STUDY OF THE EFFECT OF PRIVATE WIRE LAWS ON DEVELOPMENT OF COMBINED HEAT AND POWER FACILITIES

Pursuant to Section 1308 of
The Energy Independence and Security Act of 2007

Prepared for:
U.S. Department of Energy

Navigant Consulting, Inc.
Suite 500
1801 K Street, NW
Washington, DC 20006

202.481.7534
www.navigantconsulting.com

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STATUTORY REQUIREMENT

Energy Independence and Security Act of 2007

SEC. 1308. STUDY OF THE EFFECT OF PRIVATE WIRE LAWS ON THE DEVELOPMENT OF COMBINED HEAT AND POWER FACILITIES.

(a) STUDY.—

(1) IN GENERAL.—The Secretary, in consultation with the States and other appropriate entities, shall conduct a study of the laws (including regulations) affecting the siting of privately owned electric distribution wires on and across public rights-of-way.

(2) REQUIREMENTS.—The study under paragraph (1) shall include—

(A) an evaluation of—

(i) the purposes of the laws; and

(ii) the effect the laws have on the development of combined heat and power facilities;

(B) a determination of whether a change in the laws would have any operating, reliability, cost, or other impacts on electric utilities and the customers of the electric utilities; and

(C) an assessment of—

(i) whether privately owned electric distribution wires would result in duplicative facilities; and

(ii) whether duplicative facilities are necessary or desirable.

(b) REPORT.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a report that describes the results of the study conducted under subsection (a).

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Glossary of Terms and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ACEEE	American Council for an Energy Efficient Economy
APPA	American Public Power Association
ATC	Average Total Cost
Btu	British Thermal Unit
CHP	Combined Hear and Power
DG	Distributed Generation
DOE	U.S. Department of Energy
EEI	Edison Electric Institute
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act
ERCOT	Electric Reliability Council of Texas
EWG	Exempt Wholesale Generator
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GW	Gigawatt
ISO	Independent System Operator
ISO-NE	Independent System Operator – New England
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt-hour
LEED	Leadership in Energy and Environmental Design
MISO	Midwest Independent System Operator
MW	Megawatt
NARUC	National Association of Regulatory Utility Commissions
NEC	National Electric Code
NYISO	New York Independent System Operator
OASIS	Open Access Same-time Information System
OSHA	Occupational Safety and Health Administration
PJM	PJM Interconnection
POCC	Point of Common Coupling
POI	Point of Interconnection
PSC	Public Service Commission
PUC	Public Utility Commission
PUHCA	Public Utility Holding Company Act
PURPA	Public Utility Regulatory Policies Act
QF	Qualifying Facility
SGIP	Small Generation Interconnection Procedure
USCHPA	United States Combined Heat & Power Association

1. Executive Summary

Section 1308 of the Energy Independence and Security Act of 2007 ("EISA 2007") directed the Secretary of Energy, in consultation with the States, to undertake a study of the laws affecting the siting of privately-owned distribution wires on or across public rights of way and to consider the impact of those laws on the development of combined heat and power ("CHP") facilities, as well as to determine whether a change in those laws would impact utility operations, costs or reliability, or impact utility customers. The study is also to consider whether a change in those laws would result in duplicative facilities and, if so, whether that would be desirable. This document has been prepared to satisfy the requirements of EISA 2007 Section 1308.

For purposes of this study "private distribution wires" refers to lines that are not owned by an electric utility and that are designed to provide electric service directly from a non-utility generator to one or more end-use customers on terms negotiated between the parties without regulatory oversight or involvement. The term "utility" or "public utility" includes investor-owned utilities as well as government-owned or cooperative utilities.[1] They are all "public" in the sense that they serve the general public in a manner similar to common carriers, with published (and, in the case of investor-owned utilities, regulated) rates.

Scope of Study

Issues included in the scope of the EISA 2007 Section 1308 study are as follows:

- Survey of laws affecting the installation of electric distribution wires on public rights of way by entities other than public utilities;
- Evaluation of impact of these laws on CHP development:
- Discussion of potential impact to utilities and their customers if laws change; and
- Assessment of whether private wires would result in duplicate facilities and discussion of the consequences of duplication.

Issues that are beyond the scope of the EISA 2007 Section 1208 study include:

- Analysis of state and local laws relating to municipal powers;
- Review of municipal ordinances;
- Other factors impacting CHP development, including permitting, costs (including interconnection and standby power tariffs), and market demand;
- Quantitative and qualitative analysis of the costs vs. the benefits of eliminating restrictions on private (i.e., non-utility) distribution wires crossing public property;

[1] As discussed below, regulated electric utility companies are generally owned by investors, and are often referred to as "investor-owned utilities." Utility companies may also be owned by a governmental entity or agency such as a municipality or owned by the customers they serve, as is the case with a cooperative utility. Investor-owned utilities and cooperative utilities are "private" in the sense that they are not government-owned.

» Assessment of legal issues that might arise as a result of eliminating private wires laws;
» Pole attachment issues; and
» Potential benefits of CHP.

Background on CHP

CHP is the generation of two or more forms of energy by a single process. The most common forms of energy CHP units produce are mechanical (often instantly converted into electricity) and thermal. The process is commonly classified by the fuel type and the prime mover. The prime mover is the central piece of equipment within the CHP system and defines how the fuel is converted to energy. Prime movers include boiler/steam turbines, combined cycle units, combustion turbines, reciprocating engines, fuel cells and microturbines. Fuels also vary from system to system. While natural gas is the dominant choice of fuel, other options include biomass, coal, oil, waste and wood.[2] The thermal energy portion of the CHP system is designed based on the desired applications, and outputs can be various combinations of steam, hot water, hot air or chilled water. Mechanical energy is also sometimes used for compression and pumping applications.

CHP is further divided into "topping" and "bottoming" cycle applications. In a "topping cycle" CHP thermal energy is recovered from the electric generation process and used to serve local thermal load (e.g., heat for a building). In a "bottoming cycle" application, the unit captures some of the heat produced in an industrial process and uses that thermal energy to generate electricity.

Nature of the Laws Affecting Distribution Wires

The laws affecting the siting of electric distribution wires fall into two major categories: state laws (and constitutional provisions) pursuant to which states and local governments administer public rights of way and state laws relating to utilities. Neither type of law, however, is likely to refer to "privately owned distribution wires." In practice, however, the two types of law often limit the ability of an entity other than an electric utility to site distribution wires in public rights of way.

Administration of Public Rights of Way

Administration of public right of way is a fundamental role of state and local governments. Accordingly, many state laws and ordinances affect the siting of any infrastructure – including distribution wires – in public rights of way. There is no general right to use the public right of way for private purposes. Similarly, however, there does not appear to be any general prohibition against private entities contracting with local governments to cross rights of way with a private (i.e., for non-

[2] Data collected from EEA CHP Database, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

public use) line for sewer, gas, electric, or other "utility" purpose.[3] This gives local governments an enormous amount of latitude to determine what uses will be permitted.

Utility owned wires and facilities are commonly sited in public rights of way. The "accommodation" of infrastructure for electric, sewer, water, telecommunications, etc., is an important aspect of managing public roads and highways. It requires the public owner to ensure peaceful coexistence of varying types of facilities in limited space, often while maintaining the safety and integrity of a road and minimizing public inconvenience.

Regulation of Electric Utilities

The provision of electricity in the United States is governed by state and federal law. Federal law, in general, focuses on high-voltage interstate transmission and on the wholesale markets for electric generation. Most other issues surrounding electric service, including distribution of electricity at the local level, are governed by state law. Every state regulates electric utilities providing service within its boundaries under the banner of a state public utility law.[4] In addition, some municipalities directly own and operate the electric utilities serving their residents. These utilities, while usually exempted from state regulation, are established by local ordinance. Similarly, cooperatively owned utilities, while generally self-regulated for rate purposes, are often regulated under state law with respect to safety or service quality. These and certain other types of "public power" utilities are established pursuant to state law or local ordinance. Federally chartered utilities, while exempt from state rate regulation, may, like cooperatives, be subject to regulation as to safety or service levels.

As recently as 20 years ago, most electric service in the United States was provided by vertically integrated electric utilities owning generating, transmission, and distribution facilities and operating as regulated or public-power monopolies in designated service territories. Electric service was long considered to be a "natural monopoly," where the economies of scale were such that costs would be expected to be less than could be obtained in a competitive model.

In the mid-1990's, several states began to question the natural monopoly model with respect to generation and adopted restructuring laws that allowed customers to buy power from alternate suppliers. At one point, nearly half the states had adopted or were actively considering some form of restructuring law. However, many of these states have since repealed or suspended these laws. There are currently 15 states,[5] plus the District of Columbia, with restructuring laws in place that permit retail

[3] Indeed, it is quite common. See, e.g. Program Guide, Utility Relocation and Accommodation on Federal-Aid Highway Projects, Sixth Edition, January 2003, Prepared By: Office of Program Administration Federal Highway Administration; See also utility accommodation policies referenced in *Survey of State Utility Accommodation Manual provisions*, American Association of State Highway and Transportation Officials (AASHTO), *available at* http://cms.transportation.org/sites/rightofway/docs/OR_UtilitiesAccommodationManual.doc (last visited September 15, 2008). In the context of these manuals and policies, the term "utilities" refers to the facilities – e.g., sewer lines, electric lines, telecommunications infrastructure – not the entity installing or owning them.

[4] Nebraska is arguably the one exception to this rule: it does not "regulate" public utilities because it does not permit them. All electric service in Nebraska is provided by public power entities, which are regulated by local government officials.

[5] Oregon only permits retail choice for non-residential customers. See discussion in Section 5.1.5.

customers to choose their supplier[6] Two additional states that suspended their restructuring programs have some degree of retail choice. None of these restructuring efforts (including those in the states that returned to traditional utility regulation) disturbed the utilities' monopolies with respect to electric distribution. Instead, the utilities in these states were required to deliver the power, in exchange for tariffed delivery rates. Among other things, this avoided the need for retail energy suppliers to construct multiple distribution networks to reach end-use customers[7] as well as avoiding concerns about potential stranded costs relating to the wires side of the utility business.[8] It also allowed these states to continue to hold the local regulated utility accountable for universal service, public safety, and reliability. Additionally, in some states, it provided a mechanism for collection of certain non-bypassable charges (such as taxes) that had previously been assessed against the utility.

Electric distribution continues to be a monopoly service provided by utilities within designated service territories, even where states have allowed customers to choose their electric suppliers. The service territory monopoly, however, comes with a price. In exchange for monopoly rights to serve all customers within an area, electric utilities are subject to extensive regulation reaching all aspects of their operations, including not only prices (i.e., rates), but also their service levels, reliability, and safety. Regulation also encompasses siting of facilities and may include construction practices, land use issues, and mitigation of environmental impacts. Distribution utilities are also required to serve all customers in their territories, regardless of the cost of building the infrastructure to do so and regardless of the customers' ability to pay.[9] Nonetheless, some state laws recognize limited exceptions to the franchised utility's exclusive rights to provide electric distribution. In some cases states, such as California and New Jersey, permit private wires under specific circumstances.

Regardless of whether states have restructured their utility laws, they generally permit customers to generate electricity on site for their own consumption. However, the right of a generation owning customer to serve other sites or to sell "excess" electricity directly to another customer is limited. The seller may be deemed to be a "public utility" under state law. In addition, the transaction may violate the exclusive right of the franchised utility to provide the service under local or state laws.

States define "public utility" broadly. Regulation is the quid pro quo for the monopoly franchise granted to utilities within their service territories to provide electric distribution services (and, in many states, all services relating to electricity, including supplying generation). The designated utility has the exclusive right, but also the obligation to serve all customers within the service territory. A utility's service territory rights may be expressly exclusive, or the exclusivity may be implied. In either case, the result is that any entity attempting to provide distribution service within a utility's service territory may

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[6] http://www.eia.doe.gov/cneaf/electricity/page/restructuring/restructure_elect.html (last visited November 4, 2008).

[7] Proponents of competition and restructuring viewed "retail wheeling," as essential, since it would be impracticable and cost-prohibitive for the non-utility power sellers to build power lines to serve customers.

[8] "Stranded costs" refer to those utility investments that would not be recovered in the normal course after restructuring.

[9] Utility bad debt costs around $1 billion annually. American utilities, through their ratepayers, paid an average of $3 per customer to collect bad debt, and in some cases, the cost was as high as $10. See *Utility Collections Best Practice: Theory Into Practice*, Peace Software White Paper (May 2005), *available at* http://www.peace.com/industry-watch/whitepapers/Peace-Collections-Best-Practice.pdf (last visited September 16, 2008).

not only be considered to be a public utility – and therefore subject to the full range of regulation that would entail – but may also be violating the incumbent utility's exclusive right to provide distribution services.

In most states, cities and municipalities enter into franchise agreements granting the local utility rights to use streets and rights of way. These agreements are usually long-term, and vary from state to state, and often from town to town. These franchise agreements may or may not state that they are exclusive, and they often entail the provision of services (such as street lighting) as part of the consideration. Some states clearly recognize the possibility that a private party might locate a distribution line in a public right of way. In addition, private wires are often only allowed to *cross* rights of way, as compared to being allowed to make extensive longitudinal use of the right of way.[10]

Impact of Utility Laws on On-Site Generation and Private Wires

States have taken different approaches in their treatment of on-site generation. Florida, for example, has strictly limited self-generation to a single premise where the generator and the property are owned by the same party[11]. At the extreme, it is not clear whether a third-party could lawfully own and operate the generator and provide the output to the property owner.[12] Other states, such as California and New Jersey, have taken a more liberal approach, permitting generation – sometimes limited to certain favored technologies such as CHP or renewable resources – on one property to be provided to "adjacent" properties under limited circumstances.

The EISA 2007 Section 1308 study reviewed the utility laws of 10 states to determine whether the owner of a CHP unit at one site could legally serve other customers through privately-owned distribution wires – i.e., without using the incumbent utility's distribution wires. These states represent a range of utility regulatory models and include a number of states where large numbers of CHP units or a large amount of CHP capacity has been installed, or where there is a large technical potential for CHP.

Some of the states examined would not permit any entity other than a utility to serve end-use (or retail) customers under any circumstances, effectively precluding the siting of non-utility distribution wires in public rights of way. Several of the states examined, however, have adopted some type of provision that would allow limited "direct" service via non-utility distribution wire from a generator to one or more customers without subjecting the generator owner to regulation as a utility. These exceptions are generally narrowly drawn. For example, California and New Jersey have statutes that expressly permit CHP owners to serve properties separated by a public right of way – but only if the properties are under common ownership or meet other specific conditions. New York and Michigan also permit CHP units to serve a small number of nearby customers through private wires.

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[10] See, e.g., Minnesota Department of Transportation Utility Accommodation Policy, amended November 2005, *available at* http://www.dot.state.mn.us/utility/files/pdf/appendix-b.pdf (last visited September 16, 2008) and others cited in response to Survey cited in footnote 2 above.

[11] *PW Ventures, Inc. v. Nichols*, 533 So.2d 281, 283 (Fla.1988)

[12] This appears to be the case in Florida as well as Texas, though Texas permits a generator owner to serve tenants and employees as well. Illinois, on the other hand, specifically recognizes that a third party may operate or even own the facility. See discussion in Section 5.2 of the EISA Section 1308 Study.

Whether other states have or would adopt similar provisions that would allow greater siting of non-utility wires in or across public rights of way is unknown. Private wires would represent an exception to the monopoly granted to the utility to provide distribution service. Competition, in this instance, increases the costs to other customers. In addition, private wires involve many of the same issues that states wrestled with in deciding whether – and how – to restructure their utility laws to permit customers to choose alternate electric suppliers. Private wires also raise concerns as to the potential proliferation of wires. Just as states took different approaches to restructuring, states might take different approaches to private wires.

In those states that have restructured their utility regulation to permit retail choice (and provide for competitive generation), there may be concern that allowing private wires would upset the balance struck between the interests of the various stakeholders after what may have been lengthy and contentious proceedings. In those states that have not introduced retail choice, the reluctance to permit an unregulated entity to provide direct retail service may be greater. In those states, only the incumbent, state-recognized utility can provide electric service to a customer located in the utility's service territory, absent other provisions in the law. As a result, while a CHP owner could generate electricity for its own use, it could not sell excess power to another end user, through private wires or otherwise, in most cases. .[13]

Finally, even in those states where the utility law would permit a self-generator to serve another customer via a private distribution line, the siting of that line is subject to local conditions and ordinances. Local authorities control siting and have the obligation to administer the right of way in the public's interest.

Impacts on CHP

Despite restrictions on siting private distribution wires, CHP projects have been and are being developed, although the pace of development has slowed since 2003. As of October 2007, approximately 85 GW of CHP generating capacity is installed in the United States, representing nearly 8% of the total installed capacity in the country.[14] CHP has been installed in every state, plus the District of Columbia.

Numerous factors impact the economics of installing CHP, including fuel prices, thermal requirements, electric load, owner's cost of capital, payback time, power reliability and security needs, and regulatory issues. In addition, site constraints, construction and installation costs, interconnection terms or absence of standards, the cost of back-up or standby service, and other items can also impact the financial viability of the project. In addition, as with any major project, delays along the way can also add to

[13]Even these states might permit private wires in limited circumstances, however. Iowa, for example, permits a customer-generator to serve up to 5 additional facilities by "secondary line." See discussion in Section 5.2 of the EISA Section 1308 Study.

[14] CHP data as of October 18, 2007, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008); total generation data as of December 31, 2006, *available at* http://www.eia.doe.gov/cneaf/electricity/epa/epat2p2.html (last visited November 4, 2008). The actual value is 7.924%.

costs. The elimination of private wires restrictions would enable CHP developers to sell excess power at retail pricing without becoming regulated as public utilities, which could potentially impact the economics of a CHP installation. However, it is not clear how large the impact would be and whether it would be sufficient to overcome other concerns.

CHP generators, like other generators, have alternatives to dispose of excess power, including wholesale transactions and, in some states, net metering or net billing. Net metering provides a credit against the customer's bill at the price that the customer pays for both the energy and delivery charge. In some instances, the credit may be carried over for future bills. Net metering credit reflects the retail rate and is generally only available for very small installations, and often only available for renewable resources. Net billing similarly provides a credit for power exported to the grid, but at the wholesale price for power.[15]

Some CHP proponents have argued that CHP cannot profitably chase "spark spreads" in the wholesale market. This is the spread between the cost of the gas (or other fuels) needed to produce electricity and the price that can be obtained for the electricity. Because natural gas continues to be the dominant fuel for CHP, the assertion is that at off-peak generation times, CHP – and other gas-fired non-CHP generating units – may not be competitive with coal, nuclear, or hydro generation. If this is true, in order to avoid competing with low cost, off-peak power, CHP generators generally would prefer to sell directly to end-use customers under long-term agreements. This option would be facilitated by direct distribution links between two or more sites.

It is unclear whether elimination of all restrictions on the ability to site privately owned distribution wires to serve multiple sites from a single CHP facility would have a significant impact on CHP development. Private wires issues only apply to CHP installations that have the potential to produce excess electricity on a regular basis. Smaller CHP units at commercial facilities (less than 500 kW) tend to be sized to serve the thermal load and, due to the relatively low thermal requirements, usually provide less than the full electricity requirements of a site, leaving the grid (or the local utility) to provide the remainder. While these sites may have excess power to sell from time to time, they would be unlikely to have enough extra power on a regular basis to serve another customer by private wire. Facilities of this size currently represent approximately 40% of the total CHP sites. For CHP sites that are greater than 500 kW, the costs associated with permitting, installing, and maintaining private distribution would offset at least a portion of the anticipated revenues from bypassing utility service.

In addition, because CHP is necessarily sited near the thermal load, the ability to serve multiple sites will depend on having suitable energy customers near the thermal load. Most of the installed CHP capacity is located at industrial sites. These sites may or may not have close neighbors that would be able to use excess energy. Some CHP providers have suggested that urban locations would provide an opportunity for further CHP expansion if the CHP unit could directly serve additional customers via private distribution wires.

Impacts on Utilities and their Customers

[15] Even where the credit represents the wholesale value, the generation owner receives the added benefit of having a ready buyer for small volumes of energy.

