Enron Cross Exhibit 1 D. A. Krall
R-973954
8/18/97
JK Hbj

Pennsylvania Power & Light Company
Response to Interrogatories
of Enron Capital & Trade Resources, Set III
Dated June 6, 1997

Docket No. R-00973954

Q.16. (a) If, after January 1, 1999, a PP&L Delivery Group customer: (i) does not qualify for participation in a given phase of direct access or (ii) does qualify, but does not select a generation supplier including PP&L's Generation Supply Group, will the Delivery Group customer's generation supply be provided by the Delivery Group or the Generation Supply Group?

(b) If a Delivery Group's customers referenced in (a) above will be provided generation supply by the Delivery Group, will the generation supply be provided pursuant to regulated, tariffed rates? Would the rates be subject to the Commission's Chapter 13 oversight?

(c) If a Delivery Group's customers referenced in (a) above will be provided generation supply by the Generation Supply Group, will the generation supply be provided pursuant to regulated, tariffed rates? Would the rates be subject to the Commission's Chapter 13 oversight?

A.16. (a) A Delivery Group customer who does not qualify for participation in a given phase of direct access will continue to receive generation supply from the Generation Supply Group. A Delivery Group customer who qualifies for choice, but does not select a competitive generation supplier will be provided generation supply at prevailing market prices by the Delivery Group.

(b) For Delivery Group customers who qualify for choice, but do not elect a competitive generation supplier and, consequently, are provided generation supply by the Delivery Group, that generation supply will be provided pursuant to PP&L's proposed Tariff 201 (see Exhibit OGK 2). However, because supply will be at market prices, Chapter 13 of the Public Utility Code may not apply.

(c) For Delivery Group customers who do not qualify for a particular phase of direct access, generation supply will be provided pursuant to PP&L's proposed Tariff 201 (see Exhibit OGK 2). All aspects of Chapter 13 should apply subject to the rate cap established by the Customer Choice Act.

DOCUMENT FOLDER

CHAPTER 6

Promoting Competition in Traditionally Regulated Industries

AT THE CENTER OF THE SUCCESS OF our economy is the market, and at the core of the success of the market is competition: it is competition that drives down costs and prices, induces firms to produce the goods consumers want, and spurs innovation and the expansion of new markets abroad.

In stark contrast to the gains from competition are the inefficiencies that result from monopoly. Monopolists typically set an artificially high price and restrict output, and often have weaker incentives to innovate than do competitive firms. The disadvantages of monopoly are sufficient to warrant government action to ensure competition or regulate the conduct of monopolies. Part of this Administration's commitment to strengthen the private sector involves ensuring that robust competition prevails where competition is possible, and guarding against the abuse of market power in those limited instances where it is not.

Powerful market forces, coupled with increased recognition of the costs of regulation, are strengthening the consensus to reform regulation in order to promote competition in two of our country's major regulated industries: electric power and telecommunications. Regulatory policy needs to respond to the forces of change in these industries, and important reform initiatives are under way.

At the Federal level the Congress, with the Administration's support, has recently passed sweeping legislation to rewrite the Communications Act of 1934 and other rules governing competition in telecommunications services. The Federal Communications Commission, which helped foster competition in telephone equipment and long-distance service, is developing policies for the interconnection of telephone networks that will promote competition in local telephone service as well. And the Federal Energy Regulatory Commission is trying to ensure access to electric utilities' transmission lines for all power generators. Various States also are moving to promote competition in intrastate phone service and in electricity. The stakes are high. Electricity and telecommunications are critical elements of an economy's infrastructure, and in the United States each sector accounts for over $200 billion in annual sales or, collectively, over $800 per U.S. resident.

Regulatory reform enjoys broad support, but disagreement exists over how best to make the transition from regulated monopoly to competition, and over the role of government once that transition is complete. Although the debate is often couched in terms of "regulation" versus "deregulation," implying that deregulation by itself will encourage competition and thus efficiency and innovation, what is at issue is something far more subtle, namely, the form and nature of regulation, with profound effects on both efficiency and equity. It cannot be overemphasized that immediate blanket deregulation is not a panacea. Well-designed regulations and antitrust safeguards are likely to result, ultimately, in more competitive markets with more innovation than immediate deregulation could provide. Moreover, until competition develops, it is important to maintain safeguards to protect consumers and to prevent incumbent monopolists from stifling the growth of competition.

This chapter discusses the challenges facing regulatory and antitrust policies in the telecommunications (Box 6–1) and electric power (Box 6–2) industries. It begins by discussing the growing consensus for increased reliance on competition in traditionally regulated industries, then provides an overview of the main challenges to successful regulatory reform. The two subsequent sections elaborate on these challenges in the telephone industry, which accounts for most telecommunications revenues, and in the electric power industry.

FROM REGULATED MONOPOLY TO COMPETITION

Public policy has historically taken two approaches to the problem of monopoly power: antitrust and regulation. The Congress passed the first antitrust law, the Sherman Act, in 1890. Antitrust policy seeks to encourage free market competition wherever possible by prohibiting parties from stifling competition through certain mergers, collusive practices, or unreasonable exclusion of competitors. Antitrust policy does not outlaw monopoly or monopoly prices, but instead seeks to prevent monopoly by promoting competition.

But the main policy approach in public utility industries like electricity, gas pipelines, and telephones has been regulation of private monopolies. (Some countries have tried government ownership as an alternative, but with few exceptions these have proven less effective than private ownership and regulation.) The first Federal law permitting regulation of monopoly, the Interstate Commerce Act, dates back to 1887.

Usually the stated reason for resorting to regulation of a monopoly rather than promoting competition through antitrust is that the industry in question is believed to be a *natural monopoly*—an in-

Box 6-1.—The Telecommunications Industry

The boundaries of the telecommunications industry are not clearly defined. In the broadest sense, the industry spans the entire backbone of our information economy. Some divide the industry into three segments: "conduit" (including local and long-distance telephone service; cable television; wireless services; emerging services that combine data, voice, and image transmissions; and communications equipment); "content" (such as broadcast television and radio and cable programming); and "computers" (computer hardware and software, and computing and processing services). In this chapter, "telecommunications" generally refers to conduits, especially telephones, cable television, and wireless services.

Telephone service generated about $150 billion in revenues in 1994, television and radio broadcasting almost $42 billion, and cable television about $28 billion. Cable television, although small compared with the telephone industry, is an important component of the telecommunications industry. Almost two-thirds of American households with televisions—more than 60 million households—subscribe to at least basic cable service, and the industry employs about 112,000 people.

The telecommunications equipment market includes a vast array of hardwares, from sophisticated equipment to facsimile machines to public pay phones. This market is growing rapidly: its sales of more than $63 billion in 1994 are projected to rise to almost $100 billion by 1997.

dustry in which product demand can be supplied most efficiently by a single firm. Natural monopolies arise mainly from large fixed costs relative to the size of the market: for example, the cost of running telephone or video cables to a home, or the cost of electric transmission lines. Such conditions create large economies of scale; that is, unit costs drop significantly with the volume of firm's output. In such cases the judgment may be made that competition is not workable and that the market is best served by a single monopoly firm that can fully exploit economies of scale but is prevented by price regulation from exercising monopoly power over customers.

The last 25 years have witnessed a sea change in attitudes toward regulating industries on grounds of natural monopoly. Economic studies have increasingly questioned the extent of economies of scale, challenging the view that many such industries are ubiquitous natural monopolies. More important, there has been a growing awareness of the major inefficiencies spawned by the regime of regulated monopoly.

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Box 6–2.—The Electric Power Industry

Four main types of electric utilities operate in the United States: investor-owned utilities, which are typically privately owned, regulated monopolies; non-Federal publicly owned utilities, which are nonprofit State and local government agencies established to serve their communities and nearby customers at cost; cooperative utilities, which are owned by and provide electricity to their members; and Federal power agencies, which are primarily electricity producers, wholesalers, and transmitters. Although only about 250 out of the 3,204 electric utilities nationwide in 1994 were investor-owned, they are by far the most economically significant group, earning almost 80 percent of all electricity revenues. Over 99 percent of investor-owned utilities' revenues accrued to the 179 largest utilities.

Total electricity revenues in 1994 were $203 billion, or about 3.2 percent of gross domestic product (GDP). Of that sum, residential users accounted for almost $85 billion, commercial users for about $63 billion, and industrial users for $48 billion. The electric utility industry is one of the most capital-intensive in the United States; the 179 largest investor-owned utilities alone had almost $575 billion in assets in 1994, amounting to almost 5 percent of the gross capital stock of all industries.

Competition typically offers important advantages over monopoly: it encourages innovation, which lowers costs and increases the variety of products available to consumers. And *regulated* monopolists generally have weaker incentives than unregulated monopolists to cut costs, to launch new products, and to respond to changing customer demands. In addition, there are administrative costs of regulation and, more important, the potential for losses due to protracted disputes between the regulated firm, customers, and regulators, which can cause long delays in adjusting prices or in authorizing new investments.

The bottom line is that competition need not be perfect for it to be preferable to regulated monopoly. The advantages of competition can easily outweigh the disadvantage of not fully exploiting economies of scale.

