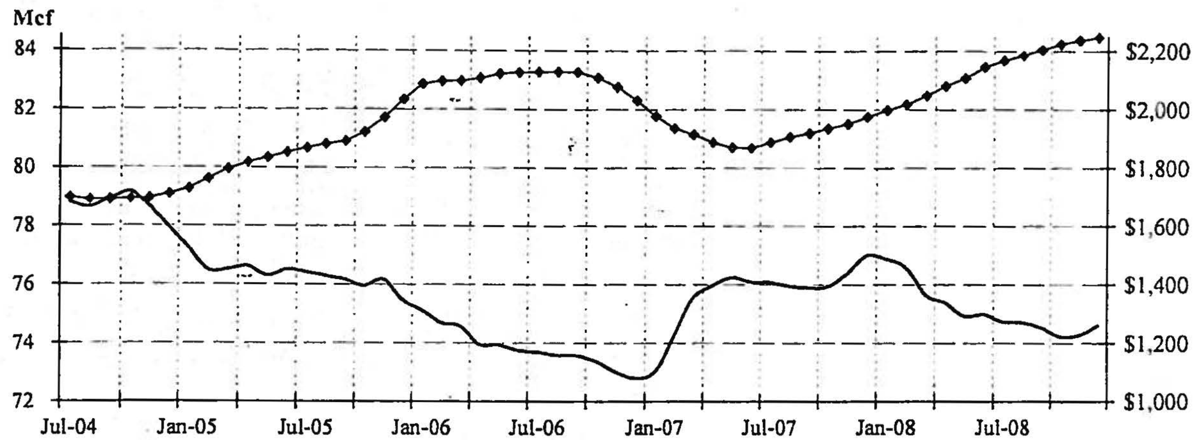
By examining the correlation between use per customer and the typical bill for the classes, the relationship between price and demand can be discerned. As displayed in Exhibit III-10, use per customer for the residential and commercial classes declined noticeably as the typical bill rose. This implied a loss of load of nearly 1.5 Bcf for the residential class from July 2004 to December 2008. Similarly, the commercial class lost nearly 1.3 Bcf of load. The industrial class use per customer remained essentially flat over this period for reasons beyond price. The industrial class serves national and international markets with demand for product being the determining factor.

Another way to look at the issue is to use the price elasticity for each class calculated at the mean and compute the price impact. Using the residential class as an example, the typical bill rose approximately 31% from October of 2004 to December of 2008. The mean price elasticity estimated from the Company's model is -0.309. The elasticity times the real price change suggests that about 1.5 Bcf of volumes, or almost 10%, have been lost over this period due to price. For the commercial class, with a price increase of 32% and a price elasticity of -0.263, the analysis would estimate a reduction in load of 1.2 Bcf, about 8.3%. The industrial class, with a price increase of better than 40% and a price elasticity of -0.108, reduced volumes an estimated 0.3 Bcf or 4.4%.

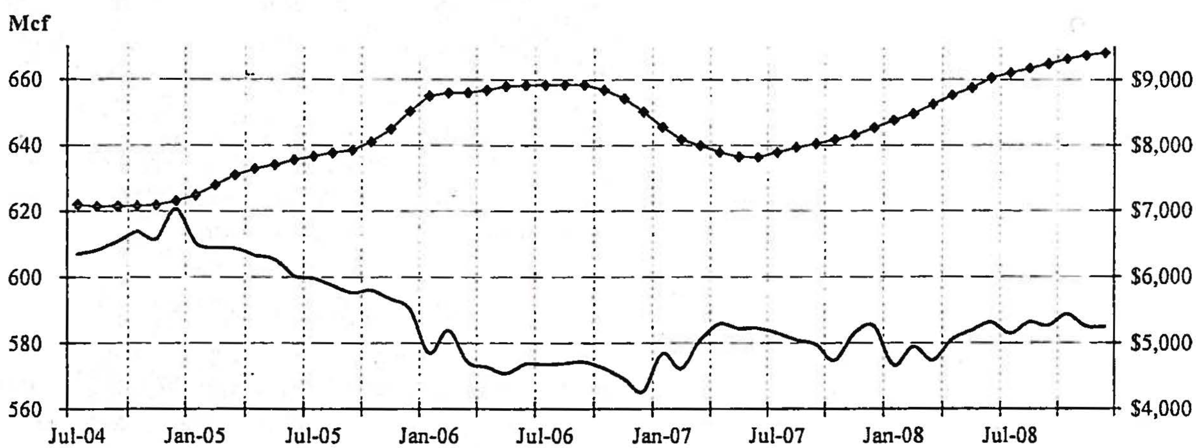
The fall in the price of natural gas since the summer of 2008 suggests a rise in demand for natural gas is likely. Based on price alone, this seems reasonable. But, there are a few considerations to keep in mind. Firstly, the duration of the run-up in price was such that gains in efficiency most certainly occurred. That is, during the run-up, customers were implementing strategies to reduce their natural gas requirement. These could range from shell improvements to more efficient furnaces, burners and water heaters, any of which would result in a permanent loss of load regardless of future prices. So, with a decline in price, while usage may increase, the requirement to achieve a similar level of utility; e.g., ambient room temperature, will be less. Usage is unlikely to return to the same level.

