

**REPORT TO THE WEST VIRGINIA LEGISLATURE
BY
THE PUBLIC SERVICE COMMISSION OF WEST VIRGINIA**

SUPPLY - DEMAND FORECAST FOR GAS UTILITIES

2001 - 2010

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SUMMARY

The sixty-fourth Legislature (1979), directed the Public Service Commission to make an annual report to the Legislature on the status of the supply and demand balance for the next ten years for the gas utilities in West Virginia (W. Va. Code Section 24-1-1(d)(3)). Pursuant to this directive, the Commission's Staff has undertaken independent analyses of both the supply and demand sides of the gas market. As in the past, demand projections are limited to utility direct sales to ultimate customers in the residential, commercial, and industrial classes.

This report contains projections of natural gas demand and supply for the next decade made by the four major companies operating in the State of West Virginia and by the Public Service Commission. It is expected that the next several years will be a period of demand and supply balance for the national and state natural gas markets. Both national and state natural gas markets continue to be affected by recent changes in transportation and regulatory policies. The most recent example is the Energy Policy Act of 1992. The net impact of efforts to "restructure" the electric utility industry is unknown as markets continue to evolve. On the one hand, a competitive electric power market will certainly increase end-use competition. On the other, there may be increased use of gas-fired turbines for electric generation.

Following is a brief summary of the average annual growth rates of total company natural gas demand for the period 2001-2010 implied by the forecasts of the four major utilities and the Public Service Commission:

<u>Company</u>	<u>Company Average Annual Growth Rate</u>	<u>PSC Average Annual Growth Rate</u>
Mountaineer	1.3%	0.7%
Hope	0.9%	0.3%
West Virginia Power Gas Service	0.4%	0.5%
Equitable	0.0%	-0.1%
W.Va. Total Gas Demand	1.1%	0.5%

With the exception of a higher growth rate for Mountaineer Gas, the companies project the same average annual growth rates for natural gas demand in West Virginia as in last year's report. The combined companies' projected growth is such that the growth in projected total WV demand is at a slightly higher level than last year. PSC forecasts predict a modest decrease in the growth of WV total demand, compared to last year's report. This results from PSC forecasted growth rates which are slightly lower for each company with the exception of Mountaineer Gas. A significant determinant of the level of natural gas demand is winter weather and both the companies and the PSC assume "normal" or long term winter weather patterns will replace the mild winters of recent years.

I. INTRODUCTION

The gas utilities reviewed for this report were the four major companies which serve West Virginia: Mountaineer Gas Company, West Virginia Power Gas Service, Hope Gas, Inc., and Equitable Gas Company. Although there were thirty-three active gas utilities serving the State, these major companies made 90% of the total volume of residential, commercial and industrial gas sales in the State last year; therefore, an examination of these four utilities will provide an overview of the gas markets that is sufficiently complete to draw meaningful inferences but shorn of unnecessary detail.

Prior to the passage of the Natural Gas Policy Act of 1978 (NGPA), the natural gas market was characterized by artificial shortages resulting from price controls. The NGPA attacked these shortages by setting forth a schedule of price decontrol over time, reducing barriers between interstate and intrastate markets, and providing incentives for gas exploration and production.

As a result of the sharp increase in prices between 1978 and 1983 as regulated prices changed to competitive prices, consumers in all classes reacted by reducing their consumption of natural gas. Reductions occurred as a result of increased efforts in weatherization of structures, improved appliance efficiencies, and switches to alternate sources of energy. These changes, brought about by increased prices, will continue to have some

influence on present and future natural gas demand, even if prices level off or decrease.

Both the natural gas industry and regulatory agencies such as the Federal Energy Regulatory Commission (FERC) have continued to develop policies to allow and encourage the operation of competitive forces. Past developments included flexible rates, special marketing programs, negotiated transportation, and use of the spot, or short-term contracts. A brief history of regulatory policies which will continue to have a major impact on the future natural gas market are:

- (1) FERC Order 500 -- Order 500 continues the transportation policies of Order 436 designed to promote competitive access to spot market gas. However, Order 500 also addressed industry take-or-pay problems through a crediting mechanism as a prerequisite to transportation for producers.
- (2) Natural Gas Decontrol Act of 1989 -- On July 27, 1989, the Natural Gas Decontrol Act of 1989 became law. This Act amended the Natural Gas Policy Act of 1978 by removing the remaining price controls on natural gas.
- (3) Clean Air Act Amendments of 1990 - On November 15, 1990, Public Law 101-549 made comprehensive revisions to the Clean Air Act. Title IV of this law addressed acid rain.

