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CONSUMER BENEFITS FROM GAS CHOICE: EMPIRICAL FINDINGS FROM THE FIRST PROGRAMS

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EXECUTIVE SUMMARY

Gas choice programs started in a small Iowa town in 1995. Since then, programs have spread across twenty three states and the District of Columbia with about three million customers (mostly residential customers) participating. Some gas utilities have developed second generation programs, with more customers allowed to participate and more permanency in the duration of the program. The evidence to date, at least as interpreted by many industry observers, has been mixed: many residential customers and marketers have participated in the programs, but the benefits have generally not been significant. Perhaps the best characterization of the outcome of gas choice programs is that "we have learned much and the results for many, if not most, programs are encouraging enough to move ahead."

This study attempts to add to the "knowledge base" concerning the benefits that residential gas customers have received from choice programs. This issue has both academic and policy importance. The academician wants to know whether the competition induced by choice programs has benefitted consumers as expected and, if so, by how much. Practitioners and policymakers, namely the gas utility, the public utility commission (PUC) and state legislature, are interested in knowing whether these programs are the "right thing" and whether they should be initiated or expanded. Naturally, one important piece of information in

determining this is the actual benefits to consumers. After all, choice programs are rationalized as the preferred mechanism to disperse the benefits of gas industry restructuring and competition to small retail customers, including residential customers.

This study largely confirms the perception by industry observers of outcomes of gas choice programs to date: customers have generally received limited benefits from current programs – the *average* price savings for all the selected programs in the study are 3.02 cents per therm or 7.8 percent; and, marketers and other energy service providers have not yet successfully learned how to repackage different value-added services that customers demand and at a profit to suppliers. Consequently, the benefits of past and current gas choice programs come almost exclusively in the form of lower gas bills. It is inconceivable that gas choice will accelerate much beyond its current status without the availability of value-added services. These services will provide greater benefits to consumers and opportunities for suppliers to earn much higher profit margins than what they have to date.

This study did provide some surprises, at least to the authors. One was the finding that for several of the programs some marketers offered prices above the local gas utility's standard offer price. No information was available on how many customers actually purchased gas from these marketers. Another finding was the wide range of prices offered by marketers in some of the programs. More than anything, this

fact may reflect an expected characteristic of a newly structured market where consumer misinformation and confusion commonly occur.

Overall, the study provides empirical support for the commonly held perception that residential consumers, to date, have benefitted from gas choice programs but not significantly. Marketers in general have found it difficult to overcome the economics of commodity retailing for mass market customers where low profit margins are the norm. To reiterate, for gas choice programs to achieve greater success in the future, marketers face the challenge of repackaging different services, both gas and nongas, so as to produce value-added benefits to residential consumers; so far, this has not occurred.

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FOREWORD

Residential consumers in several states can now choose among different commodity-gas suppliers. Whether and how much these consumers have benefitted are important policy questions. This report attempts to answer these questions by examining price data for a number of gas choice programs. The report should especially assist those state commissions contemplating either initiating or expanding gas choice programs in their states.

Sincerely,

Raymond W. Lawton, Ph.D.
Director, NRRI
October 2000

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MOTIVATION FOR STUDY

Since 1995, residential consumers in twenty-three states and the District of Columbia have participated in gas choice programs.[1] These programs have given retail consumers the ability to choose among different suppliers for certain gas services. These services have been largely confined to commodity gas transported by pipelines from production areas to the city gate.

Although gas choice programs have expanded over time and have generally received favorable reviews, the actual benefits to consumers have not been systematically calculated or reported across different programs.[2] At this stage of gas choice programs, three major questions for policymakers have come to the forefront: (1) What have been the overall benefits to residential consumers? (2) Have some consumers who switched suppliers actually become worse off? and (3) Does the evidence compiled so far support expanding current programs and originating new programs in other jurisdictions?

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[1] American Gas Association, *Providing New Service to Residential Natural Gas Customers: A Summary of Customer Choice Pilot Programs and Initiatives*, June 2000 update.

[2] Kenneth W. Costello, "Remarks on Gas Customer-Choice Programs," presented at the NARUC Annual Convention, San Antonio, Texas, November 9, 1999.

This report represents the fourth NRRI study on retail gas unbundling.[3] It seems appropriate at this time, partly because gas unbundling has been in place for a few years,[4] longer than for electric retail competition, to begin assessing whether gas choice programs have in fact produced benefits to consumers. After all, if the evidence shows that consumers have benefitted little, and are unlikely to do so in the future, policymakers may have good reason to not give support for the continuation or origination of gas choice programs.

METHODOLOGICAL APPROACH

Consumers can benefit in various ways when the market for one or more gas services transforms from a monopolistic to a more competitive structure. Conceptually, consumer benefits represent a net value of benefits over costs. For example, consumers may incur search and hassle costs in the process of choosing a lower-priced supplier.[5] These

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[3] Titles of the three previous studies are *Unbundling the Retail Gas Market: Current Activities and Guidance for Serving Residential and Small Customers* (1996); *Household Participation in Gas Customer Choice Programs: Some Fact, Explanations, and Lessons Learned* (1999); and *Cost Allocation and Rate Design for Unbundled Gas Services* (2000).

[4] Fourteen of the programs, for example, started before 1998.

[5] Some economists distinguish between transaction costs (i.e., costs incurred every time a consumer switches a supplier) and learning costs (i.e., costs incurred by a consumer only when contemplating switching to a supplier who has

(continued...)

so-called transaction costs should be deducted from (say) the bill savings and other gross benefits to derive the overall effect on consumers.

The net benefit can be measured in terms of consumer surplus, or compensating or equivalent variation.[6] Consumer surplus represents the value received from a product or service minus the monetary and nonmonetary (e.g., search costs) outlays. Under customer choice, consumer surplus could increase because of (1) reduced prices, (2) the availability of additional services (e.g., value-added services), and (3) an increase in the quality of service. Conceivably, consumer surplus can increase even when gas bills rise. If, for example, price falls and consumption increases by a greater percentage (i.e., the price elasticity of demand exceeds one, in absolute terms), consumers are better off in spite of higher gas bills.[7] The reason for this is that the incremental value consumers receive from consuming more gas exceeds their additional outlay. Studies on recently transformed industries have consistently

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[5] (...continued)
not supplied that consumer before. See, for example, Paul Klemperer, "The Competitiveness of Markets with Switching Costs," *RAND Journal of Economics* 18 (Spring 1987): 138-50.

[6] Willig has shown that under most circumstances, where the income effect (i.e., the product of the income elasticity and the fraction of income spent on natural gas) is small, these three measures are roughly equal (see Robert D. Willig, "Consumers' Surplus Without Apology," *American Economic Review* 66 [September 1976]: 589-97.)

[7] Econometric studies have shown that, in the short run, price elasticities of demand for natural gas are far below one in absolute terms, more in the range of 0.2-0.3

shown that competition has benefitted consumers through a combination of lower prices, higher quality of service, and additional available services.[8] The implication here for measuring consumer benefits from gas choice programs is that looking at the price alone would tend to under-calculate, conceivably by a large margin, the true consumer benefits. As argued later, however, a large proportion of the consumer benefits from existing gas choice programs derives from lower gas prices.

The consumer surplus measure of benefits from lower gas prices can be expressed mathematically as[9]

$$\Delta CS = (P_1 - P_2)Q_1 + \tfrac{1}{2} ed^2 P_1Q_1$$

where

ΔCS	=	the change in consumer surplus
P_1	=	the bundled sales price of gas
P_2	=	the unbundled (aggregated) delivered price
Q_1	=	the amount of gas consumed without choice

[8] See, for example, Robert Crandall and Jerry Ellig, *Economic Deregulation and Customer Choice: Lessons for the Electric Industry* (Fairfax, VA: Center for Market Processes, 1997); Clifford Winston, "U.S. Industry Adjustment to Economic Deregulation," *Journal of Economic Perspectives* 12 (Summer 1998): 89-110; and Kenneth W. Costello and Robert J. Graniere, "The Outlook for a Restructured U.S. Electric Power Industry," *The Electricity Journal* 10 (May 1997): 81-91.

[9] The first term represents the consumer's bill savings assuming no change in consumption; the second term measures the so-called "triangular benefit" that results from the elasticity effect (i.e., the net gain to the consumer from purchasing additional gas).

e = the price elasticity of demand

d = the proportional change in price (i.e., $[P_1 - P_2]/P_1$).

