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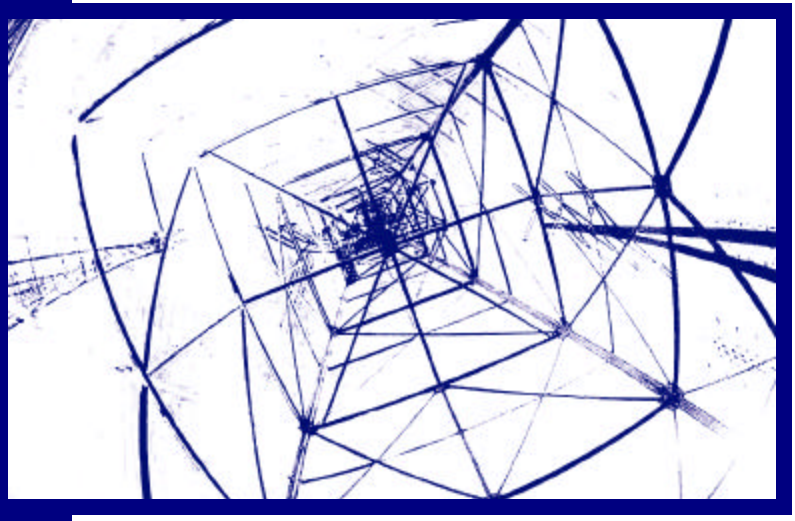
The State of Regulation: An Annual Examination of the Four Utility Sectors

July 2001



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The State of Regulation: An Annual Examination of the Four Utility Sectors

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Foreword

The U.S. public utility industries are vital engines of economic growth and provide essential services for the well being of consumers. State regulatory commissions are now more than ever challenged to encourage competitive markets and make sure that consumers benefit from change. This second annual NRRI review ranges across pressing issues in the telecommunications, energy and water industries. The review highlights transformation of the commissions themselves, the increasingly important job of consumer issues and education, and the development of broadband telecommunications services.

State regulatory commissions are now more than ever challenged to encourage competitive markets and make sure that consumers benefit from change.

In "Building Blocks of Regulatory Success," the first chapter of this volume, David Wirick notes that newly deregulated markets cannot be left entirely to their own devices. It takes work to make workable competition. Neither can regulation rely on traditional mechanisms. Mr. Wirick, who directs the NRRI program on commission transformation, reports on the trend towards commissions turning

outward, becoming less adversarial, and reestablishing consensus among stakeholders about regulatory methods and institutions. "Telecommunications Industry Restructuring," by Edwin Rosenberg and Vivian Witkind-Davis tracks developments in 2000 and early 2001 on the growth of competition and the difficult task of maintaining universal service. The chapter includes a snapshot of forms of regulation in the United States as of late 2000 and discusses the implications of longitudinal FCC data on service quality. The authors remark on the frustration policymakers feel at the glacial progress on telecommunications competition that encourages "fantasies of Congress playing Alexander of Macedon and cutting the Gordian knot."

If efforts to bring competition to the telecommunications industry caused frustration in 2000, deregulation in the electric and gas industries resulted in real pain. "The transition to a restructured energy industry walked into a tar pit in 2000," write the authors of the chapter on "Energy Industry Restructuring," when California wholesale electric prices skyrocketed and major companies were driven towards bankruptcy. Other states questioned the whole restructuring movement. Problems arose in natural gas utility service as well. High gas prices roiled consumers. In Georgia, implementation of a gas choice program proved more difficult than expected. Looking towards the development of long-term policy to protect consumers and provide intergenerational equity, NARUC turned attention to public benefits? how to continue assistance to low-income consumers, protect the environment and promote energy efficiency. Ken Rose, who serves as program manager of both NRRI's electric restructuring and market monitoring programs, Ken Costello, program manager for natural gas, and Mohammad Harunuzzaman, jointly authored the chapter.

In "The Millennium Bug (or Was It Something in the Water?)" John Wilhelm, manager of the NRRI's water program, notes the several efforts to contemplate the future of the water industry that occurred in 2000, perhaps

as some primal instinct to pause and look forward. The four studies examined common elements and themes. The chapter focuses on one of those? the need to replace and finance our nation's aging water infrastructure.

Fran Sevel, consumer affairs and education program manager, discusses "The Evolution of the Consumer Affairs Department" of state regulatory commissions. Changes have brought much greater importance and value to consumer affairs. These departments now handle many more inquiries and complaints from consumers, often about new problems brought on by the transition to competition. They must also take on consumer research, policymaking, enforcement and consumer education.

Finally, deployment of advanced telecommunications capabilities is addressed in "Broadband Connections" by Vivian Witkind-Davis. The chapter focuses on the need for facts on how fast deployment is occurring before a policy maker can decide whether it is fast enough. In 2000 there was considerable progress mapping the digital divide. The results suggest that it could take a couple of decades before broadband capabilities, as currently defined, are universally available. In the meantime, more research is needed on factors that predict success of broadband deployment efforts.

"May you live in interesting times," the Chinese proverb, may be considered a curse or a blessing. These times for oversight and nurturing of the public utility industries are interesting, exciting and extremely challenging.

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The Building Blocks of Regulatory Success in the New Era

> *They would be subject to no one, neither to lawful ruler nor to the reign of law, but would be altogether and absolutely free. That is the way they got their tyrants, for either servitude or freedom, when it goes to extremes, is an utter bane, while either in due measure is altogether a boon.*
>
> Plato[1]

DAVID WIRICK *is an Associate Director. He created and leads the NRRI's program to provide assistance to state public utility commissions engaged in transformation in response to changing utility and regulatory environments.*

He has worked directly with many states and regulators making presentations on change, facilitating workgroups, assessing organizational readiness for change, evaluating organizations and processes, and helping them develop strategies for effective regulation in a changing environment. He has also authored reports and articles on a wide variety of topics.

He is a mediator, a mediation trainer, and a Certified Management Accountant. He holds an M.P.A. from the Ohio State University in Public Policy.

A sentiment prevails in some quarters that the economy, and in specific, public utility service provision would be well served if the fetters of regulation were removed and markets were freed to govern utility and consumer behavior. Those sentiments have taken life in substantial changes in the way that portions of public utility service are currently regulated. Despite some successes in infusing competition into markets and the application of market-based regulation and the potential for still more, however, many knowledgeable observers are less than optimistic about the chances for market success and are unwilling to allow regulation to inappropriately atrophy.

If it is incorrect to presume that markets should be left completely to their own devices, it is also incorrect to presume that regulation of utility service provision should rely on traditional control mechanisms. We have, for better or worse, entered a new era, an era in which the effectiveness of control mechanisms is waning. According to William Ury:[2]

What is necessary is to identify that "due measure" of regulation and market freedom of the sort sought by the Platonic ideal.

> the old authoritarian hierarchies are tumbling down; the father, the boss, the chief, the king [and the traditional regulator?] cannot simply give orders anymore. Increasingly, we cannot compel others to do what we want; we depend more and more on voluntary cooperation. We have little choice but to learn how to make our decisions jointly. [Phrase in parentheses added by the author.]

In this era of demand for regulatory reform and changing decision-making structures, what is necessary for effective service delivery and simultaneous protection of public interests is to identify that "due measure" of regulation and market freedom of the sort sought by the Platonic ideal, avoiding the bane of either extreme.

Clearly, many public utility commissions recognize the changes demanded of them and have set out to modify their operations and methods in pursuit of new regulatory methods and new relationships with stakeholders. In general, they are:

- Turning outward. In addition to the use of competitive markets, commissions are becoming more attentive to the needs of consumers and the concerns of legislators. Creating methods of gathering more information and finding ways to encourage dialogue about utility sector issues are on the agenda in many states. Though some commissions regarded a relationship with the state legislature in the past as unnecessary or even inappropriate on the grounds of "judicial" independence, it is hard today to find a state regulatory commission that is not serious about bettering its legislative relationships.
- Attempting to become less adversarial. Regulation was

predominantly based in the past on adversarial, quasi-judicial processes. There is now more recognition that those processes, though still effective for some purposes, are limited in others and create unintended outcomes that may not serve the public interest. According to Carrie Menkel-Meadow, adversarial processes force parties into "attack and defensive postures which then may inhibit creativity in finding solutions;"[3] Gregory Bateson says, they lead to "symmetrical schismo-genesis" in which each party does more of the same thing in reaction to the other;[4] Alfie Kohn's assessment is that adversarial processes lead to mutually exclusive goal attainment, in which my success is dependent on your failure.[5] Today, alternative means of dispute resolution are getting more attention at federal and state regulatory commissions.

- Reestablishing consensus among stakeholders about regulatory methods and institutions. To be effective, regulatory processes and institutions must operate with the consent of those they govern. That consensus has eroded in some cases and many stakeholders are seeking new ways to pursue their legitimate interests, ways that may serve to end the monopoly that public service commissions maintained over the development of utility policy. Commissions are also actively seeking to build new relationships with legislators, relationships that were once thought unnecessary or which were damaged in the industry restructuring process.

> Implementing this model of regulation will take time, substantial change in commission skills and roles, and an extensive dialogue between commissions and a wide array of stakeholders.

If regulatory commissions are to remain relevant and effective, in addition to these general directions they need to refocus their missions, processes, and skills. Figure 1 illustrates a five-part model for regulatory agency success in

the new era. The elements of that model include:

1) Unbiased, independent enforcement of industry laws and policies. Even though commissions are becoming more involved in industry-wide policy-making, they will still need to accomplish company-specific functions. When issues involving an individual firm are before a commission, due process protections will remain imperative. When commissions exercise their power to sanction or penalize individual firms for violation of standards, they should continue to operate free of political influence using appropriate quasi-judicial procedures.

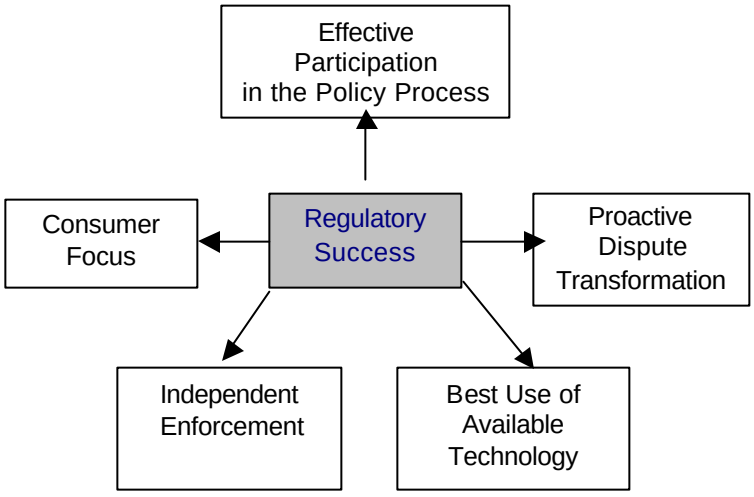

Figure 1: Five building blocks of regulatory agency success.

2) Effective participation in policy-making processes. When commissions make policy, they must operate in concert with other policy-making bodies. Legislators and other agencies have roles in policy making; the policy-making "space" must, therefore, be shared between commissions, who hold substantial expertise in these fields, and legislators, who are ultimately responsible for policy success or failure. Successful commissions will find ways to support legislative decision-making and apply their expertise in the public interest, sometimes on an issue-by-issue basis as legislative preferences for involvement change.

3) Proactive dispute transformation. William Ury has described a conflict transformation model that relies more on prevention and collaborative resolution than intervention, which has been the principle tool applied by regulatory commissions.[6] He suggests that a valid strategy for dispute transformation is "contain if necessary, resolve if possible, best of all prevent."[7] That simple model, however, turns the typical model of

regulatory commission operations on its head. Some commissions have begun to employ education as a means of preventing problems and collaborative processes as a means of resolving them. In the current utility and societal environments, more use of these types of dispute trans-formation processes will be required.

4) A consumer focus. The traditional focus of regulatory commissions has been on the industries that they regulate. Increasingly, consumers are becoming more powerful and demanding of high levels of service. As this happens, public interest goals may be effectively and efficiently accomplished through commission attention to their needs and decreased attention to the internal workings and financial structure of service providers.

5) The best use of information technology. The availability of information and the speed with which it can be processed will surely change the regulatory environment and regulatory institutions. Currently, regulatory commissions are seeking to employ modern information technology largely to support traditional processes through the use of electronic filing and docket management systems. A wider view of the use of information is required along with integration of information systems into the strategic direction and mission of the commission. New sources of information will be necessary for interacting with consumers and monitoring markets, and information that supports the performance assessment of commissions will need to be gathered. What is required is an analysis of the "infor-mation ecology" of the regulatory process.[8]

Implementing this model of regulation will take time, substantial change in commission skills and roles, and an extensive dialogue between commissions and a wide array of stakeholders including legislators, consumers, and service providers. New commission skills will be required in information gathering and dissemination; mediation, arbitration, and facilitation; market analysis and monitoring; and consumer interaction. New roles for commissioners will be

required as well. Though their judicial role may be reduced, they will need to become policy leaders, advocates of conflict resolution, consumer advocates, legislative advisors, facilitators, and chief information officers. They need not be the ones at the commission most expert in the latest technology but those insistent on the collection, dissemination, sharing, and use of the best available information that facili-tates the accomplishment of the commission's mission.

The result of this extensive effort may be the creation of regulatory agencies that possess a wide array of skills that can be applied as appropriate, thereby decreasing reliance on the one-size-fits-all application of quasi-judicial and adversarial processes. What should also result is a better relationship among all of the stakeholders in the public utility policy-making process, thereby formally and permanently ending the sole hold on that policy by public utility commissions. Finally, this effort should result in a regulatory system that optimizes the use of markets and regulation in a manner that would do justice to the due measure and balance that Plato believed so vital.

Endnotes

[1] Plato, Eighth Letter as cited by Robert Grudin, *The Grace of Great Things* (New York, NY: Ticknor and Fields, 1990), 127.

[2] William Ury, *The Third Side* (New York, NY: Penguin Books, 2000), 198.

[3] Carrie Menkel-Meadow as cited in Deborah Tannen, *The Argument Culture: Moving From Debate to Dialogue* (New York, NY: Random House, 1998), 164.

[4] Gregory Bateson as cited in Deborah Tannen, *The Argument Culture*, 165

[5] Alfie Kohn, *No Contest: The Case Against Competition* (Boston, MA: Houghton Mifflin, 1986), 4.

[6] William Ury, *The Third Side*.

[7] Ibid., 113.

[8] The phrase "information ecology" is used and explained in William Davenport with Laurence Prusak, *Information Ecology: Mastering the Information and Knowledge Environment* (New York, NY: Oxford University Press, 1997).

Telecommunications Industry Restructuring

The Telecommunications Act of 1996 envisioned both robust competition in telecommunications markets and a fulfillment of universal service principles. Five years later, this vision is not realized, says Phyllis Bernt in a recent assessment.[1] Competition is growing in all telecommunications markets (local, short-haul long distance, and long-haul long distance), although—especially for residential local access—much more slowly than expected. State regulatory commissions in 2000 continued to promote competition, wrestling with difficult issues that included unbundling of network elements, sharing telephone lines with data services, reciprocal compensation, and number conservation.

Commissions also worked on unraveling the tangled web of pricing rules for subsidies that promote universal service. Telephone subscribership is high in the United States, although there are geographic areas and demographic strata where it

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His research at the NRRI has included analysis of competition and market power issues, universal service policies, merger and acquisition analysis, rights-of-way policies, incremental cost-based pricing, alternative regulation, regulation of regional telecommunications holding companies, and contract pricing of electric and telephone service.

He received his Ph.D. in Economics from North Carolina State University. He is a member of the American Economics Association and its Transportation and Public Utilities Group. He is also an active member of the NARUC Staff Subcommittee on Telecommunications.

VIVIAN WITKIND-DAVIS *is Associate Director for Research. She is currently conducting research on state efforts to encourage deployment of advanced telecommunications capabilities.*

is relatively low. Policies preventing disconnection are one means of improving this picture. Access charge reform was on the table for restructuring in 2000 and was achieved for the largest telephone companies. Smaller and rural incumbent local exchange carriers (ILECs) asked for similar treatment in the fall of 2000.

While the major emphasis in telecommunications is on building competition and continuing or expanding universal service, state commissions still regulate monopoly providers of local service. The majority of states use price-cap regulation, which encourages ILEC efficiency but still protects customers. Commissions are also concerned about telecommunications service quality, especially given evidence of declines for some companies on some quality-of-service measures.

Growth of Competition[2]

Although competition has evolved somewhat more slowly than many people predicted when the 1996 Act was passed, it is growing and it is growing rapidly.[3] As of December 31, 2000, competitive local exchange carriers (CLECs) reported 16.4 million (or 8.5 percent) of the approximately 194 million local telephone lines in service to end users nationwide, compared to 8.3 million (or 4.4 percent) of nationwide end-user lines at the end of 1999. This represents a 97 percent growth in CLEC lines and a 93 percent increase in CLEC market share in a single year. Moreover, even though total end-user lines grew by 4.19 million during 2000 (from 189.63 million to 193.82 million), the number of lines served by ILECs actually declined by 3.89 million, from 181.31 million to 177.42 million.[4]

Although competition has evolved somewhat more slowly than many people predicted when the 1996 Act was passed, it is growing and it is growing rapidly.

CLEC activity also showed considerable geographic dispersion. Although CLEC activity is greatest in the most populous states at least one CLEC reported data to the Federal Communications Commission (FCC) from all states (with the exception of Hawaii), the District of Columbia and Puerto

Rico. Moreover, at least four CLECs reported serving customers in thirty-four states and the District of Columbia. CLECs served the greatest number of lines in New York (2.77 million), while California, Florida, and Texas each had more than one million CLEC lines, and Pennsylvania was just short of a million CLEC lines. New York also led the way in percentage terms with 20 percent of lines served by CLECs, but CLECs reported serving between 10 and 15 percent of lines in nine states (Georgia, Illinois, Iowa, Kansas, Louisiana, Massachusetts, Minnesota, Pennsylvania, and Texas).

The geographic dispersion is also evidenced by the fact that 56 percent of zip codes nationwide were served by at least one CLEC. Furthermore, the FCC reported that nearly 88 percent of households reside in those zip codes. Moreover, 66.5 percent of households reside in the 28.2 percent of zip codes served by at least three CLECs, and 26.9 percent of households reside in the 8.8 percent of zip codes served by at least seven CLECs. In California, Florida, Georgia, New York, and Texas, at least 20 percent of the zip codes had at least seven CLECs. In addition, the 77 providers of mobile wireless telephone services that reported year-end 2000 data served about 101 million subscribers, and the number of wireless subscribers continued to increase at a rapid rate, showing a 27 percent increase during 2000.

About 35 percent of CLECs' end-user lines were provided over their own local loop facilities. To serve the remainder of their customers, they resold the services of other telephone companies or leased unbundled network element (UNE) loops. At year-end 2000, ILECs provided about 6.82 million resale lines, compared to about 4.65 million at the end of 1999, and they provided over 5.27 million leased UNE loops, compared with 1.47 million a year earlier.

It must be noted, however, that CLEC entry has focused mainly on non-residential customers, as evidenced by the fact that, as of year-end 2000, only 41 percent of CLEC local lines served residential and small business customers.[5] In comparison, 79 percent of ILEC lines served residential and small business customers. Several

forces portend even more competition soon. One results from the merger agreement that gave SBC permission to merge with Ameritech. Under that agreement, SBC agreed to enter thirty of the fifty largest metropolitan areas outside its combined home territory. In these markets, SBC will be a CLEC. As of late 2000, SBC has entered nine.[6] As SBC moves into the others, competition should be enhanced. In addition, SBC agreed to go the extra mile in opening local markets within its home territory to CLECs.[7]

Several forces portend even more competition soon

Unbundling

Two of the major issues surrounding local competition include: (1) how to determine which of the ILEC's network elements must be made available to competitors, and (2) how these elements should be priced. Those services must be priced at a reasonable level if competition is to develop. Pricing them too high will impede competition and may lead to inefficient investment in alternative facilities; pricing them too low, on the other hand, will slow the pace of deployment of alternative networks and lead to the ILECs subsidizing the CLECs.

Unbundling Rules

Late in 1999, the FCC clarified its unbundling rules[8] in response to the 8th Circuit Court of Appeals' remand of its original Order.[9] The circuit court had said that the FCC had not taken into consideration the "necessary and impaired" standard in its original determination of which elements must be unbundled and made available to competitors. In its revised view, the FCC defined an element as *necessary* if competition is precluded without it; a competitor is *impaired* if competition is materially diminished without it.

In addition, UNEs must be deaveraged into at least three price zones? typically urban, suburban, and rural. States had until May 1, 2000, to implement deaveraging or obtain a waiver from the FCC. A requirement for efficient entry into local tele-communications markets is that potential entrants face a perceived cost

of entry that reflects the actual economic cost of that entry. In an environment where price signals are distorted by cost averaging over wide areas, efficient entry is not likely to result. Deaveraging is intended to promote efficient competition by giving more accurate price signals to potential entrants. Deaveraging will force the prices charged for elements, such as loops, closer to their actual forward-looking costs by removing the subsidies created through statewide averaging. However, deaveraging at the wholesale level without concomitant rebalancing at the retail level may create distortions that favor one carrier over another, and retail rebalancing has implications for universal service funding, especially since retail deaveraging may lead to questions of affordability and comparability.[10]

The Telecommunications Act of 1996 requires that just and reasonable rates for network elements be "based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element."[11]

In 1996, the FCC determined that prices for interconnection and UNEs should be based on the TELRIC (total element long-run incremental cost) or FLEC (forward looking economic cost) of network elements or functions.[12] Moreover, the FCC argued that these costs should be based on an ILEC's existing wire center locations (central offices or switches) using the most efficient technology available in the industry, regardless of the technology actually used by the ILEC and furnished to the competitor.[13]

This requirement has created considerable controversy. Although many states adopted TELRIC in one form or another for pricing UNEs and interconnection, some ILECs felt that the application of this pricing concept would put them at a disadvantage relative to the CLECs. This issue, along with others, became the subject of litigation. The ILECs' position was that TELRIC pricing would not allow them to recover their investment in embedded networks, which could lead to an unconstitutional taking.