ADAPTING REGULATION TO INCREASE COMPETITION

Although regulation has been the primary tool for addressing monopoly in infrastructure industries, these industries have also been subject to antitrust rules in some aspects of their operation, such as interconnection in the case of the telephone industry. Regulation and antitrust have had an uneasy coexistence, given their somewhat inconsistent thrusts: antitrust encourages competition

but for the most part does not attempt to control a firm's prices, investments, and technology choices, whereas regulation does attempt to control such decisions and often restricts entry into the industry as well, thereby reducing competition. The difficulties in reconciling these approaches, and the distortions that stem from regulating monopolies, have created growing support for moving toward a more integrated competition-cum-antitrust regime.

Regulatory reforms in the 1970s and 1980s demonstrated that largely unregulated competition yields more efficient performance in such traditionally regulated industries as air transport and trucking, natural gas production, and long-distance telephone service. More recently, technological advances have further increased the scope for competition in local telephone and cable service and in the electric power industry. Regulatory regimes should adapt to changing conditions, to help shrink the boundaries of the regulated sector and rely more on competition.

Removing Legal Entry Barriers

The need for regulatory reform is nowhere more glaring than in telecommunications, with its blistering pace of technological change. Several technologies may in the future offer economical alternatives to today's local telephone network. Cable companies are experimenting with upgrading their existing lines to deliver telephone service. Wireless technologies now used mainly for mobile communications might also be used for ordinary telephone service if costs fall sufficiently. Fiberoptic lines, now used principally by companies that specialize in providing access to long-distance carriers, could be extended to homes and businesses. Mobile telephone service from low-orbiting satellites could eventually provide basic local service. Similarly, large-scale competition to cable companies in delivering video services may come from various sources including satellites, wireless land-based technologies, or telephone companies upgrading their networks. Meanwhile the rapid technological change that is blurring industry boundaries in telecommunications is also leading to the emergence of hybrid services such as multimedia, which defy easy classification into traditional industry definitions.

With so much uncertainty about the shape of the communications networks of the future, and with significant potential for competition, the best course is to leave their evolution to be determined by the private sector. Policymakers should not attempt to prejudge the outcome by assuming that local telephone and cable service are natural monopolies best provided by regulated franchise monopolists. Attempts to preserve artificial industry lines for the sake of maintaining regulation under traditional monopoly franchises become arbitrary, futile, and counterproductive.

For many years, local telephone and cable monopolies were sheltered from competition by legal restrictions: States granted monopoly franchises to local phone companies, municipalities could grant monopoly cable franchises, and, with some exceptions, Federal law restricted phone companies' ability to offer cable service. During the past few years a broad consensus has arisen, both in the Congress and in the executive branch, that it is desirable to try to eliminate existing regulatory and artificial technical barriers to competition in these industries. A number of States have started to open up their local telephone markets to competition. The recently passed telecommunications legislation requires immediate removal of all State and local laws and regulations that unduly prevent entry into telecommunications and cable services.

In electric power generation, the advent of smaller, more efficient gas-fueled generators, coupled with falling prices for natural gas, led to greatly reduced economies of scale. In addition, since the 1980s it has been demonstrated that independent generators can be successfully integrated into utility-owned transmission grids. These and other developments have prompted growing interest in further promoting competition in electricity generation. Although States now retain monopoly franchises for electric utilities virtually everywhere moves to relax legal barriers to competition are gathering steam. Many States are considering initiatives to permit some competition, and some, like California, have developed concrete proposals.

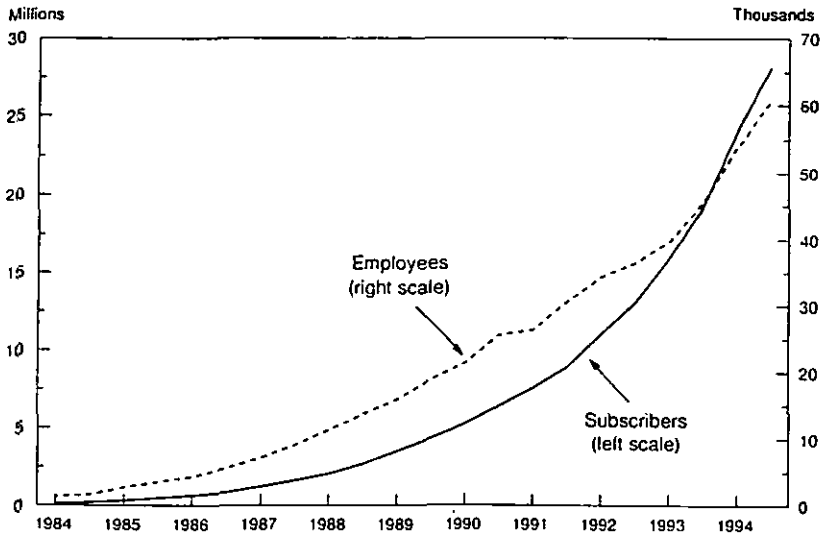
Assigning Spectrum Licenses Through Auctions

A major step taken by this Administration to promote competition and market forces in telecommunications is the recent, highly successful use of auctions to assign certain licenses for use of the so-called "spectrum"—the range of electromagnetic wave frequencies used in wireless communications services, including radio and television broadcasting, paging, and mobile telephones. The huge sums of revenues raised in recent auctions have focused attention on budget and equity issues. Auctions for other parts of the spectrum, if appropriately designed, could raise billions of additional dollars. When the government does not auction off but simply assigns spectrum licenses for free, it is giving away public resources worth billions of dollars. But more than revenue is at stake. Auctions can help promote economic efficiency, by ensuring that spectrum is deployed in the highest-return uses, including emerging growth industries that entail innovative technologies and services.

Assigning spectrum efficiently has taken on increased urgency as the value of spectrum has risen with the growth of wireless technologies. Wireless technologies are among the most promising avenues for delivering new services and for eventually providing com-

petition to wireline local telephone and cable monopolies. The exciting potential of wireless technologies is evidenced by the rapid growth of cellular telephone systems (Chart 6–1) and of direct broadcast satellite television service, which since its inception in June 1994 has already attracted almost 2.5 million subscribers.

Chart 6-1 **Growth in the Cellular Communications Industry**
The cellular telecommunications industry has grown dramatically, illustrating the market potential for wireless technologies in general.



Note: Data are for end of year, except 1995 are as of June 1995.
Source: Cellular Telecommunications Industry Association.

The Federal Communications Commission (FCC), charged with managing spectrum use by the private sector, traditionally assigned licenses without charge, using hearings to judge which applicants would best serve the public interest. These trial-like hearings resulted in large wasteful expenditures by applicants and long delays in assigning licenses. In 1981 the Congress authorized the FCC to use lotteries in certain cases. Lotteries reduced the delay in assigning licenses, and the ability of lottery winners to resell licenses allowed users that valued spectrum highly to try to obtain licenses in a secondary market. However, using the secondary market can entail inefficiently large transaction costs, especially in assembling suitable blocks of licenses. The lotteries also created windfall profits for lottery winners—windfalls that became transparent when certain lottery winners resold their licenses at huge profits.

To avoid such inefficiencies and windfall gains to a lucky few, economists have long urged the use of auctions to allocate scarce

public resources such as the spectrum. Spectrum auctions have also been advocated by the National Telecommunications and Information Administration (NTIA) of the Department of Commerce, the Council of Economic Advisers, and the FCC. In 1993 the Congress gave the FCC limited authority to use auctions in assigning spectrum licenses to provide services for which subscribers pay fees (in contrast to advertising-financed broadcasting), such as personal communication services (PCS; these are advanced mobile two-way voice and data communications services).

Designing good rules for PCS and other spectrum auctions presents novel and difficult problems. Bidders are often interested not in a single license but in suitable blocks of licenses, which makes the values of different licenses interdependent. Interdependence arises, for example, because aggregating licenses over adjoining regions allows a PCS device to use the same spectrum frequency over a wider area and makes boundary coordination easier. Interdependence can also arise because a bidder may be able to reconfigure its planned network to use a different set of frequencies as prices for some frequencies increase. Designing auction rules to help bidders cope with such interdependence in license values can both promote economic efficiency and bring in greater auction revenue.

To date, the FCC—in consultation with economists—has developed innovative auction rules and has conducted very successful auctions. For example, in the largest auction to date, winners were able to assemble suitable aggregations of PCS licenses over frequency bands and regions, as needed to form efficient communications networks. The auctions have attracted participation by numerous entrepreneurial companies and promise to speed up the availability of innovative services to consumers. In the short time since their inauguration in July 1994, spectrum auctions have raised over $15 billion for U.S. taxpayers.

DEREGULATION IS NOT ENOUGH: CHALLENGES TO REGULATORY REFORM

Removing legal barriers to entry into traditional monopoly industries, although critical, is unlikely by itself to ensure the rapid development of competition or an efficient and equitable transition. To promote these and other goals, regulatory reform must address several difficult and important challenges, which are outlined below and discussed further in the later sections on the telephone and electric power industries.

Promoting and Preserving Competition

Preventing regulated monopolists from distorting competition in related markets. A common and difficult problem arises in bringing competition to traditionally regulated industries when, whether for

jurisdictional or technological reasons, a vital "bottleneck" segment will continue for some time under the control of a regulated monopoly. For example, competition is envisaged in electric power generation, but for the time being transmission and distribution will remain regulated monopolies. Similarly, competition is expected to develop more slowly in certain elements of local telephone networks, notably the final set of wires to a customer's premises (the "local loop"), which will therefore remain regulated longer.