As an example, let us assume that the price for bundled sales service is 70 cents per therm (P_1) and the unbundled delivered price is 63 cents per therm (P_2);[10] the proportional change in price is therefore 0.10 or 10 percent; also assume that the consumer has a price elasticity (in absolute terms) of 0.2; consequently, if she annually consumes 900 therms of gas when paying the bundled sales price, she would consume 918 terms when paying the marketer's price (i.e., 900 therms + [.2 x .1 x 900] therms). Inserting these numbers into the above expression produces the following result: the total increase in consumer surplus is $63.63, of which $63 represents lower gas bills and only $0.63, or one percent, represents the "triangular area" measuring the benefits from additional consumption. Although the numbers used here are hypothetical, they closely resemble the actual situation for some of the gas choice programs. For empirical purposes, this gives strong support to the supposition that the change in consumer surplus, or consumer benefits, is equivalent to the change in the consumer's total gas bill.[11]

[10] The unbundled delivered price would be the sum of the prices for individual services such as commodity gas, interstate transportation, and local distribution.

[11] This, of course, assumes no change in the availability of value-added services and the quality of service, which for current gas choice programs is highly reasonable.

Gross benefits to consumers come in various forms, some of which may be more long term in nature and nonexistent under existing programs. Examples of gross benefits include lower gas bills, sign-up bonuses and other promotional "give-a-ways," the offering of new value-added services, higher service quality, and the offering of different price management options. For the programs examined for this study, as well as other current programs, gross benefits consist mostly of the reduction in gas bills resulting from lower city-gate gas costs; this is equivalent to the percentage decrease in the price of gas at the city gate times the ratio of the city gate price to the delivered price times the otherwise bundled gas bill. As an example, if the consumer buys city gate gas at a 15 percent discount off the LDC's price, and assuming the city gate portion of the delivered price is 0.6 and the bundled monthly gas bill would have been $60, the benefit to the consumer is $5.40.[12] Another possible benefit from current programs is the availability of price management services. Some consumers, for example, may assign a value to receiving gas at a fixed price over a one or two year period. For most gas utilities, gas costs vary over time through a purchased gas adjustment (PGA) mechanism.

Since no one measure of consumer benefits by itself accurately depicts the overall effect on consumers, a portfolio of different indicators may be considered. For example, in addition to the change in gas bills, other indicators may include the length of time consumers stay with a

[12] This calculation is derived from $60 (0•15 X 0•6). The hypothetical example, showing monthly benefits of $5.40, or $64.80 annually, is strikingly similar to the actual benefits enjoyed by residential customers for some of the programs.

particular marketer, the offering of different energy-market risk options (e.g., weather normalized bills), consumer satisfaction based on a survey, and the number of customers switching from other forms of energy (e.g., oil, electricity) to gas because of lower prices.

Additional comments should be made about consumer benefits. First, it is probably wrong to extrapolate the benefits achieved so far into the future. The inception of choice for residential customers inevitably requires a subsequent transition over which the immaturity of a new market produces outcomes that should not be expected to prevail in the long run. As discussed later, future benefits may be much greater to the extent providers are successful in profiting from the sale of value-added services to residential customers.[13]

Second, non-switching customers can benefit as well as switching customers. In fact, the analysis presented later in this report suggests that gas choice programs may have placed pressure on gas utilities to lower their costs and prices for bundled-sales-service. Further, as in Pennsylvania and some other states, choice programs have led to the abolition of the gross receipts tax on utilities.[14]

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[13] Benefits to consumers in other restructured industries tend to increase over time. See Crandall and Ellig, *Economic Deregulation and Customer Choice.*

[14] Although the elimination of taxes benefits consumers, it may not reflect a net benefit to society as a whole but only a distributional effect.

Third, as mentioned earlier, customer search, hassle and other customer transaction costs must be deducted from the gross benefits to arrive at the net effect on consumers. These costs, arguably, play a major role in explaining customer inertia or the reluctance of consumers to participate in choice programs to date.[15] A simple example illustrates this point. Suppose that a customer spends two hours in total for researching new suppliers, understanding the new rules, evaluating alternative choices, and making a decision. Assume that the customer values his time in accordance with his income (which is consistent with economic theory and empirical studies).[16] If his annual after-tax income is $40,000, which translates to about $20 per hour, he needs to expect savings from switching to a new supplier of at least $40. As shown later in this report, customers for some choice programs may with good reason not expect savings of this amount. Consequently, after accounting for other factors such as the risk associated with relying on a new supplier, it should not

[15] See, for example, Kenneth W. Costello, *Household Participation in Gas Customer Choice Programs* (Columbus, OH: The National Regulatory Research Institute, January 1999); Kenneth Rose, *Electric Restructuring Issues for Residential and Small Business Customers* (Columbus, OH: The National Regulatory Research Institute, June 2000); and Kenneth Train and Anne Selting, *The Effect of Price on Residential Customer Choice in Competitive Retail Energy Markets: Evidence from Specific Markets To Date*, prepared for the Edison Electric Institute, March 2000.

[16] See, for example, Gary S. Becker, "A Theory of the Allocation of Time," *Economic Journal* 75 (September 1965): 493-517.

seem too surprising that many customers decide not to switch or that the net benefits to those customers that do switch are small.[17]

One pendent question surrounding customer choice is whether a subgroup of customers switching to a new supplier has actually become worse off. For example, some customers for various reasons may end up paying higher gas bills when switching to another supplier. Of course, one can reasonably suppose that any switching customer expects (*ex ante*) to be better off but, like other consumption experiences, these expectations can often turn out to be wrong (*ex post*). In the case of gas choice, a customer may become worse off for the following reasons: (1) locking in to a fixed price arrangement during a period of reduced market prices for gas, (2) unanticipated transaction costs such as "hassling" by marketers, (3) lack of adequate information in reaching a decision, (4) misinformation, for example marketer deception, (5) uncertainty over future market conditions, and (6) elimination of cross-subsidies induced by rate unbundling and competition.[18]

[17] Ibid.

[18] Elimination of cross-subsidies would have a particularly negative effect on those consumers who previously benefitted the most from these cross-subsidies, namely low-income households.

THE EMPIRICAL EVIDENCE ON PRICE SAVINGS

As argued earlier, price savings is a key measure of the benefits of customer choice programs.[19] One of the strongest, and arguably the most measurable, motivators for a customer to switch to an alternative supplier of gas is the amount of money the customer expects to save by switching. Regardless of whether price is a strong motivator for a customer's choice of a supplier,[20] it is obviously a defensible index of the benefits of a customer choice program. A lower price improves consumer welfare largely by reducing the outlays of consumers for a fixed amount of natural gas.

Data Used in the Analysis

The data for the analysis presented in this section were primarily gathered from Internet websites. The websites include those of the American Gas Association (AGA), the Energy Information Administration (EIA), Energy Info Source, Energy Guide, utility companies, and state public utility commissions (PUCs). Each source of data varied with

[19] Other measures of customer benefits may include bill savings, sign-up bonuses, the availability of value-added services, enhancement of service quality, and the availability of price and other energy-market, risk-management options.

[20] As argued elsewhere in this report, price is unquestionably the dominant factor for programs implemented to date.

respect to the type, range, and volume of data published. In most of the states with gas choice programs, marketers are not required to file price data with the public utility commission.

AGA

The AGA data are available at the website www.aga.org. The members-only section of this website (which the NRRI has access to) contains reports on the status of unbundling and customer choice programs in different states. Summary reports on the historical evolution of choice programs and data on participation levels are also included.[21] With some exceptions, data on prices are not reported.

EIA

The EIA site is maintained at www.doe.eia.gov. This site provides data on wellhead, city-gate and end-user prices. The prices are published monthly. Annual average and year-to-date prices are also available over several years. The reported prices and related data,

[21] See past issues of American Gas Association, *Providing New Services to Residential Natural Gas Customers: A Summary of Customer Choice Pilot Programs and Initiatives.*

however, are based only on sales by utilities and pipelines. They do not include data for marketers and other non utility suppliers.[22]

Energy Info Source

Energy Info Source maintains a website at www.energyinfosource.com. Among other reports, it provides a set of reports called "Rapid Reports." One of these reports is "Competitive Gas Pricing Report," which provides data on standard offer prices of LDCs[23] and competitive prices offered by alternative suppliers in all customer choice programs.

Energy Guide

Energy Guide maintains a website at www.energy.guide.com. This site contains data on utility standard offer prices and alternative supplier prices for every service area. The data are displayed by postal zip code.