Enabling CHP developers – and other generators – to "bypass" utility distribution systems by constructing private distribution wires linking multiple sites or customers has the potential to impact utilities and their customers. Utility rates – whether bundled full-service retail rates or unbundled delivery service rates – reflect the average cost to serve various classes of customers. The average cost may be higher or lower than the marginal cost to serve a specific customer. However, because the utility has a duty to serve all customers and to build the infrastructure to do so, the excess costs of serving some customers are socialized. This is a fundamental principle of rate design that ensures that all customers will have access to electric service at a fair price.[16]

Some CHP developers have suggested that they can make CHP more competitive overall by constructing private wires at a cost lower than the utility's delivery charges, in effect offsetting the excess generation costs at times. Alternately, they argue that they could achieve the same result if the utility were to purchase excess power from the CHP at the utility's full retail rate. In either case, this could result in a cost shifting from the CHP customers to the utility's customers, since the utility's rates reflect average costs to serve customers, as compared to the marginal cost in a specific instance. Where a customer bypasses the utility's charges, the utility may avoid incurring its marginal costs. However, any excess over marginal cost that would have been collected from that customer must now be borne by the utility and its other customers. [17]

Whether a state has restructured its utility laws to permit retail customers to choose their energy suppliers will also factor into the impacts on the utility, and other customers. Where a state has not restructured its utility regulation, the question of the utility's potential stranded costs associated with customers leaving the utility's service will likely arise. In the absence of a mechanism to recover these amounts, utilities may assert a "taking" of their property and a breach of the so-called regulatory bargain.

Other Issues; Duplicate Facilities

In addition to rate concerns, there are public safety, maintenance, cost, and aesthetic issues. These concerns become more significant the greater the amount of public access to the wires in question. While placing wires underground may address the public access and aesthetic issues, underground

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[16] Charles F. Phillips, Jr., *The Regulation of Public Utilities - Chapter 2: The Economic Concepts of Regulation,* Public Utilities Reports, Inc. (1993). See also, Steven Braithwait, Dan Hansen, & Michael O'Sheasy, *Retail Electricity Pricing and Rate Design in Evolving Markets*, Edison Electric Institute (July 2007), *available at* http://www.eei.org/industry_issues/electricity_policy/state_and_local_policies/rising_electricity_costs/Retail_Electricity_Pricing.pdf (last visited September 15, 2008).

[17] *See,* Richard A. Posner, *Natural Monopoly and its Regulation* - 30th Anniversary Edition Cato Institute, Washington, DC , 1999, Pg.1-2; Charles F. Phillips, Jr. , *The Regulation of Public Utilities*, Public Utilities Reports, Inc., Arlington, VA, 1993, Chapter 2. With respect to purchasing power at a retail rate, as noted above, some in the utility community argue that this compensates the CHP provider for delivery services it is not performing.

installations are far more expensive than above-ground installations.[18] Underground wires, while generally more reliable, are more difficult and expensive to maintain and repair. From a purely logistical point of view, in many urban areas, the space available for utility facilities is limited. Adding additional duct packages would be a challenge, and cities may be reluctant to cede limited space for private purposes.

The public safety issues associated with electric distribution wires are far more significant than those related to, for example, telecommunications wires. While telecommunications wires are not dangerous, improper handling of electrical wires can result in severe injury, loss of life, and property damage. Like a utility's wires, private wires can either be suspended in air or buried underground. Where wires are above ground, the downed wires can create obvious hazards. Multiple wires owned by different parties present additional risks. When weather or a traffic accident causes a live power line to contact the ground, a car or other property, emergency responders need to have the line de-energized. With multiple wires and multiple owners, it may not be clear who can do this. Similarly, when linemen are restoring the system after a major disruption, they need accurate information about which wires are or are not energized. Again, multiple wires and owners may make this more difficult.

With underground wires, a new set of safety issues arise. The precision associated with mapping and locating wires varies dramatically. Contractor dig-ins often occur, even where regulated utilities have installed wires. Increasing the number of parties who can install electric distribution wires in public rights of way would likely exacerbate this problem. In addition, there is the added concern as to whether this might open the door for installation contractors with limited experience.

Other questions arise: will the CHP owner be financially viable over the life of the distribution wires? Will the CHP owner be able to bear the costs of repair and replacement over time? These are questions that are equally applicable to utilities. However, regulated public utilities have a cost recovery mechanism (rates) that enhances the likelihood that the utility will survive and be in a position to maintain the integrity and safety of the line. This is their core business, and the regulator (and the public) will quickly intervene if safety is an issue. Many of these issues are solvable with appropriate rules and minimal regulation.

Removing restrictions on private distribution wires may result in duplicate facilities. If all restrictions were lifted, such that any party could build a distribution line (i.e., not just a CHP developer), then there is a greater potential for duplicate facilities. This can increase grid and end-user reliability, but could

[18] This is well-known throughout the utility industry. The additional cost may range from 4 to 10 times the price of above-ground installation. While the reliability of underground installations is greater, maintenance and repair is more difficult and, hence, more expensive when needed. A study performed for the Long Island Power Authority in 2005 determined that while the frequency of outages declined with underground lines, restoration lines were significantly longer. In addition, the study noted that underground lines have proved to have shorter useful lives than overhead facilities and are more susceptible to corrosion, as well as risks from flooding, tree roots, rodents and dig-ins. The study is *available at* http://www.lipower.org/pdfs/company/papers/underground_030805.pdf (last visited November 4, 2008). Similar studies have been conducted by the Edison Electric Institute and are available on its website.
See, e.g., http://www.eei.org/industry_issues/energy_infrastructure/distribution/UndergroundReport.pdf (last visited November 4, 2008).

also pose additional concerns. Significantly, duplicate facilities present increased challenges for local planning and coordinating electric operations, increased safety and aesthetic concerns, as well as permitting complications. This is especially true for private wires, where the operation and ownership of the duplicate line is not controlled by the utility. For these and other reasons, including the significant costs associated with installation and maintenance of redundant wiring, duplicate distribution facilities have been avoided since the early days of electric service.

Even if an exception were applicable only to CHP, the utility would have to maintain distribution wires to each of the sites in order to provide back-up power in the event the CHP unit is out of service (should the facility choose to remain connected to the grid, which most do) or a facility desires to take its principal electric service from the utility.[19] Furthermore, the cost, safety, and aesthetic issues mentioned above would still arise.

Conclusions

Whether to permit private electric distribution wires raises fundamental questions of policy under state utility laws. Each state has chosen to regulate electric utilities operating within their borders. Fifteen states have restructured their laws to permit customers to choose the supplier of their electricity. No state has chosen to permit general competition in electric distribution. Electric distribution is provided as a monopoly service in all 50 states and the District of Columbia, although some states have carved out limited exceptions. In exchange for monopoly rights, utilities undertake the obligation to serve all customers in a defined geographic territory at published rates on a non-discriminatory basis. Rates are set based on the cost to serve various customer classes, and are designed to provide the utility a return of and a return on its investment. A key element of rate design is the avoidance of cross-subsidies between different types of customers. This regulatory model, based on the existence of a "natural monopoly" has been in place for decades.

Private wires are inconsistent with this model. However, several states have nonetheless chosen to permit them under limited circumstances, including, in some states, where the wires are used to provide generation specifically from CHP units. The issues surrounding private wires are complex. There are operating, planning, and rate issues, in addition to potential concerns regarding public safety and grid safety. The customer and utility impacts of permitting private wires could be significant and could vary from utility to utility, as well as from state to state.

At the same time, it is not clear that existing restrictions on private wires per se are materially hampering the development of CHP. There are many different factors that impact the development of CHP, including the economics of particular projects, as well as the economy of a region. Not every state has the same technical potential for CHP. Other factors are cited as more significant by some developers.

[19] If the facilities served by a CHP provider are under common ownership then, arguably, the utility would only have to have a single connection in order to provide service to the facilities. However, it seems unlikely that unrelated customers would be willing to forego a separate connection to the utility grid, either for purposes of backup power when the CHP generator was out of service or to have the option of returning to utility service should the CHP owner fail or be unable to meet service level assurances.

Nonetheless, private wires restrictions may be a factor in some cases, where they may improve the economics of the project.

Private distribution wires, if constructed, would be duplicate facilities in many respects. Customers served by the private wires would likely also be connected to the local utility's distribution system. While there are potential benefits from duplicate facilities, there are also operational and reliability challenges from the utility's perspective, since the wires would not be controlled by the utility. In addition, multiple sets of wires and other distribution facilities raise concerns as to aesthetics, public safety, and public inconvenience.

2. Overview of Study

2.1 Statutory Requirement

On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007 (the "Act") into law. Section 1308 of the Act directs the U.S. Department of Energy ("DOE") to undertake a study of the laws pertaining to the siting of "privately-owned electric distribution wires on and across public rights-of-way" and to file a report of the study with Congress within one year from the date of the enactment of the law:

> SEC. 1308. STUDY OF THE EFFECT OF PRIVATE WIRE LAWS ON THE DEVELOPMENT OF COMBINED HEAT AND POWER FACILITIES.
> (a) STUDY.—
> (1) IN GENERAL.—The Secretary, in consultation with the States and other appropriate entities, shall conduct a study of the laws (including regulations) affecting the siting of privately owned electric distribution wires on and across public rights-of-way.
> (2) REQUIREMENTS.—The study under paragraph (1) shall include—
> (A) an evaluation of—
> (i) the purposes of the laws; and
> (ii) the effect the laws have on the development of combined heat and power facilities;
> (B) a determination of whether a change in the laws would have any operating, reliability, cost, or other impacts on electric utilities and the customers of the electric utilities; and
> (C) an assessment of—
> (i) whether privately owned electric distribution wires would result in duplicative facilities; and
> (ii) whether duplicative facilities are necessary or desirable.
> (b) REPORT.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a report that describes the results of the study conducted under subsection (a).

This study has been prepared pursuant to Section 1308.

2.2 Methodology, Scope, and Limitations

This study is focused on the laws that affect siting non-utility distribution wires across public rights of way, and the impact that those laws may have on development of CHP facilities, as well as the impact that changes in those laws might have on utilities and their customers. This study also considers whether changes in the laws might result in duplicative electric distribution facilities and, if so, whether that might be desirable.

Various research methods were employed in connection with this study, including broad internet and other searches to identify potential restrictions on private use of public rights of way. Charles Gray,

Executive Director of the National Association of Regulatory Utility Commissioners provided input on this study from the perspective of the states, and regulatory staff members in at least ten states were consulted on an informal basis. Numerous other parties were interviewed, representing a number of stakeholders impacted by potential CHP expansion, including utilities, trade associations, CHP project developers, government, and former utility regulators. CHP proponents identified a number of restrictions to private wires development, including municipal ordinances, but indicated that the principal source of restrictions on privately-owned distribution wires arose from state utility regulation, and from the franchises and other rights granted to public utilities by the states and, in some cases, by municipalities.

As a result, this study focused on the regulation of public utilities and the specific provisions of utility law and regulation that may be implicated when a CHP developer desires to install a private distribution line to serve one or more additional facility separated by a public right of way.

Issues included in the scope of this study are as follows:

- Survey of laws affecting the installation of electric distribution wires on public rights of way by entities other than public utilities;
- Evaluation of impact of these laws on CHP development:
- Discussion of potential impacts to utilities and their customers if laws change; and
- Assessment of likelihood that private wires would result in duplicate facilities and discussion of the consequences of duplication.

Issues that are beyond the scope of this study include:

- Analysis of state and local laws relating to municipal powers;
- Review of municipal ordinances;
- Other factors impacting CHP development, including permitting, costs (including interconnection and standby power tariffs), and market demand;
- Quantitative and qualitative analysis of the costs vs. the benefits of eliminating restrictions on private (i.e., non-utility) distribution wires crossing public property;
- Assessment of legal issues that might arise as a result of eliminating private wires laws;
- Pole attachment issues; and
- Potential benefits of CHP.

A committee comprised of stakeholders across the utility, regulatory, and CHP community was asked to provide advice and input to this study. An effort has been made to ensure that all points of view are reflected. However, it is important to note that the members of the committee disagree on the significance of some issues or the relative merits of many positions. Participation on the committee should not be construed as an indication of agreement with all aspects of this study or any of the conclusions expressed herein.

Committee members included:

- Merrill Smith, Private Wires Study Project Lead, U.S. Department of Energy;

- Jessica Bridges, Executive Director, U.S. Clean Heat and Power Association;
- Charles Gray, Executive Director, National Association of Regulatory Utility Commissioners;
- Michael Hyland, American Public Power Association;
- Michael Oldak, Edison Electric Institute;
- Katrina Pielli, U.S. Environmental Protection Agency;
- Lawrence Plitch, Vice President and General Counsel, Trigen, a Veolia Energy Company; and
- Patrick Wheeler, Consolidated Edison Company of New York.

These stakeholders and other parties who had previously indicated an interest in the study were invited to submit comments, which are included in Appendix B.

3. Discussion of CHP

3.1 Description of Technology

CHP is the generation of two or more forms of energy by a single process. The most common forms of energy CHP units produce are mechanical (often instantly converted into electricity) and thermal. The process is commonly classified by the fuel type and the prime mover. The prime mover is the central piece of equipment within the CHP system and defines how the fuel is converted to energy. Prime movers include boiler/steam turbines, combined cycle units, combustion turbines, reciprocating engines, fuel cells and microturbines. Fuels also vary from system to system. While natural gas is the dominant choice of fuel, other options include biomass, coal, oil, waste and wood.[20] The thermal energy portion of the CHP system is designed based on the desired applications, and outputs can be various combinations of steam, hot water, hot air or chilled water. Mechanical energy is also sometimes used for compression and pumping applications.

CHP, also known as cogeneration, is a form of distributed generation ("DG"). Further distinctions, such as the differences between "topping" and "bottoming" cycle systems, as well as the most typical applications, can be found in Section 3.2.

Over two-thirds of all CHP units installed today and more than 70% of CHP installed capacity are fueled by natural gas.[21] The popularity of natural gas stems from its availability and price in the United States, based on the existence of a broad distribution infrastructure. In addition, natural gas is "cleaner" than other fuels such as coal and oil from an emissions perspective, which makes it appealing in CHP applications that are located in urban areas (as opposed to sites in industrial parks) or where regulations dictate more stringent emissions levels.

The most popular prime mover used in CHP units today is the reciprocating engine, accounting for 45% of all CHP units. Like automobile or truck engines, reciprocating engines are generally cheaper and easier to start and stop than rotational machines such as turbines. As a result, they are found on most medium-sized and small CHP applications. Where emissions are a major factor and the CHP load is small, fuel cells and microturbines have been used as well. For larger applications, steam turbines, combustion turbines, and combined cycle plants are more popular. The graph below shows the different CHP units by fuel type and prime mover.

[20] Data collected from EEA CHP Database, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

[21] See Figure 1.

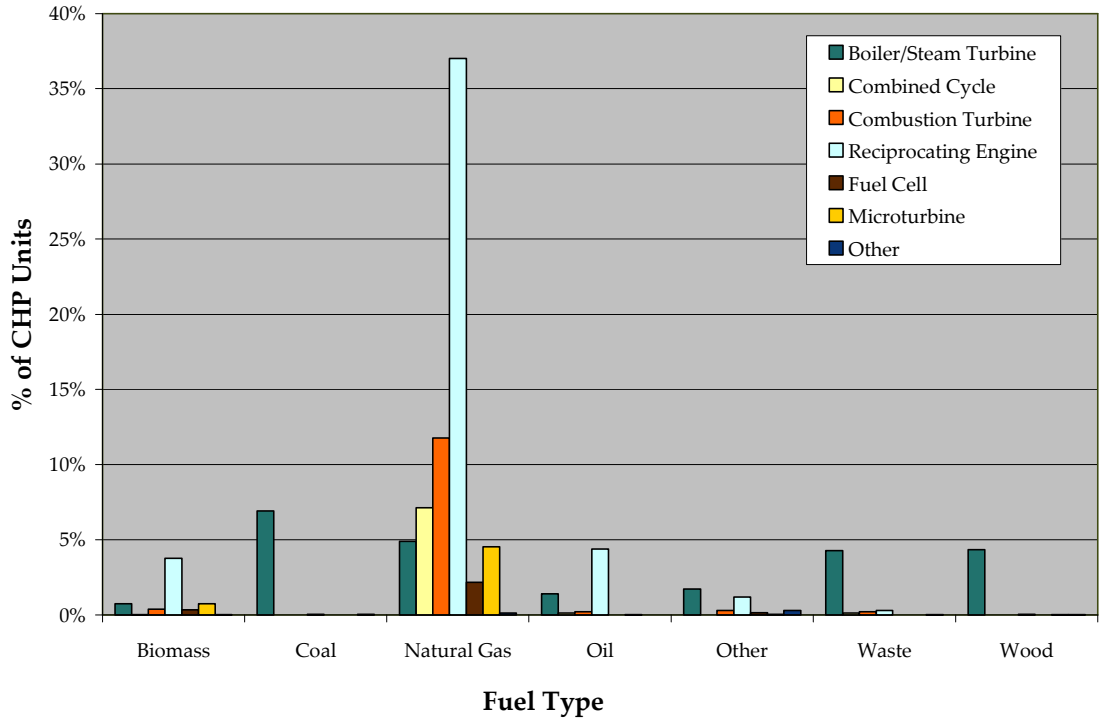

Figure 1. CHP Units by Fuel Type and Prime Mover[22]

3.2 Typical Installations

CHP installations in the United States typically fall into one of two configurations. In the majority of cases, there is an existing coincidental need for both electricity and thermal energy, such as for heating. This configuration is often referred to as a "topping cycle" CHP unit. These facilities mimic larger generation facilities in that their primary operation is to create electricity, but differ in that they use the excess heat to serve local thermal load. This is typical for new installations or retrofits in non-industrial facilities such as schools, universities, or large office buildings. The most common topping cycle installation is a gas turbine or engine with a heat recovery unit.[23]

The other general configuration for CHP is more commonly seen in industrial settings. There, an entity may install CHP to capture some of the heat generated in an industrial process and use that heat as fuel to generate electricity. This is referred to as a "bottoming cycle" application. Bottoming cycle CHP is most often seen in large production facilities such as chemical plants and refineries. Steam is the most useful form of heat for generation, and therefore the most common bottoming cycle system is a steam boiler with an attached steam turbine.[24]

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[22] Data collected from EEA CHP Database, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

[23] http://www.epa.gov/chp/basic/index.html

[24] http://www.epa.gov/chp/basic/index.html

Regardless of the type of installation, the CHP units are almost always sized to meet the thermal load. This means that the electricity generated can vary widely as a percentage of the total requirements and can range from being a small part of the facility's electricity demand to exceeding the site's requirements. The issue of private wires arises only when CHP installations have the potential to produce excess electricity on a regular basis, as discussed in other sections of this report. The following graph shows the percentages of both the capacity and the unit count of only the most typical applications.

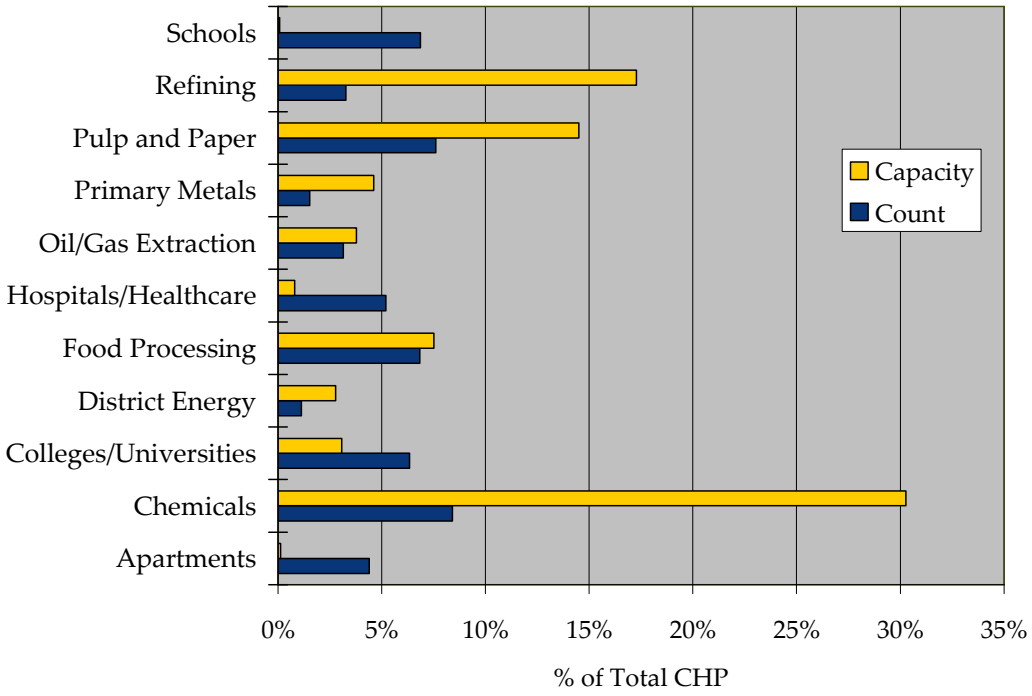

Figure 2. Typical CHP Applications[25]

3.3 Site Requirements

CHP installations can be found in a large variety of institutions, from schools to refineries. Due to the higher efficiency of CHP units, the emissions are often lower than for other types of generation (when calculated using output based emissions calculations). This may make CHP more suitable for urban environments than some other types of generation. The most attractive sites for CHP are those with natural gas readily available via a high pressure natural gas pipeline. Construction of a new spur line may add to the cost and will require sufficient scale and load to justify the investment. Industrial and commercial facilities with existing hot-water/steam/chilled water distribution systems also make attractive sites for CHP. In locations where new thermal energy distribution capacity is needed, new CHP investments will be more challenging.

