Summary

Federal Legislation Needed to Facilitate Electric Industry Restructuring

Statement
of
Charles G. Stalon
Consultant on Energy Regulation

to the
Subcommittee on Energy and Power
of the
Committee on Commerce
U.S. House of Representatives

Chicago, Illinois
May 2, 1997

Federal legislation is needed to ensure that the electric industry is transformed from its existing structure to one in which an unregulated generating industry is effectively disciplined by competitive forces.

At this time it does not appear to me that a federal deadline requiring retail access would be useful. The problem I see is not an unwillingness of states to provide retail access; it is, instead, overcoming the obstacles to creating a robust, efficient spot market that is essential if small buyers and small sellers are to benefit from direct access. Without a robust, efficient spot market, only large players can gain substantially from retail access.

Task for Federal Legislation: Four interdependent problems, in particular, call for federal legislation, some more rapidly that others: All are designed to create electricity markets that will, in turn, make retail access meaningful.

(1) The market power of generation companies must be eliminated.
(2) Operating standards must become mandatory, and organizations with responsibilities to enforce such standards must be created.
(3) Transmission assets must be transferred from existing owners to regional transmission companies which may also be ISOs.
(4) The FERC's powers to ensure that needed transmission lines are constructed in a timely manner need to be increased.

Federal Legislation Needed to Facilitate Electric Industry Restructuring

Statement
of
Charles G. Stalon[1]
Consultant on Energy Regulation

to the
Subcommittee on Energy and Power
of the
Committee on Commerce
U.S. House of Representatives

Chicago, Illinois
May 2, 1997

Introductory comment: Federal legislation is needed to ensure that the electric industry is transformed from its existing structure to one in which an unregulated generating industry is effectively disciplined by competitive forces, each user of electricity is free to choose his electricity supplier, and the new industry structure provides reliability that is as good as or better than the current industry provides. Markets that create such results will not just happen: they must be created by foresighted public officials. Federal officials have the responsibility to ensure that the interstate component of the industry, on which all states depend, facilitate efficient competition among generating companies and that the regulated transmission and system control infrastructure on which that competition depends is constructed. Solutions to some problems call for federal legislation sooner than do others. For some, the needed legislation should come after more time is spent in reasoned debate and further airing of issues. The opportunities for

[1] A resume is attached at the end of the statement.

discussion and the pressures for intense thought created by this Committee provides what is currently needed..

Essential Characteristics of the Current Industry: The modern electric industry in the lower forty eight states, with a limited exception of Texas, is an interstate industry, in fact an international industry. The Eastern and Western interconnections on which most of us currently depend for reliable electric service cannot be coherently regulated by the states acting individually. That has been the case for more than a half century and it will continue to be the case. Furthermore, the "voluntary" system of governance that has served as a substitute for government regulation of this interstate system cannot be expected to continue to function as the large, vertically-integrated utilities are de-integrated: And vertically de-integrated they must be if a competitive generating industry is to delivery fully on the promise to improve industry efficiency and lower the real cost of kilowatt hours.

Background: I accept as a given that technical and economic developments of the last quarter century have rendered the existing structure of the electric industry economically obsolete. Multiplication of transmission interconnections and the exhaustion of economies of scale in generation have removed the traditional justification for tolerating vertically-integrated utilities with near absolute monopoly power over the sales of electricity to a designated set of users. Economic regulation of the generation sector can now be replaced by carefully constructed competitive markets for generating services. The development of efficient, off-the-shelf, combined-cycle generating plants is a force adding urgency to the task. News accounts of new

generation being build in a system with substantial excess capacity is just one indication of the structural faults of the current system. Congress recognized the need for change, as least in part, in the Energy Policy Act of 1992 (EPACT).

