# Electric Market Restructuring
## Issues for Rural America

Constance **Newman**

*Deregulation can create new opportunities for rural America, but it may also introduce new costs. Rural areas are susceptible to changes in the industry that increase electricity costs because such areas are already expensive to serve, and the cooperatives that serve them tend to be small. This article discusses four electricity deregulation issues of importance to rural areas: transmission pricing and investment, retail competition, market power and mergers, and distributed generation.*

Rural America currently enjoys high-quality electric service, and the continued provision of that service will be essential to rural economic development efforts. Yet the enormous changes underway in the electric industry may complicate those efforts by making rural electricity provision more expensive or less reliable. One of the most promising development proposals for rural areas has been the expansion of computer and internet-based services, but this path is highly dependent on electricity. Other rural development approaches—like tourism, value-added service manufacturing, and small-scale energy production—must also anticipate the impact of changes in the electric industry on rural customers.

California's recent effort to deregulate the industry and the crisis that ensued has led to more careful consideration of market design. What was once considered a simple path to improving efficiency in the industry is now evident as a complex restructuring of institutions and markets. The Bush administration and Congress are pursuing legislation to address the structural defects revealed by the California experience, but stakeholders agree that the new legislation must be based on a more thorough understanding of electricity markets.

How deregulation might affect rural areas is especially relevant in the wake of the California debacle. Historically, rural areas have struggled with electricity markets. Rural America was severely underserved at the beginning of the century when the industry was completely private. Only 10 percent of rural households had electricity by 1930, while 90 percent of urban households did. Rural households had better access to telephones and automobiles than electricity.

It was not until the mid-1930s, with technical and financial assistance from the Federal Government, that rural areas were able to connect to the electric power grid. Cooperatives emerged as the main providers of rural electricity after government overtures to private investors failed. Private utilities claimed that rural residents were too dispersed and too poor to afford electricity and that it would not be profitable to serve them. But the cooperatives were able to provide electricity at a lower cost than the private utilities had estimated. Ironically, once the cooperatives became successful, the private utilities often challenged them in court and tried to steal their customers by building lines through the cooperatives' service territories.

Once started, rural electrification took off rapidly. Rural households bought electric appliances of all kinds due to electricity's many applications on the farm and the promotion of appliances by the Rural Electrification Administration. Today, rural consumers still depend heavily on electricity. As a percentage of a household's total energy budget, rural households spend 72 percent on electricity while urban households spend 65 percent, according to the Department of Energy's 1997 Residential Energy Consumption Survey.

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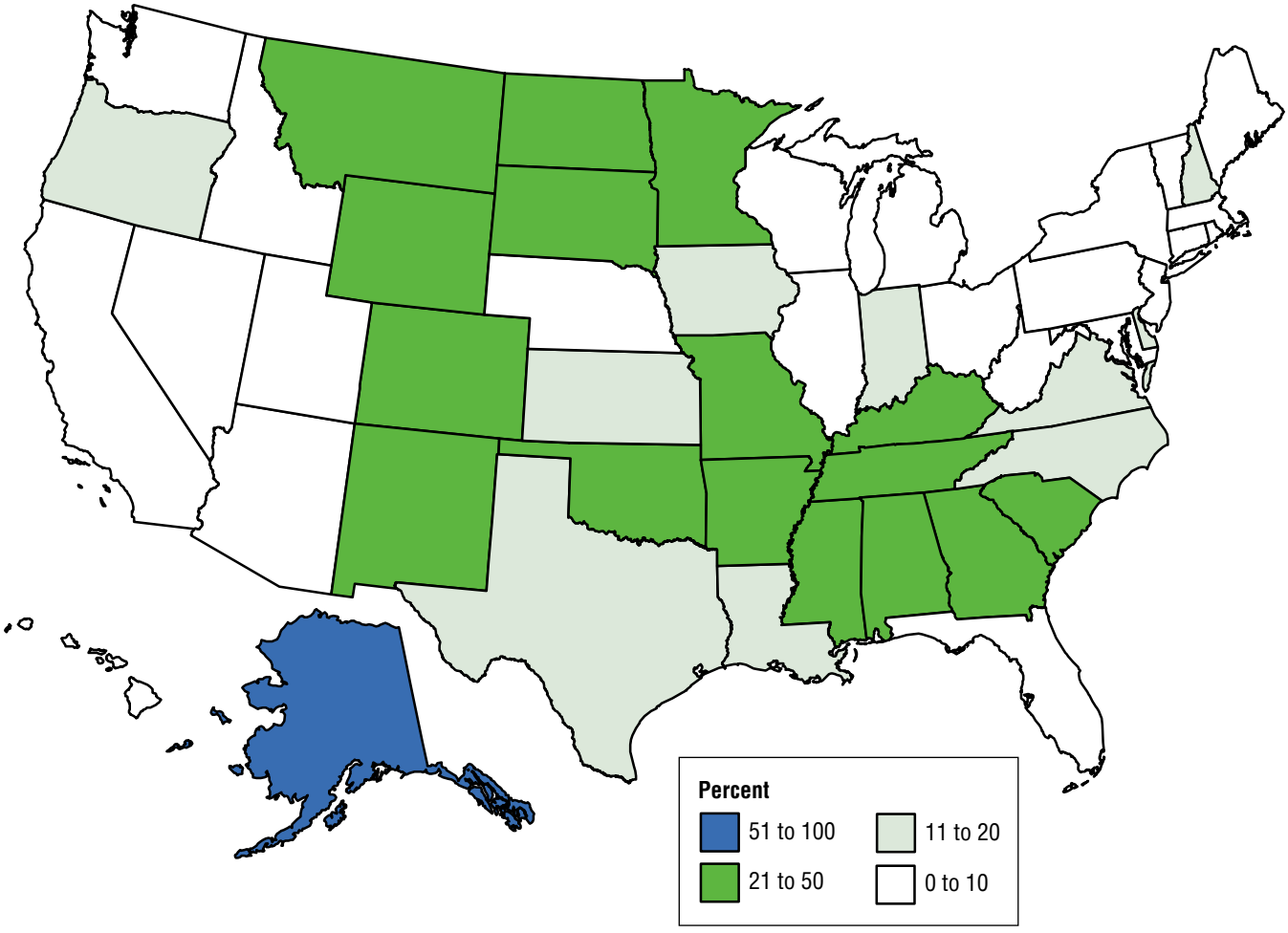
As electricity deregulation progresses, will rural areas continue to receive the high-quality and affordable electric service that they are accustomed to? That will likely depend on how four issues are handled: (1) transmission, (2) retail competition, (3) mergers and market power, and (4) distributed generation.