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[22] The Energy Information Administration (EIA) is currently initiating an effort to redesign its data collection program. As part of this program, EIA expects to expand its coverage of consumers price program by reporting on transactions between gas marketers and end-use customers. ("EIA Launches Overhaul of Data Collection to Reflect Industry Restructuring and Preserve Declining Coverage of Consumer Prices," *Foster Natural Gas Report No. 2280*, April 13, 2000: 33-34.)

[23] Standard offer prices represent the bundled sales price to residential customers minus the distribution component; or, equivalently, the city gate prices reflected in most purchased gas adjustment mechanisms.

State PUC Websites

A number of state PUC websites, including those of Michigan, New Jersey and Ohio, publish data on utility standard offers and supplier prices.[24] Some websites, such as Ohio's, have data on participation levels by supplier, but the suppliers are not identified by name.

Quality of Data

All of the sources cited above provide useful data. One source, namely Energy Guide, also provides exhaustive data for every service area under current gas customer choice programs. For the purposes of this analysis, however, these data sources contain a number of limitations.[25]

For some of the sources, the data are either missing, incomplete, or unclearly characterized. For example, Energy Info Source does not include every supplier in a given choice program. As another example, Energy Info Source and Energy Guide do not clearly state whether the

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[24] See, for example, the Michigan Public Service Commission, Gas Customers Choice Comparison of Supplier Terms and Prices at www.cis.state.mi.us/mpsc/gas/choicesup; and the Public Utilities Commission of Ohio's Apples to Apples charts at www.puc.state.oh.us/consumer/gaschoice.

[25] Most of the data limitations can be attributed to proprietary restrictions on information. Other data limitations can be attributed to the fact that the data bases in question are in various stages of development.

price quoted includes or excludes a balancing charge for each supplier. None of the above sources, except AGA and the Public Utilities Commission of Ohio, includes data on total participation levels or the percent of switched customers. AGA does not provide data on market shares of different suppliers. Although the Ohio Commission reports on market shares of different suppliers, it does not identify them by name. As previously mentioned, the price data published by EIA are based on sales by pipelines, utilities and wholesale marketers; the data do not include prices charged by marketers to residential and commercial customers.

Some of the above data sources do not indicate whether they include separate monthly charges, or whether the monthly charges are implicitly incorporated into the quoted price based on some assumed consumption level. Energy Guide does provide information on monthly charges and monthly bills calculated on the basis of average consumption levels. But these data are segregated by postal zip code, making it difficult to compile averages for a given supplier in a chosen choice program. Also, none of the data sources provides information on average bills for customers with variable price contracts.[26]

Finally, the data posted by different website sources are not contemporaneous for each supplier; nor are the data contemporaneous

[26] Information from the various sources relied on for this report indicates that the vast majority of residential consumers have opted for fixed price contracts.

for different suppliers within the same source. For example, the posted prices for marketers in East Ohio Gas' service area may have different dates than the prices for marketers in Peoples Gas' service area. This made the intended "apples-to-apples" comparison within a program, across programs and over time difficult.

Because of these limitations, this study hopes only to identify broad patterns and average magnitudes of customer benefits. It is expected that as customer choice programs mature and data become more comprehensive and accessible, a more rigorous study can be undertaken to measure customer benefits.

Analytical Approach

This study focuses on price as a key measure of customer benefits. In this study, data on prices offered by the local distribution companies (LDCs) and other suppliers in eighteen selected customer choice programs were collected and analyzed. The general trends of prices were identified to examine whether customer choice programs have resulted in a reduction of prices relative to the price offered by the LDC (i.e., the standard offer price). The historical trends of wellhead, city-gate and end-use prices were also examined to identify general time patterns of these prices, as well as any change in their relationships with respect to time. The last observation may be useful in suggesting whether the

introduction of customer choice has had any effect on end-use prices independent of time variation of prices at the wellhead and the city gate.[27]

One fundamental problem with the approach taken in this study arises from the fact that the spot price for gas has steadily risen over the last several months.[28] With the expectation of higher prices, marketers would rationally increase their prices for fixed-price transactions. Consequently, a snapshot of prices as of a particular period may understate the actual benefits from marketers' gas. The reason for this is that the gas utility's future price for delivered gas is expected to be higher with purchased gas adjustment (PGA) passthroughs. To illustrate this, we apply the following relationship:

$$P^u_t = P^u_{t-1} + PGA$$

$$P^m_t = P^m_{t-1}$$

where

P^u	=	gas utility price
P^m	=	marketer price, for a fixed (e.g., one-year or two-year) price offering
t	=	period of future gas consumption
t-1	=	current period
PGA	=	allowable gas price adjustment by the gas utility

[27] End-use prices, as reported by EIA, exclude gas directly purchased from marketers. This precludes examining the effect of gas choice programs except to the extent that the resultant competitive pressures have caused the prices of bundled sales services to decline (see later analysis in this report).

[28] Since mid-1999, the spot price of gas has more than doubled to over $5.00 per Mcf.

m = marketer

u = utility

The first expression says that the price a consumer pays a utility during the future period t (P^u_t) relates to the current utility price (P^u_{t-1}) and the allowable gas price adjustment by the utility (PGA); the second expression simply reflects a fixed price contract where the price the marketer currently charges (P^m_{t-1}) remains fixed over future consumption period t. It is certainly conceivable, especially for a market environment where prices are anticipated to rise, for the utility's price to be currently lower than a marketer's fixed price but higher after a PGA adjustment.

The opposite could occur when prices are anticipated to fall and the customer is locked into a fixed price for a specified period. In this situation, a marketer's price may seem attractive today, but it may not tomorrow if the decline in market gas costs gets passed along to consumers (who remain with the utility) through the PGA.

Illustrating the above, suppose that for the month of June we observe the utility's gas cost to be 40 cents per therm and the marketer's offer price to be 42 cents per therm. At first glance, it seems sensible to stay with the utility. But let us assume that the marketer's price is fixed over a twelve-month period. If it is expected that the utility's gas cost will increase by (say) 10 percent over this period, the consumer may rationally switch to the marketer even though she initially pays a higher

price: by the end of the twelve-month period the marketer's price would be lower than the utility's price (42 cents versus 44 cents).

Results and Discussion

Average Price Savings

Table 1 shows average price savings from residential consumers switching to an alternative supplier in each of the selected customer choice programs. These programs represent a mix of programs with varying levels of success in terms of customer participation. The savings are calculated as the difference between the average supplier price and the utility's standard offer price (i.e., purchased gas costs).[29] The average supplier price is calculated as the arithmetic mean of fixed price offers by suppliers for a customer choice program. The price data used in this calculation were those reported between November 1999 and June 2000. Figure 1 displays graphically the standard offers and average supplier prices. Figures 2 and 3 show graphically the price savings, in both absolute and percentage terms.

The standard offer prices of utilities in the study vary between 31 cents per therm for Nicor Gas in Illinois and 45.16 cents per therm for

[29] The *average supplier price* equals the arithmetic mean of all suppliers' prices within a given program for a chosen period. The *utility standard offer price* equals the average purchased gas cost for a chosen period.

Table 1 here

Figure 1 here

Fig. 2 goes here

Fig. 3 goes here

Columbia Gas in Ohio (Table 1 and Figure 1). The average supplier prices vary between 26.80 cents per therm for the SEMCO program in Illinois and 42.96 cents per therm for the Washington Gas program in the District of Columbia (Table 1 and Figure 1).

For fifteen of the eighteen selected programs, positive price savings are observed (Table 1 and Figures 1 and 2). The remaining three programs potentially have negative savings.[30] The price savings vary from -2.64 cents per therm for the Washington Gas program in Virginia to 7.92 cents per therm for the New Jersey Natural Gas program (Figure 2). The price savings, expressed as percentages of the utilities' standard offer prices, vary between -6.59 percent for the Washington Gas Program in Virginia to 18.24 percent for the New Jersey Natural Gas program (Figure 3). *The average price savings for all the selected programs in the study are 3.02 cents per therm or 7.77 percent (Table 1).*

The observed data on the selected programs show that residential customers have generally saved on price from switching to a non utility supplier, although the average savings are observably small.[31] The negative average savings for three of the choice programs seem puzzling. The following section offers possible explanations for the negative or low savings observed in our analysis.

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[30] The discussion below argues that the actual savings to consumers who switch may not be negative.

[31] At least for the period used for our analysis, large savings were achieved for choice customers of New Jersey Natural Gas, South Jersey Gas, Columbia Gas of Pennsylvania and Virginia, and East Ohio Gas.