Although EPACT has had the beneficial effect of expanding opportunities for utilities to buy and sell power to one another more efficiently, and the beneficial effect of encouraging several states to accelerate their re-considerations of the proper role for vertically integrated utilities, it has done little to create an efficient, competitive structure for the electric industry. It left initiatives for change largely in the hands of the industry rather than in the hands of public officials. The Federal Energy Regulatory Commission (FERC) has demonstrated admirable efforts in moving the industry towards the needed structure, but my reading of the EPACT. the Federal Power Act and the FERC's power thereunder leads me to believe that the agency cannot, in a reasonable time period, impose an efficient structure on the industry. The choice for the nation is federal legislation to resolve some of the problems the states cannot solve or rely on hope that competitive forces will, without government guidelines, bring the desired structure into being over a prolonged period. Reliance on hope is not a sound public policy.

The Promise of Industry Restructuring: Elementary economics suggests that with sufficiently wise actions the nation can replace the existing monopoly-controlled generating industry with a competitive one *and* make all industry stakeholders better off. The task for legislators and other public policy makers is to channel changes so as to ensure that this promising potential is actualized. Actualizing the potential requires the creation of robust, efficient electricity markets

in which all users, large and small, and all generating companies, large and small, can buy and sell as they choose. Some may choose to buy and/or sell only in a spot market, others may choose to buy and/or sell only in a long term bilateral contracts market, but more likely most will use both types of markets.

At this time it does not appear to me that a federal deadline requiring retail access would be useful. The problem I see is not an unwillingness of states to provide retail access; it is, instead, overcoming the obstacles to creating a robust, an efficient spot market in their immediate trading area that is essential if small buyers and small sellers are to benefit from direct access. Without a robust, efficient spot market, only large players can gain substantially from retail access.

Task for Federal Legislation: Four interdependent problems, in particular, call for federal legislation, some more rapidly that others: All are designed to create electricity markets that will, in turn, make retail access meaningful. (1) The market power of generation companies must be eliminated. (2) Operating standards for generators and system operators (Sos) must become mandatory, and organizations with responsibilities to enforce such standards must be created. (3) Transmission assets must be transferred from existing owners to regional transmission companies which may also be ISOs. (4) The FERC's powers to ensure that needed transmission lines are constructed in a timely manner need to be increased. At this time it is not necessary to impose deadlines on states to provide retail access. If the federal government ensures provides efficient access to robust electricity markets open access will be an easy call for state policy makers.

Problem One: The Market Power of Generation Companies Must Be Eliminated.

Even most severe critics of economic regulation as it is practiced in the U.S. accept the argument that unregulated monopoly power would likely be worse than the existing system of regulation. Consequently, deregulation of existing generating activities while leaving the generating companies with substantial monopoly power is the worst of all possible outcomes of the existing debate.

The Case Against Monopoly: The case against monopoly power is analogous to the business person's case against "leaving money on the table" when negotiating an agreement. For business persons "money remaining on the table" signifies an opportunity to make both parties to the contract better off. Full satisfaction is not achieved until there is no possibility of increasing the benefits of one party without reducing the benefits to the other. Exercised monopoly power leaves "social welfare" on society's table. It signifies an opportunity to make at least some members of society better off without making anyone else worse off.

The creation of efficient, competitive electricity markets will require that large utilities either divest some of their generating plants and/or that substantial excess transmission capacity be built, and/or bidding requirements (a form of detailed regulation) be imposed on generators of large generating companies, and/or detailed running requirements (a form of detailed regulation) be imposed on some (perhaps many) of the generators of large generating companies. Obviously, the only option consistent with the creation of a truly efficient, competitive generating market is the first one, that is, divestiture.

The Herfindahl-Hirschman Index, (HHI) The HHI is one measure of the degree of competitiveness of a market. It can also be used to measures the change in competitiveness of a market if two or more firms serving the market merge, if one or more firms are forced to divide themselves . HHI indices suggest the difficulty of the task of creating competitive generating markets for individual states.[2]

The *Department of Justice and Federal Trade Commission Horizontal Merger Guidelines*, April 2, 1992, offers some suggestions about the relative intensities of monopoly power. First, they note the obvious, namely, "Market concentration is a function of the number of firms in a market and their respective market shares." (Page. 28) Then, the DOJ divides the spectrum of market concentration as measured by the HHI into three regions that can be broadly characterized as:

- unconcentrated, i.e., HHI below 1000,
- moderately concentrated, i.e., HHI between 1000 and 1800, and

highly concentrated, i.e., HHI above 1800.

