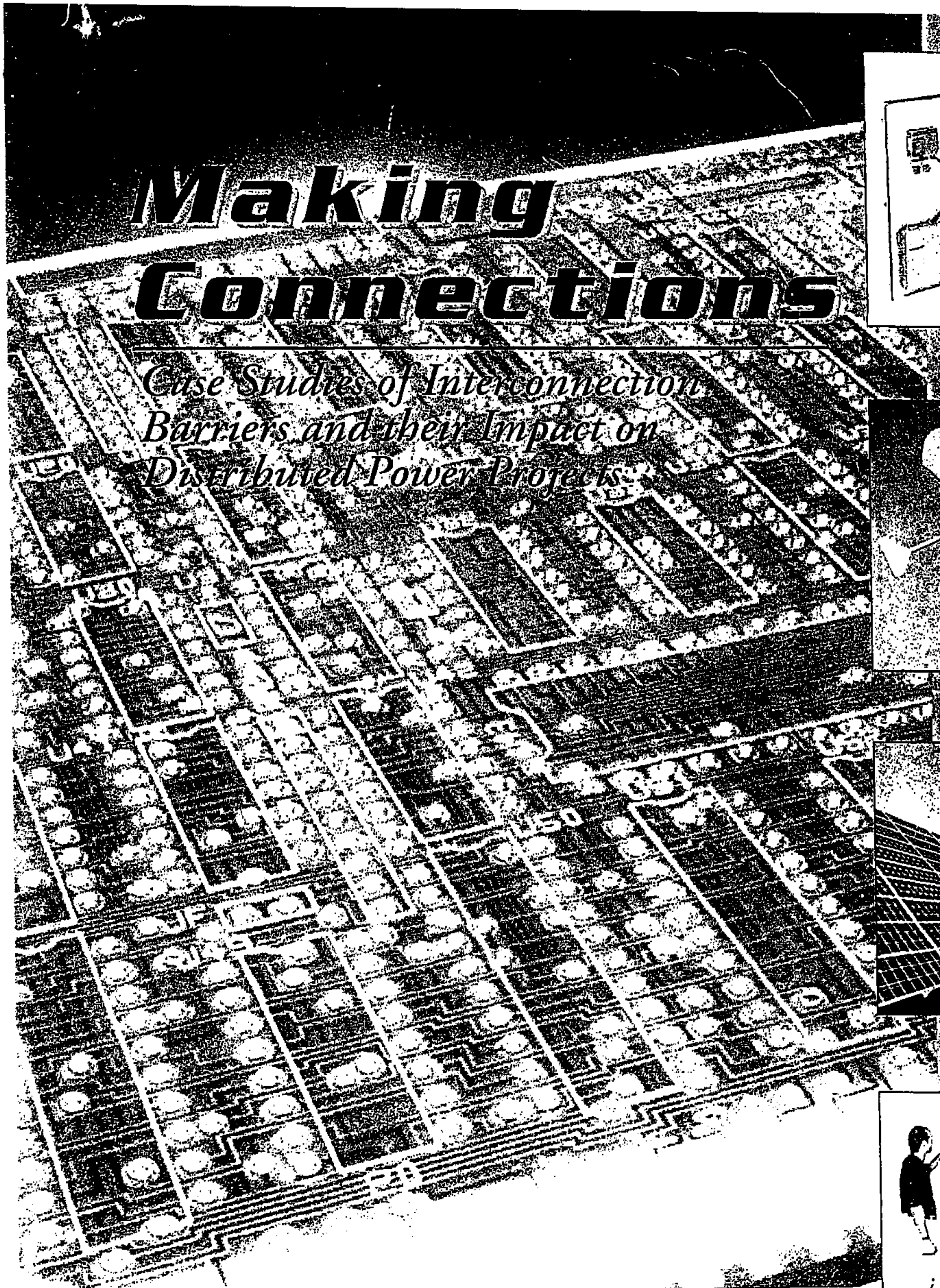
DISCLAIMER

Electronic versions of the exhibits in these minutes may not be complete.

This information is supplied as an informational service only and should not be relied upon as an official record.

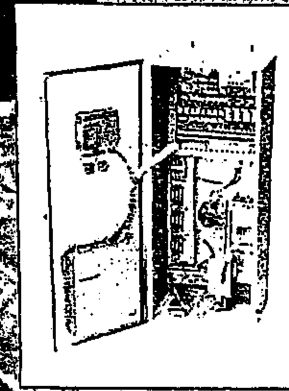
Original exhibits are on file at the Legislative Counsel Bureau Research Library in Carson City.