## Characteristics of Rural Electric Cooperatives

Rural electric cooperatives serve over 34 million customers in 46 States, or about 11 percent of the current U.S. population. Individual cooperatives tend to be small enterprises averaging fewer than 60 employees and 10,000 customers. In comparison, the typical investor-owned utility (IOU) has over 2,200 employees and 315,000 customers. Despite their small size, however, cooperatives cover 75 percent of the country's total land mass and operate 2.3 million miles, or 44 percent, of the country's distribution lines.

Nationally, there are 865 distribution cooperatives and 60 generation-and-transmission cooperatives, or G&Ts for short. The G&Ts are obligated to serve the distribution cooperatives and only occasionally have excess electricity to sell on the open market. The G&Ts generate about half of their supply from their own plants, and the other half

Figure 1
**Rural electric cooperatives by State**
*The South and Midwest have the highest percentages of co-op customers among State customers*




Source: National Rural Electric Cooperative Association.

Table 1

**Rural electric cooperatives and deregulation status by State**

*The South and Midwest, with higher percentages of co-ops, are less likely to have passed deregulation legislation*

| State | Number of co-ops | Total customers (all utilities) | Cooperative customers | Co-op percent of total | Deregulation passed | Reversal or slowing of deregulation |
|---|---|---|---|---|---|---|
| Connecticut | 0 | 1,503,282 | 0 | 0.0 | yes | |
| District of Columbia | 0 | 219,923 | 0 | 0.0 | yes | |
| Hawaii | 0 | 421,581 | 0 | 0.0 | | |
| Massachusetts | 0 | 2,827,093 | 0 | 0.0 | yes | |
| Rhode Island | 0 | 467,794 | 0 | 0.0 | yes | |
| California | 3 | 12,899,380 | 13,487 | 0.1 | yes | suspended |
| New York | 4 | 7,499,171 | 15,845 | 0.2 | yes | |
| New Jersey | 1 | 3,605,476 | 10,371 | 0.3 | yes | |
| West Virginia | 1 | 943,913 | 8,653 | 0.9 | yes | delayed |
| Maine | 3 | 723,516 | 13,979 | 1.9 | yes | |
| Nebraska* | 3 | 885,715 | 20,701 | 2.3 | | |
| Nevada | 3 | 870,800 | 26,735 | 3.1 | yes | delayed |
| Utah | 4 | 833,806 | 29,361 | 3.5 | | |
| Pennsylvania | 13 | 5,104,483 | 198,233 | 3.9 | yes | |
| Illinois | 25 | 5,139,907 | 249,301 | 4.9 | yes | |
| Washington | 8 | 2,707,232 | 140,643 | 5.2 | | |
| Michigan | 9 | 4,534,231 | 251,877 | 5.6 | yes | |
| Arizona | 6 | 2,121,707 | 131,782 | 6.2 | yes | |
| Ohio | 24 | 5,197,242 | 327,820 | 6.3 | yes | |
| Wisconsin | 24 | 2,571,264 | 185,273 | 7.2 | | |
| Maryland | 2 | 2,174,889 | 157,223 | 7.2 | yes | |
| Vermont | 2 | 322,197 | 24,395 | 7.6 | | |
| Florida | 15 | 7,961,361 | 788,233 | 9.9 | | |
| Idaho | 11 | 617,058 | 62,348 | 10.1 | | |
| Oregon | 16 | 1,635,114 | 172,242 | 10.5 | yes | delayed |
| New Hampshire | 1 | 623,962 | 70,311 | 11.3 | yes | |
| Virginia | 12 | 3,062,559 | 364,649 | 11.9 | yes | |
| Iowa | 37 | 1,416,687 | 192,165 | 13.6 | | |
| Kansas | 29 | 1,330,034 | 194,634 | 14.6 | | |
| Delaware | 1 | 370,500 | 56,844 | 15.3 | yes | |