The difficulty posed by such a mixture of regulation and deregulation is that a price-regulated bottleneck monopolist has strong incentives to provide its own affiliates in unregulated segments better access to the bottleneck than it offers to rivals. (This and related issues are explored further in the section on the telephone industry below.) Such discrimination can inefficiently exclude rivals from the potentially competitive segments, harming both the would-be rivals and consumers. Preventing such access discrimination (and cross-subsidization, which, as discussed later, also distorts competition) could be approached in alternative ways, all of which have certain limitations.

Relying solely on regulation to prevent the regulated monopolist from favoring its unregulated operations over rivals raises problems. Firms can devise many clever technological games to circumvent regulation, such as varying the quality of connections provided to competitors. An alternative approach is to separate the regulated and unregulated parts of a monopolist's business into different companies. This was done in the Department of Justice's landmark case that resulted in the 1982 consent decree and the 1984 breakup of the American Telephone and Telegraph Company (AT&T, then the dominant U.S. telephone services provider). The seven regional Bell operating companies (RBOCs) created under the 1982 consent decree were allowed to offer regulated regional telephone service but were barred from the largely unregulated long-distance market.

Such forced structural separation helps promote level-playing-field competition in the unregulated markets, but it may sacrifice economies of scope—efficiencies in joint ownership and operation of related segments of an industry. How to prevent discrimination without unduly sacrificing economies of scope is a central challenge in assessing whether and under what safeguards the RBOCs should be permitted to offer long-distance service while they still dominate local telephone networks; and whether electric utilities should be allowed to sell unregulated power in competition with rivals while they still control the vital transmission grids.

Preventing monopolists from unreasonably denying interconnections. One way in which network monopolists can stifle competition is by denying potential competitors interconnection with their net-

works. The telephone industry exhibits strong positive network externalities—a user's benefit from the network increases greatly as additional users are connected. This feature marks an important distinction between telephones and, say, textiles. A new textile producer does not need much cooperation from other textile producers, but an entrant to local telephone service needs the incumbent's cooperation to let its customers communicate with the incumbent's customers. With its much larger customer base, the incumbent could hamper entry even by efficient entrants, by denying interconnection or by providing connections of poor quality or at an exorbitant price. Ensuring suitable and fairly priced interconnection may require government intervention.

Restricting mergers between likely potential competitors. Regulation must be forward looking: it must consider the market not only as it is today but also as it is likely to evolve. In most traditionally unregulated industries, it is actual competitors—the firms already present in a market—that largely determine the prospects for present and future competition. But in traditionally regulated monopolies, future competition must largely come from the outside. Mergers between regulated monopolists that are likely potential competitors therefore can significantly reduce the likelihood of future competition.

For this reason, the Administration opposes excessive loosening of restrictions on mergers and cross-ownership between cable and telephone companies in the same local area. Although there are technological challenges in using telephone wires to deliver video, and cable wires to deliver telephone service, cable and telephone companies nevertheless are likely potential competitors because both have wires to the home. Thus, consolidations among them could delay competition.

Antitrust enforcers could attempt to block such anticompetitive consolidations, but reviewing and challenging a potentially large number of transactions in different regions on a case-by-case basis would be quite costly. Maintaining clear prohibitions may be the better course as long as such mergers promise no significant economies, and as long as local cable and telephone companies remain among each other's most likely potential competitors.

Improving the Regulation of Remaining Monopoly Segments

As noted earlier, although promoting competition is generally the preferred approach, some segments of telephone and electric utilities' operations will continue to be regulated for some time. In those segments it is important to devise better ways to regulate prices. Traditionally, utilities have been subject to cost-of-service regulation, under which prices are set to cover the regulated firm's costs plus a "fair rate of return" on capital. Such regulation, however, reduces incentives to innovate or to contain costs, because the

firm realizes essentially the same profits regardless of its efforts: success at cutting costs is penalized by reducing the allowed prices.

Performance-based regulation (PBR) loosens the link between the firm's controllable costs and its allowable price. For example, pure price-cap regulation places a ceiling on the firm's price at some initial level based on estimated cost, then lets the cap change only with conditions outside the firm's control, such as the rate of inflation. The firm then has an incentive to cut costs, because to do so increases its profit. On the other hand, the firm also has an incentive to cut costs by shading quality, and regulators must guard against such attempts. Recognizing that suitably designed PBR can often create better incentives than pure cost-based regulation, ultimately benefiting both the firm and consumers, many States are moving toward PBR in telephone service and in the transmission and distribution of electricity.

Protecting Consumers and Investors During the Transition

Protecting consumers. When should an incumbent monopolist's prices be deregulated? Setting a fixed date reduces investors' uncertainty, but at the risk that competition may not have developed enough by that time to substitute for regulation in disciplining prices. For example, critics of rapid deregulation of cable television rates point out that substantial actual competition (not merely potential competition) is needed to discipline prices, and argue that the requisite competition will develop more slowly than proponents of quick deregulation assume. In electricity, many economists favor some temporary regulation of the prices that utilities can charge, even if reforms are instituted to make generation competitive, because it will take time to build new plants and reduce existing utilities' dominant share of generation assets.

A complicating factor in deregulating prices is that competition often develops faster for some customers than others, typically faster for large business customers than for residential users. It therefore may be appropriate to deregulate prices on a phased basis, starting with those customers for whom competition develops earliest. But if the utility has large (current or past) fixed costs that are common to all of its operations, which regulators allow to be recovered through regulated rates, it becomes important to ensure that deregulating one group's prices will not shift onto others an increased share of these common costs. One way to prevent this is to deregulate some prices, but on condition that the utility agrees not to raise prices to its remaining captive customers. Competition should increase overall benefits, not be used as a cover for cost shifting among customers.

Protecting investors. Nor should competition be a cover for unreasonably shifting costs from customers to utility investors. To meet their obligation to serve all customers in their monopoly franchise

areas, electric utilities have made costly investments in long-lived generating plant and other assets—with the regulators' implicit promise of a guaranteed return. Opening up utilities' traditional monopoly franchises to competition at a time when they have significant excess capacity would greatly reduce the value of such investments, and subject utilities to so called "stranded costs." As discussed further in the section on the electricity industry below, it is important to ensure that, in the transition to competition, utilities are not saddled with these stranded costs.

Promoting Universal Service and Other Social Goals

Promoting universal service—reasonably priced access to essential services for all customers—has been a longstanding goal of regulators in both the telephone and the electric power industries. Traditionally this and other social goals (such as assisting certain disadvantaged customers and reducing environmental pollution) have been pursued by imposing obligations on and regulating the price structure of utilities.

These regulations, however, have spawned inefficiencies. Moving to competition and letting prices respond to market forces, so that they more accurately reflect true costs, are likely to reduce these inefficiencies and cut the cost to society of providing universal service by lowering overall costs and prices. But doing so may require devising alternative ways of funding service to those consumers who would not be able or willing to pay the prices that might emerge under competition.

Reassessing Jurisdictional Boundaries

In both the telephone and the electric power industries, State and Federal regulators share jurisdiction. This can lead to differing regulatory objectives and inconsistent policies. As is discussed in Chapter 4, a main advantage of decentralizing regulatory jurisdiction is to allow States the flexibility to pursue social and economic policies tailored to different local preferences and conditions. As markets become more competitive, the scope for pursuing such goals through regulation may decline, although the States will play a major role in ushering in an efficient and equitable transition to competition.

On the other hand, decentralizing regulation also has its drawbacks. Efficient networks in telecommunications and electricity often involve facilities used to serve several States, which can lead to inconsistent policies when such networks are regulated at the State level. Multiple State regulatory regimes also can increase firms' uncertainty and costs of compliance. For these and other reasons, jurisdictions such as the European Union have been moving to harmonize the regulation of network industries. As the United States attempts to increase competition in such industries, it too

will have to reassess what jurisdictional boundaries are most efficient. In any event, regulators must work across jurisdictional boundaries to foster cooperative and consistent public policy goals.

PROMOTING COMPETITION IN TELEPHONE SERVICE

The 1984 breakup of AT&T was a landmark event in fostering competition in parts of the U.S. telephone industry. As explained earlier, a regulated monopolist operating in related, unregulated markets has incentives to stifle competition in such markets. To prevent such behavior, the breakup aimed to separate local telephone service, which many viewed as a natural monopoly that would remain regulated, from manufacturing of telephone equipment and from long-distance service, which were viewed as potentially competitive and could eventually be deregulated. AT&T retained its equipment manufacturing and long-distance service divisions. Seven new regional Bell operating companies inherited AT&T's regulated local-service monopolies, each within its region, and were prohibited from entering the less regulated markets for equipment and long-distance service.

Today the long-distance market is relatively competitive, whereas local service remains largely a regulated monopoly, in most cases provided by the RBOCs (Box 6–3). The new telecommunications legislation aims to increase competition further in equipment manufacturing and long-distance service and allows the RBOCs back into these markets under certain conditions. The legislation also aims to introduce competition in local telephone service, by removing State barriers to entry and by requiring local telephone companies to grant entrants reasonable access to their networks. These legislative and related regulatory initiatives, together with technological advances discussed previously, promise to foster increased competition throughout the telephone industry.

