Before the Public Utilities Commission of the State of California

Docket No. R.98-12-015

Distributed Generation and Competition in Electric Distribution Service

Comment of the Staff of theBureau of Economics of the Federal Trade Commission(1)

I. Introduction

The staff of the Bureau of Economics of the Federal Trade Commission (FTC) appreciates this opportunity to present its views to the Public Utilities Commission of the State of California (CPUC) in its proceeding regarding the structure and regulatory framework governing electricity distribution service or distributed generation (DG). California is a leader among states considering regulatory reforms to bring more of the benefits of competition (lower prices, improved service, and innovation) in the electric industry to its citizens and businesses.

The FTC is an independent administrative agency responsible for maintaining competition and safeguarding the interests of consumers. The staff of the FTC often analyzes regulatory or legislative proposals that may affect competition or the efficiency of the economy. In the course of this work, as well as in antitrust research, investigation, and litigation, the staff applies established principles and recent developments in economic theory and empirical analysis to competition issues.

The staff of the FTC has a longstanding interest in consumer protection and competition issues affecting energy markets, including proposals to reform regulation of the electric power and natural gas industries. The staff has submitted numerous comments concerning these issues at both the federal and state levels.(2) Moreover, the FTC has reviewed proposed mergers involving electric and gas utility companies.

The CPUC requests comment on a wide range of issues regarding DG and distribution competition. Over the past several decades, generation has been highly centralized in large generation facilities. Customers are served primarily by utility distribution companies (UDCs) that have connections to large generation facilities using high voltage transmission lines and connections to customers through their lower voltage distribution lines. This grid system is referred to as the transmission and distribution (T&D) system. In an electrical system with DG, smaller, widely-dispersed generating units would supply electric power in addition to (or instead of) centralized facilities. The CPUC has raised numerous questions in Appendix A to the Order Instituting Rulemaking related to the policy implications surrounding the use of DG, and this comment addresses a subset of those questions.

In general, advances in DG technology offer substantial potential benefits to consumers, but the rate and extent of DG implementation have yet to be determined and there are some potential costs of DG use as well. DG also faces potential discrimination in connecting to the grid from vertically-integrated, incumbent suppliers in light of DG's potential to increase competition in generation, transmission, and distribution. Realizing these potential benefits may depend upon the CPUC's affording DG a fair market test. A fair market test requires technical interconnection rules allowing DG units to connect to the T&D system without undue discrimination and unnecessary technical requirements left to the discretion of incumbent generation and T&D suppliers. The CPUC is likely to benefit consumers by first addressing the conditions necessary for a fair market test of DG and then addressing the broader, longer-term questions of distribution competition. The results of the fair market test in terms of DG's market acceptance might provide additional guidance to the CPUC as it examines the issues implicated by increased competition in generation, transmission, and distribution.

II. Discussion

A. From a policy perspective, does consideration of DG necessarily require a broader, more comprehensive look at distribution competition and the role of the UDC? (Appendix Question #1)

Rather than being viewed as a novel, untried development requiring substantial new thinking and operating considerations, DG is best considered as an extension of traditional co-generation arrangements(3) and of the trend toward technologies that allow increased competition in generation by reducing economies of scale at that stage of the electric power industry.(4) In many ways, DG is an extension of these now well-established practices and trends.(5) DG is unlikely to present conceptually novel issues requiring a fundamental reexamination of industry operations. The issues of reliable and safe interconnection with the grid, adjustments to demand projections for incumbent suppliers, and pricing reconsiderations are likely to be quite similar for DG and traditional types of co-generation units.(6)

Like generation regulated under PURPA as well as co-generation and combined-cycle gas generation, DG has implications for T&D, as well as generation, competition. The most fundamental competition issue raised by DG is its potential to facilitate entry and to limit generation and T&D market power, if any, of incumbent firms. The unknown factor is the degree to which DG is going to be readily and economically substituted for centralized generation and T&D, and to provide new service options for consumers.(8)

The significance of DG for T&D competition will depend on the rate at which DG is adopted by present suppliers, marketers, new entrants, and customers. Whether DG is extensively employed by these entities depends, in part, on the interconnection rules that the CPUC adopts in this or other proceedings. The degree of integration of DG into the dispatch protocols of the independent system operator (ISO) may also be an important element. The pace of technical advances and natural gas prices also will likely be important elements in the spread of DG. For example, given the importance of natural gas fuel for DG, if natural gas prices were to increase substantially, the rate of diffusion of DG would likely decrease.(9)

For a variety of reasons,(10) it appears unlikely that implementation of DG will occur so rapidly that all the surrounding distribution competition issues need to be addressed simultaneously with the basic interconnection issues to obtain a fair market test of this new technology. As with the emergence of earlier alternative generation sources, there does not appear to be a sound public interest rationale to delay resolving the technical questions required to allow DG to continue to develop as a new source of generation and T&D competition. Regulatory adjustments regarding system reliability and safety may be necessary to accommodate this new source of generation competition. Encumbering DG in the interim, while potential regulatory adjustments are considered, likely will raise costs and make the determination of the necessary regulatory adjustments more difficult.

