

**PRICING LOCAL DISTRIBUTION SERVICES
IN A COMPETITIVE MARKET**

**Daniel J. Duann
Senior Institute Economist**

THE NATIONAL REGULATORY RESEARCH INSTITUTE

**The Ohio State University
1080 Carmack Road
Columbus, Ohio 43210**

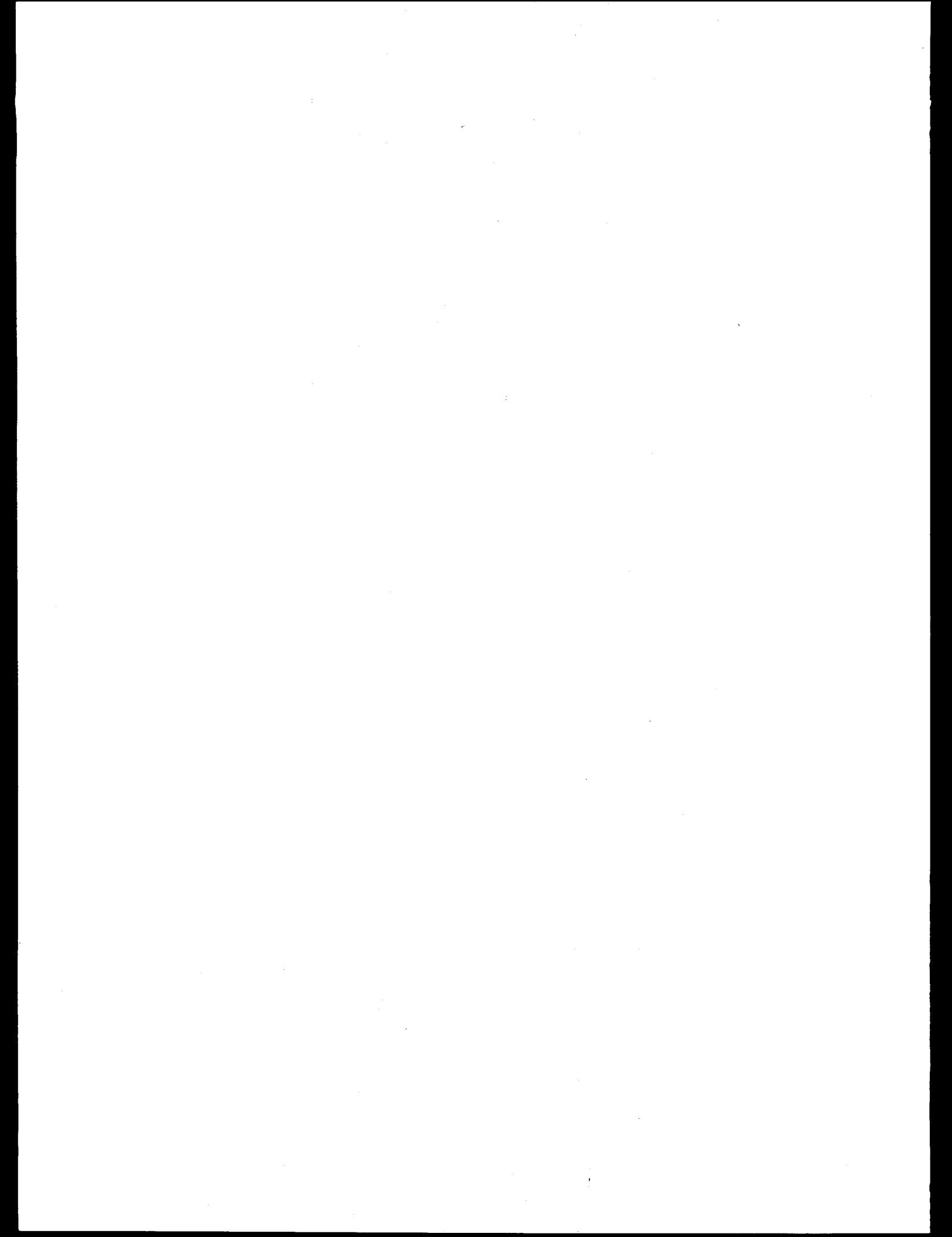
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EXECUTIVE SUMMARY

The unbundling and restructuring of local distribution services is the focus of the natural gas industry. As a result of the regulatory reforms in the wellhead and interstate markets, a "competitive" local distribution market has emerged, and the validity of continuing with traditional cost-based regulation is being questioned. One alternative to cost-based regulation is to completely unbundle local distribution services, in the same fashion as the unbundling of pipeline services by the Federal Energy Regulatory Commission (FERC), and transform the local distribution company (LDC) into a common carrier for intrastate transportation services. Parts of the local distribution market continue to exhibit many characteristics of a franchised monopoly, and some form of cost-based regulation will still be required to protect the interests of core customers. This combination of competition and monopoly in a single market represents a significant challenge to the state public utility commissions (PUCs) and LDCs.

In response, many state PUCs are exploring and considering a broad range of new policy options. These policy options include the establishment of new monitoring and incentive mechanisms for gas procurement, flexible (contract) pricing, deregulation of gas services to noncore customers, and allowing more open and equitable intrastate transportation services. One particular policy that has been gaining much attention recently is the use of alternative pricing mechanisms, such as price caps and cost indexing, for certain distribution services.

Several factors contributed to the heightened interest in applying alternative pricing mechanisms to local distribution services. One factor is the significant cost shifting from noncore to core customers resulting from the adoption of straight-fixed variable rates and full pass through of transition costs from pipelines to LDCs. Another factor is the increased competition in the gas industry brought about by the unbundling of pipeline services and the wide availability of equitable and

economical transportation services. The third factor is the continued presence of a large number of core customers who do not have viable alternatives other than buying gas from the LDC.

The state PUCs are facing several conflicting objectives in applying alternative pricing to local distribution services. The first objective is to facilitate competition to the extent that it is economically efficient and to assure high service reliability to all end-use customers. The second objective is to equitably allocate a large amount of new costs among all end-use customers. Third, the state PUCs and LDCs, mindful of the competition from other service providers, may have to give some "price discounts" to fuel-and supplier-switchable customers in order to keep them on the system. Lastly, the cost and feasibility of executing some alternative regulatory mechanisms will require legislative actions or a more elaborated institutional arrangement. The consideration of these objectives has certainly restrained the applicability of either the traditional cost-based regulation or the total unbundling approach pioneered by the FERC. They also complicate the design and implementation of any alternative pricing mechanisms whether it being price caps, cost indexing, or flexible rates.

Not surprisingly, there is no single pricing mechanism that can simultaneously satisfy all these criteria. Some compromises have to be made, and the most desirable form of alternative pricing regulation for a particular local distribution service may depend on the specific conditions of the LDC and the regulatory objectives of the state PUC.

Three kinds of alternative pricing mechanisms are examined in this study. They are value-based pricing, performance-based pricing, and flexible pricing based on specific regulatory objectives. There are several variations to each of these main categories of alternative pricing mechanisms. Based on the likely development of the local distribution market and the strength and weakness of these alternative pricing mechanisms, the most desirable (or the least objectionable) way of regulating specific local distribution services can be identified. Specifically, an LDC

with a typical customer base and supply and demand characteristics should be allowed to offer unbundled commodity gas at unregulated price to all customers within the service territory. The LDCs should also be allowed to provide bundled gas services to all customers who demand it at a cost-based rate approved by the state PUC. In order to improve the efficiency of gas procurement, a cost index based on spot prices and a sharing factor may be most effective.

As for the pricing of firm intrastate transportation services, cost-based pricing is the preferred method unless strong evidence suggests that a competitive secondary market can be established and maintained. There are several possibilities for pricing interruptible transportation capacity. A combination of price caps and flexible pricing appears to offer the best balance in protecting end-use customers and promoting competition so that transportation capacity can be allocated to customers who value it the most. There should be no restrictions on the participation of new suppliers for the different kinds of auxiliary services. During the transition period, price caps and flexible pricing appear to be the preferred regulatory mechanisms for these services. At some future date, competitive forces in the auxiliary-service markets may warrant deregulation of these services.

