

COMMENT

THE LEGAL IMPEDIMENTS TO DISTRIBUTED GENERATION

I. INTRODUCTION

Distributed generation¹ (DG) is modular electric generation usually sited near the point of use.² Recent advances³ in DG technology have refocused national debate from feasibility to implementation. DG could improve electricity distribution systems by, *inter alia*, better managing load, reducing transmission degradation, more proficiently expanding capacity, and more extensively utilizing combined heat and power capabilities.⁴ This new focus demands policy goals to guide subsequent technology advancements.⁵ DG raises questions of whether existing legal structures can address both ownership and regulatory issues. This discussion, then, will summarize current debates over implementation and suggest an analytical framework for that debate.

One of the Bush Administration's first acts was to define its goals for the future of the nation's energy system, including an emphasis on clean and diverse generation.⁶ Administration recommendations praised prospective DG load

1. The concept of distributed generation is also referred to as "distributed power," "distributed energy," et. al., each nomenclature having slightly different implications. This article will maintain reference to "distributed generation" nomenclature.

2. Many governments and organizations have tried to define DG with wide-ranging results. The California Energy Commission (CEC), for instance, defined DG as stationary applications "smaller than 50 MW of net generating capacity, the Energy Commission's power plant siting jurisdiction threshold." Further, the Commission explains that DG includes "generating technologies such as diesel engines, fuel cells, small and micro gas turbines, solar (photovoltaic) PV, and wind turbines, and may be combined with electric storage technologies such as batteries and flywheels," and that DG "may be owned by electric or gas utilities, by industrial, commercial, institutional or residential energy consumers, or by independent energy producers," CALIF. ENERGY COMM'N, DISTRIBUTED GENERATION: CALIFORNIA ENVIRONMENTAL QUALITY ACT REVIEW AND PERMIT STREAMLINING 10 (Dec. 2000) [hereinafter CEC, PERMIT STREAMLINING REPORT], available at <http://www.energy.ca.gov/distgen/reports/reports.html>.

3. Francis H. Cummings & Phillip M. Marston, *Paradigm Buster: Why Distributed Power Will Rewrite the Open Access Rules*, PUB. UTIL. FORT., Oct. 15, 1999, at 22, 25. Two illustrations in this article graphically depict distributed generation's technological progression over the last five years in efficiently "miniaturizing" both size and cost. The article goes on to suggest that, as the system adapts to the realities of DG, the new technology's size and cost should shrink further still.

4. See generally footnotes 6-10 and accompanying text.

5. If society seeks individual energy independence, for instance, science would be able to concentrate its efforts on accommodating the island generation market. On the other hand, if society wishes only to increase the efficiency of the existing interconnected system, then science could target transition technology to allow for new forms of load management and interactivity.

6. "A sound national energy policy should encourage a clean and diverse portfolio of domestic energy supplies." NATIONAL ENERGY POLICY DEVELOPMENT GROUP, *Nature's Power, Increasing America's Use of Renewable and Alternative Energy*, in RELIABLE, AFFORDABLE, AND ENVIRONMENTALLY SOUND ENERGY FOR AMERICA'S FUTURE 6-1, (2001), available at <http://www.whitehouse.gov/energy/>. Vice President Dick Cheney headed the National Energy Policy Development Group that created this report, which was released on May 17, 2001. In a letter to the President introducing the task force's report, Vice President Cheney

management improvements, reduced transmission degradation, capacity creation, and combined heat and power.⁷ Benefits noted by others include improved power quality and reliability,⁸ diminished concern for upgrading and maintaining certain sectors of transmission lines,⁹ and increased national security through redundant systems.¹⁰ Some go so far as to suggest that DG may expand and diversify the nation's fuel source portfolio.¹¹

DG goals and benefits also align with calls for responsible deregulation.¹² Though customer choice was the focus of deregulation debates, California's 2000 energy crisis heightened the need for a smooth transition to competition. A smoother, and presumably slower, transition to deregulation should allow for increasing reliability while bringing more meaningful changes in customer choice and consumer service than existing deregulation efforts.¹³ DG appears as an emerging component in the nation's energy policy. Market forces may encourage development, but regulation may determine when and if the market is afforded the opportunity to decide the issue.

summarized the balance between "reliable energy and a clean environment" necessary to achieve an expected standard of living. He asserted that the path to striking that balance lies in modernizing conservation efforts and the nation's energy infrastructure while increasing energy supplies and the security thereof. *Id.* at cover letter.

7. *Id.* at 6-9, 6-10.

8. Thomas F. Armistead, *Distributed Generation: Rolling Blackouts Rekindle Faith in Placing Generation Near Demand*, ENGINEERING NEWS-RECORD, July 1, 2002, available at <http://enr.construction.com/features/powerIndus/archives/020701.asp>. The article anecdotally explains DG's appeal to modern business with "microprocessor-heavy loads," due to increasing need for quality and reliability.

9. See generally Energy Info. Admin., *Upgrading Transmission Capacity for Wholesale Electric Power Trade*, DEP'T OF ENERGY (March 4, 2002) at http://www.eia.doe.gov/cneaf/pubs_html/feat_trans_capacity/w_sale.html. The Energy Information Administration document is a survey of the electric industry's transmission predicament anticipated by F.E.R.C. Orders 888, 889.

10. Decentralized production, fewer long-distance transmission lines and substations, and a more diverse fuel source set would drastically reduce the electricity industry's vulnerability. See generally NATIONAL RESEARCH COUNCIL, *MAKING THE NATION SAFER: THE ROLE OF SCIENCE AND TECHNOLOGY IN COUNTERING TERRORISM* Ch. 6 (National Academy Press 2002), available at <http://www.nap.edu/books/0309084814/html/>.

11. In addition to allowing generation to utilize more renewable resources, some have suggested that DG will provide for alternative uses and markets for fossil fuels. For example, "natural gas seems particularly well suited to power residential fuel cells." Regina R. Johnson, *Fuel cells: White Knight for Natural Gas?*, PUB. UTIL. FORT., March 15, 2000, at 22, 24 [hereinafter *Fuel Cells*].

12. Compare Joseph P. Tomain, *The Past and Future of Electricity Regulation*, 32 *Env'tl. L.* 435 (2002) (The author posits that the California energy crisis, Sept. 11 terrorist attacks, and Enron collapse "may slow restructuring, but restructuring should continue as a matter of sound industrial policy.") with Gary C. Bryner, *The National Energy Policy: Assessing Energy Policy Choices*, 73 *U. COLO. L. REV.* 341 (2002) (Though this author has reservations about the nation's energy policy, he insists that a better policy "can largely be market-driven and need not be managed by government regulators."). See also Energy Information Administration, *Status of State Electric Industry Restructuring Activity as of October 2002* (last modified Oct. 4, 2002), at http://www.eia.doe.gov/cneaf/electricity/chg_str/regmap.html.