For a pure monopoly, HHI $=[(100)(1)]^2 = (100)^2 = 10{,}000$.

For a duopoly in which each firm's sales are equal, the first row in the table illustrates that,

$$HHI = [100(.5)]^2 + [100(.5)]^2 = (50)^2 + (50)^2 = 5000.$$

Other values are illustrated in other rows. One generalization of relevance is that a measure of "moderately concentrated" can be obtained only if six or more firms of approximately equal size are in the market. To gain an "unconcentrated market," that is, an HHI of below 1000, the number of firms must be 10 or more of approximately the same size (not illustrated in the table).

[2] The HHI is defined as HHI = sum $(100x_i)^2$, i = 1, ..., n.

It is worth noting that if one firm has one-half the market, the HHI will not be below 2500 even if that firm has a thousand competitors.

Herfindahl-Hirschman Index, Illustrative Examples

	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	HHI
Mrkt Sh	50%	50%	0%	0%	0%	0%	5,000
Mkt Sh	33.34%	33.33%	33.33%	0%	0%	0%	3,333
Mkt Sh	25%	25%	25%	25%	0%	0%	2,500
Mkt Sh	20%	20%	20%	20%	20%	0%	2,000
Mkt Sh	60%	20%	10%	5%	5%	0%	4,150
Mkt Sh	50%	30%	10%	5%	5%	0%	2,850
Mkt Sh	40%	30%	15%	10%	5%	0%	3750
Mkt Sh	16.67%	16.67%	16.67%	16.66%	16.66%	16.66%	1667

Problem Two: Operating Standards must Become Mandatory and Organizations with Responsibilities to Enforce Such Standards Must Be Created.

Introduction: In all industries, the commercial arrangements designed to facilitate trade must recognize the unique features of the commodity or product being produced and delivered, but the task of designing commercial arrangement that facilitate efficient electricity trades and are consistent with the physics of moving electricity across complex transmission networks is an especially demanding task.

Creating efficient, competitive power markets in an electric industry composed of interconnected control areas requires the existence of one or more agencies with authority to define, impose and

enforce rules for the operation of all generators and all control areas so interconnected. It has been noted that "the pursuit of self-interest, unrestrained by suitable institutions, carries no guarantee of anything except chaos."[3] In no part of the economy is this lesson more relevant than in the North American electric industry. As the industry evolves from one dominated by vertically-integrated utilities into one with competitive power markets and unregulated generators, the coordinating institutions that has worked acceptably well to restrain and guide self-interested decision makers of economically regulated firms must now be reconstructed to restrain and guide self-interested decision makers of unregulated generating companies (gencos), power merchants and new kinds of system operators.[4]

The problem: Power failures are one of the many inconveniences of modern life. Keeping the frequency of such failures relatively small is an important objective of managers and regulators of the electric industry. Power failures occur for many reasons, but it is convenient to group them into two types, failures of distribution systems and failures of bulk power systems.[5]

---

[3] Lionel Robbins, *The Theory of Economic Policy in English Classical Political Economy:* (Macmillan & Company Ltd., London, 1952). p. 56

[4] See "The Future Course of NERC," a Report to the North American Electric Reliability Council Board of Trustees by the Future Role of NERC Task Force -II, accepted by the NERC Board of Trustees, September 16, 1996, and "Options to Ensure Compliance with NERC and Regional Reliability Council Policies, Standards and Criteria," prepared by the NERC Compliance Team, October 12, 1996, henceforth cited as NERC Team, *Options*.

[5] A bulk power system is defined as a set of generators and the transmission lines that interconnect them and, in turn, connect them to users and distribution companies. Such a system is commonly called an "interconnection," or "grid," although the latter term is also used to describe the transmission network and connected generators of a single utility. The word "interconnection" has two common definitions: originally it meant a transmission line or set of transmission lines connecting one utility to another. The original meaning is still common. A second meaning is an alternating current transmission network in which all generators operate synchronously. The second definition encompasses the first. The context should make clear which meaning is intended. The four interconnections, in the last noted sense, that comprise the North American electric industry are described below.