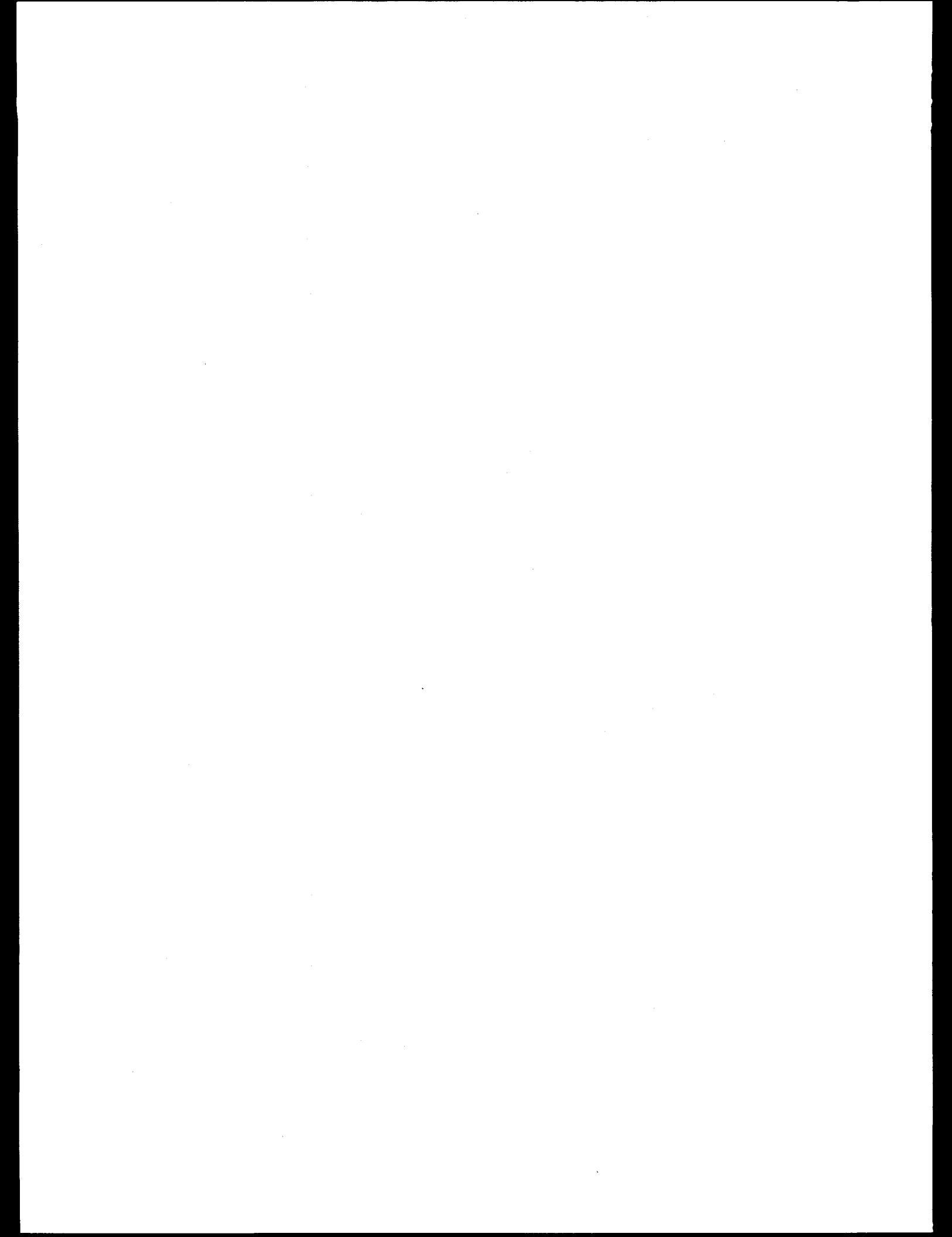


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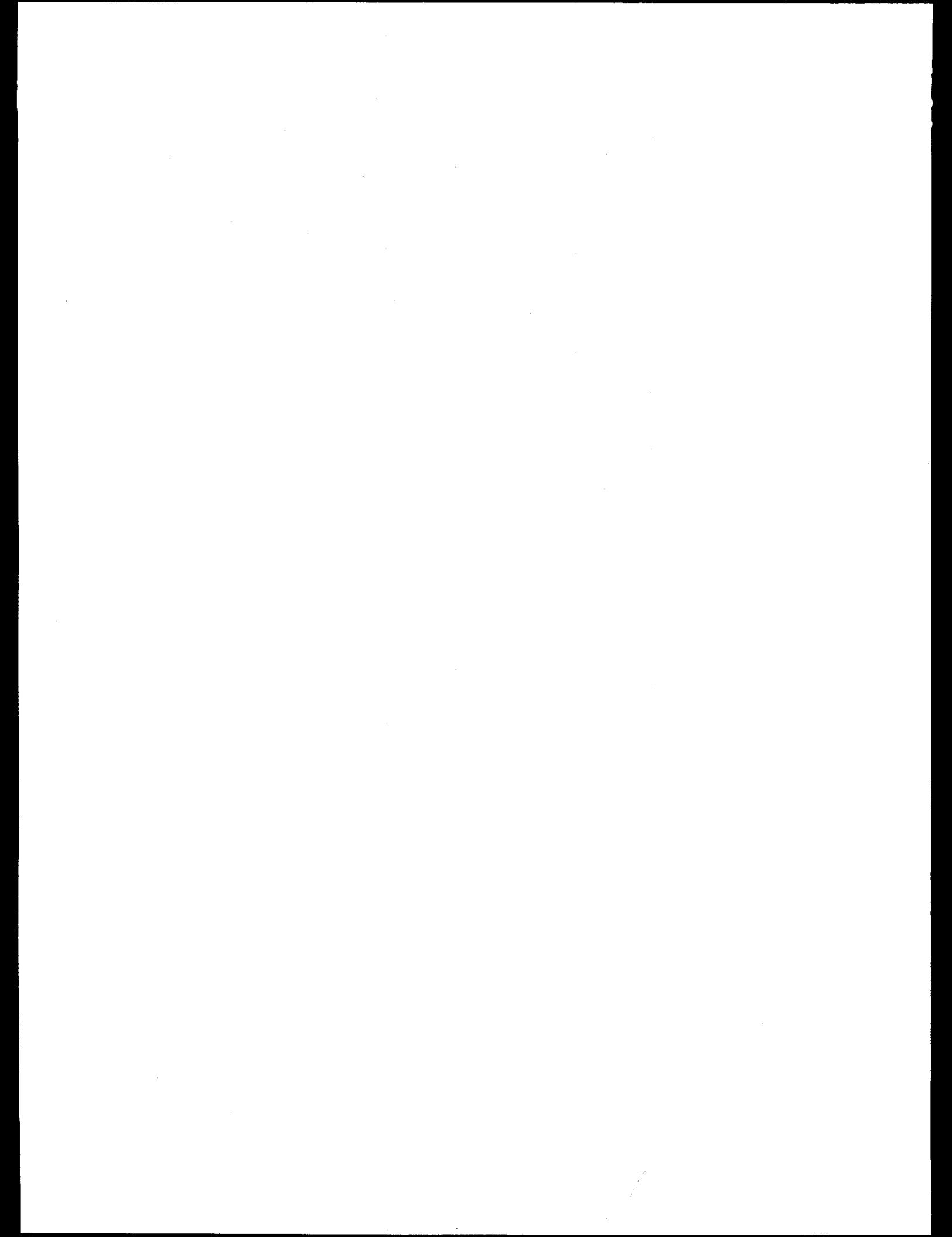
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FOREWORD

This report is the most recent in a series of studies we have done on LDCs, pricing, and competition. It juxtaposes cost-based pricing with several alternative pricing mechanisms that are increasingly being considered in the new environment. These mechanisms are discussed for auxiliary services, firm and interruptible services, bundled sales, and commodity gas.

Douglas N. Jones, Director
Columbus, Ohio
December 1, 1995



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CHAPTER 1

INTRODUCTION

As the restructuring of the wellhead and interstate markets is near completion, the focus of the natural gas industry is shifting to the unbundling and restructuring of local distribution services.¹ Clearly, a more competitive local distribution market has emerged, calling into question the validity of continuing with traditional cost-based regulation in this market. Nevertheless, parts of the local distribution market continue to exhibit characteristics of a franchised monopoly and some form of cost-based regulation may still be required in protecting core customers. The application of proper regulatory control to a market characterized by both competition and monopoly is probably the biggest challenge facing the state PUCs and LDCs.

In response, many state PUCs are exploring and considering a broad range of new policy options that can assist the LDCs to compete in a drastically restructured marketplace. These policy options include establishment of new monitoring and incentive mechanisms for gas procurement, deregulation of gas services to noncore customers, and provision of more open and equitable intrastate transportation services.² One particular policy which recently gained much attention is the

¹ See Daniel J. Duann, *Restructuring Local Distribution Services: Possibilities and Limitations* (Columbus, OH: The National Regulatory Research Institute, 1994) for a detailed discussion on the effects of restructuring of upstream markets and the emergence of local service restructuring as a critical regulatory issue.

² A review of the more recent state regulatory actions concerning the restructuring of local distribution services can be found in Daniel J. Duann and Belle Chen, *A Survey of Recent State Initiatives on EPACT and FERC Order 636* (Columbus, OH: The National Regulatory Research Institute, 1994).

application of alternative pricing mechanisms such as price caps and cost indexing to certain local distribution services.

The use of alternative pricing mechanisms for setting the rates of local distribution services is not a totally new concept.³ The prices of some gas services, such as commodity gas and certain interruptible interstate transportation services, are already set through competitive market forces. The electric and telecommunication industries have also been using price caps and sharing mechanisms with varying degrees of success.

Several factors contributed to the heightened interest in applying alternative pricing mechanisms to local distribution services.⁴ One factor is the drastic cost shifts from noncore to core customers as a result of the adoption of straight-fixed variable transportation rates and full pass through of transition costs mandated in FERC Order 636. Another factor is the increased competition in local distribution market resulting from the unbundling of pipeline services and the wide availability of open and economical interstate transportation services. The third factor is the continued presence of a large number of core customers who have no viable alternatives other than buying bundled gas service from the LDC.

Given the substantial service restructuring and unbundling already taking place in the upstream markets, state PUCs and LDCs can no longer rely on

³ For example, cost indexing, price caps, and flexible rate-of-return have all been suggested as alternatives to traditional cost-based regulation. See Mohammad Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies Under Changing Industry Structure* (Columbus, OH: The National Regulatory Research Institute, 1991). A general discussion on due and undue price discrimination for gas services can be found in Daniel Z. Czamanski, "Price Discrimination Limits and the Loss of Load by Gas Utilities," in J. Stephen Henderson, ed., *Natural Gas Restructuring Issues* (Columbus, OH: The National Regulatory Research Institute, 1986).

⁴ See Daniel J. Duann, *The FERC Restructuring Rule: Implications for Local Distribution Companies and State Public Utility Commissions* (Columbus, OH: The National Regulatory Research Institute, 1993).

traditional cost-based regulation to preserve the monopolistic position of the LDCs. The continued application of cost-based regulation in a substantially "competitive" market may eventually endanger the reliable and economical supply of gas services to many end-use customers. State PUCs need to develop pricing mechanisms that can effectively respond to the coexistence of competition and monopoly, as well as the segmentation of core and noncore markets.

The state PUCs have to consider several conflicting objectives in restructuring and pricing local distribution services. First, they need to devise some equitable ways to allocate a large amount of new costs that passed through from producers and pipelines to LDCs and end-use customers. Then, there exists the requirement to facilitate, at least not to inhibit, competition to the extent economically possible in the local distribution market. Third, the LDCs and state PUCs, mindful of the competition from other providers of gas services to noncore customers, may have to give some "price discounts" to these customers in order to keep them on the system. Such a price discount in all likelihood will lead to a even higher price for services provided to core customers, in addition to the full pass through of restructuring-related costs. This significant cost increase to core customers may also create some "fairness" concerns among different customer groups.

There is no single regulatory mechanism that can simultaneously satisfy these three objectives. Some compromises have to be made. The best choices largely depend on the specific gas demand and supply conditions of the LDC. Three broad categories of regulatory paradigms are available to the state PUCs in restructuring local distribution services: traditional embedded cost-based (franchised monopoly) regulation, total (mandatory) unbundling of distribution services, and a "mixed" approach, which divides the market into core and noncore segments and regulates them accordingly.⁵ It has been argued that in restructuring the local

⁵ See Duann, *Restructuring Local Distribution Services*.

distribution market, both the total unbundling and the franchised monopoly approaches are less efficient and equitable than the "mixed" approach.⁶

A number of tasks are involved in applying this "mixed" approach. Many different policy options also may be implemented.⁷ One of the key elements in implementing this "mixed" approach is the proper pricing of various gas services, in particular intrastate transportation services to noncore customers. It should also be noted that the FERC currently is in the process of evaluating and designing alternatives (such as market-based rates and performance-based rates) to traditional cost-of-service ratemaking for interstate pipeline services.⁸

Clearly, the unique characteristics of the local distribution market have constrained the applicability of both cost-based regulation and total unbundling in the restructured local distribution market. Some alternative pricing mechanisms have to be considered, evaluated, and possibly implemented in order to fully realize the benefits of regulatory reforms in the wellhead and interstate markets. The purpose of this study is to provide some guidelines to the state PUCs and LDCs in using these alternative pricing mechanisms.

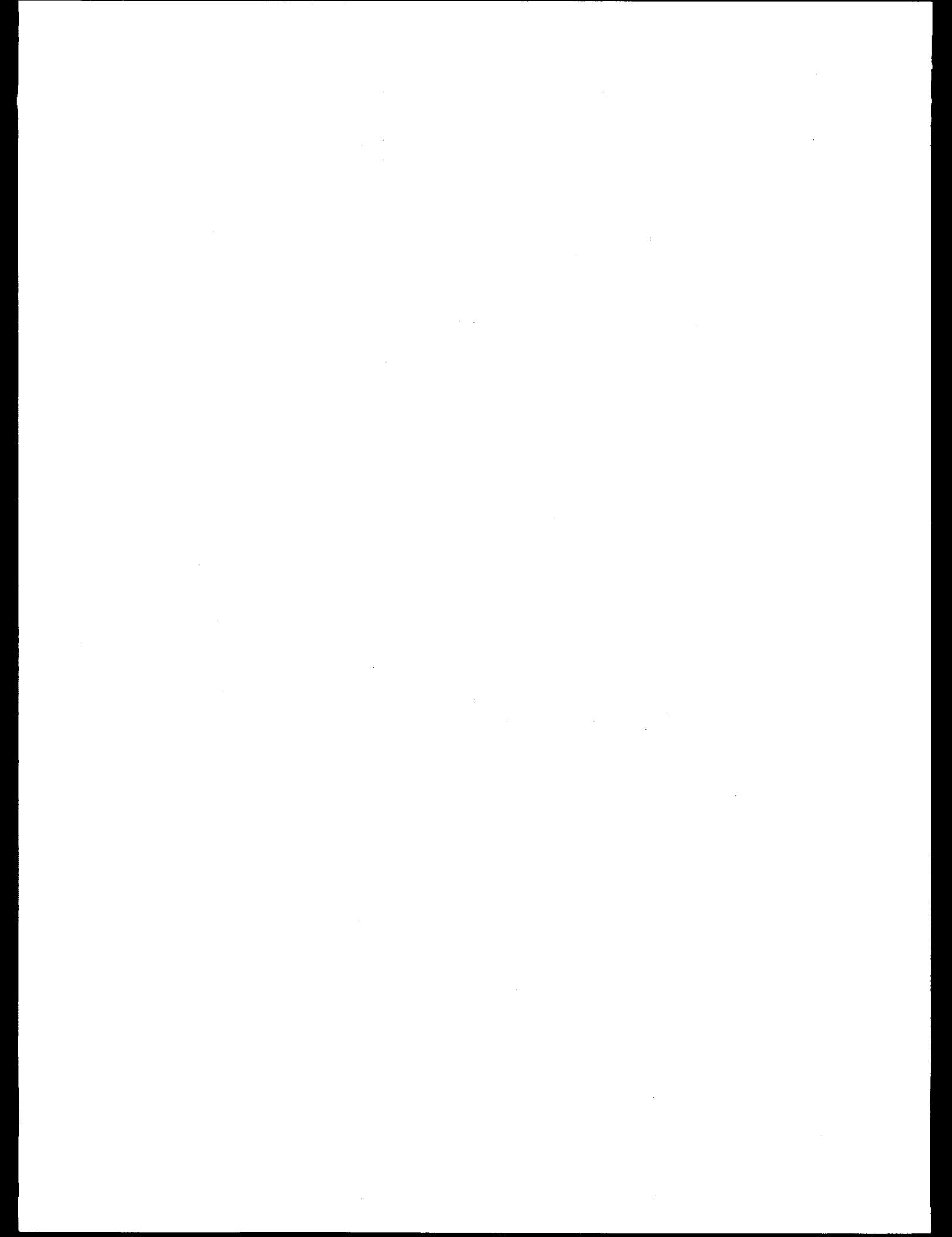
This study consists of six chapters. The next chapter includes an overview of the transformation of the local distribution market as brought about by FERC Order 636 and previous federal and state initiatives. The emphasis is on the emergence of a highly competitive local distribution market and the limitations of both the franchised monopoly and total unbundling approaches. Chapter Three focuses on the economic efficiency, equity, and administrative feasibility criteria

⁶ Ibid.