Exhibit III-10

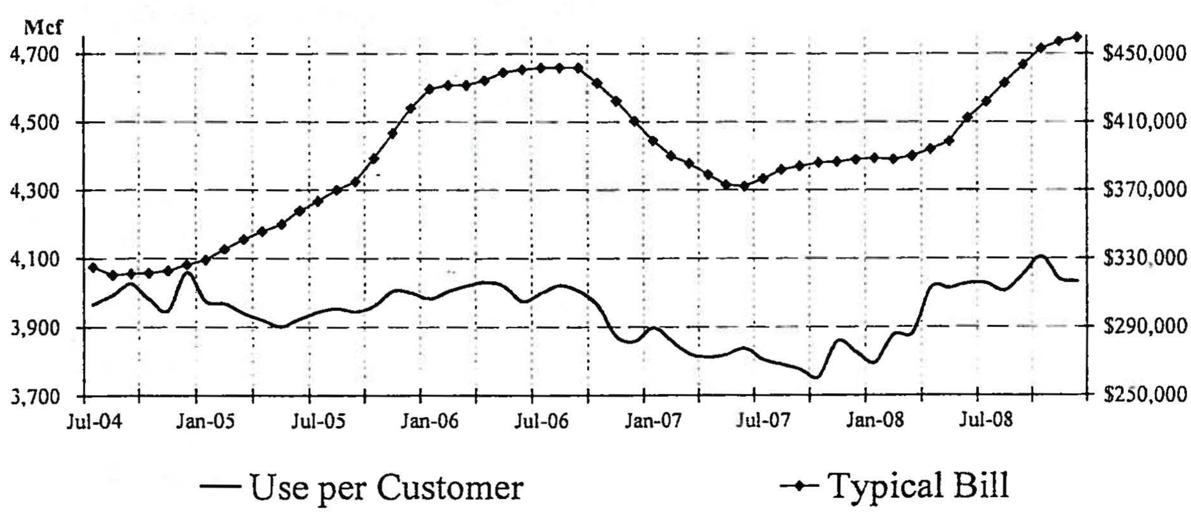
## Use per Customer and Typical Bills
## Weather Normalized - Twelve-Month-Ending Totals
### Residential




### **Commercial** (net of Special Contract)




### **Industrial** (net of Special Contracts)



Secondly, the severe economic distress being currently experienced may preclude the customer from fully exploiting the lower price as resources freed up by the lower natural gas price will be utilized elsewhere in the customer's budget.

- <u>**Out-of-Model Impacts**</u>

As mentioned above, the models are adjusted for known or expected out-of-model impacts. The first examined was the potential for large customer changes. In the normal course of business, firms are continually leaving or entering the market. To be considered, the size of the change for any customer, or the size of the change across all of the Company's customers in a particular class, would have to be significant; e.g., the addition to the load of the 2002 Mohegan Sun expansion. For this forecast cycle, it was determined there were several expected large customer changes to class loads that merited special consideration. All other changes that were occurring were relatively small and tended to cancel each other. They were considered to be within the normal trend of the forecast models and, as such, embedded in the "noise" of the data.

Two other explicit adjustments were made to the model results. The first was for Company-sponsored conservation and load management impacts. The C&LM savings used in this forecast are consistent with those discussed in detail in Section II. For this forecast cycle, the traditional low-income residential programs have been expanded by making them available to a wider spectrum of the residential customer class. Also, there has been a significant ramp-up in efforts to develop C&LM programs for the commercial and industrial sectors. The savings associated with these programs are included in the forecast.

The second adjustment was for the impact of distributed generation. This is a group of customers who intend to use natural gas to generate electricity for their own needs and to supply any excess to the electric distribution system. The methodology for modeling the adoption of DG has progressed from its infancy a few years ago, but still has little historical data on the various determining factors upon which to build a forecast model. Therefore, the analysis relies on customer data about the size of the unit, its natural gas requirement, the probability that the project will come to fruition, and the ability of the project to recapture the waste heat produced by the unit to offset the demand requirement.

The individual out-of-model impacts on the class trend forecasts, as well as the total impact by class and the cumulative out-of-model impacts by class, are presented in Tables III-11 and III-12. A further breakout of Distributed Generation by class for the volumes, maximum demand and kW capacity is provided in Table III-13.