Explanations for Negative and Low Savings

Exclusion of Variable Price Contracts

As mentioned above, the data analyzed in this study consist entirely of fixed price contracts. No data are currently available on the yearly average prices of variable price contracts and, therefore, no analysis of such contracts was feasible. Calculation of the yearly average price of a particular variable contract requires monthly prices that were actually charged to customers and the total monthly consumption of customers for a given contractual arrangement with individual suppliers. As these data were unavailable, the present analysis was not able to incorporate the effect of variable price contracts and calculate the true average supplier price.

Unavailability of Market Share Information

In the absence of market share data, the only available estimate for average supplier prices was the simple arithmetic mean of supplier prices within a program, which was used in this analysis. This method assumes equal market shares (by consumption volumes) for all suppliers. In reality, the suppliers with higher prices are likely to have relatively lower market shares. If the prices were weighted by market shares (as should be done to estimate the correct average price for suppliers), the higher prices would be expected to have relatively lower weights; consequently, the estimates of average prices reported in Table 1 would be lower. This,

in turn, would lead to higher estimates of savings. It is likely, based on arguments previously discussed, that the reported average prices are overestimated with the reported savings consequently underestimated.

Customer Information

Further, it is possible that for some programs, the prices of some suppliers are indeed higher than the utility's standard offer for a number of reasons. It is possible that the utility is a more efficient provider than these suppliers. The customer may, however, not have accurate information to compare prices and other terms and conditions among suppliers (including the utility); the customer, for example, may subscribe to the supplier that makes the earliest contact or has the more aggressive marketing campaign. Some of these suppliers may also have offered promotional bonuses or discounts that are not reflected in the reported prices. The higher-than-standard-offer prices of these suppliers may have pushed the average supplier price upward, with a corresponding downward pull on the savings.

The Effect of Price Variations Within a Program

To examine how variations of supplier prices within a program may have affected the average supplier price and estimated price savings, the standard deviations of supplier prices for each program were estimated. The standard deviations are shown in Figures 4 and 5. The standard

Fig. 4 goes here

Fig. 5 goes here

deviations varied between 0 (for the Conectiv program in Delaware, the SEMCO program in Illinois, and the People's Gas program in Pennsylvania) and 7.63 cents per therm (for the Washington Gas program in Virginia).[32] The corresponding percent deviations were 0 and 17.86. An inspection of Figures 3 and 5 shows that programs with low or negative savings generally have relatively high standard deviations. This observation suggests that relatively high fixed prices of particular suppliers may have had a disproportionately large effect on the estimated (unweighed) average supplier prices with a corresponding high negative effect on average program savings.

Historical Trends of Gas Prices

To test the effect of customer choice programs on end-user prices, this study examined the time trends of wellhead, city-gate, industrial, commercial and residential prices during the period 1994-2000. As previously mentioned, these data are based on prices charged by pipelines, LDCs and wholesale suppliers of gas. They do not include prices charged by marketers in the retail market to residential and commercial customers. Therefore, the following analysis is intended to

[32] The standard deviations of supplier prices in these programs are zero simply because each of these programs includes only one non-utility supplier in the study sample.

examine the effect of customer choice programs on only the prices of the LDC, and *not* of other retail suppliers.

Figures 6 and 7 show two different representations of historical trends of gas prices at the wellhead and the city gate, and for three major classes of customers for the years 1994-2000. Figure 6 shows that these prices consistently track each other in individual years over the historical period. The prices follow the expected order, from the lowest to the highest: wellhead, city gate, industrial, commercial and residential. The relative differences in prices can be explained by the fact that city gate prices include only the price of wellhead commodity gas and interstate transportation, while end-use prices include the city gate price plus the price of local transportation. Figure 7 shows another view of the relationship among prices. It can be observed that city gate prices and industrial prices are similar. This can be explained by the fact that an industrial customer presumably is able to get significantly lower prices for gas at the city gate (by purchasing its own gas and interstate transportation) as well as for local transportation (because it can use the lower-priced interruptible transportation), relative to those of the other classes of customers.

Figure 7 also underscores the relationships among the prices as a function of time. It shows that all prices generally tend to rise and fall together, and maintain their relative differences. It is notable, however, that while wellhead, city-gate and industrial customer prices show an upward trend during 1998-2000, average residential and commercial prices show a general decline. In other words, the gap between the

Fig. 6 goes here

Fig. 7 goes here

average price of industrial customers and that of other classes of customers has been narrowing over the last two years. Two factors can explain this phenomenon.

First, one can surmise that the costs of commodity gas and local transportation may have fallen for commercial and residential customers relative to those of industrial customers.[33] It follows that LDCs may have managed their gas portfolios and operated their local transportation services more efficiently, passing on these efficiency gains to residential and commercial customers. The industrial customers may not have achieved any additional benefits from these efficiency gains because they were already getting relatively low prices. We observe the downward trend of residential and commercial gas service prices starting around 1998, the year in which most of the customer choice programs completed their first phase and expanded in size. The unbundling of commodity sales and transportation, and the resulting market pressures, may have had induced efficiency improvements for the LDC.

Another explanation for the decline in residential and commercial prices relative to industrial prices is that a large part of the industrial customer's gas is purchased on the spot market, the price of which has been rising (as reflected in the rise of wellhead gas prices in Figure 7). On the other hand, some of the LDC's gas, which is sold to residential and commercial customers, is purchased on longer-term firm contracts.

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[33] It is unlikely that the cost of interstate transportation has fallen for the LDC over the short period under discussion as this service is largely purchased through long-term firm contracts.

The price of gas in these contracts is generally lower than the price of gas traded more recently on the spot market. Therefore, the price of gas on the LDC's portfolio that serves residential and commercial customers has remained more stable while the price of gas has risen for industrial customers. This effect, in combination with presumable efficiency improvements in the LDC's local transportation service, may have contributed to the decline of residential and commercial gas prices relative to industrial gas prices.

Conclusions

This study examined price savings as a key measure of customer benefits from gas choice programs. In view of the limited availability of data, the study selected those programs that have prices for marketers posted on one or more websites. The study finds that customers have achieved price savings in most of the programs. Some of the programs exhibited negative savings that either suggest actual losses or reflect artifacts of data limitations of the study. For example, the simple arithmetic mean used to calculate the average supplier price may have distorted the estimate upward: the estimation fails to account for the actual consumption volumes or market shares of each supplier. This, in turn, may have introduced a downward bias on the average price-savings estimations.

To test the effect of customer choice programs on end-user (bundled sales service) prices, the study examined the time trend of wellhead, city-

gate, industrial, commercial and residential prices during the period 1994-2000. The study found that prices generally track, from the lowest to the highest, an expected sequence. This behavior of prices is understandable in terms of the cost contributions of commodity gas, interstate transportation and local transportation. One observation on these price trends was that, since 1998, residential and commercial prices have declined relative to wellhead, city-gate and industrial prices. One explanation may be that the introduction of customer choice programs has induced LDCs to manage their gas portfolio and local transportation operation more efficiently.

In sum, the analysis for this study suggests that gas customer choice programs generally have had the intended effects of reducing prices and improving the efficiency of the market. The effects have, however, been observably small.

REVIEW OF OTHER STUDIES

Some analysts have recently conducted studies on retail competition and customer choice programs in gas and electricity markets. One study examined consumer benefits from the Atlanta Gas Light (AGL) program.[34] Another study, conducted by Bay State Gas,

[34] George R. Hall, *Consumer Benefits from Deregulation of Retail Natural Gas Markets: Lessons from the Georgia Experience*, prepared for AGL Resources Inc., March 10, 2000; and George R. Hall, "Lessons from Georgia: The Benefits,"

(continued...)

estimated the actual savings from its Advantage Pilot Program.[35] A survey by XENERGY contrasts the responses of residential customers to the customer choice programs of AGL and Columbia Gas of Ohio.[36] Studies by Cambridge Energy Research Associates (CERA),[37] Faruqui,[38] Flaim,[39] and Joskow[40] address broad issues relating to the economics of retail competition for mass market customers (e.g., residential customers). These studies provide insights into the current status and the future direction of gas customer choice programs. The following discussion summarizes the major points in these studies.

The study conducted for AGL Resources estimated, for the period of

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[34] (...continued)
Public Utilities Fortnightly (May 15, 2000): 32-45.

[35] Bay State Gas Company, *Choice Advantage Wave 6 – Pilot Research Results*, February 1999.