⁷ Ibid.

⁸ "FERC Requests Comments on Alternatives to Traditional Cost of Service Pricing for Interstate Pipeline Services," *Foster Natural Gas Report* (February 9, 1995), 1-6.

applicable in the development and evaluation of alternative pricing mechanisms. The formats and rationales of various alternative pricing mechanisms such as price caps, performance-based pricing, flexible pricing, and value-based pricing in a competitive market are the subject of Chapter Four. The application of these alternative mechanisms to specific distribution services is presented in Chapter Five. Chapter Six provides some concluding remarks.



CHAPTER 2

COST-BASED PRICING FOR LOCAL DISTRIBUTION SERVICES

The pricing of utility services based on the costs of providing such services has been the hallmark of public utility regulation ever since the establishment of public utilities and utility regulation in the early part of this century. Though there are few explicit statutes or regulatory requirements that the prices of all utility services be cost-based, it is generally accepted that a cost-based rate is the primary, if not the only, proxy for a just and reasonable rate.¹ A just and reasonable rate has been one of the most common legal requirements for pricing utility services. The pricing of local distribution services is no exception. Before the initiation of recent federal and state regulatory reforms in the natural gas market, the LDC had always been viewed as a franchised monopoly and was regulated accordingly.²

It becomes apparent, however, that as the interstate and wellhead markets were undergoing fundamental restructuring, the LDC's position as a franchised monopoly within its service territory has also been seriously eroded. Many LDC customers have a wide variety of choices regarding the suppliers of commodity gas, transportation services, storage and backup services, and other auxiliary services. In this environment, the LDC can no longer always charge its customer (or a group of customers) a price that fully reflects its cost of providing service to that customer (or the customer group). The values perceived by the customers of

¹ See James C. Bonbright, *Principles of Public Utility Rates* (New York: Columbia University Press, 1961). However, it should be noted that there is case law giving state PUCs great leeway in setting rates as long as the rates are deemed just and reasonable and produce a fair rate of return.

² Two extensive analyses on the evolution of the natural gas industry and its regulation can be found in Congressional Research Service, *Natural Gas Regulation Study* (Washington, DC: U.S. Government Printing Office, 1982) and Richard J. Pierce, Jr., "Reconstituting the Natural Gas Industry from Wellhead to Burnertip," *Energy Law Journal* 9 (1988):1-57.

the service, the costs of viable alternatives, the degree of competition in the marketplace, and any unique regulatory objectives all have to be taken into account by the LDC and state PUCs.

Cost-Based Rates As the Basis of LDC Regulation

Prior to the unbundling of interstate pipeline services and the wide availability of open-access interstate transportation services, strong economic and technical justifications existed for regulating the LDC as a franchised monopoly. Accordingly, the prices of its services were set strictly on the allocated costs of providing such services. Clearly, cost allocation itself does not *determine* the actual costs of particular LDC services. It merely sets the individual customer's responsibility regarding the revenues needed to cover a certain proportion of the overall costs to the LDC for providing that service. After all, there are extensive economies of scale and scope in delivering gas from the citygate to the burnertip and in balancing and managing pipeline loads.³ Other activities, such as underground storage and supply integration also exhibit certain scale and scope economies even if competing suppliers for these services do exist within the local distribution market. There seems to be little reason to allow two or more LDCs to provide services in the same service territory.

A second technical factor that tends to favor the franchised monopoly approach is that local distribution services typically require the use of immobile and idiosyncratic assets that have very few alternative uses. Consequently, an explicit or implicit assurance of the continuing utilization of the distribution facilities and the recovery of costs associated with them is critical in preserving the economic viability of the LDCs. This assurance of continuing utilization also provides the

³ See Congressional Research Service, *Natural Gas Regulation Study*.

financial incentives for the LDCs to make essential investments to serve current and future core customers who have no alternative suppliers.⁴

The third technical factor for maintaining monopoly is the bundling of transportation services with commodity gas. This are few technical reasons to do so. This practice is a regulatory decision made by the FERC and state PUCs based on the paradigm of regulating pipelines and LDCs as public utilities. As a result of this bundling, there is no possibility for an LDC customer to buy gas from other entities. No alternative suppliers are available to the end-use customers within the service territory. Even if suppliers are available outside the service territory, it is very difficult and cumbersome for individual end users to arrange transportation services from the wellhead to the burnertip.

Current Pricing Practices for LDC Services

In return for having this exclusive rights of providing services within the service territory, the LDC is required to provide services with reasonable reliability to all customers who demand them. The prices of these gas services are also regulated by state PUC; they are generally set equal to the prudently-incurred costs of the LDC in providing these services. Some LDCs are allowed some flexibility in pricing certain gas services to their customers with fuel- and supplier-switching capability. Up to now, this has been used only in limited circumstances. For the most part, the rates are set according to the allocated costs of providing these services.⁵ This franchised-monopoly approach seemed to be a reasonable and efficient arrangement as long as the upstream markets were also tightly regulated and the LDC was not exposed to competition from alternative suppliers.

⁴ See Richard J. Pierce, Jr., "Intrastate Natural Gas Regulation: An Alternative Perspective," *Yale Journal on Regulation* 9 (1992): 407-16.

⁵ More detailed discussion on the use of flexible pricing can be found in Chapter Three.

Four steps are typically involved in setting the prices for LDC services: load studies and analysis (including the classification of customer groups), cost allocation studies, selection of rate objectives, and calculation of tariffs.⁶ There are extensive literature and quantitative models on preparing these studies, and they will not be repeated here. Essentially, an LDC at first needs to study its load characteristics and allocate the total costs (or revenues responsibility) among various groups of homogeneous customers. Once the classifications of various customer groups are decided, the rates are calculated and adjusted according to the allocated costs of providing local gas distribution services to specific groups of customers and the rate objectives set by the state PUC and LDC.

The purpose of the load study is to identify the characteristics of the various gas loads served by the LDC. The load studies are essential in designing distribution networks, procuring gas supplies and interstate transportation services, planning conservation and curtailment if necessary, and improving system operations. A cost allocation study *allocates* the cost of service to each customer class (group), and this "allocated" cost of service is probably the most important factor in setting the price of local distribution service. Rate objectives define the goals the state PUCs and LDCs intend to achieve through the pricing of local distribution services. The four primary objectives of public utility rates are: capital attraction, production efficiency, demand control or consumer rationing, and income distribution.⁷ Based on these four goals, specific rate objectives for an individual LDC may be developed. Not surprisingly, rate objectives often conflict with each other requiring state PUCs and LDCs to compromise and balance the contested issues.

⁶ See American Gas Association, *Gas Rate Fundamentals* (Arlington, VA: American Gas Association, 1987).

⁷ See Bonbright, *Principles of Public Utility Rates*.

New Market Trends and Their Consequences in the LDC Sector

As is widely recognized, there have been three major regulatory reforms in the natural gas industry over the last fifteen years: the wellhead price deregulation mandated in the Natural Gas Policy Act of 1978 (NGPA); the open access of pipeline transportation capacity initiated in FERC Orders 380, 436, and 500; and the pipeline service unbundling promulgated in FERC Order 636. These regulatory reforms have fundamentally changed the way natural gas is bought, sold, delivered, balanced, metered, and billed. During the period when the wellhead and interstate gas markets went through a drastic transformation, the local distribution market also underwent a less pronounced, but no less significant, evolution. The evolution of the local distribution market mirrored the transformation in the interstate market in many ways. Substantial increases in the amount of gas transported for end-use customers, intensive competition from pipeline and other LDCs, and the increasing popularity of more flexible prices characterized the evolution of the local distribution markets.

The implementation of FERC Order 636 has brought about additional changes in the local distribution markets. The effects of FERC Order 636 on the local distribution market are substantial and still unfolding.⁸ On the one hand, these changes provide further impetus for restructuring the local distribution market. On the other hand, the various provisions, such as the straight-fixed-variable (SFV) rates, have constrained the policy options of state PUCs. At the present time, two issues seem to be most important to the LDCs and state PUCs. One is the cost shifting from nonfirm to firm pipeline customers caused by the pass through of transition costs and the adoption of a new pipeline transportation rate design.

⁸ See Daniel J. Duann, *The FERC Restructuring Rule: Implications for Local Distribution Companies and State Public Utility Commissions* (Columbus, OH: The National Regulatory Research Institute, 1993).

Another is the intensifying competition brought about by the formal division of core and noncore markets and the substantial unbundling of distribution services.

There are two aspects to cost shifting in the local distribution market. One involves cost shifting from pipelines and producers to local distribution companies, and eventually to end-use customers. The second involves cost shifting from one customer group (such as large industrial customers) to another customer group (such as residential customers) within the local distribution market. The state PUCs and LDCs have little control over the cost shifting to the LDCs. They do, however, have considerable influence over the way additional costs are allocated within the local distribution market. A fair allocation of these costs represents a major objective of applying alternative pricing mechanisms.

The costs shifted to the LDC include both the transition costs incurred in pipeline service restructuring and the adoption of straight-fixed variable rate design for interstate transportation service. There are several estimates on the size of cost increase to the LDCs and their customers as a result of FERC Order 636. Given the nature of the transition costs and the number of interstate pipelines involved, it is difficult to obtain an independent and reliable assessment about the size of transition costs. Based on data provided by pipeline compliance filings through early 1993, the FERC estimated the total transition costs to be \$4.8 billion.⁹ A 1993 General Accounting Office (GAO) report indicated a total transition costs of \$5.7 billion.¹⁰ In any case, these costs are large.

The FERC Order 636 adopts a specific method of allocating transportation-related costs based on the demand characteristics of the customers. Under the straight-fixed variable rate (SFV), all fixed costs are included in the demand charge

⁹ See "Chair Moler Responds to House Energy Committee Questions about Order No. 636 and FERC Policies in General," *Foster Natural Gas Report* (March 18, 1993): 1-7.

¹⁰ See "Draft GAO Report on Cost Impact of Order No. 636 Projects \$400 Million Greater Cost Shift to LDCs and Their Customers Than FERC Forecasted," *Foster Natural Gas Report* (July 22, 1993): 1-4.

and all variable costs are included in the commodity charge. Compared with existing transportation rates, the SFV rate will increase the demand charge and lower the commodity charge. The costs of transportation services to the LDCs, which typically require firm transportation service and have low load factors, will increase and the customers of the LDCs, in turn, will face significant cost shifting. There is a wide range of estimates on the cost shifting of the SFV rate. The FERC estimated that it would cause an annual shift of \$800 million while the American Public Gas Association projected a cost shift of \$4.3 billion.¹¹ The GAO estimated that without any mitigation measures, the cost shifting would amount to \$1.2 billion per year.¹² In any event, the absorption of transition costs would undoubtedly be a considerable burden on the LDCs and their customers, at least over the next few years.

