COMMENTS

DISTRIBUTED GENERATION: A STEP FORWARD IN UNITED STATES ENERGY POLICY

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I. INTRODUCTION

On August 14, 2003, the East Coast of the United States and parts of Canada experienced one of the largest blackouts in history.[1] The blackout originated in a small area in Ohio, yet ultimately affected over fifty million people in eight states and one Canadian province.[2] In the end, the total cost estimates were between four billion and ten billion dollars.[3] This recent example illustrates the level of national dependency and instability that our electricity system allows. This current state of our electricity grid has resulted from a combination of government regulatory actions and natural market forces.[4] Naturally, then, the solution must be likewise multi-faceted.[5] Distributed Generation[6] offers one micro solution to

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1 *See* U.S.-CANADA POWER SYSTEM OUTAGE TASK FORCE, FINAL REPORT ON THE AUGUST 14, 2003 BLACKOUT IN THE UNITED STATES AND CANADA: CAUSES AND RECOMMENDATIONS 1 (2004) [hereinafter BLACKOUT REPORT 2003], *available at* https://reports.energy.gov (detailing the results of a report prepared for the President of the United States and Prime Minister of Canada detailing the blackout of August 2003 and its effects).

2 *Id.*

3 *Id.*

4 Joshua J. Franklin, Note, *Upgrading the National Power Grid: Electric Companies Need an Economic Incentive to Invest in New Technology*, 31 RUTGERS COMPUTER & TECH. L.J. 159, 160 (2004) (arguing that the introduction of the market system has led to a fundamental change in the operation and public expectations of the electricity grid).

5 *See id.* at 181–85.

6 Distributed Generation is defined as a "generating plant serving a customer on-site or

this macro problem by encouraging more localized generation through smaller, closed systems. This Comment will argue that the federal government, through policy incentives and law, should be promoting distributed generation to supplement and stabilize our current grid and to allow more widespread use of renewable resources.

This Comment will discuss the feasibility of, and problems with, distributed generation as a solution to the energy problems currently faced by the United States, focusing on federal initiatives that should be undertaken. Part II briefly discusses the history of electricity generation in the United States, explaining the background on how the current landscape developed. Part III explores the Energy Policy Act of 2005, which is the federal statute that sets forth the federal government's energy policy.[7] Specifically, Part III discusses renewable energy and distributed generation policy on the federal level and how the slack left in federal policy falls on the states to make up. Part IV discusses the problems with our current system and suggests why it is not a sustainable long-term solution to meet future electricity needs. This part includes a discussion of externalities that are unaccounted for in traditional electricity generation, and the widely underestimated problem of grid unreliability. Part V introduces distributed generation as one potential solution to these current problems. Also discussed in this part is distributed generation as a vehicle for introducing renewable energy sources into the grid. Part VI offers some ideas for realistically integrating distributed generation into our grid on a large-scale basis including: load response programs or incentives, federal encouragement of local installed capacity markets, federal net metering standards, and federal municipality incentives and tax credits to offset costs. Lastly, Part VII looks at New York's approach to distributed generation and how it differs in scope and level of commitment from the federal approach. Overall, the federal response and action toward distributed power generation has been a failure, forcing the states to intervene independently.

providing support to a distribution network, connected to the grid at distribution-level voltages." INTERNATIONAL ENERGY AGENCY, DISTRIBUTED GENERATION IN LIBERALISED ELECTRICITY MARKETS 19 (2002), *available at* http://www.iea.org/textbase/nppdf/free/2000/distributed2002.pdf. The Energy Policy Act of 2005 defines distributed generation as "an electric power generation facility that is designed to serve retail electric consumers at or near the facility site." Energy Policy Act of 2005, Pub. L. No. 109-58, § 917(g)(3), 119 Stat. 594, 864 (2005).

[7] *See generally* Energy Policy Act, 119 Stat. 594

II. HISTORY OF ELECTRICITY MARKET DEREGULATION

The late 1800s marked the electrification of the United States. With it, small privately owned generators began serving customer's electric power needs at cost-based prices.[8] However, many factors pushed the nation to restructure this localized system into a privately-owned, centralized system.[9] As a result, during the early 1900s, many of the small generation resources were purchased by larger privately-owned holding companies,[10] and by 1930, about sixteen companies owned seventy-five percent of the generators in the United States.[11]

In response to the changing industry, Congress enacted the Public Utility Holding Company Act,[12] which initiated the regulation of such holding companies.[13] Furthermore, Congress created the Federal Power Commission in 1935, which eventually became the Federal Energy Regulatory Commission (FERC) in 1977.[14] Also at this time, the federal government began to subsidize target development of power systems through legislation such as the Rural Electrification Act,[15] where loans and assistance were given to electricity providers in rural areas.[16] During this period, numerous

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8 Only about two-fifths of the nation's power was produced by large public utilities early in the twentieth century and "many businesses (nonutilities) generated their own electricity." ENERGY INFORMATION ADMINISTRATION, U.S. DEP'T OF ENERGY, THE CHANGING STRUCTURE OF THE ELECTRIC POWER INDUSTRY 2000: AN UPDATE 5 (2000) [hereinafter CHANGING STRUCTURE OF ELECTRIC POWER], *available at* http://www.eia.doe.gov/cneaf/electricity/chg_stru_update/update2000.pdf. The rest of the country's electricity needs were met by local or on-site generation. *Id.*

9 *Id.* Some of the factors that encouraged centralization included skyrocketing demand from consumer product innovation and development of more efficient generation technologies. *Id.*

10 *Id.* A holding company is defined as "any company which directly or indirectly owns, controls, or holds with the power to vote, 10 per centum or more of the outstanding voting securities of a public utility." R. Richard Geddes, *Time to Repeal the Public Utility Holding Company Act*, 16 CATO J. 63, 64 (1996), *available at* http://www.cato.org/pubs/journal/cj16n1/cj16n1-4.pdf (internal quotation marks omitted).

11 CHANGING STRUCTURE OF ELECTRIC POWER, *supra* note 8, at 5.

12 Public Utility Holding Company Act of 1935, 15 U.S.C. § 79 to 79z-6 (2000).

13 Richard L. Gordon, *The Public Utility Holding Company Act: The Easy Step in Electric Utility Regulatory Reform*, REGULATION: THE CATO REVIEW BUS. & GOV'T, Winter 1992, at 1, *available at* http://www.cato.org/pubs/regulation/reg15n1-gordon.html.

14 *Id.* The Federal Energy Regulatory Commission "[r]egulate[s] and oversee[s] energy industries in the economic, environmental, and public safety interests of the American public." FEDERAL ENERGY REG. COMM'N, STRATEGIC PLAN FY 2006 – FY 2011, at 3 (2004), http://www.ferc.gov/about/strat-docs/FY-06-11-strat-plan-print.pdf. Specifically, Goal 1.4 of this agency is to "[p]romote the [d]evelopment of a [s]trong [e]nergy [i]nfrastructure," in part by "[m]aintain[ing] a [r]eliable and [s]afe [i]nfrastructure." *Id.* at 7–16.

15 Rural Electrification Act of 1936, 7 U.S.C. §§ 901 to 950aa-1 (2000).

16 *Id.* § 918a(a)(1). This section authorizes the secretary to "improve energy generation,

hydroelectric dams were built by the federal government to provide low cost electricity to the public.[17] By 1941, generation growth was averaging about eight percent per year,[18] and the number of privately-owned generation resources had decreased significantly as federally-built generation continued to increase.[19] Regulation of this industry continued until the 1990's, when FERC began unbundling the electricity industry with the Energy Policy Act of 1992 (hereinafter EPACT of 1992),[20] which resulted in FERC Order Number 888 (hereinafter FERC Order 888).[21]

A. The Energy Policy Act of 1992

The Energy Policy Act was enacted to help solve problems that had emerged in the electricity industry as a result of the National Energy Act of 1978.[22] The problems arose in the transmission component of the electricity system.[23] Transmission line owners

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transmission, or distribution facilities serving communities in which the average residential expenditure for home energy is at least 275 percent of the national average." *Id.*

[17] CHANGING STRUCTURE OF ELECTRIC POWER, *supra* note 8, at 6. Specific government sponsored/owned hydroelectric generation facilities built at this time include the Hoover Dam (1936) and Grand Coulee (1941). *Id.*

[18] ENERGY INFORMATION ADMINISTRATION, U.S. DEP'T OF ENERGY, HISTORY OF THE U.S. ELECTRIC POWER INDUSTRY 1882–1991, http://www.eia.doe.gov/cneaf/electricity/chg_stru_update/appa.html (last visited Mar. 3, 2007).