| Texas | 66 | 9,032,925 | 1,395,908 | 15.5 | yes | |
| Indiana | 39 | 2,816,941 | 451,828 | 16.0 | | |
| Louisiana | 11 | 2,041,874 | 329,584 | 16.1 | | |
| North Carolina | 27 | 4,006,103 | 806,768 | 20.1 | | |
| Colorado | 22 | 2,047,712 | 428,385 | 20.9 | | |
| Alabama | 22 | 2,224,999 | 468,925 | 21.1 | | |
| New Mexico | 16 | 826,832 | 174,923 | 21.2 | yes | delayed |
| Missouri | 40 | 2,736,945 | 611,639 | 22.3 | | |
| Oklahoma | 26 | 1,729,389 | 405,863 | 23.5 | yes | delayed |
| Minnesota | 43 | 2,275,795 | 610,099 | 26.8 | | |
| Wyoming | 11 | 271,125 | 75,246 | 27.8 | | |
| South Carolina | 20 | 2,012,085 | 567,370 | 28.2 | | |
| Tennessee | 21 | 2,747,901 | 775,877 | 28.2 | | |
| Arkansas | 17 | 1,339,280 | 385,948 | 28.8 | yes | delayed |
| Montana | 24 | 480,628 | 143,969 | 30.0 | yes | delayed |
| South Dakota | 28 | 379,689 | 122,488 | 32.3 | | |
| Kentucky | 24 | 1,991,347 | 680,009 | 34.1 | | |
| North Dakota | 18 | 341,197 | 118,892 | 34.8 | | |
| Georgia | 42 | 3,732,145 | 1,429,267 | 38.3 | | |
| Mississippi | 25 | 1,345,963 | 633,720 | 47.1 | | |
| Alaska | 15 | 269,831 | 190,799 | 70.7 | | |
| **TOTAL** | **814** | **125,242,583** | **14,514,972** | **11.6** | | |

Source: National Rural Electric Cooperative Association.

*In Nebraska, all consumers are served by nonprofit entities: consumer-owned municipal systems, public power districts, and rural cooperatives.

they buy from Federal power marketers at "preference" (lower) rates. Overall, the G&Ts fulfill about 55 percent of the distribution cooperatives' needs. The distribution cooperatives purchase the rest of their needs from private sources via long-term contracts and on the spot market.

Cooperatives are spread throughout the country, but are especially prevalent in the Midwest and the South (table 1 and fig. 1). The average share of customers served by cooperatives in a State is 11.6 percent. In all States except for Alaska, cooperatives serve less than half of the population. States with higher percentages of customers served by rural electric cooperatives are less likely to have undergone much deregulation (fig. 2). Cooperatives have had less exposure to changes resulting from deregulation.

Cooperatives have lower profits, on average, than other utilities. They have substantially fewer customers per mile served and lower revenues per mile than either IOUs or municipal utilities (table 2). Cooperatives earn 13 percent of what IOUs earn per mile and 11 percent of what municipals earn. In addition to having the highest percentage of rural customers, cooperatives have the highest percentage of residential customers (58 percent). Significantly, cooperatives have the lowest percentage of industrial customers, who enable a utility to better manage demand since an industry can alter its demand more easily and consume electricity during off-peak hours. As a consequence, cooperatives must maintain more excess capacity than IOUs in order to meet the more inelastic peak demand of their customers. This adds to costs and further erodes profits relative to other utilities.