[25] Data collected from EEA CHP Database, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

The most important site-related requirement is properly matching the thermal and the local electrical load. The electric load at the site may be large or small. A well designed CHP system will always be designed to meet the thermal load. The generation technology selected will depend on several factors – including power to heat ratio of the equipment and price paid for electricity exported.

3.4 Economic Drivers

CHP can provide numerous benefits, including reduced energy costs for the customer, taking into account the costs of electricity and thermal energy (e.g., heat). Due to the efficiency of CHP (simultaneous utilization of electricity and heat from a single fuel source), less fuel is needed for the same output. At various times (particularly during periods of peak demand and highest rates), it may be less expensive to generate electricity with CHP than to buy it from the utility.

Large commercial and industrial customers generally purchase electricity at prices that reflect the size of the load and wholesale energy costs at different times of day. In addition to the cost of the electric commodity, these customers must also pay for the utility to deliver it. Electricity prices and delivery charges can vary for these customers based on the overall demand and load on the grid. During the day, as more expensive units are turned on to meet peak loads, CHP can be price-competitive with or cheaper than other alternatives.

There are additional potential economic drivers that are not captured by a cost-based analysis focusing on the price of power or thermal energy. Adding any type of redundant generation on-site enhances the reliability of electric service to the load, which can be valuable to manufacturing companies where power outages may cause expensive shutdowns. In addition, as businesses and the public increasingly focus on emissions and greenhouse gas issues, CHP may play a role. The U.S. Environmental Protection Agency's Combined Heat and Power Partnership was created in 2001 in recognition of the emissions reductions that can be achieved through increasing the efficiency of the nation's energy supply through increased investment in CHP. The U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") certification program gives building owners a recognizable "green" label, based on an elaborate points system. A CHP installation serving a building's thermal and electric needs can earn significant points toward certification. The range of points varies depending on a number of factors, including whether the building is new construction or a renovation, the amount of energy savings and other factors. LEED certification may be a valuable marketing tool for building owners.

Ultimately, however, CHP is most often installed to save the customer money. CHP is usually installed as an economically preferable alternative to purchasing electricity and generating thermal energy on-site. CHP is a major capital investment. In analyzing capital investments, many corporations require payback rates of 2 to 3 years, which can hamper some CHP project development. Third-party financing or owner-operator arrangements can sometimes be used to alleviate this issue. Entities that can take a longer view and are more confident of their future operations at a particular site, such as hospitals, universities, and prisons, will frequently accept a longer payback period, which enhances the feasibility of installing CHP for these types of facilities.

3.5 Potential Impediments to CHP Expansion

According to a wide variety of CHP industry contacts, there are several impediments to the expansion of CHP aside from restrictions on siting private distribution wires. These include the fluctuating price of natural gas; the lack of standard, nation-wide interconnection procedures; interconnection and standby power costs; the perceived lack of adequate governmental incentives and support, and the so-called "utility throughput incentive."[26] Most, though not all, of the CHP industry participants interviewed for this study indicated that these issues were more significant factors in CHP development than the ability to install private wires. Two developers, however, asserted that the ability to install private wires could be a significant factor in increasing CHP development.

A major barrier to CHP expansion is the fluctuating cost of natural gas, which is often measured by "spark spread." Spark spread refers to "the difference in the cost to generate electricity from a fuel source and the cost to purchase from the utility."[27] As of October 2007, natural gas powered over 70% of all CHP generation capacity in the United States.[28] Therefore, when the price of natural gas is above a given point the economics for the CHP facility are not favorable. Natural gas price risk – and the resulting energy price risk – may also impact decision-making regarding the sizing of CHP units in comparison to the energy demands at the site.

Another impediment to CHP expansion has been the lack of a broadly accepted interconnection policy at the electrical distribution level. This is discussed in some detail in Section 6 of this report. In addition, CHP proponents also cite interconnection costs and utility standby power charges as major inhibitors of CHP development. These items are discussed in Section 6 of this report.

The market has not priced some of CHP's benefits as compared to fossil-fired generation. Because there is no national carbon emissions policy, CHP's potential benefit as a cleaner generation source is not currently reflected in market prices for power. A carbon emission tax, or other mechanism to reflect the cost of carbon emissions, would enhance CHP's competitiveness.

Finally, some CHP industry leaders have cited the need for more governmental and public assistance or incentives to further expand CHP development, while noting that the recent enactment of a 10% investment tax credit for CHP[29] may be helpful. Until this point, CHP has not been afforded the same incentives that certain types of renewable generation resources have received in recent years. Renewables can and should coexist with CHP and thus the new tax credit may provide support for this.

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[26] The "throughput incentive" is often cited as a disincentive for utility participation in energy efficiency and demand side initiatives. It is a matter of utility rate design and beyond the scope of this paper. For further discussion, see http://www.epa.gov/cleanenergy/energy-programs/napee/resources/guides.html#guide2 (last visited November 10, 2008).

[27] As defined by the American Council for an Energy Efficient Economy ("ACEEE").

[28] Data collected from EEA CHP Database, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

[29] CHP eligibility and requirements added by the Emergency Economic Stabilization Act of 2008, P.L. 110-343, 122 Stat. 3765 (October 3, 2008).

4. Economic Underpinnings of Distribution as Monopoly Service

4.1 *Natural Monopoly Theory*

Electric distribution utilities are often provided a state or municipal franchise allowing the utility to be the exclusive provider of service within a specified geographic area. These franchises are justified from an economic standpoint if that utility is a *natural monopoly*.

The next section will discuss the economic characteristics of competitive markets and monopolies. The concept of a natural monopoly will be introduced which forms the foundation for the rationale of regulated natural monopolies. This section will also discuss some of the fundamental rate concepts that flow from the regulated monopoly construct.

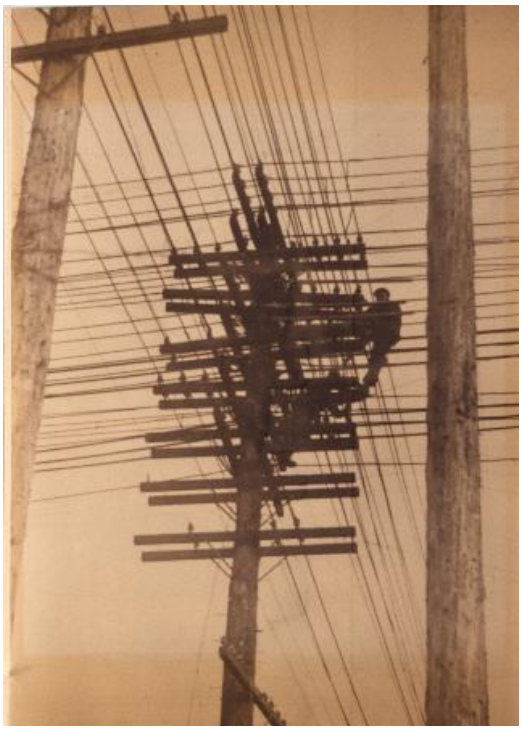

Figure 3. The distribution system in Indianapolis before monopolies were established. (Photograph courtesy of IP&L)

4.2 *Competitive Pricing and Consumer Welfare*

In a perfectly competitive market economic efficiency is maximized for all participants in the market – both producers and consumers. No other level of production for the commodity – either an increase or decrease from the competitive equilibrium level – will increase the level of social welfare. Furthermore, no one seller or buyer has the ability to influence the price of the commodity. In other words no market participant can make itself better off by altering their behavior (i.e., either produces more or less of a commodity).

Figure 4 below illustrates equilibrium in a competitive market.

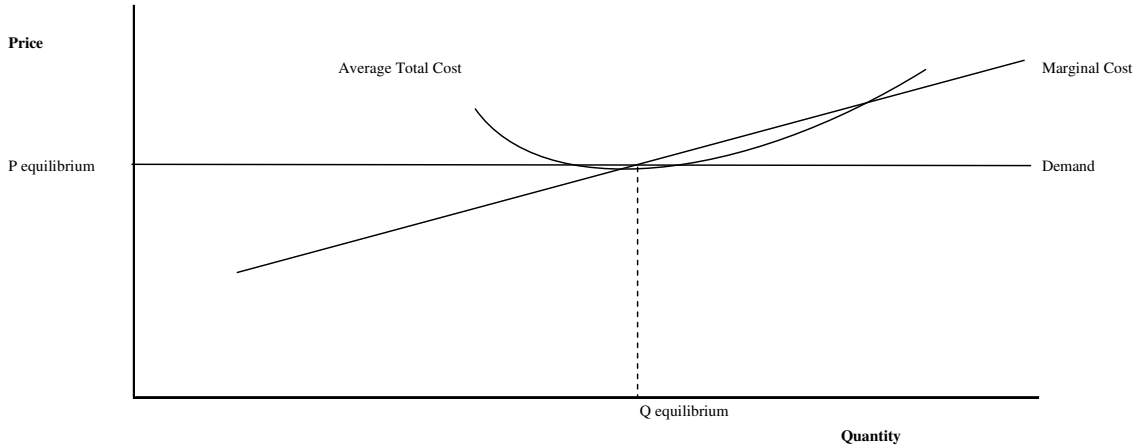

Figure 4. Long-Run Equilibrium of a Firm in a Perfectly Competitive Market

Equilibrium in a competitive market contains the following attributes:

- *Any increase or decrease in the quantity will increase the Average Total Cost* – The equilibrium quantity in a competitive market occurs where Average Total Cost ("ATC") is minimized. Therefore, any increase or decrease in production will trigger an increase in ATC.
- *At Equilibrium Quantity the Price is Equal to the Marginal Cost which is Equal to the Marginal Revenue* – At this point Marginal Cost equals Marginal Revenue. Any increase the quantity will produce a condition where the marginal costs exceed the revenues received from that increase in production thus reducing the profitability of the suppliers. Conversely, a decrease in the quantity will result in a decrease in revenue that exceeds the decrease in the costs incurred by the firms supplying the product and thus reducing profitability.

4.3 Behavior of a Monopolistic Market

Under a monopolistic market the quantity supplied by the monopolist is reduced because the monopolist is facing the demand curve for the market (downward sloping) and therefore will receive a lower price for every unit of output they produce. As discussed above a competitive supplier has no influence on the price of a commodity. Therefore, the monopolist has the ability and incentive to limit production thus maximizing their own profitability but producing a socially inefficient level of output.

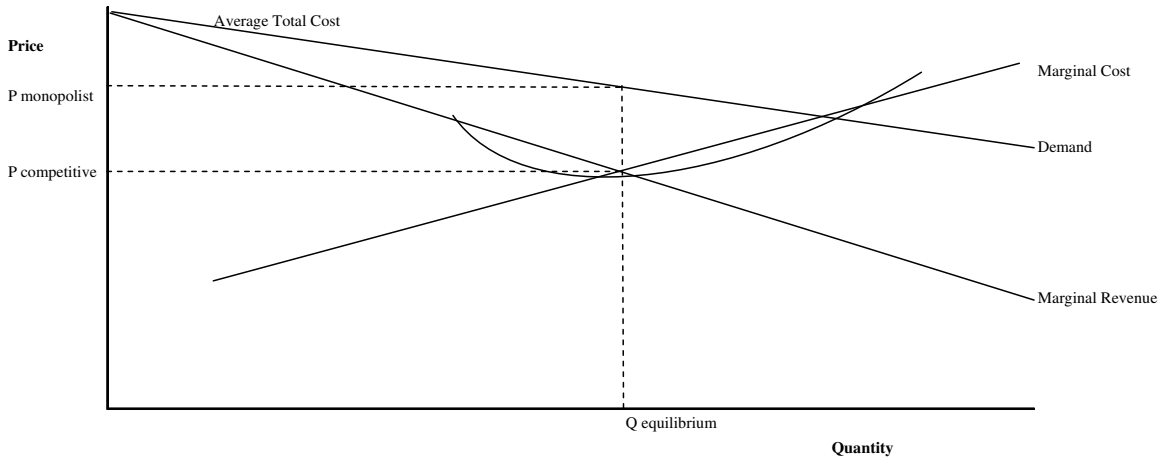

Figure 5. Long-Run Equilibrium in a Monopolistic Market

The difference between the market faced by a monopolist and a competitive supplier is summarized below:

1) A competitive supplier faces the same prices regardless of the quantity supplied to the market whereas the monopolist faces the demand curve for the entire market. The demand curve for the entire market (i.e., the demand curve faced by the monopolist) is generally downward sloping and thus the monopolist can influence the equilibrium price by changing the quantity supplied;
2) The Marginal Revenue of a monopolist will be downward sloping as opposed to the marginal revenue of a firm facing perfect competition which is flat;
3) The monopolist has the ability to price discriminate between different customers or customer groups. In this context price discrimination means charging a different price that is not cost or otherwise justified; and
4) The monopolist will produce a quantity where Marginal Cost equals Marginal Revenue like a competitive firm. However, that quantity will result in a price that exceeds Marginal Cost.

4.4 Natural Monopolies

Certain industries have cost behavior where a single producer of the commodity achieves the lowest average cost. When a market is characterized in this manner it is referred to as a *Natural Monopoly*. The Organization of Economic Co-operation and Development ("OECD") defines a natural monopoly as follows:

» A natural monopoly exists in a particular market if a single firm can serve that market at lower cost than any combination of two or more firms.
» Natural monopoly arises out of the properties of productive technology, often in association with market demand, and not from the activities of governments or rivals.

» Generally speaking, natural monopolies are characterized by steeply declining long-run average and marginal-cost curves such that there is room for only one firm to fully exploit available economies of scale and supply the market. [30]

A natural monopoly is defined as an industry where a high ratio of fixed to variable costs exists. Significant economies of scale (i.e., the average cost per unit decreases as the scale of output increases) exist for natural monopolies.

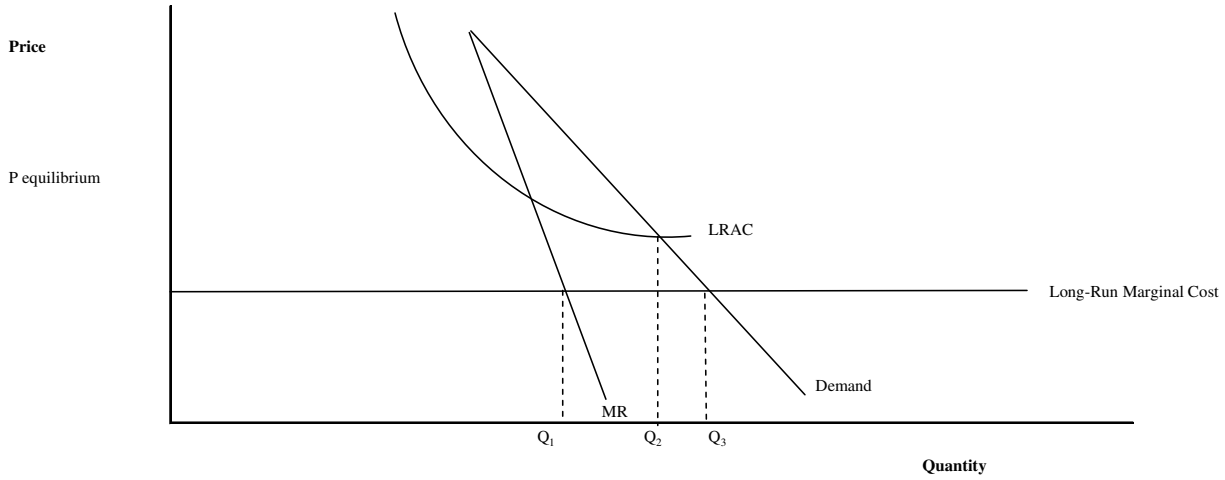

Figure 6. Behavior of a Natural Monopoly

Figure 6 above illustrates the behavior of a natural monopoly. If the natural monopoly produces a quantity that is normally considered socially efficient – where Long-Run Marginal Cost equals Price equals Q_3 – it will be producing below that firm's average cost (i.e., it will not recover all of the firm's accounting costs).

The monopolist has an incentive to produce where marginal revenues equal marginal costs at Q_1 - a point where price exceeds average cost thus allowing the producer to earn excessive profits. Therefore, price regulation is established in order to establish a justifiable price to be charged by the producer.

The objective of price regulation is to set prices that allow the monopolist to recover its costs and earn a "normal" return. A normal return is defined as the recovery of all just and reasonable costs including a return on and of capital that is justified by the risk faced by the firm.

4.5 Examples of Natural Monopolies

The most commonly cited examples of natural monopolies are industry structures that are defined by the existence of a network. A network is where a single system of activity is required to serve all customers. The existence of more than one network to serve customers does not provide a higher level of reliability and/or product choice but simply increases costs.

[30] OECD, Glossary of Statistical Terms, http://stats.oecd.org/glossary/detail.asp?ID=3267 (last visited November 4, 2008).

Distribution utilities are the most common examples of natural monopolies. Specific examples include: (1) Electric distribution networks; (2) Natural gas distribution networks; (3) Water distribution networks; and, (4) Postal systems providing basic services.

An example of an industry which previously was a natural monopoly but is no longer is the telecommunications industry. Previously a local phone call required the use of a system of local wires operated by a telecommunications utility. Technological change characterized by voice over internet ("VOIP") and mobile phones has introduced competitors to the network and thus changed the structure of this industry. In contrast, no such technological change has occurred with respect to electric distribution, nor has an alternative been developed to the physical wires and network such as occurred in the telecommunications business.

4.6 Impact of the Introduction of Competition for a Natural Monopoly

The introduction of competition into a natural monopoly market increases prices to consumers. This outcome is contrary to other market structures because the reduced production by the natural monopoly reduces the economies of scale. The introduction of competition effectively shifts the demand curve and therefore triggers an equilibrium on the Average Cost Curve that is higher than before.

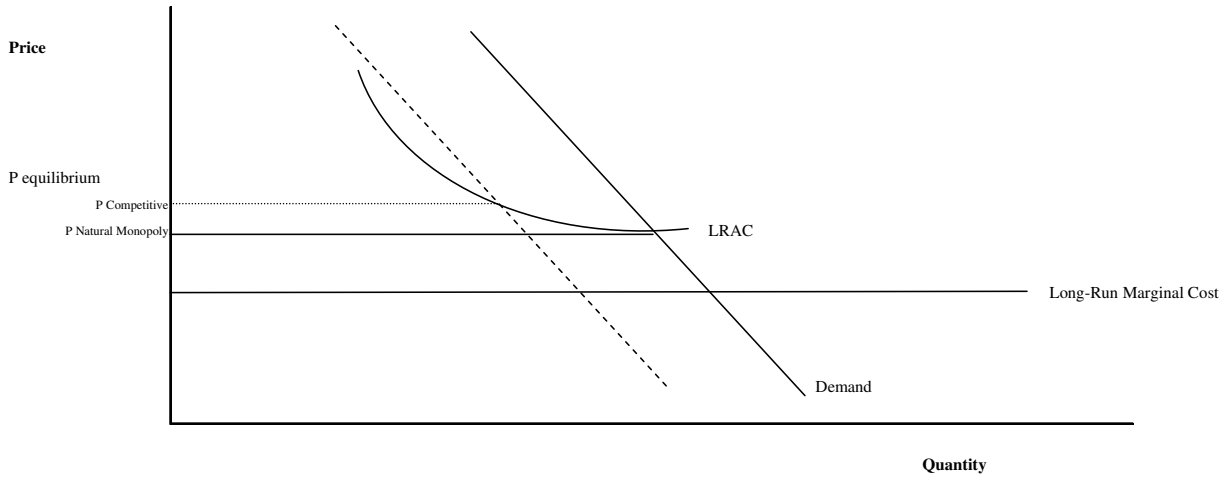

Figure 7. Illustration of the Change in Prices Faced by Consumers when Competition is Introduced into a Natural Monopoly Market

Figure 7 above contrasts the outcome with the same natural monopoly with a reduced quantity demand by customers. The equilibrium between the new demand curve and the Long-Run Average Cost Curve produces a higher price to consumers. The higher price to consumers is attributable to the loss of economies of scale to the industry through the introduction of competition.

5. Restrictions on Private Electric Distribution Wires

5.1 Nature and Purpose of Restrictions

State and local governments have broad powers to control access to public roads, streets, and other rights of way. Similarly, federal highway authorities have extensive power to control access to federal rights of way. The provisions of state and local law on this subject vary from state to state and even town to town. Many state laws and ordinances affect the siting of any infrastructure – including distribution wires – in public rights of way. There is no general right to use the public right of way for private purposes. Similarly, however, there does not appear to be any general prohibition against private entities contracting with local governments to cross rights of way with a private (i.e., for non-public use) line for sewer, gas, electric, or other "utility" purpose.[31] This gives local governments an enormous amount of latitude to determine what uses will be permitted.