[19] CHANGING STRUCTURE OF ELECTRIC POWER, *supra* note 8, at 6. "From 1933 to 1941, one-half of all new capacity was provided by Federal and other public power installations." *Id.*

[20] Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (1992).

[21] Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540 (May 10, 1996) (codified at 18 C.F.R. pts. 35 and 385) [hereinafter FERC Order 888].

[22] The National Energy Act consists of five pieces of major legislation: the National Energy Conservation Policy Act, Pub. L. No. 95-619, 92 Stat. 3206 (codified as amended in scattered sections of 12, 15, 23, and 42 U.S.C.); the Powerplant and Industrial Fuel Use Act of 1978, Pub. L. No. 95-620, 92 Stat. 3289 (codified as amended in scattered sections of 15, 19, 42, 45, and 49 U.S.C.); the Natural Gas Policy Act of 1978, Pub. L. No. 95-621, 92 Stat. 3351 (codified as amended in scattered sections of 15 and 42 U.S.C.); the Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended in scattered sections of 15, 16, 30, 42, and 43 U.S.C.); and the Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (codified as amended in scattered sections of 19, 23, and 26 U.S.C.).

[23] These problems were largely a result of the Public Utility Regulatory Policies Act of 1978 (hereinafter "PURPA"). Joseph P. Tomain*, The Past and Future of Electricity Regulation*, 32 ENVTL. L. 435, 451–53 (2002). PURPA created "qualifying . . . facilit[ies]," which were essentially small-scale energy producers who were generating electricity for their own needs, yet at times had excess power to sell back to the grid. *See id.* at 452. These facilities, if qualified, were able to sell power back to the electricity utilities at an "avoided cost" rate established by FERC. *See id.* Problems resulted from this introduction of competition because the transmission lines were privately-owned. *Id*. Therefore, qualifying facilities could only sell power to the utilities, not end users. *Id.*

were unwilling to allow competitors to use their infrastructure, even if the power produced was cheaper for end users.[24] Since "the transmission segment moves electricity from producers to consumers," it is essential to have open access to these lines for the market to operate properly.[25] To help solve this, EPACT of 1992 "gave FERC broad authority, subject to a public interest standard, to order 'virtually any transmission owning entity in the U.S. to wheel power for wholesale transactions.'"[26] To implement this legislative directive, FERC enacted Order 888 on April 24, 1996.[27]

B. Federal Energy Regulatory Commission Orders 888 and 889

FERC Order 888 opened the once regulated electricity market to competition. This regulatory act required all utilities to allow their transmission lines to be used by competitors.[28] FERC Order 888 significantly eliminated discrimination from the transmission industry by creating open access to the transmission system.[29] The problem before FERC Order 888 was that transmission owners were discriminating by limiting what generation could travel over their privately-owned lines.[30] This was a significant barrier to competition in the electricity market because consumers were not receiving the best-priced electricity, only the most favored.[31] FERC Order 888 began the process of deregulation in the United States because transmission customers were assured of competitively priced generation that was not being filtered by the transmission owners.[32]

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[24] *See id.* at 453.

[25] *Id.* at 454.

[26] *Id.* at 453 (quoting Reiner H.J.H. Lock & Marlene L. Stein, *Electricity Transmission*, *in* 4 ENERGY LAW AND TRANSACTIONS § 81.01[4][a] (David J. Muchow & William A. Mogel eds., 1994). "'Wheeling' is the use of one utility's transmission system by a generator to sell power to another distributor or end user." *Id.* at 452 n.87.

[27] FERC Order 888, *supra* note 21, at 21,540.

[28] *Id.* at 21,541. The introduction of the Act itself states that its purpose "is to remedy undue discrimination in access to the monopoly owned transmission wires." *Id.*

[29] *Id.*

[30] David B. Spence, *Coal-Fired Power in a Restructured Electricity Market*, 15 DUKE ENVTL. L. & POL'Y F. 187, 199–202 (2005).

[31] *Id.* In quoting the Federal Energy Regulatory Commission, one federal district court upholding Order 888 stated "utilities owning or controlling transmission facilities possess substantial market power; that, as profit maximizing firms, they have and will continue to exercise that market power in order to maintain and increase market share, and will thus deny their wholesale customers access to competitively priced electric generation." Transmission Access Policy Study Group v. Fed. Energy Regulatory Comm'n, 225 F.3d 667, 682 (D.C. Cir. 2000).

[32] *See* FERC Order 888, *supra* note 21, at 21,541.

At about the same time FERC Order 889 was issued, which equalized the availability of information so participants could not gain preferential and unfair access to system information, which was a major problem before deregulation.[33] This Order required public utilities to establish an Open Access Same-time Information System (OASIS), which made available to transmission customers information on transmission capacity, prices, and other essential information necessary for a competitive market.[34] It also standardized the reporting and formatting of this information to make it even more accessible to customers or potential customers.[35] The creation of Independent System Operators (ISO)[36] was suggested at this time,[37] but FERC did not feel deregulation in the United States was ready for mandatory large-scale introduction of markets at this time.[38]

Though FERC Orders 888 and 889 provided many benefits, they fostered an environment where larger centralized generation could grow. "Since Order No. 888 was issued, more than 40 applications have been filed for Commission approval of proposed mergers involving public utilities."[39] This rapid increase in the number of participants in the electricity market combined with unprecedented increases in consumer demand resulted in unanticipated consequences for the electricity system. Consequently, these changes have led to "the transmission grid . . . being used more intensively and in different ways than in the past."[40] For instance,

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[33] Open Access Same-Time Information System (Formerly Real-Time Information Networks) and Standards of Conduct, 61 Fed. Reg. 21,737 (May 10, 1996) (codified at 18 C.F.R. pt. 37) [hereinafter FERC Order 889].

[34] *Id.*

[35] *Id.* at 21,738–39.

[36] ISO's are forms of Regional Transmission Organizations that are "independent regionally operated transmission grids [that] will enhance the benefits of competitive electricity markets." Regional Transmission Organizations, 65 Fed. Reg. 810, 811 (Jan. 6, 2000) (codified at 18 C.F.R. pt. 35) [hereinafter FERC Order 2000].

[37] "[W]e believe that ISOs have great potential to assist us and the industry to help provide regional efficiencies, to facilitate economically efficient pricing, and, especially in the context of power pools, to remedy market discrimination and mitigate market power." FERC Order 888, *supra* note 21, at 21,551.

[38] As stated in FERC Order 888, "although we do not at this time find it necessary to require power pools to form an independent system operator in order to remedy market discrimination, we believe ISOs may prove to be an effective means for accomplishing comparable access." *Id.* at 21,593–94; *see also* FERC Order 2000, *supra* note 36, at 812–13.

[39] FERC Order 2000, *supra* note 36, at 813.

[40] *Id.* at 814; *see also* ENERGY SECURITY ANALYSIS, INC., PROPOSAL TO ACCELERATE MERCHANT AC TRANSMISSION INVESTMENT (2003), http://www.ksg.harvard.edu/hepg/Papers/ESAI_Merchant.Transmission.Memo_3-27-03.pdf (discussing methods to stimulate financial investment in transmission infrastructure).

one study conducted by the United States Department of Energy in 2005 cited FERC's own concerns about the problems with "under-investment in needed transmission" and the problems with "generation sitting in locations far from customers."[41] The Department of Energy also cited its own study that underscored the urgent problem of transmission congestion and strain.[42] With these concerns in mind, it seems logical that distributed generation would help to alleviate the growing transmission problems by placing the generation closer to the load, eliminating the need for additional transmission capacity. Therefore, distributed generation would not be a step backward to the days before regulation, but rather a step forward to meet these new problems.