13. DG applications may actually bring the electricity industry's development full circle. Naturally, the first generators were local and marketed to businesses. See generally DAVID MORRIS, *SEEING THE LIGHT* 10 (Institute for Local Self-Reliance 2001). This is likely to be how DG comes to the fore, first through industry's growing need for higher quality power on a more reliable basis.

II. DISCUSSION

Impediments to DG implementation remain significant. Emissions and interconnection issues are often mentioned high on the list. However, the burden of transition costs and “turf protection” by utilities may be more significant. Some DG applications¹⁴ are so different from current generation and distribution technologies that they simply fall outside of the existing regulatory system for pollution control.¹⁵ With traditional fossil fuel and nuclear DG technologies, on the other hand, both the economic and environmental issues could have greater implications. Additionally, less prominent impediments may present significant hurdles beyond emissions and interconnection. Building codes become important because the combined heat and power¹⁶ generation capabilities of DG applications are so integral to marketing these products’ cost efficiency.

A. Emissions

Two questions define the DG emissions debate: First, what emissions standards will apply to DG units? Second, will some types of applications be exempt? Each question is primarily concerned with entry into the market and each has the potential to eventually exclude certain DG applications from the market.

1. State trends

Increased demand for electricity¹⁷ feeds pressure for emissions reduction. One recent example is Texas’ Senate Bill 5,¹⁸ which requires public buildings in

14. This article’s reference to “DG applications” is an attempt to remind readers that, unlike a high-voltage connection to an end-user, the on-site “application” of DG technologies is integral to full consumer benefits from DG.

15. A hydrogen fuel cell, for instance, creates only electricity, heat, and water. Such virtually emissions-free technology is difficult to categorize for air quality permitting. Air quality regulators, on the other hand, are unwilling to allow the units to circumvent procedural permitting requirements that other DG technologies are required to satisfy.

16. Combined heat and power (CHP) capabilities of DG applications are sometimes referred to as co-generation, but CHP terminology seems more suitable. While some DG applications, such as some larger natural gas microturbine units, use excess heat to create electricity, the more common configuration offers the ability to use the excess heat for climate control, water heaters, etc.

17. The Energy Information Administration’s Annual Energy Outlook forecasts:

From 2000 to 2020, 355 gigawatts of new generating capacity (excluding cogenerators) is expected to be needed to meet growing demand and to replace retiring units . . . Of the 185 gigawatts of new capacity expected by 2010, 10 percent is projected to replace retired oil- and natural-gas-fired steam capacity . . . [Of the 355 gigawatts needed by 2020] 88 percent is projected to be combined-cycle or combustion turbine technology, including distributed generation capacity, fueled by natural gas. Both technologies are designed primarily to supply peak and intermediate capacity, but combined-cycle technology can also be used to meet baseload requirements.

ENERGY INFO. ADMIN., DEP’T OF ENERGY, ANNUAL ENERGY OUTLOOK 2002 WITH PROJECTIONS TO 2020 73 (2001), available at <http://www.eia.doe.gov/oiaf/aeo/>.

18. S.B. 5, 77th Leg. (Tex. 2001). The bill, popularly known as the Texas Emissions Reduction Plan (TERP), adds Chapters 386, 387, 388, and 389 to Subtitle C, Title 5, of Texas’ Health and Safety Code. The TERP requires a 5% per year reduction for five years, beginning in January of 2002. Notably, school buildings are exempt from this requirement.

the twenty most populous counties to consume less electricity in the name of air-quality improvement and reduced fuel consumption.¹⁹ But Senate Bill 5 offers no specific guidance on how to consume less electricity, nor does it provide any funding for its mandate.²⁰ As a result, many of the local governments in these counties are turning to DG technology to meet the mandate.²¹

While traditional "green"²² DG technologies seem to best meet the law's goals, on-site fuel cell and natural gas microturbine appliances would lower consumption to mandated levels. These on-site technologies lead to lower loads by reducing the energy lost in transmission and, if utilized as such, by the technologies' combined heat and power capabilities.²³ The reduction would be most significant if compliance is measured at the central generation site, rather than at the facilities where the law focuses.²⁴

The mandate essentially excludes diesel fuel generators from Texas' DG market, because dispersing emissions through distributing traditional fossil fuel generators goes against the policy behind providing grants to reduce diesel emissions.²⁵ Texas has also restricted diesel generators through recent public

19. Section 1 of Texas Senate Bill 5 sets out the law's intent as follows:

(a) It is the intent of the legislature to give the Texas Natural Resource Conservation Commission additional tools to:

- (1) assure that the air in this state is safe to breathe and meets minimum federal standards established under the federal Clean Air Act (42 U.S.C. § 7407);
- (2) develop multipollutant approaches to solving the state's environmental problems; and
- (3) adequately fund research and development that will make the state a leader in new technologies that can solve the state's environmental problems while creating new business and industry in the state.

Further, the text of the new sections of Title 5, Section 386.052, titled "Commission Duties," elaborates on the law's intent:

(b) Appropriate commission objectives include:

- (1) achieving maximum reductions in oxides of nitrogen to demonstrate compliance with the state implementation plan;
- (2) preventing areas of the state from being in violation of national ambient air quality standards; and
- (3) achieving cost-saving and multiple benefits by reducing emissions of other pollutants.

20. As Senate Bill 5 is an integral part of Texas' clear air plan, the state's failure to fund this legislation has brought threats of federal sanctions, including a federal implementation plan.

21. See generally Knight Ridder Tribune Bus. News, *Cutting-Edge Firms Can Help Texas Counties Meet Energy Savings Law*, SAN ANTONIO EXPRESS-NEWS, Oct. 10, 2001. The article points out the fact that, though none are sure exactly to what penalties local governments might be subject should they be unable or unwilling to comply, the current national atmosphere of aversion to energy imports leaves local officials loathe to oppose the new laws' goals.

22. "Green" meaning no-emission technologies such as photovoltaic and wind generation.

23. See generally U.S. Combined Heat and Power Ass'n, *What is CHP Fact Sheet*, at <http://www.ncmw.org/uschpa/aboutus.html> (last visited Nov. 19, 2001). The fact sheet gives a brief explanation of what combined heat and power is and how it works.

24. Though a DG customer may not have a significant drop in on-site electricity use, consumption measurement is more effective if taken at the central generation facility because it would better reflect reductions in transmission losses. Where a DG application utilizes combined heat and power capabilities, on the other hand, measurement both on site at the central generation facility might show significant reductions in electricity use.

25. In the language Senate Bill 5 added to Title 5 of Texas' Health and Safety Code:

health law amendments requiring DG emissions standards to comply with those of central power stations.²⁶ These amendments to Texas' Administrative Code may also adversely affect some microturbine applications.²⁷

Another example of the interrelationship of concern about demand and emissions can be drawn from California. Despite compelling energy demands, air quality remains a high priority. California's Senate Bill 1298²⁸ required the California Air Resources Board (CARB) to develop uniform emissions standards for DG applications.²⁹ Senate Bill 1298 arguably promoted DG by creating a standard certification program for such units, rather than requiring that each be sited individually,³⁰ but also required incorporation of "best performance" standards, which may present a moving target for DG proponents.³¹ Further, the law requires "best available" central power station emission equivalence as soon

Sec. 386.051(b) Under the plan, the commission, the comptroller, and the council shall provide grants or other funding for:

(1) the diesel emissions reduction incentive program established under Subchapter C, including for infrastructure projects established under that subchapter.