Table 2
**Customers and revenues by utility type**
*Cooperatives have fewer customers and lower revenues per mile than other utilities*

| | Customers per mile | Revenues per mile | Residential customers | Industrial customers |
|---|---|---|---|---|
| | *Number* | *Dollars* | *Percent* | *Percent* |
| Cooperatives | 6 | 7,900 | 58 | 21 |
| Investor-owned utilities | 33 | 61,000 | 33 | 33 |
| Municipal utilities | 43 | 71,000 | 35 | 29 |

Source: National Rural Electric Cooperative Association.

Unlike investor-owned utilities, which act as profit-maximizers, cooperatives are cost-minimizers. They are private entities, incorporated under State law with the mission to provide least-cost electricity service to their customer-owners. Because the cooperatives are cost-minimizers, market rules and regulations can have different implications for cooperative customers than for IOU customers. For example, if a market rule stipulates that utilities must engage in a costly activity, the cost of which they cannot pass on to their customers, the bills of IOU customers are left unchanged. A cooperative has to pass on the cost to customers since the owners of the business are the customers themselves. Thus, if such a rule is instituted with the goal of protecting consumers, it will only protect IOU customers and put the cooperatives at a relative disadvantage in terms of customer service.

## Changes in the Industry

The electric utility industry is in a period of exponential change. In a few years, the way electricity is supplied, marketed, delivered, and consumed will be quite different from the standard model of the regulated vertical monopoly. The impetus for structural change came with the Public Utility Regulatory Policies Act of 1978 (PURPA). PURPA was designed primarily to encourage the use of renewable energy for electricity production, but by doing so, it also showed that small-scale generation facilities could be cheaper and more efficient than the traditional large-scale plants. This, together with favorable reviews of electricity deregulation in the United Kingdom, led many to conclude that generation should be treated as a competitive market rather than as part of a regulated monopoly.

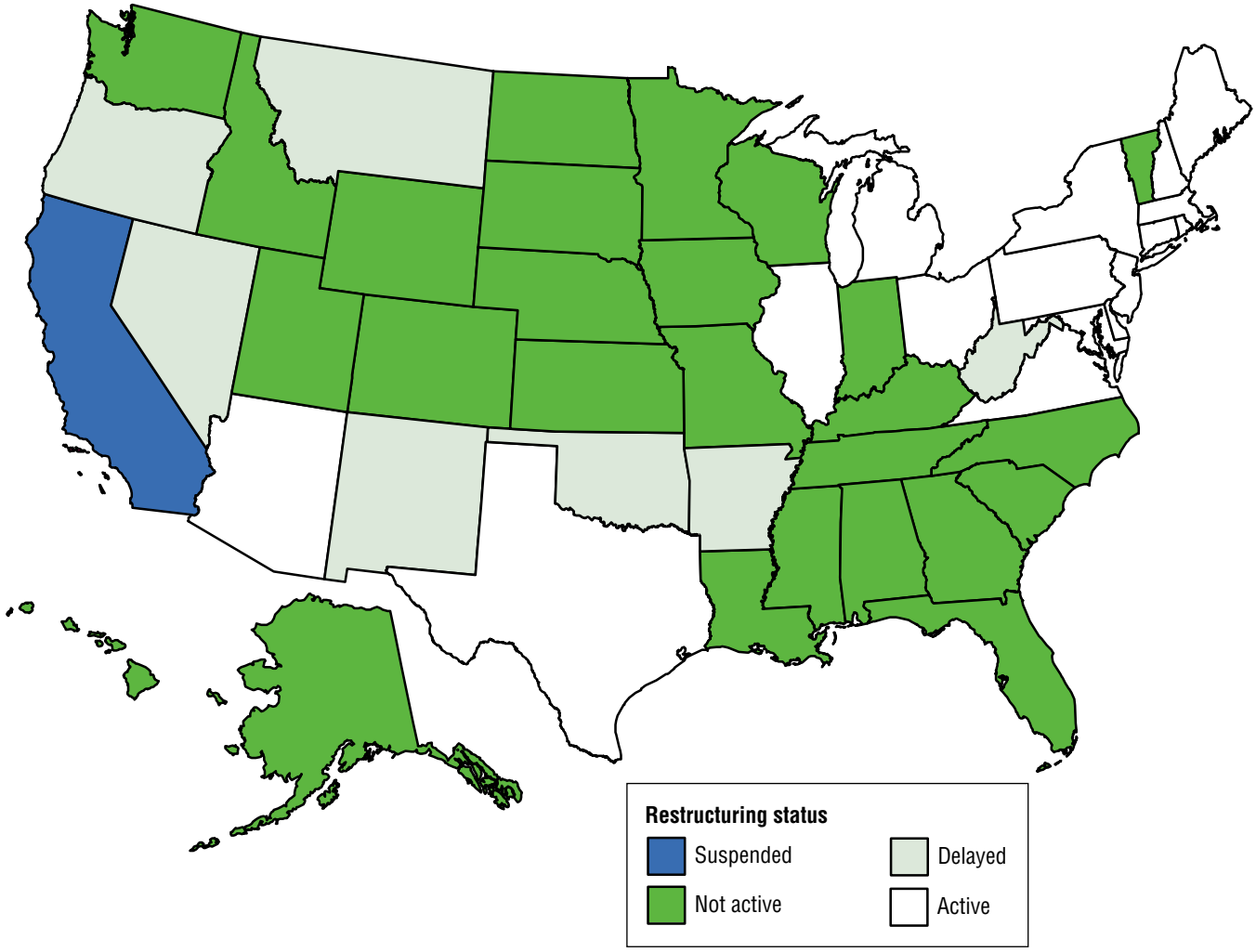
Industrial customers also spurred the movement towards deregulation. Before they deregulated, California and the Northeast had the highest energy rates nationwide, mostly because of the industry's large investments in nuclear facilities, but also due to investments in energy efficiency and low-income programs. Industrial customers threatened to leave these States if nothing was done to reduce rates.