The second significant impact of FERC Order 636 on the local distribution market is the substantial increase in competition, especially for noncore customers. As indicated before, the trend toward more intensive competition in the local distribution market has been in place before the promulgation of FERC Order 636. But FERC Order 636 accelerated the process of moving toward competition. Up to now, competition in the local distribution market was largely manifested in the noncore distribution market. With the unbundling of pipeline services, fuel- and supplier-switchable customers are in an attractive position since they can aggressively purchase gas from sources other than the LDCs and still rely on the LDCs to provide services during peak period when gas supply is tight. Furthermore,

¹¹ See "GAO Skeptical of FERC's Anticipated Order 636 Benefits, Impacts," *Inside F.E.R.C.* (July 19, 1993): 1, 11-13.

¹² *Ibid.*

with the new SFV transportation rate, the noncore customers, with their load characteristics (high-load factor and more use of interruptible services), will tend to have a lower total cost for transportation services. This, in turn, will encourage noncore customers to buy more gas directly.

Limitations of the Total Unbundling Approach

The federal regulatory reform of the interstate gas market is often mentioned as a possible paradigm for restructuring the local distribution market. Obviously, some lessons can be learned from the federal regulatory reforms. But given the inherent differences between interstate and local distribution markets, a verbatim and uniform implementation of the same total unbundling approach in the local distribution market would be problematic.

First of all, the customer base of a typical LDC is much more diversified than that of a typical interstate pipeline. There are considerable differences in the customers' ability and incentives to buy gas directly or to arrange transportation and backup services. The customer base of the interstate market is relatively homogeneous and customers have similar ability and economic incentives to obtain gas from several competing suppliers. However, the customers in a local distribution market are quite diverse with significant differences in their ability and economic incentives to procure gas and transportation services. Part of the local distribution market is competitive, but other parts of the market may not be competitive at all.

The second inherent difference between the interstate and local distribution market is the degree of competition that potentially can be achieved under existing gas delivery infrastructure. It is generally understood that, under the existing physical infrastructure, the physical distribution of gas (or the intrastate transportation) is less competitive than the interstate transportation of gas. Specifically, the extensive interstate transportation network that was originally

constructed to connect interstate pipelines with a large number of gas supply sources would lead to a network connecting with many customers. This close interconnection between suppliers and customers would lead to more competition among interstate pipelines.¹³ In contrast, the intrastate transportation network is designed to connect all customers with only one supplier — the LDC.

In addition to these two inherent differences, the significant cost shifting that has to be allocated among the LDC's customers also restrains the applicability of the total unbundling approach. As a result of the restructuring of interstate and wellhead markets, the LDCs are facing significant cost increases. More importantly, the LDCs have to allocate these costs to their customers, some of whom may not be able to pass through the cost increase to anybody else. These new costs include the costs of rearranging supply contracts with producers, adding new facilities for unbundling services, and abandoning some existing facilities. The pipelines can pass through these costs to their customers, especially to the firm-service and low load-factor customers such as the LDCs. In contrast, an LDC has to either absorb some of the transition costs or allocate all costs among its customers. This will definitely induce some customer bypass or switch from core bundled services to transportation-only service, which, in turn, will create additional cost-shifting pressure to the remaining core customers. Even though the pipelines are also likely to experience customer bypass or switching to interruptible transportation services, the need to find alternative ways to deal with cost shifting is considerably less in the interstate market than in the local distribution market.

For these reasons, the restructuring and pricing of local distribution services, in many aspects, is more difficult than the restructuring and pricing of interstate gas services. Some division of the LDC's customer base is unavoidable and a

¹³ David B. Hatcher and Arlon R. Tussing, *State Regulatory Challenges for the Natural Gas Industry in the 1990s and Beyond* (Columbus, OH: The National Regulatory Research Institute, 1992).

uniform regulatory approach that applies to all customers seems infeasible. So even if it is very tempting to apply the same total (mandatory) unbundling approach to the restructuring of local distribution services, the unique nature of the local distribution market has significantly constrained the usefulness of this approach.

In summary, the fundamental changes in the local distribution market over the last fifteen years have clearly indicated the need for developing and applying new regulatory paradigms. One possible alternative is a complete and mandatory unbundling of local distribution services, in the same mode as the unbundling of pipeline services. This regulatory approach has some advantages. But these advantages are clearly outweighed by the disadvantages associated with its implementation. Consequently, the development and implementation of some alternative pricing mechanisms must be given serious consideration.

Limitations of the Franchised Monopoly Approach

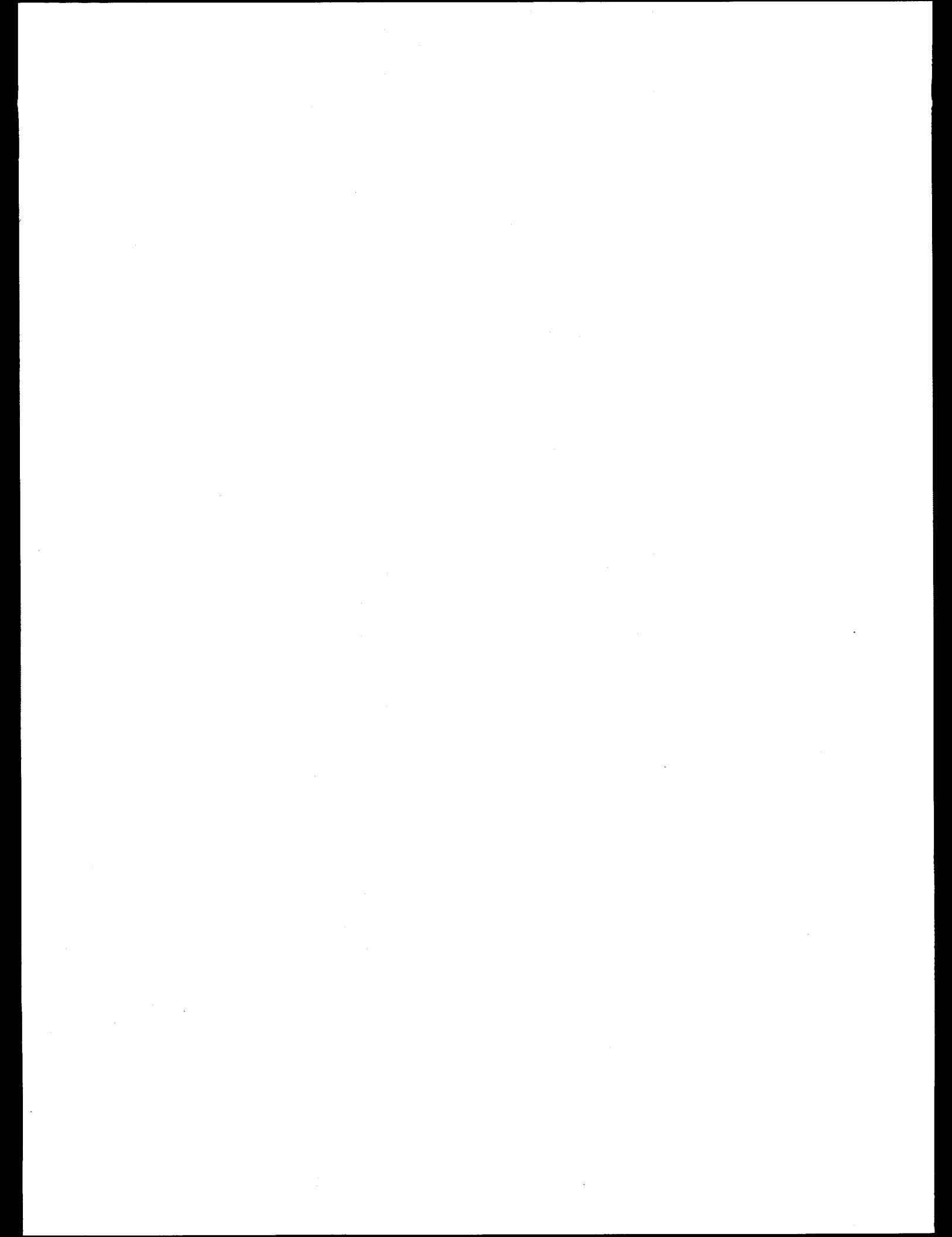
As the total unbundling of local distribution services is infeasible, one alternative is to continue the current "franchised monopoly" approach and set the prices of local distribution services strictly on the basis of embedded cost. But this approach also contains some serious problems when applied in an increasingly competitive local distribution market. These difficulties include the erosion of customer base, the drastic increase of gas service costs to core customers, and under-utilization of existing facilities and supplies. In other words, without some pricing reforms and pricing flexibility, the LDC will not be able to compete with other service providers in serving those fuel- and supplier-switchable customers. As these customers leave the local distribution system, core customers may be required to bear all or most of the costs of under-used gas supplies and transportation facilities.

The continuation of traditional embedded cost-based pricing mechanism in a largely competitive market is likely to lead to inefficient and inequitable results that

are detrimental to most, if not all, end-use customers. Specifically, four inefficient outcomes may arise. First, the use of transportation-only service may be unduly restricted. Customers who are likely to use transportation-only services if these services are available and provided at a lower price than their embedded costs, will choose not to use the transportation-only services under traditional cost-based regulation. Second, uneconomic bypass by some noncore customers may occur as the LDC's transportation services are priced too high. Those customers that have a more economical source of gas supply but not necessarily the most economical way of transporting the gas may choose to bypass the LDC completely.

Third, due to uneconomic bypass and the reduction of demand for transportation-only services, the distribution facilities and gas resources owned by the LDC would be less utilized. Fourth, because these facilities and resources have few alternative uses, the costs associated with them must be borne by the remaining customers if the financial viability of the LDC is to be maintained. The core customers are therefore likely to face a higher cost for bundled gas services than they otherwise would. The franchised-monopoly regulation and its associated cost-based rates are clearly incompatible with a local distribution market where both competition and monopoly coexist. The cost-based rates have to be replaced totally or, as argued below, they have to be revised or used in combination with other pricing mechanisms.

In summary, cost-based regulation in a restructured local distribution market will lead to inefficient and inequitable results. An extreme case would be the so-called "death spiral" where only a small number of core customers are left on the system and the LDC eventually loses the ability to provide gas service to any customer at reasonable cost and high service reliability.



CHAPTER 3

CRITERIA FOR DEVELOPING ALTERNATIVE PRICING MECHANISMS

Increased competition and significant cost shifting have undoubtedly created very favorable conditions for the development and implementation of alternative pricing mechanisms in the local distribution market. There is no assurance, however, that this reform process will be smooth and successful. In reality, the state PUCs and LDCs need to consider several conflicting goals at the same time; and an emphasis on one regulatory goal may reduce the effectiveness in achieving others. The economics literature and the current practices of some state PUCs suggest four criteria in the development of alternative pricing mechanisms for local distribution services.¹ They are the provision of proper price signals (economic efficiency), the fair allocation of costs (equity), the control of enforcement costs and additional legal and regulatory requirements (implementation), and the accommodation of specific regulatory objectives (flexibility).² Economic efficiency and equity are considered primary regulatory objectives while feasibility of implementation and flexibility are relegated to secondary importance.

The Provision of Proper Price Signals

One fundamental reason for using alternative pricing mechanisms is to correct the distortions created by applying cost-based regulation in a competitive

¹ See, for example, Robert E. Burns et al., *State Gas Transportation Policies: An Evaluation of Approaches* (Columbus: OH: The National Regulatory Research Institute, 1989), and Mohammad Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies Under Changing Industry Structure* (Columbus, OH: The National Regulatory Research Institute, 1991).

² Other objectives of pricing local distribution services include the following: achieving the revenue requirement, simplicity and administrative ease, conservation of resources, rate stability, environmental protection, balance of payments, employment, and social goals.

market. Alternative pricing is used to enhance the effectiveness of price signals. In other words, a desirable pricing mechanism will allow the LDC and end-use customers to make economically efficient production and consumption decisions. The provision of proper price signals is an important criterion for state PUCs because the greatest efficiency improvement to be gained in the local distribution market may come from pricing efficiency.

The easiest way of providing proper price signals is to simply deregulate the local distribution market and let a competitively-determined price prevail. The LDC and end-use customers can make their decisions accordingly. This is a valid approach as long as the underlying market is "workably" competitive or contestable and remains so for an extended period of time. The existence of a large number of core customers who have no viable alternative to LDC-supplied services means not all segments of the local distribution market are competitive or can be made so. Deregulation as an alternative to cost-based regulation may be limited to only a few local distribution services. Cost shifting and the concern for fair allocation of these costs may diminish the desirability of total deregulation in the local distribution market. After all, if the local distribution market is deregulated, the core customers may be forced to pay more of the fixed costs associated with the local distribution system.