On July 18, 2000, the 8th Circuit Court of Appeals remanded the FCC's use of

a hypothetical network using the most efficient available technology. The court did not remand the use of a forward-looking incremental cost standard *per se*, but it stated that the basis for determining forward-looking costs must be the ILEC networks currently in place, rather than a hypothetical network. The Court held that the UNE prices must be based on the cost of providing the actual facilities and equipment that will be used to provide the UNEs to the CLEC.[14]

The issue is not settled. On January 22, 2001, the Supreme Court granted writs of certiorari[15] and will hear argument on several issues, including (1) whether the court of appeals erred in holding that the Telecommunications Act of 1996 forecloses a cost methodology based on the efficient replacement cost of existing technology for determining the interconnection rates that CLECs must pay ILECs, (2) whether the court of appeals erred in holding that neither the takings clause nor the Telecommunications Act requires incorporation of an ILEC's "historical" costs into the rates it charges CLECs for access to its network elements, and (3) whether regulators are prohibited from requiring ILECs to combine certain previously uncombined network elements when a CLEC requests the combination and agrees to compensate the ILEC for performing the combination. Resolution on these issues will be found in the Supreme Court's decision, which is expected in early 2002.

Line Sharing

Under a 1999 FCC order, CLECs can obtain access to the high-frequency portion of the ILEC's local loop.[16] The FCC directed ILECs to share their telephone lines with providers of high speed Internet access and other data services.

Allowing CLECs to provide digital subscriber line (DSL)-based services over the same telephone lines simultaneously used by the ILEC promotes competition for advanced services. Line sharing does not affect the ILEC's ability to offer either DSL service or voice service but it does put CLECs on a more equal footing with the ILEC. There are, however, some "separations" implications of the FCC's position, because the local loop must

be upgraded to offer DSL and line sharing (there are line-conditioning and provisioning costs), and 75 percent of loop costs are in the local jurisdiction. Thus, although DSL is an interstate service, it may impose costs on the intrastate jurisdiction.

Other issues surrounding DSL provision and line sharing include the time allowed for provisioning an unbundled DSL line, pricing the high frequency portion of the shared line, collocation of the CLEC's digital subscriber line access multiplexers (DSLAMs), and whether to require sub-loop unbundling or line splitting so that CLECs can put their line cards in ILECs' remote terminals. As is usually the case, many of the issues result from a desire to ensure parity or equal access for competitive DSL providers relative to the ILEC's affiliated DSL providers.

Reciprocal Compensation

The question of inter-carrier compensation for terminating traffic on other networks arises with the entry of CLECs into local telephone markets. So long as traffic flows are reasonably balanced between networks, no problem exists. Major imbalances, however, may create distortions, especially when residential customers are served under flat-rate tariffs, which do not allow for per-minute charges for local calls. Internet Service Providers (ISP)-bound calls, which generate significant one-way traffic across networks, have been a source of contention between ILECs and CLECs, especially CLECs that built their business plan around serving ISPs and collecting reciprocal compensation payments. ILECs argue that it is inequitable for them to have to pay unlimited per-minute reciprocal compensation payments for ISP-bound calls, especially when they have no mechanism for recovering those payments from the originating consumer.

In 1999, the FCC ruled that dial-up calls to ISPs are generally interstate in nature, although they might be subject to intrastate reciprocal compensation rules or agreements.[17] Numerous states have addressed this issue,[18] and the courts have generally upheld state authority to require reciprocal

compensation where called for under the terms of an interconnection agreement.

In April 2001, the FCC gave something to each side in the debate over reciprocal compensation for dial-up traffic to ISPs. ILECs got an immediate cut in the rates they pay CLECs for terminating such traffic; CLECs got a gradual reduction rather than an immediate and total elimination of reciprocal compensation payments.[19] The FCC also opened a proceeding to consider a range of inter-carrier compensation issues.[20]

Over time this issue may become less important as a greater proportion of Internet traffic moves from dial-up modem access to DSL or cable modem access; but so long as the number of Internet users continues to increase and the number of dial-up modem users increases, the question of reciprocal compensation will exist. Congress is considering legislation that will foreclose states or the FCC from requiring reciprocal compensation for calls to ISPs. The FCC's recent actions may forestall Congressional action on this issue.

Number Conservation

The FCC in 2000 established new policies and rules to conserve telephone numbers, thereby reducing the need for new area codes, since area-code splits are disruptive and ten-digit local dialing is not favored by most consumers.[21] The new rules are intended to make the numbering system more compatible with the increasingly competitive telecommunications environment. Without more efficient use of numbering resources, entrants may find themselves blocked because they are unable to obtain a sufficient allocation of numbers in an area that is approaching number exhaustion.

The rules adopted by the FCC created national standards to address numbering resource optimization. Possible policies to conserve numbering resources might include: allocating numbers in blocks of 1,000 rather than the 10,000 number blocks generally used until now;[22] adopting a uniform set of definitions, criteria, and data reporting to increase carrier accountability and incentives to use numbers efficiently; establishing numbering resource reclamation

requirements to ensure the return of unused numbers to the inventory for assignment to other carriers; consolidating rate centers to reduce the quantity of numbers a carrier would need to serve an area; and using technology-based overlay area codes.

In addition, the FCC asked for comments on questions including: which costs associated with implementing number pooling should be recovered; whether charging carriers for numbering resources is a viable means of promoting more efficient utilization; what utilization threshold carriers must meet before they may obtain growth-numbering resources; and the appropriate time frame for imposing 1,000-block pooling on wireless carriers.

One State's Approach to Promoting Competition

If over some reasonable time existing structures and rules fail to produce a competition-friendly environment leading to real choices for consumers, policy makers might consider whether structural adjustments are needed. For example, in 1999, the Pennsylvania Public Utility Commission (PUC) ordered Bell Atlantic-Pennsylvania (Verizon Pennsylvania) to structurally separate its wholesale network functions from retail functions.[23] In addition, the PUC's Order required Verizon Pennsylvania's retail arm to follow the same procedures as CLECs in accessing the wholesale unit's network.

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The PUC's concerns are worth noting.[24] Verizon Pennsylvania controlled bottleneck facilities such as local loops and switches, as well as more than 90 percent of the local retail service market. In the PUC's view, the inherent conflict between Verizon Pennsylvania's dual roles as both supplier to and competitor with other local exchange carriers created a potential conflict of interest that is likely to lead to a tilted playing field.[25] Thus, the PUC expressed a belief that structural separation was the most

efficient means of opening and maintaining truly competitive local exchange markets.[26]

Recently, however, the PUC stepped back from requiring full structural separation, at least for now. On March 22, 2001, the PUC decided against requiring Verizon Pennsylvania to split into completely separate wholesale and retail units. Instead, the PUC ordered a *functional* separation under which Verizon Pennsylvania will continue to operate as a single company, but its wholesale and retail divisions must conduct their affairs at arm's length. The functional separation would apply a strict code of conduct to assure non-discriminatory access to the phone system for Verizon Pennsylvania's retail arm as well as for its competitors. In addition, the PUC substantially increased fines Verizon Pennsylvania would have to pay for violating per-formance standards. Moreover, the PUC warned that if Verizon Pennsylvania didn't accept the functional separation plan, the result might be full structural separation in the company's proceeding under Section 271 of the Telecommunications Act.[27]

Subsequently, Verizon Pennsylvania accepted the terms of the Pennsylvania PUC's order requiring functional separation of the company's wholesale and retail units.[28] Functional or structural separation is also under consideration in the energy sector[29] and such measures are being suggested in other jurisdictions.[30]

Universal Telecommunications Service

Telephone subscribership has generally been increasing over time. The FCC's latest report on telephone subscriber-ship levels in the United States says that, as of November 2000, 94.1 percent of households in the United States had telephone service.[31] The national number is up 2.7 percent from the November 1983 report. Moreover, universal service programs, including Lifeline, have been especially successful at improving subscribership among low-income households.[32] In fact, the number of households without a phone actually decreased by 14.9 percent (from 7.4 to 6.3 million) from November 1983 to November 2000,

even though the number of households increased by 24.1 percent (from 85.8 to 106.5 million).[33]

The FCC's report shows that subscribership varies by state, income level, race, age, household size, and employment status. The single most significant factor determining whether a household has a telephone appears to be income. The 2000 average telephone penetration rate for households with annual incomes below $5,000 was 80.0 percent, while the rate for households with incomes over $75,000 was 98.4 percent. Nonetheless, even when adjusted for income, penetration levels for minority households tend to be lower than for white households.[34]

Although the overall telephone penetration rate is high, there are pockets of low penetration (on tribal lands, for example) that may require more tightly focused policy approaches. Indeed, the FCC has announced a series of initiatives intended to improve access to telephone service on unserved and underserved areas, including tribal lands.[35]

Price is only one factor determining whether a household has a phone. Many households without telephones had telephones at some point but dropped off the network or were disconnected for non-payment. Special policies might be aimed at keeping these households on the network or getting them reconnected once disconnected. As of December 1998,eighteen states had implemented some form of "do not disconnect" (DND) policy, which prohibits local exchange carriers (LECs) from disconnecting a consumer from the local telephone network so long as the consumer pays the *local* portion of the telephone bill.[36] In states without a DND policy, a LEC can present customers with an ultimatum: either pay the phone bill in its entirety (local charges plus long distance and other types of charges), or be disconnected from the network entirely. In states with a DND policy, consumers who pay the local portion of their bill cannot be disconnected from the local telephone network. Some states have a "soft" or "warm" dial tone, which allows

Price is only one factor determining whether a household has a phone.

disconnected customers to call 911 and the LEC's business office so that service can be re-established. In addition, long distance or other companies with unpaid charges may discontinue services to customers who don't remit payment.

In some states with a DND policy, the LEC has discretion on how to apply whatever funds the consumer remits, and, unless the consumer specifies which portion of the bill is being paid, the LEC may prorate partial payments across all charges. Upon finding that the local telephone charges were not paid in full, the LEC may still disconnect the consumer, even though she has paid enough to cover the local charges on the bill. A stronger DND policy assigns payments to basic local charges first; monies left after basic charges are covered go to enhanced and toll services.

Between 1984 and 1999, penetration rate increases were greater for states with DND policies in effect for more than five years than for states that either did not have a DND policy or had one in effect for fewer than five years. This indicates that the beneficial effect on penetration might not be noticeable for several years. The difference in penetration rates for households with incomes below $10,000 was especially striking. In March 1999, states with a DND policy in place for at least five years had a penetration rate of 90.6 percent for households with less than $10,000 income. The penetration rate for households with incomes below $10,000 was 84.2 percent in states without a DND policy.

Universal Service Support in Rural Areas

The universal service provisions of the Telecommunications Act of 1996 charge the Federal-State Joint Board on Universal Service and the FCC to promote the availability of quality services at just, reasonable and affordable rates; increase access to advanced telecommunication services throughout the nation; advance the availability of such services to all consumers, including those in low-income, rural, insular, and high-cost areas at rates

> Few tasks have proven to be more challenging than that of ensuring affordable and comparable rates in all areas of the country.

that are reasonably comparable to those charged in urban areas.[37] Few tasks have proven to be more challenging than that of ensuring affordable and comparable rates in all areas of the country.

On September 29, 2000, the Rural Task Force (RTF), a group that included NARUC commissioners from rural states, representatives of small ILECs, CLECs, and interexchange carriers (IXCs), proposed that the FCC's forward-looking proxy cost model, which had been adopted to determine the level of support in high-cost areas served by non-rural companies, not be used in rural areas.[38] Subsequently, the Federal-State Joint Board on Universal Service made a recommendation to the FCC that incorporated the RTF proposal.[39] The RTF proposal was that universal service support for rural areas be based on a modified version of the current high-cost loop support mechanism—which is based on carriers' embedded costs.[40]

The RTF also proposed various upward adjustments to current limits on high-cost loop support for rural carriers and recommended that per-line support levels within a study area become fixed once a competitive eligible tele-communications carrier (ETC) begins providing service in a study area.[41] In addition, the RTF proposed the use of a new annual index to adjust the limits on high-cost loop support and to adjust per-line support levels in competitive study areas on a going-forward basis.[42] The RTF also proposed additional support for investment in high-cost telephone exchanges acquired by rural carriers and extra support in years in which rural carriers experience rapid growth in telecommunications plants in service.[43] On May 10, 2001, the FCC modified the existing universal service support mechanism for rural LECs to ensure that telephone service is affordable and reasonably comparable throughout the country. Specifically, the FCC adopted an interim embedded, or historical, cost mechanism for a five-year period to provide predictable levels of support to rural carriers. The FCC indicated that its action was based on the RTF's recommendations.[44]

Pricing Issues

Jurisdictional Separations

The Federal-State Joint Board on Separations recommended in July a five-year freeze of all Part 36 (Jurisdictional Separations rules) category relationships and allocation factors for price-cap carriers and a freeze of the allocation factors for rate-of-return carriers.[45] The frozen allocation factors are to be calculated based on carriers' data from the twelve months prior to issuance of the FCC's final Order; the proposed freeze is mandatory, would apply to all carriers subject to the Part 36 rules, and should remain in effect for five years, unless the FCC takes further action in response to a further Joint Board recommendation before the five years have elapsed.

During the five-year freeze period, the Joint Board recommended that it and the FCC should continue to review issues regarding separations reform. Moreover, if the FCC finds that Internet traffic is jurisdictionally interstate, the Joint Board recommended that the local dial-equipment minutes (DEM) factor be frozen for the duration of the five years at some substantial portion of the current year level based on data from the twelve months preceding the implementation of the freeze. The Joint Board recommended that the precise percentage of the current year's local DEM should be established according to how much of a reduction in local DEM is warranted in light of any effects that Internet usage has had on jurisdictional allocations or consumers.

On May 11, 2001, the FCC stated that it wanted to stabilize and simplify the separations process and continue to work on more comprehensive separations reform.[46] Therefore, the FCC adopted the Joint Board's recommendation for an interim freeze on the Part 36 [47] jurisdictional separations rules. The interim freeze will be in place for a period of five years or until the process of comprehensive separations reform has been completed, and it applies to all category relationships and allocation factors for price cap carriers and to all allocation factors for rate-of-return carriers.[48] Because it did not believe that the record allowed quantification of the impact of the Internet on a nationwide basis with any degree of accuracy, the FCC did not adopt the Joint Board's

recommendation to reduce local DEM to compensate for the impact of the Internet on local calling patterns. Rather, the FCC deferred consideration of this issue.[49]

Access Charge Reform

The CALLS Plan

The Coalition for Affordable Local and Long Distance Services (CALLS group), composed of AT&T, Sprint, and four of the largest ILECs proposed in July to revise the access charge system. The suggested changes relied largely on shifting from per-minute line charges in the access charges paid by IXCs to per-line fees that ILECs would levy on end users. Over five years, the plan was projected to cut about $5.6 billion out of access charges paid by the IXCs. Higher local rates from raising the subscriber line charge (SLC) would replace much of that revenue.

On paper it appeared that ILECs would recoup their per-minute access-rate cuts through the increased SLC on local bills. One major ILEC was concerned, however, that state freezes, price caps on local rates, and other factors might preclude it from recovering the lost access revenues from local end users. There was also some concern as to whether IXCs would, in fact, pass the reduced access charges along to end users. Nevertheless, on May 31, 2000, the FCC adopted a modified version of the CALLS plan.

Under the plan adopted by the FCC, interstate access charges are reduced by a total of $3.2 billion. AT&T and Sprint will no longer charge “minimum bills” for low-use customers. The presubscribed inter-exchange carrier charge (PICC) was eliminated, and the interstate SLC will be raised gradually from $3.50 per month to a maximum of $6.50 per month.[50] A $650 million interstate universal service fund was created from a surcharge on interstate revenues, and federal universal service support will be shown as a line item on customers’ bills.

One advantage of the new plan is that it is more competitively neutral, because the new fund will be available to any carrier serving high-cost areas or customers. In contrast, the implicit universal service subsidies under the old access charge system were available only to ILECs. In addition, the new

system is more economically efficient in that it eliminates reliance on a usage-based charge to recover the interstate portion of the fixed loop cost.

The MAG Plan

The CALLS plan applies to the large, non-rural ILECs. On October 20, 2000, a group of medium and small non-price-cap ILECs called the Multi-Association Group (MAG) filed a plan referred to as the MAG plan with the FCC.[51] The general features of the MAG plan are similar to those of the CALLS Plan, except that it was designed to meet the needs of the smaller and rural ILECs.[52] The MAG plan provides for access reform and increases in interstate universal service, proposes an optional incentive regulation plan for non-price-cap ILECs, and shifts costs currently recovered through per-minute access charges to higher end-user charges (SLCs) and to a larger federal universal service fund by eliminating the current funding caps on high-cost loop support for rural carriers. Because non-price-cap LECs would be allowed to elect an optional form of incentive regulation based on investments undertaken over the next five years, the MAG plan's proponents argue that it would promote deployment of advanced services to rural areas.

The MAG plan focuses on reducing per-minute access rates and moving toward recovery of common line costs through flat, non-traffic sensitive charges. Thus, it may improve efficiency by aligning access rate structures more closely to the way common line or loop costs are incurred. Moreover, its proponents believe that a more efficient access cost recovery method will promote competition and lower rates.

The MAG plan provides for a new, explicit interstate access universal service subsidy to deal with any shortfall in carriers' revenues. To the extent that explicit and portable universal service support replaces implicit subsidies in the current access rate structure, competition for local service in rural areas might be improved. Also, because IXCs would be required to pass through to consumers any savings realized from lower access rates resulting from its implementation, the MAG plan encourages rate and service comparability between urban and rural areas, so IXCs could offer rural consumers the

same optional calling plans offered to urban consumers.[53]

Price Caps for Telephone Service

Most state regulatory commissions use price-cap regulation to keep a lid on prices charged by major telephone companies for basic service during the hoped-for transition to competition. Price caps are intended to protect consumers while enabling the companies to improve efficiency so they can compete with entrants. A crucial question for state regulators, especially those faced in the near future with re-upping or replacing price-cap regimes, is whether price caps are working as planned. A recent NRRI publication by Jaison Abel examines that issue and comes to the conclusion that in some ways price caps have worked well and in others not.[54]

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Price caps is a form of regulation that allows prices to increase annually with inflation, less an estimate of productivity growth in the industry. Services are ordinarily grouped in "baskets" or "cells" according to their degree of competitiveness. They are regulated accordingly, with less regulation for more competitive services. States may also freeze rates at a fixed level, rather than allowing for indexed changes.[55] Traditional rate-base, rate-of-return regulation set rates to produce revenues that would cover a monopoly company's costs.

Many states use different regulatory regimes for different services or companies under their jurisdiction. In 2000, price caps or price caps with an interim rate freeze were in place for forty states and the District of Columbia for basic telephone service provided by one or more regulated incumbent telephone companies (see the Table at the end of this chapter). Basic telephone service includes both business and residential service and access to local service and toll. Exceptions to that definition are shown in parentheses in the Table. For example, the District of Columbia imposed an interim rate freeze for basic residential service on Verizon and price caps for services other than basic residential. In Arkansas, Century

is under rate base, rate-of-return regulation and SBC and Alltel are under price caps for basic exchange and switched access. Nine states used rate freezes alone for some services or providers. One state—Nebraska—has largely deregulated the prices of retail telephone service. Only fourteen states apply traditional rate base, rate-of-return regulation for significant portions of the telephone industry in their states. Two of those—Oregon and Washington—at one time used price caps but rescinded them. Poor service quality by the incumbent local exchange carriers was a major concern of the commissions in returning to traditional regulation.

Abel's analysis of the empirical evidence on the impact of price-cap regimes suggests that the industry has in many ways responded as policy makers hoped to the incentives created by price-cap regulation. The effect has been more pronounced under a pure price-cap plan than one that contains an earnings-sharing component, in which a utility company retains some incremental earnings or profits in a prespecified range and also shares some with consumers. Price-cap regulation is associated with lower telephone prices, higher productivity, more network modernization, and firm financial performance that is no worse than that realized under alternative methods of regulation. The results for service quality are, however, mixed. The empirical evidence suggests a negative relationship between price-cap regulation and competition: price-cap regulation is associated with less net entry by competitors and smaller cumulative competitive fringes.

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When commissions attempt to judge the success or failure of price-cap plans, Abel warns of a number of pitfalls:

1) *Uni-dimensional yardstick*: Look at all the dimensions price caps may affect before drawing a conclusion on the impact.
2) *Causality*: Don't mistake correlation for causality.

3) *Competition effect*: In measuring the effects of price caps, you must control for the effects of competition.
4) *Mandated versus motivated effect*: Watch out not to attribute observed actions to price caps or other forms of incentive regulation that are actually mandated by regulators as a *quid pro quo* for incentive regulation.
5) *Demonstration effect*: Be wary of the possibility that a firm may act in the short run in a way to convince regulators that incentive regulation works when in the longer run it will exploit its freedom.
6) *Measurement timing*: It may take time before the expected impact of price caps takes place. Avoid measuring too early and thus casting doubt on the resulting evaluation.
7) *Sequencing*: Similar to the demonstration effect, this pitfall occurs when a firm games the regulators by shifting impacts across time.
8) *Aggregation effect*: State-level analysis of price caps may not be appropriate. As shown in the Table, often a price-cap plan applies only to certain companies, services or parts of a state and it is misleading to aggregate results.
9) *Classification effect*: In reality, there are fifty-one different regulatory regimes being used by the fifty-one public utility commissions. Grouping them by types of regulation is difficult and can be misleading.

Commissions are likely to be under pressure to modify or scrap price-cap plans in the coming year. In some cases, the call will be to completely deregulate as soon as possible. Commissions reviewing their regulatory regimes have a difficult job of balancing efficiency and equity considerations. The conclusions of Jaison Abel in his NRRI report about the effect of price caps so far, and the cautionary advice for the future, will be of value to commissions faced with hard choices.