The terms for allowing the RBOCs to enter long-distance service have been one of the most contentious issues in the debate over telecommunications reform and may have the greatest economic consequences. Telephone service is by far the largest telecommunications industry (see Box 6–1), and establishing appropriate conditions for allowing entry by the RBOCs into the other markets is critical to achieving the legislation's goals.

Allowing immediate, unrestricted entry by the RBOCs while they still control vital local telephone networks would have been unlikely to promote efficiency and consumer welfare in the way that unrestricted entry normally does. To clarify this point, the next part of this section explains the incentive—and the ability—of a price-regulated monopolist in local telephone service to distort com-

Box 6–3.—The Structure of the U.S. Telephone Industry

The 1982 AT&T consent decree distinguished "local" from "long-distance" service by dividing those parts of the country served by the Bell System into local access and transport areas (LATAs). Each RBOC's territory encompasses multiple LATAs, but an RBOC may provide service only within LATAs. For interLATA service it must use the facilities of long-distance carriers, also known as interexchange carriers. Local exchange carriers (LECs) are the companies that provide the wire to the home. There are many independent LECs, especially in rural areas, but LECs owned by the RBOCs account for about 75 percent of total LEC revenues.

Although competition has been growing in parts of the local network, notably in the provision of private lines connecting business customers directly to long-distance companies, the LECs still have virtual monopolies over local networks. They receive over 96 percent of all fees paid to access local networks. Their prices for local calls and for access to interexchange carriers are regulated by the States and the FCC.

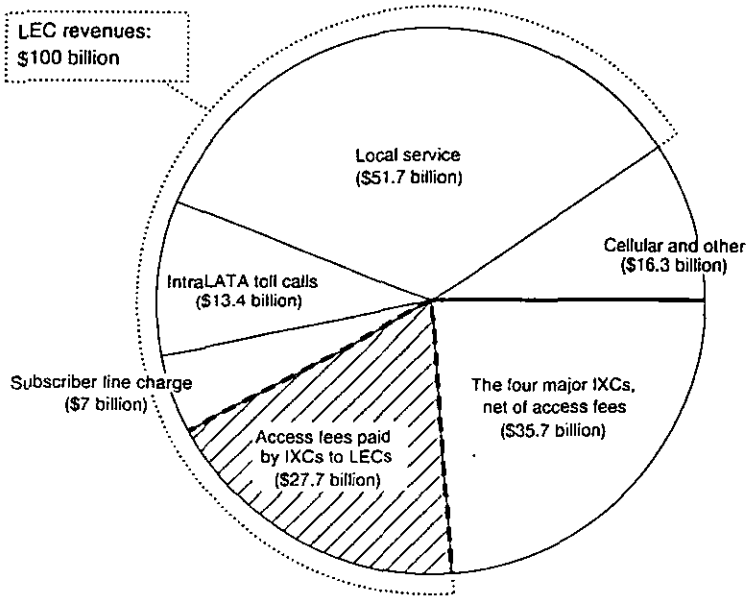
In contrast, the long-distance market is largely unregulated and relatively competitive; several carriers provide national service (the three largest through their own facilities), and many more carriers provide regional service. Reflecting this competition, the FCC ruled in October 1995 that AT&T should be reclassified as "non-dominant." Chart 6–2 provides a breakdown of revenues from local and long-distance service.

petition in related, unregulated markets such as long-distance service that are dependent on access to the monopolist's bottleneck facilities. We then analyze further the issues of RBOC entry into long-distance and of local competition. The final part of this section discusses the relation between increased competition and universal service.

UNBUNDLING POTENTIALLY COMPETITIVE SERVICES FROM REGULATED MONOPOLY SERVICES

As noted above, traditional cost-of-service regulation sets prices so as to allow the regulated monopolist a "fair rate of return" on its investment. Under such regulation, a monopolist can gain from engaging in related businesses that are potentially competitive. As long as regulation is not too stringent, the more businesses the monopolist is engaged in, the more likely it is to successfully conceal profits from the regulators, because overstating costs slightly in many businesses is more likely to escape detection than overstating costs dramatically in a single monopoly business. Moreover, by ex-

Chart 6-2 **Telephone Industry Revenues in 1994**
Local exchange carriers (LECs) account for two-thirds of all telephone industry revenues when one includes the access fees paid by interexchange carriers (IXCs).



Note: Access fees are not double-counted as net IXC revenues. Some cellular revenue accrues to LECs.
Source: Federal Communications Commission.

cluding all rivals from potentially competitive businesses, the monopolist can prevent regulation of these segments from becoming more stringent: the exclusion of competitors denies regulators a signal of the true costs in those businesses.

To promote competition, regulators can mandate unbundling—that is, they can require the firm to offer the monopoly service separately from other services, at a regulated price. But problems arise if, as is often the case, regulators allow the monopolist to offer the potentially competitive services at unregulated (or less tightly regulated) prices, on the theory that competition will keep these unregulated prices low. For example, a local telephone company's access charges to long-distance carriers might be regulated, but not its long-distance prices to consumers. Such partial regulation induces the monopolist to favor its unregulated affiliates over rivals in ways that are difficult for regulators to prevent. The motive of this favoritism may be largely to shift profits to unregulated affiliates, but the effect can be to stifle competition.

Cross-Subsidization and Discrimination in Bottleneck Access

One way that such profit shifting occurs is through misattribution of costs incurred by a firm's unregulated businesses to the regulated business. This is sometimes referred to as cross-subsidization. Under cost-based regulation, shifting costs to the regulated business allows the firm to argue for higher regulated

rates. In principle, cross-subsidization may be a problem whenever a regulated firm also operates in unregulated markets; but it is more likely to escape regulatory detection when the markets are related, since there is more scope for interaffiliate transactions and for mischaracterizing costs as common to both businesses.

Discrimination poses an even greater threat to competition. The monopolist controlling the price-regulated bottleneck facility may try to evade regulation through what is known as "tying." Suppose that customers seek to purchase an unregulated service, the provision of which hinges on access to the bottleneck service. The monopolist can then require, as a condition of access to the bottleneck, that customers also purchase from it the unregulated service at a high price. To implement such tying, the monopolist reduces competition in the unregulated market by discriminating against competitors in the technological and other nonprice terms it grants them for access to the bottleneck.

AT&T's behavior before its breakup is consistent with these incentives. The monopoly local telephone service was a major customer of equipment and a vital input into long-distance service. AT&T's prices for long-distance service and equipment were regulated more lightly than those for local service, creating incentives for AT&T to favor its less regulated affiliates. Indeed, AT&T's local affiliates were alleged to have paid its equipment affiliate Western Electric inflated prices for possibly inferior equipment. AT&T is also alleged to have discriminated against long-distance rivals in various ways, including offering poorer connections to local networks and imposing unnecessary delays in honoring requests.

Resulting Inefficiencies and Harm to Consumers

When it occurs, cross-subsidization inflates the reported cost of regulated services, leading to higher prices. For this reason regulators consistently try to keep the cost accounting of unregulated and regulated businesses as separate as possible. Prices of unregulated services—whose costs are underreported—could fall, but need not (for example, if underreporting involves fixed rather than variable costs). Even if prices do fall, they will be artificially below cost, and consumption of unregulated services will be inefficiently high. Also, sales may be diverted away from more efficient competitors in the unregulated markets, because the regulated firm attains an artificial advantage through the cross-subsidies.

Discrimination in access terms raises the prices of *unregulated* services, because the excluded competitors might have been more efficient, and because even equally efficient competitors could curb the monopolist's prices more effectively than can regulation alone. Consumers also are denied the variety and innovation that competitors might have offered. Finally, such potentially more efficient or innovative competitors are denied profit opportunities. These

losses resulting from discrimination can far exceed the gain to the regulated monopolist: the monopolist is willing to exclude a rival that would generate large benefits to consumers (say, by offering a superior alternative), as long as exclusion yields even a modest increase in its own profit.

ENTRY BY THE REGIONAL OPERATING COMPANIES INTO LONG-DISTANCE

The Department of Justice sought AT&T's breakup, which separated the ownership of the regulated-monopoly local telephone service from other services, because it believed that regulation alone could not, without imposing undue burdens, prevent the many ways in which AT&T could use its control of local telephone service to inefficiently favor its affiliates. (The Justice Department and AT&T at one point tried to negotiate a settlement without divestiture; the result was a draft consent decree which for its length and complexity became known as Quagmire II, or the Telephone Book decree.)

Maintaining the consent decree's prohibition of RBOC entry into other markets may forgo some economies of scope that could be realized therefrom, but it is likely to be more effective than regulation alone in curbing access discrimination by the RBOCs against competitors in these other markets. The new legislation attempts to achieve the best of both worlds, by linking the RBOCs' entry authority to the emergence of competition in their local markets—competition that should reduce their control of local networks and ability to discriminate against competitors.

Arguments in Favor of Entry: The Drawbacks of Separation

Consumers could well benefit from one-stop shopping for all their telephone needs; for example, an integrated provider could offer simplified calling plans. The RBOCs could provide such one-stop shopping if allowed into long-distance, although in principle this could be provided even without RBOC entry. For example, the new legislation requires all incumbent local telephone companies to sell local service to other companies at discounted wholesale prices. When authorized, long-distance or other companies could resell such local service together with long-distance and other services.