There is no one clear definition on what constitutes a *proper* price signal in a market characterized by both competition and monopoly. The term "proper" as used here, does not mean a best price (such as marginal price or Ramsey price) that can maximize economic efficiency. Rather, a "proper" price signal refers to a price that is reasonably efficient and equitable in light of the imperfection of the particular market and any other institutional constraints. By using this definition, it can be argued that in a monopoly market, the cost-based rate can be viewed as the *proper* price signal. In a competitive market, the market price is a *proper* price signal. Then the question becomes: What is a good proxy for the competitively-determined market price if a competitive market does not exist? Under this

circumstance, any price between these two price levels can be viewed as a proper price signal for a market characterized by both competition and monopoly. One example is the negotiated price for gas sales to an industrial customer with a good transportation interconnection.³ Generally, the price for this customer is lower than the embedded cost with the discount decided by the negotiation positions of the LDC and the industrial customer. This is a proper price signal as it allows an economically-efficient decision to be made under imperfect market conditions.

The implications of a proper price signal are threefold: to facilitate economic bypass or transportation-only services, to prevent uneconomical bypass, and to promote better utilization of the distribution facilities and LDC-owned gas supplies. In addition to buying bundled distribution service from the LDC, end-use customers have two choices in obtaining gas from other entities. They can either build their own connection line to the citygate, or they can contract with the LDC for transportation services. Under traditional cost-based regulation, the LDC typically sets a transportation rate that is higher than the LDC's marginal cost of transportation. Then it is quite likely that some end-use customers may choose to buy bundled gas from the LDC even if cheaper commodity gas is available from other providers. An opportunity for economic bypass is not realized.

Alternatively, with a high transportation rate, the end-use customer may choose to build its own distribution connection even if its costs are higher than the marginal transportation cost of the LDC. This is a case of an uneconomic bypass that should not occur but does anyway because of inadequate pricing. In both cases, the total cost for society as a whole (or more narrowly defined, for the LDC and the end user combined) in delivering gas to that particular customer is certainly higher than it otherwise would be.

³ Clearly, this assumes that both sides of the negotiation are in relatively equal positions and have extensive, if not perfect, knowledge about the other side's alternatives and preferences.

Uneconomic bypass will lead to the under-utilization of the LDC's existing distribution facilities and gas supply sources. This in turn will create an additional cost allocation problem as the noncore customer makes no contribution to the fixed costs of the LDC. Over an extended period of time, the financial health of the LDC may also be adversely affected.

The Fair Allocation of Costs

The fair allocation of costs is the second criterion for developing alternative pricing mechanisms. Under alternative pricing, the prices of certain local distribution services to some end-use customers will definitely deviate from the LDC's fully allocated costs. A cost allocation problem will naturally occur. In this situation, someone has to make up the shortfalls between the fully-allocated costs and the discounted prices offered to those fuel- and supplier-switchable customers.⁴ Either the LDC or the other customers or both have to absorb this price difference. In all likelihood, based on current regulatory policies, it is unlikely that the LDCs will be required to absorb a large part of the revenue shortfalls.⁵ In the end, core customers, with no alternative but to buy gas from the LDC, are likely to absorb a large portion of the price difference.

The concern for cost allocation is further complicated by large transition costs and cost shifting caused by the SFV pipeline transportation rate. Then, in addition to making up the price discounts offered to other customers, core customers are also required to pick up a large majority of the new costs incurred.

⁴ Another possibility, though very unlikely in the current local distribution market, is that the market price for some customers may turn out to be higher than the embedded cost. Then the issue becomes how to allocate the profit between the LDC and its core customers.

⁵ Up to now, most state PUCs tended to allow the LDCs to make up the revenue shortfalls from core customers based on the belief that core customers benefit from the retention of these noncore customers. Some exceptions do exist and states are increasingly looking into sharing mechanisms to provide incentives to the LDCs to reduce the amounts of revenue shortfalls.

Thus, the key question is not whether the "price discounts" should be offered to noncore customers, but what are the limits to such a price discount. There is no universally-accepted definition of a "fair" price discount.

Two guidelines may be suggested here. First, the prices for services provided to noncore customers should at least cover the marginal costs of providing these services.⁶ Otherwise, the LDC and the core customers are better off for not providing services to the noncore customers. A price lower than the LDC's marginal cost will also generate inefficient gas production and consumption decisions that are detrimental to society at large. Second, if the costs of alternative suppliers or fuels can be determined with a high degree of certainty, the discounted price should track the costs of the best alternatives as closely as possible provided that these costs are higher than the LDC's marginal cost. By equating the discounted price with the "opportunity cost" to the noncore customers, these customers have indeed contributed to their "fair" shares of the fixed cost of the LDC system. Actually, everybody benefits under this pricing guideline: the noncore customers can obtain gas services at the lowest possible costs, the LDC's distribution facilities and gas supplies are used to an economically-justified level, and the cost burden to core customers are minimized.

The Costs and Feasibility of Implementation

The third criterion is the control of costs and additional implementation requirements for using alternative pricing. The traditional cost-based regulation (or more specifically the proceeding of a full-blown rate case) is typically a deliberate process with a large number of substantive and procedural requirements to insure openness and impartiality. This is sometimes referred to as the "due process"

⁶ See J. Stephen Henderson and Robert E. Burns, *An Economic and Legal Analysis of Undue Price Discrimination* (Columbus, OH: The National Regulatory Research Institute, 1989).

requirements. There are many other procedural requirements for public utility regulation, but these will not be discussed here. Openness and impartiality are certainly desirable goals of utility regulation. But these and other requirements also impose considerable costs on all participants. The state PUC, the LDC, and the ratepayers all need to devote resources to protect the integrity of the process, as well as their particular interests. Additionally, cost-based pricing is largely a fact-finding process under which a lot of accounting and economic data are recorded, analyzed and contested. This also contributes to the high administrative costs of cost-based regulation.

Reducing the costs associated with utility regulation has always been one of the objectives of regulatory reform in general and pricing reform in particular. The local gas distribution market is no exception. Many of the alternative pricing mechanisms proposed are intended to reduce the costs of regulation. But alternative pricing mechanisms may entail up-front costs and requirements for implementation. For example, under existing institutional arrangements, the application of alternative pricing usually requires some extensive policy review by state PUCs to justify the selection of specific pricing policies or new legislative actions to authorize the state PUCs to take the necessary steps. Furthermore, alternative pricing may require the calculation of benchmark costs or price limitations even if it no longer needs these accounting cost data.

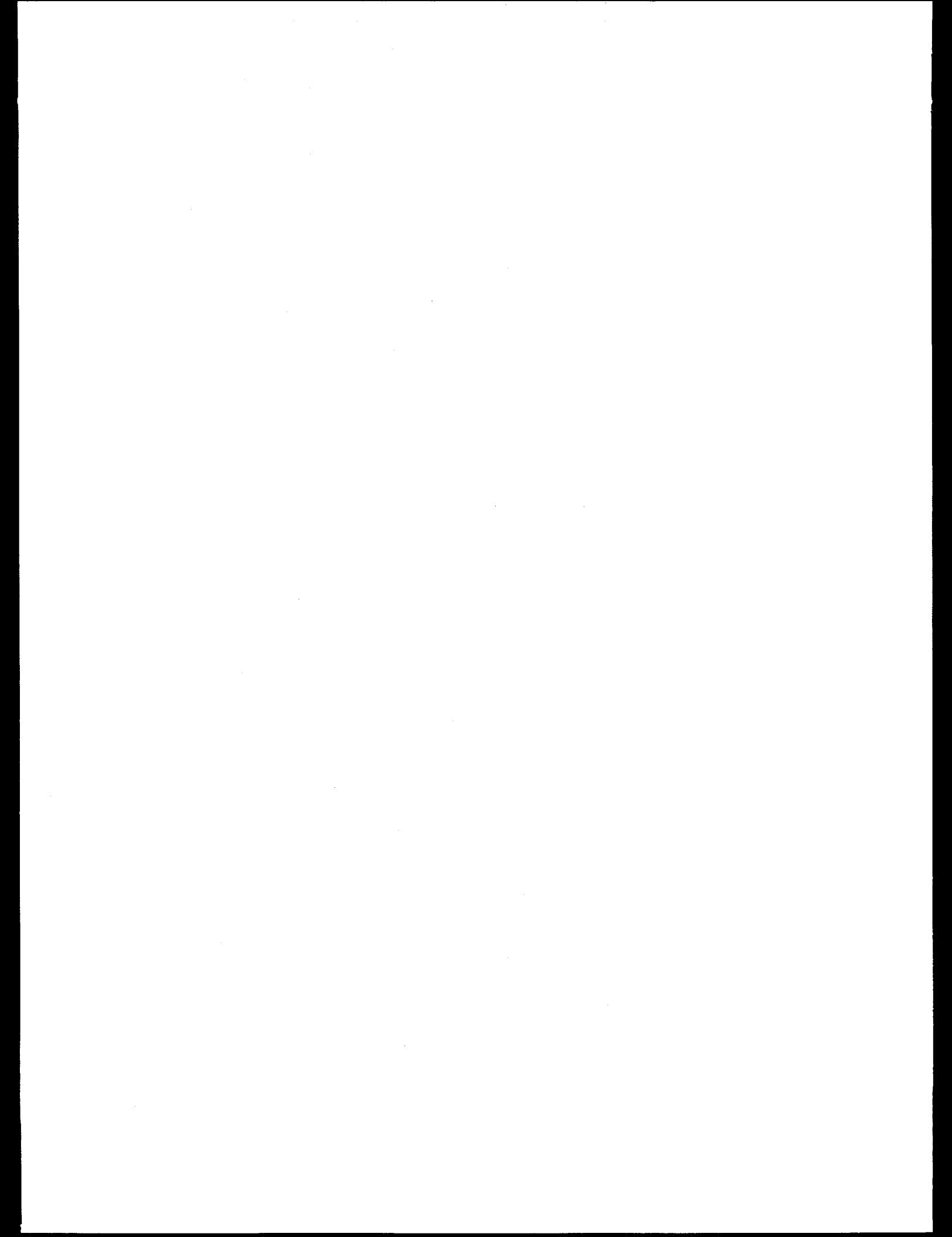
Specifically, the implementation of alternative pricing can be reviewed through its impact on the following factors: the frequency and scope of the traditional rate case, new cost and price targets, the changes of existing cost-based regulatory tools such as prudence reviews and PGA proceedings, the requirement for additional legislative authorization and regulatory review. It is worth noting that the increased costs of implementation and the additional legislative and regulatory requirements are usually conflicting. In other words, a pricing mechanism (such as deregulation or price caps) that can reduce the long-term cost of implementation

usually requires more drastic changes to the current regulatory framework which, in turn, will require substantially more legislative and regulatory actions.

The Accommodation of Specific Regulatory Objectives

The flexibility of incorporating other regulatory goals is the fourth criterion. As indicated before, a specific alternative pricing mechanism has to grapple with conflicting regulatory goals and some compromises have to be made. It is also worth noting that the state PUCs, in setting the prices of local distribution services, may also consider other regulatory goals that lie beyond the scope of economic efficiency and equity in the local distribution market. For example, the state PUC may want to promote the use of natural gas vehicles or state economic development. In many instances, these regulatory objectives are mandated by the legislature.

Actually, one of the alternative pricing mechanisms, flexible pricing, explicitly considers the incorporation of other regulatory goals in pricing local distribution services. No general rules on the interaction between the main objectives of alternative pricing and other regulatory goals are apparent. Consideration of the regulatory flexibility associated with a specific alternative pricing policy depends on the specific policy and other regulatory goals being considered. Nevertheless, pricing policies for local distribution services cannot, and should not, be set in a vacuum. In addition to the unique demand and supply conditions of the LDC, other regulatory objectives should also be considered.



CHAPTER 4

THREE ALTERNATIVE PRICING MECHANISMS

As more upstream markets are deregulated, pipeline services unbundled, and open and comparable access to transportation capacity widely available, it is becoming increasingly difficult to continue insulating the LDC from competition. In many local markets, a qualified customer has the option of buying commodity gas from any entity it chooses and ask the LDC to transport the commodity gas for a fee. Many customers, especially the large industrial and commercial customers, do exercise this choice of direct purchase when they can do it economically.