[36] See, "Natural Gas Marketers To Residential Customers Come Under Scrutiny in Canada and U.S., Xenergy Survey Finds More Residential Customer Confusion in Georgia Than Ohio," *Foster Natural Gas Report No. 2281*, April 20, 2000: 22-4.

[37] Cambridge Energy Research Associates, "Three Paths To Retail Energy Competition," Official Press Release, April 26, 2000.

[38] Ahmad Faruqui, "Electric Retailing, When Will I See Profits?" *Public Utilities Fortnightly* (June 1, 2000): 30-40.

[39] Theresa Flaim, "The Big Retail 'Bust': What Will It Take to Get True Competition?" *The Electricity Journal* 13 (March 2000): 41-54.

[40] Paul L. Joskow, "Why Do We Need Electricity Retailers? Or Can You Get It Cheaper?" Sloan School of Management and Center for Energy and Environmental Policy Research at MIT, unpublished paper, February 13, 2000.

November 1998-July 1999, the bill savings to residential customers switching from AGL to a marketer. The savings were calculated at 7-12 percent off the monthly gas bills, or equivalently $46-$78 savings per year on a typical bill for 880 therms. The study argued that consumer benefits include more than lower prices or bills; for example, benefits encompass expanded price management options, promotional practices (e.g., sign-up bonuses up to $50), better customer service, and product innovations. The author of the study expects larger and sustainable price and nonprice consumer benefits in the future. He also pointed out that long-term profitability requires marketers to successfully offer customers value-added energy and nonenergy services.

An *ex post* study by Bay State Gas of its pilot program estimated that participating residential customers on average saved $120 and $62 during the first and second year of the program, respectively. This translates into a 20 percent and 12 percent savings off the gas cost or a 11 percent and 7 percent savings off a customer's total bill. According to a follow-up survey, 3 percent of the participants felt they actually paid more for gas because of the program.

Earlier this year the consulting firm XENERGY conducted a survey of the AGL and Columbia Gas of Ohio residential markets. According to the survey responses, 46 percent of the customers in AGL's market "wish that natural gas deregulation had never occurred." At the same time, 67 percent of the same customers mentioned that they were satisfied with

their current supplier. In Columbia Gas of Ohio's service area, 85 percent of the customers reported that they were satisfied with their current supplier. The survey results also showed that customers in the AGL service area were much more likely to switch suppliers; for example, 25 percent of the customers surveyed said they either have already switched suppliers or are considering switching suppliers. In the Columbia Gas of Ohio's service area, customers identified price, reputation, and marketing techniques as the most important factors for selecting a new supplier.

The CERA study argues that the near-term success of retail competition in the gas and electricity sectors hinges on whether " financial forces, new technologies, e-business and other forces cause the [industries] to move even more rapidly to competitive markets." For example, under what CERA calls the Silicon Nation scenario, "[t] he development of e-commerce auction exchanges and portals, robust wholesale markets, and national standards for retail gas and electricity transactions pressures utilities to exit the regulated merchant function and provides customers with an opportunity to gain direct access quickly to wholesale markets through Internet portals and auctions."[41] Under this scenario, CERA predicts that two thirds of gas customers and almost half of electricity customers will switch suppliers before 2010. The study emphasizes the importance of e-commerce for making switching more

[41] Cambridge Energy Research Associates, "Three Paths to Retail Energy Competition," 3.

convenient for consumers by lowering their transaction costs.[42] The study points out that the success of e-commerce depends on the speed with which residential and other small customers gain access to, and utilize, the Internet for energy decisions.

Recent studies by Faruqui, Flaim and Joskow address two major topics. First, they attempt to explain the current status of retail competition, particularly for small customers, in the electric power industry. Second, they identify the major factors required for the acceleration of retail competition in the future. The three studies all agree that retail competition to date has been greatly limited by the offering of only commodity energy. In such a marketplace, energy service suppliers are able to earn only thin profits and consumers receive few benefits. The three studies also agree that the future success of retail competition largely depends on the offering of value-added services by energy service providers. These services may include enhanced metering and control technologies, price and consumption hedge contracts, total energy management services, and "one- stop" shopping for electric, gas and telephone service. Currently, few of these services are being offered to residential customers. As succinctly noted by Flaim, "no one has yet figured out how to bundle different services for mass market customers in

[42] The application of e-commerce for gas transactions is starting to develop. See, for example, "First Energy Picks Internet Provider To Sell Natural Gas and Electric Service in Northeast," *Foster Natural Gas Report No. 2283*, May 4, 2000: 27; and "Enron Teams Up with IBM and America Online To Create First National Residential and Small Business Energy Service Provider in Deregulated Markets," *Foster Natural Gas Report No. 2285*, May 18, 2000: 19.

a way that creates greater value to the customer or in a way that allows the supplier to offer the bundle at a lower total cost."[43]

Overall, the above studies identify two crucial factors in the future development of retail competition. Both of them directly affect the net benefits customers receive from choice programs. The first one, the marketability of value-added services, can greatly increase the potential benefits to consumers, as well as the potential profits to energy service providers. The second, lower customer transaction costs, makes it less costly (especially in terms of time) and more convenient for customers to switch suppliers. Transaction costs probably explain much of the consumer inertia that we have observed so far.[44]

Table 2 provides a sample of savings for residential customers of eleven gas utilities. As previously mentioned, the Bay State Gas and AGL calculations were based on *ex post* studies.[45] The savings for the three Ohio gas utilities were derived from the fixed prices offered by marketers at different points in time, as found in the Public Utilities Commission of Ohio's Apples To Apples Charts. For example, for Columbia Gas of Ohio during March 2000, marketer prices (including distribution charges) ranged from 1.4 percent above to 11.7 percent below the gas utility's

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[43] Flaim, "The Big Retail ‹Bust': What Will It Take To Get True Competition?" 43.

[44] See the earlier discussion in this report.

[45] The AGL savings were calculated prior to mandatory assignment of customers to marketers.

Table 2: Savings to Residential Customers from Switching, Selected Programs

Utility		Total Bill Savings (%)	Annual Savings ($)	Savings Off Gas Cost (%)
Bay State (MA)[1]	1st year	11%	$120	20%
	2nd year	7	62	12
AGL (GA)[2]		7-12	46-78	
Columbia Gas of Ohio (OH)		6-12[3] (-1.4)–11.7 (March 2000 prices)[4] (-3.0)–9.1 (May 2000 prices)[5]	60 million (total thru February 2000)[6]	
Cincinnati G&E (OH)		(-4.1)–3.6 (March 2000 prices)[7] 1.5–3.6 (April 2000 prices)[8]		
East Ohio (OH)		0.4–7.7 (March 2000 prices)[9] 0.8–7.4 (April 2000 prices)[10]		
Baltimore G&E (MD)				1.4–10.8 (1999)[11] 3.7–10.4 (2000)[12]

Table 2 *continued*

Utility	Total Bill Savings (%)	Annual Savings ($)	Savings Off Gas Cost (%)
Columbia Gas of Maryland (MD)	0 (1998-99 winter)[13] 5 (1999)[14]		
Washington Gas (MD)			3.4–8.4 (12 months ending November 1999)[15]
Consumers Energy (MI)	0.8–3.2 (November 1999 prices)[16]		
Michigan Consolidated Gas (MI)	2.9 (November 1999 prices)		
SEMCO	3.8–6.8 (November 1999 prices)[18]		

NOTES:
1. Bay State Gas Company, *Choice Advantage Wave 6–Pilot Research Results*, February 1999, 2.
2. George R. Hall, *Consumer Benefits from Deregulation of Retail Natural Gas Markets: Lessons from the Georgia Experience*, prepared for AGL Resources Inc., March 10, 2000, 10.
3. George R. Hall, "Lessons from Georgia: The Benefits," *Public Utilities Fortnightly* (May 15, 2000), 36.
4, 5. Public Utilities Commission of Ohio, Apples to Apples charts, www.puc.state.oh.us/consumer/ gaschoice.
6. Columbia Gas of Ohio, "Savings for CHOICE Program Customers," unpublished document, March 2000.
7, 8, 9, 10. Public Utilities Commission of Ohio, Apples to Apples charts, www.puc.state.oh.us/ consumer/gaschoice.
11, 12, 13, 14, 15. Unofficial estimates made by the Maryland gas utilities and submitted to the Maryland Public Service Commission. Marketers offering a guaranteed discount off a gas utility's prices were excluded in the analysis.
16, 17, 18. Michigan Public Service Commission, Gas Customer Choice Comparison of Supplier Terms and Prices, www.cis.state.mi.us/mpsc/gas/choiceup.

bundled sales price. The savings for the three Maryland gas utilities were based on unofficial utility estimates. For the Michigan utilities, savings were derived from the Michigan Public Service Commission's website comparison charts.