B. What should be the Commission's role in facilitating the optimal use of DG? (Appendix Question #5)

In order to maximize the net benefits of DG to consumers, the CPUC may wish to provide a regulatory setting in which DG can obtain a fair market test in competition with other forms of generation, transmission, and distribution. This may require establishing rules or procedures for interconnection that prohibit discrimination against DG by incumbent, regulated distribution (and transmission) companies. Incumbent UDCs are likely to have incentives to discourage diffusion of DG beyond their own use of such units. In considering such interconnection rules, the CPUC quite rightly may have a strong regard for system reliability and safety.(11) The rules and procedures, however, should be no more restrictive than necessary for these purposes and should avoid giving incumbent generation and T&D suppliers substantial discretion to discriminate against use of DG by customers, entrants, and marketers.

C. How would the integrity, reliability, safety, and efficiency of the T&D system be affected by a more competitive electric distribution and/or DG market? (Appendix Question #6)

In general, DG may provide considerable integrity, reliability, and efficiency benefits to the existing T&D system by alleviating congestion and facilitating stronger competition between existing and new sources of generation. Although we focus here on selected system effects, the CPUC also may wish to consider potential environmental and service reliability benefits of DG to consumers.(12) One of the strongest aspects of DG from an efficiency perspective is its ability to be sited in a wide variety of locations close to the point of demand for electric power, and, through multiple units, at a wide range of capacity levels. DG units could be located (or moved) quickly to alleviate transmission congestion or other circumstances that raise costs or threaten system integrity, reliability, and efficiency. DG's ability to respond quickly to system problems could reduce the investment in T&D and generation required to meet projected demand growth. Like present co-generation arrangements, the presence of customer-owned DG units should cause demand to be more elastic as customers can turn to self-supply rather than do without electric power in periods when reducing load is required to maintain system integrity. Thus, widespread availability of DG is likely to help the system reduce load in peak periods in a more efficient manner -- through the price system rather than through arbitrary cutoffs and rationing.(13)

DG also may enhance security of supply, an aspect of reliability. Because DG units are much smaller and are likely to be more dispersed, the loss of any individual DG unit to the system would be almost immaterial compared to the significant contingency planning required to deal with unanticipated outages of large units. The smaller size and greater dispersion of DG units also would reduce the system's vulnerability to natural and manmade disasters.(14) Each major generator and transmission line would become much less important for system integrity with a significant presence of DG units.

Although DG is likely to provide electricity system benefits as described above, the shift to DG could increase the importance of reliability of natural gas supplies. To the extent that DG is fueled predominantly by natural gas,(15) growth of DG could shift the overall fuel mix of California toward natural gas. Consequently, disruptions in natural gas supplies could have broader implications for disruptions of electricity supplies than heretofore.

D. Describe the potential costs of promoting competition in distribution and/or DG? What are the potential stranded costs? What are the benefits? How should the potential costs and benefits be analyzed and quantified? (Appendix Question #11)

There are a variety of potential scenarios about the role of DG in supplying electric power and the effects of this increased competition on existing suppliers. In one scenario favorable to consumers and easy to implement from a regulatory viewpoint, a fair market test of DG could result in widespread use of DG to meet increases in projected demand for electricity in California. This would likely bring efficiencies to transmission and distribution functions as described in Section II.C of this comment, and may reduce the need for additional generation, transmission, and distribution investment to meet projected future growth in demand. Widespread adoption of DG could reduce system costs accordingly. In this scenario, generation technologies already used by incumbents would generally maintain their present levels of output, but would have a less important role in meeting demand growth. Because DG can be located close to load sources, both transmission and distribution costs are likely to be lower in a system with extensive DG. With smaller line losses, a system with extensive DG would require less total generation capacity to meet a given level of projected demand.

A more difficult scenario from a regulatory perspective, although one in which consumers might continue to be net beneficiaries, would emerge if DG experienced exceptionally rapid growth rates. Although this scenario appears unlikely,(16) such a pattern of adoption of DG could result in stranded T&D costs even as the use of DG reduced total electricity prices for consumers.