One method by which sulfur-emitting industries or electricity generation facilities can comply with this law is through fuel switching, as in switching from coal and oil to natural gas. The amendments will also impact the demands for natural gas such as through increased usage of natural gas vehicles.

- (4) FERC Order 636 - On April 8, 1992, the FERC issued what is now called the Restructuring Rule. The main feature of this rule is the requirement that all pipelines end their "merchant" function by ending bundled sales services. This rule was intended to complete the transition to a competitive natural gas industry by equalizing the transportation of gas sold by pipelines and non-pipelines while maintaining the reliability of service.
- (5) FERC Order 636-A - On August 3, 1992, the FERC issued this Order in response to numerous comments received concerning Order 636. Order 636-A largely affirmed the provisions of Order 636, but modifications were made to address the concerns of small customers.

- (6) Energy Policy Act of 1992 - On October 24, 1992, Congress enacted and the President signed the Energy Policy Act. Section 115 of this Act required state regulatory authorities to consider two new standards under PURPA to include the use of integrated resource planning by each gas utility and investments in conservation and demand side management. Further, Section 404 provides incentives for the promotion of alternative-fueled vehicles, including natural gas.
- (7) In 1995, the first programs to facilitate residential natural gas customer choice were begun. The PSC has Case No. 96-0241-G-GI pending which concerns "pooling" of customers by marketers and may well enable residential gas customers to enter such "pooling" arrangements. The result would be an increase in the shift of residential tariff sales to "transport-only" sales. Such shifts in sales are now generally limited by economics to the commercial and industrial classes.
- (8) Increased regulatory emphasis on the environmental effects of coal-fired electric generation may also increase natural gas demand. Recent U.S. EPA rules have placed

more stringent limits on nitrous oxide emissions. Further, the United States is discussing an international agreement which would increase limitations on carbon dioxide emissions. Both of these changes would impact the coal-fired electric plants in West Virginia and one possible result would be fuel-switching from coal to natural gas.

- (9) Just as FERC Order 636 has led to major restructuring of the natural gas industry, it is anticipated that similar restructuring will occur in the near future in the electric utility markets. Two major effects of electric market restructuring on the natural gas market will be increased end-use competition and greater uncertainty regarding the use of natural gas for power generation.

It is within this environment of continuing change that we explore the future gas supply and demand in the State of West Virginia.

It should be noted that average growth rates (AGR) are used throughout this report, and caution should be used in interpreting these growth rates since they are heavily dependent upon the starting and ending values.

II. DEMAND ANALYSIS

The demand projection in this report has been developed independently of supply considerations, such that the extent of the demand for utility natural gas in West Virginia has been calculated assuming no supply limitations. This notion is in accord with our current and medium-term abundant supply position. As in the past, these demand projections are limited to utility direct sales to ultimate customers in the residential, commercial and industrial classes.

Unlike the major electric utilities that operate in West Virginia, the gas utility companies examined do not use highly sophisticated modeling techniques for forecasting. The reasons for this lack of modeling sophistication are inherent in the nature of the product: natural gas is used primarily for space heating, water heating, cooking and specific industrial processes. Unlike electrical energy, gas can be stored or withdrawn from storage to satisfy an unexpected market demand. Finally, since the gas transmission and distribution system is essentially in place, plant construction is not a major concern of gas distribution companies. These companies are more concerned with commodity availability.

The ten-year forecasts presented in this report are based upon the models and data used for the January 2000

report. The starting point for that forecast of natural gas demand was an analysis of customer demand, growth, and restrictions from 1975 through 1998. Based on annual reports (F.E.R.C. Form No. 2) filed with the Public Service Commission by West Virginia utility companies, the levels of residential, commercial and industrial sales were identified. Of course, the raw 1975-1998 sales data reflect the effect of weather conditions experienced during that period, the effect of curtailments due to supply deficiencies, and the effect of periodic moratoria on adding new customers which must be considered.

Residential and commercial uses of gas are generally less discretionary than the industrial load because the stock of gas-using appliances, the space heating unit and the water heater, are fixed in the short-term. Therefore, in any given year, a residential and commercial user's gas consumption is highly correlated with the severity of the weather¹. With that in mind, the companies often rely heavily on some variant of a weather adjusted trend line technique to forecast residential and commercial sales. However, the PSC has also supplemented trend line analysis by examining forecasting models which include weather and economic conditions as explanatory variables.

¹Weather is measured by reference to historical and "normal" heating degree days (HDD); heating degree days are a measure of the cumulative difference between average daily temperature and 65 degrees Fahrenheit.

Trend line analysis, econometric models of various complexity, and judgement were employed by the PSC to derive the projections in this report. Each forecasting technique relies on the ability to extract meaningful inferences about the future from the historical past. Each technique differs in the method and efficiency with which such inferences are drawn. Regardless of the forecasting technique used, there is more confidence associated with predictions in the near future, and ten year projections must be viewed with caution.