Utility-owned wires and facilities are commonly sited in public rights of way. The "accommodation" of infrastructure for electric, sewer, water, telecommunications, etc., is an important aspect of managing public roads and highways. It requires the public owner to ensure peaceful coexistence of varying types of facilities in limited space, often while maintaining the safety and integrity of a road and minimizing public inconvenience.

While many state and local laws and ordinances affect the siting of electric distribution wires in public rights of way, and may even prohibit non-utility access, the principal restrictions on non-utility wires flow from the regulation of and rights granted to electric utilities under state law. [32] Where the utility law may permit a self-generator to serve another customer via private distribution line, the siting of that line is subject to local conditions and ordinances. Local authorities control siting and have the obligation to administer the right of way in the public interest.

Electric distribution utilities in the United States operate for the most part as state-franchised, regulated monopoly service providers within a defined geographic service territory. They are subject to extensive and pervasive regulation, with a goal of ensuring that they provide safe and reliable electric service to all customers at a reasonable price.

In most states, cities enter into franchise agreements granting the local utility rights to use streets and rights of way. These agreements are usually long term, and vary from state to state, as well as from

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[31] See, e.g., Program Guide, Utility Relocation and Accommodation on Federal-Aid Highway Projects, Sixth Edition, January 2003, Prepared By: Office of Program Administration Federal Highway Administration; See also utility accommodation policies referenced in *Survey of State Utility Accommodation Manual provisions*, American Association of State Highway and Transportation Officials ("AASHTO"), *available at* http://cms.transportation.org/sites/rightofway/docs/OR_UtilitiesAccommodationManual.doc (last visited September 15, 2008). In the context of these manuals and policies, the term "utilities" refers to the facilities – e.g., sewer lines, electric lines, telecommunications infrastructure – not the entity installing or owning them.

[32] Various CHP advocates interviewed in connection with this report affirmed that they view state utility laws and franchises as the primary source of restrictions on privately owned distribution wires.

town to town. These franchise agreements may or may not state that they are exclusive, and they often entail the provision of services (such as street lighting) as part of the consideration. Some states clearly recognize the possibility that a private party might locate a distribution line in a public right of way.[33] The Minnesota Utility Accommodation Procedures are instructive in this regard:

> **Private Lines**
> 1. Private lines are privately owned facilities that convey or transmit communications, electricity, gas, oil, water, or any other similar commodities outlined in the definition of utility facility, but devoted exclusively to private use.
> 2. Since private lines serve only the owner, it is generally not in the public interest for them to be located within highway right of way. Even so, private lines may be allowed to cross State trunk highways, but longitudinal installations are not allowed. Reasons for needing to cross the highway right of way might vary. There might be a need by a private entity to expand its operations to the other side of a highway, or there might be a need to restore existing private facilities that would be severed by construction of a highway project. [34]

To the extent that it would be illegal for an entity other than a public utility to provide electric distribution, local authorities would likely decline to issue permits to non-utilities.

5.1.2 Utility Regulation as the Source of Restrictions

Different aspects of the provision of electricity in the United States are governed by state, local, and federal law. Federal law, in general, focuses on high-voltage interstate transmission and on the markets for electric generation. Most other issues surrounding electric service, including distribution of electricity at the local level, are governed by state and local law. Every state regulates electric utilities providing service within its boundaries under the banner of a state public utility law.[35]

Similarly, while every state permits customers to generate their own electricity on-site for their own use, the ability of self-generating customers to serve a second, contiguous or non-contiguous site or to sell "excess" electricity directly to other customers is limited, either because these transactions might subject the seller to extensive regulation as a utility or because the incumbent regulated public utility has the exclusive right to provide some or all of the services in question.

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[33] See, e.g., Minnesota Department of Transportation Utility Accommodation Policy, amended November 2005, *available at* http://www.dot.state.mn.us/utility/files/pdf/appendix-b.pdf (last visited September 16. 2008), which provides: "The policies and procedures contained herein apply to all public utilities (and private lines that are only allowed to cross highways), including . . . electricity . . . that is to be accommodated within the right of way of highways under the jurisdiction of the Commissioner of Transportation and which by law are entitled to use public highways.." Id., at p.1.

[34] Id., at 15.

[35] Nebraska is the sole exception. It does not regulate investor-owned public utilities because it does not permit them. All electric service in Nebraska is provided by public power entities.

Historically, the electricity business, including generation, transmission, and distribution, was considered a natural monopoly.[36] Under this framework, a single utility assumed a "public utility obligation" and was therefore responsible for providing electric service to all businesses and residences within its designated service area. This generally included an obligation not only to build a transmission and distribution system to deliver the power to consumers, but also to generate or purchase power to meet their needs in a safe, reliable, and cost-effective manner. In return for accepting these obligations, utilities were given a reasonable opportunity to recover their prudently incurred costs, plus a rate of return on their investment, in rates established by regulators.[37] Now, in some states, only energy delivery is considered a natural monopoly. In addition, despite the natural monopoly, some state utility laws include narrow exceptions tailored to specific types of generators and other circumstances. No state, however, has opened electric distribution and delivery to general competition.

Definitions of "public utility" under state law are generally – and intentionally – broad.[38] This serves a dual purpose – allowing the state to have a basis to protect the public interest by regulating all entities operating in this sphere, as well as preserving the exclusive franchise of the utilities. State-franchised utilities are subject to pervasive regulation touching virtually every aspect of their business and operations. This is a direct consequence of the exclusive franchise granted to utilities within their service territories to provide electric distribution services (and, in many states, all services relating to electricity, including supplying generation). The utilities' rights may be expressly exclusive, or the exclusivity may be implied. In either case, the result is that any entity attempting to provide distribution service within a utility's service territory may not only be considered to be a public utility – and therefore subject to the full range of regulation that that entails – but may also be violating the incumbent utility's exclusive right to provide distribution services.

5.1.3 Competition in Electric Generation and Implications for CHP and Private Wires

As recently as 20 years ago, most electric service in the United States was provided by vertically integrated electric utilities owning generating, transmission, and distribution facilities and operating as

[36] Amy Abel, *Electricity Restructuring Background: The Public Utility Regulatory Policies Act of 1978 and the Energy Policy Act of 1992*, CRS Report for Congress 98-419 ENR (May 4, 1998), *available at* https://www.policyarchive.org/bitstream/handle/10207/609/98-419_19980504.pdf?sequence=1 (last visited September 15, 2008). As discussed below, some states have altered the monopoly model with respect to generation and retail services while continuing to regulate delivery of electricity as a monopoly.

[37] Utilities may be investor-owned or operate as public power entities, meaning that they are owned or operated by municipalities, state government agencies, or similar bodies or operate as cooperatives. While the regulatory framework may be somewhat different, the issues as discussed in this report are the same from the utility's perspective in terms of impacts of private distribution wires on rates and customers, the utility's operations and public safety. Municipal utilities and cooperatives are usually excluded from regulation by the state public utilities commission. While they enjoy monopoly power, it is pursuant to other state laws and charters, and they are not intended to operate as for-profit enterprises.

[38] Section 5.2 below compares the laws of several states; see also the table included in Appendix A.

regulated monopolies in designated service territories. [39] All aspects of electric service were long considered to be a "natural monopoly," where the economies of scale were such that costs would be expected to be less than could be obtained in a competitive model. In recent years, however, the monopoly model has changed in some states with respect to generation and retail services (but not delivery of power). The energy distribution business, however, has continued to be a fully regulated electric monopoly service provided by utilities in every state, although some states have adopted narrow exceptions, as discussed below.

5.1.3.1. Emergence of Non-Utility Generation

Every state permits customers to generate electricity for their own needs. What was originally less clear was whether the local utility would be required to interconnect a customer's generator to the utility's grid and, if so, whether and how any excess output from the generator could be sold.

In 1978, Congress enacted the Public Utility Regulatory Policies Act ("PURPA")[40] to encourage more energy-efficient and environmentally friendly energy production. Section 210 of PURPA established a new class of non-utility generators called Qualifying Facilities ("QF") to encourage the development of power production from renewable sources and cogeneration of electricity and thermal energy, or CHP. [41] The PURPA provisions further required that electric utilities interconnect QFs to their systems, thereby opening the electric generating market to non-utility entrants, and that they purchase power from those generators at the utility's "avoided cost".[42] In 1992, the Energy Policy Act ("EPAct 1992") removed additional barriers to entry in the electric generation market, further increasing competition in wholesale electricity supply. Specifically, EPAct 1992 created a new type of competitive non-utility generation

[39] California was among the first state to allow customers to choose their electric supplier. In December 1995, California Public Utility Commission ("CPUC") issued its final order calling for the restructuring of the electric power industry and allowing consumers direct access to competitive suppliers of electric power. Originally, the CPUC plan was to phase in consumer direct access, but later it was amended to allow retail access for all consumers simultaneously, beginning January 1, 1998. California has since suspended its retail access and restructuring programs.

[40] Pub. L. No. 95-617, 92. Stat. 3117 (1978).

[41] QFs, which are by definition not utilities, were able to combine the availability of natural gas and new, more efficient generating technology, such as combined-cycle, with a regulatory system (specifically, section 210 of PURPA) that provided them with a captive market that priced their product at their local utility's "avoided cost." See Amy Abel, *Electricity Restructuring Background: The Public Utility Regulatory Policies Act of 1978 and the Energy Policy Act of 1992*, CRS Report for Congress 98-419 ENR (May 4, 1998), *available at* https://www.policyarchive.org/bitstream/handle/10207/609/98-419_19980504.pdf?sequence=1 (last visited September 15, 2008).

[42] FERC adopted rules under PURPA to define avoided cost as the likely costs for both energy and facilities that would have been incurred by the purchasing utility if that utility had to provide its own generating capacity. State regulators were given wide latitude in establishing the procedure to assign avoided costs.

entity, the exempt wholesale generator ("EWG"), that could sell power in wholesale markets for resale but was prohibited from selling at retail to ultimate consumers.[43]

5.1.3.2. Development of the Wholesale Energy Market

Following EPAct 1992, FERC issued two major rules on transmission access – Orders 888 and 889 – to promote open, nondiscriminatory access to transmission and to remove barriers to competition in the wholesale electricity market. While the principal outcome was a requirement that utilities provide open access to their transmission systems for wholesale transactions, the foundation for open access was allowing utilities to recover their wholesale "stranded costs." These represented costs that would not be recovered in the ordinary course of existing rate structures due to the transition from a comprehensive regulatory regime to a more competitive wholesale market structure. Under the regulated monopoly system, utilities made investments in electric generating facilities based on the assurance of recovery based on the so-called regulatory bargain.[44] Thus, FERC Order 888 allowed utilities to recover any wholesale stranded costs, with those costs being paid by wholesale customers wishing to leave their current supply arrangements.[45]

Order 888 required transmission owners to grant access to their facilities for wholesale transactions by all parties, without discriminating in favor of their own generation or that of their affiliates. Utilities were required to file open access tariffs stating the terms on which they would make their transmission available to a generator to effect a wholesale transaction. While public power entities were not subject to Order 888, in order to take advantage of its provisions, they too were required to file open access tariffs with FERC.

Order 889, the Open Access Same-time Information System ("OASIS") rule, established standards of conduct to ensure a level playing field in purchasing transmission service, which is considered vital to the operation of a competitive generation market – especially for short-term, opportunistic transactions. In adopting Orders 888 and 889, FERC recognized that generation-owning utilities faced inherent conflicts of interest in providing transmission services to non-utility generators competing for utilities' customers. Thus, Order 889 required that utilities separate their wholesale power marketing and transmission operation functions, although FERC did not require corporate unbundling or divestiture of assets. Order 889 compelled transmission owners to provide any information regarding the status and availability of transmission to all generators – affiliated as well as non-affiliated – simultaneously. While FERC worked to achieve competition on a wholesale level, the jurisdiction over retail competition remained with the states.

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[43] PURPA added Section 32 to the Public Utility Holding Company Act, Pub. L. No. 74-333, 49 Stat. 803 (1935) ("PUHCA"), defining an EWG as an entity that is exclusively engaged in the ownership of facilities used to generate electricity for sale at wholesale. An EWG was expressly deemed not to be a "utility" for purposes of PUHCA, which otherwise regulated holding companies that operated utilities in more than one state. An EWG was required to sell all of its power at wholesale and prohibited from making retail sales. PUHCA (including Section 32) was later repealed in the Energy Policy Act of 2005.

[44] See Larry B. Parker, *Electric Utility Restructuring: Overview of Basic Policy Questions*, CRS Report to Congress 97-504 ENR (January 7, 1999), *available at* http://www.cnie.org/NLE/crsreports/energy/eng-37.cfm (last visited September 15, 2008).

[45] Recovery of *retail* stranded costs was the central issue in the efforts around restructuring of state utility laws in the mid-1990's. State restructuring is discussed below in Section 5.2.

5.1.3.3. EPAct 2005 and Modification of PURPA

While PURPA promoted the development of CHP, it also brought unforeseen consequences. Some developers installed units that were designed to produce far more electricity than thermal energy. Because utilities were required to purchase the electricity from QFs at "avoided cost" as determined by state regulators, some units were being paid well above wholesale prices for power. Meanwhile, wholesale markets continued to develop in a number of regions across the country. As a result, as part of the Energy Policy Act of 2005 ("EPAct 2005"), Congress amended PURPA by eliminating the requirement that electric utilities enter into energy purchase contracts with QFs under certain circumstances.

Specifically, EPAct 2005 modified § 210 of PURPA to eliminate the electric utilities' obligation to enter into new agreements to purchase power from QFs that FERC finds have access to a competitive wholesale energy market administered by an independent system operator. Agreements in place at the time EPAct was enacted were not affected. In addition, EPAct 2005 called for FERC to establish new standards for new cogeneration QFs, requiring the thermal and electric output to be used fundamentally for industrial, commercial, or institutional purposes, and not fundamentally for sale to an electric utility. EPAct 2005 also amended Title 1 of PURPA to require state commissions and electric utilities to consider implementing new standards, including standards relating to interconnection and net metering.[46]

In February 2006, FERC adopted revised regulations implementing the new standards for new cogeneration QFs..[47] In October 2006, FERC issued a final rule, "New PURPA Section 210(m) Regulations, Applicable to Small Power Production and Cogeneration Facilities," implementing the changes to the mandatory power purchase obligation for electric utilities under PURPA as required by EPAct 2005.[48] In the final rule, FERC determined that four regional wholesale markets administered by independent system operators – the Midwest Independent Transmission System Operator ("MISO"), PJM Interconnection, ISO-New England ("ISO-NE"), and the New York Independent System Operator ("NYISO") – provided wholesale markets that met the statutory criteria. Accordingly, FERC established a rebuttable presumption that QFs above 20-MW capacity have non-discriminatory access to these markets and that electric utilities in these markets qualify for relief from their mandatory purchase obligations.

Similarly, FERC determined that the Electric Reliability Council of Texas ("ERCOT") offered comparable competitive wholesale power market access meeting the statutory criteria, making electric utilities in ERCOT also eligible for relief from PURPA's mandatory purchase obligation.

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[46] *See* Subtitle E—Amendments to PURPA, Sections 1251 though 1254 of the Energy Policy Act of 2005 for provisions related to distributed generation and modifications to PURPA.

[47] Revised Regulations Governing Small Power Production and Cogeneration Facilities, Order No. 671, 71 FR 7852 (Feb. 15, 2006), FERC Stats. & Regs. ¶ 31,203 (2006), *order on reh'g*, Order No. 671-A, 71 FR 30585 (May 30, 2006), FERC Stats.& Regs. ¶ 31,219 (2006), *available at* http://www.ferc.gov/legal/fed-sta/ene-pol-act/final-orders.asp#skipnavsub (last visited November 25, 2008)..

[48] Final Rule: New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities, 18 C.F.R. § 292 (October 16, 2008), *available at* http://www.ferc.gov/whats-new/comm-meet/101906/E-2.pdf (last visited September 15, 2008).

FERC, however, did not actually terminate the purchase obligation of any utility with this final rule. Electric utilities in these markets must file applications for relief, and QFs may be able to rebut the presumption of access to markets due to operational characteristics or transmission constraints.

5.1.4 Retail Competition and Retail Choice

In the mid-1990s, a number of states moved to restructure their utility laws to allow retail (i.e., end-use) electricity customers to choose their electricity supplier. California and a number of Northeast states were at the forefront of this effort. Several states, including California, New Jersey, and others required utilities to divest their non-nuclear generation to non-affiliates. Other states, such as Illinois, permitted, but did not require divestiture. The restructuring approaches and schedules varied on a state-by-state basis. In many states, retail rates were frozen or reduced during a transitional period stretching several years into the future.

Significantly, every state that pursued electric restructuring continued to treat distribution as a regulated monopoly.[49] There were many reasons for this aside from the economic underpinnings of natural monopolies, including concerns that it would be neither feasible nor desirable for alternative electric suppliers to construct separate distribution systems to serve customers. Other considerations included safety, grid reliability, and a desire to ensure that the utility would continue to have the obligation to serve all customers. Continuing to treat distribution as a regulated monopoly enabled regulators to hold utilities accountable for the safe, reliable, and efficient delivery of power to all customers. In addition, in some states, it provided a mechanism for collection of certain non-bypassable charges (such as taxes) that had previously been assessed against the utility.

As a result, restructuring efforts focused on competitive generation and alternative suppliers who would contract with customers to supply the power over the utility's wires. Retail choice – the ability of end-use customers to choose their electric supplier – thus still involves the distribution utility, even if a customer selects an alternative supplier.

State restructuring efforts were contentious, with utilities arguing that they would be saddled with enormous stranded costs. Many utilities argued that this would in effect be a "taking" of their property without compensation and threatened litigation without stranded cost recovery. In the end, virtually every state that restructured its utility law, like FERC, agreed to permit utilities to recover the investments they made under the "traditional utility" regulatory regime that would now be stranded by the movement to a competitive model. By the late 1990's, approximately half the states had adopted or were actively considering restructuring proposals. However, the California energy crisis of 2000 caused many states to reconsider, as did increasing electricity prices as the transitional rate freezes imposed in some states began to expire. As of April 2007, only 15 states[50] plus the District of Columbia had completed the restructuring of their state's electricity marketplace to permit full retail choice, while 7

[49] As discussed in Section 5.2, some state utility laws include narrow exceptions to the distribution monopoly tailored to specific types of generators and other circumstances. No state, however, has opened electric distribution to competition on a general level.

[50] Oregon is counted in this number, though retail choice is only available for non-residential customers.

states have suspended their restructuring activities.[51] California suspended retail choice and other aspects of electric restructuring.

Most states that proceeded with retail choice also set rules and requirements for alternative suppliers. However, since the suppliers were using the utility's wires, most such rules relate to financial capability and consumer protection. In contrast, utilities continue to bear the burden of ensuring safe, reliable delivery of power.

Electric distribution continues to be a monopoly service provided by utilities within designated service territories, even where states have allowed customers to choose their electric suppliers. In exchange for monopoly rights to serve all customers within an area, electric utilities are subject to extensive regulation reaching all aspects of their operations, including not only prices (i.e., rates), but also their service levels, reliability, and safety. They are also required to serve all customers in their territories, regardless of the cost of building the infrastructure to do so and regardless of their ability to pay.[52]

5.1.5 Impact of Retail Choice on Private Wires Issues

5.1.5.1. States with No Retail Choice

In states where the electric utility industry has not been restructured to permit retail choice, public utilities generally retain an exclusive franchise right to provide electric service within a defined geographic territory. Within that territory, with very few exceptions, no other electricity provider can offer competing electricity services to end-use customers, and consumers cannot access electricity from any provider other than the utility.[53] Self-generation is allowed, but under most circumstances, the customer-generator cannot serve another customer. Even so, as discussed below and in Section 5.2, there may be limited exceptions that would permit a CHP owner to serve additional customers.

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[51] *Status of Electricity Restructuring by State*, U.S. Energy Information Administration, *available at* http://www.eia.doe.gov/cneaf/electricity/page/restructuring/restructure_elect.html (last visited November 5, 2008). The 15 states that permit full retail choice are as follows: CT, DE, IL, MA, MD, ME, MI, NJ, NH, NY, OH, OR, PA, RI, and TX, plus the District of Columbia. See Oregon Public Utility Commission *at* http://www.puc.state.or.us/PUC/electric_restruc/index.shtml (last visited November 4, 2008) for its retail choice status. Retail choice in Oregon does not extend to residential customers. AZ, AR, CA, MT, NM, NV, and VA have suspended their restructuring activities. In Nevada and Virginia, although restructuring activities have been suspended, retail choice is available to large customers. Montana eliminated retail choice except for customers currently served by alternate suppliers. See *Start Dates for Retail Choice*, American Public Power Association, *at* http://appanet.org/aboutpublic/index.cfm?ItemNumber=9567&sn.ItemNumber=2102 (last visited September 15, 2008).