E. Does competition in electric distribution service have implications on the delivery infrastructure for natural gas? (Appendix Question #12)

To the extent that DG technology develops with natural gas as its primary fuel, expansion of DG implies increased demand for natural gas. This expanded demand for natural gas is likely to create incentives to expand natural gas

transmission and distribution facilities. Further, to the extent that DG offers material advantages to customers in terms of prices, reliability, or other factors, areas presently without access to natural gas distribution might be expected to request service so that they too may benefit from access to DG. The ability of DG to utilize other fuels could reduce these incentives to extend natural gas distribution.

More generally, widespread adoption of DG would place the natural gas grid in increasingly direct competition with the electricity grid. With DG fueled by natural gas, price changes in electricity delivered through the T&D network could be constrained by rapid entry or shifting of DG generating capacity. Whether the degree of such competition would eventually be sufficient to consider lifting regulation of the electric T&D network is uncertain, and the CPUC may wish to periodically revisit this question rather than seek a "once and for all" solution at this time.

F. What procedural steps should be pursued? (Appendix Question #13)

Because DG is likely to be at a critical stage of development and particularly vulnerable to discriminatory behavior by incumbent utilities in connecting to the T&D grid, the CPUC may wish to first establish conditions for a fair market test of DG. Both the New York Public Service Commission and the Texas Public Utility Commission have established (or are in the process of establishing) technical interconnection rules so that DG can be implemented before resolving the broader competition issues implicated by DG.(17)

After the CPUC has conducted a fair market test and evaluated DG's initial rate of market acceptance, it may then wish to address the longer-term questions of distribution competition that may arise if DG is adopted extensively. Whatever the CPUC's ultimate determination regarding distribution competition, it is unlikely that allowing incumbent suppliers of generation and T&D to raise the development and implementation costs of this technology will serve the interests of consumers.

III. Conclusion

Like co-generation and generation from alternative energy sources, DG faces potential discrimination from incumbent suppliers in connecting to the grid. Because of DG's unique ability to be sited close to demand centers, DG has the potential to increase competition in generation, transmission, and distribution. DG's siting flexibility also means that it can provide substantial efficiencies and enhance system integrity and reliability. Realizing these potential benefits may depend upon the CPUC affording DG a fair market test. This may require state technical interconnection rules allowing DG units to connect to the transmission and distribution system free of potential discrimination with respect to interconnection by incumbent, regulated distribution (and transmission) companies. The CPUC is likely to benefit consumers by first addressing the conditions necessary for a fair market test of DG and then addressing the broader, longer-term questions of distribution competition. Evaluation of the results of a fair market test, including the initial rates of market acceptance, may provide the CPUC with additional insights when it considers the broader competition issues raised by DG.

Respectfully submitted,

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1. This comment represents the views of the staff of the Bureau of Economics of the Federal Trade Commission. They are not necessarily the views of the Federal Trade Commission or any individual Commissioner. Inquiries regarding this comment should be directed to John C. Hilke, Electricity Project Coordinator (303-844-3565).

2. The staff of the FTC has commented to the Federal Energy Regulatory Commission (FERC) on electric power regulation in Docket RM98-4-000 (Sept. 11, 1998); Docket No. PL98-5-000 (May 1, 1998); Docket Nos. ER97-237-000 and ER97-1079-000 (Feb. 6, 1998); Docket No. RM96-6-000 (May 7, 1996); Docket Nos. RM95-8-000 and RM94-7-001 (Aug. 7, 1995). The staff of the FTC also has submitted comments to various state agencies including the Alabama Public Service Commission, Docket No. 26427 (restructuring generally) (Jan. 8, 1999); Louisiana Public Service Commission (LPSC), Docket No. U-21453 (affiliate transactions) (Oct. 30, 1998); Commonwealth of Massachusetts Department of Telecommunications and Energy, Docket No. DTE 97-96 (standards of conduct) (Oct. 8, 1998); Public Utility Commission of Nevada, PUCN Docket No. 97-5034 (affiliate transactions) (Sept. 22, 1998); Mississippi Public Service Commission, Docket No. 96-UA-389 (Transco proposal) (Aug. 28, 1998); LPSC, Docket No. U-21453 (stranded costs) (Aug. 7, 1998); Michigan Public Service Commission, Case No. U-11290 (electric restructuring) (Aug. 7, 1998); West Virginia Public Service Commission, Case No. 98-0452-E-GI (electric restructuring) (July 15, 1998); Commonwealth of Virginia, Joint Subcommittee Studying Electric Industry Restructuring, SJR-91 (July 9, 1998); Public Utility Commission of Texas, Project Number 17549 (affiliate transactions) (June 19, 1998); Maine Department of the Attorney General and Public Utilities Commission, "Interim Report on Market Power in Electricity" (May 29, 1998); LPSC, Docket No. U-21453 (market power) (May 15, 1998); California Public Utilities Commission, Docket Nos. R.94-04-031 and I.94-04-032 (electric industry restructuring) (Aug. 23, 1995); and South Carolina Legislative Audit Council (foreign experience in electric industry restructuring) (Feb. 28, 1994). These comments are included on the FTC's website <http://www.ftc.gov/be/advofile.htm>.