(A) RESIDENTIAL AND COMMERCIAL DEMAND

The analysis of residential and commercial demand is based upon data obtained from records of four major West Virginia gas utilities. These four companies represent about 90% of the total utility residential and 90% of total natural gas sales in the State of West Virginia. These utilities are, in descending order of sales volumes:

- (1) Mountaineer Gas Company
- (2) Hope Gas, Inc.
- (3) West Virginia Power Gas Service (WVPGS)
- (4) Equitable Gas Company

(1) MOUNTAINEER GAS COMPANY

Although Mountaineer continued to list forecasting variables such as population and heating degree days for the January 2001 report, Mountaineer decided to incorporate the analyses of the Gas Research Institute to project the Company's ten year residential and commercial demand. The Company anticipates a continuing increase in the number of new customer line extensions, although the increase is expected to be partly offset due to commercial expansions into residential areas and homes being abandoned. The prospect of lower natural gas usage per customer due to increasing appliance efficiency is expected to be offset by obtaining new customers.

Mountaineer's residential and commercial projections can be found on Table 1. These projections reflect an average annual rate of increase of approximately 1.4% from 2001 to 2010 in the residential class. The commercial class forecast projects an average annual rate of increase of 1.8% from 2001 to 2010. Mountaineer's forecasts for the residential class represents a general decrease in the level of demand compared to last year's forecast but at a higher growth rate. Mountaineer's forecasts for the commercial class predict a large general increase in the level of demand when compared to last year's forecast, but at about the same rate of growth.

(2) HOPE GAS, INC.

Hope's forecasting methods are similar to most gas forecasting techniques insofar as they disaggregate total residential and commercial sales into base load and weather sensitive components. In its determination of base load, Hope uses the July and August average volume. The average volume is multiplied by a factor of 12.0 to establish an annual base load for the residential and commercial sectors.

With regard to the weather sensitive load, Hope evaluates climatological data from the West Virginia town of Parkersburg. This climatological data is applicable across Hope's service territory.

Upon development of a monthly weather sensitivity factor by comparing historical sales to historical heating degree days, Hope forecasters consult their marketing division to establish an expectation of the customer growth rate in Hope's service area. This customer growth rate is multiplied by the expected usage under normal weather conditions to develop a projected future usage level. This figure is linearly trended with the explicit recognition that conservation will have a downward influence on projected values.

Hope's forecasts are shown on Table 3. These forecasts reflect residential sales volumes increasing at an annual rate of 0.6% from 2001 to 2010 and commercial sales

increasing at a 1.6% annual rate over the same period. The annual rate of change projected for both classes of sales is the about the same as forecasted last year. Further, the level of the demand forecasts for both classes are the same as in last year's report.

(3) WEST VIRGINIA POWER GAS SERVICE (WVPGS)

WVPGS is a gas utility which provides service in nineteen counties generally located in the southwestern quadrant of West Virginia. WVPGS's residential and commercial forecasts are based on historical sales levels, weather adjusted, with an annual conservation reduction (approximately 1%) imputed to the forecasts. These forecasts are shown on Table 5. WVPGS's residential demand shows a rate of increase from 2001 to 2010 of 0.4% per year, while WVPGS's commercial forecasts project sales to increase at a rate of 0.3% per year over the same period. These projected growth rates and the levels of demand are both nearly the same as contained in last year's report.

On December 9, 1999, in Case No. 99-1407-EG-PC, the Commission approved the sale of West Virginia Power Gas Service, a division of UtiliCorp United, to Monongahela Power Company. The main economic impact on WVPGS's customers is that the Stipulation approved by the Commission includes a provision that gas base rates shall be frozen, except for certain stated circumstances, from January 1, 2000, to

December 31, 2005,. While total gas rates will continue to reflect annual changes in purchased gas costs, current customers of WVPGS will most likely not see a general base rate change before January 1, 2006.

(4) EQUITABLE GAS COMPANY

Equitable Gas Company is an interstate gas distributor that serves portions of Pennsylvania and West Virginia. In the spring of 1988, Equitable Gas Company was reorganized and Equitrans, Inc. was formed. Equitable Gas Company now consists of the distribution facilities in Pennsylvania and West Virginia. Equitrans includes the transmission, storage, and gathering facilities that were formerly part of Equitable Gas Company.

The Company's response to the PSC's request for its forecasted demand is shown on Table 7. Equitable Gas provided a forecast for 2001 and stated it is expected that both the number of customers and respective volumes for all customer classes will remain flat for the forecast period.