Some economists contend that RBOC entry into long-distance service is particularly important for lowering prices because the long-distance industry is far from perfectly competitive. Although there is some debate about how competitive the long-distance industry already is, the real issue is why entry would be more profitable for the RBOCs than for other firms. This could be the case either because the RBOCs could use such entry to circumvent local rate regulation (a "bad" reason), or because they have special cost advantages in offering long-distance service (a "good" reason).

A clear such cost advantage arises because any RBOC could link its existing networks to provide long-distance service at lower cost than could other entrants deploying entirely new facilities. Indeed, the separation between local area service and long-distance service (see Box 6–3) can be arbitrary and artificial: the boundaries of "local areas" at times do not track economic or technological realities. This highlights a general problem with using structural separation to prevent a regulated bottleneck monopolist from stifling competition in potentially competitive markets. Where to draw the boundaries depends on where the monopoly bottleneck lies, but the bottleneck can shift location as technology changes. For local telephone networks, most agree that the bottleneck includes the local loop, but experts disagree over whether it includes additional upstream elements such as switches. The issue of where the bottleneck lies is relevant also for policy toward promoting local competition.

Arguments Against Entry: Preventing Access Discrimination

Combining local and long-distance service within a single firm is likely to offer some economies of scope, but such economies also existed at the time of AT&T's breakup. The policy judgment then was that breakup was needed to protect competition in the potentially competitive segments, given the incentive and ability of local network monopolists to stifle it, and that the gains from competition would outweigh the loss of economies of scope. On many counts the breakup has succeeded: today the equipment and the long-distance markets are reasonably competitive. Opponents fear that if the RBOCs are allowed to reenter these markets before they face competition in their core local phone markets, regulation alone could not prevent them from inefficiently excluding competitors.

Long-distance service still hinges on access to local networks, which for now are still largely monopolies controlled by the RBOCs. Although cross-subsidization by the RBOCs from their regulated local phone service to their unregulated businesses may be less of a threat today, access discrimination against other providers of long-distance service and perhaps of central-office switching equipment remains a real concern.

Cross-subsidization may now be less of a threat because, in order to improve regulated firms' incentives, States are replacing pure cost-of-service regulation of local phone rates with performance-based regulation. Such regulation also reduces the regulated firm's incentives to cross-subsidize, because higher costs of the regulated business are not passed through as fully or as rapidly in higher regulated rates as under pure cost-of-service regulation. As added protection, the new legislation requires the RBOCs to manufacture equipment and provide long-distance service through separate sub-

sidiaries for some time, to help regulators detect cross-subsidization.

However, preventing RBOC discrimination against long-distance companies in access to local networks remains a thorny challenge. Performance-based regulation of local rates leaves intact incentives to discriminate against long-distance rivals, in order to raise prices in the unregulated long-distance market. Requiring long-distance service to be offered through a separate subsidiary does not eliminate discrimination incentives, because the subsidiary's profits accrue to common shareholders. Finally, regulators today may be more attuned to the dangers of discrimination, but preventing through regulation all avenues of technological discrimination in network access is still likely to be difficult.

Allowing the regulated RBOCs to provide unregulated long-distance service gives them incentives to discriminate against long-distance rivals. Allowing them to manufacture switches and other network equipment could enhance their ability to discriminate, by making it easier for them to retain proprietary control of important technical information needed to interface with long-distance and other unregulated services that rely on the network. If, as is likely, regulation alone cannot adequately curb such discrimination, then allowing the RBOCs to enter these other markets while they retain monopolies over local networks could reduce prices temporarily in those markets; but it could threaten rivals' long-run viability, raising the specter of ultimately reducing competition and causing higher prices and less innovation.

Competitive Safeguards

Local competition can greatly help prevent access discrimination. It provides alternative ways of reaching some customers. It also offers regulators a useful yardstick for policing discrimination: claims that certain network services cannot be provided to competitors will ring hollow if a local network competitor finds no difficulty providing such services. Although competition is coming to local networks, the RBOCs' dominance is unlikely to disappear overnight even if regulatory entry barriers are relaxed. Potential entrants have encountered technological problems, for example, in delivering telephone service over cable lines. Wireless connections may eventually offer alternatives to the local loop for reaching a customer's premises, but those currently available are higher in cost, less secure, and of lower quality than wireline connections.

Since local competition is both critical to safeguarding competition in long-distance and related markets but is in a nascent stage, the new legislation not only imposes regulatory safeguards against discrimination and other abuses but, importantly, links the RBOCs' authority to enter these other markets to the emergence of local competition. In broad brush terms, the new legislation provides the

following process for authorizing RBOC entry into long-distance (i.e. interLATA) service. Such service, as well as the manufacturing of equipment, must be offered through a separate subsidiary. An RBOC may offer long-distance service immediately on enactment of the legislation in any State where it currently provides no local service. But an RBOC must receive FCC approval to offer service originating in any State where it does provide local service (and likely controls many local networks). FCC approval is granted only after the following requirements are met.

Within 6 months of the new law's enactment the FCC will formulate rules for interconnection and network unbundling, discussed further below, that all incumbent local exchange companies must follow in dealing with new local competitors. At a minimum, an RBOC must offer terms, including prices, which the State public utility commission certifies are consistent with the FCC rules. Moreover, if a new local competitor has requested interconnection from an RBOC, then before being eligible to offer long-distance service the RBOC must have *fully implemented* a binding interconnection agreement with the competitor. That agreement must satisfy the FCC rules; the competitor must use predominantly or exclusively its own facilities; and it must provide local exchange service to both business and residential customers in the State (pure access providers, for example, do not suffice). In short, the local competitor is intended to have a significant presence.

Because these requirements help promote local competition but do not guarantee its imminence or durability, the new legislation provides further safeguards. Before authorizing RBOC entry, the FCC must consult with the Department of Justice regarding the likely competitive implications and give the Department's evaluation "substantial weight." This procedure offers an important safeguard, given the leading role that the Department's Antitrust Division has played in bringing competition to long-distance telephone service through the AT&T breakup, and given its analytical expertise in competition matters. Finally, the FCC must determine that RBOC entry would be in the public interest. Preservation of competition requires that antitrust enforcers and regulators have the latitude to make judgments of this kind, because no mere checklist could hope to capture all the relevant contingencies.

IMPLEMENTING LOCAL COMPETITION

As mentioned earlier, in order to foster local competition the new legislation would require existing local exchange companies to cooperate with entrants. Even a full facilities-based entrant (one that serves its customers entirely through its own physical facilities) would still require interconnection to the incumbent's network—to enable its customers to communicate with the incumbent's cus-

tomers, to let customers keep their telephone numbers if they switch to the entrant, and to access common signaling facilities and data bases. The new legislation requires incumbent carriers to provide such cooperation on reasonable terms.

Other entrants might lease some or all facilities from the incumbent. A *reseller* of local services would lease all network facilities in bulk but undertake all customer-related functions such as marketing and billing ("retailer" might therefore be a better term). It could offer to customers a package of local and other services such as interexchange service or cellular service. A *partial facilities-based entrant would lease some elements and supply the rest itself*; it might, for example, install its own switches but use the incumbent's local loops. Both types of entrants require unbundling of the local exchange carrier's integrated functions. A reseller would require unbundling of network functions from marketing and other customer-related functions. A partial facilities-based entrant would additionally require unbundling of some network functions. To accommodate such entrants, the new legislation requires incumbents to unbundle their networks and provide nondiscriminatory access to all the unbundled components.

Inevitably the new legislation provides only a framework and leaves such "details" as the pricing of interconnection and unbundled services to be determined later by the FCC and State regulatory commissions. But these details will be crucial. To stay in business, a reseller must be able to buy the local network services at a sufficient discount below retail rates, reflecting the fact that it undertakes costly retailing functions otherwise performed by the incumbent. (The new legislation requires incumbents to offer their services to resellers at wholesale rates, defined as retail rates less the costs avoided by incumbents.) If the discount is too small, even an efficient reseller will be unprofitable. A partial facilities-based entrant likewise needs reasonably priced access to the facilities it wishes to lease.

Determining the proper discount to resellers has already raised controversy, embroiling regulators in defining and measuring the costs a local phone company could avoid by delegating some retailing functions. In long-distance there is already an active market in capacity resale, as multiple owners of facilities compete to provide capacity. But until competition arrives in local networks, implementing resale of local service through mandated discounts will be difficult. Mandated unbundling of physical network elements, as opposed to just retailing functions as with resale, is likely to be even harder. There are many joint and common costs, network congestion is important in determining efficient prices, and unbundling certain elements may pose technical problems.

In short, introducing competition into local networks will be a complex process, requiring continued active involvement by State regulators, the FCC, the Justice Department, and possibly the courts. Nevertheless, by defining the broad rules and providing for active government involvement in implementing agreements and refereeing disputes, the new legislation holds the promise of stimulating ubiquitous, vigorous competition with potentially enormous benefits to businesses and

REPLACING CROSS-SUBSIDIES AND PROMOTING UNIVERSAL SERVICE

A longstanding policy goal in the United States has been universal service: widespread access to telephone service at reasonable prices. Such a goal can be defended on narrow economic grounds because the benefits of having a telephone on one's premises accrue not only to the subscriber but also to others who might be interested in calling that subscriber. Encouraging telephone subscription by people who would not otherwise have a phone on their premises can therefore also benefit others. Support for universal service, however, is based also on broader social considerations—that all members of a society should be entitled to a certain level of key services.