The significant cost shift caused by the unbundling of pipeline services is an additional impetus for re-examination of the validity of cost-based rates. Under traditional cost-based regulation, all customers of the LDC are expected to share equally the cost shift from pipelines to LDCs. Those core customers that have to rely on the LDC for gas services may have no choice but to accept the cost increase. But many fuel- and supplier-switchable customers may decide to arrange their own gas supply and transportation rather than facing a cost increase. Such a switch is beneficial to noncore customers. However, it also eliminates their share of contribution to the fixed costs of the LDC system. The cost of service to the remaining customers who choose to stay on the system will further increase. A new round of customer switch and flight may ensue. In the end, only the residential and small commercial customers are left; they are charged an extremely high price for bundled gas service. This gives way to the argument that the LDC should be allowed some pricing flexibility so that it can offer "price discounts," which deviate from the cost-based rates, to these noncore customers seeking other providers.

A number of alternatives to cost-based pricing have been suggested and implemented.¹ Two examples are economic development rates offered by many LDCs to attract new businesses into their own service territory and load-retention rates made available to those customers with dual-fuel or alternative-supplier capability. This study will consider three broad categories of alternative pricing mechanisms that are most relevant to the conditions of the local distribution market. Each broad category may contain several specific pricing policies. The basic format and rationales of these alternative pricing mechanisms are discussed in this chapter while their application to specific local distribution services is presented in Chapter Five.

Value-Based Pricing

One alternative to cost-based rates is to set the prices of gas services based on the "value" perceived by customers. From the perspective of economic efficiency, the "value" is definitely a better measurement of the "true cost" (or opportunity cost) of using scarce resources for the society as a whole. Actually, if "value" is interpreted as the customers' "willingness-to-pay," a value-based price is equivalent to a price set in a competitive unregulated market.

There are, however, some complexities in applying value-based pricing to public utility regulation, in particular the regulation of local distribution services. First of all, "value" is a subjective measurement, which is quite difficult to identify and quantify especially in the absence of a market-determined prices that can be used as a proxy for values. Then the "value" of utility services has to be measured or imputed by a regulatory agency. In directly measuring the customers' willingness-to-pay, the possibility of misrepresentation and manipulation is high.

¹ See, for example, Mohammad Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies Under Changing Industry Structure* (Columbus, OH: The National Regulatory Research Institute, 1991).

Those customers who value the utility services the most may not reveal its true valuation and may not necessarily pay the highest prices as the value-based pricing mechanism originally intended. In contrast, most cost data (at least the accounting kind) are clearly-defined and recorded. It is much easier for the state PUCs to ascertain the total costs of providing utility services, at least for the utility as a whole. Obviously, state PUCs still face many difficult issues in fairly allocating the costs to various customer groups.

The second problem of value-based pricing is the great variations in the valuation of service perceived by different customers. The application of a value-based pricing mechanism will mean significant price differentials among different customers even if the costs of serving these customers are roughly the same. This seems to be an apparent violation of one of the widely-held principles of public utility regulation — rates should not be unduly discriminatory. In other words, some justifications must be provided to support the difference in prices to different customers for the same utility service. Indeed, price discrimination can be justified in a number of circumstances.² They include the abilities to pay for such services and the values perceived in using these services.

One of the basic rationales for considering alternative pricing is to use price discrimination to allocate resources to those who value them the most. But the possibility of misrepresentation and the high costs of directly measuring values has rendered value-based pricing less attractive. In reality, deregulation may be a better alternative than a strictly-applied value-based pricing. This may partly explain why value-based pricing is not widely used at the present time even if there are theoretical advantages. However, variations of the value-based pricing mechanisms may be useful and occasionally have been incorporated into other forms of utility regulation.

² See J. Stephen Henderson and Robert E. Burns, *An Economic and Legal Analysis of Undue Price Discrimination* (Columbus, OH: The National Regulatory Research Institute, 1989).

One variation of value-based pricing is especially useful for pricing local distribution services that are competitively supplied by the LDC and other gas service providers. It involves the re-definition of the term "value." Specifically, the term "value" should be interpreted as the costs of the best alternative available to the end-use customers rather than a subjective valuation perceived by the users of LDC services. In other words, the prices of distribution services provided to a fuel- or supplier-switchable customers are set, not by the costs of providing these services, but by the costs of using competing fuels and suppliers. By using this alternative definition of "value," the two difficulties identified above can be considerably alleviated.³

From the perspective of a noncore customer, the valuation of distribution services provided by the LDC can be no higher than the costs of obtaining the same services from another supplier or using alternate fuels. For this customer, its willingness-to-pay for services provided by the LDC is therefore limited by the costs of alternative suppliers and fuels. Otherwise, the customer can simply bypass the LDC system completely and buy gas from another supplier or use a different fuel. If the "value" refers to the cost of the best available alternative, then the concern for undue price discrimination can be largely alleviated because all customers are free to pursue other alternatives to the LDC's services. Those customers who have more and better alternatives are entitled to a lower price for services provided by the LDC. Another advantage of this interpretation is the certainty and feasibility of measuring the "value" of distribution services. After all, the costs of alternative suppliers and fuels are readily observable market information. Therefore, very few possibilities exist for misrepresentation or manipulation. The costs of obtaining these data are also comparably lower than the costs of directly measuring the customer's willingness-to-pay.

³ Clearly, there may still exist some problems concerning the verification of specially situated customers who will claim access to resources at better than the "market" price due to locations or volumes.

Performance-Based Pricing

The second alternative to cost-based pricing is performance-based pricing. Under this approach, the prices of local distribution services are set, not by the costs of providing the services or some observed or imputed values of the services, but by the LDCs performance in relation to some predetermined performance targets. A performance-based pricing mechanism is sometimes referred to as incentive pricing. The basic rationale for performance-based pricing is that the regulated utilities usually have better information than the regulators. The primary function of utility regulation is to align the interests of a utility with the interests of its ratepayers or to overcome the information asymmetry with more stringent oversight and reporting requirements.⁴ Regulators should not attempt to take on the role of utility managers because they typically do not have the same amount of information or the same economic incentives as the utility managers.

In a sense, all forms of utility regulation provide incentives for specific utility behaviors. Therefore, they can be viewed as variations of incentive regulation. Then the question is not whether incentives should be used or not but what kind of incentive should be used and whether the induced utility behaviors are compatible with market conditions and regulatory objectives. Various forms of traditional cost-based regulation, including rate cases, purchased gas adjustments, prudence reviews, and least-cost planning all contain some incentives for cost minimization even though, as many would argue, these incentives are either weak or distorted.⁵ For example, the embedded cost-based proceeding can provide two kinds of cost-minimizing incentives. On the one hand, the close examination and record-keeping

⁴ See Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies*. An extended discussion of the application of incentive regulation to the electric and natural gas industry can be found in Lorenzo Brown et al., *Incentive Regulation: A Research Report*, Office of Economic Policy, Federal Energy Regulatory Commission, November 1989.

⁵ See Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies*.

requirement used in the extended hearing process may force the utility to submit rate filings that do not appear to contain exorbitant cost components. This will assure that a utility's operation is reasonably efficient and costs prudently incurred.⁶ On the other hand, the time lags between rate hearings also provide incentives for cost minimization. Once a rate case is completed, the rates remain in effect until the next rate case. During this period between rate cases, the utility can maximize its profits by keeping costs as low as possible. Other forms of cost-based regulation also contain their own specific cost-minimization incentives.⁷

As the upstream gas markets become increasingly competitive and the LDCs and their customers are having more opportunities to buy gas directly and arrange their own transportation, the incentive problems for a utility to perform efficiently under cost-based pricing become apparent. This underscores a real need to explore some forms of performance-based pricing. Three kinds of performance-based pricing are most relevant to the competitive nature of the local distribution market. They are price caps, cost indexing, and flexible rate-of-return. These performance-based pricing mechanisms are usually combined with some components of the cost-based pricing mechanism. Also, these pricing mechanisms may be useful for only one segment of the local distribution market or one particular cost component.

Price Caps

Price caps is probably the most well-known form of performance-based pricing mechanisms. It is used primarily in the telecommunication industry. But more recently, it started receiving some attention in the electric and natural gas

⁶ See James C. Bonbright, *Principles of Public Utility Rates* (New York: Columbia University Press, 1961).

⁷ See Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies*.

industries. It is generally agreed that this pricing mechanism is especially useful in an industry with rapid technological advances and cost reductions. There are some concerns about its applicability to the natural gas industry where the technologies of gas production, transportation, and distribution are relatively stable.

Price caps refer to a regulatory mechanism whereby prices of specific utility services are permitted to change without a formal rate review. The prices charged by a utility are restricted by indices reflecting cost changes for some broadly-based units such as the utility industry as a whole, the general economy, or a regional average.⁸ The proponents of price-cap regulation argue that this form of regulation is particularly suitable to an industry characterized by partial monopoly and partial competition. It was suggested that price caps can improve the efficiency of utility services in several different ways.⁹ First, the utility can improve its pricing efficiency as the utility has more flexibility to change its prices in line with market conditions. Second, price caps, by decoupling the prices charged and costs incurred over an extended period of time, provide a stronger incentive for reducing costs than traditional cost-based regulation. Third, price caps may reduce administrative costs to both regulators and utilities as the number of rate cases declines.

Price caps can be a useful regulatory tool in pricing certain local distribution services. However, there are a number of issues that need to be addressed before its application. The more important ones include the selection of the types of services covered under price-cap regulation, the setting of the initial prices, the

⁸ The exact format and components of price caps vary, of course, with different state PUCs and LDCs. There is no one universally-accepted formula. A more detailed discussion of the rationales, evolution and application of price caps regulation can be found in Brown et al., *Incentive Regulation: A Research Report*.

⁹ See Harunuzzaman et al., *Incentive Regulation for Local Gas Distribution Companies*.

price adjustment indices, and the length-of-time between formal rate cases.¹⁰ A detailed discussion of the application of alternative regulatory mechanisms, including price caps, to specific local distribution services is included in Chapter Four.

Some general observations on the limitations of price caps in these particular markets have been suggested.¹¹ First, the improvement of production efficiency by LDCs may be rather limited as there would be only very few opportunities to adopt new technologies for local gas distribution. Furthermore, price caps may not necessarily simplify the regulatory process or reduce the administrative costs of regulation — at least not initially. This is because a new regulatory mechanism would tend to require extensive policy development and data collection and analysis. Lastly, a price caps approach may be politically unpopular since, by severing the linkage between future price ceiling and profits earned in earlier period, an LDC may earn "excess" profits over an extended period of time.

Cost Indexing

Cost indexing is a performance-based pricing mechanism that applies primarily to the pricing of commodity gas. In general, the market for commodity gas is quite competitive and there is little, if any, need to impose regulation in this particular market segment. However, there are still many residential and small commercial customers that will prefer to buy bundled distribution services from the LDC. This bundled service will, in large part, continue to be subject to cost-based regulation. Then there is definitely a need to provide some incentives or regulatory oversight to induce the LDC to minimize its gas procurement costs. The

¹⁰ Ibid.

¹¹ Ibid.

importance of providing a gas procurement incentive is further enhanced by the fact that gas commodity cost currently accounts for over 60 percent of the total cost of bundled distribution service.

Under this pricing mechanism, a target level for commodity gas cost is set and a rewards and penalties sharing factor is chosen. A target cost (benchmark cost) provides the LDC with an incentive to beat the target by minimizing its gas costs. A number of different methods are available in establishing the benchmark cost, and each of these methods has its own unique advantages and weakness.¹² One way of setting the benchmark cost is to first determine an optimal gas supply portfolio in serving the LDC's customers and then to calculate the minimum costs for building this supply portfolio.