Service Quality

At least until recently Americans took excellent telecommunications service quality as a given. In many areas of the country that is simply not so right now. In fact, federal data show an

alarming decline in key indicators of quality of service over the past few years. Without real growth in local competition, as was hoped for and even promised by the Telecommunications Act of 1996, consumers are still dependent on the incumbent local exchange carrier, for which local service is a large but stagnant business. State regulatory commissions are battling company incentives to divert assets and energy to lucrative new markets, bypassing basic residential customers and small business customers and leaving behind "hollow monopolies" that do not face competition.

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If customers have a choice of providers for a good or service, they will decide on the price/quality combination that most suits their needs. As discussed above, facilities-based competition is developing slowly if at all in the local telephone business. Nor is wireless yet a true competitor. While wireless services are spreading rapidly, they are for the most part not being used as substitutes for traditional landline service. Incumbent companies claimed 96 percent of local service revenues in 1998, the most recent FCC figures available, down from 98 percent in 1997.[56]

In telecommunications, unlike electricity, the emphasis in quality of service as far as state regulatory commissions are concerned is for the most part on customer service issues rather than reliability. Reliability has been and should be expected to be improving in telecommunications because of the continuing investment in new technologies that are more reliable and sometimes cheaper than the old ones. Digital switching, for example, has replaced analog switching throughout the United States and is more reliable than its predecessor. Problems like installation and repair—customer service issues—are much more salient.

Price caps, the regulatory regime used by most state regulatory commissions, in their fundamental form do not give incentives for service quality to remain

constant or improve. In fact, they may do the opposite. Price caps encourage regulated firms to be more efficient both in their use of capital and labor. To reduce labor costs, a company may eliminate jobs, including for experienced customer-service employees.

Data collected by the FCC in its Automated Reporting and Management Information System (ARMIS) provide a consistent annual record of trends in telecommunications service. The major telephone companies report information such as installation commitments met, average installation interval, trouble reports, repeat trouble reports, complaints, and customer satisfaction. Of these measures, all except initial trouble reports have gotten worse.[57]

Figure 1 shows the decline in initial trouble reports from 1991 to 1999. This is consistent with the hypothesis that underlying reliability of the tele-communications system is getting better. On the other hand, on average companies have met fewer commit-ments to install local telephone service on time, installation takes longer,

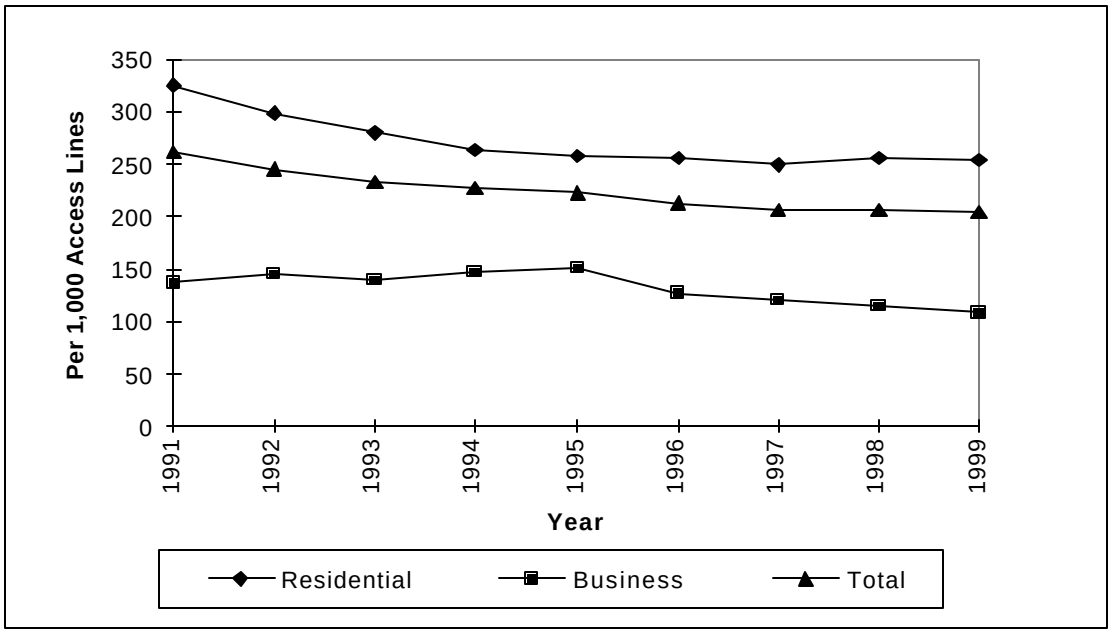

Figure 1. Weighted average customer trouble reports (for the largest local telephone company in each state and the District of Columbia, excluding Alaska and Nynex companies).

Source: Michael E. Clements, "Trends in Local Telephone Quality of Service," *NRRI Quarterly Bulletin* Vol. 21, no. 2 [Winter 2001]: 126.

complaints filed with the FCC and state commissions are up, and there are more repeat trouble reports. Repeat trouble reports are indications that a problem was not fixed right the first time and consistent with the hypothesis that in a drive for greater efficiency in use of labor, incumbent companies have cut service quality jobs. Figure 2 shows the increase in repeat trouble reports from 1991 through 1999.

On December 4, 2000, the FCC initiated a review of service quality reporting requirements for incumbent local exchange carriers. The FCC proposed streamlining the report system and giving consumers more ability to compare the service quality of competing carriers.[58] A NARUC resolution passed at the annual meeting in November 2000, supported FCC attempts to target collection of information on service quality. But the resolution generally supported the reporting of telephone service quality information at no less than the current level unless a showing can be made that the reporting is not crucial to the monitoring of service quality. The

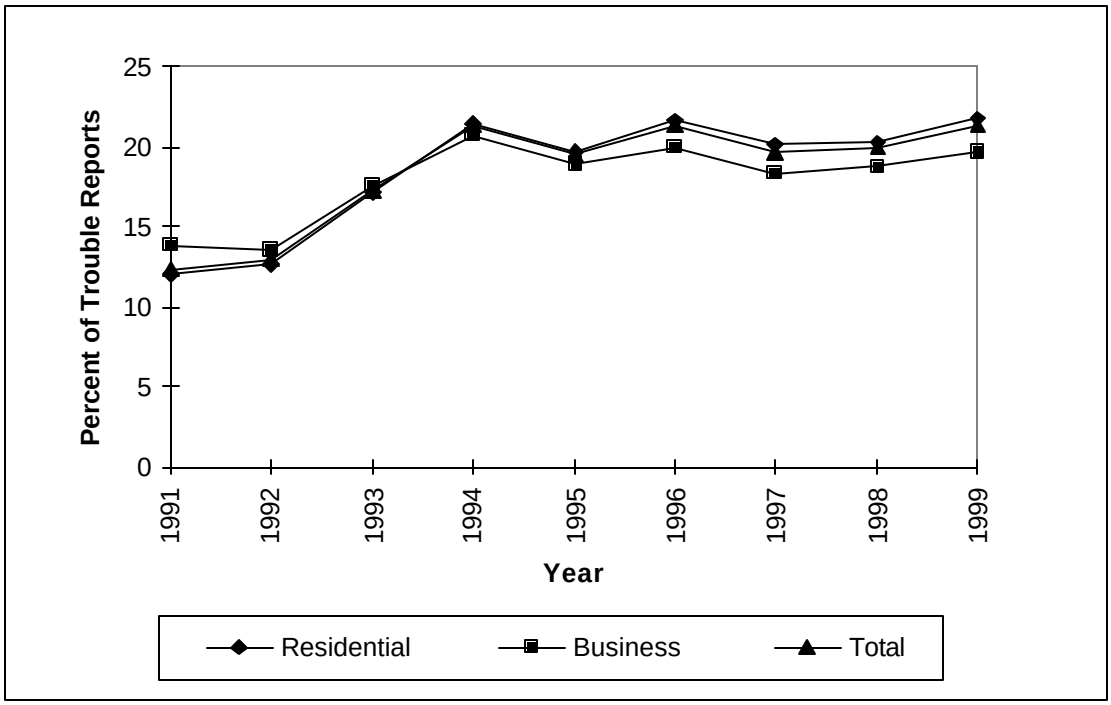

Figure 2. Weighted average repeat trouble reports as a percent of customer trouble reports (for the largest local telephone company in each state and the District of Columbia, excluding Alaska and Nynex companies).

Source: Michael E. Clements, "Trends in Local Telephone Quality of Service," 126.

continued ability to track key indicators of service quality consistently from year to year is essential to our knowledge of the impact of regulatory and industry changes on consumers.

Commissions have been working hard to improve service quality by building requirements into price-cap plans, establishing or stiffening minimum service-quality requirements and publicizing and enforcing violations. The data make clear that this will be a continuing challenge during the remainder of 2001 and beyond.

Conclusion

If it does nothing else, a brief overview of the accomplishments made in 2000 in implementing the Telecommunications Act sharpens the ear to rumblings in Congress about reopening the Act. Frustration at the glacial progress of competition and the details of implementation encourages fantasies of Congress playing Alexander of Macedon and cutting the Gordian knot. A swift, sharp blow of the sword to a complex, interdependent system would create as many problems as it would solve, however. State regulators, federal regulators, state legislators, Congress, industry and consumers must continue to work together to make competition a reality. Where competition by itself does not achieve all our goals for benefits of telecommunications to society, the public and private sectors need to continue to work together to achieve balanced policies and judicious regulatory oversight.

Frustration at the glacial progress of competition and the details of implementation encourages fantasies of Congress playing Alexander of Macedon and cutting the Gordian knot. A swift, sharp blow of the sword to a complex, interdependent system would create as many problems as it would solve, however.

Table. Forms Of Regulation For Basic Services In The U.S. States
(As of October, 2000)

ROR	Price Cap	Price Cap with Interim Rate Freeze*	Rate Freeze & Non-indexed Caps (no expiration date)	Deregulation
Alaska (Large incumbents)	**Arkansas** (SBC, Alltel)	**Alabama** (BLS, VZ)	**California** (PB, VZ? non-competitive services)	**Idaho** (Q? access charges)
Arizona (Q)	**Connecticut** (SNET)	**Colorado** (Q)	**Idaho** (Q? basic local exchange below 5 lines in an exchange with local competition)	**Nebraska** (Q)
Arkansas (CTL)	**Delaware** (VZ)	**D.C.** (VZ- basic residential)	**Kentucky** (CBT)	**Pennsylvania** (VZ? business service for large retail accounts)
Colorado (CTL)	**D.C.** (VZ? excluding basic residential)	**Florida** (BLS, VZ, Sprint? basic services for all)	**Minnesota** (Sprint, Frontier)	
Hawaii (VZ)	**Florida** (BLS, VZ, Sprint? access charges for all)	**Illinois** (AIT? basic residential)	**Nevada** (NB? excluding access charges)	
Idaho (Q-basic local exchange below 5 lines, without local competition)	**Georgia** (BLS, Alltel)	**Indiana** (AIT? local rates, Sprint)	**Ohio** (CBT)	
Minnesota (CIT)	**Illinois** (AIT? excluding basic residential)	**Louisiana** (BLS, Sprint)	**Oregon** (Q)	
Montana (Q)	**Iowa** (Q, Iowa Telecom Service, Frontier)	**Massachusetts** (VZ? basic residential)	**South Dakota** (Q)	
New Hampshire (VZ)	**Kansas** (SBC, Sprint)	**Minnesota** (Q)	**Texas** (SBC, VZ, Sprint? residential basic and access for the three companies)	
New Mexico (Q/Valor Telecom)	**Kentucky** (BLS)	**Nevada** (Sprint)	**West Virginia** (VZ, CIT? excluding access charges for both companies)	
Oregon (VZ, Sprint)	**Maine** (VZ)	**New Jersey** (VZ? basic residential)		
South Carolina (GTE South, United)	**Maryland** (VZ)	**New York** (Frontier, VZ)		
Virginia (VZ South)	**Massachusetts** (VZ? excluding basic residential)	**Ohio** (AIT)		
Washington (Q, VZ)	**Michigan** (AIT, VZ)	**Oklahoma** (SBC)		
	Mississippi (BLS)	**Pennsylvania** (VZ, VZ North? basic services for both companies)		
	Missouri (SBC, VZ, Sprint)	**Rhode Island** (VZ? basic residential)		
	Nevada (NB? access charges)	**South Carolina** (BLS)		
	New Jersey (VZ? basic business service, access charges)	**Texas** (SBC, VZ, Sprint? basic business rates for the three companies)		
	North Carolina (BLS, VZ, Sprint, Alltel, Carolina)	**Utah** (Q)		
	North Dakota (Q)	**Vermont** (VZ)		
	Rhode Island (VZ? excluding basic residential)	**Virginia** (VZ)		
	South Carolina (Sprint)			
	Tennessee (BLS, Sprint, CIT)			
	Virginia (Sprint)			
	West Virginia (VZ, CIT? access charges for both companies)			
	Wisconsin (AIT, VZ)			
	Wyoming (Q)			

Source: *State Telephone Regulation Report White Paper*, 18 (20-22).

* Most interim freezes expire in 2000 and 2001.

AIT = Ameritech (SBC)
BLS = BellSouth
CBT = Cincinnati Bell
CTL = Century Telecom
CIT = Citizens Telecom
NB = Nevada Bell (SBC)
PB = Pacific Bell (SBC)
Q = Qwest
SBC = Southwestern Bell
SNET = Southern New England Telephone (SBC)
VZ = Verizon

Endnotes

[1] See Phyllis Bernt, *Balancing Competition and Universal Service: The Role of the Regulator Five Years After the Telecommunications Act*, (Columbus, OH: The National Regulatory Research Institute, March 2001).

[2] Unless otherwise identified, the data cited in this section were taken from *Local Telephone Competition: Status as of December 31, 2000*, FCC Common Carrier Bureau, Industry Analysis Division, May 2001.

[3] See *Local Telephone Competition: Status as of December 31, 2000* (Washington, D.C.: Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division), May 2001. The FCC notes that, although the understatement is small, the ILEC line count data may be understated because carriers serving fewer than 10,000 lines are not required to report. The understatement of CLEC lines is likely larger, at least on a percentage basis, than for ILECs, because of state-specific reporting thresholds. See n. 4.

[4] A CLEC industry estimate stated that as of the third quarter of 2000, CLECs had 16.162 million lines and a market share of 8.2 percent. See *The State of Local Competition,* The Association for Local Telecommunications Services (ALTS), February 2001, 9.

[5] There was some dispersion in this figure. The FCC reported that over 50 percent of CLEC lines served residential or small-business customers in Colorado, Iowa, Kentucky, New York, Oregon, and Texas, with Kentucky's 86 percent and New York's 63 percent heading the list.

[6] Based on information on SBC entry into markets outside its home territory obtained from http://www.sbctelecom.com/Territory/ 1,1503,,00.html, accessed December 8, 2000.

[7] The conditions agreed to by SBC may be found on the FCC's website at http://www.fcc.gov/ Bureaus/Common_Carrier/ News_Releases/ 1999/nrc9077a.doc, accessed December 8, 2000.

[8] See FCC 99-238, "Third Report and Order and Fourth Further Notice of Proposed Rulemaking," Implementation of the Local Competition Provisions of the *Telecommunications Act of 1996* in CC Docket 96-98, (released November 5, 1999).

[9] See FCC 96-325 First Report and Order in CC Docket No. 96-98, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, (Released August 8, 1996).

[10] The issue of deaveraging is considered more fully in Jaison R. Abel and Vivian Witkind-Davis, *Geographic Deaveraging of Wholesale Prices for Local Telephone Service in the United States: Some Guidelines for State Commissions* (Columbus, OH: The National Regulatory Research Institute, April 2000).

[11] See 47 U.S.C. 252(d)(1)(A)(i).

[12] FCC 96-325, released August 8, 1996.

[13] This is the "scorched-node" approach.

[14] Iowa Utility Board, et al. v. FCC, Case No. 96-3321, Slip Op. at 8. The Court did not directly address the taking issue, since there had been no showing that an actual taking had occurred.

[15] In issuing the writs, the Supreme Court consolidated several individual appeals of the 8th Circuit Court of Appeals' decision. The individual appeals were: 00-511, Verizon Communications v. FCC, et al.; 00-555, WorldCOM, Inc., et al. v. Verizon Communications; 00-587, FCC, et al. v. Iowa Utilities Bd, et al.; 00-590, AT&T Corp. v. Iowa Utilities Bd, et al.; and 00-602, Gen. Communications, Inc. v. Iowa Utilities Bd., et al.

[16] See FCC 99-355, Advanced Services Third Report and Order and Fourth Report and Order in Dockets 98-147and 96-98 (released December 9, 1999).

[17] See FCC 99-38 (released February 26, 1999). On March 24, 2000, the U.S. Court of Appeals for the D.C. Circuit vacated certain provisions of the

FCC's declaratory ruling and remanded the matter to the FCC. The Court stated that calls to ISPs do not clearly fit into either the local or long-distance category and that the FCC had not provided adequate explanation of the classification of calls to ISPs. See Bell Atlantic v. FCC, Case No. 99-1094.

[18] For a summary of state actions as of mid-2000, see "Reciprocal Compensation for ISP-bound Traffic: State Actions," prepared by Barbara Combs of the Oregon PUC Staff.

[19] See FCC 01-131, "Order on Remand and Report and Order," in CC Dockets 96-98, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996,* and 99-68, *Intercarrier Compensation for ISP-Bound Traffic*, (released April 27, 2001).

[20] See FCC 01-132, Notice of Proposed Rulemaking, in CC Docket 01-92, *Developing a Unified Intercarrier Compensation Regime* (released April 27, 2001).

[21] See FCC 00-104, Report and Order and Further Notice of Proposed Rulemaking issued in Docket 99-200 (released March 31, 2000).

[22] The demand for telephone numbers has increased dramatically due to the growth of wireless phones, pagers, and second lines for fax machines or Internet access. However the main pressure on number resources results from competition. Each area code can have a maximum of 792 10,000 number blocks. When numbers are allocated in 10,000-number blocks, each CLEC must obtain a minimum of 10,000 numbers in each rate center they wish to serve—even if they plan to serve only a few lines. The use of 1,000-number blocks will reduce the number of allocated but unused numbers in an area, thus extending the life of existing area codes. Similarly, reducing the number of rate centers within an area code will reduce the number allocation necessary for a carrier to provide service.

[23] See Pennsylvania Public Utility Commission, Order and Opinion in Dockets P-00991648 and P-00991649 (entered September 30, 1999), Section XVI. See also, Brian Hammond and Lynn Stanton, "Bell Atlantic To Appeal 'Radical' Pennsylvania Ruling Requiring Wholesale-Retail Split, UNE Rate Reductions," *Telecommunications Reports* 65, no. 35 (August 30, 1999). The PUC's Order did not follow the AT&T divestiture model in requiring full divestiture, but it did require that the functions be offered by separate subsidiaries.

[24] The Pennsylvania Commonwealth Court upheld the Pennsylvania PUC's Order. See "Pennsylvania Court Upholds Structural Split for Verizon," *Telecommunications Reports*, 66, no. 43 (October 30, 2000).

[25] Pennsylvania PUC, Order and Opinion, Section XVI, A.

[26] Ibid., Section XVI, C. 1. The PUC reached its conclusion based on the disparity in size between Verizon Pennsylvania and its competitors and Verizon Pennsylvania's ability to exercise market power? including its potential ability to provide itself with anti-competitive cross-subsidies and to discriminate against competing telecommunications carriers in the provision of wholesale services.

[27] See "PUC Orders Functional Structural Separation of Verizon," News Release, Pennsylvania Public Utility Commission, March 22, 2001. Downloaded from the PUC's website http://puc.paonline.com, March 29, 2001.

[28] See "Verizon Accepts Functional Separation Order In Pennsylvania; AT&T Wants Compliance Audit," *Telecommunications Reports*, April 23, 2001.

[29] See *Codes of Conduct Governing Competitive Market Developments in the Energy Industry: an Analysis of Regulatory Actions,* A White Paper by the NARUC Committees on Finance and Technology, Gas, and Electricity, November 2000. Available at http://www.naruc.org/Resolutions/2000conv/codes of_conduct_white_paper.htm

[30] See, for example, "Minnesota Bill Seeks 'Structural Separation' of Qwest Operations," *Telecommunications Reports*, April 30, 2001;

"Structural-Separation Battle Escalates in Two Verizon States," *Telecommunications Reports*, March 5, 2001; "CLECs Urged To Keep Eye on Policy Issues; Structural-Separation Movement Seen Growing," *Telecommunications Reports*, March 5, 2001; "CLECs Seek Structural Split Of Verizon's Virginia Telcos," *Telecommunications Reports*, April 16, 2001; and "Debate over Splitting ILECs Expands to Michigan, Indiana," *Telecommunications Reports*, May 14, 2001.

[31] See Alexander Belinfante, *Telephone Subscribership in the United States (Data Through November, 2000)* (Washington, D.C.: Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division, March 2001). The annual average penetration for 2000 was 94.4 percent.

[32] See Alexander Belinfante, *Telephone Penetration by Income by State (Data Through 1999)* (Washington, D.C.: Federal Communi-cations Commission, Common Carrier Bureau, Industry Analysis Division, March 1999). Belinfante notes that the Lifeline program was expanded to all states in 1998, so that comparisons between states with and without a program are no longer meaningful.

[33] Belinfante, *Telephone Subscribership in the United States (Data Through November, 2000)*, Table 1.

[34] Ibid., Table 4.

[35] On August 5, 1999, the FCC adopted a "Further Notice of Proposed Rulemaking" titled: "Promoting Deployment and Subscribership in Unserved and Underserved Areas, Including Tribal and Insular Areas." The FNPRM sought comment on initiatives to encourage the extension of wireline service to tribal lands and other unserved areas and to expand subsidies for all carriers, whether wireline, terrestrial wireless, or satellite, that serve these areas. See FCC 99-204 in CC Docket Number 96-45, *In the Matter of Federal-State Joint Board on Universal Service* (released September 3, 1999).