III. ENERGY POLICY ACT OF 2005: THE FEDERAL ENERGY POLICY

The modern federal energy policy is encompassed in the Energy Policy Act of 2005 (EPACT 2005), and was signed into law on August 8, 2005.[43] EPACT 2005 addresses a wide range of energy issues including efficiency, renewable resources, oil, gas, coal, nuclear, vehicle efficiency, and hydrogen, to name only a few.[44] This piece of legislation focuses on production capacity with little consideration of conservation and environmental concerns.[45] EPACT 2005 also sets mandatory electricity reliability rules and repeals the Public Utility Holding Company Act (PUHCA), eliminating the oversight power from the Securities and Exchange Commission (SEC) and transferring it to the FERC.[46] In the areas

[41] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ELECTRICITY TRANSMISSION IN A RESTRUCTURED INDUSTRY: DATA NEEDS FOR PUBLIC POLICY ANALYSIS 1–2 (2004), www.eia.doe.gov/oss/TransmissionDataNeeds-DH.pdf (internal quotation marks omitted).

[42] *Id.* at 2; *see also* U.S. DEP'T OF ENERGY, NATIONAL TRANSMISSION GRID STUDY, at xi–xii (2002), *available at* http://www.ferc.gov/industries/electric/indus-act/transmission-grid.pdf (discussing the need for improvements relating to transmission reliability standards).

[43] Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified as amended in scattered sections of 7, 10, 15, 16, 22, 25, 26, 30, 33, 42, and 43 U.S.C.). This was the first legislation of its kind since EPACT 1992. *See generally supra* Part II.A (discussing the impetus behind EPACT 1992 and its results).

[44] *See* Energy Policy Act of 2005.

[45] *See* Daniel Ramish, *Government Regulatory Initiative Encouraging the Development and Sale of Gas/Electric Hybrid Vehicles: Transforming Hybrids from a Curiosity to an Industry Standard*, 30 WM. & MARY ENVTL. L. & POL'Y REV. 231, 237 n.60 (2005); *see also* Tim Bishop, *Congress Must Refine Its '05 Energy Bill*, NEWSDAY, Sept. 22, 2005, at A47, *available at* 2005 WLNR 14939091.

[46] SHIRLEY NEFF, CTR. FOR ENERGY, MARINE TRANSP., & PUB. POL'Y AT COLUMBIA UNIV., REVIEW OF THE ENERGY POLICY ACT OF 2005, at 5 (2005), http://www.cemtpp.org/PDFs/EnergyBillHighlights.pdf.

of renewable energy and distributed generation, however, a comprehensive and well defined commitment is surprisingly absent from the Act.

A. Renewable Energy Under EPACT 2005

Title II of EPACT 2005 is focused entirely on renewable energy.[47] EPACT adjusts the federal target percentages for renewable energy to 3% for 2007–2009, 5% for 2010–2012, and 7.5% for 2013 and beyond.[48] It also extends the energy production tax credit for two more years[49] and creates clean renewable energy bonds for qualifying entities.[50] Significantly, however, the bill did not include a federal renewable portfolio standard (RPS).[51] By failing to enact a federal RPS mandate, Congress has left most of the burden for renewable energy policy on the individual states.[52] Furthermore, the bill does not focus on reducing energy demand and consumption.[53] According to the American Counsel for an Energy-Efficient Economy," [s]ince Congress has not led on the major challenges, state and local governments will need to ramp up their efforts. And Congress will likely have to revisit key energy issues like oil dependency and natural gas prices again soon."[54]

B. Distributed Generation and Reliability Under EPACT 2005

EPACT 2005 also states lofty goals for distributed resources.[55]

[47] Energy Policy Act of 2005, §§ 201–252.
[48] *Id.* § 203(a).
[49] FRED SISSINE, CONGRESSIONAL RESEARCH SERVICE REPORT FOR CONGRESS, ENERGY EFFICIENCY AND RENEWABLE ENERGY LEGISLATION IN THE 109TH CONGRESS 2 (2005).
[50] NEFF, *supra* note 46, at 8.
[51] *Id.* at 2. Such a provision would require "that utilities purchase a certain percentage of electricity from renewable sources." *Id.* In addition, "[t]he Senate version of the bill had proposed a 10% incremental RPS by 2020, which is comparable to what a number of the states with RPSs have implemented." Robert H. Edwards, Jr., *Renewables and the Act: Incentives for Renewable Energy in the Energy Policy Act of 2005 Create Opportunities for Renewable Energy Projects in the United States*, PROJECT FINANCE, Sept. 21, 2005, at 43. As of July 31, 2005, nineteen states had their own mandatory renewable portfolio standards and four more states had some type of voluntary renewable goals. *Id.* at 44.
[52] *Id.* at 44.
[53] STEVEN NADEL, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE FEDERAL ENERGY POLICY ACT OF 2005 AND ITS IMPLICATIONS FOR ENERGY EFFICIENT PROGRAM EFFORTS 14 (2005).
[54] Press Release, Am. Council for an Energy-efficient Economy, Conference: Energy Bill Misses the Big Targets (July 28, 2005), *available at* http://www.aceee.org/press/0507confbill.htm.
[55] *See generally* Energy Policy Act of 2005, Pub. L. No. 109-58, §§ 921–25, 119 Stat. 594, 684–85 (2005).

The Act says the secretary shall research and develop "application[s] on distributed energy resources and systems reliability," but does little to concretely implement any type of a comprehensive plan to do so.[56] There has been extensive research regarding the costs and benefits of distributed generation,[57] and it is time that action is taken to bring these technologies to service. However, EPACT 2005 merely provides possible funding by appropriating money, and does not take any definitive steps toward developing and introducing distributed generation resources.[58] For instance, "the law provides for a 10 percent investment tax credit for 'stationary microturbine power plants.'"[59] There is also a further tax credit for fuel cells.[60] Aptly put, one report states that such tax credits help, but "distributed generation systems . . . face a variety of other barriers such as inconsistent and often cumbersome interconnection and emissions regulations."[61] Without a comprehensive federal policy, these other problems cannot be effectively addressed by states.

IV. TODAY'S ELECTRICITY GENERATION CONCERNS

As indicated above in Part I, one of the major problems with having such a highly connected and centralized electricity grid is system reliability.[62] The electricity grid is so interconnected that a localized threat, such as a natural disaster, terrorist attack, or generation failure, can have catastrophic national effects.[63] Another problem with our current system is the hidden costs or externalities that are associated with its operation.[64] In the electricity

[56] *Id.* § 921(a), 119 Stat. at 684.

[57] *See, e.g.*, Will McNamara, *Comparison Shopping: Distributed vs. Central Station Generation*, POWER ENGINEERING, Aug. 2005, *available at* http://pepei.pennnet.com/articles/article_display.cfm?article_id=235216.

[58] § 921(b)(1), 119 Stat. at 684.

[59] NADEL, *supra* note 53, at 8.

[60] *Id.*

[61] *Id.* The report concludes that the "United States will need to do much more to promote energy efficiency than the items included in the new 2005 energy bill." *Id.* at 17.

[62] *See* NAT'L RURAL ELEC. COOPERATIVE ASS'N, WHITE PAPER ON DISTRIBUTED GENERATION 14–15 (2005), http://www.nreca.org/Documents/PublicPolicy/DGWhitepaper.pdf [hereinafter WHITE PAPER] (detailing the numerous factors that go into system reliability and their high interdependence). *See generally* BLACKOUT REPORT 2003, *supra* note 1 (discussing the causes of the electricity blackout of 2003).

[63] CONG. BUDGET OFFICE, PROSPECTS FOR DISTRIBUTED ELECTRICITY GENERATION 19 (2003) [hereinafter CBO REPORT], *available at* http://www.cbo.gov/ftpdocs/45xx/doc4552/09-16-electricity.pdf.

[64] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ELECTRICITY GENERATION AND

generation context this means, "the price charged for electric power is lower than it would be if the costs of externalities were internalized."[65] Distributed generation helps solve both these problems by encouraging local generation and allowing a realistic vehicle for the introduction of renewable generation resources, thereby reducing externalities.