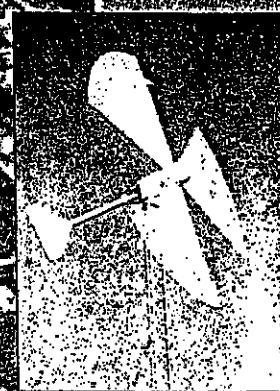
Contact the Library at (775) 684-6827 or library@lcb.state.nv.us.

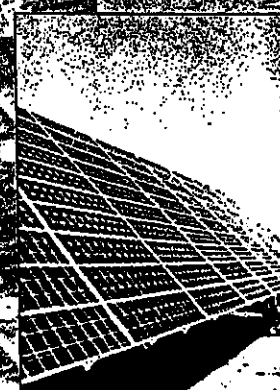


Making Connections

Case Studies of Interconnection Barriers and their Impact on Distributed Power Projects







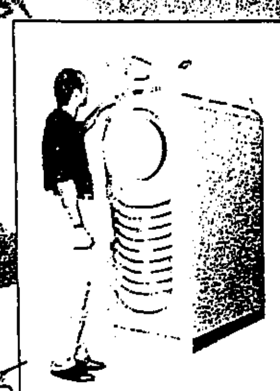


EXHIBIT K Committee on Commerce/Labor

Date: 5/2/03 Page 1 of 5

NREL/SR-200[illegible] May 2000

Executive Summary

Environmentally-friendly renewable energy technologies such as wind turbines and photovoltaics and clean, efficient, fossil-fuel technologies such as gas turbines and fuel cells are among the fleet of new generating technologies driving the demand for distributed generation of electricity. Combined heat and power systems at industrial plants or commercial buildings can be three times more efficient than conventional central generating stations. When facilities such as hospitals and businesses with computers or other critical electronic technology can get power from either the grid or their own generating equipment, energy reliability and security are greatly improved.

Distributed power is modular electric generation or storage located close to the point of use. It can also include controllable load. This study focuses primarily on distributed generation projects. Distributed generation holds great promise for improving the electrical generation system for the United States in ways that strongly support the primary energy efficiency and renewable energy goals of the U.S. Department of Energy (DOE). Distributed generation offers customer benefits in the form of increased reliability, uninterruptible service, energy cost savings, and onsite efficiencies. Electric utility operations can also benefit. Smaller distributed-generation facilities can delay or eliminate the need to build new large central generating plants or transmission and distribution lines. They can also help smooth out peak demand patterns, reduce transmission losses, and improve quality of service to outlying areas.

However, overlaying a network of small, non-utility owned (as well as utility-owned) generating facilities on a grid developed around centralized generation requires innovative approaches to managing and operating the utility distribution system, at a time when actual or anticipated deregulation has created great uncertainty that sometimes discourages adoption of new policies and practices.

In December 1998, DOE sponsored a meeting of the stakeholders in distributed generation. The need to document the nature of the entry barriers for distributed power technologies became clear. Customers, vendors, and developers of these technologies cited interconnection barriers—including technical issues, institutional practices, and regulatory policies—as the principal obstacles separating them from commercial markets. Industry and regulatory officials are also beginning to examine the nature and extent of these barriers and to debate the appropriate responses.

This report reviews the barriers that distributed generators of electricity are encountering when attempting to interconnect to the electrical grid. The authors interviewed people who had previously sought or were currently seeking permission to interconnect. This study focuses on the perspective of the project proponents. No attempt was made to assess the prevalence of the barriers identified.*

By contacting people known to be developing distributed generation projects or to be interested in these projects, and then gathering referrals from those people, the authors were able to identify 90 potential projects for this study. Telephone interviews were then conducted with people involved with those 90 projects. For smaller projects, this was usually the customer or owner of the project. For larger projects, this was usually a distributed generation project developer building the facility for the customer. The authors obtained sufficient information about 65 of the 90 projects to develop full case studies for these projects. The sizes of the projects represented by the case studies range from 26 megawatts to less than a kilowatt.

Most of the distributed power case studies experienced significant market entry barriers. Of the 65 case studies, only 7 cases reported no major utility-related barriers and were completed and interconnected on a satisfactory timeline. For the remaining case studies, the project proponents expressed some degree of dissatisfaction in dealing with the utility. They believed that the utilities' policies or practices constituted unnecessary barriers

* The purpose and value of the study was simply to confirm that barriers do exist, to provide illustrative examples of current case studies, and to initially identify the kinds of barriers. The authors made no attempt to obtain a statistically valid or unbiased sample. Also, the use of referrals to select case studies for identifying barriers likely skewed the selection toward cases where there were barriers.