26. 30 TEX. ADMIN. CODE § 106.512 (West 2001).

27. Though some microturbines do not meet current central generation emission standards, microturbine industry leader Capstone Turbine Corp. claims the following capabilities for its flagship product, a 30 kW generator that sells for \$30,000-35,000:

Emissions of nitrogen oxides (NO_x) on gaseous fuels are less than 9 ppmv @ 15% O₂.

Emissions of carbon monoxide and hydrocarbons are 40 ppmv and 9 ppmv respectively . . .

After-combustion emissions controls are not required to achieve these numbers, which are comparable to Best Available Control Technology (BACT) for much larger gas turbines using post-combustion controls such as selective catalytic reduction . . . And long-life tests have shown no degradation in emissions performance over time.

Capstone Turbine Corp., *Official website, Technology page* at <http://www.capstoneturbine.com/technology/techBenUltra.asp> (last visited Oct. 15, 2002). The website also provides "White Papers," comparing its products' emissions with other natural gas microturbines. Capstone Turbine Corporation, *Capstone Low Emissions MicroTurbine Technology White Paper* at <http://www.capstoneturbine.com/technology/whitepapers.asp> (last modified March 6, 2000).

28. Codified at CAL. HEALTH & SAFETY CODE §§ 41514.9, 41514.10 (West Supp. 2001).

29. The CARB adopted the Distributed Generation Certification Program on Sept. 20. Cal. Admin. Code tit. 17, § 94200, et. seq. (2002).

30. Section one of California Senate Bill 1298 outlines the legislature's declared reasons for the new law:

(a) Distributed generation can contribute to helping California meet the energy requirements of its citizens and businesses.

(b) Certain distributed generation technologies can create significant air emissions.

(c) A clear set of rules and regulations regarding the air quality impacts of distributed generation will facilitate the deployment of distributed generation.

(d) The absence of clear rules and regulations creates uncertainty that may hinder the deployment of distributed generation.

(e) It is in the public interest to encourage the deployment of distributed generation technology in a way that has a positive effect on air quality.

(f) It is the intent of the Legislature to create a streamlined and seamless regulatory program, whereby each distributed generation unit is either certified by the State Air Resources Board for use or subject to the permitting authority of a district.

2000 Cal. Adv. Legis. Serv. 741 § 1 (Deering).

31. CAL. HEALTH & SAFETY CODE § 41514.9(b) (Deering 2000).

as possible³² and allows local air districts to establish more stringent emission standards.³³

More recently, California has enacted significant incentives for renewable distributed generation. The California Renewables Portfolio Standard Program³⁴ requires investor owned utilities and direct access providers to increase renewable energy use by at least 1% per year until 2017, when 20% of their retail electricity sales must come from renewable resources.³⁵ On the heels of that aggressive program, the state indefinitely extended a net metering incentive program for solar and wind systems.³⁶ The net metering legislation also increased the eligible system size for the program from 10kW to 1MW. California also recently began offering a significant tax credit for solar energy systems.³⁷

The span of environmental legislation associated with DG suggests that California's legislature is relatively unwilling to sacrifice air quality or control over other environmental concerns while promoting DG as one potential solution to the state's long-term energy needs. Strong lobbying efforts are attempting to keep it that way. One California Public Interest Research Group (CalPIRG) report called for, among other things, "stringent emissions and efficiency-based standards for all distributed generation units operated in California."³⁸ By far the largest numbers of DG units in California are diesel fueled, in part because the most captive DG customers, those required to install emergency back-up units, are unable to utilize natural gas microturbines for emergency backup power.³⁹

32. CAL. HEALTH & SAFETY CODE § 41514.9(a) set the deadline for the CARB to establish the DG emissions certification program, but did not give a specific date by which it expects DG applications to be subject to the standards of central generating plants.

33. CAL. HEALTH & SAFETY CODE § 41514.9(c).

34. S.B. 1078, 2nd Sess. (Cal. 2002).

35. California utilities purchase between 5 and 10 percent of electricity they provide from renewables now. Notably, California includes only solar, wind, geothermal and biomass as renewable sources, not hydroelectric like most states.

36. A.B. 58, 2nd Sess. (Cal. 2002).

37. S.B. 17, 2nd Sess. (Cal. 2001). The Legislative Counsel's Digest for California Senate Bill 17 explains that:

This bill would, under both laws, allow until January 1, 2006, a credit in an amount equal to the lesser of (a) either 15% or 7 1/2 % of the net cost paid or incurred by a taxpayer during the taxable year for the purchase and installation on property in this state of a solar energy system for the production of electricity, or (b) the applicable dollar amount per rated watt of generating capacity of that same system, as provided.

Id.

38. See generally CAL. PUB. INTEREST RESEARCH GROUP, THE GOOD, THE BAD, AND THE OTHER: PUBLIC HEALTH AND THE FUTURE OF DISTRIBUTED GENERATION 26 (2001), available at <http://calpirg.org/reports>. Fellow DG advocates, the Coalition for Clean Air, assisted CalPIRG in creating this report.

39. The CEC PERMIT STREAMLINING REPORT, *supra* note 2, at 37, explains that the California Building Code "requires that certain building classifications provide standby or emergency power when the normal electrical supply system is interrupted." Buildings usually subject to such requirement include "places of assembly where artificial light is required for safe exiting and panic control in buildings subject to occupancy by large numbers of persons, such as hotels, theaters, sports arenas, health care facilities and similar institutions." Emergency back-up units for these facilities must "be fueled by an on-premises fuel supply of sufficient storage capacity to fully power required electrical equipment for a specified number of hours." This

Still, the CalPIRG report advocated emissions standards for DG applications to be “as clean or cleaner than the cleanest central power plant technology,”⁴⁰ including requiring “emission-control equipment for diesel generators used for emergency back-up power supply.”⁴¹

These state goals concerning DG emissions requirements appear to coincide with stated federal goals. The trends in state law and policy are to establish “greener” energy sources, such as Texas’ intention to “assure that the air in this state is safe to breathe,”⁴² and California’s “solar energy systems” tax credit.⁴³ State trends also follow the national policy to achieve energy goals, in part, through conservation, as Texas’ Senate Bill 5 mandates. These states are also careful to ensure that their energy systems remain reliable while adding DG technology to the states’ energy portfolios.

2. Are DG specific emissions standards needed?

State and national trends for setting emissions standards, then, seem aimed toward establishing distinct standards for DG applications, allowing them, for the most part, to be permitted by unit rather than by site, and encouraging, sometimes through incentives and sometimes through mandates, implementation of the “greenest” DG applications. Perhaps even in the near term, all DG emissions will have to meet at least the same standards as central generators, and possibly stricter standards.