A. Decreasing System Reliability

Our current electricity grid has major reliability problems that will only worsen as demand increases strain our system.[66] This problem is aptly evidenced by the energy crisis in California and the blackout in New York.[67] In California, the problem was blamed on rapid deregulation and a failure to encourage new generation facilities through the state's energy policy.[68] The solution offered by distributed generation is twofold. Not only is demand decreased, but the amount of strain on the system decreases by displacing the power from the bulk transmission system and onto the more localized lines. This puts even less stress on the transmission system and decreases prices.[69]

B. Lack of Transparency

The current electricity system does not operate like a typical market. In a perfect market, "as a price of a good rises, demand for that good will decrease as consumers use substitutes and/or curtail their consumption of that good."[70] After the promulgation of FERC

ENVIRONMENTAL EXTERNALITIES: CASE STUDIES 7 (1995), *available at* http://www.eia.doe.gov/cneaf/electricity/external/external.pdf [hereinafter ELECTRICITY GENERATION AND ENVIRONMENTAL EXTERNALITIES] ("Market failures attributable to the divergence between social costs/benefits and private costs/benefits lead to an inefficient allocation of resources.").

[65] *Id.* at 8.

[66] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2006 WITH PROJECTIONS TO 2030, at 4 (2006), *available at* http://www.eia.doe.gov/oiaf/archive/aeo06/index.html ("Total primary energy consumption . . . is projected to increase at an average rate of 1.2 percent per year, from 99.7 quadrillion Btu in 2004 to 127.0 quadrillion Btu in 2025 . . . .").

[67] *See supra* Part I.

[68] Richard Allen Greene, *California Blackout: Why it Happened*, BBC NEWS, Jan. 18, 2001, http://news.bbc.co.uk/2/hi/americas/1123665.stm.

[69] *See* CBO REPORT, *supra* note 63, at 19.

[70] OFFICE OF AIR & RADIATION, ENVTL. PROT. AGENCY, ELECTRICITY DEMAND RESPONSE TO CHANGES IN PRICE IN EPA'S POWER SECTOR MODEL 2 (2005), *available at* www.epa.gov/airmarkets/mp/pssupport/DemandResponse.pdf.

Order 888,[71] the initial electricity market designs did not include the ability for demand customers to reduce their consumption based on market prices.[72] There have been several uncoordinated attempts to rectify this market-wide problem,[73] but such localized programs have been unsuccessful at addressing this on a national level. This inelasticity of demand response "has been indicted as the chief culprit behind the price spikes, shortages, and charges of market manipulation that have plagued several U.S. electricity markets the past few years."[74] The promotion of homeowner power production through distributed generation (specifically renewable) so that consumers can react to current power prices would help control prices at peak demand times.[75] A generator could be turned on to decrease high-priced power consumption. Nevertheless, this would require a much more transparent market system allowing prices to be viewed easily by consumers.

C. Externalities

One of the concerns with distributed generation is the cost. However, this concern fails to recognize that there are costs unaccounted for in today's electricity generation methods. These costs are known as externalities.[76] Such externalities represent the hidden costs of current electricity generation. With the focus on

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[71] *See supra* notes 21–32 and accompanying text.

[72] Letter from John A. Anderson, Exec. Dir., Elect. Consumers Resource Council, to Curt Hebert, Jr., et al., Chairman & Comm'rs, Fed. Energy Regulatory Comm'n (April 11, 2001), *available at* http://www.elcon.org/Documents/PressReleases/041801ferc_letter.pdf (concluding that such a failure "is now recognized to be a significant and unfortunate oversight on the part of initial market designers").

[73] Both New York ISO and the ISO of New England have implemented such programs. *See* DAVID KATHAN, FERC'S STANDARD MARKET DESIGN PROPOSAL 13–14 (2003), http://www.aceee.org/conf/mt03/wbprsnt/Kathan-CC4w.pdf.

[74] STEVEN D. BRAITHWAIT ET AL., EDISON ELEC. INST., THE ROLE OF DEMAND RESPONSE IN ELECTRIC POWER MARKET DESIGN 28 (2002), *available at* http://www.eei.org/industry_issues/retail_services_and_delivery/wise_energy_use/demand_response/demandresponserole.pdf.

[75] An Electric Power Research Institute study concluded that "a 2.5% reduction in electricity demand statewide could reduce wholesale spot prices in California by as much as 24%; a 10% reduction might slash wholesale price spikes by half." ELEC. POWER RESOURCE INST., CUSTOMER DEMAND RESPONSE PROJECT EXCEEDS PHASE II TARGETS, DEMONSTRATES EFFECTIVE WAY TO MEET CALIFORNIA'S POWER NEEDS (2001), *available at* www.epri.com (follow the "Search" function; enter the title of the document; then follow the link to the document that appears in the search response).

[76] Externalities are defined by the Energy Information Administration as "benefits or costs resulting as an unintended byproduct of an economic activity that accrue to someone other than the parties involved in the activity." ELECTRICITY GENERATION AND ENVIRONMENTAL EXTERNALITIES, *supra* note 64, at v.

deregulation, the full impact of these costs has not been fully appreciated. "Although these impacts have a direct bearing on individuals' well-being, the impacts are not factored into any of the decisions to generate or consume electric power."[77] Such environmental and social costs are not accurately reflected in current prices.

Furthermore, there are non-environmental hidden costs to consider inherent in our current system.[78] The electricity grid was set up originally to carry small quantities of power over relatively short distances.[79] However, contrary to what was intended, the current system relies on large-scale generation to produce power and send it to consumers who are hundreds of miles away,[80] oftentimes sacrificing power through line losses.[81] It is estimated that by using distributed generation, "transmission and distribution line losses (about 5 percent) are reduced because the energy is generally used near the source."[82] Another hidden cost comes from waste heat. The average generator efficiency is only thirty-three percent, and the remaining sixty-seven percent of the energy is

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[77] RUSSELL LEE ET AL., ADDRESSING ENVIRONMENTAL EXTERNALITIES FROM ELECTRIC GENERATION IN SOUTH CAROLINA (2001), http://www.ornl.gov/~webworks/cppr/y2001/pres/110126.pdf. Studies estimating externalities usually involve either comparing the health and environmental costs of different resources or estimating the costs of certain programs currently in place to mitigate these environmental and health costs. OFFICE OF TECH. ASSESSMENT, U.S. CONG., STUDIES OF THE ENVIRONMENTAL COSTS OF ELECTRICITY 5 (1994), *available at* http://www.wws.princeton.edu/ota/disk1/1994/9433/9433.pdf.

[78] Many of these costs are not internalized in the current system, so they are not reflected in the current price of electricity. "As a result, distributed generation power sold into the grid must compete with the utility's inexpensive (and dirty) large-scale power generation . . . ." Andrew R. Thomas et al., *Regulation of Power Generated by Stationary Fuel Cells in the United States*, 18 TUL. ENVTL. L.J. 141, 152 (2004).

[79] Franklin, *supra* note 4, at 159–60. Deregulation has created unanticipated stresses on our current electricity infrastructure that has resulted in system-wide instability. *See id.* at 160. The result of this misuse was the East Coast blackout of 2003, which is considered "the worst blackout in United States and Canadian history." *Id.* at 159; *see also supra* notes 1–2 and accompanying text.

[80] *Id.* at 160. The current market system encourages national trading of power, forcing extremely long transmission distances and the resulting line losses. *Id.*

[81] Reduction in transmission line losses is specifically cited as one potential benefit of using distributed generation as opposed to current generation methods. Ida Martinac, Comment, *Considering Environmental Justice in the Decision to Unbundle Renewable Energy Certificates*, 35 GOLDEN GATE U. L. REV. 491, 495 (2005).

[82] NAT'L ENERGY POLICY GROUP, *Nature's Power: Increasing America's Use of Renewable and Alternative Energy, in* RELIABLE, AFFORDABLE, AND ENVIRONMENTALLY SOUND ENERGY FOR AMERICA'S FUTURE 6–10 (2001), *available at* http://www.whitehouse.gov/energy/Chapter6.pdf [hereinafter NATURE'S POWER]. The Distributed Power Coalition of America estimates that distributed generation will save between $2.34 and $3.14 per megawatt-hour from transmission line losses. WHITE PAPER, *supra* note 62, at 13.

expelled.[83] Large-scale generation does not have much use for this excess heat, therefore it is wasted.[84] But, distributed generation or "co-location with consumption makes it more feasible to use waste heat, displacing otherwise needed natural gas or electricity for heating purposes."[85] Lastly, distributed generation reduces costs by "allow[ing] for the integration of on-site energy efficiency."[86] After considering a wide range of factors including environmental, system, traditional, etc., one estimate concludes the total savings from using distributed generation to be between $300 and $1,000 per kW per year.[87] Once these costs of traditional generation and the benefits of distributed generation are taken into account, the financial picture does not look so bleak for distributed generation.