[52] Utility bad debt costs around $1 billion annually. American utilities, through their ratepayers, paid an average of $3 per customer to collect bad debt, and in some cases, the cost was as high as $10. See *Utility Collections Best Practice: Theory Into Practice,* Peace Software White Paper (May 2005), *available at* http://www.peace.com/industry-watch/whitepapers/Peace-Collections-Best-Practice.pdf (last visited September 16, 2008).

[53] The exception for on-site generation is common, as is a specific provision relating to cogeneration or renewable energy, with excess power being sold to the utility or to the wholesale market. Some states have in the past allowed very large loads to buy power from sources other than the utility. This trend, however, seems to have fallen into decline as states have pulled back on considering retail choice initiatives.

As noted above, restructuring was a contentious process in every state that moved forward to permit retail choice. In those states, mechanisms were adopted to recover some or all of the stranded costs claimed by utilities. In addition, each affected utility, through state commission proceedings, established separate rates for delivery services to support sales by alternate retail suppliers to their customers. These elements are not in place in non-restructured states.

However, certain states that do not allow retail choice, such as California, may permit a building owner to serve additional tenants or adjacent properties under certain conditions. For instance, California provides a narrow exception to any person or entity that employs cogeneration technology for its own use, for use of its tenants, and for sale to no more than two other entities on adjacent properties. The properties may be considered adjacent even if a public street crosses between them if they are under common ownership with the cogeneration site. Similarly, Iowa and Minnesota, while not permitting retail choice, have mechanisms that may permit a customer-generator to provide electricity to additional customers. The laws of these and other states are discussed below in Section 5.2.

5.1.5.2. States with Retail Choice

In states that permit retail choice the issue is somewhat different. In these states, electric suppliers are allowed to compete for the sale of electricity to retail customers and customers are allowed to choose their generation suppliers and services. These states have made the decision to permit customers to purchase electricity from a source other than the utility. However, these states have also laid out the terms on which that may occur, and private wires are not contemplated. As discussed above, every state that has proceeded with restructuring its utility law has retained a monopoly structure for electric distribution.[54] Retail electrical suppliers are generally subject to registration or licensing and may be regulated in terms of their financial and customer service capability or in other respects. They are not constructing wires. Instead, they are purchasing delivery services from the utilities. There is a reasonable likelihood that a generation owner purporting to sell energy to another customer in a retail choice state would be subject to regulation as an alternative retail supplier, unless there is a specific provision in the law providing otherwise.[55]

5.1.5.3. Impact of Franchise Agreements and Service Territory Designations

As discussed, the delivery of electricity via the local utility's distribution system remains a monopoly service in both restructured and non-restructured states, with the electric utility generally maintaining exclusive rights to serve customers within pre-defined service territories. Some states establish service territory rights by statute (e.g., Minnesota, Oregon), while others leave the setting of service territory boundaries to state regulators. In some states, the "exclusive service territory" is a creature of case law (e.g., Illinois). However established, the service territory represents the geographic area in which the

[54] As noted above and as discussed in Section 5.2, some states, including retail choice states, may include limited exceptions to the distribution monopoly. No state permits general competition for electric delivery service.
[55] This is the case in Illinois, for example, which provides that a customer-generator can supply generation to its other facilities (using the utility's distribution system, at tariffed rates) without registering as an alternative retail electricity supplier. 220 ILCS 5/16-115(e)..

public utility is obligated to provide service to all customers, in exchange for which it is not subject to competition. [56]

In addition, utilities commonly enter into franchise agreements with municipalities and other local authorities. A franchise agreement is a grant of special privilege to use the public rights of way, and it outlines the rules, rights, and fees associated with using public property. These agreements are usually long term and vary state by state, if not from town to town. An electric franchise agreement between a municipality and an electric utility provides the utility with rights to build and maintain distribution facilities on public rights of way, as well as the obligation to serve all customers on a non-discriminatory basis even in an unprofitable situation.[57]

Through these franchise agreements, the municipality is generally compensated by the utility for its privilege of using the municipality's public rights of way for the delivery of electricity. In general, the utility recovers the cost of franchise fee by applying per kilowatt-hour additions to electricity rates. Franchise agreements are usually, but not always, "exclusive."

5.2 Analysis of Public Utility Law Provisions in Select States

Federal and state laws and regulations often parallel and interrelate in many areas of energy and utility regulation. Although the regulatory boundaries between federal and state jurisdiction are often uncertain, the regulatory jurisdiction of the FERC is determined by the type of activities involved, pursuant to the Federal Power Act ("FPA"). FERC, as the federal regulatory agency, has regulatory jurisdiction over facilities used for the transmission of electricity and wholesale sales of electricity, in interstate commerce.[58] On the other hand, activities and facilities related to retail sales (i.e., direct sales to ultimate consumers) and service activities not in interstate commerce fall outside of FERC jurisdiction.[59] State public utility laws establish the authority and jurisdiction of the state regulatory commission, define "public utilities" subject to regulation, and exempt certain entities and activities from regulation. The basic structure of state public utility laws is similar from state to state. However, the specific definitions and exclusions from regulation can vary significantly. This can affect the treatment of CHP facilities and siting of privately owned distribution wires. "Public utility" (or comparable term), generally refers to an entity that produces (or, in some cases, purchases) and delivers electricity for sale to an end user, as opposed to merely selling energy in wholesale transactions. Some utility laws go further and distinguish between sales to a small number of customers and sales to the "public."

Every state (except Nebraska, which only permits public power entities) regulates electric utilities providing services to end users within its boundaries, subject to various exemptions and exclusions. Most state utility statutes provide explicit exemptions for specific types of suppliers or end users or define "public utility" in such a way as to exclude certain types of entities. These provisions exempt or

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[56] While service territories are almost always exclusive, there are notable exceptions. For example, neither Consolidated Edison Company of New York ("ConEd") nor Oncor have exclusive rights in their full service territories. Based on telephone interviews, it appears that Oncor serves in dually certified areas, and ConEd has franchises granted by the towns and municipalities that are not always exclusive.

[57] Lorrin Philipson & H. Lee Willis, *Understanding Electric Utilities and De-regulation,* CRS Press (2006).

[58] FPA § 201(b); 16 U.S.C. § 824(b).

[59] FPA § 201(b)(1); 16 U.S.C. § 824(b)(1).

exclude, among others, public power entities (i.e., municipal utilities, cooperatives, and other publicly-operated entities), and, in some cases, certain small power generators, including alternative energy producers, cogeneration facilities, renewables, or other preferred sources or technologies. In addition, an exemption from "public utility" status may be based on specific "limited distribution" factors, whether by the distinct relationship between the producer and the end user, the number of customers served, or the contiguous situation of the properties involved.

The focus of the analysis of state public utility law provisions for this study is on those provisions that might impact the ability of a CHP owner to provide service to another facility via privately owned distribution wires. Significantly, in several instances, we were unable to determine from the statutory language whether a private distribution wire could in fact be used to provide service or whether the statute merely created a platform for wheeling power over the utility's grid. The ambiguity arises from the complexity of the utility laws and their interaction with other laws, including municipal ordinances.[60] In addition, as states backed away from restructuring initiatives, the application and interpretation of some provisions has become less clear. We have taken steps to verify the information in this section through informal contacts with staff at each of the state regulatory agencies in states considered for this report. Some regulatory staff members were reluctant to draw a conclusion or provide their interpretation of the law, commenting that it is very difficult and could be misleading to provide legal advice without taking into effect the specific circumstances of each case. Such verification, though not authoritative, supports the conclusion that several of these states do permit limited use of private wires under their utility laws, although the siting and permitting of those wires would be subject to local law and ordinances.

This study considered the public utility laws in the following states: California, Illinois, Iowa, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, and Texas. These states were chosen as representing a range of utility regulatory models, as well as including states where large numbers of CHP units or a large amount of CHP capacity has been developed or where there is a large technical potential for CHP.[61]

The discussion below summarizes several exceptions in some of these states and Table 1 includes relevant provisions of the utility laws in these states and corresponding references.

5.2.1 Limited Distribution Exemptions

Some states explicitly exempt certain electric providers based on the condition of limited distribution or a limited number of customers. One of the most common exclusions of this nature is where the power produced is for the producer's own use or for its tenants/employees. This exemption is often, but not always, limited to service provided solely on a single private property, such as service to tenants. The following illustrates several variations of this exemption, as enacted in Minnesota, California, Texas, New Jersey, and Iowa.

[60] Thus, for example, where the state law permits an entity to serve up to a specified number of customers without being deemed a public utility, exclusive service territory designations that leave few if any "gaps" may render this of little value. This is discussed below in this Section.

[61] Section 6.1 of this report discusses the technical potential of CHP.

Minnesota exempts from "public utility" regulation anyone who "furnishes its services only to tenants or cooperative or condominium owners in buildings owned, leased, or operated by such person," or produces or furnishes service to less than 25 persons.[62] Based on conversations with regulatory staff, this exception would appear to permit private wires, subject to siting and permitting issues. However, as discussed below, Minnesota has also designated utility service territories by statute. The interrelationship of these two provisions may make it difficult to install private wires, particularly if the customers are to be connected to the utility for standby or back-up service.

California public utility law provides narrow exceptions to certain types of electricity generators. In California, an "electric corporation" does not include an entity or person that generates and distributes electricity solely on private property for its own use or the use of tenants and not for sale or transmission to others. It also permits power from cogeneration to be used by or sold to up to two additional entities solely for use on the property where the electricity is generated or on property immediately adjacent unless there is an intervening public street constituting the boundary between the real property on which the electricity is generated and the immediately adjacent property. In that case, the properties will only be considered "adjacent" if one or more of the following applies:

- The properties are under common ownership or control, provided that common ownership or control was not gained solely for purposes of sale of electricity so generated;
- The useful thermal output of the facility generating the electricity is used on the adjacent property for petroleum production or refining; or
- The electricity furnished to the immediately adjacent property is utilized by a subsidiary or affiliate of the corporation or person generating the electricity.

The statute provides similar exemptions for generators using landfill gas technology or digester gas technology.[63]

In Texas, the term "public utility" does not include any person that "furnishes electric service to itself, its employees, or tenants if it is not resold or used by others." The exception appears to be narrowly construed so that the furnishing of electric service to employees, or tenants must be as an incident of employment or tenancy.[64] Texas law also exempts from utility regulation anyone that "owns or operates facilities for producing, generating, transmitting, distributing, selling, or furnishing electric energy to an electric utility if the facilities are used primarily for the production and generation of electric energy for consumption by that person."[65] Under these circumstances, Texas law would allow the use of non-utility wires.

In New Jersey, an "on-site generation facility" is not considered a "public utility." Similar to other states' provisions, such an on-site generation facility is a facility providing electric sales to the end users located on the property or a "contiguous" property. By statute, contiguous means being "geographically

[62] Minn. Stat. § 216B(02).
[63] Cal. Pub. Util. Code § 218(a)-(d).
[64] Tex. Util. Code § 31.002(6)(J).
[65] *Ibid*.

located next to each other, but may be otherwise separated by an easement, public thoroughfare, transportation, or utility-owned right of way."[66]

Under New York law, the term "electric corporation" excludes any electric plant in which "electricity is generated and distributed by . . . the producer solely from one or more co-generation, small hydro, or alternative energy production facilities or distributed solely from one or more of such facilities to users located at or near a project site."[67] In the same section, a "co-generation facility" is defined as an electric generating plant sized at up to 80 MW, together with any related facilities located at the same project site, which simultaneously or sequentially produces electricity and thermal energy useful for industrial or commercial purposes.[68] Furthermore, a cogeneration facility also includes, besides the electric and steam cogeneration facility itself, "such transmission or distribution facilities as may be necessary to conduct electricity . . . or useful thermal energy to users located at or near a project site."[69]

The New York Public Service Commission issued a declaratory order under this section affirming that a cogeneration site that included electric and steam generation and distribution facilities would not be considered an electric corporation, even though the project would serve multiple users – a university, a hospital and another healthcare facility – and one distribution line would cross a public street [70] The Commission found that the cogeneration exemption specifically contemplates multiple users and does not require that they share property ownership rights.[71]

In addition to the limited distribution exemptions based on the relationship of producer and end-user or the "contiguous" condition of the properties, some states provide an exception from "public utility" regulation based on the number of customers served. Iowa provides an exception permitting a person who produces electricity primarily for its own consumption to furnish electricity to five or fewer customers either by secondary line or from an alternate energy production facility or small hydro facility.[72] The key point in the statutory provision cited is that the person furnishing electricity must produce the electricity primarily for the producer's own use. In addition, as discussed below, Iowa has assigned service areas for electric utilities, or "exclusive service areas" provided under Iowa Code § 476.22-27, which may limit the ability of a customer-generator to serve additional customers.

5.2.2 The Effect of Exclusive Service Territory Provisions

Although several states provide limited exceptions from public utility regulation for certain electric generators, some of these states also have specific provisions that assign service territories to public utilities. Such designated service territories grant public utilities the exclusive right to distribute

[66] N.J. Stat. § 48(3)-(51).
[67] N.Y. Pub. Serv. Law § 2(13).
[68] N.Y. Pub. Serv. Law § 2(2-a).
[69] N.Y. Pub. Serv. Law § 2(2-d).
[70] Burrstone Energy Center LLC, Declaratory Ruling on Exemption from Regulation, 07-E-0802, New York Public Service Commission (2007).
[71] *Id*.at p. 5, citing N.Y. Pub. Serv. Law § 2(2-d).
[72] See Iowa Code Title XI, Chapter 1, §476.1 Applicability of Authority. "Secondary line" means any single or multiphase electric power line operating at nominal voltage less than either 2,000 volts between ungrounded conductors or 1,155 volts between grounded and ungrounded conductors, regardless of the functional service provided by the line.

electricity to all customers in their designated service territories. It is unclear how this would affect the exceptions from the definition of "public utility."

Minnesota exempts from "public utility" regulation anyone who "furnishes its services only to tenants or cooperative or condominium owners in buildings owned, leased, or operated by such person," or produces or furnishes service to less than 25 persons.[73] However, Minnesota, by statute, also provides electric utility facilities with "assigned service areas," within which a specified electric utility shall provide electric service to customers on an exclusive basis.[74] Minnesota regulatory staff suggested that private wires might be permitted if there were no interconnection with the relevant utility, but that otherwise the generator would likely have to reach an agreement with the utility. Although an entity or person could be exempt from the "public utility" regulation, it is unclear whether such a private entity might be able to distribute electricity to others due to the exclusive service territory provisions.

Oregon provides exceptions from "public utility" regulation to certain power producers based on the number of customers being served or the types of fuels they use to generate electricity. Specifically, it excludes any corporation or individual providing heat, light, or power from *any* energy resource to fewer than 20 customers, if it began providing service to a customer prior to July 14, 1985 *or* if it serves only residential customers. The statute further exempts any entity providing power from solar or wind resources, as well as from biogas, waste heat, or geothermal resources to *any* number of customers.[75] Such an entity may generate or sell electricity without being regulated by the Oregon Public Utility Commission ("Oregon PUC"). However, Oregon PUC staff suggested that Oregon's statutory designation of service territories may limit the applicability of this exception to generation and sale, not distribution of power. According to regulatory staff, public utilities hold the exclusive right to distribute power to everyone in their designated service territories in Oregon, and a non-utility electric generator would likely have to use the utility's distribution wires to deliver the electricity it wants to sell.

5.2.3 Retail-Choice State Provisions

States with retail choice generally exclude alternative retail electric suppliers from the definition of "public utility"; however, alternative retail electric suppliers continue to be regulated under specific provisions of each state's law. Although the sale of electricity is no longer a monopoly service in retail choice states, the distribution of electricity continues to be a regulated monopoly, except to the extent the state has enacted one of the limited exceptions described earlier in this Section. Accordingly, the alternative retail suppliers in these states do not own distribution facilities but instead deliver power over the local utility's wires, for which the utility is compensated at tariffed rates. While not directly involving private wires, the provisions regarding alternative retail suppliers are instructive because they indicate the approach the states have taken in restructuring their utility laws to implement competition at the retail level. In addition, whether or not a private wire is involved, the provision of electricity to a separate end-use customer may make the provider fall within the definition of an alternative supplier and subject to registration or regulation. The following are specific provisions in select retail choice states, including Ohio, Illinois, Michigan, and New York.

[73] Minn. Stat. § 216B(02).
[74] Minn. Stat. § 216B(37), (39), (41).
[75] Or. Rev. Stats. § 757.005(C).

In Ohio, the Public Utility Commission of Ohio regulates both traditional public utilities and competitive retail electric suppliers. It also exempts from the definition of "electric light utility" any self-generator to the extent it consumes electricity it produces or to the extent it sells electricity it produces for resale. Under Ohio Rev. Code § 4933.81-90, electric suppliers[76] have the exclusive rights to serve all customers within its certified territory, subject to exceptions for municipal utilities.

Illinois also regulates both traditional public utilities and alternative retail electric providers. Alternative retail electric suppliers are subject to registration and other requirements. However, Illinois permits a form of "self-wheeling," pursuant to which a self-generator can provide energy to other facilities under common ownership using the utility's distribution system (at tariffed rates) without registering as an retail electric supplier. [77]

Michigan, like other retail choice states, has a licensing approach for "alternative electricity suppliers." These suppliers do not own distribution wires. In addition, Michigan clearly exempts entities providing or taking "self-service power" from regulation as either public utilities or as alternative electricity suppliers. Michigan expressly permits private wires for self-service power under limited circumstances.[78] Self-service power is defined as:

- Electricity generated and consumed at a single residential, industrial, or commercial site, or a contiguous industrial site without using an electric utility's transmission and distribution system; and
- Electricity generated primarily by the use of by-product fuels, including waste water solids, and the electricity is consumed in a contiguous facility, using an electric utility's transmission and distribution system no greater than 3 miles distant from the point of generation to the point of receipt.[79]

The same section of Michigan law further provides that if the self-generating facility had existing load on June 5, 2000, the site will be considered "contiguous" even if it is divided by a body of water or public highway or roads as long as it otherwise meets the "contiguous" requirement. The law also states that

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[76] This term is used in the Ohio statute, but it refers to entities that are public utilities. Ohio Rev. Code § 4933.81.
[77] 220 ILCS 5/16-115(e).
[78] Michigan law governing alternative electricity suppliers provides as follows:

> Only investor-owned, cooperative, or municipal electric utilities shall own, construct, or operate electric distribution facilities or electric meter equipment used in the distribution of electricity in this state. This subsection does not prohibit a self-service power provider from owning, constructing, or operating electric distribution facilities or electric metering equipment for the sole purpose of providing or utilizing self-service power. This act does not affect the current rights, if any, of a non-utility to construct or operate a private distribution system on private property or private easements. This does not preclude crossing of public rights of way.

Mich. Comp. Laws §460.10q(4).
[79] Mich. Comp. Laws § 460.10a(12).

such "self-service power" treatment shall not be affected by whether the owner of the premise, in which the generating facility is located, also owns the generating facility.[80]

The Michigan Public Service Commission has applied the "self-service power" exception to permit a generator located at one industrial facility to serve that facility and a second industrial facility on a property deemed "contiguous," even though the properties were not under common ownership and were separated by a public right of way.[81]

In New York, retail choice was implemented through an Order issued by New York Public Service Commission ("NYPSC") in 1994.[82] The NYPSC oversees the competitive retail market and requires that all "energy service companies" file various documents demonstrating that they meet the Commission's requirements. Energy service companies do not own distribution wires but instead deliver energy over the utility's wires.

The following table summarizes various provisions relating to private wires, self-generators, and retail electric providers in selected states, with a view toward identifying potentially applicable provisions that might exclude or exempt an entity from regulation as a public utility.

[80] *Id.*

[81] Ford Motor Co. v. Detroit Edison Co., No. U-12980, Michigan Public Commission (1996).

[82] N.Y. P.U.C. Case No. 94-E-0952.