Adoption of strict standards is problematic. Small units that are “green” enough may be *de facto* exempt from these standards and initially advantaged.⁴⁴ Strict emissions standards are likely to exclude diesel-fueled DG applications from the market entirely, and sooner rather than later. If the maturation of fuel cells outpaces that of natural gas microturbines,⁴⁵ it could also put the natural gas DG proponents at a significant disadvantage⁴⁶ in certain sectors of the developing DG marketplace.⁴⁷ As for DG implementation as a whole, however, emissions standards may pose an insignificant barrier. They may even be a boon to markets for certain DG applications.

limits natural gas microturbines because fuel “delivery might be interrupted by the same emergency, which caused the normal electrical supply system to fail, such as an earthquake.”

40. CalPIRG, *THE GOOD, THE BAD, AND THE OTHER*, *supra* note 38, at 5.

41. *Id.* at 6.

42. S.B. 5§1(a)(1) (Tex. 2001).

43. S.B. 17, 2nd Sess. (Cal. 2001).

44. On the other hand, many of the greenest applications are the most expensive. MORRIS, *SEEING THE LIGHT*, *supra* note 13, at 51. Perhaps, then, the exemption only serves to level the playing field.

45. *Small is Powerful*, *The Engineer*, Aug. 30, 2002 at 26. This article explores the cutting edge of distributed generation technology, including discussion of a Rolls-Royce produced fuel cell-gas turbine hybrid set for commercial demonstration (of a 250kW unit) in 2005.

46. Natural gas would be at a disadvantage, namely in geographic regions already lacking in natural gas infrastructure. As central generators are not going away anytime soon, however, this may not be a significant blow to natural gas markets, especially in light of the fact that natural gas may have a healthy role in marketing fuel cell applications. See generally *Fuel cells*, *supra* note 11.

47. Though investor confidence in DG has waxed and waned considerably in the last few quarters, there are still substantial drivers making the DG market viable. See generally Phillip J. Deutch, *Energy Tech Chronicles: Will Bust Turn to Boom?*, PUB. UTIL. FORT., Feb. 15, 2002 at 38.

3. The toll of transition costs

An underlying financial struggle that may impede DG implementation has begun. As previously mentioned, the bulk of DG applications in use are diesel fueled. Even if those companies producing and distributing diesel-fueled DG appliances are willing to adapt to new technologies, they will want to limit investment losses. Because this financial struggle is among DG market participants – traditionally DG advocates – it may be the most detrimental aspect to arise out of the debate over emissions standards.

The DG implementation impediments to follow are less discriminatory of DG applications' fuel sources, but no less likely to create transition costs issues. However, the underlying financial struggles not associated with emissions are generally between utilities and DG proponents. Thus, the impediments they create are more easily defined and addressed by utilities and DG proponents alike.

Still, the emissions impediment to DG implementation seems smaller after full consideration than it might have at first glance. The direction of the debate is clear: there will be no air quality compromise to facilitate DG implementation. DG proponents, then, have a good idea about what emissions goals they must meet to effectively penetrate the market. This leaves for DG investors only a debate over which technologies will find the most success in a changing regime.

B. Interconnection

Resolution of interconnection issues will not necessarily favor one fuel source for DG applications over another nor differ by region. Most of the onus, in fact, is on utilities to decide whether to oppose or embrace DG.⁴⁸ General utility resistance, in fact, has led state and federal regulators to propose DG implementation schemes that address technology, time, and contract standards. Critical interconnection issues are technology requirements, demand charges and net metering, and DG application size.⁴⁹ Underneath these issues is the question of who will bear the cost of transition to the type of open-market system DG might create.

1. Transition costs revisited

Implementation costs loom as a reason for utility resistance to DG – a resistance that may be manifested in opposition to interconnection. Purchasing and installing a DG appliance can be quite costly, as can fueling and maintaining DG applications.⁵⁰ To make their purchase more feasible, DG customers are

48. Obviously, debate remains over whether DG should be the mode by which the nation achieves the goals it has set out in the national energy policy recommendations, or whether the goals are proper, for that matter. Those debates, however, must be reserved for another discussion.

49. One Department of Energy study classified interconnection barriers into three divisions: technical, business-practice, and regulatory. See generally NAT'L RENEWABLE ENERGY LAB., DEP'T OF ENERGY, MAKING CONNECTIONS: CASE STUDIES ON INTERCONNECTION BARRIERS AND THEIR IMPACT ON DISTRIBUTED POWER PROJECTS 5 (May 2000) [hereinafter NREL, MAKING CONNECTIONS], available at <http://www.nrel.gov/docs/fy00osti/28053.pdf>.

50. See generally MORRIS, SEEING THE LIGHT, *supra* note 13, at 49-57.

compelled to offset the initial costs, often through interconnection.⁵¹ In the short term, these offsets may be adverse to the interest of the utilities to which a DG customer might wish to connect.

Interconnection studies, a series of utility determinations of what effect the connection of a specific generator might have on the grid, are an immediate cost. The studies require site- and technology-specific inspections at various intervals of installation.⁵² There is also a cost in planning to accommodate the type of standby service⁵³ the DG customer will require and determining how it will affect the utility's distribution.⁵⁴ One point of contention between DG proponents and utilities concerns what share of these costs DG customers will be assessed.

Transition to a deregulated market may also create stranded costs. Most states are deciding to allow 100% recovery of such stranded costs.⁵⁵ DG customers may be able to avoid paying for much of this recovery through typical electricity bill charges because they will be purchasing a smaller percentage of their power from the grid. If DG is prevalent in the deregulated market, then the non-DG customers may have to pay a disproportionate share of the stranded cost recovery.

Interconnection may eventually benefit the utilities. Utilities are likely to be able to claim the capacity that DG units add to the grid. This will allow utilities to meet generation and transmission capacity obligations for a longer period with reduced costs of building new generation and transmission capacity.⁵⁶ Still, utilities expectedly remain unwilling to shoulder transition costs.

2. Interconnection resistance: Studies, fees and technological standards

Whether a DG customer is primarily served on site⁵⁷ or operates as a peak-

51. Interconnection allows for net metering, which earns the DG consumer wholesale rates for any electricity he sells to the grid. See generally STEVEN FERREY, *LAW OF INDEPENDENT POWER* § 4.27 (16th ed. 2000).

52. In addition to inspecting the equipment to be used and the site at which the DG application will be installed and interconnected, interconnection studies also include the utilities' processing of a DG proponent's application and account, and planning for implementation.

53. The utility may have to provide the DG customer service that is: 1) supplementary, 18 C.F.R. § 292.101(b)(8), grid power supplied to augment self-generation; 2) backup, 18 C.F.R. § 292.101(b)(9), grid power supplied to a usually self-generated customer who is experiencing an unscheduled outage; 3) interruptible, 18 C.F.R. § 292.101(b)(10), grid power that is supplied subject to conditional stoppage; or 4) maintenance, 18 C.F.R. § 292.101(b)(11), grid power supplied to a usually self-generated customer who is experiencing a scheduled outage.