At the national level, the Federal Energy Regulatory Commission (FERC) has been introducing rule changes since the mid-1980s to promote competitive wholesale markets. With these changes, the industry has already been moving toward the separation

Figure 2

**Deregulation status by State**

*The Midwest and the South are less likely to have enacted deregulation legislation*




Note: "Active" means the State has either enacted enabling legislation or issued a regulatory order to implement some form of retail competition. Some States are still in the preparatory phases of implementation. "Delayed" means that the State has enacted legislation or issued regulatory orders to delay implementing retail competition. "Suspended" means that the State has suspended its retail competition plan. "Not active" means that the State has not enacted legislation to restructure the electric industry or implement retail competition.

Source: Prepared by the Energy Information Administration, 2001.

of transmission and generation. One of the new rules stipulated that transmission line owners must let other parties use their lines for a standard fee. This was designed to encourage more efficient trading of energy, but there were many ways utilities could still hamper other providers. To counter this, the FERC recently told all utilities to join four Regional Transmission Organizations (RTOs) that would act as independent managers of regional transmission. This policy met with strong opposition from many parties, such as State regulators who are unconvinced of the benefits of RTOs in the first place and firms already committed to different RTO configurations. The FERC has pledged to consult widely on the design of the RTOs, but they are committed to establishing them despite lingering concerns in the industry.

Electric deregulation became a household term when problems hit in California. As one of the first States to deregulate, California had instituted a gradual process of allowing the IOUs to charge market prices to retail customers. In the summer of 2000, wholesale prices

skyrocketed. San Diego Gas & Electric was the only IOU able to raise retail prices because they had paid off their debt. In an ironic twist, the California IOUs had negotiated—as their condition for accepting deregulation—a higher retail rate than what they had charged before. The higher rate was justified by the IOUs as necessary to pay off "stranded" debt that the IOUs had incurred and that they were afraid would put them at a competitive disadvantage with other firms in a newly unregulated market. This price cap ended up as a price ceiling instead of a price floor as intended. San Diego Gas & Electric did not have as much stranded debt as the other two much larger IOUs, so once they paid off their debt they were no longer restricted by the retail price cap and could charge market prices. They charged customers five times the usual rate. Within a month, and after significant cost to the San Diego economy, the California Assembly intervened and passed retroactive retail price freezes.

The situation in California had begun as a true energy supply shortage, but because the deregulation design ignored the possibility of shortage and high prices, the situation spiraled into a complex crisis. Since all of the electricity that could be supplied was being consumed and demand was virtually unresponsive to price change, generators could increase the wholesale market price by withholding supply. Another important factor was that prices for natural gas, a critical input in California's electricity generation, had also hit record levels. The pricing behavior of generators, however, was a factor that the State of California thought should be deterred through regulatory action. The California Public Utility Commission and the Governor asked the FERC to intervene by imposing wholesale price caps and issuing orders to generators to refund what the State called excess profits. Despite the FERC's own assessment that generation firms had manipulated market prices, the FERC declined to take action.

Wholesale prices fell in October 2000, only to soar again in November and December. In mid-December, utilities were paying $400/Mwh for power and selling for $65/Mwh—due to price caps on distributors but not generators. The State refused to issue retail price hikes that the IOUs said were necessary for them to stay in business, and by January 2001, the IOUs stopped paying their past-due invoices. The State of California stepped into the unprecedented role of purchasing power for the IOUs in late January 2001. The State spent roughly $10 billion on energy purchases between January and August 2001, and raised rates to all customers, by much more than originally requested by the IOUs.