SUMMARY AND CONCLUSION

Much of what we learned from this study reinforces or confirms what many observers of gas choice programs believe to be true. First, consumers have received limited benefits, especially so after accounting for customer transaction costs. The benefits, measured in terms of percentage declines in price, lie below those historically seen in the wholesale gas and large-customer retail gas markets. This is not surprising as gas utilities have over time altered their gas portfolio to correspond closer to market realities: the prices they pay for gas have continuously edged toward market prices.

Second, the benefits of existing gas choice programs largely consist of lower gas bills plus the option to choose between fixed prices and variable prices for gas purchased from marketers. The evidence supports the preference of most residential consumers for fixed price contracts, with these consumers presumably willing to pay a premium to avoid price volatility. In view of rising gas prices over the last several months, those consumers may be receiving higher benefits than

previously. Maximum consumer benefits to date generally fall within the range of a 5-12 percent savings in the total gas bill.

Third, the evidence gives credence to the argument that consumer inertia to date mostly reflects rational behavior. The fact that most residential consumers have remained with their incumbent utility can be largely explained by economics: *the expected benefits relative to the costs and risks associated with switching to a new supplier are just too small to induce switching.* As some analysts have recently pointed out, large-scale switching will require the expansion of services offered by energy service suppliers in combination with the lowering of transaction costs. Unless these two events transpire, the majority of residential consumers will likely prefer to receive all of their gas services from the local gas utility.

Fourth, our analysis shows that for some geographical areas it may be futile to expect residential consumers to switch to new suppliers. In these instances, marketers find it difficult to under-price the local gas utility. In fact, we found several cases where a marketer's price exceeded the local utility's standard offer. It is puzzling how these marketers could compete under such conditions. Perhaps they are able to capitalize on the inexperience of consumers in choosing a gas supplier; or perhaps, misinformation could induce some consumers to switch even when (unknowingly) they pay higher prices.

This study was handicapped by data deficiency. One serious one is the unavailability of data on the market shares of different suppliers. This information is required to calculate the actual average savings of consumers switching to new suppliers. The study had to rely on the

unweighed average price offered by marketers, which would tend to understate the true savings because of the expected negative correlation between market share and price; in other words, one would assume that marketers with the lowest prices would have the highest market shares.

One surprising finding of this study was the number of marketers offering prices above the utility's standard offer price. How many consumers, if any, actually took gas from these marketers could not be determined. Of course, consumers may rationally pay a price currently higher than the utility's price if the price is fixed over a one or two year period.[46] These consumers may be willing to pay more for gas today with the expectation that the utility's price in the future will rise above the fixed price. As another possible explanation, some customers may abhor their gas utilities so much that they would be willing to pay a higher price for gas just to switch to another supplier.

Another finding of this study was the wide range of prices offered by marketers in some of the programs. In markets where consumers have poor information or information is costly to acquire, the different prices offered by firms tend to vary more. This phenomenon seems to exist in the newly competitive residential gas market where consumer misinformation and confusion likely prevail.

One last point deals with the question of whether the pro-competitive nature of gas choice programs has placed any pressure on utilities to lower the price of residential bundled sales service. A valid statistical method for answering this question would be regression

[46] See the earlier discussion in this report.

analysis, where the coefficient for a "dummy variable" could be estimated to test the hypothesis of cause-and-effect between gas choice programs and the bundled gas sales price (i.e., the delivered price of gas purchased by residential customers from the local gas utility). Data limitation precluded us from undertaking this exercise. As an alternative, and admittedly a poor substitute, we tracked the average U.S. residential gas price back to 1994. We also tracked prices over the same period for the average wellhead price, the city gate price, the commercial price, and the industrial price. What we found (see Figure 7) was that since 1997, the first full year over which many gas choice programs operated, the price of residential bundled sales service has continuously fallen. This occurred in spite of rising wellhead prices since 1998; further, although commercial and industrial prices have fallen since 1997, they did not continuously fall as did residential prices. While choice programs may have been a contributing factor, other just-as-plausible explanations can be offered as well.

In conclusion, gas choice programs collectively to date have produced benefits to consumers. Based on the evidence in this study, higher consumer participation and benefits in the future will require three areas of improvement in current programs – lower consumer transaction costs, better consumer education, and the availability of value-added services.

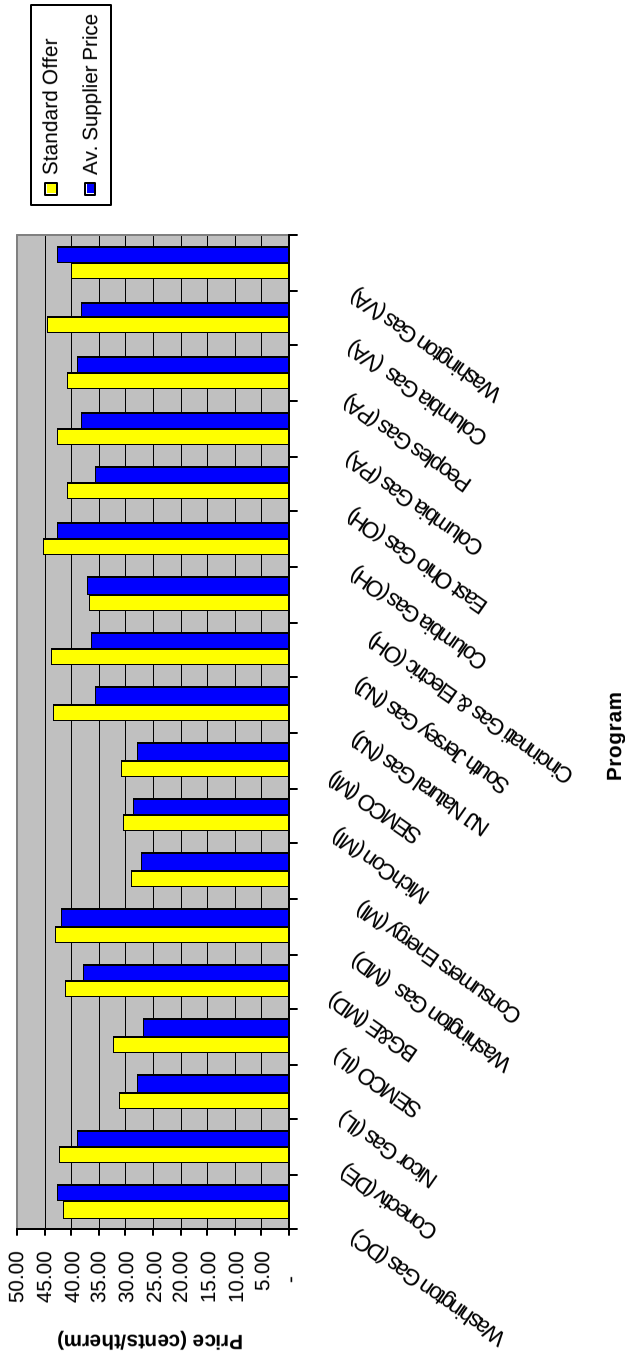

Figure 1. Utility standard offers and average supplier prices. Data Sources: Energy Info Source, Energy Guide, utility and state PUC websites.