Failures of distribution systems are caused primarily by weather-related phenomena, such as ice storms, thunderstorms, hurricanes, and tornados that break distribution lines. Such power outages are usually localized, and planning and actions to minimize the frequency and duration of them are management problems for distribution utilities.[6] This part of the reliability problem can safely be left to the oversight of distribution companies and states.

In contrast, failures of a bulk power system can cause power outages for users on many distribution systems simultaneously, and there is little that managers of distribution utilities of state officials can do to protect their customers/citizens from them. Consequently, the reliability of each distribution utility's services depends critically on the reliability of the bulk power system from which the distribution company receives its power.[7] Individual states are dependent on multi state organizations and/or the federal government to ensure an acceptable solution to this problem.

---

[6]Individual users have options for providing themselves additional outage protection. The two most obvious ones are (1) ownership of back-up oil, gasoline, and/or natural gas-fired generators on the user's premises, a strategy commonly used by hospitals, telephone exchanges and some rural citizens, and (2) back-up battery power for critically needed equipment, such as emergency lighting and computers.

[7]See, "Blackout a Caution Sign on Road to Deregulation," *New York Times*, August 19, 1996, p. A.7 for a description of the August 10, 1996 failure that caused a loss of power in nine states in the Western System Coordinating Council area. See also "Did Competition Spark Power Failures," *Wall Street Journal*, August 19, 1996 p. B.1. which notes, "During a 105-minute period Aug. 10, five trees came into contact with five lines in the Portland Area. There was also a mechanical failure at a power substation. The last straw came when a 600-megawatt hydroelectric plant that could have prevented the outage was kept partly off-line to allow salmon to migrate downstream on the Columbia River." This article notes that 4 million customers were affected. It also notes that the July 2, 1996 failure, in an overlapping area, affected 2 million customers. In the Secretary of Energy's letter to the President of August 2, 1996 reporting on the July 2, 1996, outages in the Western System Coordinating Council region, it was noted that these 2 million customers were spread over 14 states. One part of that letter states, "The outage was initiated when a transmission line sagged too close to a tree, creating a short circuit and causing the line to disconnect automatically. A protective device on a parallel line misinterpreted the short circuit and disconnected its line. Loss of the two lines activated an automatic procedure to shut down two large generating units at a nearby power plant served by the two lines because the generators' output otherwise would overload remaining transmission lines."

It is useful to divide the problem of reliability of bulk power systems into two parts: the problem of coordinating the use of generators and users in each control area and the problem of coordinating control area operators in interconnections with more than one system operator.

The fundamental building blocks of the existing North American electric industry are control areas, each with its control area operator.[8] They, and the agencies that coordinate their plans and operations, are critical agencies in maintaining system efficiency and reliability. Although responsibilities of control area operators (system operators (SOs) for short) will change in fundamental ways in the new industry, control areas and SOs will remain fundamental building blocks. In the current industry the SO is an employee of the utility, or group of utilities, whose plants are being dispatched, or of a pool organization created by the set of cooperating utilities whose plants are being dispatched. In order to create nondiscriminatory access to transmission services, the current system must be replaced with one in which SOs have no special loyalties to any subset of generators or users. Such new system operators are commonly called "independent" system operators (ISOs). Their loyalties must be to the preservation of reliability and the implementing the preferences of buyers and sellers in so far as those preference are consistent with accepted reliability standards.[9] The ISO will take control and should take ownership of existing control centers and existing transmission lines in its control area.

[8] A control area is a set of generators connected via transmission lines to a single control center and coordinated in use by that single control center. Each generator belongs to one and only one control area.

[9] Airline traffic controllers are often cited as examples of desired standards for independent system operators, since their responsibility is to implement the preferences of pilots to the extent doing so does not infringe on accepted safety standards.