The basic function of a sharing mechanism is to moderate the effects of the benchmark cost in order to accommodate other regulatory goals. In the case with "no-sharing," the LDC has the strongest incentive to reduce commodity gas cost, with risk completely shifted away from the ratepayers to the LDC. At the same time, however, the ratepayers do not share any of the benefits gained from the efficiency improvement of gas procurement. If a "total-sharing" mechanism is used, then the LDC does not share any benefits or risks associated with gas procurement. This cost-indexing mechanism is no different from cost-plus regulation. A sharing mechanism also has the benefit of assuring the financial viability of the LDC by allowing the LDC to pass through some of the excess costs to the ratepayers. It is difficult to determine a so-called "optimal" sharing factor, but a sharing factor of 0.9 or 0.8 may be reasonable. Factors within this range have been used in some existing cost indexing programs.¹³ For example, New York allows electric utilities to retain 20 percent of the savings, and Wyoming allows the LDCs to keep up to 10 percent of the gas cost reduction.

¹² Ibid.

¹³ Ibid.

Another element of the cost indexing mechanism is the length of time (rate period) between rate adjustments.¹⁴ Since the rates cannot be adjusted during the rate period, this provides a strong incentive for the LDC to reduce costs. A short rate period tends to reduce the incentive for cost reduction while a long rate period may put the utility's financial viability at risk, or allow the utility to make windfall profits if the price and cost fluctuations are persistently out of sync with cost recovery.

Flexible Rate-of-Return Pricing

The flexible rate-of-return pricing mechanism allows an LDC to permanently retain all profits earned within some pre-specified range. Under this regulatory mechanism, the initial prices are determined by the traditional cost-based regulation. But instead of setting a single allowed rate of return, a range of rate of return is specified. If the LDC achieves a rate of return higher than the prespecified range, the prices charged by the LDC will be lowered. On the other hand, if the LDC fails to reach the pre-specified rate-of-return, the prices can be raised. As an incentive for controlling costs, the LDC is required to absorb part of the excess and deficient rate of return.

The range of acceptable rate-of-return and the sharing parameter for excess and deficient profits are the two key elements of this pricing mechanism.¹⁵ The flexible rate-of-return pricing mechanism is very similar to the cost-indexing mechanism. But it is probably easier to understand and implement since the targeted rate-of-return is usually easier to set than the targeted cost, which may depend on the development of a complex gas supply portfolio and projection of

¹⁴ Ibid.

¹⁵ See Edwin Rosenberg et al., *Contract Pricing of Electric and Telephone Service: Current Practice and Policy* (Columbus, OH: The National Regulatory Research Institute, 1992).

future gas commodity costs. The disadvantage of flexible rate-of-return pricing is the absence of a component for improving pricing efficiency as this alternative pricing mechanism only deals with the overall profit level of the LDC. There is no component, unlike price caps, that allows the LDC to adjust its prices in response to competition from other service providers.

Flexible Pricing

In addition to value-based pricing and performance-based pricing, a third alternative pricing mechanism is flexible pricing (nontariffed pricing). Under this pricing mechanism, no specific set of pricing rules is used. Instead, the public utilities and individual customers are allowed to negotiate contracts or special tariffs with service terms and prices different from those contained in existing tariffs.¹⁶ The negotiated prices may deviate from traditional cost-of-service standards. Furthermore, the negotiated prices are typically the products of bilateral negotiation and are not subject to the same degree of scrutiny applied to regular tariffs. In order to prevent abuse and to maintain regulatory integrity, this kind of flexible pricing is typically effective only for a specific period of time. Once the specific regulatory objectives are achieved, a regular tariff, whether it be cost-based or not, may replace the negotiated price.

Flexible pricing allows the public utilities to react more quickly and flexibly to competition from other entities and to achieve specific regulatory objectives without an extensive overhaul of current tariffs or regulation. Flexible pricing has been used extensively in the telecommunications and electric industries. There are several types of flexible-pricing mechanisms aimed at achieving different regulatory goals. One is economic development rates that are used to encourage a customer to locate within the service territory or to promote expansion or increased use of

¹⁶ Ibid.

existing facilities. The second one is load retention rates which are designed to retain sales to customers with competitive alternatives. The third one is interruptible rates that offer utility services at rates lower than the regular firm-service rates to those customers willing to have their services interrupted or curtailed. The last one is special contracts that are developed to accommodate usual and/or new services and load characteristics for which there is no sufficient demand to justify establishing a tariff.¹⁷

Flexible pricing can become a useful tool in pricing local distribution services. The characteristics of the future local distribution market fit nicely with those commonly associated with flexible pricing, namely increased competition associated with a large number of fuel- and supplier-switching customers, the continued presence of a declining but still substantial number of core customers for whom alternate sources are not feasible, and the rigidity of LDC's capital investments and supply contracts.

¹⁷ Ibid.

CHAPTER 5

ALTERNATIVE PRICING FOR LOCAL DISTRIBUTION SERVICES

In devising the proper alternative pricing mechanisms for specific local distribution service, it is essential to examine both the features of alternative pricing mechanisms as well as future developments in the local gas distribution market. Based on the extent of service unbundling and restructuring in the wellhead, interstate, and the present local distribution market, the basic characteristics of the five segments (commodity gas, firm transportation, interruptible transportation, auxiliary distribution services, and bundled sales services) of the local distribution market can be identified.¹

There are significant variations regarding the possible extent of competition (primarily the number of potential suppliers) in the various market segments. In addition, the allocation of restructuring-related costs, the transaction costs associated with service unbundling, and the complexity of implementation, all show some degree of differences among the five market segments. The discussion in previous chapters has clearly indicated that different alternative pricing mechanisms would have their specific advantages and weakness when applied to the various market segments.

Consequently, almost all major alternative pricing mechanisms can be applied to at least one segment of the local distribution market. Specifically, it can be argued that the commodity gas market within the local distribution market should be deregulated, and the bundled services to core customers would be best regulated under a cost-indexing incentive mechanism. Firm transportation capacity

¹ A more detailed discussion on the likely development of local distribution market in the future can be found in Daniel J. Duann, *Restructuring Local Distribution Services: Possibilities and Limitations* (Columbus, OH: The National Regulatory Research Institute, 1994).

should still be priced based on the cost of providing this service, while price caps and flexible pricing seem to be the preferred pricing policies for interruptible transportation and other auxiliary services. It can be expected that not every local distribution market matches the characteristics identified here, but the preferred alternative pricing mechanism suggested here can still be used as useful guidelines.

The New Structure of the Local Distribution Market

After the substantial federal and state regulatory reforms of the natural gas industry in the last fifteen years, the trends toward unbundled services and equitable transportation access have been well-established. Intensive competition, rather than government regulation, has become the driving force in setting the prices and quantities in many gas market segments. During this transformation, the traditional rigid three-tier (wellhead, interstate, and local distribution markets) industry structure has given way to a more flexible and parallel four-market (commodity gas, interstate transportation, core distribution, and noncore distribution) structure.

Three trends are of paramount importance in the evolution of the natural gas market: (1) a significant increase in the amount of directly-purchased gas; (2) a proliferation of market intermediaries (such as marketers and brokers) assisting the customers to buy gas directly and to arrange their own transportation services; and (3) the establishment of spot (less than one month) and short-term (less than one year) contracts as well as gas futures contracts as the dominant forms of gas procurement. Long-term contracts are still being used, but their importance has significantly diminished in the restructured gas industry. As a result of the sequence in regulatory reforms, these trends appeared first in the wellhead and interstate markets.

In the restructured gas industry, the commodity gas market at both the interstate level and within the local areas has become quite competitive. The

primary transportation market will still be subject to cost-based or performance-based regulation by the FERC while the eventual degree of competition in the largely unregulated secondary market is yet to be determined. The noncore distribution market is expected to expand further as more currently captive customers find it advantageous to arrange their own commodity gas and transportation services. The size of the core distribution market will be further reduced with some forms of price caps or cost indexing mechanisms to be used to replace traditional cost-based regulation.

In comparison with the wellhead and the interstate pipeline markets, the changes in the local distribution markets have been less pronounced and with significant variations among them. Many local distribution markets have considerably different service and regulatory characteristics, and they are also subject to different state regulatory policies. At the same time, statistical information on the transformation of the local distribution market is considerably less than those of the interstate market.² The implication here is that the discussion in this chapter only reflects the more basic and general aspects of changes in the local distribution market.

Under this new market environment, the nature of the local distribution service also changes significantly. The local distribution service is no longer a single bundled sales service available to all customers. Several distinct distribution activities that start with commodity gas procurement and extend to transportation, load balancing, storage, and metering and billing of services can be separately supplied and priced. There are considerable differences in the economies of scale and scope associated with these activities. Thus, a mixture of different market

² Obviously, the extent of market restructuring and service unbundling is much more extensive and well-established in the interstate market than that in the local distribution market. Furthermore, the FERC is the sole agency in regulating the interstate market and a uniform reporting system has been in place for many years.

transaction mechanisms and regulatory frameworks is required for the most efficient delivery of distribution services.

In specifying the structure of the local distribution market and the nature of local distribution services, it is useful to provide a brief overview of the changes in supply and demand options facing the LDC. Several features characterize the more important changes in the marketplace.³ Specifically, the price of commodity gas is deregulated, pipeline services are fully unbundled, interstate transportation is priced under the new straight-fixed variable rates, most transition costs are passed through from pipelines to LDCs, and a centralized secondary market for pipeline transportation capacity is established.

All these changes present significant new challenges to the LDC. On the supply side, the LDC will have more freedom in assembling its own gas supply portfolio. But the LDC is also exposed to more risk and reward. It also has an increased need for expertise in contracting for gas services. More importantly, on the demand side, the LDC will be facing, instead of an undifferentiated group of customers, a diverse group of customers with substantially different requirements for service reliability and quality. As many customers gain the ability and incentive to switch to other providers, the LDC will assume three distinct roles: (1) the sole provider of bundled distribution service to core customers; (2) one of many possible suppliers of commodity gas, and perhaps other auxiliary services to noncore customers; and (3) the main provider of transportation-only services to noncore customers.

Under the mixed approach, local distribution services are restructured similarly to pipeline services except in two areas. The LDC will substantially unbundle all distribution services and make transportation-only and related services

³ See Duann, *Restructuring Local Distribution Services*.

available to noncore customers. However, the LDC will continue to provide a bundled service, at least for some time, to residential and small commercial customers. The initial allocation and pricing of intrastate transportation capacity will still be subject to state PUC regulation; and the LDC will retain tight control over the access and operation of intrastate transportation capacity. A secondary market may be created if there is a high probability of excess transportation capacity and no entity (except the LDC) in the local distribution market possesses significant market power in buying and selling intrastate transportation capacity.

Four Factors in Developing An Overall Pricing Strategy

There are four factors that need to be considered in applying alternative pricing mechanisms to the various segments of the local distribution sector. One is the number of potential suppliers in the particular market segment. This is a critical factor because it can determine the degree of competition. If vigorous competition does exist in a particular market segment, then this market may be deregulated or only subject to very loose regulation. On the other hand, if there is only one or a few suppliers in a market segment, continued cost-based regulation may be necessary.

The second factor is the extent of cost reallocation associated with the restructuring of wellhead and interstate pipeline markets. As discussed before, there are large amounts of reallocated costs as a result of federal regulatory reforms in the last fifteen years. These costs not only provide the impetus for applying alternative pricing mechanisms; they also constrain the use of alternative pricing. More importantly, the various segments face very different degrees of cost reallocation. For example, there are no restructuring-related costs associated with the gas commodity market. The customers of bundled distribution services, however, are facing considerable cost increases as a result of the gas market restructuring. Consequently, if the application of one particular alternative pricing

mechanism would further increase the costs of services for these customers, it is unlikely to be adopted without some other remedial measures.

The third factor is the transaction costs incurred by the end users to procure unbundled services. The transaction costs must be measured in terms of the capability of end users to buy gas services directly and the benefits that can be generated. If the transaction costs are relatively small in relation to the total costs of distribution services or end-use customers have sufficient experience and knowledge, then the probability of applying alternative pricing to promote direct purchases is higher. Conversely, if the transaction costs are high, then the continuation of cost-based regulation may be a better policy.

The fourth factor is the feasibility of implementing the alternative pricing mechanisms under existing legislative mandate and regulatory authority of the state PUCs. At the present time, most LDCs are under cost-based regulation administered by state PUCs under state public utility laws. Not surprisingly, there are considerable differences in the law and regulation of public utilities among the states. However, in general, an alternative pricing mechanism that is closely related to existing cost-based regulation is more likely to be implemented than one that is quite different from the existing legal and institutional arrangement.