States throughout the West were affected by the crisis, especially the high-consumption States in the Northwest. The Northwest also experienced a shortage of supply because of a drought, and their utilities were forced to pay the same prevailing, inflated wholesale prices. Since most of the Western States had not deregulated their markets, the utilities were able to pass on the higher costs to consumers with rate hikes ranging from 20 to 50 percent. But still the Northwest utilities went heavily into debt, and many businesses closed down.

The FERC changed its course in the summer of 2001, largely as a result of the addition of two new commissioners who formed a new majority opinion on the Commission. The FERC instituted a wholesale price cap and started a process for negotiating refunds. The change in policy, along with lowered demand and a stable supply of energy, led to a subsequent and sustained fall in wholesale prices. The crisis was over by mid-summer 2001, but electricity provision in California will continue to be expensive and the responsibility of the State for many years to come. Other States saw the problems and the lack of cooperation between the Western State officials and Federal agencies as a signal to stop or postpone their own deregulation plans.

## Transmission Issues

The electric transmission system in the United States today has been compared to the patchwork of roads that existed before the interstate highway system was built. Historically, utilities formed connections to neighboring utilities as a way to help each other manage loads in special times of imbalance. The North American Electric Reliability Council (NERC) was formed in the mid-1960s by electricity providers after a blackout reverberated along the East Coast and showed how critical it was for the utilities to work together. NERC established guidelines for all utilities in managing their parts of the interconnected national grid, and the rules were enforced through reciprocity and mutual self-interest. But according to a spokesman for NERC, the grid was not designed to work in a competitive environment, nor to handle the large flows of

Photo courtesy PhotoDisc.

electricity that competition engenders.

With deregulated wholesale markets, more transactions occur over longer distances, and fewer entities have direct responsibility for maintaining reliability, according to NERC. As a result, the system is increasingly vulnerable to blackouts and service interruption. The rate mechanisms no longer cover the extra costs associated with running the grid at such levels, and some entities are able to profit from bending the rules. Most analysts agree that the voluntary approach is no longer viable and that the NERC rules should be enforceable either by NERC itself or by giving those powers to another agency, such as the FERC.

There is less consensus on how to price the use of transmission lines. The FERC holds that pricing must be based on an efficient market mechanism that reflects use and rewards investment appropriately. However, because of the way transmission works and the fact that property rights on the lines are not well defined, there is no one "best" price. Electricity flows along all open paths to get to a final destination, rather than along a specified contract path. This makes even the standard cost-of-service-based rate impossible to correctly identify. Economists have recommended various pricing mechanisms that are designed to increase with congestion and thereby indicate which lines are in need of expansion. There is disagreement, however, among economists on which of these pricing mechanisms is best.

Advocates for rural electric cooperatives, consumers, and public power entities prefer a fixed-fee pricing approach, that is independent of congestion, with investments in the grid to be decided by an independent agency and funded by the Federal Government. They argue that the grid is more like a public highway and that access to it should be open and not determined by willingness to pay as is the case with incentive pricing mechanisms designed by economists. Also, advocates say that if the transmission lines are already paid for, the real cost of using the lines is close to zero. Higher transmission prices discourage competition in generation because the relevant market size is smaller; customers have fewer options and are more captive to local generators. Leading economists in the field, such as Paul Joskow of MIT and James Bushnell at the University of California Energy Institute, are beginning to address these issues.

## Retail Competition

Despite some of the impressions given by the California crisis, no State has completely deregulated prices at the retail level. Most have laws that stipulate a slow introduction of competition in retail markets, but all offer regulated retail prices as at least an option to consumers for a period of transition, or even indefinitely. Nor have any States taken steps to introduce "real-time metering," which would allow all customers to adjust their demand to real prices. A true demand response is a critically important missing element in deregulation plans today, but other problems complicate the implementation of full competition.

Deregulation was universally expected to lead to lower retail

Table 3

**Pennsylvania customers with alternative supply and changes over time**

*Commercial/industrial customers have dropped precipitously*

| | April 2000 | October 2000 | July 2001 |
|---|---|---|---|
| Residential | 429,670 | 459,029 | 574,661* |
| Commercial | 101,153 | 89,534 | 16,479 |
| Industrial | 4,622 | 3,103 | 456 |

*Includes 16.4% or 223,747 residential customers who participated in the Competitive Discount Service. Under deregulation, PECO agreed to randomly select 20% of its customers to receive electricity from an alternate supplier.