The second part of the problem is coordinating the activities of SOs. When two utilities interconnect, each loses its sovereign control over its economic performance. Each become dependent on the other for efficient and reliable delivery of power to its customers. It is the nature of interconnected system that power continuously flows from one system into the other, sometimes in one direction and sometimes in another; or if there are multiple interconnections between two system, it may simultaneously be flowing in through one interconnection and out through another. The interdependent SOs must accept complementary responsibilities for maintaining desired net flows between control areas. Furthermore, the concept of a net flow in or out of each system assumes that each system is defined, that is, that each SO "controls" a well defined set of generators and loads and defines his "borders" as a set of transfer (metering) points between adjoining control areas. It also means that a single generator or load may not arbitrarily redefine itself into another control area. In effect each generator is in one and only one control area and each load is, with few exceptions, in one and only one control area. Also, since spinning reserves, operating reserves and transmission capacity have characteristics of public goods in interconnected systems, similar "reserve requirements" and similar operating standards need to be imposed on both control areas if one is not to "free ride" on the other.

Interconnections between utilities compelled the interconnected utilities to create a system of self regulation, since the interconnecting utilities were often regulated by different states or one, perhaps an investor-owned utility was regulated by a state regulator and the other, perhaps a publicly-owned utility was not regulated, or was regulated by an agency other than the one that regulated the IOU. While the jargon of the industry emphasizes that bilateral contracts between

interconnected utilities were (and are) commercial agreements voluntarily accepted and could be terminated at the option of either party, the reality was (and is) that extensively interconnected utilities were (and are) dependent on one another to produce power efficiently and provide service reliably. As interconnections grew to include many utilities in different states, some investor-owned and others publicly-owned, the complexity of governing the system also grew.

The extent to which the U.S. government looks to this voluntary system of industry self governance to maintain reliability in the electric industry is demonstrated by Section 205(a) of PURPA. That section says,

> The Commission [the FERC] may, on its own motion, and shall, on application of any person or governmental entity, after public notice and notice to the Governor of the affected State and after affording an opportunity for public hearing, exempt electric utilities, in whole or in part, from any provision of State law, or from any State rule or regulation, which prohibits or prevents the voluntary coordination of electric utilities, including any agreement for central dispatch, if the Commission determines that such voluntary coordination is designed to obtain economic utilization of facilities and resources in any area.[10]

[10] The qualifications in the following sentence dilutes the force of this assertion somewhat. It says, "No such exemption may be granted if the Commission finds that such provision of State law, or rule or regulation — (1) is required by any authority of Federal law, or, (2) is designed to protect public health, safety, or welfare, or the environment or conserve energy or is designed to mitigate the effect of emergencies resulting from fuel shortages. Several other provisions of Title 2 of PURPA were directed towards strengthening the reliability of the electric industry by improving the system of coordination of interconnected control areas.

In the new industry the fiction that operating standards are voluntary must be abandoned, a proposition that the NERC has now accepted . However, if standards are not voluntary, sanctions must be imposed on those who violate them. These considerations lead to the conclusion that the ISO must be a utility regulated by the FERC, and the agency empowered to impose penalties on ISOs (sometimes referred to as an independent interconnection operator (IIO)) must also be a utility regulated by the FERC. The NERC may remain in existence as the international body coordinating the development of standards applicable to both U.S. and Canadian and, perhaps, Mexican SOs, but it should be controlled by the ISOs and perhaps IIOs, not by generating companies. The regional reliability councils may also remain in existence until ISOs grow large enough to displace them, and they, as the NERC, must be controlled by ISOs (and, perhaps, IIOs), not by generating companies.

The sooner the federal government creates and empowers such governance organizations the sooner the tasks confronting state reformers will be simplified.