Findings

This report focuses on cases where barriers were present and does so from the project proponents' perspective. Nonetheless, the study offers the following findings about current barriers to interconnection of distributed power generation projects.

- A variety of technical, business practice, and regulatory barriers discourage interconnection in the US domestic market.
- These barriers sometimes prevent distributed generation projects from being developed.
- The barriers exist for all distributed-generation technologies and in all regions of the country.
- Lengthy approval processes, project-specific equipment requirements, or high standard fees are particularly severe for smaller distributed generation projects.
- Many barriers in today's marketplace occur because utilities have not previously dealt with small-project or customer-generator interconnection requests.
- There is no national consensus on technical standards for connecting equipment, necessary insurance, reasonable charges for activities related to connection, or agreement on appropriate charges or payments for distributed generation.
- Utilities often have the flexibility to remove or lessen barriers.
- Distributed generation project proponents faced with technical requirements, fees, or other burdensome barriers are often able to get those barriers removed or lessened by protesting to the utility, to the utility's regulatory agency, or to other public agencies. However, this usually requires considerable time, effort, and resources.
- Official judicial or regulatory appeals were often seen as too costly for relatively small-scale distributed generation projects.
- Distributed generation project proponents frequently felt that existing rules did not give them appropriate credit for the contributions they make to meeting power demand, reducing transmission losses, or improving environmental quality.

to interconnection. As of completion of the report, 29 of the case study projects had been completed and interconnected; 9 were meeting only the customer's load and were not sending any power to the grid; 2 had disconnected from the grid; 7 had been installed, but were still seeking interconnection (and may be operating independently in the interim); 13 were pending; and 5 projects had been abandoned.

For purposes of this analysis, the barriers encountered in the case studies were classified as technical, business practice, or regulatory.

Technical barriers consist principally of utility requirements to ensure engineering compatibility of interconnected generators with the grid and its operation. Most significant of the technical barriers are requirements for protective equipment and safety measures intended to avoid hazards to utility property and personnel, and to the quality of power in the system. Proponents of potential distributed generation systems often stated that the required equipment and custom engineering analyses are unnecessarily costly and duplicative. Such requirements added $1200 or 15% to the cost of a 0.9 kW photovoltaics project, for example, plus an additional $125 per year for relay calibration. Newer generating equipment already incorporates technology designed specifically to address safety, reliability, and power-quality concerns.

Business-practice barriers arise from contractual and procedural requirements for interconnection and, often times, from the simple difficulty of finding someone within a utility who is familiar with the issues and authorized to act on the utility's behalf. This lack of utility experience in dealing with such issues may be one of the most widespread and significant barriers to distributed generation, particularly for small projects. Utilities that set up standard procedures and designate a point of contact for distributed generation projects considerably simplify and reduce the cost of the interconnection process both for themselves and for the distributed generation project proponents.

Other significant business-practice barriers included procedures for approving interconnection, application and interconnection fees, insurance requirements, and operational requirements. Many project proponents complained about the length of time required for getting projects approved. Seventeen projects—more than 25% of the case studies—experienced delays greater than 4 months. Smaller projects often faced a lack of uniform standards, procedures, and designated utility points of contact for determining a particular utility's technical requirements and review processes. This led to prohibitively long and costly approvals. Proponents of larger projects sometimes formed the perception that the utility was deliberately dragging out negotiations. Application and interconnection fees were frequently viewed as arbitrary and, particularly for smaller projects, disproportionate. Utility-imposed operational requirements sometimes resulted in direct conflicts between utility and customer needs. For example, utilities often ask to control the facility so that, among other things, they can shut down the facility for safety purposes during power outages. This requirement would preclude the customer using the facility for emergency backup power—a key advantage of distributed generation.

Regulatory barriers were principally posed by the tariff structures applicable to customers who add distributed generation facilities, but included outright prohibition of "parallel operation"—that is, any use other than emergency backup when disconnected from the grid. The tariff issues included charges and payments by the utility and how the benefits and costs of distributed generation should be measured and allocated. Also, several project proponents reported being offered substantial discounts on their electrical service from the utility as an inducement not to build their planned distributed generation facilities.