Source: Pennsylvania Office of Consumer Advocate.

prices. But over the last year, while regulated rates stayed constant or even dropped, high wholesale electricity prices discouraged the entrance of competitive suppliers in deregulated States. In Pennsylvania, which is widely thought to have the most successful deregulation plan, there were 52 "alternative" suppliers in October 2000. (Alternative suppliers are providers other than a customer's historical provider.) As of August 2001, there were less than 10. Since then, alternative suppliers have been serving only the more populated urban areas, and rural areas have been left with no alternatives, despite the fact that cooperatives made extensive system upgrades to accommodate competitors. Table 3 shows the decline in the number of Pennsylvania customers signed up with alternative suppliers since April 2000, a couple months after full competitive access had been allowed. The decline is quite rapid for industrial and commercial customers.

The withdrawal of alternative suppliers from the market in Pennsylvania may be temporary, but it illustrates the tension between being able to guarantee service and the needs of a market where no such protections are in place. Alternative suppliers are not required to serve all customers under any State's deregulation law, but the distributing utilities are required to serve as the "provider of last resort." This means that they have to have the capacity to serve many more than they may actually be serving at any point in time. Some State programs have allowed the utilities to restrict the number of times a customer can return to their default provider. And in some States, the requirement that the utility provide default service expires at the end of the transition period, generally 1 to 3 years.

The contradictions between the needs of the competitive suppliers and the goal of universal service are especially relevant to rural electric cooperatives. Cooperatives have an obligation to serve their customers at lowest cost. The generation of electricity from cooperative entities must be used entirely for the designated market and cannot be diverted to the most profitable use. The purpose of an electric cooperative is precisely to be the "provider of last resort," so they will always be at a competitive disadvantage to alternative suppliers.

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On the other hand, cooperatives are the least likely among utilities to have real supply competition because of their mostly residential customer base. To date, many alternative providers have decided not to provide residential service at all in deregulated markets. This may be due to continued regulations that protect residential prices or other more basic reasons such as the high cost of recruiting many small customers. While cooperatives are less vulnerable to alternative suppliers courting their residential customers, they are highly vulnerable to "cherry picking" from their large industrial customers because they have fewer industrial customers to begin with.

The establishment of retail competition has been plagued by many problems, especially in California. No consumer wants to be exposed to the volatility characteristic of wholesale electric markets. And deregulation proponents may have overestimated the public's desire to shop around for electricity deals. Given the problems to date, retail competition has taken a back seat to wholesale market issues, thereby giving policymakers more time to weigh its pros and cons.

## Mergers and Market Structure Issues

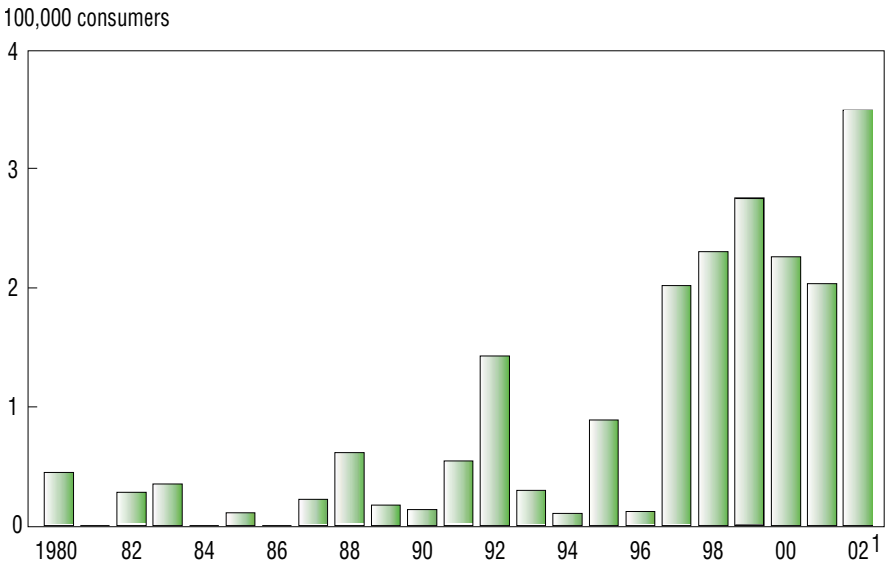
In preparation for the competitive market, investor-owned utilities have sold a large percentage of their generation capacity to firms that specialize in generation. In New England, where divestiture was required, 100 percent of the total generation capacity was sold; in the Mid-Atlantic, 43 percent of the capacity was sold; and in the Pacific Northwest and California, 36 percent of capacity was sold. Nationally, 22 percent of capacity had been sold as of April 2000.