3. In traditional co-generation arrangements, a large manufacturing customer opts to self-generate part of its load, usually with a generating facility that also supplies heat for the manufacturing plant.

4. Recently the Electric Power Research Institute announced testing of microturbines in recognition of their potential to supplement reliability and reduce consumer costs. *EPRI Readies Test of Microturbine Systems*, 11 Elect. J. 13 (Dec. 1998).

5. *The Electricity Business, Power to the People*, reprint from The Economist (Mar. 28, 1998). Although the term "distributed generation" is commonly applied to only microturbines, fuel cells, and other very small scale power sources, the shift in the technology of generation toward smaller scale units is not a new one. Indeed, the present interest in generation competition stems in large part from the emergence of moderate-scale, combined-cycle, gas-generator technology.

6. Since Congress enacted the Public Utility Regulatory Policies Act of 1978 (PURPA),(7)

7. The PURPA FOOTNOTE

8. Increased reliability is one service aspect of DG that may be attractive to some customers. For example, grocery stores and restaurants may suffer significant food spoilage losses when electric power is interrupted. Availability of DG, either as a backup power supply or as the primary power source, is likely to reduce the risk of power interruptions from weather-related T&D disruptions.

9. Diffusion of photovoltaic DG, however, would probably not be affected because it relies on solar energy as a fuel source rather than on natural gas.

10. Chief among these is the extended remaining useful life of existing generation capacity. Much of this capacity is likely to remain competitive on an incremental cost basis, even if it has larger average costs (including its sunk costs). *The Electricity Business, Power to the People , supra* n. 5. Consumer inertia and consumer financing may be other factors.

11. Safety and reliability considerations are likely to be important both in original equipment and in equipment service and repair.

12. For a discussion of the projected system, environmental, operational, and safety benefits of DG extending beyond those described here, and focused particularly on photovoltaic cells, *see* William A. Sprately, *Solar Rooftops and Distributed Resources* 11 Elect. J. 40 (Dec. 1998). For discussions of DG more generally, *see*, e.g.: Brian O'Reilly, *Transforming the Power Business*, reprint from Fortune (May 11, 1998); The Electricity Business, *Power to the People , supra* n. 5); Joanne Von Alroth, *Generating Interest, Current Events, Microturbines Tout Cheaper, More Reliable Power,* reprint from Crain's Chicago Business (Apr. 13, 1998).

While the CPUC Order Initiating Rulemaking restricts this inquiry to effects on the electric grid, DG offers potential advantages in environmental emissions and in thermal efficiency when exhaust heat can be used by the customer to replace or supplement existing heating and cooling sources. Kurt E. Yeager, Stephen Gehl, Brent Barker, and Robert L. Knight, Roadmapping the Technological Future of Electricity, 11 Elect. J. 17 (Dec. 1998). From a customer perspective, new DG technologies may offer higher reliability than is possible from use of the grid alone. New DG units may allow smaller customers to have economical emergency backup capability similar to that presently provided to hospitals and similar institutions by diesel backup generators.

13. Reducing peak loads is just one of the likely effects of DG on system load variance. The CPUC may wish to examine this more general area to assess any additional benefits or costs of DG from this perspective.

14. Kurt E. Yeager, Stephen Gehl, Brent Barker, and Robert L. Knight, *Roadmapping the Technological Future of Electricity, supra* n. 11.

15. DG microturbines typically are fueled by natural gas, however, microturbines can be designed to use propane or other hydrocarbon fuels. *EPRI Readies Test of Microturbine Systems, supra* n. 4.

16. The Electric Power Research Institute's Electricity Technology Roadmap Initiative reviewed new technology developments in generation. It projects that DG will be an important addition to traditional centralized generation and associated T&D networks. It does not envision, however, that DG will supplant other generation sources in the 50-year time frame of the study. Kurt E. Yeager, Stephen Gehl, Brent Barker, and Robert L. Knight, *Roadmapping the Technological Future of Electricity, supra* n. 11.

17. Presentation of Maureen Helmer, Chair, New York Public Service Commission, and Judy Walsh, Commissioner, Texas Public Utility Commission, at the National Association of Regulatory Utility Commissioners Winter Meeting, Joint Meeting of the Energy Resources and the Environment Committee and the Electricity Committee, Washington, D.C. (Feb. 24, 1999).