Where attaining universal service is thought to require government intervention, because without it prices would be deemed too high in certain regions or to certain customer groups, economists generally advocate the use of targeted, explicit subsidies, financed through broadly based taxes. Traditional regulatory policy has not taken this route. Instead, regulators have used the rate structure of regulated telephone monopolists to promote universal service and other goals. Many economists believe that this rate structure is inefficient and incompatible with a move toward increased competition in telephone service.

The new legislation requires the formation of a Federal-State Joint Board, representing regulators and consumers, to thoroughly review the existing system of Federal support for universal service and recommend reforms within 9 months of the law's enactment. Within 15 months of enactment, the FCC is to establish a specific timetable for implementation of reforms. This envisaged reform for the most part promises to better harmonize the goals of promoting competition and universal service.

Cross-Subsidies and the Tension with Competition

Cross-subsidization arises when the price in one market does not cover the incremental cost of serving that market, and the deficit is financed by charging a price significantly above incremental cost in another market. The different markets can be for different products (e.g., long-distance versus local calls) or different identifiable

customer groups (e.g., residential versus business customers of local calls). As discussed earlier, cross-subsidies can arise from attempts by a regulated monopolist to evade cost-based regulation by misattributing costs of its unregulated business to the regulated business. But cross-subsidies also can be mandated by regulators.

For many years regulators, with the support of the Congress, used cross-subsidies between regulated monopolists to pursue universal service goals. Through a complicated nationwide pooling of telephone costs and revenues, local telephone companies, especially in high-cost rural areas, received substantial subsidies to keep their rates low. The subsidies were financed by setting prices of long-distance calls and of telephone equipment artificially high. In addition, long-distance rates were set by geographic averaging: rates for routes of the same distance were set equal despite different traffic densities and therefore different costs. There may also have been subsidies from business to residential customers generally.

This system was administered by AT&T, whose affiliate companies provided most local telephone service nationwide and virtually all long-distance service. The system came under strain once AT&T's virtual monopoly began to erode. The growth of competition in supplying customer premises equipment (such as telephone sets) in the 1970s and later in long-distance service reduced the funds available for cross-subsidies. In response, after the breakup of AT&T the FCC introduced fixed monthly fees for all telephone subscribers, reducing the need for subsidies; the FCC and State regulators also instituted explicit access fees for all long-distance carriers originating and terminating calls on local carriers' networks. These access fees are still used to finance subsidies to rural carriers.

The inflated access fees, however, prompted large long-distance customers to bypass the local exchange and instead use private lines to connect their premises directly to an interexchange carrier. Such bypass again threatens the revenue used to cross-subsidize other services. Some local telephone companies have also alleged that revenue from high-volume local business customers cross-subsidizes basic local service to residential customers, so that permitting entry into local service also will threaten cross-subsidies: entrants will siphon off lucrative business customers and reduce the revenue available for subsidizing rates to other customers.

Universal service and other social goals that may be threatened by competition can be pursued through diametrically different approaches, as discussed below. One is to try to maintain a broad monopoly charged with meeting these social objectives, by legally prohibiting entry or by requiring all entrants to make substantial contributions to cover the incumbent's cost of providing below-cost

services. The other is to permit widespread competition and develop alternative, market-based ways of funding legitimate social goals.

Joint Costs, Natural Monopoly, and Cream Skimming

Defenders of retaining monopoly might paint the following picture of local telephone service. Serving the different markets—be they different customers or different services—is largely a natural monopoly, because it entails large fixed and common costs. The markets are therefore most efficiently served by a single firm, but to cover the fixed costs, prices in some or all markets will have to exceed the incremental costs of serving those markets. Entry could then be profitable but economically inefficient, because an entrant could engage in *cream skimming*—targeting only the monopolist's more lucrative markets where the gap between prices and incremental costs is greatest, thus saddling other groups with a higher proportion of the common costs.

Charging different price-cost margins, which are vulnerable to cream skimming, can be efficient if demands in different markets exhibit different degrees of price sensitivity. The fixed costs are then best covered by charging higher margins where demands are less price-sensitive, as this pricing pattern minimizes the inefficiency from reduced consumption due to prices that exceed marginal costs (economists call this "Ramsey pricing"). For example, if demand for local service were less price-sensitive than demand for long-distance service, it might make sense to charge higher margins for local calls to finance the common costs, such as for wires to the home, entailed in providing local and long-distance service.

Distortions in the Current System

If the view of the industry just outlined—as a ubiquitous, multimarket natural monopoly that is pricing efficiently to recover common costs but is vulnerable to cream-skimming entry—were accurate, policymakers would face a tradeoff: restricting entry would better allow exploitation of scale and scope economies, but would deny the benefits of competition and impose regulatory costs. Many economists, however, challenge this portrait of the local telephone service industry. They are skeptical about characterizing too many costs as "fixed and common" and the industry as a ubiquitous natural monopoly. Moreover, to the extent there do exist fixed and common costs, current regulated prices do *not* recover such costs efficiently. Rather, the current price structure sends wrong signals about the true costs, thereby distorting the decisions of entrants and consumers.

Distorted entry decisions. Access fees charged by local network operators to long-distance companies far exceed marginal costs. These high fees cross-subsidize service in rural areas and perhaps

basic local service nationwide, which may be priced below its marginal cost. Such pricing can distort entry decisions in two ways: artificially high prices can encourage inefficient entry, and artificially low prices can discourage efficient entry.

Regarding possibly inefficient entry, inflated access fees may have provided an artificial stimulus to the growth of so-called competitive access providers: companies that bypass local networks and link businesses directly to long-distance companies. Regarding the discouragement of efficient entry, there may be greater potential for competition in local services than is currently evident. Artificially low prices for the subsidized incumbent's services (such as to rural areas) can make it unprofitable for entrants to compete for providing such services, even if the entrants are more efficient. This comes about because under the current system only incumbents are eligible for certain subsidies.

Distorted consumer decisions. The current rate structure also distorts consumer decisions. High long-distance rates subsidize telephone subscription but discourage calling; raising the fixed charge for telephone subscription and reducing the prices for calls would stimulate calling. The benefits from lower toll rates and expanded calling would make many consumers better off even after paying higher fixed charges. Cross-subsidies from long-distance to local service are sometimes defended on the grounds that low-income individuals use local service relatively intensively, but the correlation between income and long-distance versus local calling may not be strong, and some studies have indicated that high toll bills often lead to low-income subscribers being disconnected for nonpayment. Better ways can be found to assist those with low incomes.

Lack of transparency. A vital ingredient of any sound economic policy is to make costs and objectives explicit and transparent. The goals and methods of telephone cross-subsidies are now opaque; as a result, the true extent of cross-subsidies needed to ensure universal service or other legitimate social goals remains unclear. In some cases, cross-subsidies may instead reflect regulatory capture—some groups may simply be more adept than others at manipulating the regulatory process so as to procure subsidies for themselves. Competition is likely to reduce the cost to society of providing universal service by lowering costs and most prices and by introducing new technologies. It may well reveal that most people would have affordable access to basic telecommunications services even without subsidies.

Challenges for Reform

The rapid changes in technology and the accompanying changes in regulation described earlier imply that protecting universal service by maintaining regulated monopolies is likely to become both increasingly inefficient and untenable. Many economists favor giv-

ing competition freer rein and letting prices adjust to better reflect true costs. Any legitimate social goals served by the current regulated price structure should be addressed through other means that are more transparent, more targeted to explicit goals, and do not distort competition. A strong collaborative effort between Federal and State regulators should be established in pursuit of these goals.

What should be included in universal service? For many years there was only one basic service to be universalized or not: a telephone was a telephone. Today, however, telephone and other telecommunications networks are evolving to permit a much broader range of enhanced services. As conditions change, it will be important to review, perhaps on an evolving basis, the range of services targeted for universal service and to be clear about what is meant by "sufficiently affordable" prices.

Increasingly, we have realized the potential of modern communications to affect other aspects of life, from health (via telemedicine) to education. Access to computers and the Internet can put at the instantaneous disposal of every child in America resources superior to those available in even the best schools only a couple of decades ago. This Administration, through the National Telecommunications and Information Administration, has been striving to ensure that all Americans have access to advanced information services, for example, through public institutions such as schools and libraries. The new legislation includes the provision of such access as a core principle to guide universal-service reform.

Who should be eligible for support? For example, should all rural residents be eligible or only low-income consumers wherever they reside? And how much should prices be allowed to vary so as to reflect differences in the cost of providing service? Another reform principle adopted by the new legislation is that all consumers should have access to telecommunications and information services that are "reasonably comparable" in quality, variety, and rates to those available in urban areas. It goes further, however, with regard to interexchange and interstate telecommunications services (which include, at a minimum, telephone service), by requiring the rates charged to residential subscribers in rural areas to be "no higher" than those charged in urban areas. Many economists would hesitate to recommend such a stringent requirement.