V. DISTRIBUTED GENERATION AS A SOLUTION

Distributed generation involves moving electricity generation close to the place of utilization.[88] This move toward more localization of markets seems counterintuitive because the historic trend in United States energy policy has been toward centralization.[89] Distributed generation, however, seeks to supplement and enhance this centralized system, rather than replace it.[90] The benefits offered by distributed generation are widespread considering the flexibility it gives a system to adapt to numerous situations. With the consumption of both residential and commercial energy expected to grow at a higher rate than in years past, the United States needs to look for more long-term sustainable energy solutions like distributed generation to meet its electricity

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[83] Steven Ferrey, *Power Future*, 15 DUKE ENVTL. L. & POL'Y F. 261, 271 (2005). "Cogenerators that recover and use waste heat and sequentially produce electricity have the capability to achieve efficiencies from 50 to 90 percent . . . ." *Id.* This will result in "efficiencies" that are 250 to 300 percent higher than the technologies currently in use. *Id.*

[84] *Id.*

[85] NATURE'S POWER, *supra* note 82, at 6–10.

[86] *Id.*

[87] Ferrey, *supra* note 83, at 274 (citing JOEL N. SWISHER, ROCKY MOUNTAIN INST., CLEANER ENERGY, GREENER PROFITS: FUEL CELLS AS COST-EFFECTIVE DISTRIBUTED ENERGY RESOURCES 29 (2002)).

[88] *See* DISTRIBUTED GENERATION IN LIBERALISED ELECTRICITY MARKETS, *supra* note 6, at 19 (defining distributed generation).

[89] *See generally* Franklin, *supra* note 4, at 160–68 (outlining the regulatory history of the electricity industry).

[90] As noted by one author, selling wholesale power back to the grid is not an efficient or practical use of distributed generation. Thomas et al., *supra* note 78, at 152. Rather, the best use of distributed generation is for on-site needs and peak price-shaving. *Id.*

needs.[91]

A. Definition of Resources

Distributed generation resources differ from typical resources in their scale and target markets. Typical resources used for distributed generation include reciprocating engines, microturbines (hydro-generators), combustion gas turbines, fuel cells, photovoltaics, and wind turbines.[92] Windmills are the most practical for small-scale installation because of their lower installed cost and shorter payback period.[93] A windmill has an installed cost of four dollars per watt and a fifteen-year payback period, while solar energy runs between eight dollars and ten dollars per watt with a twenty-five to thirty-year payback.[94] Consumers considering distributed generation must do a comprehensive cost study focusing on the type of resource they intend to install.[95] While the initial cost of installing distributed resources may be higher, their most significant cost savings seem to be long-term and system-wide.[96]

B. Increases in System Reliability

Localization of power production might seem like a step backwards considering the increasingly global operation of the United States economy today. Moving from complete government regulation, to highly centralized markets, to localized generation

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[91] ROBERT T. EYNON, ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, THE ROLE OF DISTRIBUTED GENERATION IN U.S. ENERGY MARKETS (2002), *available at* www.eia.doe.gov/oiaf/speeches/dist_generation.html.

[92] McNamara, *supra* note 57.

[93] SMALL WIND TURBINE COMM., AM. WIND ENERGY ASS'N, ROADMAP: A 20-YEAR INDUSTRY PLAN FOR SMALL WIND TURBINE TECHNOLOGY 11 (2002), http://www.awea.org/smallwind/documents/31958.pdf.

[94] *Id.*

[95] The price consumers pay for traditional power is an all inclusive cost, while the cost of distributed generation includes both initial fixed costs and on-going variable costs. WHITE PAPER, *supra* note 62, at 10–11. The start-up costs associated with distributed generation include capital costs like hardware costs, installation costs, and connection costs. *Id.* at 11. There is also on-going fuel, maintenance, and operation costs that a consumer must add in to determine the true cost of distributed generation resource. *Id.* However, considering only raw costs doesn't complete the picture. Before installing a distributed generation resource, consumers should also consider the tax savings and incentives for certain distributed generation technologies, and the cost-savings for ensured non-interrupted electricity service that is vital to certain businesses. *See* CBO REPORT, *supra* note 63, at 14.

[96] *See* McNamara, *supra* note 57. "The installation costs for [distributed generation] may be slightly higher, but when coupled with combined heat and power it is far more efficient and draws the operating costs down. So it becomes more cost efficient over time." *Id.* (internal quotation marks omitted).

may not seem to be a consistent or cooperative energy policy. However, this paper argues that distributed generation is actually more suited to the current electricity infrastructure than is outwardly apparent. "The grid was originally built to transfer power from monopolistic utilities to local customers, a movement of relatively small amounts of power over short distances."[97] The problem this overload has created is obvious when considering the recent energy crisis in California and the blackout in New York.[98] A large percentage of the generation capacity in the United States comes from generators with a capacity of over one hundred megawatts, and this is unlikely to change.[99] However, distributed generation "can complement central power by providing incremental capacity to the utility grid or to an end user."[100] By dispersing generation, there is less dependency on these few generators, making the entire system more reliable.[101] Localizing generation also decreases the demand on the centralized generation units, which in turn decreases prices.[102]

Deregulation has created an electricity infrastructure that is widely under-funded and out-of-date because deregulation left no incentives for utilities to invest in needed infrastructure improvements.[103] The deregulated market system encouraged by FERC[104] and adopted by many states[105] pulls directly away from

[97] Franklin, *supra* note 4, at 159–60.

[98] *See supra* notes 1–2 and accompanying text.

[99] Seventy-six percent of the megawatts produced in the United States are produced by only twelve percent of the generators. *See* ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, FORM EIA-860A DATABASE: ANNUAL ELECTRIC GENERATOR REPORT, http://www.eia.doe.gov/cneaf/electricity/page/eia860a.html (last visited Mar. 19, 2007).

[100] CAL. ENERGY COMM'N, CALIFORNIA DISTRIBUTED ENERGY RESOURCE GUIDE, http://www.energy.ca.gov/distgen/background/background.html (last visited Mar. 19, 2007).

[101] *See* CBO REPORT, *supra* note 63, at xi. Incorporation of distributed generation technologies "would lower the overall cost of electricity for all customers, enhance the reliability of the power supply, [and] reduce the need for transmission." *Id.* at xii.

[102] *Id.* at xii, 16. Price also decreases because consumers aren't paying for transmission and distribution of the electricity, which in some areas is estimated to be thirty percent of the total cost of electricity. *Id.* at 16.

[103] Franklin, *supra* note 4, at 160.

[104] Currently seventeen states have adopted full markets for electricity and twenty-seven are still traditionally regulated. NAT'L REGULATORY RESEARCH INST., MAP OF STATE ELECTRICITY MARKETS, http://www.nrri.ohio-state.edu/Electric/map-of-electricity-estructuring/view (last visited Mar. 19, 2007) (citing SCOTT POTTER, AFTER THE FREEZE: ISSUES FACING SOME STATE REGULATORS AS ELECTRIC RESTRUCTURING TRANSITION PERIODS END, NRRI REPORT NO. 03-18 (2003) (updated to December 2005) (detailing exactly which states have fully restructured, which states are still traditionally regulated and which states have limited or reversed restructuring)).

[105] FERC Order 2000, *supra* note 36, at 811.

short distance transmission and encourages large-centralized generation.[106] The electricity industry and more specifically the transmission portion of the system has traditionally always been thought to have "natural monopoly characteristics,"[107] and, thus, never able to be totally deregulated. Distributed generation allows a solution where the benefits of deregulated markets can be realized while the reliability and investment problems are addressed. Essentially, the electricity system would be reinforced from the bottom up. Combining distributed generation with municipality ownership of the distributed generation units creates a more reliable system[108] with a realistic means for financing the needed infrastructure improvements. Current deregulated markets aren't doing a good job of promoting transmission investment; distributed generation will alleviate this problem by reducing need for upgrades.