Exhibit III-11

## Total Firm Volumes (Mcf)

| Year | Trend Volumes | Annual % Change | Large Customer Impacts | Company Sponsored Conservation Savings | Distributed Generation | Total Reference Volumes | Annual % Change |
|---|---|---|---|---|---|---|---|
| | | | **Residential** | | | | |
| 2008 | 13,481,924 | -2.6% | 0 | 0 | 0 | 13,481,924 | -2.6% |
| 2009 | 13,372,674 | -0.8% | 0 | -11,444 | 0 | 13,361,230 | -0.9% |
| 2010 | 13,641,580 | 2.0% | 0 | -45,777 | 0 | 13,595,803 | 1.8% |
| 2011 | 13,770,960 | 0.9% | 0 | -80,109 | 0 | 13,690,851 | 0.7% |
| 2012 | 13,868,988 | 0.7% | 0 | -114,441 | 0 | 13,754,547 | 0.5% |
| 2013 | 13,855,972 | -0.1% | 0 | -148,774 | 0 | 13,707,198 | -0.3% |
| C.A.G.R. 2008-2013 | | 0.5% | | | | | 0.3% |
| | | | **Commercial net of Special Contracts** | | | | |
| 2008 | 13,215,380 | 1.2% | 48,927 | 0 | 4,429 | 13,268,736 | 1.7% |
| 2009 | 13,009,702 | -1.6% | 378,692 | -6,758 | 101,457 | 13,483,093 | 1.6% |
| 2010 | 13,119,497 | 0.8% | 203,130 | -27,032 | 160,533 | 13,456,128 | -0.2% |
| 2011 | 13,546,276 | 3.3% | 218,921 | -47,306 | 179,663 | 13,897,553 | 3.3% |
| 2012 | 14,040,233 | 3.6% | 208,515 | -67,580 | 180,155 | 14,361,322 | 3.3% |
| 2013 | 14,261,530 | 1.6% | 208,515 | -87,854 | 179,663 | 14,561,853 | 1.4% |
| C.A.G.R. 2008-2013 | | 1.5% | | | | | 1.9% |
| | | | **Industrial net of Special Contracts** | | | | |
| 2008 | 6,825,598 | 3.5% | 3,050 | 0 | 3,620 | 6,832,268 | 3.6% |
| 2009 | 6,586,419 | -3.5% | 231,289 | -3,054 | 210,404 | 7,025,057 | 2.8% |
| 2010 | 6,551,425 | -0.5% | 325,233 | -12,216 | 305,959 | 7,170,401 | 2.1% |
| 2011 | 6,577,173 | 0.4% | 325,233 | -21,379 | 345,204 | 7,226,232 | 0.8% |
| 2012 | 6,640,185 | 1.0% | 325,677 | -30,541 | 346,150 | 7,281,471 | 0.8% |
| 2013 | 6,666,041 | 0.4% | 316,083 | -39,703 | 345,204 | 7,287,625 | 0.1% |
| C.A.G.R. 2008-2013 | | -0.5% | | | | | 1.3% |
| | | | **Total Firm net of Special Contracts** | | | | |
| 2008 | 33,522,902 | 0.1% | 51,977 | 0 | 8,049 | 33,582,928 | 0.3% |
| 2009 | 32,968,794 | -1.7% | 609,981 | -21,256 | 311,861 | 33,869,380 | 0.9% |
| 2010 | 33,312,501 | 1.0% | 528,363 | -85,025 | 466,492 | 34,222,332 | 1.0% |
| 2011 | 33,894,409 | 1.7% | 544,154 | -148,794 | 524,867 | 34,814,636 | 1.7% |
| 2012 | 34,549,406 | 1.9% | 534,192 | -212,563 | 526,305 | 35,397,340 | 1.7% |
| 2013 | 34,783,542 | 0.7% | 524,598 | -276,331 | 524,867 | 35,556,676 | 0.5% |
| C.A.G.R. 2008-2013 | | 0.7% | | | | | 1.1% |