54. If the interconnected DG customer is not obliged to remain connected or operating with any degree of consistency, for instance, the utility will still have to account for that customer's full service because the utility cannot avoid its obligation to provide reliable service to its rate base.

55. See generally Energy Information Administration, *Status of State Electric Industry Restructuring Activity as of October 2002* (last modified Oct. 4, 2002), at http://www.eia.doe.gov/cneaf/electricity/chg_str/regmap.html.

56. See generally Cummings & Marston, *Paradigm Buster: Why Distributed Power Will Rewrite the Open Access Rules*, *supra* note 3, at 24.

57. With primary-use applications, these DG proponents might also choose to reap the combined heat and power benefits that most DG applications offer, thus further offsetting costs. Still, they would require

shaving emergency backup self-generator, he is likely to require interconnection. This is true even of those DG customers so concerned with power quality and reliability⁵⁸ that they purchase DG appliances for both primary and emergency backup power.⁵⁹ Interconnection, then, is essential for widespread development of the DG market. Once interconnected these customers, especially the latter, may wish to offset initial DG costs by selling excess power back to the grid.⁶⁰

Many utilities have discouraged DG through interconnection bureaucracy. Many utilities have demonstrated reluctance to establish technical standards for interconnection and even in designating a contact person with whom a DG customer might speak.⁶¹ Moreover, the industry as a whole has no incentive to create uniform interconnection standards. A DG customer planning multiple sites and requiring interconnection with more than one utility could face an entirely different set of standards from each utility.⁶²

Merely establishing the interconnection is not a DG customer's final hurdle. Utilities continue the struggle against further DG implementation through unique demand charges⁶³ and net metering fees and discounts.⁶⁴ Employment of net metering technology creates issues of its own, such as synchronization, power flow tracking and assuring frequency harmonization.⁶⁵ The burden for resolving most of these issues rests on the utilities – another justification to avoid DG expansion.

The National Renewable Energy Laboratory (NREL) MAKING CONNECTIONS study⁶⁶ was especially critical of utilities' uses of demand charges to deter DG, because the Public Utilities Regulatory Act (PURPA) was designed to prevent such exploitation.⁶⁷ The study was also critical of duplicitous charges,⁶⁸ and price hiking if the DG proponent went forward with the project

interconnection for emergency backup power.

58. See generally James Hall, *The New Distributed Generation*, TELEPHONY, Oct. 1, 2001. The article discusses how microprocessor technologies, an obviously continually growing sector of customer-base needs, have 99.9999% reliability requirements and how those requirements are effecting deregulation and DG demand.

59. Few DG proponents are willing to totally sacrifice either power quality or reliability, requiring interconnection to ensure against the loss of one or the other. Those most concerned with quality and reliability would require interconnection as third-tier insurance against power failure. See generally *id.*

60. At least twenty-nine states allow for net metering. FERREY, *supra* note 51.

61. For instance, one California DG advocate involved in the California Electric Commission's working group on interconnection said: "The utilities have just made you dance around and write a blank check and take up a lot of your time, and it's just been a very difficult process." Carl J. Levesque, *Distributed Generation: Doomed by Deployment Details?*, PUB. UTIL. FORT., Feb. 1, 2001, at 47, 49.

62. See generally *id.*

63. Fees a DG customer must pay for utilizing an interconnection to draw power from the grid. They may include standard demand rates charged other utility customers.

64. Net metering requires monitoring electricity flows to and from a DG customer, so that a utility might give credit for power supplied to the grid and charge for power drawn from the grid.

65. Cummings and Marston, *Paradigm Buster: Why Distributed Power Will Rewrite the Open Access Rules*, *supra* note 1, at 26.

66. See generally NREL, MAKING CONNECTIONS, *supra* note 49.

67. The Study also mentioned that the PURPA required reasonably priced backup charges. NREL, MAKING CONNECTIONS, *supra* note 49, at 23.

68. Some utilities, for instance, would split demand and backup charges in order to charge for each

after the initial quote.⁶⁹ The MAKING CONNECTIONS study also suggested that utilities' technologically inconsistent aversion to encouraging peak-shaving DG applications is because "[r]evenues based on throughput and system averaged pricing are optimized by keeping maximum loads and highest revenue customers on the system."⁷⁰ Therefore, unless a generation facility is at or near capacity, there is no incentive to encourage DG applications that reduce loads and create little, if any, immediate revenue.

3. Federal intervention

The interconnection issue became such an impediment to DG implementation that three national forces have emerged in the last half of 2002 with attempts to remedy the problem. First the National Association of Regulatory Utility Commissioners (NARUC) released model interconnection agreements and procedures to assist states that were trying to promote DG expansion.⁷¹ On the heels of that release, the Federal Energy Regulatory Commission (FERC) issued an advance notice of proposed rulemaking (ANOPR)⁷² that it would create national interconnection agreement and procedure standards. Both entities suggest that they are looking toward technical standards that they anticipate the Institute of Electrical and Electronics Engineers (IEEE) is on the verge of releasing.⁷³

The three entities have expressed a desire to work with one another. The ANOPR specifically mentions wanting to incorporate the NARUC standards wherever practical and both the FERC and the NARUC deferred to IEEE's technical expertise. But there is some question about whether the FERC's jurisdiction allows it to regulate this matter.⁷⁴ There is also question about how keen the states are to have the FERC interfere.⁷⁵ But the fact that these bodies are now so heavily involved indicates that the interconnection issue is highly solvable and well on its way out of the implementation debate limelight.

The ANOPR has divided the field of small generators into one category of 2 MW and smaller and another of between 2 MW and 20 MW. The interconnection procedures and agreements (IP and IA) proposed for the smaller category are akin to those used for similarly sized generators in Texas. The

separately, though they work in concert. *Id.*

69. *See generally id.* at 55-56.

70. *Id.* at 34.

71. Model Distributed Generation Interconnection Procedures and Agreement (2002), available at <http://www.eren.doe.gov/distributedpower/PDFs/0802dgiaipFinal.pdf>.

72. Advanced Notice of Proposed Rulemaking, Standardization of Small Generator Interconnection Agreements and Procedures (Aug. 2002) (No. RM02-12-000).

73. Steve Kalland, *IEEE Balloting Completed with 90 Percent Voting Affirmative*, Interstate Renewable Energy Council website, Sept. 29, 2002 at http://irecusa.org/articles/static/1/1033297769_987096450.html. The IEEE P157 Standard for Interconnecting Distributed Resources with Electric Power Systems is a consensus process with fairly balanced input from all interested parties.

74. The ANOPR makes a significant argument supporting FERC jurisdiction. It states that the rulemaking "would be applicable to all public utilities that own, operate, or control transmission facilities under the Federal Power Act."