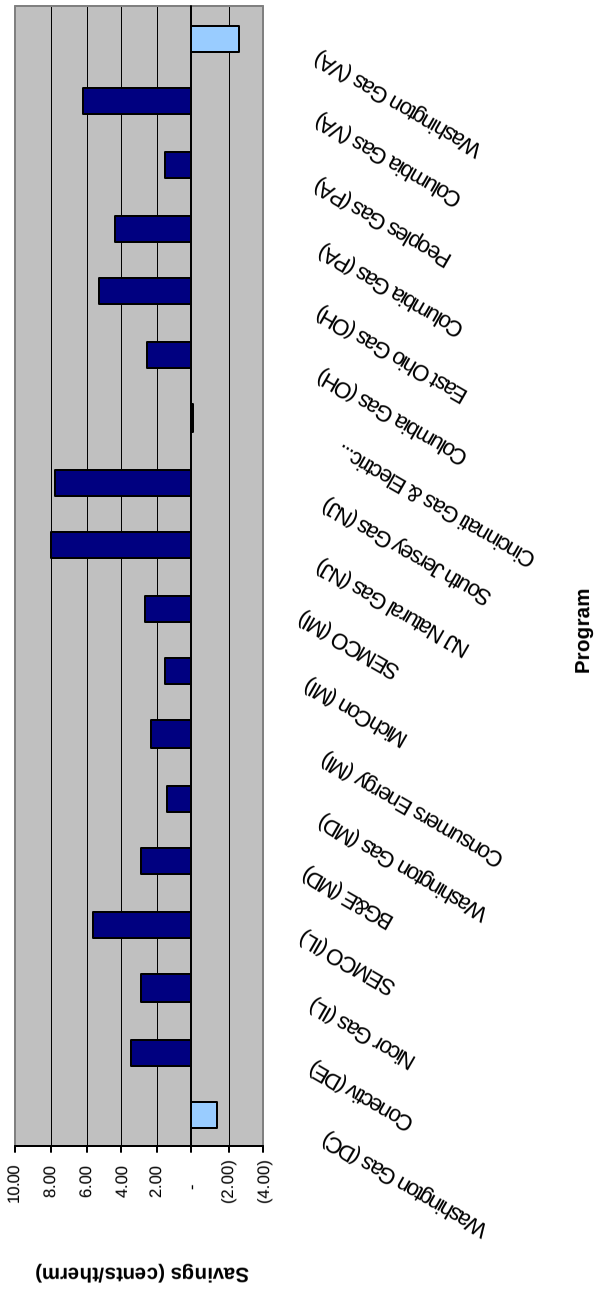

Figure 2. Differences between standard offers and average supplier prices.
Data Sources: Energy Info Source, Energy Guide, utility and state PUC websites.

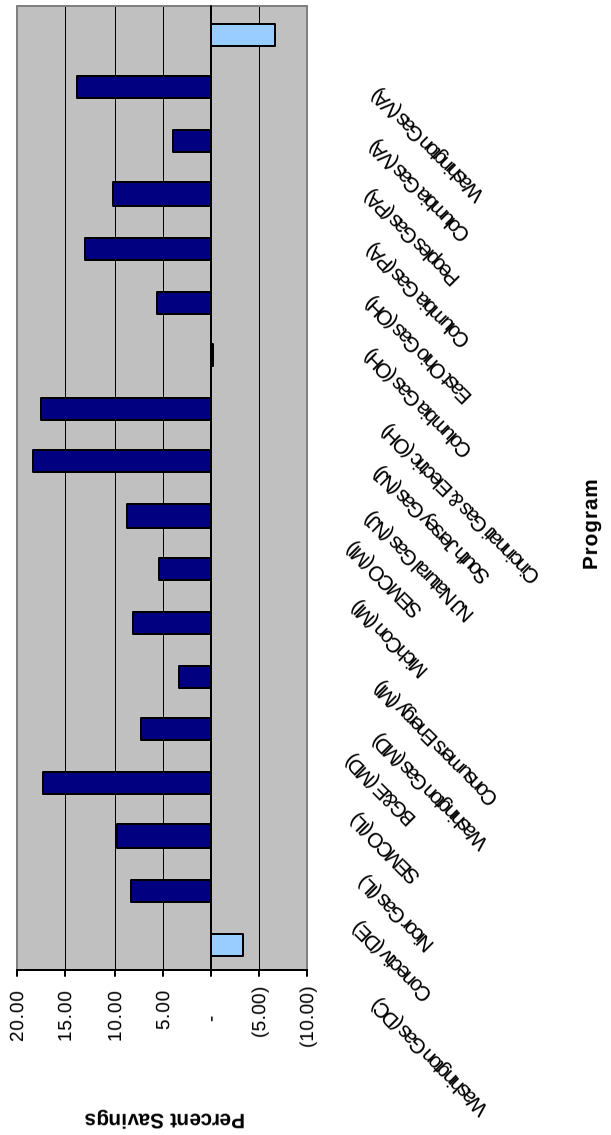

Figure 3. Percent differences between standard offers and average supplier prices.
Data Sources: Energy Info Source, Energy Guide, utility and state PUC websites.

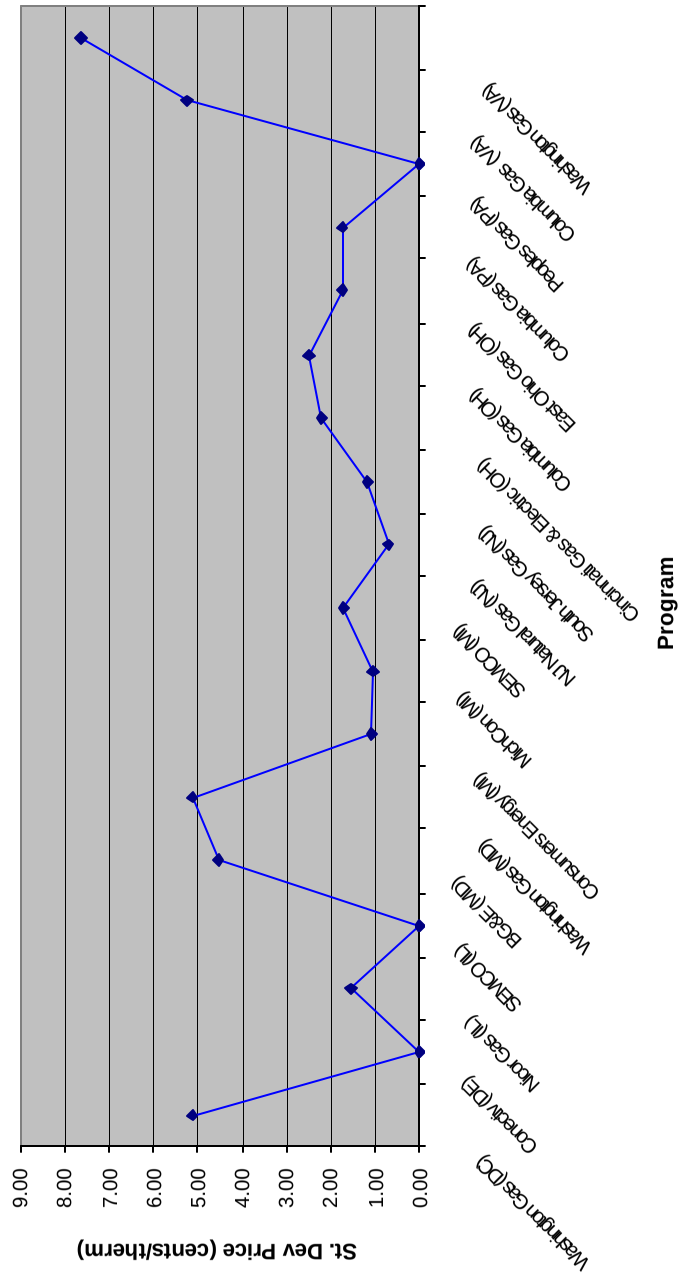

Figure 4. Standard deviation of supplier prices.
Data Sources: Energy Info Source, Energy Guide, utility and state PUC websites.

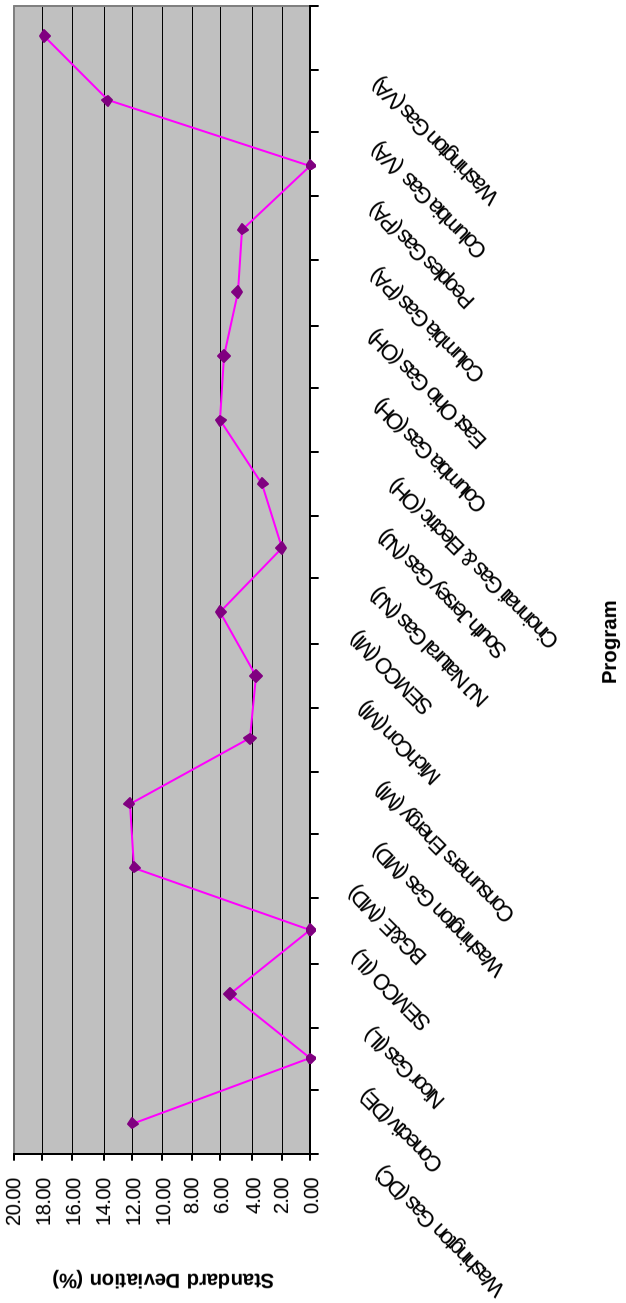

Figure 5. Percent standard deviation of supplier prices. Data Sources: Energy Info Source, Energy Guide, utility and state PUC websites.