C. Renewable Sources

Another benefit of distributed generation is that it promotes a more widespread and substantial introduction of renewable energy sources.[109] Distributed generation promotes renewable energy because by definition many renewable technologies are small-scale power producers.[110]

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[106] *Id.*.

[107] Tomain, *supra* note 23, at 443. A natural monopoly is defined as when "product costs for some time will be lower if they consist in a single supplier." *Id.* at 445 (internal quotation marks omitted). The author argues that regulation of this industry should continue "until there are significant technological advances," specifically in the area of distributed generation. *Id.* at 437.

[108] *See* WHITE PAPER*, supra* note 62, at 21. Distributed Generation units become more practical when owned by non-profit organizations rather than investor owned utilities because they are "cost minimizers, not profit maximizers." *Id.* Such non-profit companies are more interested in benefits such as peak shaving and system reliability, whereas a typical investor-owned utility is mainly concerned with profit. *Id.* at 20–21.

[109] CBO REPORT, *supra* note 63, at 19 ("Distributed generation technologies that relied on renewable energy sources could yield environmental benefits in the form of reduced emissions of pollutants and greenhouse gases if those technologies displaced utility-supplied power . . . ."); *see also* Martinac, *supra* note 81, at 496 (listing some of the benefits of renewable distributed generation as lower production of nitrogen oxide and carbon dioxide, lower soil pollution, and "fewer power-plant siting impacts"). *But see* WHITE PAPER, *supra* note 62, at 31 (arguing that blanket environmental claims are not entirely true and environmental benefits are highly dependant on the type of distributed generation technologies chosen). Certain technologies like wind and photovoltaic (PV) energy are extremely clean, while diesel and combustion turbine engines (the most common distributed generation technologies) sometimes have emissions that are much higher than the current types of electricity generation. WHITE PAPER, *supra* note 62, at 31.

[110] A vast number of renewable technologies have smaller kilowatt hour capacities. For

Approximately seventy-one percent of the United States's electricity generation is currently being produced by fossil fuels and this percentage is increasing yearly.[111] A major byproduct of burning fossil fuels is carbon dioxide,[112] which contributes to the amount of pollution in the earth's atmosphere.[113] With the installation of renewable energy sources, the amount of energy needed to be produced by fossil fuel-fired generators decreases.[114] By creating policies that promote distributed generation there will be an increase in the amount of clean power because renewable sources are a viable type of distributed generation for consumers.[115]

VI. MARKET INTEGRATION SOLUTIONS FOR DISTRIBUTED GENERATION

Fitting distributed generation into the existing market system could prove to be challenging. If not done properly, distributed generation could actually create reliability and predictability problems because of the delicate balance required with the electricity grid.[116] In a majority of the current electricity markets across the nation, distributed generation plays a small role in supplying power to the end users.[117] Most markets today consist of large generators that operate through economies of scale, thereby pricing out smaller generators.[118]

The actual significance of distributed generation is hardly realized given its size and contribution to the grid.[119] Small

example, the range for wind turbines is between 50 and 2,000 kW, and the range for solar cells is only between 1 and 100 kW. WHITE PAPER, *supra* note 62, at 10.

[111] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, U.S. ELECTRIC POWER INDUSTRY NET GENERATION 2005 (2006), *available at* http://www.eia.doe.gov/cneaf/electricity/epa/figurees1.pdf; *see also* ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, POLICIES TO PROMOTE NON-HYDRO RENEWABLE ENERGY IN THE UNITED STATES AND SELECTED COUNTRIES 6 & fig.1 (2005), *available at* http:/www.eia.doe.gov/fuelrenewable.html (follow "Policies to Promote Renewable Energy" under "Analyses"; then click on title page to view the pdf) (discussing the breakdown for current United States power generation).

[112] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ELECTRIC POWER ANNUAL 2005, at 47 tbl.5.1 (2006), *available at* http://www.eia.doe.gov/cneaf/electricity/epa/epat5p1.html.

[113] *Id.*

[114] *See* CBO REPORT, *supra* note 63, at 19.

[115] Martinac, *supra* note 81, at 495 ("[M]any renewable Distributed Generation systems are owned by individual home owners . . . .").

[116] *See* WHITE PAPER, *supra* note 62, at 14–15; CBO REPORT, *supra* note 63, at 19–20.

[117] "Current estimates suggest that grid-connected [distributed generation] capacity accounts for only 3 percent of total U.S. capacity." McNamara, *supra* note 57.

[118] Distributed generation units also face increased costs for connection and management. WHITE PAPER, *supra* note 62, at 24–25.

[119] *See id.* at 14–15.

distributed generators play an important role in the reliability of the power grid by supplying power from the "ground up," thus ensuring that the system will remain reliable even if there were a loss of a transmission line or an on-line generator.[120] At the current wholesale electricity rates, it is difficult for a small generator to recover the fixed costs of owning or building a plant.[121] Several ways to overcome this would be to create specialized rules or rates for generators labeled as "distributed generation."[122]

A. Load Response Program

One market-based solution that has been created and utilized by several ISOs is the Load Response Program. Load entities can opt into the program and decrease or eliminate their load connected to the electricity grid based on the market prices and/or load levels.[123] This program is a perfect complement to distributed generation because market participants that own distributed generation resources can reduce the amount of power they require from the grid when prices are high and replace it with power created by their own generators.[124] Not only will the participants save money by producing their own power, but they will receive a payment from the Load Response Program.[125] Thus, distributed generation helps to solve a problem uniquely inherent in the electricity market,

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[120] CBO REPORT, *supra* note 63, at 16–17.

[121] *Id.* at 29–34 (offering solutions for "[r]educing [t]echnical, [c]ontractual, and [c]ost [b]arriers" for smaller distributed generation units).

[122] *Id.*; *see also* FED. ENERGY REGULATORY COMM'N, DOCKET NO. RM02-12-000, STANDARDIZATION OF SMALL GENERATOR INTERCONNECTION AGREEMENTS AND PROCEDURES (2005) (codified at 18 C.F.R. § 35.28 (2006)), *available at* http://www.ferc.gov/industries/electric/indus-act/gi/small-gen/05-12-05-order2006.doc (requiring public utilities to "include standard generator interconnection procedures" for devices with a capacity of twenty megawatts or less).

[123] *See* ISO NEW ENGLAND, DEMAND RESPONSE REAL-TIME PRICE RESPONSE PROGRAM CASE STUDY – WESLEYAN UNIVERSITY (2003), *available at* http://www.iso-ne.com/genrtion_resrcs/dr/broch_tools/Wesleyan_University_Real-Time_Price_Response_Case_Study.pdf. This details a case study whereby Wesleyan University participated in the demand response program established by ISO New England. *Id.* The success of the program was great for both the University and the grid as a whole. *Id.* The University got paid "wholesale prices for its demand response performance" and at the same time the ISO New England was able to shave peak prices from the market. *Id.*

[124] *Day-Ahead Load Response Program* (ISO New England web broadcast May 5, 2005), *available at* http://www.iso-ne.com/support/training/courses/dalrp/dalrp_05_05_05.ppt.

[125] *Id.*; *see also* N.Y. STATE ENERGY RESEARCH & DEV. AUTH, GET IN THE GAME WITH THREE ELECTRIC LOAD-MANAGEMENT PROGRAMS, DEMAND RESPONSE PROGRAM PRIMER 2 (2004), *available at* http://www.nyiso.com/public/webdocs/products/demand_response/general_info/demand_response_primer.pdf.

which is that there is no actual end-user response to prices.