[36] See *Universal Service Monitoring Report*, prepared by the Staff of the Federal-State Joint Board on Universal Service, Federal Communications Commission, September 2000.

[37] See 47 U.S.C.254(b)(1),(2),(3).

[38] "Rural Task Force Recommendation to the Federal-State Joint Board on Universal Service," CC Docket 96-45 (filed September 22, 2000). The RTF proposal was intended to be implemented immediately and remain in place over a five-year period.

[39] FCC 00J-4, "Recommended Decision," in CC Docket 96-45, *In the Matter of Federal-State Joint Board on Universal Service* (released December 22, 2000).

[40] Ibid., para. 7. The RTF also recommended retaining the Long Term Support and Local Switching Support mechanisms.

[41] Ibid. Under the RTF's proposal, both the ILEC and a competitive ETC would receive fixed per-line support based on the ILEC's embedded costs. See Ibid., para. 18.

[42] Ibid., para. 8.

[43] Ibid., paras. 7-9.

[44] See FCC 01-157, "Fourteenth Report and Order, Twenty-second Order on Reconsideration, and Further Notice of Proposed Rulemaking," in CC Docket No. 96-45, *Federal-State Joint Board on Universal Service*, and "Report and Order" in CC Docket No. 00-256, *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers*, (released May 23, 2001). For summaries of these provisions, see "FCC Modifies High Cost Universal Service Support System to Preserve and Advance Affordable Telephone Service," available at http://www.fcc.gov/Bureaus/Common Carrier /News Releases/2001/nrcc0118.html and the associated *Fact Sheet* available at http://www.fcc.gov/Bureaus/Common_Carrier/News Releases/2001/ncc0118a.html.

[45] FCC 00J-2, Federal-State Joint Board on Separations, "Recommended Decision," in CC Docket 80-286, In the Matter of Jurisdictional Separations Reform and Referral to the Federal-State Joint Board (released July 21, 2000).

[46] See FCC 01-162, "Report and Order" in CC Docket No. 80-286, *Jurisdictional Separations and Referral to the Federal-State Joint Board*, (released May 22,2001), para. 1.

[47] 47 C.F.R. 36.

[48] See FCC 01-162, para. 2.

[49] Ibid., para. 9.

[50] Although the SLC was increased, the elimination of the PICC resulted in an initial net reduction in most consumers' bills, because the IXCs had generally been passing the PICC along to end users.

[51] MAG consists of the National Rural Telecom Association (NRTA), the National Telephone Cooperative Association (NTCA), the Organization for the Promotion and Advancement of Small Telecommunications Carriers (OPASTCO), and the United States Telephone Association (USTA).

[52] For example, the FCC has noted that non-price-cap carriers often have higher costs, receive a higher proportion of their total revenues from interstate access revenues and universal service support, and may receive much of their revenue from a small number of multi-line businesses in their service territories. See FCC 00-448, "Notice of Proposed Rulemaking," in CC Docket No. 00-256, In the Matter of Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers; CC Docket No. 96-45, In the Matter of Federal-State Joint Board on Universal Service; CC Docket No. 98-77, In the Matter of Access Charge Reform for Incumbent Local Exchange Carriers Subject to Rate-of-Return Regulation; and CC Docket No. 98-166, In the Matter of Prescribing the Authorized Rate of Return For Interstate Services of Local Exchange Carriers (released January 5, 2001), para 3 and n. 6.

[53] IXCs have not been willing to offer some optional calling plans to customers in rural areas, because rural ILECs tend to have higher access charges, making such plans unprofitable. Ibid., para 13.

[54] Jason Abel, *The Performance of the State Telecommunications Industry Under Price-Cap Regulation*: *An Assessment of the Empirical Evidence* (Columbus, OH: The National Regulatory Research Institute, 2000)

[55] Sometimes a rate freeze is called a "nonindexed cap."

[56] FCC Industry Analysis Division, *Trends in Telephone Service*, March 2000, 9-1.

[57] For an in-depth discussion of ARMIS data and service quality, see Michael Clements, "Trends in Local Telephone Quality of Service," *NRRI Quarterly Bulletin*, 21, no. 2 (Winter 2001): 123-130.

[58] FCC 00-399, 2000 Biennial Regulatory Review–Telecommunications Service Quality Reporting Requirements, Notice of Proposed Rulemaking in CC Docket 00-229, released December 4, 2000.

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Energy Industry Restructuring

The transition to a restructured energy industry walked into a tar pit in 2000, when California wholesale electric prices skyrocketed and major companies were driven towards bankruptcy. On the natural gas side of restructuring, high prices began to hit consumers hard, and in one state, Georgia, implementing a choice of gas suppliers for consumers proved more difficult than anticipated. The California and Georgia experiences are entirely different in magnitude, but both illustrate the perils of creating workably competitive markets where monopoly regulation was once the rule.

As state commissions make the transition to markets that reward efficiency, they still must attend to the public benefits that have always been in their purview. Assistance to low-income consumers, protecting the environment, and promoting energy efficiency are examples of policy goals that may be more difficult to support in a deregulated world of regional markets. Through a working group of

the National Association of Utility Regulatory Commissioners (NARUC), the states are examining current expenditures on public benefits and considering policy options.

This chapter reviews some of the lessons learned so far from the California and Georgia experiences and takes a look at the evolution of policy information on public benefits.

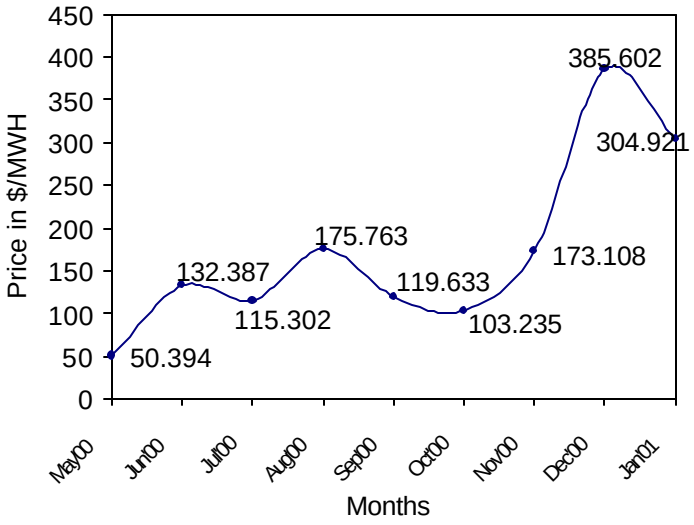

Figure. Load-Weighted Day Ahead Average Prices

Source: California Power Exchange

California Electric Restructuring Meltdown

Since San Diego Gas & Electric (SDG&E) finished paying its stranded costs ahead of the time frame originally anticipated when the California electric restructuring law was passed in 1996, the rate freeze for residential and small commercial customers also ended early. As a result, SDG&E customers were the first utility distribution company (UDC) customers in California to pay generation prices directly from the California Power Exchange (PX). The weighted average price of the California PX's day-ahead market is shown in the following Figure.

The high electricity prices in California that began in the summer of 2000 resulted from a combination of factors that can be placed into three general categories: (1) strong demand, (2) tight supply, and (3) higher electric production costs. These factors all contributed to drive the price to an unprecedented level throughout the summer. Each of these general factors are discussed in more detail below.

The high electricity prices in California that began in the summer of 2000 resulted from a combination of factors

1) Strong Demand and Load Growth

Because of recent strong economic growth and increasing population, California's peak demand increased by 12 percent from 1996 through 1999. Electricity demand increased by 5 percent the first eight months of 2000 relative to the same period in 1999. High summer temperatures contributed to high daily peak loads. While the overall summer temperatures may not have been the hottest ever for California, they were the hottest since restructuring began. The 13.7 percent load growth from June 1999 to June 2000 was the result of both overall strong demand growth and the high temperatures.

2) Supply Constraints

While demand was surging, California's supply resources were considerably restricted from increasing to meet the higher load requirements or, for some capacity resources, were actually reduced. Peak demand increased by 5,522 MW from 1996 to 1999, but only 672 MW of net capacity were added.[1] The Electric Power Supply Association tallies almost 17,000 MW of planned capacity in California. However, due to long lead times for permitting and sitting and resistance from people living near potential plant locations, the process of moving from drawing board to producing power can take years. Sometimes a project is even completely scuttled.

A number of additional factors further limited the amount of available capacity. First, there was a significant decrease in net imports into the California independent system operator (ISO) throughout the summer. Scheduled and real-time average hourly net energy imports decreased almost 49 percent and 33 percent, respectively, for the period of May through August of 1999 compared to the same period of 2000.[2] This net import drop was primarily due to an increase in exports from California. Second, both planned and unplanned plant outages increased from June through August when compared to the same period of the previous year. The average planned megawatts out of service

increased by 53 percent in June, 57 percent in July, and 23.5 percent for August when compared to the same months of 1999.[3] Unplanned plant outages increased much more dramatically; average megawatts out of service increased by 77 percent for June, 121 percent for July, and 461 percent for August above the same months in 1999. A third important factor that reduced available capacity in California was a decrease in western states' hydroelectric capacity. Hydro-electric generation in the west decreased by 23.2 percent in June 2000 from the June 1999 level; a decrease of almost 3.9 million MWh.[4] This resulted in a shift to generally more costly thermal and other non-hydro generation to meet the load requirements.

3) Production Cost Increases

Additional pressure was placed on prices when natural gas prices rose from less than $2 per MMBtu in March and April of 1999 to about $5 by September of 2000. For a gas-fired unit with a heat rate of 10,000 Btu/kWh, this rise in natural gas prices results in a fuel cost increase from $20/MWh to $50/MWh.[5] Also, nitrogen oxide (NOx) emission credits for the South Coast Air Quality Management District (SCAQMD) in the Los Angeles basin increased from about $6 per pound in May of 2000 to about $45 per pound in September. A staff report by the Federal Energy Regulatory Commission (FERC) concludes that the increase in natural gas and NOx emission credit prices raised the marginal running cost of a combined cycle generation unit with a heat rate of 10,000 Btu/kWh and an NOx emission rate of 1lb/MWh by approximately $64.00 per MWh? to $90.00 per MWh from $26 per MWh.[6]

These factors alone explain why the price for power in California and other western states would increase substantially. What is being debated now, and will continue to

What is being debated now, and will continue to be for some time, is whether the entire price increase in California was due to the tight supply conditions to meet the growing demand or whether some portion was due to supplier market power.

be for some time, is whether the entire price increase in California was due to the tight supply conditions to meet the growing demand or whether some portion was due to supplier market power. Conceptually, scarcity-induced price increases (from the increased use of marginally more expensive plants) can be separated from market power-induced price increases; however, separating them in practice is a formidable task because of the complexity and the number of factors involved.

Fallout in Other States

Several states have conducted inquires as to whether what occurred in California last summer could happen in their region as well. No state that has already started retail access has reversed its decision to allow it. However, several states that were set to begin in the near future have either decided to delay (Nevada) or likely will delay pending formal action (Arkansas, New Mexico, and Oklahoma). Also, some states that have not passed restructuring legislation have shown reluctance to move toward retail access (Iowa and Wisconsin). While it is difficult to distinguish between a "California factor" and a general reluctance to allow retail access because of conditions or concerns that may have already been present within a state, judging from trade press and other personal accounts the experience of California has at least added an argument to those who have advocated caution or been reluctant to allow retail access.

A Federal Problem or a State Problem?

To come to grips with the California electricity crisis, policy makers and the general public should recognize that there are actually two crises that have beset the state. One is the upward price spiral of wholesale prices; the second, the financial difficulties of distribution companies. When deciding what the respective roles are for the state and federal agencies involved, it should be clear which of these two crises is being addressed. This is because a simple answer about who is responsible, the federal government or the state of California, is not the same

for each. But recognizing the extent of both problems suggests a larger federal role until both crises are brought under control.

The first crisis began last summer with the sharp price increases that peaked last December at more than $1,400 per MWh. What caused the price spiral has been discussed widely and includes these factors: inability to build sufficient supply to meet rapidly growing demand, unexpected plant outages, a hot summer, rising natural gas and environmental permit prices, reduced hydroelectric output, lack of demand response, problems with the spot market design, lack of long-term contracting and hedging by the distribution companies, and finally, in part because of the tight supply and demand conditions, supplier price leverage or market power. In *Perfect Storm* fashion, all these factors aligned to cause wholesale prices to soar.

The FERC can do little or nothing about most of the contributing factors. However, in the case of supplier market power, FERC can play a significant role since California simply cannot solve the problem alone. Market power is a multi-state, regional issue as much as a state issue. Economists will debate for some time the portion of the price increase attributable to supply scarcity, causing the price be set by high-cost units, and the portion attributable to suppliers' ability to control the price. While there is no "smoking gun" that proves price fixing or collusion, the evidence suggests that suppliers acting on their own may have had sufficient market leverage to considerably increase prices.

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The wholesale price and the interstate transmission system have for decades been the domain of the federal government. FERC has more recently overseen the move to transmission "open access" and wholesale price deregulation. The foundation for this federal role is the fact that electrons placed on the interstate transmission system do not respect state borders.

(The lone exception is the Texas system, which is mostly not inter-connected with the rest of the United States.) FERC's necessary role in deregulation of wholesale markets establishes its importance in the general move toward wholesale and retail competition. The California restructuring plan may have been the creation of the state's legislators and regulators, but FERC approved important aspects of the plan and has the authority to adjust policies governing interstate transmission and wholesale power pricing when something goes awry.

If indeed suppliers have significant market power that contributed to the soaring prices, FERC has the authority to take action either to insure that conditions exist to allow competitive markets to develop or limit or suspend market-based pricing until conditions improve. In short, if *wholesale* markets are broken, it is up to FERC to fix them. FERC's investigations into supplier market power have so far been inadequate. Market purists may object to an intrusion into the market process, but we must recognize the institutional realities that undergird the wholesale electricity markets. On occasion, markets fail, sometimes because government-imposed policies are misguided and sometimes because market characteristics are such that acceptable competitive markets cannot develop without correcting mechanisms. In the California case, both of these may be explanatory factors, but further work is clearly needed to determine the extent of the impact and appropriate corrective measures. A possible temporary solution is a regional price cap that is pegged to the price of natural gas. Since natural gas generators are the marginal suppliers, benchmarking the price cap in this way would prevent the cap from being less that the cost of generating the power (thereby exacerbating the shortage). On June 18, 2001, FERC unanimously ordered "market-based" price mitigation on spot market wholesale prices across the 11-state Western power market. During emergency supply periods in

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California (when reserves are below 7 percent), the price ceiling will be based on the California ISO market clearing price. The market clearing price will be based on the highest cost gas-fueled unit located in California needed to serve the California ISO's load. The bid will reflect a published cost of gas plus an adder for operating and maintenance expenses. During non-emergency periods, the cap will drop to 85 percent of the most recent emergency period price. The cap may be exceeded with justification. The price mitigation will end on September 30, 2002.

The second crisis was touched off by the first? the financial difficulty of the distribution companies in California. This was brought about because the higher wholesale costs could not be completely recovered from customers since the retail rates are fixed. Over the last year, the result has been that the companies have dug a $12 billion hole that they may not be able to climb out of by themselves. The January shortages that led to black-outs were exacerbated by power suppliers' understandable reluctance to sell to companies that appeared near bankruptcy (one company subsequently did file for bankruptcy).

Under ordinary circumstances, fixing this second problem would clearly be in the domain of the state of California, since they alone oversee the regulation of the distribution companies and retail prices. However, the magnitude of the problem may be just too great for even a large state like California to absorb if the problem persists. Moreover, as Alan Greenspan has noted, the financial failure of one or more of the companies would reverberate across the country. In this extreme circumstance, a federal role may also be warranted.

Few outside the electric industry paid much attention to the last five years of restructuring activity. If there is any silver lining, it may be that with the spotlight now on the issue (at least where there is power to the spotlight), positive steps to real competitive markets hopefully will be made. Unfortunately, the scale of the distribution companies' financial problems is obscuring the root cause, a

problem that the federal government can do something about.

Georgia Gas Restructuring Problems

In 1997 the Georgia legislature passed the Natural Gas Competition and Deregulation Act. The Act allows for gas distributors in the state to relinquish their gas merchant function under specified conditions. Atlanta Gas Light Company (AGL), the state's largest gas distributor, elected to be a "pipes" business only. In November 1998, AGL began its program to give all firm customers, including residential and commercial, the right to choose their gas supplier. A unique feature of the program is that, when the Georgia Public Service Commission determined that a competitive market existed, all remaining customers of AGL who did not choose marketers were given 100 days to do so; if they failed to choose a marketer, they were randomly assigned to one by the regulator. The "last chance" notice was issued during April 1999; roughly 280,000 customers who had not chosen a marketer by August 11, 1999 were randomly assigned to marketers in proportion to the share of customers each marketer had captured as of that date. In October 1999, AGL exited the merchant function.

The AGL program has been the most publicized gas choice program in the country, partly because of its unique features. Particularly, in no other gas program in the country (or electric program for that matter) are customers required to choose a marketer or else be assigned to one. Because the AGL program is the most radical gas choice program in the United States, it offers a case study of what some would call "flash cut" deregulation. While such an approach to industry restructuring has higher potential benefits in the short term relative to a more incremental one, it poses higher risk. The presumption underlying radical restructuring is that problems encountered during the short transition

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period can be addressed and mitigated within a reasonable time period through appropriate responses. Supporters of this position tend to argue that extending the time to reach a true competitive market may inflict a lost opportunity for consumer benefits.

Actual events related to the AGL program have, to put it mildly, caused turmoil in Georgia. Several problems have, at one time or another and sometimes simultaneously, emerged to complicate the transition process. These problems have included marketers' failures to get bills out on time to consumers, a major change in rate design of distribution service to a straight fixed-variable (SFV) method, cost shifting from interruptible customers to firm customers, bank-ruptcies of three marketers, customer confusion, exploding growth in customer complaints, slamming, poor customer service from marketers, and massive disconnects. A recent survey by a consulting company pointed to discontent of consumers over restructuring of AGL's gas market.[7] According to the survey, 46 percent of the customers in AGL's market "wish that natural gas deregulation had never occurred." At the same time, however, 67 percent of the same customers mentioned that they were satisfied with their current supplier. The survey also showed that many customers in the AGL service area were likely to switch marketers; for example, 25 percent of the customers surveyed responded by saying that they either have already switched marketers or are considering it.

A study conducted earlier in 2000 for AGL depicted a more sanguine picture of Georgia's gas experience, at least during the start-up period.[8] The study points to the different ways consumers have benefited from choice; the two important ones are the availability of a wider variety of pricing plans than were previously available, and lower gas bills. Based on published price data, the study estimated that the typical residential customer switching to a marketer between November 1998 and July 1999 saved between 7 and 12 percent of his gas bill. This translates into savings of $46-$78 per year; in addition, some consumers benefited from a one-time sign-up offer by

marketers (up to $50). The study estimated that consumers received millions of dollars worth of promotional offers during the initial enrollment period.

Several lessons can be learned from the gas restructuring experience in Georgia. First, seemingly minute matters such as billing can under-mine the credibility of restructuring. With the benefit of 20-20 hindsight, billing responsibilities during the initial period should probably have stayed with the gas utility, AGL. Instead, marketers assumed this responsibility, and many could not handle the billing for the large number of customers that they signed up. Second, restructuring can make life more complicated for a state regulatory commission: the transition problems placed an added burden on the commission, especially in handling consumer complaints about billing, customer service, and slamming.

Third, the Georgia experience gives support to an incremental approach to industry restructuring. Underlying this position is the presumption that the potential gains from "flash cut" restructuring for both consumers and society as a whole are small relative to the risks of "things going wrong." Many observers would argue that this has been the case in Georgia. One example is the shift to a new and much different rate design method for distribution service? which has had a particularly adverse effect on residential customers who consume little gas. Although the problems encountered in Georgia can arguably be resolved over time, they have carried a high cost thus far, including jeopardizing the advisability of the restructuring policy itself, that perhaps could have been largely avoided with better thought-out legislation.

The Georgia experience gives support to an incre-mental approach to industry restructuring.

Fourth, some support exists for giving commissions more authority over marketers; otherwise, for example, consumers may have little ability to file complaints against abusive marketers and receive restitution. Fifth, commissions should probably have access to information required to monitor the newly structured market and to evaluate its performance, unless

of course another entity is given explicit responsibility for these tasks. Sixth, the Georgia experience confirms the importance of creating rules that allow equal opportunities for all suppliers. When such rules are absent, the danger exists that the utility's affiliate will dominate the market.

The last lesson is marketers and other new players "will come" if the incentives are strong enough. In Georgia, marketers were attracted by the random-assignment process where, as noted above, uncommitted customers were assigned to marketers on the basis of existing market shares.

Public Benefits

Public benefits relating to energy utility services have received support from state and federal government agencies, including state public utility commissions (PUCs), for nearly two decades. Recognized public benefits include energy savings, environmental protection, promotion of national energy security, and facilitation of affordable universal service.[9] Some state PUCs have traditionally supported public benefits (PB) programs such as energy efficiency and demand-side management (DSM), renewable energy, energy-related research and development (R&D) and low income assistance. The costs of these programs were recovered in regulated utility rates. Other state agencies and the federal government have also supported public benefits programs and options through grants, loans and tax subsidies.

Effects of Restructuring

With the advent of energy industry restructuring at the retail level in the mid-nineties, support for state-level, ratepayer-funded public benefits programs operated by utilities was threatened. In anticipation of the ensuing competition, regulated utilities started reducing their discretionary expenditures, including those on public benefits programs. As utilities were forced to compete with other providers of energy, they could

With the advent of energy industry restructuring at the retail level in the mid-nineties, support for state-level, ratepayer-funded public benefits programs operated by utilities was threatened.

not support the costs of public benefits programs in prices, when other providers did not have similar costs. For example, according to state-level data collected by the Energy Information Administration, utility spending on energy efficiency and other DSM programs increased rapidly from about $0.8 billion in 1989 to $2.74 billion in1993, and then sharply declined to $1.64 billion by 1997.[10] Although there may have been other reasons, such as a lessened need for DSM with its success in reducing energy demand, restructuring is probably the dominant factor in explaining the dramatic decline in DSM spending since 1993. Utility spending on renewable energy, R&D and low-income assistance also declined during this period.