Table 1. Certain Utility Law Provisions Relating to Self-Generators, Retail Suppliers, and Private Wires			
State	**Applicable Exception From Public Utility Regulation**	**Retail Choice**	**Related Reference**
CA	(a) "Electrical corporation" includes every corporation or person owning, controlling, operating, or managing any electric plant for compensation within this state, except where electricity is generated on or distributed by the producer through private property solely for its own use or the use of its tenants and not for sale or transmission to others. (b) "Electrical corporation" does not include a corporation or person employing cogeneration technology or producing power from other than a conventional power source for the generation of electricity solely for any one or more of the following purposes: (1) Its own use or the use of its tenants. (2) The use of or sale to not more than two other corporations or persons solely for use on the real property on which the electricity is generated or on real property immediately adjacent thereto, unless there is an intervening public street constituting the boundary between the real property on which the electricity is generated and the immediately adjacent property and one or more of the following applies: (A) The real property on which the electricity is generated and the immediately adjacent real property is not under common ownership or control, or that common ownership or control was gained solely for purposes of sale of the electricity so generated and not for other business purposes. (B) The useful thermal output of the facility generating the electricity is not used on the immediately adjacent property for petroleum production or refining. (C) The electricity furnished to the immediately adjacent property is not utilized by a subsidiary or affiliate of the corporation or person generating the electricity. (3) Sale or transmission to an electrical corporation or state or local public agency, but not for sale or transmission to others, unless the corporation or person is otherwise an electrical corporation.	No	Cal. Pub. Util. Code § 218(a)-(b)
FL	No relevant exception to definition of public utility identified. Florida has not restructured its utilities law and, according to regulatory staff, it does not allow any private wires to be built.	No	Fl. Stat. Title XXVII, § 366.02.

Table 1. Certain Utility Law Provisions Relating to Self-Generators, Retail Suppliers, and Private Wires			
State	**Applicable Exception From Public Utility Regulation**	**Retail Choice**	**Related Reference**
IA	Iowa provides an exemption from regulation to a person furnishing electricity to five or fewer customers either by secondary line or from an alternate energy production facility or small hydro facility, from electricity that is produced primarily for the person's own use. "Secondary line" is defined by regulation as "any single or multiphase electric power line operating at nominal voltage less than either 2,000 volts between ungrounded conductors or 1,155 volts between grounded and ungrounded conductors, regardless of the functional service provided by the line." Other than this exception, Iowa has assigned service areas for electric utilities, or "exclusive service areas" provided under Iowa Code § 476.22-27	No	Iowa Code Title XI, Subtitle 5, § 476.1 Iowa Admin. Code, Chapter 20, § 199--20.1(3). Iowa Code Title XI, Subtitle 5, § 476.22-27.
IL	Under the definition of "alternative retail electric supplier," Illinois provides an exception to a retail customer that obtains its electric power and energy from its own cogeneration or self-generation facilities. Illinois also permits such a customer to serve its own facilities, without registering as a retail supplier, but pursuant to utility tariffs for delivery services.	Yes	220 Ill. Comp. Stat. §§ 5/16-101, 16-115(e).

Table 1. Certain Utility Law Provisions Relating to Self-Generators, Retail Suppliers, and Private Wires			
State	**Applicable Exception From Public Utility Regulation**	**Retail Choice**	**Related Reference**
MI	Michigan exempts entities providing or taking "self-service power" from regulation as either public utilities or as alternative electricity suppliers. Self-service power is defined as any of the following: o Electricity generated and consumed at a single residential, industrial, or commercial site or a contiguous industrial site without using an electric utility's transmission and distribution system. o Electricity generated primarily by the use of by-product fuels, including waste water solids, and the electricity is consumed in a contiguous facility, using an electric utility's transmission and distribution system no greater than 3 miles distant from the point of generation to the point of receipt. o Self-generating facility that had existing load on June 5, 2000, the site will be considered "contiguous" even if it is divided by a body of water or public highway or roads as long as it otherwise meets the "contiguous" requirement. o "Self-service power" treatment shall not be affected by whether the owner of the premise, in which the generating facility is located, also owns the generating facility. Michigan permits private wires for self-service power under limited circumstances. Section 460.10q(4) permits a self-service power provider from owning, constructing, or operating electric distribution facilities or electric metering equipment for the sole purpose of providing or utilizing self-service power even if it crosses of public rights of way. Although alternative electric suppliers are not regulated as public utilities in Michigan, the commission holds the authority to issue orders establishing the rates, terms, and conditions of service that allow all retail customers of an electric utility or provider to choose an alternative electric supplier. They must obtain a certificate, license, or authorization from the commission.	Yes	Mich. Comp. Laws § 460.10a(12). Mich. Comp. Laws § 460.10q(4). Mich. Comp. Laws § 460.10a
MN	Minnesota excludes from public utility regulation any entity that "furnishes its [electric] services only to tenants or cooperative or condominium owners in buildings owned, leased, or operated by such person," or produces or furnishes electric service to less than 25 persons. Minnesota statute provides electric utilities with "assigned service areas," within which a specified electric utility shall provide electric service to customers on an exclusive basis.	No	Minn. Stat. § 216B(02). Minn. Stat. § 216B(37), (39), (41).
NJ	New Jersey provides an exception from regulation for an "on-site generation facility" providing electric sales to the end users located on the property or a "contiguous" property. By statute, "contiguous" means "geographically located next to each other, but may be otherwise separated by an easement, public thoroughfare, transportation or utility-owned right of way."	Yes	N.J. Stat. § 48(3)-(51).

Table 1. Certain Utility Law Provisions Relating to Self-Generators, Retail Suppliers, and Private Wires			
State	**Applicable Exception From Public Utility Regulation**	**Retail Choice**	**Related Reference**
NY	New York provides an exception from regulation to any electric plant in which electricity is generated and distributed by the producer solely on or through private property for its own use or the use of its tenants and not for sale to others. New York also excludes any generator from the definition of "electric corporation" if electricity is generated by the producer solely from cogeneration, small hydro, or alternative energy production facilities or distributed from one or more of such facilities to users located at or near a project site. A "co-generation facility" is defined as an electric generating plant sized at up to 80 MW, together with any related facilities located at the same project site, which simultaneously or sequentially produces electricity and thermal energy useful for industrial or commercial purposes. A cogeneration facility also includes "such transmission or distribution facilities as may be necessary to conduct electricity… or useful thermal energy to users located at or near a project site." The New York Public Service Commission ("PSC") oversees the competitive retail market by requiring that all "energy service companies" file requirements with the PSC to demonstrate that it has met the Commission's requirements.	Yes	N.Y. Pub. Serv. Law § 2-13. N.Y. Pub. Serv. Law § 2(2-a), (2-d).

Table 1. Certain Utility Law Provisions Relating to Self-Generators, Retail Suppliers, and Private Wires			
State	**Applicable Exception From Public Utility Regulation**	**Retail Choice**	**Related Reference**
OH	The Public Utility Commission of Ohio regulates both traditional public utilities and competitive retail electric suppliers. Under the statute regulating competitive retail electric suppliers, Ohio provides an exception from "electric light utility" to any self-generator to the extent it consumes electricity it so produces or to the extent it sells for resale electricity it so produces. Electric suppliers – i.e., public utilities – have exclusive rights to serve all customers within its certified territory, subject to exceptions for municipal utilities.	Yes	Ohio Rev. Code § 4928.01(11). Ohio Rev. Code § 4933.81-90.
OR	Oregon provides an exception from public utility regulation to any corporation or individual providing heat, light or power from *any* energy resource to fewer than 20 customers, if it began providing service to a customer prior to July 14, 1985 *or* if it serves only residential customers. The statute further exempts any entity providing power from solar or wind resources, as well as from biogas, waste heat, or geothermal resources for nonelectric generation purposes, to *any* number of customers. Oregon, by statute, defines exclusive service territories for the distribution of electricity. Public utilities hold the exclusive right to distribute power within their designated territories in Oregon, and a non-utility electricity generator must use these public distribution wires to deliver the electricity it generates.	Yes[83]	Or. Rev. Stats. § 757.00S(2). Or. Rev. Stats § 757.930.
TX	Texas provides an exception from regulation as a utility to anyone that "furnishes electric service to itself, its employees, or tenants if it is not resold or used by others," as well as anyone that "owns or operates facilities for producing, generating, transmitting, distributing, selling, or furnishing electric energy to an electric utility if the facilities are used primarily for the production and generation of electric energy for consumption by that person."	Yes	Tex. Util. Code § 31.002(6).

[83] Retail choice only available for non-residential customers.

6. Discussion of Issues Relating to CHP Development

6.1 *Potential for Future CHP Development*

In order to understand the effect of private wires on the development of CHP, it is important to understand the potential for CHP in the U.S. As previously mentioned, total generation capacity is approximately 1,075 GW in the U.S., with CHP accounting for 85 GW, or approximately 8% of total generation.[84] A 2003 Energy and Environmental Analysis Inc. ("EEA") study found that there was a technical potential for up to 139 GW of new CHP generation capacity in the U.S. Table 2 below shows the states with greatest potential for additional CHP and the states that have the most CHP currently installed, both in terms of numbers of units and capacity. Table 3 below shows the states with the greatest technical potential for industrial and commercial use, respectively, again by unit count and capacity. Technical potential is based solely on market heat and electrical usage

Table 2. Top States by Capacity and Unit Count:
CHP Technical Potential and CHP Installed
For All Applications

2003 CHP Potential				2003 CHP Installed			
By MW		*By Count*		*By MW*		*By Count*	
State	**Value**	**State**	**Value**	**State**	**Value**	**State**	**Value**
TX	*10,763*	**CA**	*35,557*	**TX**	*16,515*	**CA**	*812*
CA	*9,966*	**TX**	*24,597*	**CA**	*9,146*	**NY**	*300*
PA	*8,610*	**FL**	*17,109*	**LA**	*6,955*	**NJ**	*192*
NY	*8,251*	**OH**	*13,847*	**NY**	*5,454*	**IL**	*135*
OH	*8,036*	**IL**	*13,226*	**FL**	*3,546*	**TX**	*133*
IL	*6,361*	**MI**	*13,139*	**NJ**	*3,483*	**MA**	*100*
GA	*5,233*	**PA**	*12,334*	**AL**	*3,363*	**PA**	*96*
MI	*4,581*	**NC**	*11,012*	**PA**	*3,219*	**AK**	*89*
IN	*4,562*	**NY**	*10,435*	**MI**	*3,102*	**MI**	*85*
NC	*4,199*	**GA**	*9,773*	**OR**	*2,509*	**CT**	*84*

[84] CHP data as of October 18, 2007, *available at* http://www.eea-inc.com/chpdata/ (last visited November 4, 2008); total generation data as of December 31, 2006, *available at* http://www.eia.doe.gov/cneaf/electricity/epa/epat2p2.html (last visited November 4, 2008). The actual value is 7.924%.

Table 3. Top States by Capacity and Unit Count:
CHP Technical Potential for Industrial and Commercial Applications

2003 Industrial CHP Potential				2003 Commercial CHP Potential			
By MW		*By Count*		*By MW*		*By Count*	
State	**Value**	**State**	**Value**	**State**	**Value**	**State**	**Value**
TX	*7,200*	**CA**	*9,758*	**NY**	*6,270*	**CA**	*25,799*
OH	*6,886*	**PA**	*6,167*	**CA**	*4,506*	**TX**	*19,061*
CA	*5,460*	**TX**	*5,536*	**PA**	*4,305*	**FL**	*14,993*
IL	*4,682*	**OH**	*5,414*	**TX**	*3,562*	**MI**	*8,914*
PA	*4,305*	**NY**	*4,900*	**FL**	*3,140*	**IL**	*8,810*
GA	*3,752*	**IL**	*4,416*	**NJ**	*1,709*	**OH**	*8,433*
IN	*3,586*	**MI**	*4,225*	**IL**	*1,679*	**NC**	*8,232*
KY	*3,364*	**NJ**	*3,622*	**NC**	*1,601*	**GA**	*7,515*
WI	*3,318*	**MA**	*3,010*	**GA**	*1,480*	**VA**	*6,386*
MI	*3,229*	**NC**	*2,780*	**MI**	*1,352*	**MA**	*6,302*

For the whole dataset provided by the EEA study, over 98% of the potential CHP sites are for units of 5 MW or smaller. Nonetheless, EEA determined that some 70.3 GW of generation capacity is available for units over 5 MW, according to the 2003 data. These facts are important to note because the size of the unit plays a vital role in assessing the viability of generating excess electricity. This is further discussed in Section 6.6

The EEA study considered only technical potential for CHP. However, economic factors play a significant role in the determination of the project viability. The price paid for exported power could be one of those economic factors. As can be seen from Figure 8 below, CHP development has slowed significantly over the last few years, suggesting that economic or other non-technical factors may be impeding development. Figure 8 shows the number of units and capacity installed since 1973 and includes a three-year moving average trend line. Note that the 2007 data is incomplete, and includes information only through October of the year.

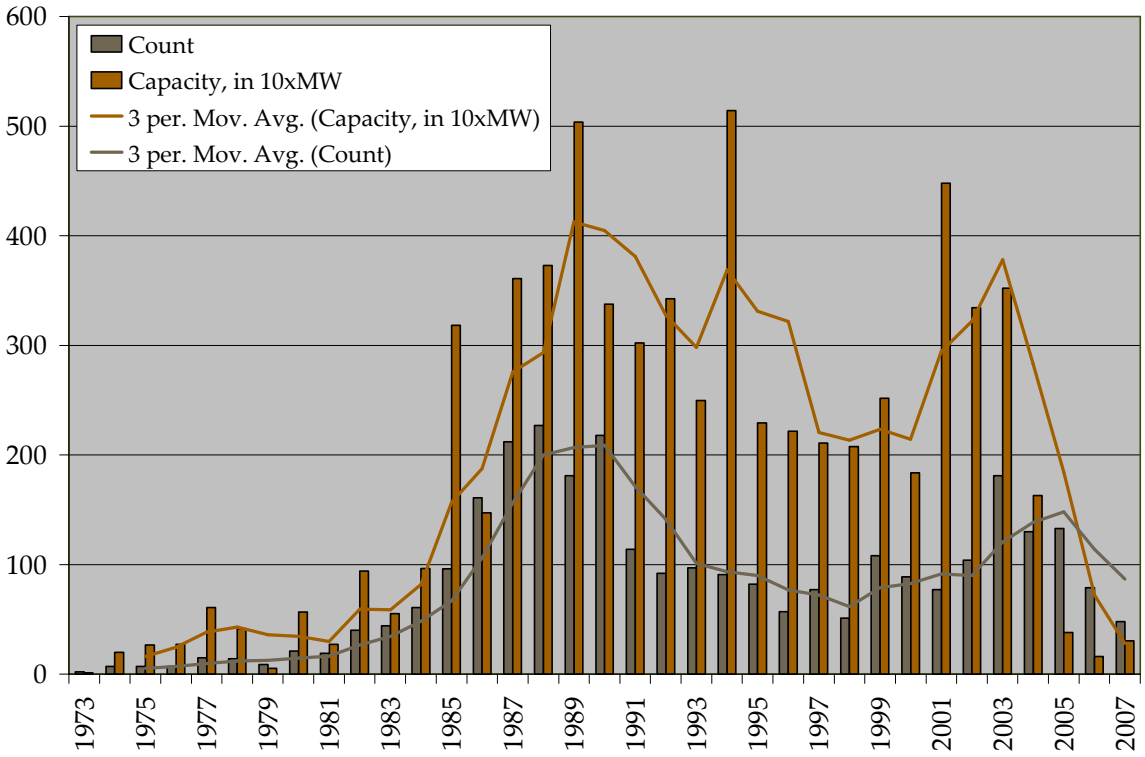

Figure 8. CHP Count and Capacity by Initial Operations Year with 3-year Moving Average Trendline[85]

6.2 *Natural Gas Price Increases and Volatility*

Perhaps the single most significant economic factor affecting CHP development in recent years is the increase in natural gas costs and price volatility, which in turn impacts spark spreads. As defined in Section 3.5, spark spread refers to "the difference in the cost to generate electricity from a fuel source and the cost to purchase from the utility."[86] Natural gas is the most common fuel for CHP, accounting for over two-thirds of the installed CHP units and more than 70% of installed CHP capacity.[87] As a result, natural gas price fluctuations can have a large impact on the CHP community.

For existing CHP units, the volatility in price impacts current operation methodology, whereas for units in the planning stages, gas price volatility may be a significant deterrent. While natural gas prices have historically been low compared to other energy resources, natural gas prices have risen dramatically since 2000, as shown in Figure 9. It is important to note that not only has the overall cost of natural gas increased, but the volatility of the gas prices has also increased sharply, as seen in the approximate 25% spike on and around January of 2006. In addition, there is growing trend to increase use of natural gas

[85] Data collected from EEA CHP Database, available at http://www.eea-inc.com/chpdata/ (last visited November 4, 2008).

[86] As defined by the American Council for an Energy Efficient Economy ("ACEEE").

[87] See Figure 1, in Section 3.1.

for all electricity generation (not just CHP). More and more, the wholesale price of electricity is being linked to natural gas prices.

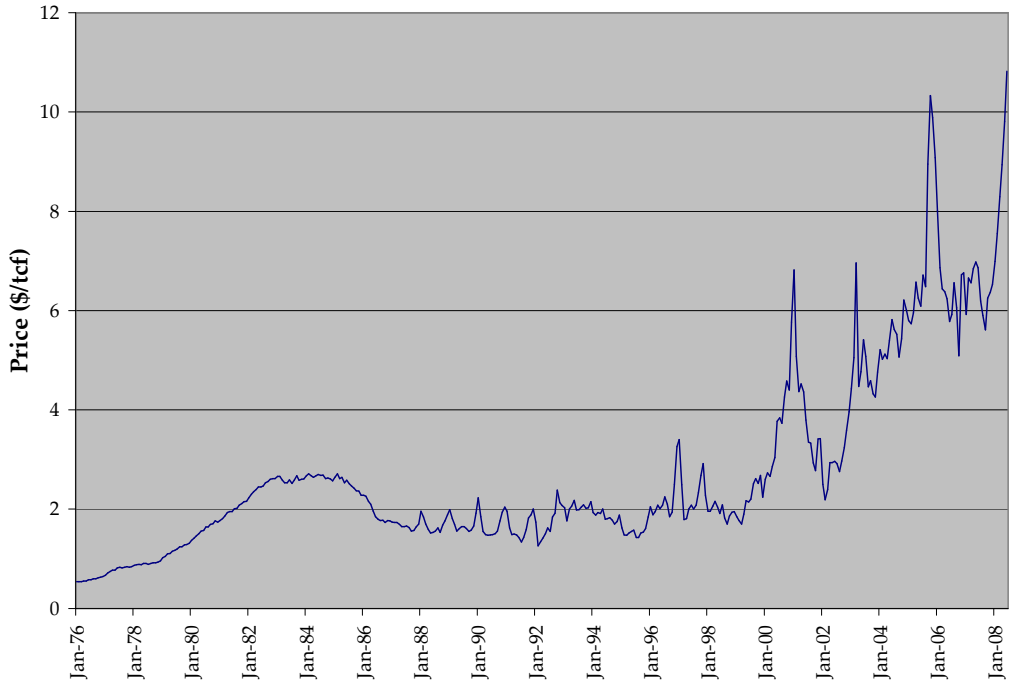

Figure 9. Monthly Natural Gas Prices – January 1976 to June 2008[88]

6.3 *Absence of Standardized Interconnection Terms and Conditions and Implications for Private Wires*

A major issue for all CHP units is interconnection with the electric grid. Depending on the size of the generator and the load it is intended to serve, the CHP unit can either be connected to the grid at the transmission or the distribution level. The specific interconnection location is also known as the point of interconnection ("POI") or the point of common coupling ("POCC"). A CHP unit can choose to completely isolate itself from the grid, which is called intentional islanding, or it can run in parallel with the utility's feeds. Other variations also exist, such as control through a microgrid, where the POCC is not directly at the CHP unit. The most common configuration among all variations is for the CHP unit to be connected in parallel with the utility on a distribution network.

Historically, the lack of standardized terms and conditions for interconnection to utility facilities has been noted as a key barrier to CHP development. However, significant progress has been made in this

[88] Data collected from EIA, available at http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3m.htm (last visited on November 4, 2008).

area in recent years. Since the majority of CHP systems remain interconnected to the grid, private wires do not remove any concerns associated with interconnection issues.

6.3.1 FERC Small Generator Interconnection Procedures

The nationwide transmission network, except for parts of Texas, Alaska, and Hawaii, is regulated by the FERC. Therefore, any unit connecting at the transmission level or proposing to engage in FERC-jurisdictional market transactions will have to follow all FERC guidelines. To make interconnection simpler, FERC published the Small Generator Interconnection Procedures ("SGIP")[89] in August 2006, applicable to all generators under 20 MW. The Large Generator Interconnection Procedures ("LGIP"),[90] for generators larger than 20 MW has been in effect since March 2004. In addition to setting guidelines for small generators to connect to the transmission system, the SGIP also provided a framework for distribution-level interconnection to distributed generation.

The SGIP is focused on the timeframe for utilities and distributed generation facilities to work together. It sets out the required application documents and the timing for them to be submitted. FERC purposely avoided setting financial terms in the SGIP, since the conditions in each region will result in differences.