Problem Three: Transmission Assets must Be Transferred from Existing Owners to Regional Transmission Companies (transcos), Which May Also Be ISOs, and This Body Should be Responsible for Expanding Transmission Assets to Satisfy Growing Needs

Each ISO/transco should be responsible for planning and constructing transmission assets as needed. In planning, the ISO/transco should be expected to cooperate closely with those ISO to which he is interconnected. Planning transmission expansion is an interstate activity. This tasks

cannot be left to generating companies since they will often be beneficiaries of transmission congestion, and it cannot be left to distribution companies. Consolidating existing transmission assets in ISOs/transcos (transco = transmission company) would help rationalize the system, especially if the federal government saw to it that all transmission assets were so transferred. If the legislation permitted existing transmission assets to be transferred at "replacement" value, or "replacement value minus depreciation" with the constraint that capital gains from the sale of such assets would be used to offset stranded costs three problems would be eased., the stranded cost problem, the reluctance of existing transmission owners, IOUs and others, to sell assets at far below their "true" value would be softened, and the FERC pricing policies for transmission services would be less likely to cause inefficiently low prices and inefficiently high demands for such services.

Problem Four: The FERC's Powers to Ensure That Needed Transmission Lines Are Constructed in a Timely Manner Need to Be Established.

Under current law, the FERC, with exceptions not relevant to this discussion, cannot order a utility to build a transmission line, and if one want to build one the FERC cannot provide either environmental clearance or eminent domain powers. Those powers lie with the states. In the new industry, the federal government must accept the responsibility to provide states with an efficient transmission network. At a minimum this requires the FERC have the power to determine the need for a transmission line and perhaps the power to specify one or more points on its route. The state(s) can then determine the precise route. The FERC will also need default

authority to determine the exact route if the state or states fails to do so.

Charles G. Stalon, Ph.D.

Consultant on Energy Regulation
1901 Weissinger Lane
Cape Girardeau, MO 63702-0779
Phone: 573/335-326, Fax: 573/335-3145

Current Ongoing Responsibilities:
Member, Illinois Governor's Committee on Electric Industry Reform since 1997 -
Member -elect, Board of Directors, New England ISO Corporation since 1977 -
Member, Board of Directors, New Jersey Resources Corp., since 1994
Member, Harvard Electricity Policy Group since 1993
Member, Keystone Center Board of Trustees, since April 1992
Senior Economist, Argonne National Laboratory since December 1991
Member, Advisory Council, Gas Research Institute, since November 1991

Past Professional Employment
Professor of Economics and Director of the Institute of Public Utilities
Michigan State University, l99l - 1993
Putnam, Hayes & Bartlett, Inc., Director, 1990 - 1991
Federal Energy Regulatory Commission, Commissioner, 1984 - 1989
Illinois Commerce Commission, Commissioner, 1977-1984
Southern Illinois University, Carbondale, 1963-1977
Washington University, Visiting Professor of Economics, 1972
Federal Power Commission, Research Economist, 1969 - 1970

Education

Ph.D. Economics, Purdue University, Lafayette, Indiana	1966
M.S. Economics, Purdue University, Lafayette, Indiana	1959-63
B.A. Economics, Butler University, Indianapolis, Indiana	1956-59
Ohio State University	1955-56

RESUME (Cont.)

Professional Recognitions
Who's Who in the East
Who's Who in the Midwest
Who's Who in Society
Who's Who in American Politics
Who's Who in America

Selected Past Professional Activities (Non-Routine)
Moderator, California Competitive Power Market Working Group 1994-95
Member, Advisory Council, Bellcore, April 1992 - 96
Member, Illinois Commerce Commission's Blue Ribbon Telecommunications Task Force, 1990
Member, Board of Directors, National Society of Rate of Return Analyst, 1982 -1990
Member, Executive Committee, National Association of Regulatory Commissioners (NARUC), 1986-1989
Member, Board of Directors, Institute for Study of Regulation, 1984-1987
Member, Board of Directors, National Regulatory Research Institute, 1983-84 & 1991-93
President, Mid-American Regulatory Commissioners, 1983-1984
Member, Advisory Council, Gas Research Institute, 1981-1984
Member, Panel on Gas Statistics, National Academy of Science 1983-1985
Member, Gas Committee, NARUC, 1980-1984
Chairman, College of Liberal Arts Council, SIUC, 1976-1977
President, SIUC Chapter, American Association of University Professors, 1970-1971

Current Memberships in Professional Associations
American Economic Association (AEA), since 1962
Transportation and Public Utility Group, AEA, since 1970
Capital Area Chapter of the International Association of Energy Economists, since 1991