Federal support for public benefits also exhibits a historical trend similar to state-supported utility public benefits programs. Total spending by the United States Department of Energy (DOE) on public benefits programs increased from $1.71 billion in 1989 to $2.54 billion in 1995 and then declined to $1.84 billion by 1998.[11] This trend, unlike that for state programs, cannot be clearly correlated to energy industry restructuring as no apparent causal relationship exists between the two. The most plausible explanation for this trend, particularly the decline in spending between 1995 and 1998, is that concerns for the mounting budget deficit and falling oil prices spurred efforts to cut federal spending for most energy-related programs including public benefits programs.

In recognition of the potential adverse effect of energy industry restructuring on the funding support for public benefits programs, state legislatures and PUCs have instituted policies and mechanisms to continue the support for public benefits programs.

State Initiatives

In recognition of the potential adverse effect of energy industry restructuring on the funding support for public benefits programs, some state legislatures and PUCs have instituted policies and mechanisms to continue the support for public benefits programs. These generally include a non-bypassable and competitively

neutral charge levied on regulated services. Of the twenty-four states and the District of Columbia that have either passed legislation or issued regulatory orders to implement restructuring, nineteen have included policy requirements to support energy efficiency programs.[12] Seventeen of the twenty-five jurisdictions have included either direct funding for renewable energy projects or a renewable portfolio standard (RPS).[13]

Changes in Federal Funding

The total appropriation for federally funded public benefits programs in 1999 was approximately $1.28 billion? an almost 50 percent drop from the 1995 level. Most of the decrease was for clean coal technology and nuclear power. The appropriations for renewable energy, fossil energy and energy conservation actually increased from their 1998 levels and are comparable to1995 levels. The appropriation increased slightly for 2000 to $1.37 billion.

A Proposed National System Benefits Trust

In response to the decline in funding support for utility public benefits programs, several initiatives were proffered in 2000 to establish a federal trust fund for public benefits programs. Besides the need to replenish the declining funds, an additional rationale presented for such a trust fund is that public benefits programs have external benefits that spill over state boundaries and, therefore, ought to be supported by the federal government. Also, there is a renewed interest in energy efficiency as an effective demand-side response to shortages and price spikes in the energy market, such as those experienced in California.

Legislation in the last Congress proposed a federal system benefits trust to support public benefits programs. The Clinton administration bill, which was part of a proposed, comprehensive, electric utility industry restructuring legislation, would have created a public benefit fund to continue traditional utility industry levels of support for low income,

energy efficiency, renewable energy and public purpose research and development activities. The national public benefits fund would be funded by a national transmission charge of less than 1 mill/kWh. The public benefits fund would match state public benefits expenditures on a dollar-for-dollar basis, thereby assisting states that have public benefits programs and also encouraging the remaining ones to set up similar programs.

In the current Congress, Senator Jeff Bingaman (D-NM) introduced a bill entitled the "Comprehensive and Balanced Energy Policy Act of 2001" that would require states to continue support for public benefits programs. The bill proposes setting up a public benefits fund to be supported by a wires charge of 1 mill/kWh of generated or imported electricity. Prospects for passage appear very low.

NARUC Efforts

In 2000, NARUC formed a public benefits working group (PBWG) to examine the issue of a national public benefits program. The working group examined the choice of programs, mechanisms and funding levels for such a trust. The NRRI supported the PBWG by gathering data on public benefits programs and performing analysis.

To assist the PBWG, the NRRI conducted a survey of state commissions to gather data on public benefits programs. The following Table summarizes the data, based on responses received. Expenditures are expressed in mills/kWh (as a fraction of sales) and as a percentage of revenues.

Table. Summary Data on Public Benefits Expenditures

Public Benefit Expenditures	Number of States Reporting Data	Mean	Median	Range
Energy Efficiency (mills/kWh)	25	0.77	0.40	0.00 – 3.07
Energy Efficiency (percent of revenue)	25	1.09	0.58	0.00 – 3.20
Research and Development (mills/kWh)	11	0.21	0.12	0.00 – 0.35
Research and Development (percent of revenue)	11	0.27	0.16	0.00 – 0.40
Renewable Energy (mills/kWh)	9	0.32	0.15	0.00 – 1.23
Renewable Energy (percent of revenue)	9	0.43	0.24	0.00 – 1.34
Low Income Assistance (mills/kWh)	21	0.24	0.08	0.00 – 0.68
Low Income Assistance (percent of revenue)	21	0.35	0.10	0.00 – 0.90
Total of All PB Programs (mills/kWh)	33	0.99	0.46	0.00 – 3.96
Total of All PB Programs (percent of revenue)	33	1.43	0.74	0.00 – 4.33

Source: NRRI Survey, Winter 2001.

Endnotes

[1] Electric Power Supply Association, "California: The Real Story," October 20, 2000, citing the California Energy Commission.

[2] Federal Energy Regulatory Commission, "Staff Report to the Federal Energy Regulatory Commission on Western Markets and the Causes of the Summer 2000 Price Abnormalities," November 1, 2000.

[3] Ibid., Figure 2-12.

[4] Ibid., Table 2-15.

[5] Ibid., 3-20.

[6] This assumes that natural gas prices increase from $2 per MMBtu to $5 per MMBtu and that the NOx emission credit price increases from $6.00/lb to $40/lb. FERC, "Staff Report on Western Markets," 3-21and 3-22.

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

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

[9] There is no universally accepted definition of public benefits. In general, public benefits are believed to include those that fall under positive economic externalities ("public goods"), or otherwise serve some chosen social goal or public purpose. Protection of the environment is an example of a positive economic externality, and assistance to the low-income segment of the population is an example of an accepted public purpose.

[10] U.S. Department of Energy, *National System Benefits Trust: Issues and Options*, March, 1998, and Energy Information Administration, www.eia.doe.gov/cneaf/electricity/dsm/table 1.html.

[11] Energy Information Administration, www.eia.doe.gov, *Federal Energy Market Intervention 1999: Primary Energy*, and *Department of Energy Research and Development Budget for 2001: Description and Analysis*.

[12] Martin Kushler and Patti Witte, *A Review and Early Assessment of Public Benefits Policies Under Electric Restructuring,* Volume 2, American Council for An Energy Efficient Economy, September, 2000.

[13] A renewable portfolio standard requires that a certain minimum percentage of new electric generation be produced from renewable resources.

The Millennium Bug (Or Was It Something In The Water?)

The Y2K scare came and went with hardly a whimper. But the advent of a new millennium did, one might surmise, have an effect on the water industry. As if responding to a primal instinct, several different groups from across the drinking water industry each seemed to instinctively know that it was time to contemplate the industry's future. For a brief shining moment, it seems, we eschewed our microscopes and opted instead for our telescopes. This article highlights the insights from four national organizations that share an interest in the private drinking water industry and have recently invested in looking to its future.

The four organizations are the National Regulatory Research Institute (NRRI), the National Association of Regulatory Utility Commissioners (NARUC), the American Water Works Association (AWWA) and the National Association of Water Companies (NAWC). Within the past year each of these organi-zations has focused some energy on

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exploring the future of the U.S. drinking water industry. What arises is a remarkable amount of similarity between the independent, forward-looking assessments from each of these groups.

The NRRI information was derived from a survey and article by John Wilhelm published in May of 2000 titled, *A Forward Look at the U.S. Drinking Water Industry: Four Visions of the Future*.[1] The NARUC perspective was obtained from a presentation given in September of 2000 by Commissioner Henry M. Duque, chair of the NARUC Water Committee, titled *Priorities of the Water Committee of the National Association of Regulatory Utility Commissioners for 2000-2001*.[2] The NAWC information comes from a discussion paper written by Janice Beecher in December of 2000 titled, *The Changing Utility Environment: Impact on the Water Industry and Issues for Economic Regulators*.[3] Finally, the AWWA information comes from a February 2001 presentation given by James Manwaring, the executive director of its research foundation, titled *A Strategic Assessment of the Future of Water Utilities*.[4]

A tabular summary and comparison of the four sets of observations is shown in Table 1 at the end of this article. The table is divided into a top portion that juxtaposes key issues and drivers that were similar between the group's assessments, and a bottom portion for the remaining observations that were unique to a specific organization. The table also highlights several shared and important themes:

1) infrastructure replacement and its associated financial considerations are already key issues for the industry and will continue to be so into the future;
2) industry restructuring (including consolidation, acquisitions, mergers, privatizations, and globalization) is a major driver of change;
3) the increasing number and scope of environmental regulations have important implementation and cost components; and
4) communication and coordination with a variety of stakeholders will become increasingly important.

Other important issues identified in the four sets of observations include the growing practice of submetering, the status and implications of water quality tort litigation, the effects of rapid technological change, the impact of a changing workplace environment on organizations and individuals, the tangential effects of deregulation in the energy and telecommunications sectors, and an emerging trend towards contestable markets in the water sector.

While all of these issues are important, infrastructure is "emerging on the national policy agenda"[5] and generating the most discussion and debate. Because of the rising importance and timeliness of infrastructure problems, the remainder of this article will focus on this issue.

Infrastructure (Out of Sight, But Not Out of Mind)

According to Jack Hoffbuhr, AWWA's Executive Director, "Our water infrastructure is four times as large as our Interstate highway system, but because it lies mostly underground, its degradation has been invisible to consumers and the government."[6] This seemingly hidden infrastructure issue is quickly becoming the eight-hundred pound gorilla of the water and wastewater industry. It is a big, hairy mess that has to be dealt with. At the heart of the issue is the need for large-scale, unprecedented investments in drinking water and wastewater infrastructure. This need is well documented, as is the growing debate regarding the magnitude, "gaps" and timing of the financial requirements.

"Our water infrastructure is four times as large as our Interstate highway system, but because it lies mostly underground, its degradation has been invisible to consumers and the government."[1]

Several recent surveys, reports and initiatives have targeted the emerging infrastructure issue. The first is the EPA's 1997 *Drinking Water Infrastructure Needs Survey*.[7] The EPA posed several key findings; the most general of these is that over the next twenty years the "total infrastructure need is large? $138.4 billion."[8]

The report concluded that "much of the nation's drinking water infrastructure suffers from long-term neglect and serious deterioration"[9] and that "water systems around the country must make immediate investments in infrastructure."[10]

A follow-up study, prepared for the AWWA by Stratus Consulting, portrayed a much bleaker picture. This study challenged the EPA's findings and suggested that "the estimates derived by the Agency may appreciably understate overall capital needs,"[11] and estimated that the actual need is closer to $325 billion.[12] The AWWA study calls for increased and better data collection on infrastructure needs, an infrastructure inventory, and a management guide for rehabilitation and replacement decision.[13]

The Water Infrastructure Network (WIN) released its first report in April of 2000. The WIN report examined the funding and investment "gap" between the EPA's estimates and the AWWA's estimates of infrastructure need. The 2000 WIN report supported the findings in the AWWA study and identified an overall investment gap of $34 billion a year (allocated between water and wastewater needs) over the next twenty years.[14] The report stated, "new solutions are needed to what amounts to nearly a trillion dollars in critical water and wastewater investments over the next two decades. Not meeting the investment needs of the next 20 years risks reversing the environmental, public health, and economic gains of the last three decades."[15] Additionally, the report stresses the need for a strong federal role in meeting these funding needs and for providing incentives for additional, non-federal investments.[16]

The findings and recommendations of the AWWA's Infrastructure Issues Group (IIG) support the need for large-scale, unprecedented investments in water and wastewater infrastructure as well. The IIG also contributes to the growing body of "gap analysis." "The IIG defines an 'affordability gap' or 'reality gap' as the difference between what should be spent on infrastructure replacement and what my utility can afford to spend in reality."[17] The group recommends that "a comprehensive

infrastructure strategy is required to change the game and restore local sustainability"[18] in water and wastewater services. The findings also focus on enhancing the role and options for private sector participation in Drinking Water State Revolving Fund (DWSRF) loans, promoting design/build options as an attractive source of funds, and perhaps most importantly for the regulatory community, calling for "a third-party study of the role of state regulatory commissions in affecting the flow of capital to investor-owned water utilities [that] would highlight the best of the 50 state programs in this arena."[19]

A second infrastructure needs report was released by the EPA in February of 2001.[20] This report increased EPA's "conservative estimate" of the total twenty-year infrastructure need nationwide from $138 billion to $151 billion. While still well short of other estimates, the EPA's trend is, nonetheless, upwards. A breakdown by category of the EPA's estimates for the drinking water industry's infrastructure needs over the next twenty years is shown in the Figure on the following page. By far the largest category of need is in the area of transmission and distribution projects ($83.2 billion, or 56 percent of the total). This category includes the installation and rehabilitation of water transmission pipes and distribution mains, and replacement of lead service lines, hydrants, valves, and backflow prevention devices.

By far the largest category of need is in the area of transmission and distribution projects ($83.2 billion, or 56 percent of the total).

At $38 billion, the second largest category of need is for treatment projects. Treatment projects include the installation, upgrade or replacement of infrastructure needed to reduce contaminants in drinking water. These processes include filtration, chlorination, corrosion control, and aeration.

The remaining categories include storage projects (storage tanks), ensuring and protecting source water supplies (surface and ground water), and a general category for such needs as emergency power generators,

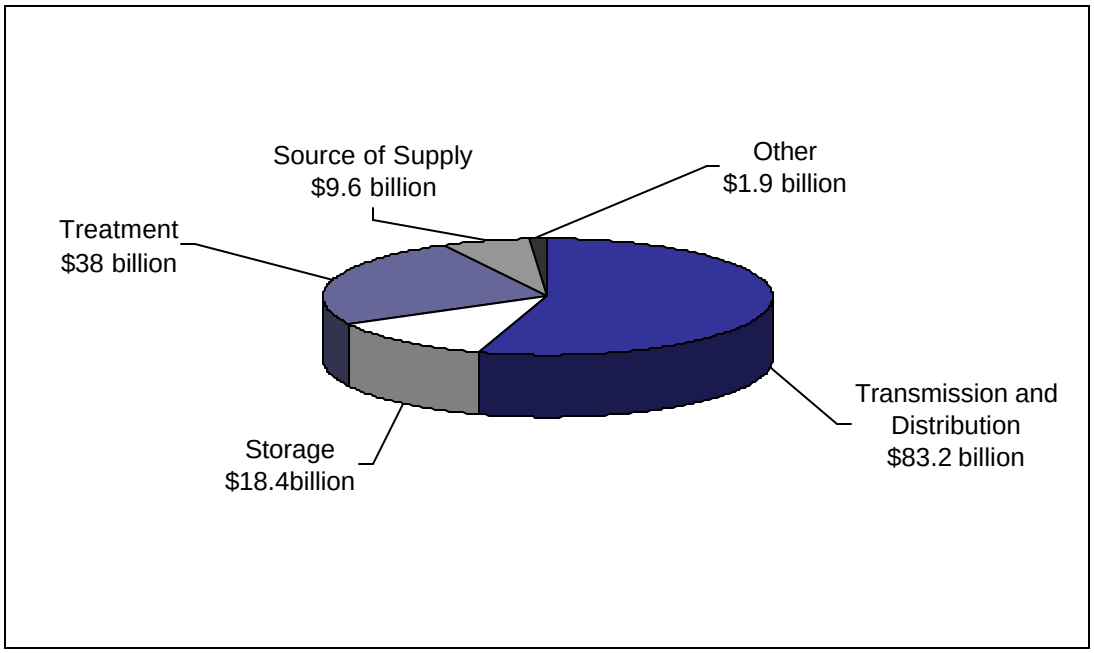

Figure. EPA's estimate of the total 20-year drinking water infrastructure need by category in January 1999 dollars

Source: EPA 816-R-01-004.

computer and automation equipment, and improvements for earthquake and flood control.[21]

A second WIN report was also released in February of 2001.[22] WIN's latest report affirms the findings of its 2000 report and outlines a "series of public and private actions that will be needed to meet the challenges for funding water and wastewater infrastructure of the coming decades."[23] This second document acknowledges the role that all levels of government and the public and private sectors must play in solving this problem. However, it also stresses the need for a strong federal funding component in the form of grants, loans, and credit enhancements. The recommendations of the 2001 WIN report are as follows:[24]

> The Water Infrastructure Network recommends that the Congress pass and the President sign a budget for new legislation to finance clean and safe water for America that:
>
> - Creates a long-term, sustainable and reliable source of federal funding for clean and safe water;
> - Authorizes capitalization of the next generation of state financing authorities to distribute funds in fiscally responsible and flexible ways, including grants,

loans, loan subsidies, and credit assistance;
- Focuses on critical "core" water and wastewater infrastructure needs and non-point source pollution;
- Streamlines federal administration at both the federal and state levels;
- Adequately finances strong state programs to implement the Clean Water Act and the Safe Drinking Water Act;
- Establishes a new program for clean and safe water technology and management innovation to reduce infrastructure costs, prolong the life of America's water and wastewater assets, and improve the productivity of utility enterprises; and
- Provides expanded, targeted technical assistance to communities most in need.

As was the case in its first report, the recommendations in the 2001 WIN report are supported by a broad-based coalition of local elected officials, drinking water and wastewater service providers, state environmental and health program administrators, engineers and environmentalists. There are, however, differences of opinion regarding some of the WIN's recommendations. Two state organizations, the Association of State Drinking Water Administrators and the Association of State and Interstate Water Pollution Control Administrators, and a newly formed group named the H_2O Coalition (Help to Optimize Water) participated in the WIN process but have not signed on to support the WIN's recommendations. These groups take issue, primarily, with the type and degree of federal involvement and the funding mechanisms proposed by the WIN. All three of these dissenting groups generally prefer a smaller federal role (and, predictably, a larger state role) and the increased utilization of the existing DWSRF that was established by the 1996 Safe Drinking Water Act.[25]

The recommendations in the 2001 WIN report are supported by a broad-based coalition of local elected officials, drinking water and wastewater service providers, state environmental and health program administrators, engineers and environmentalists.

The H_2O Coalition has put together an informative comparison that details the areas in which it agrees and disagrees with the WIN. The H_2O Coalition's "side-by-side" comparison is shown in Table 2 at the end of this article.[26] This table provides a good summary of where the two camps stand on general issues such as the duration of federal

assistance, the nature of federal assistance, and the magnitude of federal financial assistance. Typically, the WIN position calls for more federal involvement and the H_2O Coalition calls for less. Another key distinction between the approaches is that the H_2O Coalition stresses the need for utilities to be financially supported through the rates they charge. In a discussion germane to this topic, Janice Beecher agrees that "municipalities must bear some responsibility for historically under-pricing water (the 'willingness-to-charge' problem) and the associated failure to reinvest in their water infrastructure.[27]

According to Matt Shipman of the EPA, however, the positions taken by the H_2O Coalition relative to a strong federal grants and loans program are strongly influenced by the motivations of the private drinking water industry. He notes that "if [municipal] drinking water utilities have access to grants to help them maintain and upgrade their facilities, they are less likely to face economic pressure to sell out to private water companies."[28] Of course this logic cuts both ways. It is equally plausible that municipal water systems and their membership groups favor a massive federal bailout because it does not require them to become financially efficient or face the political consequences of traditionally underpricing water services.

Typically, the WIN position calls for more federal involvement and the H_2O Coalition calls for less.

Finally, public service commissions and NARUC have been involved in addressing water infrastructure needs in most states for over a century. A fundamental premise of rate-of-return regulation that has been applied to investor-owned drinking water utilities is that they be fully supported through fair and adequate rates and that these rates account for such things as infrastructure management, safety and reliability. In articulating NARUC's position, Commissioner Henry Duque, chair of the NARUC Committee on Water, states:

> The very scale of this problem and the possibility of federal action will require creative policy work to ensure that government action to solve this problem will

> enable the continuation of our system of public and private provision of water service. NARUC, through a resolution, has asked Congress to ensure that any government action avoid severing the link between water service and its true cost.[29]

The NARUC resolution on water infrastructure funding also states: "NARUC recommends against reliance on massive federal funding [and] encourage[s] a dialogue with the stakeholders."[30] Furthermore, the resolution notes that a wider range of possible solutions should be considered; mentioning regionalism, consolidation, public/private partnerships, and revolving funds.

Discounting ulterior motives and disagreements over the amount and form of federal involvement, the various parties do agree on many fundamental aspects of the problem and, in particular, that the infrastructure issue is real, that it is big, and that it is urgent. Underscoring these beliefs is the strong likelihood that the issue will be considered by Congress during the remainder of 2001.

Summary

Perhaps it was something in the water that prompted several major players in the drinking water industry to independently look to their collective future, all within a relatively short period of time. It is more likely, however, that the momentous occasion of moving into a new millennium caused even the most practical of individuals and organizations to contemplate what was on the horizon. Whatever the reason, the findings from across the industry provide an interesting glimpse into the future.

The various parties do agree on many fundamental aspects of the problem and, in particular, that the infrastructure issue is real, that it is big, and that it is timely.

Given that the future is, of course, unknown, there was a comforting level of similarity found in the work conducted by NRRI, NARUC, NAWC, and AWWA. As noted, there were many common elements and themes found throughout their reports and presentations. A majority of this article has focused on one item in particular—

the need to replace and finance our nation's aging water infrastructure. This issue is clearly emerging on the national stage. The debate is engaged and it will be interesting to participate in and observe its progress.

The focus on infrastructure should not diminish the importance of the other notable trends and drivers that were commonly held by the four groups. Again, these included industry restructuring, increasing environmental regulations, and the need to communicate and coordinate between stakeholders. Taken together, these issues serve as a harbinger of change for the U.S. drinking water industry.