75. *FERC Proposal Would Standardize Rules for Connecting Small Units*, Electric Util. Wk., Aug. 26, 2002 at 12.

proposed IPs and IAs for the larger category are based on those used in the Pennsylvania-New Jersey-Maryland Interconnection (PJM).

Both sets of proposed IPs and IAs focus on developing "a reasonable balancing of burdens" and lean in favor of smaller generators incurring less of the financial burden of DG implementation. Larger DG units that either sell off-peak excess power to the grid or require supplemental peak power create the greatest stranded cost potential. While the benefits of DG implementation will still take time to accrue, these cost barriers should encourage development of DG units small enough to allow for easier integration of their benefits into grid power management.⁷⁶ Smaller DG applications would naturally be more evenly dispersed, allowing for more T&D upgrade avoidance, and are more likely to be peak-shaving units. Smaller units also cause utilities fewer problems. Directing the costs of interconnection toward those technologies most likely to cause the most power management problems may be the best response to utilities' financial and technical concerns.

4. State trends

The FERC, the NARUC and the IEEE all acknowledge that their national standard efforts stem significantly from state efforts that preceded them. While the states' goals concerning interconnection have not been as clear as their goals concerning emissions, most states clearly want to encourage DG implementation. Four states now have DG interconnection rules.⁷⁷

California originally addressed the issue by recommending standards for, *inter alia*, interconnection fees, certification and testing procedures, and interconnection applications and agreements.⁷⁸ Perhaps the most significant standard the report set was for cost caps on interconnection studies. The report determined that the total cost of interconnection fees could not exceed \$1,400.⁷⁹ The CPUC approved the CEC's recommended \$800 minimum charge. This minimum may be the only fee a small DG proponent needs to pay if only requiring a "simplified interconnection."⁸⁰ The standards also established deadlines by which the initial and supplemental review must be complete,⁸¹ an inviting change for California DG proponents frustrated by open-ended

76. Both the MAKING CONNECTIONS study and the SUPPLEMENTAL RECOMMENDATIONS, *infra* note 78, suggested the compilation of an energy database for DG applications to give utilities accurate information to allow them to utilize the benefits of DG.

77. California, New York, Ohio, and Texas.

78. CALIF. ENERGY COMM'N, SUPPLEMENTAL RECOMMENDATION REGARDING DISTRIBUTED GENERATION INTERCONNECTION RULES (2000) [hereinafter CEC, SUPPLEMENTAL RECOMMENDATIONS], available at <http://www.energy.ca.gov/distgen/documents/index.html>. The California Public Utilities Commission (CPUC) approved the standards in December of 2000.

79. The CEC recommended a two-year trial period for the \$1,400 cap. *Id.* at 4.

80. In the context of the California interconnection standards, a simplified interconnection is essentially a connection to the grid, with certified equipment, of a non-exporting DG application with 11 kVA capacity or less that does not require a significant "in-rush" on start-up and that is being connected to a line with an approved configuration. See generally *id.* at Appendix A 46-52.

81. Section 3.1.3.3 of the Rule 21 Model Tariff, as recommended by the SUPPLEMENTAL RECOMMENDATIONS, mandates that supplemental reviews "be completed, absent any extraordinary circumstances, within 20 business days of receipt of a completed Application."

procedures of the recent past.

New York and Texas addressed the initial review issues a bit differently. Each state's utility regulating bodies adopted rules in December of 1999 that focused less on capping the costs of interconnection studies and more on who would bear the financial burden.⁸² The New York Public Service Commission (NYPSC) tried to encourage DG by wholly exempting certain DG applications from interconnection studies.⁸³ If installing a non-exempt appliance, however, a New York DG customer would have to pay for the full cost of a required interconnection study.⁸⁴ In Texas, on the other hand, the Public Utility Commission (TexPUC) exempted only the costs of interconnection studies for specified DG applications.⁸⁵ This allowed utilities to conduct studies if they so chose,⁸⁶ but forced them to pay for the studies for facilities as defined in the rules.

Allowing utilities to conduct interconnection studies whenever they feel one

82. For a more complete comparison of the New York and Texas rules in respect to initial review fees see generally NREL, MAKING CONNECTIONS, *supra* note 49, at 11.

83. In addition to exempting DG facilities of less than 10 kW from interconnection studies, the opinion adopting the interconnection requirements stated:

Staff's proposal states that the utility should initiate a coordinated interconnection review. While a full coordinated interconnection review "may" be needed to determine if any problems are created on the system, a full review "may not be needed if the total generation is less than 50 kVA on a single phase circuit or 150 kVA on a single distribution feeder."

N.Y.P.S.C. Opinion No. 99-13 at 8.

84. Responding to a suggestion by Capstone Turbine Corp. to require DG proponents to pay a \$10/kW "contribution" for the interconnection study, the NYPSC said, "As for the cost payment, the applicant is expected to pay the utility's cost of the electric system review that is not covered by the application fee. Capstone's fee proposal may or may not cover those costs and is therefore unworkable. This issue may be revisited in the future." *Id.* at 9-10.

85. Tex. P.U.C. Subst. R. 25.211(g) Pre-interconnection studies for non-network interconnection of distributed generation. A utility may conduct a service study, coordination study or utility system impact study prior to interconnection of a distributed generation facility. In instances where such studies are deemed necessary, the scope of such studies shall be based on the characteristics of the particular distributed generation facility to be interconnected and the utility's system at the specific proposed location . . .

(1) Distributed generation facilities for which no pre-interconnection study fees may be charged. A utility may not charge a customer a fee to conduct a preinterconnection study for pre-certified distributed generation units up to 500 kW that export not more than 15% of the total load on a single radial feeder and contribute not more than 25% of the maximum potential short circuit current on a single radial feeder.

86. The Texas PUC explained why it believed utilities should be allowed to conduct studies: [T]he commission declines to change the provisions of §25.211 or §25.212 in order to specify the types of applications for which no study should be conducted. The rule as proposed did not specify applications for which no study is required. Due to both the lack of information and inconsistent nature of responses regarding the necessity and components included in pre-interconnection studies, the commission finds that it is not currently possible to accurately determine those instances, if any, when interconnection studies are not necessary. One reason for the inconsistency in responses may be the utilities' lack of actual experience with DG. As experience with DG in Texas develops, unnecessary study requirements should be eliminated. Unnecessary study requirements and their associated fees have the potential to increase transaction costs and to become institutional barriers for DG developers and retail customers in Texas. These barriers could deprive customers of the benefits of DG.

Opinion adopting sections to Tex. P.U.C. Subst. R. Ch. 25, at 15

is prudent addresses the safety concerns that utilities often claim when requiring studies. Shifting the financial burden of interconnection studies assures the studies' necessity.⁸⁷ The New York approach disregarded the utilities concerns, but eliminated additional time delays that interconnection studies might present. The Texas approach, on the other hand, established a four-week time limit on studies.⁸⁸ Using either the New York or Texas approach, as with the CEC recommendations, the limited standardization of interconnection fees has relaxed some threshold barriers to DG implementation.