The SGIP guidelines allow the parties to prepare accordingly for connections to the transmission system. Significantly, neither the developer nor the utility can use its influence to speed up or delay the project. This resolved a major issue that many CHP developers encountered in selling and installing their products for transmission-level use.

6.3.2 Distribution-Level Interconnection

A more general goal of the SGIP, according to one of its original contributors, is to set a basic precedent for interconnection standards at the state level with respect to DG. For the 16 states that have not established interconnection policies for connecting DG at distribution voltages, the SGIP provides general guidelines, such as reasonable timeline restrictions, that the states and their utilities can choose to follow.

As of September 2008, 34 states plus the District of Columbia have published an interconnection policy, with varying levels of detail.[91]

6.4 Technical Issues and Concerns

6.4.1 Safety

The electrical system in place in the U.S. was originally designed around large generation plants located at a distance from the end-user. In order to make the movement of electricity feasible, the energy losses from the generator to the final load have to be minimized, which is accomplished by increasing the

[89] *Available at* http://www.ferc.gov/industries/electric/indus-act/gi/small-gen/procedures.doc (last visited November 4, 2008).
[90] *Available at* http://www.ferc.gov/industries/electric/indus-act/gi/stnd-gen/2003-C-LGIP.doc (last visited November 4, 2008).
[91] http://www.epa.gov/chp/state-policy/interconnection.html (last visited November 4, 2008) in conjunction with http://www.dsireusa.org/ (last visited November 4, 2008).

voltage level on transmission lines. While generation output voltage ranges between 4 kilovolts ("kV") and 20 kV, transmission system voltages can be as high as 500 to 750 kV. From the transmission system, the voltage is gradually stepped down by transformers to various loads and local distribution networks.

A major advantage of the distribution grid as currently constructed is that electricity flows downstream (i.e, from generator to the ultimate customer). This not only limits the end-user's interaction with the grid's high voltages, but it also enables line workers to work safely after disconnecting only one upstream switch. The installation of distributed generation at the load introduces a second direction from which electricity can flow, which increases the possibility of an accident. This is a particular concern where a utility directing the lineman is not the owner and operator of the DG, requiring close coordination between them to ensure safety.

In addition, CHP presents many of the same safety issues as other forms of electric generation. CHP developers recognize the importance of safety in their designs and installations and assert that they take safety extremely seriously. Two sets of standards directly applicable to CHP are the National Fire Protection Agency's National Electric Code ("NEC") and all Occupational Safety and Health Administration ("OSHA") requirements. Additionally, depending on the size of the generator and how it is interconnected to the transmission system, FERC requirements may apply, including electricity reliability standards, promulgated by North American Electric Reliability Corporation ("NERC"), and enforced by FERC.

6.4.2 System Protection

In addition to supporting line worker safety, there are other advantages of the vertical design with respect to system protection. The system operating variables such as frequency, voltage, and power factor are more easily controlled when electricity is generated at central stations. Fluctuations in any of these items can severely damage equipment and cause widespread outages. Distributed generation introduces system inputs that are not controlled by the utility, increasing complexity.

In order to address these concerns, the utility and the DG owner must work together to resolve potential issues. The utility will normally perform a short-circuit study to determine the effect of the CHP unit on the system. Short-circuit studies are calculated on all levels of electrical distribution, and are the basis for setting safety and reliability equipment such as breakers and switchgear. In radial distribution systems, the predominant method of distribution in the U.S., each successive downstream safety device will usually be smaller in magnitude than its preceding fuse/breaker/disconnect switch. This ensures that wherever there is a short-circuit fault at any point in the system, the breaker directly upstream of the short is disconnected, and only the minimum amount of load is dropped. All other parallel loads can still run without disruption, and an operator can instantly spot the location of the problem. Introducing DG changes the downstream nature of radial electric distribution, and could lead to a re-design of portions of the local distribution system and, in some cases, a modification in the utility's employee protocol. However, these effects would normally only be seen for sufficiently large DG applications.

6.4.3 Compatibility

Since there is no economic way to store electricity, the electrical grid is a highly dynamic structure. This requires all interconnections to function properly or be shut off. Therefore, it is of paramount importance for the CHP installation to be properly coordinated with the utility. While it is in the interest of both the utility and the CHP developer for this to go smoothly, the parties' concerns are slightly different.

From a utility's point of view, the CHP represents a variable load that may be large enough to cause disturbances. This in turn increases the challenge of monitoring the functioning of the distribution system. As mentioned in Section 6.2.2, the CHP can impact electrical system specifications such as voltage, power factor, and frequency.

The CHP unit, on the other hand, is mainly concerned with grid instability not related to the CHP unit. Since the majority of CHP installations are run in parallel with the grid, any grid fluctuations or shutdowns will often cause the CHP plant to shut down as well. Although the CHP plant may be able to restart before the rest of the grid is restored, the CHP owner still suffers inconvenience and disruption. Grid fluctuations can be a significant issue for very large CHP units that are designed to run most of the time. Just as the utility monitors and reacts to variations in the technical aspects (e.g., frequency and voltage) of the power on its wires, large CHP units can shut down to protect themselves from mechanical failure caused by these variations. Therefore, it is essential for both the CHP unit and the utility to have properly set system settings.

With the exception of fuel cells, most forms of CHP technology have been available for decades. As a result, compatibility issues are less significant than they originally were. While the issues will always exist, the precedent of previous interconnections has made CHP developers and utilities more comfortable working through these elements of interconnection.

6.5 Interconnection and Standby Service Costs

6.5.1 Interconnection Costs

As mentioned in Section 3.5, CHP industry participants commonly cite interconnection costs as a barrier to CHP development. The CHP developer, like other generators, must pay the costs of the physical interconnection, including materials and construction costs. This can occasionally include retrofitting existing infrastructure owned and operated by the utility. The components and computation of these costs involve issues beyond the scope of this study.

6.5.2 Standby Service

Utilities are required to provide standby service to customers operating onsite generation. The nature of this service is to provide generation, transmission, and distribution to the customer during times when its own generation is physically unavailable, to serve load in excess of the capability of onsite generation, or to provide an alternative source of electric power when the onsite generation is not running.

Utilities must install and maintain distribution systems to serve all of the customers in their service territories. These systems must be available 24 hours per day, 7 days a week. Furthermore, distribution

systems are designed to serve annual peak loads on specific circuits. When a facility installs DG and no longer purchases routine service from the utility, the utility will charge for being ready to "stand by" to provide electricity as and when needed.

Standby charges are tariffed rates. For regulated public utilities, these rates are set in regulatory proceedings before the state utilities commission. These standby charges are intended to ensure that the DG customer pays its share of the costs of having the infrastructure in place and that the remaining customers of the utility do not effectively subsidize the DG customer. The charges are to account for the capital investments and operations and maintenance costs associated with the local distribution network, along with the utility's revenue requirement as approved by the state regulatory body. How standby charges are calculated varies widely from state to state and utility to utility.

CHP owners have cited the magnitude of standby charges as a significant impediment to economic development of CHP projects. Assessing the methods used to compute these charges is beyond the scope of this study. Private distribution wires would not impact the need for standby service unless the CHP project would be completely independent of the grid – i.e., not interconnected with the utility's system.

6.6 Channels to Dispose of Excess Power

CHP owners have several alternative mechanisms to dispose of power not needed at the site. Many existing CHP units were developed as QFs under PURPA. Those facilities may have contracts in place requiring the local utility to purchase their output at the utility's "avoided cost." As noted above, EPAct 2005 eliminated this requirement for QFs that have access to a competitive wholesale market for energy and capacity, and utilities may apply to FERC to terminate the obligation to enter into new contracts in such markets.[92] In addition, EPAct 2005 tightened the requirements for new cogeneration units to achieve QF status, and FERC has adopted revised regulations implementing these requirements.[93] Nonetheless, sales to utilities at the utility's avoided costs under PURPA remains an option in many cases.

CHP generators, like other generators, have a number of alternatives to dispose of excess power. They may sell power to utilities and other retail energy suppliers in wholesale transactions, or request the right to wheel power – either to wholesale markets or retail customers – in states that permit retail competition. If net metering is available, they may obtain the benefit of retail pricing. For larger CHP installations that are sized to produce more power than is needed on-site on a regular basis, the wholesale market is a ready option.

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[92] Final Rule: New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities, 18 C.F.R. § 292 (October 16, 2008), *available at* http://www.ferc.gov/whats-new/comm-meet/101906/E-2.pdf (last visited September 15, 2008).

[93] Revised Regulations Governing Small Power Production and Cogeneration Facilities, Order No. 671, 71 FR 7852 (Feb. 15, 2006), FERC Stats. & Regs. ¶ 31,203 (2006), *order on reh'g*, Order No. 671-A, 71 FR 30585 (May 30, 2006), FERC Stats.& Regs. ¶ 31,219 (2006), *available at* http://www.ferc.gov/legal/fed-sta/ene-pol-act/final-orders.asp#skipnavsub (last visited November 25, 2008)..

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In some states, net metering may be available, particularly for smaller generators with smaller amounts of excess power. Net metering provides a credit against the customer's bill for the value of the power sold to the grid. In some instances, the credit may be carried over for future bills. Net metering credit reflects a bundled retail rate which includes both the facilities used to serve the load plus the energy.[94]

Net billing is also sometimes offered by utilities. Like net metering, net billing provides a credit for power exported to the grid, but at the wholesale price for power. Net billing and similar arrangements with the local utility provide a generation owner a ready buyer for small volumes of energy, while freeing the generation owner from having to manage the mechanics of the wholesale market.

Net metering is available on some level in 42 states, plus the District of Columbia.[95] However, the provisions vary significantly from state to state, and do not always apply to all utilities within a state. The combination of these limiting factors dampens the influence of net metering on CHP development.

6.7 Other Considerations

In some regions, congestion charges are assessed for the utility's need to reroute power from a location where electricity costs are relatively low to a load where costs are higher and power lines are running near capacity. In areas without established markets to price congestion, the utility may incur higher costs by running more expensive generation. The installation of CHP may mitigate these costs, and can be a significant advantage for the development of CHP. This is a benefit that is only just beginning to be captured in market prices as demand resources begin to participate in markets.

At least one state, Connecticut, has taken steps to encourage the installation of DG and CHP to relieve congestion on the grid. The Connecticut Public Utility Commission has introduced incentives for customer-owned generation, with special provisions for CHP.[96]

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[94] Net metering does not necessarily reflect time of day differentials in pricing and costs. As a result, utilities are often selling low and buying high in a netting arrangement.

[95] Data from http://www.irecusa.org/fileadmin/user_upload/ConnectDocs/December_2007_NM_table.doc (last visited November 4, 2008).

[96] *Customer-Side Distributed Generation*, Connecticut Public Utility Control, *available at* http://www.ct.gov/dpuc/cwp/view.asp?a=3356&q=419794 (last visited Dec 15, 2008)

7. Potential Impacts of Elimination of Restrictions on Private Wires

7.1 Potential Impact on CHP Development

It is difficult to assess the impact that elimination of private wires restrictions might have on future CHP development. Private wires restrictions are one of many issues for CHP developers. Eliminating these restrictions may allow some CHP facilities to obtain retail value for their excess electricity which may improve economics in systems with thermal load requirements that result in excess electricity. However, the costs of installing and maintaining distribution facilities would offset some of the anticipated benefits.[97]

Elimination of private wires restrictions would not affect many of the factors cited as impeding CHP development, including volatile natural gas prices, interconnection procedures and costs, and standby power terms and costs. Similarly, the ability to serve other premises over private wires would not overcome a business' reluctance to engage in non-core business activities or to allocate capital to a project with a long pay-back period. Elimination of private wires restrictions may allow some sites to more appropriately size units with respect to their thermal loads, which may result in excess electricity for the host site. However, it is not clear how large the impact would be and whether it would be sufficient to overcome other concerns.

A CHP provider serving one or more additional customers would effectively operate as a small utility, but without regulation. The larger the CHP unit and the larger the number of customers, the more the CHP owner resembles a traditional utility. The CHP provider would be responsible for operating and maintaining all of its distribution facilities in addition to the CHP equipment. A business considering installing CHP may be unwilling to take on the burden of managing the risks associated with providing electric service to its own facilities or those of an unaffiliated entity. A third-party developer might be willing to undertake the risks, but would require significant capital in order to manage them and may also require long-term commitments from potential customers.

From a technical point of view, private wires would increase the size of some CHP units. As previously discussed, CHP units are often sized to fit their thermal load. This often leads to a mismatch between the site's electric generation capacity and its electric requirements. For example, a school building

[97] These costs will vary according to whether the private wires are placed overhead or underground. Underground installations are far more costly. This is well known throughout the utility industry. The additional cost may range from 4 to 10 times the price of above-ground installation. In addition, underground lines, while generally more reliable, are more difficult and expensive to maintain and repair. A study performed for the Long Island Power Authority in 2005 determined that while the frequency of outages declined with underground lines, restoration times were significantly longer. In addition, the study noted that underground lines have proved to have shorter useful lives than overhead facilities and are more susceptible to corrosion, as well as risks from flooding, tree roots, rodents and dig-ins. The study is available at http://www.lipower.org/pdfs/company/papers/underground_030805.pdf (last visited November 4, 2008). Similar studies have been conducted by the Edison Electric Institute and are available on its website.

needing a large amount of electricity and only minimal heat might install a relatively small topping cycle CHP unit meeting its thermal load and purchase the majority of its electricity from the utility or an alternative electric supplier. Conversely, a refining facility that has an abundance of thermal energy not being put to good use might choose to install a larger (likely bottoming cycle) CHP unit, assuming it could sell the electricity economically. Disposition of excess power, by all methods other than private wires, is discussed in Section 6.7. If restrictions on private wires were eliminated, the average CHP unit size might increase, primarily in situations such as the refinery example discussed above.

7.2 Potential Concerns Regarding Private Wires

7.2.1 General Considerations

Private wires present a number of challenges in terms of public safety, customer protection, utility employee safety, and grid protection. Traditional utility regulation addresses all of these issues, as well as many others. States that have adopted retail choice programs have imposed some measure of regulation upon alternative retail suppliers, ranging from registration to financial qualification. However, they all chose not to give retail suppliers the ability (or the obligation) to install distribution wires. Instead, these suppliers "wheel" power over the utility's wires. As a result, these regulations focus on financial and customer service capabilities, not safety or grid protection.

Apart from the question of whether a private wire would be allowed, a CHP provider that desires to serve another customer may be subject to regulation as an alternative retail supplier, particularly if the other customer is an unrelated entity. In Illinois, under some circumstances, related entities may "self-wheel" power to other facilities without qualifying as retail electric suppliers, though the utility's distribution wires will be used (and delivery charges incurred). [98]

However, the installation of physical wires raises concerns that may increase the level of ongoing oversight and regulation that might be necessary, even if full utility regulation would not be appropriate. As one doctoral candidate recently wrote in connection with the related topic of microgrids observed:

> A micro-grid, by definition, involves multiple customers and essential services for electricity and heating. When one also considers that customers may not fully understand the technical aspects or risks associated with energy quality and reliability, it is clear that the State has an interest in providing guidance, if not legal requirements, for how a micro-grid is managed and operated . . . [T]here are several issues that deserve consideration. They include but are not limited to: rate-setting; billing and collection; dispute resolution; insurance holdings; credit; and demand management for reliability.[99]

The issues are no different for a small system consisting of a CHP facility and an unaffiliated potential customer to be served by private distribution wire.

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[98] 220 ILCS 5/16-115(e).

[99] Douglas E. King, *Electric Power Micro-grids: Opportunities and Challenges for an Emerging Distributed Energy Architecture,* Carnegie Mellon University (May 2006), p. 72, *available at* http://wpweb2.tepper.cmu.edu/ceic/pdfs_other/Doug_King_PhD_Thesis_2006.pdf (last visited Sept. 15, 2008)

7.2.2 Public Safety

Safety concerns increase as more wires are installed, especially across public right of ways. These concerns become more significant the greater the amount of public access to the wires in question. The chief concern is the interaction of everyday people with potentially hazardous electric wires. Maintenance and safety of the cable is one of the chief responsibilities of utilities, whereas this would be a non-core function for most entities installing CHP (i.e., schools, hospitals, refineries, etc.).

The public safety issues associated with electric distribution wires are far more significant than those related to, for example, telecommunications lines. While telecommunications lines are not dangerous, improper handling of electrical wires can result in severe injury, loss of life, and property damage. Like a utility's wires, private wires can either be suspended in air or buried underground. Where wires are above ground, downed wires can create obvious hazards. Multiple wires owned by different parties present additional risks. When weather or a traffic accident causes a live power line to contact the ground, a car or other property, emergency responders need to have the line de-energized. With multiple wires and multiple owners, it may not be clear who can do this. Similarly, when linemen are restoring the system after a major disruption, they need accurate information about which wires are or are not energized. Again, multiple wires and owners may make this more difficult.

Placing wires underground may address some of the public access issues. However, underground wires present a new set of safety issues. The precision associated with mapping and locating wires varies dramatically. Contractor dig-ins often occur, even where regulated utilities have installed wires. Increasing the number of parties who can install electric distribution wires in public rights of way would likely exacerbate this problem. In addition, there is the added concern as to whether this might open the door for installation contractors with limited experience.

Utilities are subject to extensive regulation and oversight to ensure safe, reliable operations. Undoubtedly, anyone other than a utility purporting to install distribution wires would be held to many of the same standards at the outset, in terms of permit issuance and contractor qualifications. However, as an ongoing matter, there is no regulatory body (other than OSHA, with respect to employee matters) that would monitor or collect data on the safety performance of an entity other than a utility that operates private distribution facilities. If private wires are permitted, state and local authorities may conclude that some form of regulation over these activities is appropriate, since the operator of private wires in this instance would be providing otherwise regulated services.

7.2.3 Potential Grid Benefits from Additional Distributed Generation

7.2.3.1. Relief of Transmission Constraints

The majority of the existing power grid was constructed decades ago. The central element of early grid design was to have large power plants located remotely from civilization. As the need for power grew rapidly, the transmission system did not grow as fast as generation and distribution facilities, and it is now considered a limiting factor in the design of large power plants.

One way to address such transmission constraints, from a technical perspective, is by installing distributed generation, including CHP. More distributed generation would decrease the amount of power transmitted on a daily basis. In some cases the decrease in power transmitted can reduce congestion on constrained lines. However, the nature and extent of any system benefits to the grid would depend upon the location of the distributed generation, its operating characteristics, and its availability when needed. Connecticut has attempted to address this by providing incentives for customer-owned generation, including CHP, to relieve congestion.

It is not universally agreed that distributed generation (including CHP) significantly helps grid reliability, at least where it is not controlled by the utility. CHP units would still be connected to the grid and they are generally controlled by the end-user, not the utility. This complicates the utility's day-ahead and next-hour planning. Planning load following, in particular, becomes very difficult when a customer-owned generator comes on and off the grid for its own reasons. Private wires would only exacerbate these issues, since it would lead to larger units (resulting in larger variations in load). In addition, private wires may result in more variable load on the utility's system, as different facilities have different demands and load profiles. This would magnify the impact of simply installing a larger unit.

As discussed in Section 6.2, distributed generation can result in grid instability and requires coordination with the grid operator (the utility). Allowing private wires would add to the possibility of disturbances for two reasons. The CHP units will likely be larger and there would be more unique connections to the grid – in this case, the customers of the CHP unit. The combined effect of this is to diminish the control the utility has over its grid. As the uncontrolled percentage grows, it becomes increasingly difficult for a utility to ensure that system stability characteristics, such as frequency and power factor, remain within favorable ranges.

7.2.3.2. Reduction of Line Losses and Fuel Consumption

Since CHP provides two useful outputs (thermal and electric) for one fuel input, it has the potential for increased system efficiency over separate heat and power. CHP system efficiency is further increased by its proximity to the load it serves, as the power it produces does not travel over the transmission grid. Average line losses for transmission usually range from 7 to 10%. Private wires would presumably be used to support larger units with, accordingly, larger fuel savings. This may or may not have any benefit to the utility and its customers, depending on fuel mix and how fuel and generation costs are recovered. However, it could benefit the CHP customer through reduced energy costs and, potentially, the environment through reduced fuel usage and decreased emissions. In addition, the emissions reductions associated with the reduced fuel use have the potential to provide additional benefits to the customer and the environment.[100] As discussed previously, however, the benefits may be difficult to achieve because of other factors impacting the economics of CHP, including fuel prices.

[100] *Environmental Revenue Streams for Combined Heat and Power,* U.S. Environmental Protection Agency, *available at* http://www.epa.gov/chp/documents/ers_program_details.pdf (last visited Dec 15, 2008)

7.3 Proliferation of Duplicate Distribution Facilities

The following sections focus on the impacts of duplicate distribution facilities, including private wires. Other issues, such as public safety, grid protection and control, and other issues surrounding private distribution wires in general, are discussed in the preceding section.