As a result, the forecasts by Equitable Gas shown on Table 7 show no change in residential sales growth over the forecast period and at essentially the same level of demand when compared to last year. Commercial sales are projected to remain constant over the forecast period, but at a slightly higher level when compared to last year.

(5) PUBLIC SERVICE COMMISSION (PSC) STAFF

The PSC Staff has based its calculations on various statistical models, as well as judgement. The ten-year forecasts presented in this report are based upon the models and data used for the January 2000 report. Initial demand projections were made using trend line analysis where historical trends are projected into the future without consideration of potential structural shifts. Trend line analysis was followed by other regression analysis, and the most reasonable forecasts were determined. An examination of the historical residential and commercial data for the four companies studied in this report reveals that the average annual growth rates for consumption of natural gas have been:

Company	Time Period	Residential	Commercial
Mountaineer	1977-1999	-2.8%	-3.5%
Hope	1975-1998	-2.6%	-4.2%
WVPGS	1975-1998	-2.2%	-0.3%
Equitable	1975-1998	-2.8%	-0.7%

The weather impact was modeled by either using historical heating degree days as a regression explanatory variable or by attempting to weather-adjust the historical data. The choice of method depended upon the presence of statistical problems such as spurious correlation among time

series variables and/or error variance problems. In either event, normal heating degree days for the companies' service area were used in conjunction with linear regression techniques to forecast the weather-sensitive volumes through 2009.

There are a few methodological shortcomings in the calculations that deserve mention. First, highly aggregated data allows the problem of one unusual observation to be overvalued. That is, when all the usage is contained in one data point, it cannot reflect the multitude of influences that created that data. Second, when using annual heating degree days instead of monthly or quarterly temperature data, one implicitly values a HDD in January the same as a HDD in May. Clearly, a consumer may respond differently to temperature changes during the course of a year. Finally, this technique assumes that the thermal integrity of the housing stock is constant over time insofar as it weights heating degree days equally over the whole historical time frame. Again, as the housing stock has improved, the influence of unusually cold weather will have a smaller effect.

The PSC's forecasts of annual residential and commercial volumes, assuming normal weather, for each of the aforementioned utilities can be found on Tables 2, 4, 6 and 8. From 2001 to the end of the forecast period in 2010, the PSC's forecasts imply average annual growth rates as

follows:

	Residential	Commercial
Mountaineer Gas	1.2%	-0.6%
Hope Gas	0.0%	1.3%
WVPGS	0.3%	0.9%
Equitable Gas	0.3%	-0.8%

These annual average growth rates indicate projected natural gas consumption which show:

- (1) The increased growth in residential sales generally assumes continued economic growth in Mountaineer's service territory. The negative rate of growth for commercial sales reflects a belief that commercial tariff sales will continue to shift to transportation-only sales.
- (2) Hope's residential sales are predicted to remain steady assuming no changes in economic growth in Hope's service territory. The rate of growth in projected commercial sales reflects a higher level of growth than for residential sales but that rate is a decrease compared to last year's report.
- (3) The residential and commercial growth rates projected in this report for WVPGS are at a slightly decreased rate when compared to last

year's report.

- (4) There will be a decrease in the annual rate of growth of Equitable's residential sales at a similar level of demand as forecast last year. There is expected to be a no change in its commercial sales rate of growth compared to last year.

(B) INDUSTRIAL DEMAND

The most volatile component of gas demand is the industrial sector. Major causes of this instability are four-fold. First, national economic conditions have a marked impact on industrial output and, thus, gas demand, and the level of long run national economic activity cannot be predicted with complete accuracy. This is aggravated by the fact that major West Virginia industrials are often tied to the automobile and other "consumer durable" goods industries that tend to be more volatile than the economy as a whole. Second, the industrial sector is susceptible to work stoppages and other disruptions that cause gas consumption to oscillate significantly. Third, the industrial sector has more alternate fuels' capability than the residential or commercial sectors; most fuel switching occurs between natural gas, #6 fuel oil and #2 fuel oil, and many firms can switch fuels on a day's notice or less. And fourth, large industrial customers continue to negotiate purchases directly with the gas producer

four years because the PSC continues to forecast utility-regulated sales only, not all (utility and transportation) sales. The level of industrial tariff sales has decreased so sharply in the last five years that long term trend line analysis is virtually useless. Therefore, very short trends and judgement are used by the companies and the PSC to project industrial demand.

(1) MOUNTAINEER GAS COMPANY:

Mountaineer has the largest volume of industrial gas deliveries because its service territory encompasses heavily industrialized Kanawha Valley, Ohio Valley and Northern Panhandle regions. Mountaineer's primary industrial customers are in the metals, chemicals, glass and rubber industries. Mountaineer notes