How should universal service be funded? Once the goals have been clearly identified, funding mechanisms should be devised that do not distort competition. At present, subsidies to serve ostensibly unprofitable markets are not offered to all comers on an equal footing but are largely reserved for incumbent monopolists and financed through surcharges on long-distance and other services. Alternative financing methods would be less distorting and more

compatible with competition. An example might be a universal service fund, financed by charges levied on all telecommunications carriers, or even more broadly. All eligible consumers could draw on the fund, to help them pay for the provider of their choice. Alternatively, the right to provide subsidized service to a designated group could be allocated through competitive bidding among all qualified potential providers.

In the absence of explicit mechanisms to fund universal service or other social goals, regulators might feel compelled to meet such goals by imposing obligations on entrants. Such obligations could easily stifle competition. For example, regulators might be led to require entrants to offer a configuration of services, regional coverage, and rate structure very similar to that of the incumbent local monopolist. But entry is more likely to occur and to be more valuable if entrants have flexibility in choosing their technologies and mix of services to best exploit their comparative advantage. Revamping the funding of universal service therefore is an integral part of a successful move toward increased competition in telephone service. Consistent with this goal, the principles in the new legislation call for making support mechanisms explicit and predictable; requiring all providers of telecommunications services to make nondiscriminatory support contributions; and making all interested carriers eligible for support to provide service in designated areas, with the exception of any area served by a rural telephone company.

PROMOTING COMPETITION IN ELECTRICITY

The Nation's major electric utilities have historically been vertically integrated, engaged in both the generation and the delivery of electricity. Delivery is over high-voltage transmission lines from generators to substations, and from there over local distribution lines to users. The Federal Energy Regulatory Commission (FERC) regulates interstate transmission services and interstate wholesale power transactions (sales to utilities for resale), whereas the States regulate their investor-owned utilities' retail sales. In the past the supply of electricity within a given geographic area was seen as a natural monopoly, and State public utility commissions awarded utilities exclusive franchise areas. They required utilities to serve all consumers in their franchise areas at regulated, bundled rates, covering generation and delivery, based on cost of service.

A major crack in the vertically integrated structure of the industry came with the Public Utilities Regulatory Policy Act (PURPA) of 1978, which required utilities to buy power from nonutility generating companies that employed renewable energy sources or cogeneration (co-generation uses steam both to generate power and

to heat adjoining buildings). Although its primary goals were to reduce dependence on imported oil and encourage renewable energy sources, PURPA played a major role in promoting competition in power generation. By giving rise to a class of nonutility generating firms, PURPA created momentum for efforts to unbundle generation from delivery. Moreover, experience with PURPA demonstrated that independents could build generators on time and on budget and could be reliably integrated into the transmission grid, subject to utilities' control. Nonutility generating firms have grown rapidly since PURPA's enactment. Their share of nationwide generating capacity has doubled from 3.6 percent in 1987 to 7.2 percent in 1995; since 1990 they have contributed over half of all new investment in generating plant.

An obvious reason for some independents' growth is obligations imposed on utilities to purchase power from PURPA-qualifying facilities. Although PURPA required purchases at prices that were supposed to reflect utilities' expected costs were they to supply power from their own sources, regulators in a few States calculated these prices in ways that led to artificially high purchase prices. But technological change also played a major role in the growth of independents. The advent of small, efficient, natural gas-fueled generators, coupled with falling gas prices, drastically reduced the capital cost and minimum efficient scale of generating plants, making it easier for independents to finance plants (because of shorter construction lags and lower financing needs) and to build plants under contract to serve a particular utility. Market innovations in the financing of power plant construction by independents also were important.

Asymmetrical regulatory treatment also contributed to the independents' growth. Independents had stronger incentives than utilities to cut costs, because only they were exempt from cost-based regulation. The Energy Policy Act of 1992 expanded this exemption to a broader class of independents than PURPA had covered, allowing such independents to enter the wholesale power market, where they could sell power to utilities at unregulated market rates (unlike PURPA, however, the 1992 Act did not oblige utilities to purchase from the independents). In addition, some utilities may have refrained from building their own plants, fearing that regulators would later reject some of the costs when it came to resetting their rates. And regulators in some States required utilities to look first elsewhere, to nonutility generating firms or to other utilities with excess capacity, to supply their incremental generating capacity needs before building more plants themselves. In this the regulators' intent was to foster competition, as part of an effort to curb the rise in electricity prices following the oil shocks of the 1970s.

These changes expanded wholesale competition among generating firms to sell power to utilities. Pressure is growing to allow retail competition as well: for generating companies or utilities to sell directly to final customers in the franchise area of a different utility, paying regulated rates to use the utilities' existing transmission and distribution lines. This pressure comes mainly from large customers, who, among other things, can credibly threaten to bypass their local utility by generating their own electricity using small natural gas plants, or through municipalization (discussed later in this section). Promoting increased wholesale competition and introducing retail competition present three major challenges, which are discussed below.

UNBUNDLING GENERATION FROM TRANSMISSION AND DISTRIBUTION

To deliver power to final consumers, generating firms require access to the transmission and distribution facilities that utilities own and operate. These facilities appear to be natural monopolies, likely to remain subject to price regulation. This gives rise to a by-now familiar problem: if utilities are also permitted to generate their own power and sell it at unregulated rates, they will have an incentive to evade regulation by favoring their own generators and realizing profits through unregulated power sales. Such favoritism could involve cross-subsidizing the unregulated power generation business from the regulated transmission and distribution business or, more important, discriminating against outside generators in providing access to transmission and distribution networks.

If there were no significant economies of scope between generation and other functions, an obvious way to prevent discrimination would be to require separate ownership of regulated transmission and distribution assets and of unregulated generation assets. However, as discussed below, transmission and generation may be subject to important economies of scope. The challenge to policymakers and market participants is to devise solutions that balance potentially conflicting goals: preventing access discrimination, but without comprising the reliability of electricity supply, sacrificing economies of scope, or imposing excessive regulation.

The technological relationship between the generation and transmission of electricity is more complex than that between production and transportation in most other industries. Modern alternating-current transmission networks require tight and rapid balancing between power generated into and power withdrawn from the transmission grid. Storing electricity in significant volumes is generally impractical, and failure to balance power inflows and outflows can result within seconds in serious deterioration of system operation and widespread damage to equipment. The system is

much less tolerant than, say, gas pipelines, which can accommodate imbalances for longer periods through external storage and by changing the degree of gas compression within the pipelines. Moreover, electricity flows cannot be easily routed within an integrated transmission network; rather, power flows automatically and instantaneously along the path of least impedance. Imbalances at one point on the grid therefore can have widespread and unpredictable consequences throughout the network.

Although network operations are largely computerized, unforeseen contingencies can require central intervention by the grid operator: transmission constraints may result from unforeseen demand surges or equipment failures, requiring some generating sets to be unexpectedly dispatched and others turned off. In addition, there are common costs in operating a transmission network, such as maintenance of reserves, and charging individual generators for such costs requires a central authority. Operating such a complex system therefore requires the grid operator to have substantial control over at least some generating assets, and over some network functions that entail common costs.

Until now such complications have been addressed within the context of a vertically integrated industry, and through regional power pools and other voluntary associations. However, moving to a more competitive regime may require devising alternative institutions. Vertical integration opens the possibility that utilities would use their control of transmission to discriminate in favor of their own generating plant. And, as explained below, reliance on voluntary cooperation to resolve regional transmission issues may be more difficult in a competitive environment.

The FERC has addressed the issue of expanding transmission access by requiring utilities situated between one utility seeking to purchase power and another utility or independent power producer seeking to sell power to allow use of their transmission lines to complete the sale. At first efforts to expand access were episodic; for instance, approvals of utilities' merger requests were made contingent on their granting transmission access. The 1992 Energy Policy Act explicitly authorized the FERC to require wholesale transmission access upon request. The FERC is in the midst of an important rulemaking to establish a comprehensive framework for implementing open, nondiscriminatory wholesale transmission access: a utility would have to grant access to outsiders seeking to consummate wholesale transactions on the same terms as to its own generating facilities.

Important as these initiatives are, some observers believe that more will have to be done. Defining and policing against discriminatory access may be difficult when an integrated utility runs the grid. In addition, increased competition will strain the current sys-

tem of informal coordination between utilities, each operating transmission facilities that are connected into regional grids. Connecting such systems offers important advantages: it provides alternative transmission paths and economizes on redundant facilities, and it facilitates power sales to resolve temporary local imbalances between supply and demand or to benefit from differences in the cost of power over a wider region. Such informal coordination worked reasonably well in an era when utilities had exclusive franchises, but may become increasingly frayed in a competitive environment.

To address these concerns, some observers have proposed, and California regulators have recently endorsed, the formation of an "independent system operator." Investor-owned utilities and independent nonpublic generating companies would bid competitively to sell power into a regional grid. Utilities would retain ownership of transmission facilities but would turn over their operation under contract to an independent entity, which would manage the system on a regional basis. The operator would have authority over decisions such as how to respond to unforeseen contingencies and, under FERC oversight, how to price certain network services and allocate certain common costs. Although promising, this model also raises some questions. Can an operator be truly independent of utilities while they retain ownership of transmission and distribution? And will such a system cope well with coordinating investments in transmission and generation, given that different generating firms that rely on the grid can often have diverging interests?