Table 1. Key Issues and Drivers Affecting the Future of the U.S. Drinking Water Industry

Key Issues	National Regulatory Research Institute	National Association of Regulatory Utility Commissioners	American Water Works Association Research Foundation	National Association of Water Companies
Similar (Shared by multiple sources)	$ Infrastructure replacement, including cost of capital and costs for delivery and distribution systems	$ Needed infrastructure investments	$ Infrastructure replacement and management	$ Infrastructure funding
	$ Consolidation, acquisition and mergers $ Privatization $ Regionalization	$ Consolidations $ Globalization	$ Industry restructuring	$ Pressure to restructure $ Globalization of the water industry
	$ Implementing SDWA* $ Costs of implementing SDWA $ Source water protection and shortages	$ Implementing SDWA* $ Equal access to DWSRF** $ Influence the next round of water quality regulations	$ Increasing environmental regulations $ Watershed / water resources management	
	$ Consumer awareness	$ Developing communication links	$ Stakeholder relations	
Other (Unique to each source)	$ Submetering	$ Water quality tort litigation	$ Technological change	$ Deregulation of network services
			$ Changing workplace environment	$ Contestability of markets

* Safe Drinking Water Act
** Drinking Water State Revolving Fund
Source: Author's construct.

Table 2. Side-by-Side Comparison of the Recommendations of the WIN and the H_20 Coalition

General Issues		
Issue	**WIN Position**	**H_2O Coalition Position**
Duration of federal assistance	$ Wants new legislation that would create a "long-term sustainable and reliable source of federal funding for clean and safe water."	$ Recognizes short-term help may be needed but wants water utilities to be self-sustaining, not subsidized enterprises, over the long term. Utilities should be financially supported through the rates they charge (full cost-of-service rates).
Nature of federal assistance	$ Investment "needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone." $ An "enhanced federal role should provide for distribution of funds... including grants, loans, loan subsidies, and credit assistance."	$ If customers cannot afford the rates that would have to be charged to cover the needed investments, federal financial assistance is appropriate. However, non-federal solutions would need to be considered as well, such as public-private partnerships. $ To minimize the drain on the federal treasury, solutions should be structured so customers pay as much as they can afford. Subsidizing the rates of those who can afford to pay is inefficient. $ Agrees there should be a mix of financial assistance tools, which the states would employ to produce long-term solutions. $ Grants and grant-like assistance should be sparingly used to avoid wide scale dependence on government capital subsidies and assure the assistance funds will continue to revolve and be available for reuse.
Magnitude of federal financial assistance	$ Asks Congress to initially provide $57 billion in new authorizations between 2003 and 2007. $ Asks Congress to establish in 2003 a formal process to recommend a long-term financing approach.	$ Because of the size of the needed investments, agree there is a federal role in water infrastructure. However, it is not possible to state with any confidence, without more analysis, what is unaffordable to customers and therefore what the magnitude of the government support should be. $ Few utilities have done detailed long-term needs projections and looked at ways of addressing these needs through rates. $ Analysis of the affordability of these rates to customers is lacking.

Source: Side-by-side Comparison of Recommendations of the WIN and H2O Coalition, February 9, 2001

Endnotes

[1] John D. Wilhelm, "A Forward Look at the U.S. Drinking Water Industry: Four Visions of the Future," *The State of Regulation: NRRI's Annual Examination of the Four Utility Sectors and a Look Forward* (Columbus, OH: The National Regulatory Research Institute, May 2000), 57-71.

[2] Henry Duque, "Priorities of the Water Committee of the National Association of Regulatory Utility Commissioners for 2000-2001," National Association of Water Companies 104th Annual Conference, Boston, Massachusetts, 2000.

[3] Janice A. Beecher, "The Changing Utility Environment: Impact on the Water Industry and Issues for Economic Regulators," in *2000 NAWC Water Policy Forum* (Amelia Island, FL: National Association of Water Companies, 2000), 3-46.

[4] Jim Manwaring, "A Strategic Assessment of the Future of Water Utilities," NARUC Winter Committee Meetings, Washington, D.C., 2000.

[5] Duque, "Priorities of the Water Committee of the National Association of Regulatory Utility Commissioners for 2000-2001," 4.

[6] Jack Hoffbuhr, "Water Infrastructure Crisis Looms Large Threat to Public Health, Consumer Rates Demands National Solution," Water Online accessed July 17, 2000; available from www.wateronline.com.

[7] USEPA, "Drinking Water Infrastructure Needs Survey: First Report to Congress" (Washington, D.C.: Office of Water, 1997).

[8] Ibid., ES2.

[9] Ibid., ES6.

[10] Ibid.

[11] Stratus Consulting, "Infrastructure Needs for the Public Water Supply Sector" (Boulder, CO: Stratus Consulting, 1998), ES1.

[12] Ibid., ES2.

[13] Ibid., 5.4.

[14] Water Infrastructure Network, "Clean and Safe Water for the 21st Century," accessed December 12, 2000; available from http://www.amsa-cleanwater.org/advocacy/winreport.htm.

[15] Ibid. discusses the need for large-scale, unprecedented investments in water and wastewater infrastructure, ES-1.

[16] Ibid., 5-2.

[17] AWWA Infrastructure Issues Group, "AWWA Infrastructure Issues Group: Findings and Recommendations," (2000), 3.

[18] Ibid., 4.

[19] Ibid., 7

[20] USEPA, "Drinking Water Infrastructure Needs Survey: Second Report to Congress" 816-R-01-004 (Washington, D.C.: Office of Water, 2001).

[21] Ibid. This discussion on EPA's twenty-year infrastructure needs assessment was summarized from information contained in EPA-R-01-004, February 2001.

[22] Water Infrastructure Network, "Water Infrastructure Now: Recommendations for Clean and Safe Water in the 21st Century" (2001).

[23] Ibid., 1.

[24] Ibid., 4.

[25] Matt Shipman, "Water Coalition, States at Odds Over Infrastructure Funding Plans," *Inside EPA*, accessed February 13, 2001.

[26] H2O Coalition, "Water Infrastructure: Side-by-Side Comparison of Recommendations of the WIN and the H2O Coalition" (Washington, D.C.: 2001).

[27] Beecher, "The Changing Utility Environment," 2-31.

[28] Shipman, "Water Coalition, States at Odds Over Infrastructure Funding Plans," 2.

[29] Duque, "Priorities of the Water Committee of the National Association of Regulatory Utility Commissioners for 2000-2001."

[30] National Association of Regulatory Utility Commissioners, "Resolution on Water Infrastructure Financing," NARUC Summer Meetings, Los Angeles, California, 2000.

The Evolution of The Consumer Affairs Department

Numerous authors discuss the profound impact of the changing regulatory environment upon the role and function of the state and federal public utility commission, the consumer affairs department, and the consumer. Indeed, the structural and institutional changes that are hallmarks of the new regulatory environment have forced state public utility commissions to reexamine their relationships with consumers, utilities, billing agents, federal utility commissions, other government agencies, and consumer protection agencies. In doing so, it has forced them to reexamine the ways in which they protect consumers, and in essence has forced them to reexamine both their roles and responsibilities within the context of their consumer protection mandate and the very essence of who they are.

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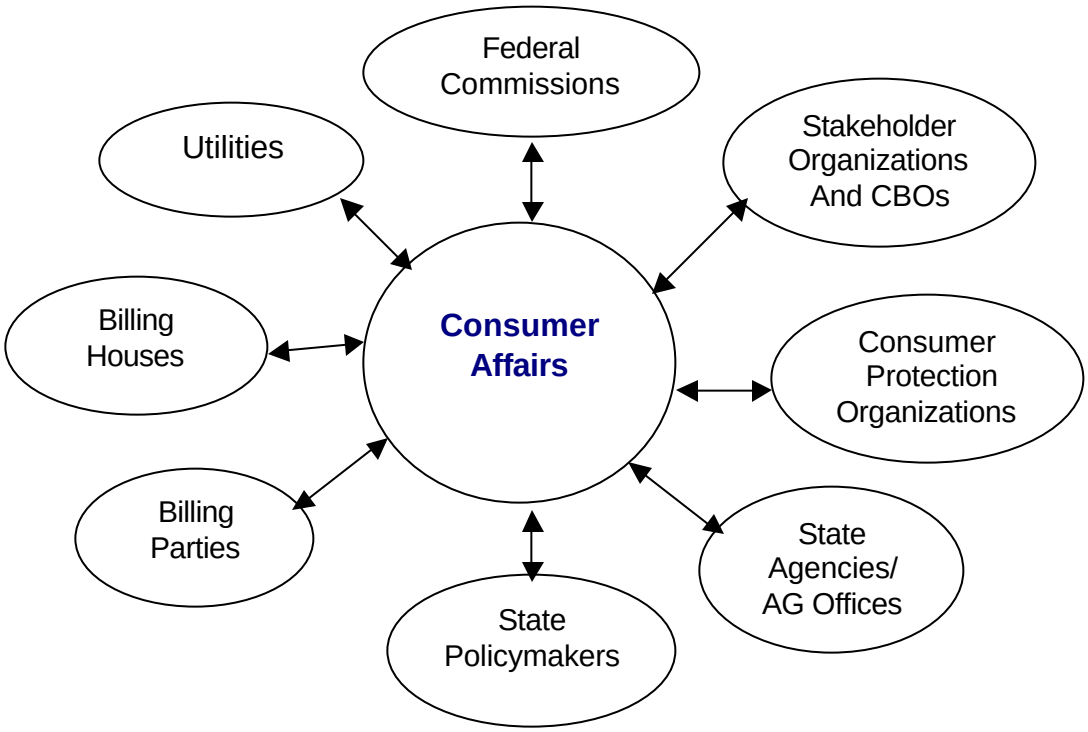

Figure 1. Organizations that consumer affairs departments interact with.

As indicated by Figure 1, the range and scope of organizations that state public utility commission consumer affairs departments interact with on behalf of consumers has increased significantly over the past few years. Consumer affairs staffs are interacting with billing parties, such as E-Z Travel, with which they never expected to have a professional relationship. On the other side of the spectrum, because of their access to complaint data and their knowledge of market abuse trends, consumer affairs staffs are providing policy recommendations that impact state and federal consumer protection legislation.

Moreover, as they navigate their way through the treacherous waters of the volatile sea that is commonly referred to as the new competitive environment, both commissions and consumers are forced to acquire new skill sets with which to enter into these new relationships.[1] As an example, in the report, *Dynamic Market Analyses for Transitional Utilities: A Role for Evolving Commissions*, Robert E. Burns et al. present an interesting discussion of

the evolving role of the commission within the new regulatory environment: "The commission is taking on a referee function, which includes setting rules of the game, imposing penalties, and protecting consumers."[2]

Similarly, author Harry Trebing discusses some of the implications of the new regulatory environment on both the consumer's skills set and the role and function of the consumer affairs department.

> As markets replace regulated sources of supply, consumers will be compelled to negotiate directly with vendors in these markets to acquire utility services. If these markets are assumed to be both efficient and competitive then the consumers' first line of protection would involve informed decision-making and free choice. This, in turn, would place primary emphasis on providing consumers with the type of information needed to make rational decisions.
>
> But if there is a strong potential for the exercise of market power and the selective exploitation of customer classes, then an entirely different form of consumer activism is called for. Information regarding prices and reliability loses much of its significance when placed in the context of market failure.[3]

Indeed, as Trebing points out, the challenges of the new regulatory environment have significant, and perhaps unprecedented impact, on the roles and responsibilities of both the consumer and the consumer protection function. Unfortunately, the impact of the "growing pains" associated with the new regulatory environment is most profoundly felt by the consumer.

The challenges of the new regulatory environment have significant, and perhaps unprecedented impact, on the roles and responsibilities of both the consumer and the consumer protection function. Unfortunately, the impact of the "growing pains" associated with the new regulatory environment is most profoundly felt by the consumer.

Figure 2 depicts the new consumer roles within the evolving regulatory environment.

As shown in Figure 2, consumers are now expected to competently detect fraud, unauthorized charges, deceptive and misleading marketing practices, and make informed choices regarding the selection of a service provider and vertical services, as well

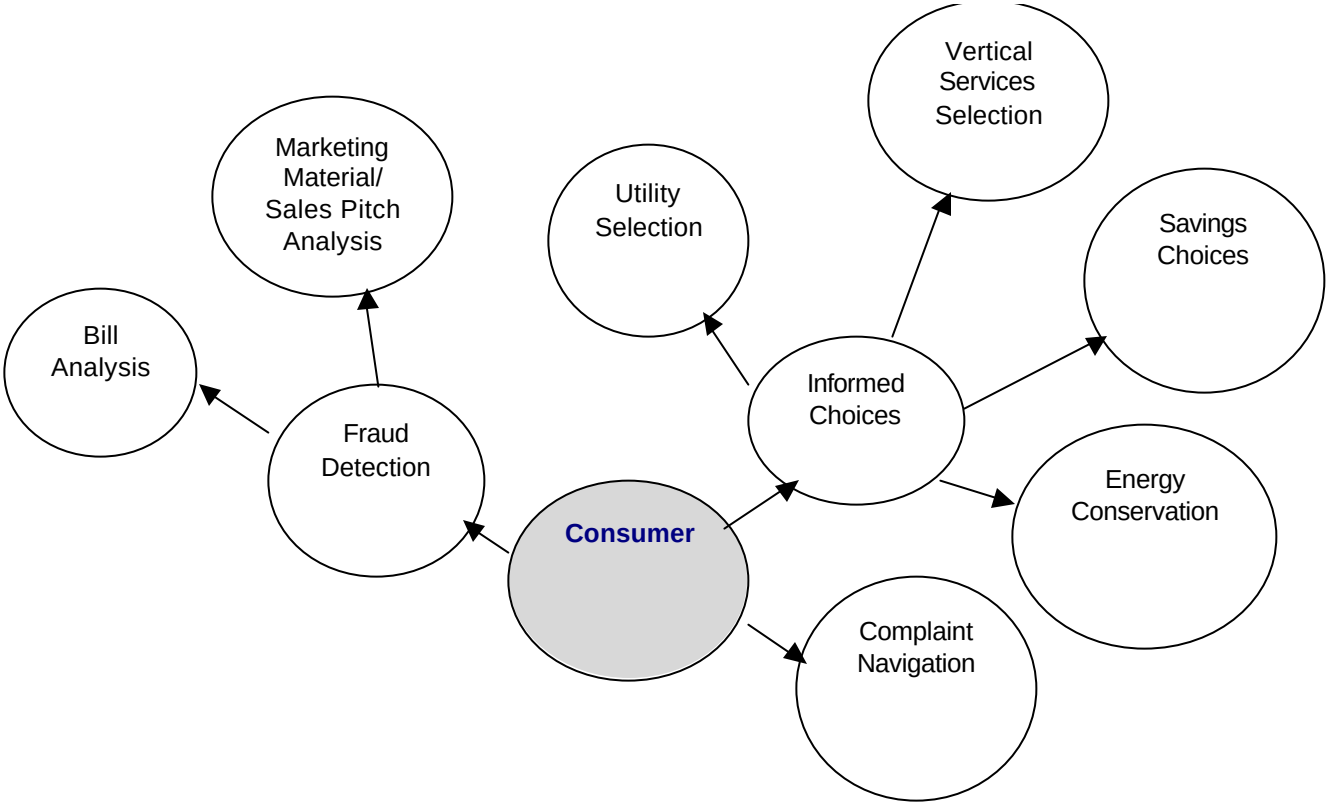

Figure 2. New consumer roles.

as successfully navigate complex complaint-handling processes. Needless to say, the burden of ensuring that consumers have the necessary knowledge and skills with which to complete these tasks falls on the shoulders of consumer affairs departments.

Staffs of commission consumer affairs departments have also acquired new roles in response to the "growing pains" associated with the new regulatory environment. As indicated by Figure 3, in many cases the consumer affairs function encompasses complaint handling, consumer research, policy making/ enforcement, and consumer education. Each of these functions will be discussed in turn.

Complaint Handling

The past few years have witnessed a tremendous rise in consumer complaints. In the article, "State Commissions in Transition: The NARUC Consumer Challenge," Commissioner William Gillis

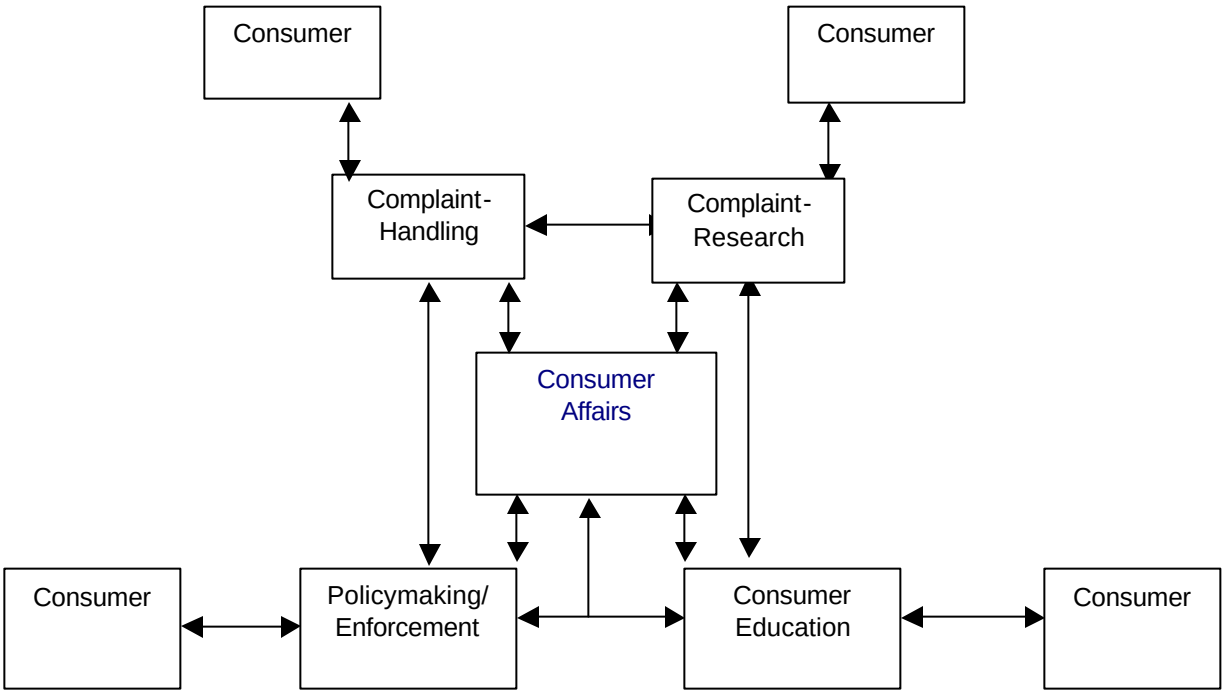

Figure 3. Consumer affairs functions.

discusses the rise in consumer complaints in response to developing markets:

> As markets have begun to develop, consumer complaints have grown. A survey of twenty-eight states conducted by the NARUC Staff Subcommittee on Consumer Affairs found that between 1993 and 1997, telephone service complaints rose by 91 percent, electric complaints by 58 percent and gas complaints by 40 percent. The California Public Utility Commission reports that consumer contacts increased by 65 percent between 1995-96 and 1997-98. It is not just regulatory commissions that are seeing the complaints. In Washington State, our Attorney General's Consumer Protection Division reports that telephone related complaints (slamming, cramming, billing practices) are their largest category.[4]

Moreover, prevalence data regarding the two largest telecommunications providers, AT&T and MCI WorldCom, indicates that the past three years have witnessed a significant rise in consumer complaints regarding these companies. In a July 12, 2000, press release, the NARUC Consumer Affairs Committee reported that consumer complaints about AT&T and MCI WorldCom long-distance services rose significantly in the last two years. In 1999 consumers

registered over 37,000 complaints against AT&T and MCI WorldCom (now WorldCom) with twenty-eight state public utility commissions. By contrast in 1997 consumers lodged 13,754 complaints against those companies in twenty-five of those states.[5]

Needless to say, the rise in consumer complaints has had a tremendous impact on the consumer affairs function. Within the realm of complaint handling, the consumer affairs department not only conducts the traditional intake, investigation, mediation, and enforcement functions but may also conduct the following functions:

- Analysis of aggregate complaint data. From the analysis of complaint-data trends consumer affairs departments are able to discern the following:
  - $ Areas where market monitoring may be needed.
  - $ Areas where new investigations, or new rules or legislation are needed. An example might be slamming.
  - $ Areas where company codes of conduct may be needed. An example is codes of conduct regarding the transfer of long distance customers from utility to utility.
- Creation of company complaint-handling policies. As an example, a number of commissions have addressed the issue of company call-completion standards.
- Creation of commission complaint-handling policies.[6] As an example, with the dramatic rise in consumer complaints, many commissions found a need to establish call-completion standards for their own intake function.

Consumer Research

With the advent of electric industry restructuring, many commissions also recognized the need to conduct market research as a component of

Results of a recent consumer research survey conducted in Pennsylvania indicate that consumers are aware of their ability to choose an electric supplier and are generally pleased with the information that they have been exposed to.[1]

their consumer education activities. As an example, results of a recent consumer research survey conducted in Pennsylvania indicate that consumers are aware of their ability to choose an electric supplier and are generally pleased with the information that they have been exposed to.[7] In this study, consumers expressed a desire to learn more about who the competing suppliers are and their rates, as well as how to compare prices and calculate savings.

Generally speaking, consumer research activities focus on one or a mix of the research activities listed below:

- Consumer demographics ? obtaining in-depth information regarding consumer attributes.
- Quality-of-service data? obtaining in-depth information regarding quality-of-service issues. Although this has been a traditional commission function, the movement toward a competitive marketplace has increased the need for this information.
- Evaluation of consumer education programs? obtaining in-depth information regarding the success of their consumer education programs. An example would be assessing the readability of a consumer education brochure.
- Identification of factors motivating and impeding choice? obtaining in-depth information regarding the factors that motivate and impede consumers in choosing alternative suppliers. Examples might include awareness of the ability to choose or awareness of price.
- Evaluation of choice programs—obtaining in-depth information regarding the success of choice programs. Examples might include in-depth information regarding the demographics of consumers choosing alterative suppliers. This information is important to commissions as it helps them to monitor to see if all groups of consumers are reaping the benefits of competition.