Similarly, standardization of technological requirements could ease DG implementation. The CEC report also recommended certification of interconnection technology. Just as advancing technology is allowing for the expansion of DG, it is improving the safety and compatibility of possible interconnection to the grid. Measures to ensure that DG customers install high-grade equipment will minimize costly personnel and property losses.⁸⁹ Some utilities, however, have voiced these concerns in justifying other interconnection obstacles. Similar to fee requirements, utilities could employ continually changing safety requirements for interconnection equipment, further extending and complicating DG installations. The report, seeing this as a potentially significant impediment to DG implementation, set some basic guidelines for interconnection equipment certification.

The CEC guidelines set out four categories of testing,⁹⁰ primarily drawing from procedures developed by several "nationally recognized testing laboratories."⁹¹ The recommendations allow a utility to require "some or all" of the tests in its own discretion. However, "[e]quipment tested and approved by an accredited, nationally recognized testing laboratory will be considered certified for interconnection purposes."⁹² These requirements may limit customer choice in interconnection equipment to those technologies that have been tested by accredited laboratories, but the choices remaining lead to an expedited and more predictable implementation process.

5. Size differentials

Even more than in the emissions debate, size permeates discussions about

87. If the utility did not have to pay any portion of interconnection study costs, it may demand more extensive testing than needed in order to discourage or delay DG installation.

88. Tex. P.U.C. Subst. R. 25.211(g)(2)(A).

89. Utilities express concerns that DG customers will install low-quality interconnection equipment that might lead to dangerous situations for utility service employees and expose equipment to unnecessary damage.

90. The four categories of testing are: 1) Type testing, consisting of "[t]ests performed on a particular model of a device to verify specific aspects of its design/construction and establish its performance," 2) Production testing consisting of "[t]ests performed on each device coming off the production line to verify certain aspects of its performance," 3) Commissioning testing consisting of "[t]ests performed during or at the completion of the DG installation to verify specific aspects of its performance and post-installation settings, and 4) Periodic testing, consisting of "[t]ests performed over the life of the DG unit to verify certain aspects of the unit's performance." CEC, SUPPLEMENTAL RECOMMENDATIONS, *supra* note 78, at 8.

91. The three testing laboratories referred to are Underwriter's Laboratories, the Institute of Electrical and Electronics Engineers, and the International Electrotechnical Commission. The requirements were also modeled after New York's attempts to standardize interconnection requirements. *Id.*

92. *Id.*

interconnection. New York, for instance, favors small DG units designed for on-site consumption. Texas tends to favor DG units large enough to export power. The focus, however, usually seems to be on balancing the burden of costs against the benefit to the system.

In establishing New York's interconnection rules, the Public Service Commission established special provisions to ease the interconnection requirements for DG applications below a 15 kVA threshold. The threshold was raised from its originally proposed 10 kVA level due to the lobbying efforts of some DG advocates. Discussing how high to raise the threshold, the commission said:

The non-utility parties have not made an adequate demonstration that potential customers that would install distributed generation units as large as 50 kVA cannot meet the requirements for larger units. No average homeowner would ever need such a large unit, and any commercial customer having need for so much electricity and being able to afford such a large unit would certainly have the ability to comply with the slightly more difficult requirements for larger units.⁹³

Notably, New York DG installations below the threshold size are exempt from application fees, thereby spreading the study costs to all utility customers. The New York PSC, therefore, seems to see small, non-exporting DG applications as the most beneficial to the system and its consumers.

In contrast, the Texas PUC formed its interconnection rules with provisions that encourage DG proponents to install exporting applications, though units small enough not to overburden the T&D system. The PUC's rationale:

The utility comments appear to concede that smaller non-exporting DG applications will not require extensive pre-interconnection studies. It also seems likely that these applications will be used to serve residential and small commercial customers. Requiring all customers to bear the costs of studies for these smaller applications will provide an incentive for DG development for residential and small commercial customers. The system-wide benefits that will accrue to all customers through the utilization of DG warrant having the utility bear the study costs for these small DG applications, recovering the costs in the rates of all customers of the distribution utility.⁹⁴

By encouraging exporting DG installation, the Texas rules are likely to lead to a resolution of net-metering issues. Increasing the number of exporting generators will bring the issue forward, while the benefits accruing from DG proliferation may reduce resistance.

While this is an example of how size influences other interconnection issues, size is not dispositive. Because benefits and complexities of DG applications vary with size, how utilities and regulators react to DG market developments may depend on which proponents press hardest and for what purposes those proponents want distributed power.

The preliminary rules that pilot states have implemented may affect the development of the market by influencing what sizes of DG applications survive. If that is the case, those rules will also have a significant effect on what benefits

93. N.Y. P.S.C. Opinion No. 99-13 at 5.

94. Opinion adopting sections to Tex. P.U.C. Subst. R. Ch. 25, at 22.

a DG infrastructure might offer, leading to the resolution of many other interconnection issues.

C. Ancillary issues

Though emissions and interconnection issues are the most substantial and defined DG implementation issues, there are a host of other legal impediments that DG proponents face.⁹⁵

For most DG applications, depending on size and fuel source, a proponent has to deal with various local jurisdictions to acquire permits that various entities require. Streamlining this process, then, is one major issue in promoting DG implementation. Each of the permitting processes, however, has its own issues. The lack of uniformity and understanding in building codes, for instance, has significant implications for the proliferation of residential DG installation.

1. Permit Streamlining⁹⁶

Because many DG applications fall outside the production levels most state commissions intended to regulate,⁹⁷ DG facilities may primarily be required to receive permits from local governing bodies as implemented by city or county planning departments, city or county building departments, and air districts. This can present a costly and time-consuming problem, especially for small-scale applications. However, abnormal for most bureaucratic labyrinths, this issue appears to be working itself out with little gnashing of teeth. It seems there is little debate over possible solutions, perhaps because there is little political pressure, from either DG proponents or utilities, as there are few costs to be allocated in streamlining the permitting process for DG applications.

The primary debate is over the role of state government in relation to its power over local jurisdictions. This is the essence of why permit streamlining is relatively a non-issue. Utilities do not oppose governmental bureaucratic impediments to non-utility DG proponents. If a utility wants to install a DG appliance of its own, that installation may not be subject to the same permitting process as it would be for a non-utility proponent. Moreover, utilities capitalize such expenses and earn on them. The remaining parties involved, namely governmental agencies and DG advocates, are interested in achieving a more efficient permitting process that promotes DG implementation. The struggle between state and local government is as old as the idea of government and does

95. In California, for instance:

The laws, regulations and policies guiding distributed generation facility siting include city and county general plans and zoning ordinances, the California Environmental Quality Act (CEQA) and CEQA Guidelines, the California Building Standards Code and local government amendments to this code, and State and local air quality laws and regulations.

CEC, PERMIT STREAMLINING REPORT, *supra* note 2, at 1.

96. The phrase "permit streamlining" is sometimes also used to describe streamlining a utility's interconnection application process. In this context, however, it is being used to describe governmental permitting processes.