B. Local Installed Capacity Market

A second market-based initiative to promote distributed generation is the Locational Installed Capacity (LICAP) market concept. These markets supply capacity payments for generators located in the most unreliable parts of the grid.[126] LICAP markets could invoke potential builders and investors to initiate more distributed generation projects because they could recover more costs and increase profits due to the additional income that this market would provide.[127] By creating more incentives for small generation to stay online or to be built in industrialized communities (where demand growth is the highest), the reliability of the grid can be reinforced.[128]

C. Net Metering Program

A net metering program[129] with federally-set standards implemented through the states would be one of the most effective ways of introducing both distributed generation, and specifically, renewable distributed generation. As stated by one author, "[n]et metering is the principal mechanism employed by the states to encourage decentralized and renewable . . . technologies."[130]

By allowing consumers to be fairly compensated for small-scale electricity generation, there becomes a greater incentive for them to invest the capital necessary for generation and to connect such resources to the grid. The problem in this area is jurisdictional, with a fundamental tension between state and federal authority

[126] ISO NEW ENGLAND INC., 2004 ANNUAL MARKETS REPORT 5 (2005), http://www.iso-ne.com/markets/mkt_anlys_rpts/annl_mkt_rpts/2004/2004_annual_markets_report_.pdf.

[127] *Id.* at 5–6. Capacity markets exist where generators receive payments simply for the amount of generation capacity they have available, where or not it is utilized by the grid. *Id.* at 54. The value to the consumer is in insuring enough available generation to the grid at all times. *Id.*

[128] *See* discussion *supra* Parts III.A, IV.B (explaining current problems with our system reliability and how distributed generation offers a solution to these reliability problems).

[129] "Net metering occurs when customers produce electric energy in excess of their needs, providing power back to the serving utility and permitting the customer to receive a credit for power they supply to the system." Press Release, Mich. Pub. Serv. Comm'n, MPSC Approves Agreement Implementing Statewide Net Metering Program That Will Allow Customers to Put Excess Electricity Back on the Grid (Mar. 29, 2005), *available at* http://www.michigan.gov/cis/0,1607,+7-154-10573_11472-114009--M_2005_3,00.html.

[130] Ferrey, *supra* note 83, at 286.

over these transactions.[131] The issue is whether net metering transactions are interstate sales subject to federal jurisdiction, or intrastate retail sales that can be regulated by the states.[132] Essentially, FERC does not have jurisdiction over local distribution facilities.[133]

> [U]nder most circumstances [FERC] does not exert jurisdiction over a net energy metering arrangement when the owner of the generator receives a credit against its retail power purchases from the selling utility. Only if the Generating Facility produces more energy than it needs and makes a net sale of energy to a utility over the applicable billing period would [FERC] assert jurisdiction.[134]

This issue is most apparent on a practical level in setting prices paid to consumers for local power generation. Without a comprehensive and fair pricing and billing policy, consumers will be unwilling to connect currently installed resources or to invest in new distributed generation resources. Absent a federal directive on this subject, states have implemented a variety of programs with divergent standards on the types of eligible technologies, the size limits, the total capacity limits, and the "[t]reatment of [n]et [e]xcess [g]eneration."[135] By combining net metering with increased market transparency argued for in Part IV.B, consumers can become small-scale market players, both buying and selling electricity when it is most profitable.

D. Municipal Ownership

Allowing a city or municipality to own and manage localized generation units is a cost-effective and practical way to implement

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[131] Steven Ferrey, *Nothing But Net: Renewable Energy and the Environment,* MidAmerican *Legal Fictions, and Supremacy Doctrine*, 14 DUKE ENVTL. L. & POL'Y F. 1, 3 (2003). "The constitutional constraints on state regulation of the traditionally federally governed American energy system are contested on the net metering battleground." *Id.*

[132] *Id.* at 108.

[133] *Id.* at 110. There has to be a line drawn between "federally regulated transmission and locally regulated distribution of energy. According to FERC, local distribution facilities normally sit close to retail customers. Power flows into a local distribution system and rarely, if ever, flows out." *Id.* at 112.

[134] Standardization of Generator Interconnection Agreements and Procedures, 106 F.E.R.C. 61,220 (2004).

[135] INTERSTATE RENEWABLE ENERGY COUNCIL, "CONNECTING TO THE GRID" PROJECT: STATE AND UTILITY NET-METERING RULES AND PROGRAMS (2006), *available at* http://www.irecusa.org/connect (follow "State-by-State Tables" hyperlink; then follow "Net Metering Table" hyperlink).

distributed generation. Currently about seventy-five percent of the power needs in the United States are met by investor-owned electric utilities.[136] The rest of the electricity needs in the United States are met by publicly-owned electric utilities, consumer-owned rural electric cooperatives, and, to a small extent, federally-owned utilities.[137] By the government encouraging both municipality-owned and cooperative-owned generation, it will be indirectly encouraging distributed generation because the size of such units is usually smaller. Furthermore, the operation of investor-owned utilities impedes the introduction of distributed generation in a way that municipality-owned utilities does not.

Publicly-owned utilities offer a real solution to one of the most prominent problems with distributed generation. Currently there are about 2,000 municipality-owned systems representing about ten percent of the nationwide generation. The American Public Power Association cites an increase in the amount of municipal generation over the last ten years partially due to the energy crisis and a desire for increased local control.[138] "They do it to address what issues are important to their community, whether that be lower rates or higher reliability."[139] One of the major differences between publicly-owned generation and investor-owned generation is the profit motive.[140] An investor-owned utility has as it major goal the maximization of profits, while a cooperative or publicly-owned utility is only seeking to minimize cost.[141] On the other hand, one of the largest barriers to large-scale development of distributed generation resources is the cost.[142] An investor-owned utility may not be able to justify the cost of distributed generation when its focus is on profit and not necessarily reliability and peak price shaving.[143] As discussed above,[144] these are some of the most beneficial elements of distributed generation. A municipality

[136] ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ELECTRIC POWER INDUSTRY OVERVIEW (n.d.), http://www.eia.doe.gov/cneaf/electricity/page/prim2/toc2.html (last visited Jan. 28, 2007).

[137] *Id.*

[138] Theo Emery, *Bill Would Encourage Municipal Utilities,* ASSOC. PRESS, Oct. 9, 2005, *available at* http://users.rcn.com/patrick.mehr/ls_encourage.shtml.

[139] *Id.* (quoting Ursula Schryver, spokeswoman for the American Public Power Association) (internal quotation marks omitted).

[140] WHITE PAPER*, supra* note 62, at 21.

[141] *Id.*

[142] CALIFORNIA DISTRIBUTED ENERGY RESOURCE GUIDE, *supra* note 100.

[143] *See* WHITE PAPER*, supra* note 62, at 20.

[144] *See supra* Part IV.

would, however, be interested in such benefits because their primary responsibility is to their local community. While the initial cost of the unit would have to be shared by the local residents, in the end the non-monetary benefits would accrue to them as well. Simply put, this allows the benefit of such a system to be realized by the people who bear the cost.

This type of solution also promotes the more widespread use of renewable resources. Combining the idea of distributed generation with municipality-owned units and transmission lines helps to encourage the development of renewable electricity generation in the most efficient way. The residents who are forced to or choose to subsidize renewable distributed resources will be able to realize all of the non-monetary benefits that such systems offer.

The municipality system further allows for a smooth administration of federal renewable energy policy, possibly through tax credits or deductions. One suggested solution is that the federal government offer favorable tax treatment for the amount of increased cost to each taxpayer within the municipality. This type of system has an indirect effect on the promotion of renewable energy. Currently, there is a lot of opposition to renewable sources particularly because of their very visible nature and necessary placement in scenic places. Even environmental groups often speak out against them because of the possible impact on local bird and bat populations.[145] "In fact, those who live closest to wind farms are, on average, even more favorable to wind energy than the general public."[146] Therefore, a town that owns a generation unit is less likely to fight its installation. Vigorous campaigns have been waged in local areas when an outsider attempts to move in and install a generation unit, even a renewable one.[147] Also, by creating a positive national policy toward renewable energy, people are more likely to be receptive.

In Massachusetts, a bill[148] has been introduced that "would remove from state law a clause that defends utilities from municipal takeover."[149] The bill would make a sale of the utility to the city or

[145] Janet L. Sawin, *Toward a Clean Energy Future,* CAPE WIND (2007), *available at* http://www.capewind.org/modules.php?op=modload&name=Sections&file=index&req=viewarticle&artid=62&page=1.