Alternative Pricing for Commodity Gas

Strictly speaking, there is not a separate commodity gas market within the service territory of the LDC. Only one national market consisting of various different forms of gas procurement contracts exists. The commodity gas market includes the wellhead market, the spot market, and the gas futures and options markets. All these markets are structurally competitive with many potential buyers and sellers. The price in the commodity gas market has been deregulated. The discussion here only serves to clarify the situation where the LDC is selling unbundled commodity gas to its customers. Clearly, the LDC should be allowed to

freely sell commodity gas to all customers, assuming the LDC does not provide any preferential treatments in transportation, load balancing or other auxiliary services to those customers who purchase commodity gas service from the LDC. There is also no need to impose any ceiling on the price of commodity gas because the LDC's customers have viable alternatives. If the price offered by the LDC is too high, gas customers can simply buy commodity gas from other suppliers.

Whether a price floor for commodity gas sold by the LDC should be imposed is a more difficult matter. The question is not on the low price itself. The LDC, as a business entity, does not want to sell commodity gas below its cost if it is unable to recover the cost difference from other customers. The key question is then the prevention of cross subsidy. So the state PUC may not need to impose any price floor on the sale of commodity gas. It should make clear to the LDC, however, that any loss (or deficit) resulting from this market segment would not be passed through to other customers.

Alternative Pricing for Bundled Sales Services

Bundled sales service is the traditional service provided by the LDC. It is also the only service available before the restructuring of the natural gas market during the last fifteen years. Because of significant differences between the interstate and local distribution markets, the total (mandatory) unbundling approach may not be appropriate for the restructuring of the local distribution market. The LDC should be allowed to offer bundled sales service to any customers that demand this service. In the past, bundled sales service was strictly priced based on the embedded costs of providing this service. This cost-based pricing policy should be maintained to protect the core customers. After all, these core customers, or those who choose to be served as core customers, do not have viable alternatives to the service provided by the LDC. The LDC has considerable market power in this particular segment. The application of value-based pricing or flexible pricing is likely

to result in monopoly pricing by the LDC. The price will be too high, consumption too low, and the profit level too high. There will be a large amount of pricing inefficiency (allocation inefficiency) in the local distribution market.

Nevertheless, some modifications to the cost-based pricing can be considered. The most suitable candidate is cost-indexing for commodity gas. A cost target based on the market price of commodity gas and the optimal supply portfolio can be developed. If the LDC can procure gas at a cost lower than the cost index, the LDC can share some of the savings. On the hand, the LDC is required to absorb part of the "excess cost" if its gas procurement cost turns out to be higher than the target cost. This is a straightforward approach, but in actual implementation there are likely to be many debates over the cost index (target cost).

Alternative Pricing for Firm Transportation Services

Even though there are different approaches regarding the unbundling and restructuring of local distribution services, no one has suggested complete deregulation of intrastate transportation services, at least for the initial allocation of firm transportation capacity. This is not surprising given the significant economies of scale associated with the local distribution of gas. It is generally agreed that the LDC should remain as the sole supplier of intrastate firm transportation services.

A broad range of issues is involved in setting up a state transportation program. In addition to the pricing of transportation services, the state PUCs need to specify the definition of transportation services, the priority in allocating and curtailing transportation capacity, the access to LDC-contracted upstream capacity, and the rights of an LDC's customers to dispose of transportation capacity already contracted but not used. The pricing of transportation services can not be separated from all these other policy decisions. In order to facilitate the discussion, it is assumed that:

- (1) all end-use customers that do not purchase bundled sales service from the LDC are provided comparable access to the LDC's transportation facilities;
- (2) a secondary market for intrastate transportation does not exist;
- (3) end-use customers are required to sell back the "excess" transportation capacity to the LDC at the PUC-set rates; and
- (4) the end-use customers are granted comparable access to upstream transportation capacity provided that such access does not affect the operation and reliability of the local distribution system.

Under this particular configuration of the intrastate transportation market, cost-based regulation remains the best policy option for various reasons. First of all, the LDC continues to have the obligation to provide transportation services to all those customers demanding the services. Second, end-use customers do not have a viable alternative to transportation services provided by the LDC other than building their own connection lines. In short, all the essential characteristics of a natural monopoly exist. Consequently, the continued application of cost-based pricing seems justified.

Alternative Pricing for Interruptible Transportation Services

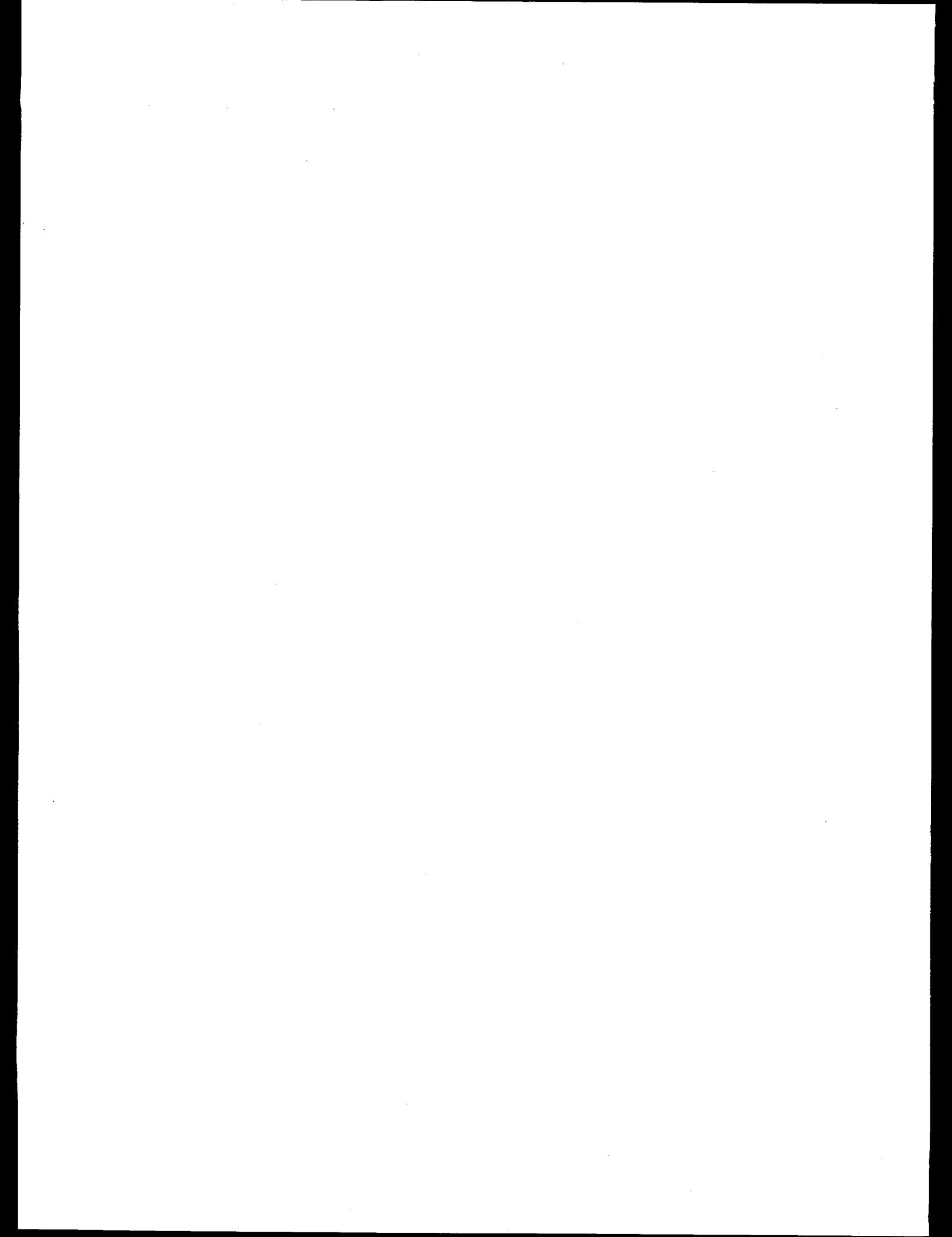
The key difference between firm and interruptible transportation services is the LDC's obligation to provide the transportation service on demand; namely, to plan and invest in sufficient and reliable transportation capacity. It is not the actual incidence of service interruptions that is important. Actually, there is no difference in the technologies for providing firm and interruptible transportation services. In most instances, both are provided through the same intrastate transportation network characterized by significant economies of scale and scope.

In addition to the LDC's service obligation, the customers' expectations are also quite different between the two transportation services. The customers of firm transportation service expect the LDC to provide the service on demand; they pay a premium for that assurance. These customers have no alternative to the LDC's transportation service. On the other hand, interruptible transportation services are usually provided to those customers that do have alternatives to LDC-supplied transportation services. The alternatives can be nongas fuels, the customer's own connection lines, or the market-area storage fields. If these customers do not have viable alternatives, they would contract for firm transportation service. Because of the availability of viable alternatives, these customers are also quite sensitive to the costs of transportation services. In general, the LDC may have to set a rate for interruptible transportation service that deviates from the fully-allocated costs. Otherwise, these customers will bypass the local distribution market.

Alternative Pricing for Auxiliary Services

The auxiliary services refer to those services typically performed by the LDC in association with its main gas procurement and transportation functions. Examples of these auxiliary services include underground storage, load balancing, supply integration, metering, and billing. In the past, the LDC was the only entity that provided these services within its service territory. But increasingly, market intermediaries have started to provide these services. Even though there are some scale and scope economies in the investment and provision of these services, there is no clear indication that one monopoly supplier can best supply these services. Consequently, there should be no restriction on participation in the markets for these services by entities other than the LDC. No restriction should be put on the prices of these services provided by entities other than the LDC unless there are evidences of collusion or price fixing.

As for the participation of the LDC in providing these unbundled auxiliary services, a price ceiling that is the fully allocated cost of the auxiliary services should be used unless the LDC chooses to provide these services through unregulated subsidiaries. Alternatively, if no price ceiling was imposed, some sharing mechanisms must be instituted for allocating the profits derived from these services between the LDC and its customers.



CHAPTER 6

CONCLUSIONS

A "mixed" regulatory paradigm should be developed for the regulation of a restructured local distribution market. Both traditional franchised-monopoly regulation and the total (mandatory) unbundling approach used by the FERC may not adequately deal with the new characteristics of a local distribution market. In other words, they do not lead to efficient gas procurement and consumption decisions in light of the diversity of the customers' ability in gas procurement, the simultaneous existence of competition and monopoly in a single market, as well as the drastic cost shifting caused by the restructuring and unbundling of the upstream markets. Specifically, total unbundling of distribution services may not be attractive to many end-use customers because of the considerable transaction costs involved in buying the many different unbundled services directly. The traditional bundled distribution services should still be offered as a viable choice for the end-use customers.

There are three key elements in the implementation of this "mixed" regulatory paradigm. One is the division of the market into core and noncore segments and applying different modes of regulation accordingly. Another is the unbundling of traditional local distribution services into several distinct services provided by the LDC and other entities. The third key element is the application of alternative pricing mechanisms to the different bundled and unbundled distribution services based on their unique demand and supply characteristics.

The development and implementation of alternative pricing policies is a demanding process for both the state PUCs and LDCs as they have to consider several competing objectives. These regulatory objectives include the provision of proper price signals, the fair allocation of costs, the accommodation of other regulatory objectives, the control of costs, and the additional legal and regulatory

requirements for implementation. Not surprisingly, no single pricing mechanism is superior to all other price mechanisms in setting the rates for all local distribution services. Actually, given the significant variations in the extent of potential competition for the different segments of the local distribution market, each different type of alternative pricing mechanisms may be applicable and effective for one or more particular market segments. It is also quite possible that the best pricing mechanism for one LDC may not be suitable for another LDC with different supply and customer portfolios.

In general, of the various categories of pricing mechanisms, cost-indexing and flexible pricing seem to be the most desirable, as they are easier to understand and implement. Up to now, they also appear to be the most widely used by state PUCs. In other words, at the present time, alternative pricing mechanisms are mostly used as a complement to traditional cost-based regulation or other regulatory tools, such as gas procurement review, rather than as a stand-alone policy tool for local distribution services. A possible explanation is simply that these alternative pricing mechanisms have only been used for a short period of time and the state PUCs and LDCs are not very familiar with their use. Over time, they will likely become more prominent.