Consumer Education

Despite the extensive regulatory concurrence regarding the need to educate the public in changing utility

markets, doing so remains one of the most salient and challenging tasks facing commissions. Although originally many observers thought that the need for consumer education would decrease after markets were deregulated, commissions are now finding that the market abuses associated with the new regulatory environment have heightened the need for consumer education. Examples include the need for consumer education materials related to slamming, cramming, and other truth-in-billing issues.

Activities related to consumer education often encompass one or a mix of the following activities:

- The development of consumer education materials. This includes printed and electronic materials.
- The coordination of town hall meetings where consumers have the opportunity to learn more about choice programs.
- The formation of stakeholder and community-based organization (CBOs) alliances. Many commissions have found that they are able to maximize the effectiveness of their consumer education efforts by forming task forces comprised of representatives of other consumer groups, government agencies, and others.[8]
- The coordination of media relations. Many commissions have recognized the importance of establishing and maintaining good media relationships as a key to gaining media coverage.
- The coordination of legislative relations. Similarly, many commissions have recognized that a vital component of consumer education is education of legislative and other government officials.

Policy

Because of their access to consumer complaint data, consumer affairs professionals are increasingly present at the policy table when commissions address issues related to the creation of rules and policies to ensure that consumers reap the benefits not the detriments of competition. As an

example, the NARUC Staff Subcommittee on Consumer Affairs recently created the policy document, "State Commission Best Practices: A Guide to Administering the New FCC Slamming Rules." The creation of national guidelines will allow states to be consistent in administering slamming complaints, which will make it easier for states, the FCC, industry, and consumers? any of which may deal with multiple jurisdictions—to understand the processes and expectations of the states.[9]

Activities related to policy making include:

- Preventing unfair trade practices. An example would include developing codes of conduct for the transfer of customers from carrier to carrier.
- Establishing service quality standards. An example would include call-completion standards for company complaint-handling functions.
- Preventing market abuses. An example is truth-in-billing rules and legislation.
- Policies related to information flow. An example would be rules and legislation regarding the transfer of customer information from company to company.
- Establishing enforcement rules and legislation. As an example, most commissions' slamming rules or legislation contain provisions regarding slamming fines.

Conclusions

Clearly, changes in the regulatory environment have increased both the relevancy and the function of the state public utility commission consumer affairs department. It will be important that commissions support the work of the consumer affairs department by devoting the resources necessary to ensure that they are able to maximize their ability to ensure that all classes of consumers

Clearly, changes in the regulatory environment have increased both the relevancy and the function of the state public utility commission consumer affairs department.

reap the benefits, not the growing pains, of the competitive arena.

Endnotes

[1] For an in-depth analysis of the impact of the evolving regulatory environment on the consumer affairs department and the consumer, see Francine Sevel, *The Consumer Response to Public Utility Competition* (Columbus, OH: The National Regulatory Research Institute, June 2001).

[2] Robert E. Burns et al., *Dynamic Market Analyses for Transitional Utilities: A Role for Evolving Commissions* (Columbus, OH: The National Regulatory Research Institute, 2000), 9.

[3] Harry M. Trebing, "New Challenges for the Consumer Movement in an Era of Utility Deregulation," *NRRI Quarterly Bulletin*, 19, no. 4 (Winter 1999), 426.

[4] Commissioner William Gillis, "State Commissions in Transition: The NARUC Consumer Issues Challenge," *NRRI Quarterly Bulletin* 20, no. 2 (1999): 171-176.

[5] Please note, although the definition of a complaint varies from state to state, in most of the states surveyed a complaint is defined as an issue that the consumer is unable to resolve with the company prior to contacting the commission.

[6] For further information on the complaint-handling process, see Francine Sevel, ed., "Innovative Excellence: Best Practices in the Consumer Affairs Function," National Regulatory Research Institute, 2000.

[7] See Wattage Monitor's "Switching Electricity Suppliers: A Research Study of Pennsylvania's Residential Consumers," Spring 1999, Wattage Monitor Inc., as downloaded from www.wattagemonitor.com.

Wattage Monitor is a commercial service providing rate comparison information to consumers.

[8] In some cases, stakeholder groups include representatives of utilities; others chose not to have the utilities involved.

[9] However, it is important to note that the FCC and the states have been clear that, while consistency is a worthwhile goal, uniformity among states is simply not possible. Individual states will have unique processes, procedures, and rules regarding slamming that will not allow absolute uniformity.

BROADBAND CONNECTIONS

State commissions face gritty issues in the digital revolution. The Telecommunications Act of 1996 calls for the FCC and state commissions to encourage deployment of advanced telecommunications capability to all Americans by removing regulatory barriers to infrastructure investment and promoting competition.[1] Policy is shaped by those goals. An earlier chapter of this review discussed two tough issues faced by regulatory commissions in 2000? conflict over sharing data lines with competitors and the reciprocity of compensation for lopsided Internet traffic. In Congress, in 2000 and on into 2001 bills intended to promote broadband through various means, deregulatory and otherwise, made headway.

Policy is also informed by the facts of deployment of advanced capability, insofar as they can be ascertained and evaluated. At regular intervals, the FCC must assess the progress of broadband deployment and its adequacy. This chapter looks at the

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She received her Ph.D. in Public Policy and Management from the Ohio State University.

FCC's August 2000 report and other sources and offers observations on some baseline questions: (1) How fast is deployment of broadband capability happening? (2) How big is the digital divide (or divides)?[2] (3) What factors other than government action (or refraining from action) are driving deployment?

Even if the answers to these questions were clear, which of course they are not, commissions will analyze alternatives carefully before coming to conclusions on the right way to proceed. They need to ask: (4) How important is the digital divide in their state and nationally? and (5) What is the proper role of government? If the divide is large, likely to be enduring and perceived as important, the FCC and some commissions might wish to push harder on deregulation and use measures to actively promote deployment as well. This chapter focuses on getting a picture of deployment and a few bellwethers of the future, not on questions (4) and (5)? how important deployment is or what actions are called for.

Is Deployment Fast Enough?

The FCC must determine whether deployment of advanced telecommunications capability is "reasonable and timely."[3] In its second report on advanced telecommunications in August 2000 (referred to herein as "the FCC report") the FCC found that deployment is going well enough so far, although some consumers are "vulnerable" to lack of access to advanced services.[4] Their conclusion is fair enough for its purpose, deciding whether heroic measures are needed. But reasonable people may disagree on just how reasonable and timely the spread of advanced services is. For one thing, a comparison of diffusion rates for broadband telecommunications and other telecommunications innovations is not likely to leave every policy maker happy. For another, the overall picture of digital deployment may be rosy, but some groups are lagging behind, as the FCC also concluded.

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Noting that “broadband” is a fuzzy term, the Commission avoided using it in its report. The FCC defined “advanced telecommunications capability” as infrastructure that can deliver a speed of 200 kilobits per second in each direction.[5] This is faster than Integrated Service Digital Network (ISDN) and fast enough for popular applications, said the Commission. At 200 Kbps a user can change web pages at the speed she can flip through a book. A “high-speed” service is defined as faster than 200 Kbps, so advanced capability, or advanced service, is a sub-set of high-speed capability. The definitions are expected to evolve over time.

To make a judgment on the reasonableness and timeliness of deployment, the FCC looked at trends in subscription rates, the emergence of competition, the build-out of infrastructure, and the level of investment in advanced capabilities. The Commission found that the penetration rate for advanced services went from 0.3 percent in 1998 to 1.0 percent in 1999. Of the one million residential or small business subscribers to advanced services at the end of 1999, about 875,000 used cable modems, about 115,000 asymmetric digital subscriber lines (ADSL), and the balance other media like satellite, land-based wireless or electric lines. Cable companies tripled their subscribers from 1998 and DSL subscribers for the telephone companies quadrupled. Cable’s overall market share declined, although cable is still in the lead. Figure 1 shows residential market shares for advanced services in 1998 and 1999.

The FCC found that infrastructure to support advanced services is being rapidly built. Backbone capacity is being supplied by nationwide wireline providers, more local transport providers, terrestrial wireless, and satellite-based wireless.[6] “Middle-mile facilities," which the FCC defines as those going from the backbone providers to the “last mile” that connects directly to customers, are also rapidly being constructed. Since 1995, fiber miles deployed in the U.S. have doubled, reflecting huge investments in middle-mile facilities.[7] Advanced capability in the “last mile,”

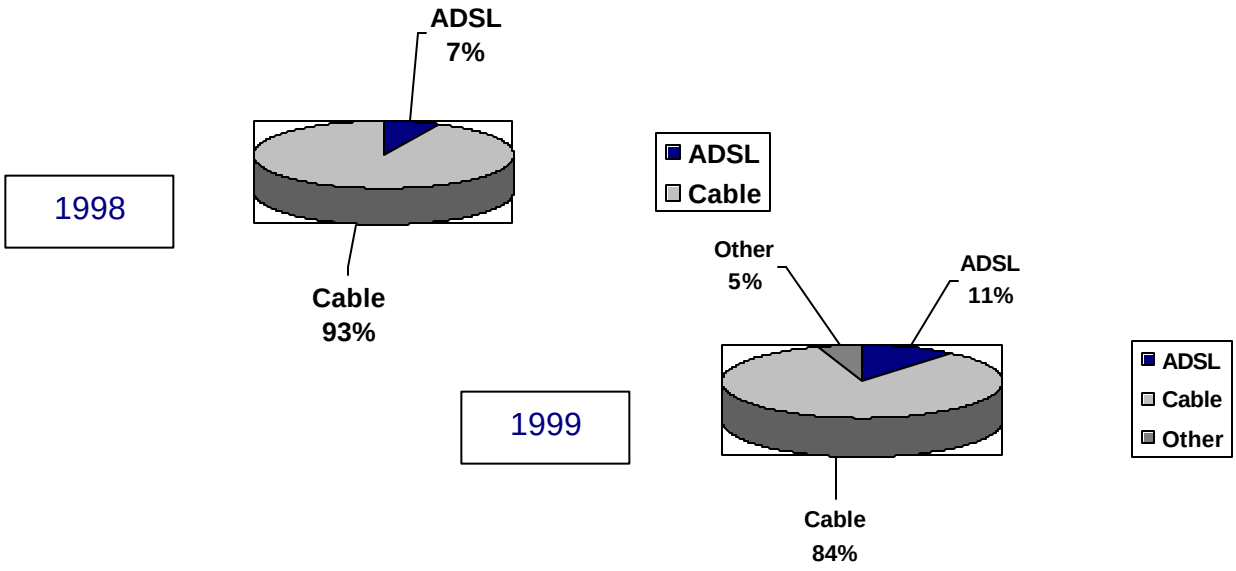

Figure 1. Residential market for advanced services, 1998 and 1999.

Source: FCC.

which connects middle-mile facilities and the last 100 feet that go to a user's terminal (the driveway in the FCC's highway system analogy) is expanding rapidly, as suggested by the increases in subscribership.[8]

The FCC report concludes, based on its own broadband survey and comments submitted to it, that "advanced telecommunications capability is available now and continues to be deployed to significant numbers of residential customers in communities of all types."[9] Existing providers show no sign of letting up on deployment and there is a "real prospect" of deployment of wireless technologies that can overcome some of the technical limits of cable and telephone plant and reach some of the most rural communities.[10]

One way of looking at the speed of broadband deployment is to compare its rate of diffusion with other communications technologies. The FCC provides some interesting comparisons of penetration levels of such technologies early in their history.[11] Diffusion of advanced tele-communications capability is ahead of some technologies, like telephone, after the same time period, but behind others, like radio. Such comparisons are not necessarily illuminating, since many factors are at work. But it is

worth noting that diffusion of an innovation based on network technology to most of the population ordinarily takes place over decades, not just a few years. Adoption rates for telephony and radio are shown in Figure 2. Data for the early years of the author of the study, thus the stories for telephone and radio start at the same time, in 1920, with adoption of telephony at 35 percent and radio at 1.6 percent (or a little ahead of the 1999 adoption level for advanced telecommunications capability, as noted by the FCC).[12] Diffusion of telephony did not take off until the 1940s, after which it followed a fairly steep slope for four decades, until it leveled off at about the current level of 94 percent. (See the telecommunications chapter of this report for more discussion of universal service penetration rates.)

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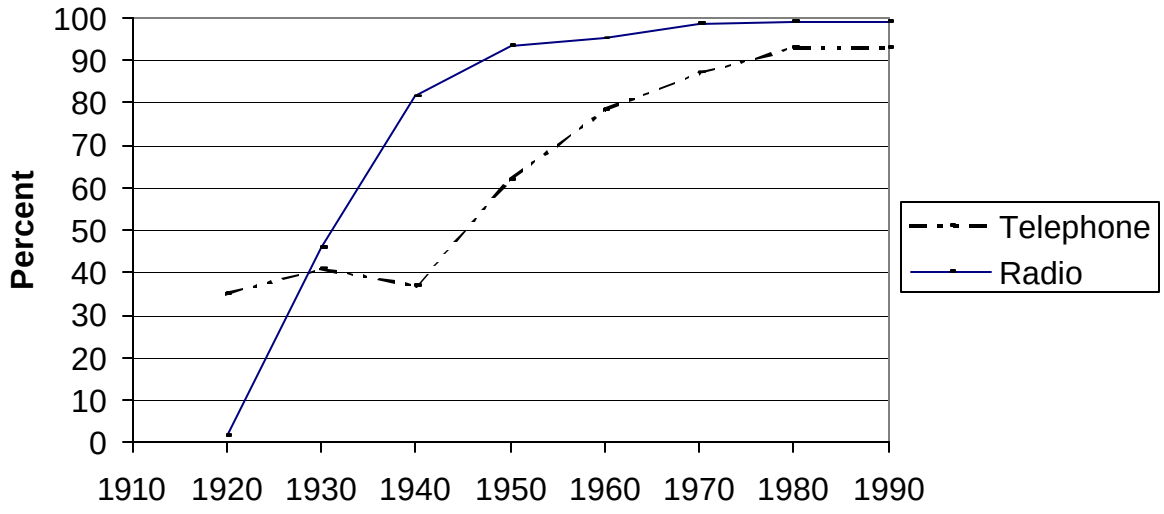

Figure 2. Adoption Rates for Telephone and Radio

Source: Annual Review of Institute for Information Studies - 1991.

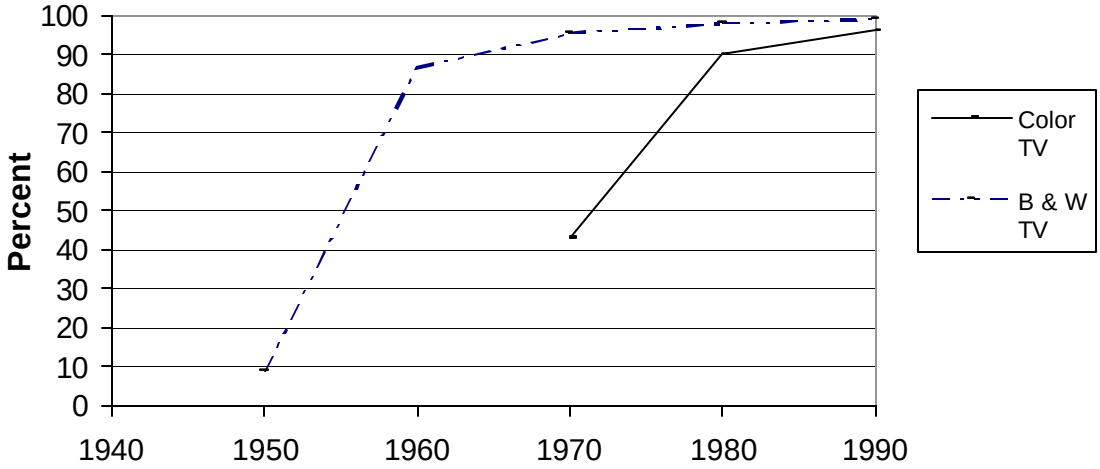

Figure 3. Adoption rates for black and white TV and color TV.

Source: Annual Review of Institute for Information Studies-1991.

The telephone is probably not an apt comparison to advanced tele-communications capability because it required the initial installation of expensive wiring and switches nationwide to enable access. Both cable modems and DSL are add-ons to existing wired networks. Perhaps radio is a more appropriate comparison. The graph shows that it took thirty years, from 1920 to 1950, to reach 90 percent of the population and it was not until fifty years had passed that it reached 99 percent. It is thus at least interesting that the FCC finds diffusion of advanced capabilities to be behind radio after the same length of time for the earliest period of diffusion.

Radio may not be an apt comparison either. Even though radio is wireless, investments and customers started from ground zero, with no initial infrastructure to build on and little customer awareness or experience with the appeal of broadcast information and entertainment. Figure 3 gives some other comparisons, in this case adoption rates for a pair of innovations building on each other? black-and-white television and color TV. Black-and-white television was an immediate hit with consumers after World War II, with an adoption level of 8.9 percent in 1950 that shot to 86.6 percent in 1960, and then grew more slowly until it reached 99 percent of the population. Color TV never

climbed quite as steep a slope, but nonetheless went to 43 percent between 1960 and 1970, rose to 90 percent by 1980 and was at 96 percent in 1990. If diffusion of advanced telecommmunications capability followed a similar path, it would be used by well over half the population in ten years and take two decades or more to reach the current level of telephone penetration.

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Some policy makers will conclude that a couple of decades is quite fast enough and that government intervention is not required to accelerate deployment. Others will disagree with the FCC conclusion that the spread of advanced telecommunications over decades is timely, especially since many households may be at the far end of the adoption cycle, as discussed in the next section.

Defining Digital Divides

The FCC report found that low-income consumers, those in sparsely populated areas, minority consumers, Indians, persons with disabilities, and people in U.S. territories are vulnerable to lack of timely access to advanced telecommunications capability.[13] Other studies have documented wide gaps in access to advanced telecommunications.[14]

The conclusion of the FCC report that some groups are lagging in access to broadband is not really surprising. The normal sequence of diffusion of many innovations is from urban to rural areas and from high-income to low-income households, which helps account for lack of access for many of the groups identified by the FCC. The 2000 FCC report focused on high-speed, switched, broadband capability as a means of using new data services. A large share of the population already has access to the Internet, the most popular of new data services, through lower-speed technologies, including existing phone lines. What is not cited

in the FCC report is evidence that the vast majority of the U.S. population is already within a local phone call of an Internet service provider over a telephone wire.[15] This access is inferior to broadband, but it works. In fact, we are dealing here with innovations that build on each other, like black-and-white TV and color TV. The Internet is fast becoming an essential tool for education, business, and full participation in society. But if people can get it in black and white, that is a whole lot better than not having access at all.

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The National Telecommunications and Information Administration (NTIA) in its fourth report on "falling through the net" found that not only did the share of households with Internet access, either narrowband or broadband, increase dramatically in a year and a half, but the gap between households in rural areas and other households narrowed. Blacks and Hispanics, however, despite large gains in Internet access, continued to lag behind the national average rate and behind households of other races and ethnic groups.[16] Gaps also still existed for different levels of income and education, old and young, single and dual-parent families, and those with and free from disabilities. The share of households with Internet access (through both narrowband and broadband technologies) increased to 41.5 percent in August 2000 from 26.2 percent in December 1998. In rural areas, 38.9 percent of the population had Internet access, only a couple of percentage points behind urban areas. While still far behind the national average, Blacks more than doubled in Internet access over eighteen months, to 23.5 percent from 11.2 percent; Hispanics almost doubled in access, to 23.6 percent from 12.6 percent. These are big improvements.

In addition to the FCC reports in 1999 and 2000, at least two other studies support the view that the digital divide is a temporary phenomenon. A study by David Gabel suggests that, at least

in some respects, the digital divide may not cut much of a fissure. Gabel found that availability of high-speed access to the Internet through DSL or cable modems does increase with telecommunications density and income. But the critical demographic variable of race was not a factor in deployment of high-speed networks.[17]

On the state level, a survey in Iowa concluded that no major geographic digital divide will exist in Iowa if industry deployment projections are realized.[18] Industry projections are for 78 percent of rural Iowa communities and 75 percent of non-rural communities to have high-speed Internet access within twelve months of the survey. The report concluded that this was reasonable.

The assessment was based on a July 2000 survey by staff of the Iowa Utilities Board of all telecommunications companies likely to offer high-speed Internet access in Iowa. These companies included incumbent local exchange carriers (ILECS), competitive local exchange carriers (CLECs), cable providers offering telecommunications services, fixed wireless providers, and satellite companies. The survey did not address access to the Internet through cellular telephones.

State Maps of The Digital Divide

To make good policy on advanced telecommunications, states need accurate information on where deployment of advanced telecommunications is taking place and for whom. Several other states besides Iowa have mapped the digital divide, including North Carolina, Florida, Ohio, and Texas. Getting a bird's-eye view of the extent of the digital divide is not a costly or time-consuming process. FCC data are publicly available on broadband deployment by zip code. Demographic information is also available by zip code. By overlaying the deployment information on the

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demographic information, a rough picture of broadband availability may be obtained.

But public policy decisions on targeting of programs may call for more detailed mapping of deployment patterns than is available through the FCC and other readily usable sources. The distance limitations of DSL then need to be taken into account, which adds complexity (and cost) to the task. To disaggregate to the switch level for DSL availability also depends on the cooperation of carriers which may not wish to share data because of confidentiality concerns.[19]

Variables Promoting Access

The FCC in their 2000 report on deployment of advanced services remarked that factors that predict which customers will not have access or will have very late access to advanced services have not been identified.[20] The Commission suggested that three factors affect deployment? demand, competition, and local effort.[21]

Demand is likely to continue growing, the FCC concluded.[22] The Commission suggested that factors affecting demand include population density, income level, and the presence of activities that place a high demand on telecommunications.

The FCC has been conducting an on-going survey of community broad-band deployment on the NRRI website since June 2000.[1] Almost 250 respondents have reported on their successful efforts.