Exhibit III-12

## Reference and Trend Forecast (MMcf)

| Year | Reference | Annual % Change | Trend | Annual % Change | Difference Level | Difference Percent |
|---|---|---|---|---|---|---|
| **Residential:** | | | | | | |
| 2008 | 13,482 | -2.6% | 13,482 | -2.6% | 0 | 0.0% |
| 2009 | 13,361 | -0.9% | 13,373 | -0.8% | -11 | -0.1% |
| 2010 | 13,596 | 1.8% | 13,642 | 2.0% | -46 | -0.3% |
| 2011 | 13,691 | 0.7% | 13,771 | 0.9% | -80 | -0.6% |
| 2012 | 13,755 | 0.5% | 13,869 | 0.7% | -114 | -0.8% |
| 2013 | 13,707 | -0.3% | 13,856 | -0.1% | -149 | -1.1% |
| **Commercial:** | | | | | | |
| 2008 | 13,269 | 1.7% | 13,215 | 1.2% | 53 | 0.4% |
| 2009 | 13,483 | 1.6% | 13,010 | -1.6% | 473 | 3.6% |
| 2010 | 13,456 | -0.2% | 13,119 | 0.8% | 337 | 2.6% |
| 2011 | 13,898 | 3.3% | 13,546 | 3.3% | 351 | 2.6% |
| 2012 | 14,361 | 3.3% | 14,040 | 3.6% | 321 | 2.3% |
| 2013 | 14,562 | 1.4% | 14,262 | 1.6% | 300 | 2.1% |

**Industrial:**

| Year | Reference | Annual % Change | Trend | Annual % Change | Difference Level | Difference Percent |
|---|---|---|---|---|---|---|
| 2008 | 6,832 | 3.6% | 6,826 | 3.5% | 7 | 0.1% |
| 2009 | 7,025 | 2.8% | 6,586 | -3.5% | 439 | 6.7% |
| 2010 | 7,170 | 2.1% | 6,551 | -0.5% | 619 | 9.4% |
| 2011 | 7,226 | 0.8% | 6,577 | 0.4% | 649 | 9.9% |
| 2012 | 7,281 | 0.8% | 6,640 | 1.0% | 641 | 9.7% |
| 2013 | 7,288 | 0.1% | 6,666 | 0.4% | 622 | 9.3% |

## Out-of-Model Cumulative Impacts by Class (Mcf)

| Year | Res'l | | Com'l | | Ind'l | | Total | |
|---|---|---|---|---|---|---|---|---|
| 2008 | 0 | --- | 53,356 | --- | 6,670 | --- | 60,027 | --- |
| 2009 | -11,444 | --- | 473,391 | 787.2% | 438,639 | 6475.9% | 900,586 | 1400.3% |
| 2010 | -45,777 | 300.0% | 336,631 | -28.9% | 618,976 | 41.1% | 909,830 | 1.0% |
| 2011 | -80,109 | 75.0% | 351,278 | 4.4% | 649,058 | 4.9% | 920,227 | 1.1% |
| 2012 | -114,441 | 42.9% | 321,090 | -8.6% | 641,286 | -1.2% | 847,934 | -7.9% |
| 2013 | -148,774 | 30.0% | 300,324 | -6.5% | 621,584 | -3.1% | 773,134 | -8.8% |

Class Compostions:

Residential - C&LM

Commercial - C&LM, Distributed Generation and Large Customer Impact

Industrial - C&LM, Distributed Generation and Large Customer Impact

# Exhibit III-13
## Distributed Generation

| Class | | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Commercial (1) - | Volumes (Mcf) | 101,457 | 160,533 | 179,663 | 180,155 | 179,663 |
| | Sum of Monthly Maximum Demand (Mcf) | 3,577 | 5,660 | 6,345 | 6,345 | 6,345 |
| | Sum of Monthly Capacity (kW) . | 26,519 | 52,908 | 61,629 | 61,629 | 61,629 |
| Industrial (2) - | Volumes (Mcf) | 210,404 | 305,959 | 345,204 | 346,150 | 345,204 |
| | Sum of Monthly Maximum Demand (Mcf) | 7,395 | 10,796 | 12,192 | 12,192 | 12,192 |
| | Sum of Monthly Capacity kW | 38,296 | 63,985 | 75,410 | 75,410 | 75,410 |
| Special Contracts (3) - | Volumes (Mcf) | 1,931,053 | 2,619,799 | 2,896,579 | 2,904,515 | 2,896,579 |
| (No SOLR) | Sum of Monthly Maximum Demand (Mcf) | 68,199 | 92,411 | 102,299 | 102,299 | 102,299 |
| | Sum of Monthly Capacity kW | 355,200 | 481,300 | 532,800 | 532,800 | 532,800 |
| ILEP (4) - | Volumes (Mcf) | 504,970 | 659,885 | 659,885 | 661,693 | 659,885 |
| | Sum of Monthly Maximum Demand (Mcf) | 17,825 | 23,305 | 23,305 | 23,305 | 23,305 |
| | Sum of Monthly Capacity kW | 92,835 | 121,380 | 121,380 | 121,380 | 121,380 |

(1) There are 16 Commercial DG customers, including 2 Municipals.
(2) There are 4 Industrial DG customers, 1 with 2 units.
(3) There are 3 Special Contract DG customers, 1 with 2 units.
(4) There are 2 ILEP DG customers.

Notes: All volumes, maximum demands and kW capacity are probability weighted.
All units assume a 50% waste heat recapture.