97. The report explains that 50 MW of net generating capacity is the lower limit of the CEC's plant siting jurisdiction and that CPUC can only regulate DG applications that are owned by investor-owned utilities. CEC, PERMIT STREAMLINING REPORT, *supra* note 2, at 1.

not pose a significant obstacle to the issue's resolution.

What remains is to establish a logistically sound, efficient solution to streamline the permitting process. Forming effective solutions is never an easy task, but with a cooperative effort of DG advocates and governmental representatives, permit perplexity should not be a perpetual impediment to DG implementation. California is continuing to address the issue and is likely to be a trendsetter in the field. Market forces will dictate which states will follow and when. On the other hand, internal issues with individual permitting processes pose much more significant impediments.

2. Building Codes

Building codes again raise uniformity issues. Potential players in the DG market need some semblance of uniformity to cost-effectively produce and market combined heat and power applications of any size. Bringing about standards of at least regional proportions, however, is a lengthy and expensive effort. This is especially true in light of the varied forms of DG applications, and that diversity is specifically one of the basic goals and rationale behind DG implementation in the first place. The two-pronged inquiry, then, is how to promote cost-efficient product proliferation while properly promulgating effective rules and educating local code makers about how the new rules apply in a timely manner. This could be the single most significant impediment to proliferation of residential DG installations.

The Permit Streamlining Report explains that the California building standards, which set minimum safety standards, have several sections relevant to DG installations.⁹⁸ Further, it explains that building permit approval is subject to zoning changes that may be required and the approval of conditional-use permits.⁹⁹ These permits will be required in most DG installations, though natural gas applications and others utilizing combined heat and power capabilities will be most involved in complying with code requirements.¹⁰⁰

98. CEC, PERMIT STREAMLINING REPORT, *supra* note 2, at 36:

The California Building Standards Code (CCR, Title 24) applies to all buildings and structures in the state. The following parts of the Code are relevant to DG installations:

California Building Code (general building design and construction requirements, including fire- and life-safety and field inspection provisions)

California Electrical Code (technical requires for all electrical power supplies)

California Mechanical Code (mechanical standards for the design, construction, installation, and maintenance of heating, ventilating, cooling and refrigeration systems, incinerators, and other heat-producing appliances)

California Plumbing Code (requirements for natural gas pipeline additions)

California Fire Code (requirements for on-site fuel storage)

99. *Id.*

100. The PERMIT STREAMLINING REPORT explains:

All *new* construction requires a building permit. And, all additions or replacements of the following equipment or building structural components require building permits: heating and air conditioning equipment, water heaters, new electric circuits, electric services change, re-wiring, water service replacement, sewer service replacement, gas line replacement, and re-plumbing. Construction cannot begin until the local jurisdiction has received the building permit fee and issued the building permit.

Considering the interrelationship of these issues, the complexity of building code issues multiplies with the integration of DG applications into a household. Thus, making the most beneficial use of an application may be most detrimental to its installation.

Projecting this complexity on a national scale, makes a daunting impediment for DG manufacturers and distributors. Consider: "There are some 44,000 local building code jurisdictions throughout the country, an astounding number when you consider that whenever a new technology comes out, new regulations must be promulgated in every jurisdiction before the product can proliferate."¹⁰¹ Promulgating new rules and educating those who will implement those rules will be a sizeable task that will take time.¹⁰²

Building code complexities are not, however, precluding DG implementation at public building sites and within utility infrastructures. Some New York utilities have integrated DG applications into their service.¹⁰³ In California, a company is renting roof space, installing power plants there, and selling the power back to building inhabitants.¹⁰⁴ Likewise, four major art museums in Chicago recently installed photovoltaic (PV) DG applications of approximately 50 kW each on their roofs.¹⁰⁵ The company installing the PV appliances has installed several on Chicago public buildings "representing over 300 peak kilowatts of solar generating capacity."¹⁰⁶

Ancillary issues, then, present significant obstacles for DG implementation. Those obstacles, however, are primarily logistical, not adversarial.

The clear governmental trend is toward encouraging DG implementation and government entities will provide a significant portion of an interim DG market while ancillary issues are resolved.

III. CONCLUSION

The rate at which DG technology develops is likely to determine which technologies excel in the marketplace and which fall by the wayside. That rate of development, however, may well be determined by which rules governments establish to regulate DG implementation. Installation is a key to attracting

Id. at 38 (emphasis in original).

101. Levesque, *Distributed Generation: Doomed by Deployment Details?*, *supra* note 53, at 51.

102. The Public Utilities Fortnightly article goes on to explain:

The formation of national codes and their subsequent trickling down to the local site inspector is an arduous 10-year process . . . Once a technology emerges, standards and a testing protocol must be developed . . . accepted by the four national building code bodies, . . . [and] adopted by the states. Finally, when the standards reach one of the 44,000 jurisdictions, "the guy on the street" must be educated about them.

Id.

103. Robert Gavin, *Think Small: Distributed Generation may be the Key to Making Deregulation Work*, WALL STREET JOURNAL, Sept. 17, 2001.

104. Lawrence Solomon, *The Next City*, Nat'l Post, Sept. 18, 2002 at Fin. Post Ed. 15.

105. See generally *Spire Corporation Installs 150 kW of Solar Power Systems on Three Chicago Museums as Part of Public-Private Partnership*, U.S. NEWSWIRE, Oct. 2, 2001.

106. *Id.*

investors. Investment dollars, in turn, are key to innovation. Ensuring actual implementation, then, is essential to each type of DG developer.

Having such varied players compete for the same market is consistent with stated governmental goals. DG appliances using a variety of fuel sources can be installed for a wide range of uses. This diversity is central to governmental energy policy. The supplemental nature of DG technology also should help alleviate pressing needs for T&D maintenance as well as ensuring sufficient capacity. Furthermore, those DG applications being encouraged are increasingly environmentally sensitive.

Competition is also consistent with marketplace trends and public interest concerns. Customer choice could be no better served than by having the option not only to choose to serve yourself, but with which fuel to do so. Likewise, a marketplace including DG should be more democratic, having more freedom and incentive for innovation.

The fact that DG aligns with public and private goals, coupled with the DG industry's incentive and opportunity should ensure the proliferation of at least some forms of DG applications. DG's benefits are too plentiful, and too compelling to be overlooked. Similarly, too many investors are too eager for returns for DG to be bypassed. The questions remaining concern, which DG applications will proliferate, how the system will change to accommodate the integration of DG into the existing energy infrastructure, and when this nexus will manifest.

Lawyers and other policy makers would be wise to position themselves as educated players in the DG field. Some issues concerning DG implementation may not be as significant as they seem. However, concerns such as those over cost allocation, are likely to obfuscate many issues, complicating their resolution. Other issues may be more significant than expected. With those issues, though some are non-adversarial impediments, regulators will have to have a clear understanding of the whole situation to determine intelligent solutions. Those in position to affect or be affected by DG implementation have an opportunity to develop with the market. They should seize it.

Anthony Allen