However, the Iowa Utilities Board survey referenced above found that demand for high-speed Internet access was low in many parts of the state. Absent a demonstration of the faster speeds and multimedia applications for broadband Internet service, many customers may not yet see faster speed service as a pressing need or sharp desire.

Competition between access to the Internet by cable modem and by DSL has received considerable attention and appears to be fierce. Cable has an edge in residential broadband, according to one consulting firm, and

not only because it has a head start in high-income households. Cable's "sheer capacity" and the ability to provide one-stop-shopping for Internet, television and voice give it good prospects in the residential market.[23] DSL, however, is predicted to be more profitable because it will do better on sales to mid-sized and small businesses.[24] Wireless broadband cannot be counted out of the race to win customers' hearts and pocketbooks, especially in rural areas. The FCC has been conducting an on-going survey of community broadband deployment on the NRRI website since June 2000.[25] Almost 250 respondents have reported on their successful efforts. Of those 164, or about two-thirds, were using wireless (see the Table at the end of this chapter). (Some respondents reported using more than one technology.) Local effort, the third general factor cited by the FCC, is burgeoning. Waltham, Massechusetts and Muscatine, Iowa, are discussed in the FCC report as examples of such effort.[26] Other municipal examples include Palo Alto, California;[27] Longmont, Colorado;[28] La Grange, Georgia;[29] Bloomington, Indiana;[30] Glasgow, Kentucky;[31] Burlington, Vermont;[32] and Blacksburg, Virginia.[33] For more examples, go to the website of the Federal-State Joint Conference on Advanced Services and look at the transcripts of the five field hearings held in 2000 across the country.[34]

The FCC survey on community broadband deployment quite clearly reveals one factor that is important in bringing it to potential users? a spirit of enthusiastic entrepreneurship. The FCC survey includes open-ended questions on success factors and the advice the respondent would give to others. Many respondents, who for the most part are the providers of the broadband services, gave responses like "my drive" to sum up reasons for success. They gave advice on technical and community issues but often included an admonition on the order of "just go for it"!

Besides the providers' enthusiasm and effort, community leaders appear to play a significant role in developing telecommunications infrastructure in

rural areas. A study by Joseph Donnermeyer, Ann Hollifield, and others under an Ameritech grant at the Ohio State University found that among the most important predictors of success of self-development projects was "the active involvement in the development of the project of a wide range of community members? with a particular emphasis on members of the business community and local mass media organizations."[35]

Barriers to Broadband

The absence of a sense of urgency on the part of consumers about acquiring broadband service was cited above as a factor that might inhibit adoption of broadband technology. Another variable that always counts is money. Here we can look at the cost to the provider, overall and as it differs by region, and the price charged to consumers.

The National Exchange Carriers Association in a 2000 study estimated that it will take $10.9 billion to finish wiring the rural portions of the United States for broadband service.[36] Yet, surprisingly, the study found that about 65 percent of rural telephone company lines will be capable of providing broadband service by 2002. The cost results are based on detailed engineering studies completed by a sample of companies that had or were in the process of upgrading their exchanges to broadband capability. The study measured the cost of upgrading lines. A second study completed by a sample of other companies estimated the percentage of lines that would not by upgraded to broadband capability by 2002.

Marvin Sirbu of Carnegie Mellon University has conducted cost comparisons by access line density for ADSL, cable, and broadband fixed wireless. At every density zone level, cable is cheaper than ADSL (Figure 4). MMDS is less expensive than DSL at all but the densest levels (Figure 5). Sirbu predicts that costs for all three will decline over time.[37]

How about the prices faced by consumers? A recent approximation of retail pricing put cable as the cheapest

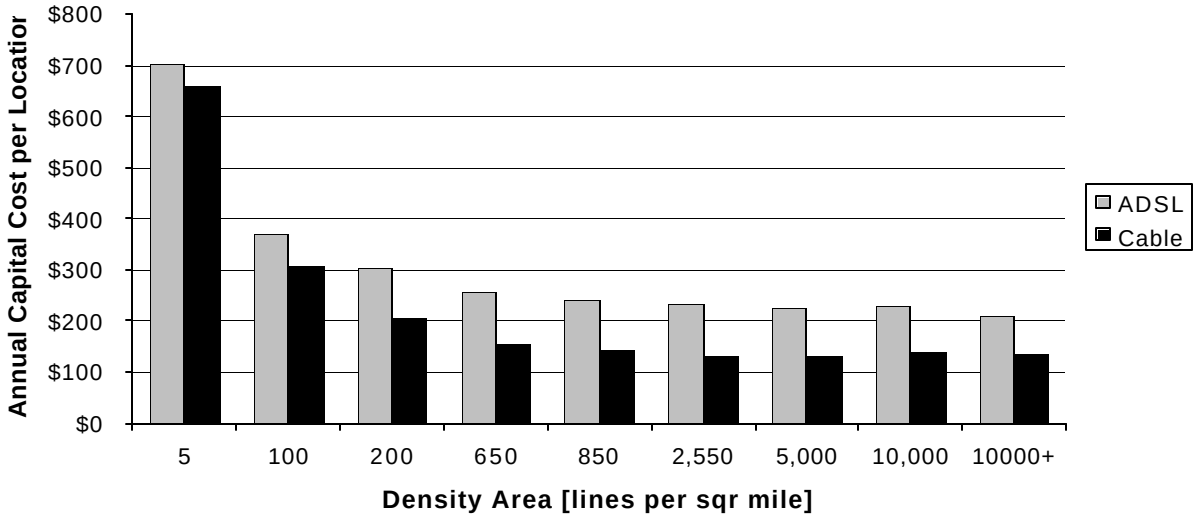

Figure 4. Cost by density zone: ADSL vs. cable

Source: Marvin A. Sirbu, Carnegie Mellon University, 2000.

option, with a $75 start-up cost and $40 monthly fee. DSL was estimated to cost $100 for start-up and $40-$50 a month. MMDS would cost $150 for installation and approximately $40 a month.[38] The pricing point of $40 a month is presumably being chosen to be competitive with the existing monthly phone company charge for a second line. The price is likely to decline with further competition.

The Bell companies themselves are sometimes mentioned as barriers to the spread of DSL. The Iowa study found that access to DSL is more likely in rural communities served by a small ILEC than a large one.[39] No rural communities served by a large ILEC had access to DSL technology, while 29 percent of rural communities served by a small ILEC did. The Gabel study did not find evidence of discriminatory behavior in an urban area, however.

Prospects for the Future

Based on the spread of other networked, technological innovations, broadband could diffuse to over 90 percent of the population in a decade or two. This is overnight if you take the long

Broadband could diffuse to over 90 percent of the population in a decade or two. This is overnight if you take the long view but may not be fast enough for the policy maker in a hurry.

view but may not be fast enough for the policy maker in a hurry. If deployment of broadband is reasonable and timely, as the FCC suggests, and most households already have access to the "black and white" version of the Internet, Draconian deregulatory measures are unnecessary. For example, allowing the Bell companies to bypass requirements of Section 271 of the Telecommunications Act to encourage the spread of DSL, as presently being proposed in Congress, may not be called for in light of the primary objective of the Act? promoting competition in telecommunications markets. In any case, there are likely to be limits to the effectiveness of nationwide solutions to the divide between broadband haves and have-nots. Local conditons are highly individualized. Community and state effort is likely to play a major role in fostering broadband connections.

More knowledge would certainly help to inform policy choices. This includes more detailed mapping of deployment and studies of influences on adoption. What are the factors that predict success of a broadband deployment effort? What are the barriers to adoption? Can we identify factors that push communities to a tipping point on use of broadband? Surprisingly little systematic study has yet been completed on these questions. Perhaps the NRRI regulatory review of 2001 will find much more information.

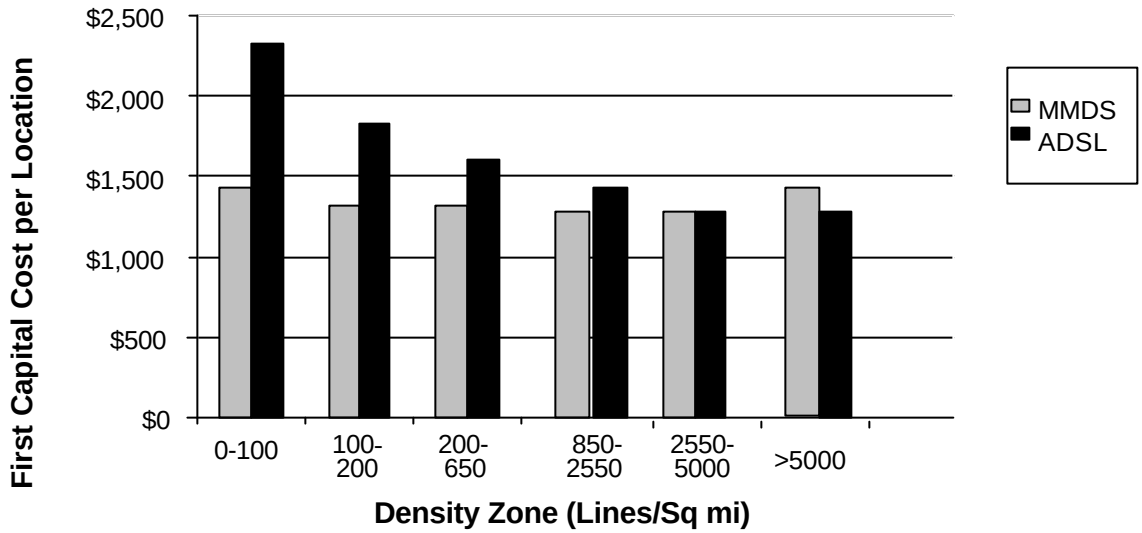

Figure 5. Broadband fixed wireless access (BFWA) cost comparison with ADSL network.

Source: Marvin A. Sirbu, "Broadband Integrated Access Telecommunications, Washington, D.C., February 28, 2001. PowerPoint presentations. www.fcc.gov/jointconference/news-feb28.html.

Table. SELF-REPORTS OF COMMUNITY BROADBAND DEPLOYMENT

Target Users		
Residential: 194	Health Care: 132	Agriculture: 98
Large Business: 137	Libraries: 151	Federal Government: 67
County Government: 140	People w/Disabilities: 111	Multicultural Communities: 97
Small Business: 196	Schools: 170	Community Centers: 140
State Government: 92	Local Government: 163	Low Income Users: 98
Other: 46		
Infrastructure		
Coaxial: 44	Copper: 73	Fiber: 75
Satellite: 17	Wireless: 164	Other: 12
Region		
Major Metro Area: 56	Urban Area: 104	Inner City: 40
Rural: 175	Remote: 70	Native American Commty: 17
Other: 33		
Funding		
Grants: 20	Loans: 37	Guarantees: 4
Matching Funds: 9	Bond Initiatives: 5	Private Funds: 133
Other: 24		
Number Served		
1-250: 34	251-1,000: 48	1,001-10,000: 81
More than 10,000: 75		
Symmetrical Speed		
Yes: 182	No: 36	Unknown: 20
Download Speed		
Less than 200 Kbps: 15	200 Kbps-2 Mbps: 132	Greater than 2 Mbps: 74
Unknown: 17		
Upload Speed		
Less than 200 Kbps: 21	200 Kbps-2 Mbps: 134	Greater than 2 Mbps: 63
Unknown: 20		

Source: FCC-NRRI Community Broadband Deployment Database, accessed 4/7/01.

Endnotes

[1] 47 U.S.C. Section 706(a).

[2] Commissioner Brett Perlman of the Texas Public Utility Commission notes that there are many digital divides, not a single fault line, meaning that numerous factors, demographic and otherwise, are associated with whether availability of broadband is high or low.

[3] 47 U.S.C. Section 706(b).

[4] FCC, Second Report, Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, CC Docket 98-146, Aug. 21, 2000.

[5] FCC, Second Report, §11.

[6] FCC, Second Report, §21.

[7] FCC, Second Report, § 26.

[8] FCC, Second Report, § 28.

[9] FCC, Second Report, § 217.

[10] Ibid.

[11] FCC, Second Report, § 219.

[12] Susan G. Hadden, "Technologies of Universal Service," *Universal Telephone Service: Ready for the 21st Century?* (Queenstown, MD: Aspen Institute, Institute for Information Studies, 1991), www.aspeninst. org

[13] Second Report, §8 and 86-92.

[14] Chang Hee Lee, "Advanced Telecomunications in Rural Areas," *NRRI Quarterly Bulletin*, forthcoming.

[15] Tom Downes and Shane Greenstein, "Universal Access and Local Commercial Internet Markets," presentation to the Consortium for Research on Telecommunications Policy and Strategy, Fourth Annual Conference, Ann Arbor, Michigan, June 1998.

[16] National Telecommunications and Information Administration, *Falling Through the Net: Toward Digital Inclusion*, October 2000, xvi-xvii.

[17] David Gabel, "Modeling the Rollout of High-Speed Access to the Internet," presentation to Federal-State Joint Conference on Advanced Telecommunications, Lowell, Massachusetts, May 22, 2000.

[18] Iowa Utilities Board and Iowa Department of Economic Development, "Assessing High Speed Internet Access in the State of Iowa," xeroxed copy (October 2000).

[19] Brett Perlman, Public Utility Commission of Texas, "How to Develop a Perspective for Measuring Broadband Deployment and Competitiion," February 2001, unpublished presentation.

[20] FCC, Second Report, §214.

[21] FCC, Second Report, §245.

[22] FCC, Second Report, §218.

[23] Jon Garcia and Jon Wilkins, "Cable is too Much Better to Lose," *McKinsey Quarterly* 2001, Number 1, 185-88.

[24] Paul J. Roche, "DSL Will Win Where It Matters," *McKinsey Quarterly 2001*, 180-184.

[25] FCC/NRRI "Community Broadband Deployment Database," www.nrri.ohio-state.edu/broadbandquery.php.

[26] FCC, Second Report, § 131-158.

[27] www.cpau.com/fiberservices/. See also, Scott Thurm, "In Silicon Valley, Zippy Web Lines Spark a Surprise: Slow Demand," *Wall Street Journal*, Jan. 20, 2000, B-a.

[28] www.ci.longmont.co.us.

[29] www.lagrange-ga.org.

[30] Jill Rosen, "Bloomington Lays 'Digital Underground'," www.civic.com/civic.articles/2000/0508/web-bloom-05-12-00.

[31] www.glasgow-ky.com/epb.

[32] www.burlingtonvt.together.com.

[33] www.bev.net.

[34] fcc.gov/jointconference/fieldhearings.

[35] C. A. Hollifield, G. H. Wofford, J. F. Donnermeyer and R. Agunga, "Telecommunications Self-Development in Rural U.S. Communities: A Comparative Study of Project Models" Unpublished manuscript.

[36] Victor Glass, *NECA Rural Broadband Cost Study: Summary of* Results (Washington, D.C.: National Exchange Carriers Association, June 2000).

[37] Marvin Sirbu, "Broadband Integrated Access and VoIP," presentation to the NARUC Committee on Telecommunications, Washington, D.C., Feb. 28, 2001, www.fcc.gov/jointconference/ news-feb28.html.

[38] Scott C. Cleland and Patrick S. Brogran, "Precursor Watch: Broadband Deployment Outlook," presentation to NARUC Committee on Telecommunications, Washington, D.C., Feb. 22, 2001, www.fcc.gov/jointconference/cleland.pdf.

[39] Iowa Utilities Board, "Assessing High-Speed Internet Access in the State of Iowa," October 2000, 4.

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The National Regulatory Research Institute provides client-driven, objective research, and services to inform and advance regulatory policy, primarily for public utility regulatory commissions. We provide customized, hands-on assistance to solve regulatory problems. We provide tutorials, training and serve as facilitators of collaborative processes. Building on our 25 years of experience and our nationally renowned staff, we are developing new programs that serve our traditional clients and new ones, domestic and international. The NRRI Director is Ray Lawton (lawton.1@osu.edu).

NARUC TECHNICAL ASSISTANCE

The NRRI provides speedy response to requests for information and assistance from state commissions. We prepare short research pieces and surveys on topics of immediate interest to NARUC member states. We actively participate in NARUC Committees, Subcommittees, task forces, and working groups. NRRI staff serves as faculty for NARUC-sponsored programs at the Institute of Public Utilities at Michigan State University, the Center for Public Utilities at New Mexico State University, and NARUC's Water Rate School.

CONSULTING

NRRI services are also available under contract to help solve specific regulatory problems for states, federal agencies, governments outside the United States and other public and not-for-profit clients. Recent domestic contract work completed by the NRRI include services for the Virginia Corporation Commission under the transformation program, services for the Rhode Island Public Utilities Commission under the natural gas program, and assessment of a postal rate increase proposal for the Consumer Advocate Division of the U.S. Postal Rate Commission.

The NRRI provides technical assistance and training to regulators around the world as they seek to transform formerly government-owned utilities to private ownership and open up markets to competition. Over its recent history, the NRRI has helped about 20 countries. This year alone we provided on-site assistance to Ghana, South Africa, the Philippines, and Japan.

PUBLICATIONS

NRRI reports on the regulation of the nation's electric, gas, telecommunications, and water utilities are free for NARUC commissions and available for purchase by others. Since its founding, nearly 500 reports have been issued.

COMMISSIONER TUTORIALS AND EXECUTIVE DIALOGUES

The NRRI offers two-day tutorials for new commissioners and two-day in-depth dialogues with commissioners on subjects of their choice at its offices at The Ohio State University. Tutorials are offered free of charge to all NARUC member states and are generally restricted to commissioners. The agenda for the tutorial allows commissioners to meet with NRRI staff experts regarding a wide-range of relevant public utility issues in an informal setting. Because the groups are small (and usually one-on-one), the instruction can be adjusted to the individual commissioner's level of expertise and interest. Dates are arranged to fit the commissioner's schedule.

NRRI QUARTERLY BULLETIN

The NRRI Quarterly Bulletin (QB) helps the regulatory community stay abreast of ideas, action, and research in electricity, gas, telecommunications and water regulation. Recent issues have focused on consumer affairs and protection, commission change, and telecommunications service quality.

CONFERENCES

The NRRI has conducted more than forty conferences and workshops. In April 2001, the NRRI held a conference on market power in the electric industry that brought together national experts to discuss continuing problems of market power as electric markets are restructured.

PROGRAMS IN BRIEF

NRRI technical assistance, research and other services are primarily provided through nine programs that address major issues in public utility regulation facing consumers, regulatory commissions (both state and federal), other state agencies and the electric, telecommunications, natural gas and water industries.

RESTRUCTURING THE ELECTRIC POWER INDUSTRY

The NRRI provides research and technical assistance to states and the National Association of Regulatory Utility Commissioners on restructuring the U.S. electric industry. Our current research on development of regional transmission organizations puts the NRRI at the forefront of this next phase of institutional development—innovative structures to operate transmission grids in a period of competitive generation.

Program manager Ken Rose (rose.8@osu.edu) is deeply involved in analyzing the California energy crisis and providing California and other states information to help understand the situation, develop solutions, and prevent a similar crisis elsewhere.

NATURAL GAS

The NRRI provides research and technical assistance to states on regulating the natural gas industry. Our most recent report is *Measuring the Benefits of Gas Choice Programs* by Ken Costello (costello.1@osu.edu), the program manager. Coming up is a report on whether gas distribution companies should hedge in the futures market to reduce volatility of gas prices.

TELECOMMUNICATIONS

Under the leadership of Frank Darr, (darr.1@osu.edu) we provide information and analysis on regulation of the telecommunications industry. *The Performance of the State Telecommunications Industry Under Price-Cap Regulation: An Assessment of the Empirical Evidence* is a recent example. Current projects include assistance to states on tests of operation support systems and on applications for Bell company entry into long-distance markets. Work on conservation of numbering resources and universal service funding is in progress.

BROADBAND SERVICES AND REGULATION

Under this program the NRRI supports the work of NARUC's Joint Conference on Advanced Telecommunications, examines forms of convergence, identifies regulatory issues that arise out of convergence and advanced capabilities and proposes appropriate, pro-competitive tools for government intervention. One recent product is a survey of the states on the extent to which they regulate advanced services. Frank Darr and Vivian Witkind-Davis (davis.241@osu.edu) are the program managers.

WATER

Our aim is to support the National Association of Regulatory Utility commissioners with research, service, education, training and other activities. *Water Capacity Development and Planning: A Benchmarking guide for Regulatory Commissions* by program manager John Wilhelm (wilhelm.38@osu.edu) is an example of a recent product. He is currently conducting innovative research on benchmarking utility performance. Initially focused on the water industry, the benchmarking study may be applicable to other industries as a tool for regulation through prescriptive interventions rather than adversarial legal processes.

COMMISSION TRANSFORMATION

Dave Wirick (wirick.2@osu.edu) leads NRRI support for the efforts of state regulatory commissions to restructure themselves in response to changing needs and environments. His most recent report is *The Creation of Dynamic Regulatory Institutions*. Mr. Wirick is currently researching better use of information technologies by state regulatory commissions.

CONSUMER AFFAIRS AND EDUCATION

Assistance to state and federal commissions in their consumer affairs education efforts is the focus of this program. For example, program manager Fran Sevel (sevel.1@osu.edu) recently worked on development of model rules for "truth in billing." Her most recent research report is entitled *The Consumer Response to Public Utility Competition*.

RELIABILITY AND QUALITY OF SERVICE

The NRRI aims to become a resource to the regulatory community on the reliability and quality of service of retail electricity, gas and telecommunications. In doing so, we are building on existing expertise in the telecommunications field. A state survey on electric reliability issues was just completed by Robert Burns, (burns.7@osu.edu) who leads the program.

MARKET MONITORING AND ASSESSMENT

In deregulated markets, consumers need assurance that they are benefiting from competition and protected from market power abuses. The NRRI program, under Ken Rose, (rose.8@osu.edu) is focused on prevention or mitigation of the exercise of market power and on advancement of fair competition. A conference on market power issues with nationally renowned speakers was held under this program in April 2001.

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Established by the NARUC at The Ohio State University in 1976