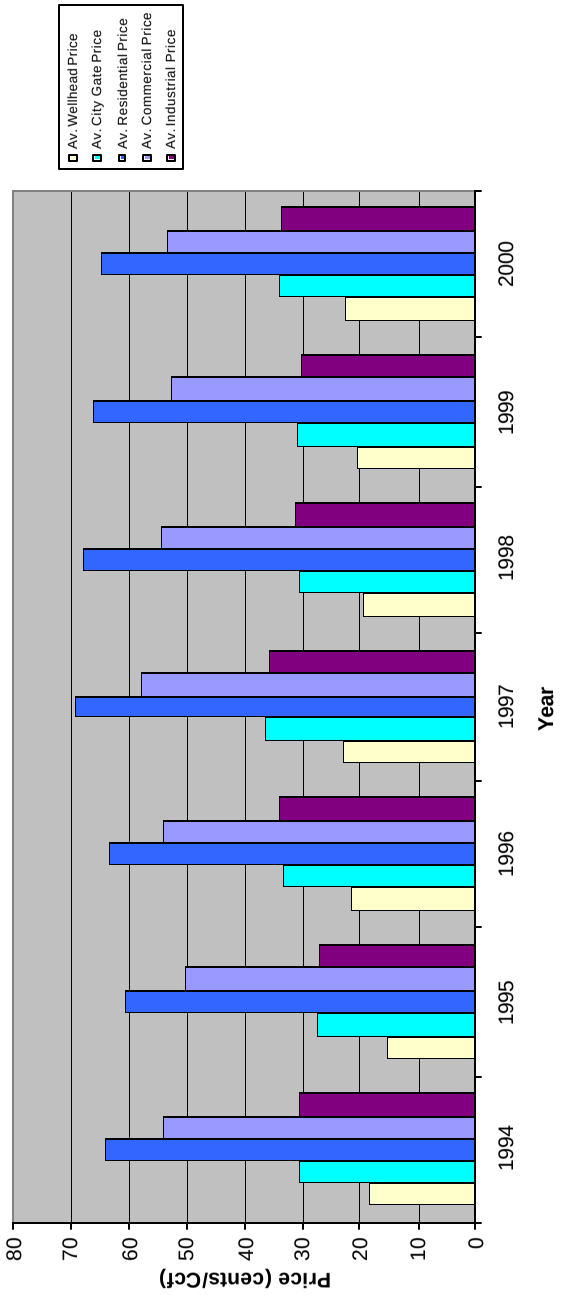

Figure 6. Comparison of Historical U.S. Average Wellhead, City Gate, Residential, Commercial, and Industrial Prices, 1994-2000.
Data Source: Energy Information Administration (EIA) website.

Figure 7. Historical U.S. Average Wellhead, City Gate, Residential, Commercial, and Industrial Prices, 1994-2000.
Data Source: Energy Information Administration (EIA) website.

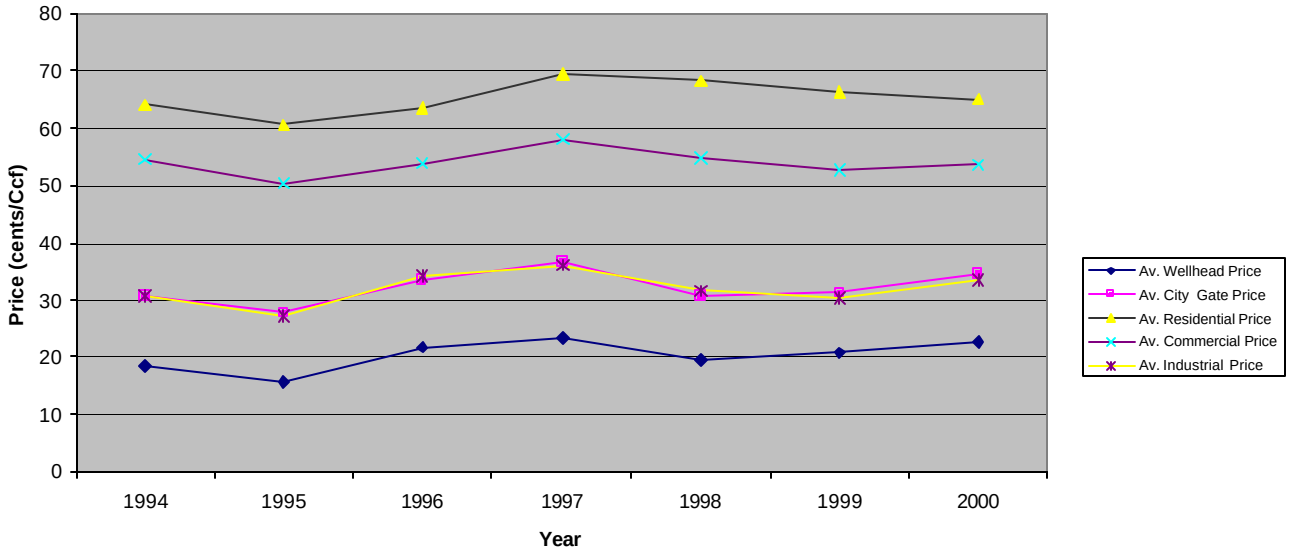

Table 1: Average Price Savings and Standard Deviation of Supplier Prices

LDC	Standard Offer (¢/therm)	Avg Supplr Price * (¢/therm)	Difference (¢/therm)	Percent Difference	Std Devtn of Supplr Prices (¢/therm)	Percent Standard Deviation
Washington Gas (DC)	41.59	42.96	1.37	(3.29)	5.12	11.92
Conectiv (DE)	42.39	38.90	3.49	8.24	0.00	0.00
Nicor Gas (IL)	31.00	28.03	2.97	9.58	1.53	5.46
SEMCO (IL)	32.40	26.80	5.60	17.28	0.00	0.00
BG&E (MD)	41.11	38.14	2.97	7.22	4.54	11.90
Washington Gas (MD)	43.17	41.78	1.39	3.22	5.13	12.28
Consumers Energy (MI)	29.25	26.90	2.35	8.03	1.10	4.09
MichCon (MI)	30.39	28.75	1.64	5.40	1.06	3.69
SEMCO (MI)	30.80	28.13	2.67	8.67	1.70	6.04
NJ Natural Gas (NJ)	43.42	35.50	7.92	18.24	0.71	2.00
South Jersey Gas (NJ)	43.91	36.20	7.71	17.56	1.17	3.23
Cincinnati Gas & Electric	36.75	36.86	(0.11)	(0.30)	2.21	6.00
Columbia Gas (OH)	45.16	42.66	2.50	5.54	2.50	5.86
East Ohio Gas (OH)	40.71	35.45	5.26	12.92	1.77	4.99
Columbia Gas (PA)	42.85	38.48	4.37	10.20	1.75	4.94
Peoples Gas (PA)	40.59	39.00	1.59	3.92	0.00	0.00
Columbia Gas (VA)	44.47	38.33	6.14	13.81	5.27	13.75
Washington Gas (VA)	40.09	42.73	(2.64)	(6.59)	7.63	17.86
Average	38.89	35.87	3.02	7.77		

* Supplier prices include only fixed-price offerings. Sources: Energy Info Source, Energy Guide, utility and state PUC