7.3.1 Potential Impact on Reliability and on Other Aspects of Grid Operations

7.3.1.1. Potential Advantages and Concerns Relating to Redundancy

In some respects, duplicate distribution facilities – including private wires – can be seen as positive. The most reliable system is one with many generation units, many transmission and distribution options, and a single load, all controlled by a single entity. For cost reasons, this is unreasonable, and most loads operate off of a single distribution feed.

From the point of view of the CHP customer(s), dedicated generation, with or without a separate distribution wire, significantly decreases the possibility of an outage for that customer. For illustrative purposes, if the grid is 99% reliable, and the CHP unit is 95% reliable, the probability of an outage for the end-user is much smaller because that would require failure of both distribution options.

Redundancy at the system level, however, is a more complicated issue. While redundancy within electrical distribution is widely considered a technical advantage, it must be done carefully. The end-users that elect to buy from the CHP system and keep the utility's distribution connection would significantly gain reliability, as discussed above. However, having duplicate wires significantly increases the risk of propagating a system disturbance across the local network. This is because the private wires serve as a connection of electricity between two or more facilities. Therefore, any system disturbance within any of the units served by the CHP could propagate through the private wires to the other sites that are connected to the CHP unit. This significantly increases the risk to system stability, both for the CHP's network and possibly the utility's grid.

7.3.1.2. System Support

Duplicate wires and distributed generation can provide system benefits in terms of redundancy and voltage support, assuming appropriate dispatch arrangements with the grid operator. One point often raised in support of expanded DG development is that DG can address congestion and enhance the stability of the grid where needed. However, with respect to CHP, the principal siting driver is the thermal load, not electrical congestion or system considerations. At least one state, Connecticut, is attempting to provide incentives for the installation of CHP where it will address congestion and system concerns.

As discussed above, however, redundancy is a more complicated issue. Duplicate wires significantly increase the risk of propagating a system disturbance across the local network, which significantly increases the risk to system stability, both for the CHP's network, and possibly the utility's grid.

7.3.1.3. Avoided Cost to Utility; Reduced Burden on System (Except when Back-Up Power is Required)

One of the often-mentioned benefits of CHP to utilities is that it reduces load on the system. This argument is extended to support private wires, noting that multiple customers could be removed from

the utility's service requirements. Some utilities, however, consider this effect to be minimal because unless the end-user completely disconnects from the utility, the utility must still be ready to serve all customers using other generating capacity. In addition, the utility's "avoided cost" has proved difficult to measure in other contexts, most notably PURPA.

7.3.1.4. Reduced Burden on System

A major advantage of larger CHP systems is the decrease of regular reliance on generation, transmission, and distribution system resources. With respect to generation and transmission, the decrease in use allows the grid to use its resources for other loads. This is the underlying idea behind a decrease in congestion charges for customers who are using the same system as the CHP unit.

If multiple CHP units with private wires were installed in the same area, the overall demand on the system will certainly decrease, although the potential demand remains the same. This does not relieve the utility of the need to maintain the distribution system, and to be in a position to serve the load if necessary.[101] The discussion in Section 7.3.1.3 as to "avoided cost" is also applicable to this issue.

7.4 Utility Rate Impacts

Private wires networks generally will increase the overall average price charged by the utility and trigger cross-subsidies between participating and non-participating customers of the utility. The increases will occur for both vertically integrated and unbundled (i.e., distribution and transmission) electric utilities. This is a well-documented consequence of competition in a natural monopoly, as discussed in Section 4 above. [102]

In addition, private wires could exacerbate the cost shifting that can occur when a customer switches between its own generator and utility service in response to fuel prices. In these cases, the utility may have to call upon more expensive power resources to serve the added load, to the detriment of customers who were taking power from the utility all along.

7.4.1 Increase in the Average Price of Distribution and Transmission Services

Section 4 of this report described the economic rationale for a natural monopoly. In summary, a natural monopoly is an industry where the marginal cost to serve customers is always below the average cost to serve customers due to inherent economies of scale. In the case of a natural monopoly the economies of scale are so significant the prices paid by consumers will increases if competition is introduced into a market. However, in order for an entity to remain financially viable it must recover average costs.

The solution to this problem that has been adopted by most developed economies is to establish the utility as a monopoly and protect consumers from abuse of monopoly power through regulatory

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[101] Some states, such as Oregon, have attempted to diminish the overall demand utilities must account for by allowing customers with on-site generation such as CHP to set their own demand levels based on how much of their load they would require the utility to serve if the DG unit is unavailable.

[102] *See,* Richard A. Posner, *Natural Monopoly and its Regulation* - 30th Anniversary Edition Cato Institute, Washington, DC , 1999, Pg.1-2; Charles F. Phillips, Jr. , *The Regulation of Public Utilities*, Public Utilities Reports, Inc., Arlington, VA, 1993, Chapter 2.

oversight. Regulatory oversight can be administered by an outside body as is the case for most investor-owned utilities and self-regulation which is common for public power entities.

The implementation of private wires would trigger increases in the overall average price charged by the utility because the overall level of utilization of the distribution and transmission network will decrease. Although the cost to build and maintain the distribution and transmission system will also decrease, the decrease in costs will be significantly less than the decrease in revenues customers will pay to the utility thus increasing the average rates of the utility.

Growth in demand, and the associated costs triggered by that growth, do not eliminate the fundamental economics of the network. An electric distribution network is a natural monopoly. A natural monopoly is defined as having, in the long-run, a marginal cost that is below the average cost. The cost to serve new load is the marginal cost and not the average cost.

As discussed in Section 4 above, the introduction of competition into a market that is a natural monopoly increases costs. The size of the increase depends on many factors, including the extent of the competition. The cost to serve new load for competing natural monopolies is the average cost, instead of the marginal cost. As a result, in the case where a redundant network is allowed to exist in a natural monopoly market structure, one of two outcomes will occur. First, the two firms will compete for the disputed customers charging only marginal cost. However, the costs required to maintain either firm in an economically sustainable manner is the higher average cost. If this occurs on a large scale, the result will be the eventual financial collapse of one or both firms. This situation occurred in the early development of electric power utilities and led to the introduction of laws granting franchises to various types of utilities that are defined as networks. The second possible outcome will be that the competing firms will vie for customers in the disputed region and recover the remaining costs from customers outside of the disputed region. In this circumstance the customers outside of the disputed region will be paying a price in excess of average cost and thus be providing a subsidy to the other customers.[103]

7.4.2 Cross-Subsidies between Private Wires Customers and Other Customers of the Utility

Any customer exiting the distribution or transmission service of the utility will trigger a decrease in costs equal only to marginal costs, whereas the decrease in revenues will be equal to average revenues. This is true regardless of the reason the customer leaves the utility's wires services, such as where a business closes a factory or relocates. However, when the decrease in the utility's revenues is not caused by competition within a natural monopoly, it is a harm without a foul.. The utility's monopoly only gives it the right to serve all customers in its service territory. Departures resulting from competition with the regulated wires business, however, present important policy issues. One such issue under these circumstances is what will happen to the other customers of the utility – those customers that are not part of a private wires arrangement.

The prices paid by the other customers will likely increase if private wires arrangements are allowed to exist. The amount of the increase can be defined as the product of (1) the decrease in the quantity of

[103] Richard A. Posner, *Natural Monopoly and its Regulation* - 30th Anniversary Edition Cato Institute, Washington, DC , 1999, Pg.1-2

distribution and transmission services associated with the private wires customers; and (2) the difference between the average cost of the utility and the marginal cost.

The cross-subsidy triggered by private wires networks will occur because the utility will be allowed to recover its revenue requirement but the reduction in the cost of the utility will only be equal to the marginal cost of the system. Since natural monopolies have a marginal cost that is less than the average cost of the system the resulting shortfall – the difference between the average cost and the marginal cost – will be shifted to the prices paid by the other customers of the utility.

As discussed in Section 5, some states have permitted private wires and other exceptions to the utility monopoly in limited circumstances. Presumably, these states have accepted some degree of cost-shifting or cross-subsidy.

7.5 Other Impacts

7.5.1 Taxes and Other Items Collected Via Non-Bypassable Charges

Utility tariffs are used as vehicles to collect taxes and to fund energy and non-energy programs unrelated to the cost to serve the customers of the utility. Allowing customers to by-pass the utility's distribution system by a private distribution connection to a non-utility generator will shift the burden of these taxes and programs to the other customers of the utility.

Municipal and state public utility taxes are relatively common and provide an important source of revenues to governmental bodies. Some of these taxes are captured explicitly as additions to the customer's utility bill. In connection with restructuring their utility laws, some states adopted alternative mechanisms to ensure that state and local governments would continue to receive the same level of revenues. In Illinois, for example, these amounts are collected by utilities, regardless of whether the customer purchased its power from the utility or through an alternative energy supplier. As a result, changes in legislation or regulation by the state utility commission would be required in order to address the impact of private wires in order to maintain revenue neutrality for governments and to prevent undue cost shifting.

Many jurisdictions fund social programs through utility tariffs and charges that appear on utility bills. Examples of the programs receiving such funding include low-income energy assistance, energy efficiency, and similar programs. Like state and municipal taxes discussed above, these funding vehicles may collect these funds either implicitly or explicitly. Absent legislation requiring private wires networks to collect funds for these purposes, these programs would not be funded by the participants in private wires system.

7.5.2 Aesthetics, Disruption of Roadways, Public Convenience

Distribution facilities are not generally attractive. In addition, poles can present a road hazard. Utilities are often pressed to place facilities underground for aesthetic reasons, as well as to enhance reliability. Regardless of whether private wires are considered to be "duplicate" or simply additional facilities, additional poles and wires will not be aesthetically pleasing, as the picture in Section 4 above demonstrates. While placing wires underground may address some aesthetic issues, underground

installations raise other issues. Underground wires, while generally more reliable, are more difficult to maintain and repair. From a purely logistical point of view, in many urban areas, the space available for utility facilities is limited. Adding additional duct packages would be a challenge, and cities may be reluctant to cede limited space for private purposes. In addition, the public inconvenience associated with construction of private distribution facilities under, over, or along roads may be significant.

8. Conclusions

Whether to permit private electric distribution wires raises fundamental questions of policy under state utility laws. Each state has chosen to regulate electric utilities operating within their borders. Fifteen states have restructured their laws to permit customers to choose the supplier of their electricity. No state has chosen to permit general competition in electric distribution. Electric distribution is provided as a monopoly service in all 50 states and the District of Columbia, although some states have carved out limited exceptions. In exchange for monopoly rights, utilities undertake the obligation to serve all customers in a defined geographic territory at published rates on a non-discriminatory basis. Rates are set based on the cost to serve various customer classes, and are designed to provide the utility a return of and a return on its investment. A key element of rate design is the avoidance of cross-subsidies between different types of customers. This regulatory model, based on the existence of a "natural monopoly" has been in place for decades.

Private wires are inconsistent with this model. However, several states have nonetheless chosen to permit them under limited circumstances, including, in some states, where the wires are used to provide generation specifically from CHP units. The issues surrounding private wires are complex. There are operating, planning, and rate issues, in addition to potential concerns regarding public safety and grid safety. The customer and utility impacts of permitting private wires could be significant and could vary from utility to utility, as well as from state to state.

At the same time, it is not clear that existing restrictions on private wires per se are materially hampering the development of CHP. There are many different factors that impact the development of CHP, including the economics of particular projects, as well as the economy of a region. Not every state has the same technical potential for CHP. Other factors are cited as more significant by some developers. Nonetheless, private wires restrictions may be a factor in some cases, where they may improve the economics of the project.

Private distribution wires, if constructed, would be duplicate facilities in many respects. Customers served by the private wires would likely also be connected to the local utility's distribution system. While there are potential benefits from duplicate facilities, there are also operational and reliability challenges from the utility's perspective, since the wires would not be controlled by the utility. In addition, multiple sets of wires and other distribution facilities raise concerns as to aesthetics, public safety, and public inconvenience.

Appendix A – Contributors to Study

Organization	Name
Burns & McDonnell	Ed Mardiat Rod Schwass
Capstone	Steve Gillette Justin Rathke
Carnegie Mellon (PhD candidate)	Douglas King
Commonwealth Edison Company	William McNeil David Geraghty
Consolidated Edison Company of New York	Patrick Wheeler Damian Sciano Denise Levine Sara Schoenwetter
Cummins	Eric Wong Eric Prince
DE Solutions	Keith Davidson
DOE EERE/ITP	Bob Gemmer
EEI	Michael Oldak Cal Odom
EPA	Katrina Pielli
International District Energy Association (IDEA)	Rob Thornton
Kean Miller	Katherine King
Louisiana Refining and Chemicals	David Cheshire
NARUC	Charles Gray
National Rural Electic Cooperative Association	Jay Morrison
Oncor Electric Delivery Company LLC	Darryl Nelson
Real Energy	Kevin Best
Recycled Energy Development (RED)	Sean Casten Dick Munson Melissa Malarky Myra Karageines
Regulatory Assistance Project (RAP)	Rich Sedano Rick Weston
Sacramento Municipal Utility District (SMUD)	Mark Rawson
Solar Turbines	Richard Brent
Southern California Edison Company	Stuart Hemphil Akbar Jazayeri

Trigen, a Veolia Energy Company	Lawrence Plitch Bill DeCroche
University of Illinois at Chicago Energy Resources Center	John J. Cuttica
United Technologies Corporation	Tim Wagner
USCHPA	Jessica Bridges

Appendix B – Stakeholder Comments

The entire committee of stakeholders and a small number of additional parties who expressed an interest in the study reviewed and provided input on two complete interim drafts of the Study. In addition, they were offered the opportunity to provide comments on the final draft of the Study for inclusion in the appendix. This Appendix includes the separate comments that were submitted.

RED
RecycledEnergy Development

the new green

www.recycled-energy.com 640 Quail Ridge Drive Westmont, IL 60559 phone 630.590.6030 fax 630.590.6037

4 December 2008

Navigant Consulting, Inc.
Suite 500
1801 K Street, NW
Washington, DC 20006

Re: "Study of the Effect of Private Wire Laws on Development of Combined Heat and Power Facilities."

Navigant Consulting's latest draft eliminates a few of the more egregious statements, but it continues to avoid two key points that any report on this subject should address. First, what are the comparisons in other industries – notably natural gas pipelines – that might inform an evaluation of how private wires might impact CHP facilities? Second, how would the competition resulting from private wires affect the bargaining ability of CHP developers?

The report, unfortunately, remains little more than a defense of status-quo electricity monopolies. Assuming that electricity distribution must be monopolized, it recounts the various regulations that led to the status quo, yet it offers no case studies – several of which were outlined in RED's initial comments – about how that status quo obstructs competition, thereby resulting in higher consumer costs, increased pollution, and lower efficiency. Without such a review of case studies, Navigant's rather bold declaration – that "existing restrictions on private wires per se are materially hampering the development of CHP" – is suspect.

Amazingly, the Navigant study fails to review comparable examples where private distribution networks encourage competition and lower consumer costs. As noted in RED's previous comments, the most obvious comparison would be with private natural-gas pipelines. The ability of private pipes to tap transcontinental natural-gas delivery pipes did not result in duplicative pipelines (as Navigant assumes for electricity), but it provided independent developers an alternative to the monopolist's system, allowing them to negotiate fairly with monopolists for the transmission of natural gas. With the ability to build their own private network, gas users find local gas distribution companies willing to negotiate. The current electric wire prohibition, in contrast, only benefits the monopolists.

These and other shortcomings demonstrate that Navigant Consulting's study on private wires remains seriously flawed. Navigant's defense of utility monopolies and the status quo adds nothing to the policy discussion about the balance between regulation and competition in the electricity market. The report either should be withheld or released only with a minority report or comments by members of the advisory committee.

Sincerely,

Dick Munson, Senior Vice President

TRIGEN
A Veolia Energy Company

The Trigen Companies
99 Summer Street / Suite 900
Boston, MA 02110
T: 617.849.6600 F: 617.482.3235
www.trigen.com

January 6, 2009

Celia David
Director
Navigant Consulting, Inc.
1801 K Street, NW
Suite 500
Washington, DC 20006

Dear Ms. David:

Thank you for the opportunity to submit dissenting comments. As we have communicated on more than one occasion during this process, Trigen has had several concerns with Navigant's various drafts of the "Study of the Effect of Private Wire Laws on Deployment of Combined Heat and Power Facilities" (the "Study"). Generally speaking, Trigen believes that the Study appears to reflect a subjective, one-sided view of private wires from the perspective of the monopoly electric utilities, with a bias towards the status quo. This is unfortunate as the opportunity afforded by the mandate of Section 1308 of the Energy Independence and Security Act of 2007 – to evaluate the effect that the private wires laws have on the development of combined heat and power ("CHP") facilities and determine whether changes in these laws might be advantageous – appears to have been squandered. This letter will only highlight the major concerns that we have with the Study.

1. The Study is surprisingly reticent on the many societal benefits that come from CHP, including energy independence, enhanced grid reliability, national security and reduced emissions of greenhouse gases. In a Study that purports to be weighing the pros and cons of removing barriers to CHP, one would not have expected the Study to ignore almost completely the several societal benefits that are widely known to flow from CHP. This is particularly troubling given the renewed focus expected from the Obama Administration and Congress in the near future on the role that energy efficiency can play in addressing climate change. We would urge the authors to review the recent study by the Oak Ridge National Laboratory, U.S. Department of Energy, on Combined Heat and Power, *Combined Heat and Power, Effective Energy Solutions for a Sustainable Future* (Dec. 1, 2008).

Trigen-Atlanta Energy Corporation
Grays Ferry Cogeneration Partnership
Trenton Energy Corporation
Trigen-Baltimore Energy Corporation
Trigen-Boston Energy Corporation
Trigen Building Services Corporation
Trigen-Glendale Energy Company, LLC
Trigen-Kansas City Energy Corporation
Trigen-LA Energy Corporation
Trigen-Las Vegas Energy Company, LLC
Trigen-Missouri Energy Corporation
Trigen-Oklahoma City Energy Corporation
Trigen-Philadelphia Energy Corporation
Trigen-St. Louis Energy Corporation
Trigen-Tulsa Energy Corporation

2. In advance of the only conference call that the Steering Committee had, Navigant distributed a PowerPoint presentation that, among other things, announced on page 5 what would be in and out of the scope of the Study. Specifically excluded were "other factors impacting CHP development, including permitting, costs (including interconnection and standby power) and market demand". The consensus on the call supported this position, given the wide range of opinions on the various state approaches to how utility rate recovery for standby and backup costs should best be determined. Notwithstanding this premise, the Study highlights the challenges of interconnection costs and standby rates, relying on an unproven assumption that these rates would so effectively impact the economic viability of CHP to the extent that eliminating private wires could not make a net positive difference. The fact that some states may have a more challenging standby rate environment than others should not be used as an excuse for inaction on the federal level regarding removal of a different barrier, i.e., private wires.

3. This approach of assuming that, were CHP facilities to enjoy a right to private wires, they would face numerous additional fatal flaws is sprinkled paternalistically throughout the Study. In addition to the rate and cost issues mentioned above, examples include: bottom of page 7 – "site constraints, construction and installation costs, interconnection terms or absence of standards, the cost of back-up or standby service"; bottom of page 8 – "the costs associated with permitting, installing, and maintaining private distribution"; bottom of page 9 – "public safety, maintenance, cost, and aesthetic issues". The list goes on. The assignment was not for DOE to imagine all the other issues that CHP facilities liberated from private wires prohibitions might face and assume the worst. The task was to focus on the specific barrier of private wire prohibitions. The Study's defense of the status quo defeats the purpose of the Study and unfairly prejudges the prospects for CHP facilities.

4. Having spent almost the entire Study explaining that allowing private wires would cause the sky to fall in numerous cataclysmic ways, it is remarkable that parenthetically buried midway through the Study is a brief discussion of the several states that actually provide CHP facilities with certain limited rights to run private wires. What is most surprising is that the Study fails to mention the effect that these partial private wire waivers have had in these more progressive states. At a minimum, one would have hoped that the Study authors would have made more of an effort to interview regulators and project developers in those states that have actually lived through the experiment with private wires for CHP and assess the practical results.

5. Finally, the Study's fear mongering on safety deserves a response. The notion that somehow safety will be compromised if independent power producers are running private electric wires is simply false. This presumption has long been disproven by the numerous PURPA QFs and IPPs that have built high voltage power lines over the past 30 years. In addition, IPPs and IOUs often use the exact same contractors and subcontractors, operating under the same codes and regulations, for construction and maintenance of electric lines as fully regulated utilities do. In fact, the reliability of a private wires distribution system has often proven to be greater over time than the adjacent utility system.

Thank you again for this opportunity to express our views.

Sincerely,

Lawrence Plitch
Vice President and General Counsel
Trigen, a Veolia Energy Company

Appendix C - References

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