Backup or standby charges were the most frequently cited rate-related barrier. Unless distributed generation customers want to disconnect completely from the grid and invest in the additional equipment needed for emergency backup and peak needs, they will be depending on the utility to augment their onsite power generation. This is a principal reason for interconnection, but it can also impose a burden on the utility because it may be required to maintain otherwise unnecessary capacity to meet the distributed generation customers' occasional added demand. Charges for these services varied widely. Standby charges ranged from $53.34/kW-yr to $200/kW-yr for just the case study projects located in the state of New York, for example. Project proponents often felt that the charges were excessive and that utility concerns could be addressed through scheduling and other procedures. Other frequently disputed charges included transmission and distribution demand charges and exit fees (charges to disconnecting customers that will no longer be supporting the payoff of the utility's sunk or "stranded" cost in generation equipment). Furthermore, the charges imposed often do not reflect the benefits to the grid the distributed generation might provide.

For small customers, net metering (where the meter runs backwards when power is being contributed to the grid—prescribed by law in about 30 states) provides credit at the retail rate. For large distributed generation facilities, however, the typically much-lower wholesale rate paid (or uplift charge assessed for using transmission and distribution systems to sell power to third parties in deregulated states) was often seen as unfair, especially if no credit was given for on-peak production. Project proponents felt that utilities were not giving them credit for their contribution to helping meet peak demands.

Environmental permitting was not a focus of this report, but many project proponents did cite it as a regulatory barrier. Inconsistent requirements from state to state and site to site were frequently listed as barriers. The length of time and cost of testing to comply with air quality standards was often seen as burdensome and unfair. Proponents also felt that permitting processes should give credit for the replacement of older, more polluting, facilities by the distributed generation projects (e.g. a gas turbine instead of a central station coal-fired plant) as well as the increased efficiencies, for example, of a combined heat and power facility.

The case studies identified a wide range of barriers to grid interconnection of distributed generation projects. These barriers unnecessarily delay and increase the cost of what otherwise appear to be viable projects with potential benefits to both the customer and the utility system. They sometimes even kill projects. There are, however, several promising trends. Uniform technical standards for interconnection are being developed by the Institute of Electrical and Electronics Engineers. Individual state regulatory agencies are adopting rules to address barriers to distributed generation. In 1999, the New York and Texas public utility commissions adopted landmark rules on interconnection, and ambitious proceedings on distributed generation are now underway in California. Individual utilities have adopted programs to promote distributed generation. These trends indicate the potential for resolution of barriers to interconnection of distributed generation projects.

Much more must be done in order to create a regulatory, policy, and business environment which does not create artificial market barriers to distributed generation. The barriers distributed generation projects face today go beyond the problems of technical interconnection standards or process delay, which are more immediately apparent to the market. They grow out of long-standing regulatory policies and incentives designed to support monopoly supply and average system costs for all ratepayers.
In the present regulatory environment, utilities have little or no incentive to encourage distributed power. To the contrary, regulatory incentives drive the distribution utility to defend the monopoly against market entry by distributed power technologies. Revenues based on throughput and system average pricing are optimized by keeping maximum loads and highest revenue customers on the system. But, as in any competitive market, those are the customers that gain the most by switching to new, more economic, efficient, or customized power alternatives. In addition, current tariffs and rate design as a rule do not price distribution services to account for system benefits that could be provided by distributed generation.

Resolution on a state-by-state basis will not address what may be the biggest barrier for distributed generation—a patchwork of rules and regulations which defeat the economies of mass production that are natural to these small modular technologies. Although regulatory proceedings and legal challenges eventually would resolve most of the identified barriers, national collaborative efforts among all stakeholders are necessary to accelerate this process so that near-term emerging markets for the new distributed generation technologies are not stymied.

Distributed generation promises greater customer choice, efficiency advantages, improved reliability, and environmental benefits. Removing artificial barriers to interconnection is a critical step toward allowing distributed generation to fulfill this promise

A Ten-Point Action Plan For Reducing Barriers to Distributed Generation

Reduce Technical Barriers

(1) Adopt uniform technical standards for interconnecting distributed power to the grid.

(2) Adopt testing and certification procedures for interconnection equipment.

(3) Accelerate development of distributed power control technology and systems.

Reduce Business Practice Barriers

(4) Adopt standard commercial practices for any required utility review of interconnection.

(5) Establish standard business terms for interconnection agreements.

(6) Develop tools for utilities to assess the value and impact of distributed power at any point on the grid.

Reduce Regulatory Barriers

(7) Develop new regulatory principles compatible with distributed power choices in both competitive and utility markets.

(8) Adopt regulatory tariffs and utility incentives to fit the new distributed power model.

(9) Establish expedited dispute resolution processes for distributed generation project proposals.

(10) Define the conditions necessary for a right to interconnect.