[146] *Id.*

[147] *Id.*

[148] H.R. 3294, 184th Gen. Ct. (Mass. 2005).

[149] Emery, *supra* note 138; *see also* Matt Carroll, *Towns Weigh Taking Power Into Their Own Hands: Local Light Plant Gaining Favor*, BOSTON GLOBE, Jan. 8, 2006, *available at*

town inevitable once a fair market value was established for the utility.[150] Such a forced takeover has the potential to reduce consumer electricity rates by an average of twenty-four percent.[151] Not only will municipalization spawn rate decrease, but it will also encourage "competition with the big utilities" and promote increased reliability.[152] Such legislation is needed to make processes like municipalization smoother for cities and towns seeking to improve costs, and at the same time focus on increasing system reliability.

VII. COMPARISON TO A STATE APPROACH: NEW YORK

As opposed to the federal government's response, the response to these problems at the state level has been promising in some states. For example, New York has made a conscious effort to address distributed generation and has implemented a comprehensive plan for the integration of distributed generation resources. The New York plan substantively addresses the barriers preventing distributed generation investment such as interconnection. As a result, distributed power generation in New York has become a much more feasible solution to meet the state's energy needs.

New York has used a very coordinated approach to implementing distributed generation programs by studying and planning early on. In 1999, the New York Public Service Commission started the process by developing standardized interconnection requirements for small generators.[153] This was a necessary first step because without standards, connection is widely uncoordinated and the benefits cannot be accurately measured. These interconnection requirements apply to distributed generation units of 300 kVA or less that are connected to distribution systems (meaning they are connected to the grid).[154] Detailed provisions were laid out for the

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http://boston.com/news/local/massachusetts/articles/2006/01/08/towns_weigh_taking_power_into_their_own_hands (detailing proposed sales of utilities to municipalities).

[150] Carroll, *supra* note 149.

[151] *Id.* Such a cost savings are recognized by the investor-owned utilities, but attributed to "additional costs, such as property taxes paid to towns," help for the poor, and energy-efficiency programs. *Id.*

[152] *Id.*

[153] *In re* Competitive Opportunities Regarding Electric Service, Op. No. 99-13, Case 94-E-0952 (N.Y. Pub. Serv. Comm'n Dec. 31, 199) [hereinafter Interconnection Requirements], http://www.dsireusa.org/documents/Incentives/NY02Rb.pdf (adopting standard interconnection requirements for distributed generation units).

[154] *Id.* at 4.

interconnection of small-distributed generation resources, which gave a specific, detailed, practical process for these smaller units to connect.[155] In the Commission's own words, the requirements created "a feasible, streamlined approach to providing for customer interconnection of distributed generation units."[156] New York is one of the only states that has established interconnection requirements outside the net metering context.[157] The Commission's overall goal was to allow greater consumer choice in relation to their energy suppliers.[158]

The Commission also investigated "costs, benefits, and rates regarding distributed generation."[159] After the information was collected, New York was able to institute a pilot program for integrating distributed generation into the utility planning process.[160] One of the specific goals of this pilot program was to determine whether a competitive request for proposals (RFP)[161] program is a viable way of introducing distributed generation into the market based system.[162] Another goal of the pilot program was for utilities to integrate distributed generation into their distribution system planning process by requiring the utilities to issue a certain number of RFP's.[163] At least half of these RFP's must be satisfied by non-utility-owned distributed generation resources.[164] Overall, the actions by the Public Service Commission show a real commitment to distributed generation as a methodology for solving energy problems.

Another initiative undertaken by New York is net metering, specifically in the area of residential photovoltaic resources. In 1997, the New York adopted its net metering law.[165] The law

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[155] *Id.* at 5–13.

[156] *Id.* at 34.

[157] *See* AM. WIND ENERGY ASS'N, SMALL WIND IN NEW YORK (2007), http://www.awea.org/smallwind/newyork.html.

[158] Interconnection Requirements, *supra* note 153, at 34–35.

[159] *In re* Costs, Benefits and Rules Regarding Distributed Generation, Op. No. 01-5, Case 00-E-0005, at 1 (N.Y. Pub. Serv. Comm'n Oct. 26, 2001), *available at* http://www.dps.state.ny.us/fileroom.html (follow "Orders & Opinions"; then "New Search"; then enter the case number and follow the link to the October 26, 2001 opinion) (internal quotation marks omitted) (approving the pilot program for the use of distributed generation in the utility planning process).

[160] *Id.* at 6.

[161] An RFP is issued by utilities for a system distribution problem and bidders submit their detailed proposals for meeting that specific need. *Id.*

[162] *Id.* at 9.

[163] *Id.* at 10.

[164] *Id.*

[165] N.Y. PUB. SERV. LAW § 66-j (McKinney 2007).

provides that utilities must offer net metering services to qualified consumers, which now consist of both residential solar participants and farm waste participants.[166] Credits are applied to program participants accounts monthly and any unused credits must be paid out annually by the utility.[167] The program participant will be paid for excess credits at the utility's avoided cost of producing the electricity.[168] The law further provides for a small state income tax credit per Watt produced and a credit for twenty five percent of the cost of a qualifying photovoltaic system.[169] One way to further improve New York's net metering program is to provide more favorable rates for renewable distributed generation resources, thereby encouraging them. Many other states have implemented similar net metering programs, but a substantial portion of them have yet to take initiative in this area.[170] A cohesive federal stance on this issue may help encourage more widespread introduction of net metering programs.

Lastly, another New York initiative closely related to net metering is combined heat and power. The New York State Energy Research and Development Authority (NYSERDA) committed twenty million dollars to installing forty-five combined heat and power generators in 2002.[171] The purpose of such programs is to take advantage of energy losses that result when power must be moved over large distances.[172] Also, this type of solution allows facilities to utilize heat that is a byproduct of the electricity generation process.[173] Such heat is typically wasted by large generating facilities that have no use for it. The result is an efficiency of about eighty-five percent, compared to the thirty-five percent typical of centralized generation.[174] In a final report issued by NYSERDA prior to its implementation of this program, the report author stated that "public policy should focus on a greater

[166] *Id.* § 66-j(1)(a), (3)(c).
[167] *Id.* § 66-j(4)(b)–(c).
[168] *Id.*
[169] *Id.*
[170] *See* State Env't Res. Ctr., Innovative State Legislation, Issue: Net Metering, http://www.serconline.org/netmetering/stateactivity.html (last visited Aug. 1, 2007).
[171] Press Release, Gov. George E. Pataki, State of N.Y., Governor: $24 Million to Support Combined Heat & Power Projects: Initiative Places Power Generation at the Point of Use to Dramatically Improve Efficiency (June 20, 2002), *available at* http://www.nyserda.org/Press_Releases/press_archives/2002/governor/govjune20_02.asp.
[172] *Id.*
[173] *Id.*
[174] *Id.*

degree of uniformity, transparency, and simplicity to [the] processes" for implementing such cleaner distributed generation resources.[175] Like New York, the federal government will need to focus its attention on these areas in order to utilize these technologies to meet its energy problems.

VIII. CONCLUSION

In conclusion, there is no single solution to the energy problems today, but distributed generation offers one option. When examining the history of the electricity system, it is easy to see how deregulation, while beneficial in many ways, has had many unanticipated consequences. Distributed generation, therefore, addresses many of the major energy problems faced, including system instability, infrastructure underinvestment, fossil fuel dependency, and other problems associated with the industries' rapid growth. The variety of market-based solutions for integrating distributed generation indicates its flexibility in accommodating unique situations and needs. Furthermore, examining the federal policy towards energy issues clearly shows a lack of commitment to distributed generation as a solution, resulting in a status-quo at the federal level. States have been forced to take the initiative voluntarily without much guidance. As the New York example indicates, these solutions are not only possible but can be successful as well. Still, a cohesive national policy considering such programs would be much more effective than scattered localized attempts. Ultimately, the promise of distributed generation implemented by diversifying and localizing energy operations is a system able to insulate itself from problems and adapt to a rapidly changing environment.

[175] NEW YORK STATE ENERGY RES. & DEV. AUTH., COMBINED HEAT AND POWER MARKET POTENTIAL FOR NEW YORK STATE: FINAL REPORT, at iv (2002).