With reorganization has come consolidation. The number of firms owning generation capacity declined from 172 in 1992 to 141 by the end of 2000. Of greater concern in terms of market power is the concentration of generation capacity in the hands of fewer and fewer large holding companies. The 10 largest utilities owned 36 percent of total IOU generating capacity in 1992; they owned 51

Figure 3

**Number of consumers affected by rural electric cooperative mergers, 1980-2002**

*RECs are consolidating in response to industry changes*




[1]2001 and 2002 are estimates.
Source: NRECA.

percent by the end of 2000. These increases in market share have raised concerns about the competitiveness of generation markets, and they may be even more harmful to the competitive structure of markets if those markets are more remote.

Concentration in the generation side of the industry has been a continuous problem for the United Kingdom, where deregulation began in 1990. Wolak and Patrick's analysis found that two factors contributed to market power: the relative size of producers to each other and the number of producers. The more producers there are, the less any one of them can influence prices. If one large generating firm knows that it will supply the bulk of electricity, it can withhold supply in order to drive up the price.

The number of mergers among rural electric cooperatives has also increased significantly in recent years. One of the biggest threats to cooperative survival in a competitive world will be their small size, and to the extent that the IOUs continue to feel the need to grow, the cooperatives will definitely need to follow suit. Figure 3 shows the growth of mergers among cooperatives measured by the number of customers served.

## Distributed Generation

Distributed generation is often suggested as a solution for rural areas, and in many ways, it can be an important development option, especially in the long term. "Distributed generation" usually refers to small generation facilities located close to the end-user that use renewable technologies such as photovoltaics, fuel cells, microturbines, and small wind turbines. Most of these technologies are expensive at present, though their prices are expected to decline. The cost of wind power has already declined substantially.

The main advantage of distributed generation for rural areas is that it can be used instead of extending or repairing the traditional transmission and distribution (T&D) lines. About half of the T&D lines in rural areas will soon need replacing. Photovoltaics, wind, and fuel cells are likely to be used in the coming years, according to a study by Hoff and Cheney and according to the National Rural Electric Cooperative Association (NRECA) in their 2001 policy paper on distributed generation.

In general, distributed generation can be costly to utilities to the extent that they have to pay off debt incurred to build T&D infrastructure that is no longer needed. Distributed generation can also be costly to a utility if it threatens the balance of supply and demand that is continuously managed by system operators. This can happen if too many households install small systems but stay connected to the grid for their peak demand needs and for supplying extra electricity back to the utility.

But reductions in demand due to distributed generation installations can also represent savings to the utilities if those customers had been heavy peak users. For a cooperative, the question of whether distributed generation is beneficial or not is less ambiguous than for an IOU. The cooperatives are only concerned with reducing costs and not, like an IOU, maximizing profits via higher demand. Cooperatives are more likely to need to reduce peak demand since they do not have a variety of users able to use the off-peak excess supply.

Rural areas tend to be the best sites for many renewable energy technologies, such as wind and solar energy. For wind, the prime areas are in the Great Plains and

near the Rocky Mountains. There are several problems with wind and solar, primarily that they are not controllable sources of energy. There is no switch to turn them on and off, and such control is an important aspect of electricity supply. But, there are ways of using these sources, and since solar energy is most available during peak periods during the day, it matches peak energy needs.

## Conclusions

Given that rural areas are more expensive to serve than urban areas, the goal of rural electric provision should be to keep rates as low as possible. The biggest threat to that goal would be the exercise of market power either in generation, transmission, or some combination of the two. Rural areas are more susceptible to market power problems because of their isolation and small size. Since the deregulation of wholesale markets is proceeding, independent of what happens with the deregulation of retail markets at the State level, the protection of rural areas from excessive price increases will depend on the creation of truly competitive wholesale markets. Economists' understanding of how market power may be exercised in the control of transmission rights is an area of market design that deserves further attention. Consolidation in generation markets could also be detrimental to rural customers.

Cooperatives and the different ways they function need to be considered in the drafting of legislation. Cooperatives have been very successful as business enterprises, but the extra costs they naturally incur in serving rural areas need to be taken into account when redesigning policy. Many analysts take their success for granted, but it is likely that they will continue to need the Federal support they currently receive as well as special consideration in the design of market rules.

Rural concerns point to areas in which general public interests may be vulnerable, as in the guarantee of universal service and the ability of the market to provide it. The challenge for policymakers will be to introduce market mechanisms that promote efficiency while also guaranteeing access to quality electric service for all customers. RA

**For Further Reading . . .**

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Paul Joskow and Jean Tirole, "Transmission Rights and Market Power on Electric Power Networks," *Rand Journal of Economics*, Vol. 31, No. 93, Autumn 2000, pp. 450-487.

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