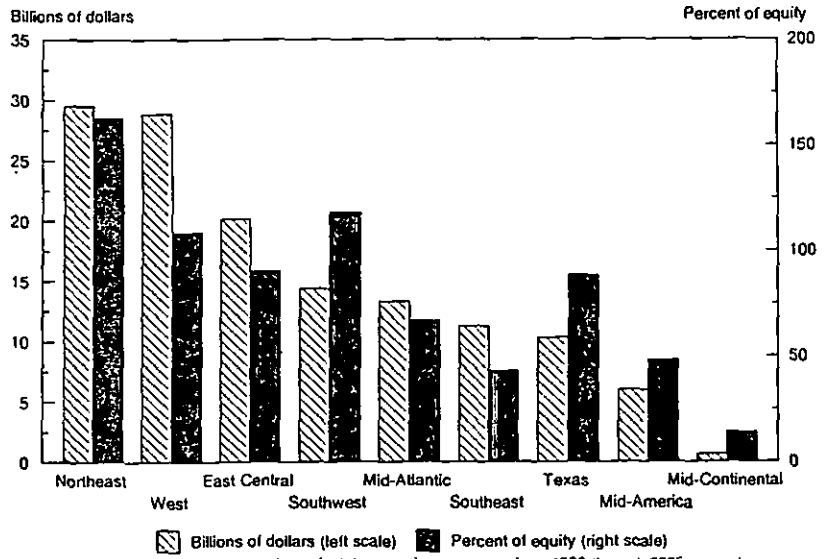
In short, moving toward a more competitive market in electric power generation will require innovations in both regulation and market institutions. Maximizing the benefits from competition will also require implementing pricing policies that more accurately reflect transmission congestion and the costs of generation at different times (peak and off-peak). Finally, the gains from increased competition beyond those already being realized from today's wholesale competition may be modest in the short run, because much of utilities' expenses are associated with past investments, and with fuel expenses, which cannot be greatly reduced.

Nevertheless, some efficiency gains could materialize even in the short run: from increased utilization of excess capacity, from superior operation and maintenance of existing plants, and from boosting labor productivity. In the longer run the gains may be greater, since generation accounts for about half of the cost of electricity to the end user, and increased reliance on competition rather than regulation could allow both better operating decisions and better investment decisions regarding the amount, mix, and speed of construction of new plant.

STRANDED COSTS

Allowing competition would put pressure on utilities' prices and customer base, threatening to create stranded costs. Stranded costs are those unamortized costs of prior investments that are scheduled for recovery through regulated monopoly rates but would not be recovered under competition. Stranded costs for the industry as a whole have been estimated at $135 billion—well over half the total equity value of all investor-owned utilities. Many of the vulnerable utilities are concentrated in California, New York, New England, Pennsylvania, and Texas (Chart 6–3 provides a breakdown by region). Many of these utilities would be threatened with bankruptcy if unfettered wholesale and, especially, retail competition were allowed without providing utilities assistance in covering stranded costs.

Chart 6-3 Potentially Stranded Costs of Investor-Owned Electric Utilities by Region
Northeastern electric utilities have the highest potentially stranded costs, both in dollars and as a percent of equity.



Note: Data are estimated present values of total costs minus revenues from 1996 through 2005, assuming a move to competition. Some utilities located in Texas are included in the "Southwest," and not in the "Texas" category.
Source: Moody's Investors Service.

One source of stranded costs is past investments that turned out differently than expected. In some cases nuclear power proved more expensive than projected, and gas prices much lower; therefore some investments in nuclear generators led to higher generating costs than those of modern gas-based plants at today's gas prices. Second, in many regions utilities overestimated power demand, leading them to build excess generating capacity. If this capacity were fully used under the pressure of competition, it would

drive the price of power down to the short-run marginal cost, and thus well below average cost (which includes sunk capital costs). Although such pricing promotes short-run efficiency, it would impose large losses on some utilities. Finally, stranded costs also arise from regulatory obligations imposed on some utilities but not on other suppliers, including requirements to buy power from PURPA-qualifying facilities at prices above today's market prices, to invest in pollution control equipment, and to fund demand conservation programs.

In unregulated markets the possibility of stranded costs typically does not raise an issue for public policy—it is simply one of the risks of doing business. However, there is an important difference between regulated and unregulated markets. Unregulated firms bear the risk of stranded costs but are entitled to high profits if things go unexpectedly well. In contrast, utilities have been limited to regulated rates, intended to yield no more an a fair return on their investments. If competition were unexpectedly allowed, utilities would be exposed to low returns without having had the chance to reap the full expected returns in good times, thus denying them the return promised to induce the initial investment. A strong case therefore can be made for allowing utilities to recover stranded costs where these costs arise from after-the-fact mistakes or changes in regulatory philosophy toward competition, as long as the investments were initially authorized by regulators.

The case for allowing recovery is even stronger where stranded costs arise from regulatory obligations imposed on utilities. Several States, notably California, required utilities to purchase power from qualifying facilities under PURPA at long-term contract prices based on high estimates of future oil and gas prices, even after utilities resisted purchasing all the capacity offered at the high prices. Utilities also were required to fit coal-fired generators with costly pollution control equipment, again with the expectation that costs would be recovered through regulated rates. Utilities should be allowed to recover such costs mandated by regulation.

To be sure, utilities should be granted recovery only of costs prudently incurred pursuant to legal and regulatory obligations to serve the public. Investments made after utilities are notified that competition is coming and are relieved of their obligation to serve should not qualify; and utilities must try to mitigate their losses. But recovery should be allowed for legitimate stranded costs. The equity reason for doing so is clear, but there is also a strong efficiency reason for honoring regulators' promises. Credible government is key to a successful market economy, because it is so important for encouraging long-term investments. Although policy reforms inevitably impose losses on some holders of existing assets, good policy tries to mitigate such losses for investments made

based on earlier rules, for instance, by grandfathering certain investments when laws and regulations change.

Because stranded costs are sunk, economic reasoning suggests that they should be recovered through mechanisms that do not artificially reduce power consumption. One possibility is a charge levied on transmission, but as a fixed fee rather than a marginal charge: customers would be required to pay specified amounts, based perhaps on their past consumption, regardless of their future use of electricity.

Since stranded costs reflect policy decisions, recovery should be borne broadly by all parties on whose behalf the stranded costs were incurred, including customers that switch to other suppliers. Consistent with this principle, the FERC proposed that wholesale customers departing a utility be assessed a contribution toward stranded costs. Although the FERC proposal would directly apply to stranded costs resulting only from increased wholesale competition, it could also serve as a model for States contemplating retail competition, and serve as the FERC approach to recovering stranded costs resulting from retail competition in the unlikely event that the State lacked authority to address the issue.

Most State discussions of initiatives to foster retail competition in fact have included, as an integral part, mechanisms to recover stranded costs. But some retail customers threaten to bypass this process, for example, by resorting to "municipalization." A municipal utility within the franchise area of an investor-owned utility may generate none or only some of its required power, and as a power reseller it qualifies for FERC-mandated wholesaler access to outside suppliers. Although municipal utilities typically serve legitimate functions, they might at times provide a loophole for avoiding fair sharing of stranded costs. A municipality might extend its boundaries to encompass the premises of a large industrial customer served by the investor-owned utility; that customer becomes eligible to buy power from outside suppliers, using the municipal utility as conduit. Such actions raise important issues of equity and cost-shifting, both for the local utility and for other customers in its franchise area that may be stuck with a larger share of stranded costs. The FERC has stated that municipalization should not be a vehicle to escape responsibility for stranded costs.

COMPETITIVE PARITY, UNIVERSAL SERVICE, AND ENVIRONMENTAL PROTECTION

For competition to work well, it must take place on a level playing field: competition will be distorted if producers are given selective privileges, or subjected to selective obligations imposed to further even legitimate social goals. This principle raises several issues as we move toward increased competition.

As competition grows, increasing distortions may result from some entities having access to special privileges such as federally tax-exempt bonds or other preferential treatment. Accordingly, re-examining special privileges of various entities may become more important.

On the other hand, producers should not be subjected to selective obligations. New ways must be found, as in the telephone industry, to address universal service, assist low-income consumers, and meet other social goals currently addressed through obligations on regulated monopoly utilities. Continuing to impose such requirements only on some producers would place them at a competitive disadvantage and imperil their ability to meet these obligations. Accordingly, these obligations would be better financed through more broadly based mechanisms.

Increased competition in electricity can also affect the environment. To reap the advantages of more efficient electricity markets and a cleaner environment, environmental policy will need to respond to any risks that restructuring may pose for environmental quality. But policy toward restructuring should also recognize those risks and, where possible, facilitate appropriate responses. For example, the burden of funding renewable energy sources or energy conservation programs to reduce pollution should be shared broadly, not placed solely on vertically-integrated utilities. Symmetrical treatment of all players will address environmental concerns more effectively and provide competitive parity.

CONCLUSION

Our telecommunications and electricity sectors are undergoing sweeping transformations, which hold the promise of increased reliance on market forces and competition, with potentially large dividends for consumers and business. To facilitate such transformations, regulatory and competition policy must adapt. Unnecessary legal restrictions on entry must be removed, and regulation must be reformed to better address those industry segments where monopoly power will persist. But blanket deregulation will not ensure an equitable, efficient, and durable transition to competition. To ensure a successful transition and protect important social goals, government will have to play an evolving but ongoing role.

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