Feasibility of Small Customer Aggregation for the Delivery of Comprehensive Energy Services in a Competitive Utility Environment

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ABSTRACT

Aggregation may serve as a useful means by which small customers—including low- income residents—may reap the benefits of a deregulated electricity marketplace. Potential obstacles and solutions for aggregating small customers are poorly understood and not well documented, threatening to frustrate the entry of entities that otherwise might wish to serve this market segment. This feasibility study, part of work being performed for the U.S. Department of Energy, will examine whether it is economically and technically feasible to aggregate small customers with regard to energy and related services, including energy efficiency services. It will analyze various approaches that might serve this potential market of over 100 million customers.

This study will analyze both active (independent sign-up) and passive (standard offer) approaches. After defining salient characteristics for segmenting the small customer market and establishing a reference regulatory framework, we will evaluate technical issues and market barriers. We will examine the business feasibility of various aggregation approaches and suggest ways to capture market opportunities for this segment. In addition to reviewing relevant research literature, we will conduct interviews of representative aggregators, suppliers, and small customer interest

A sensitivity analysis will also be performed to examine how business feasibility might be impacted by a systems benefit charge, portfolio standards, or other external modifications to a deregulated marketplace.

Introduction

The restructuring of the electric and natural gas utility industries in the U.S. and the resulting introduction of competition for retail energy services are expected to fundamentally change the market for energy efficiency and renewable energy technologies. Consumers at all levels will be afforded opportunities to freely choose energy suppliers, and it is likely that this market will similarly create opportunities for new enterprises engaged in producing and marketing a wide variety of energy services.

At the same time, concerns have been raised that the benefits of competition will not extend equally to all customers. For example, by virtue of their load characteristics, small customers may appear to sellers as more expensive to serve on a per unit basis than other customers, and will, therefore, be less attractive to serve. It is conceivable that prices for small customers may not fall significantly or may even rise relative to other customer groups.

A second concern has to do with the ability of the competitive market to deliver cost-effective energy efficiency and renewable energy services to smaller customers. Again, experience has tended to show that large commercial and institutional customers represent more profitable targets for energy

service companies. It is conceivable that because of their transaction costs, load characteristics and other factors, small customers may not represent as appealing a market for the competitive energy service institutions that are expected to emerge in a restructured electricity marketplace.

The Chicago Regional Support Office (CRSO) has initiated a several-phase project to explore the development of new market institutions in a restructured utility environment. In this first phase of the project, its interest is in exploring the technical and economic feasibility of small customer aggregation for purposes of purchasing a full range of energy services and enhancing the bargaining power and market attractiveness of residential and small commercial customers. Of particular interest is the feasibility of load aggregation for low-income customers. The central question is:

> *Is it economically and technically feasible to aggregate small customers in such a way that these customers enjoy access to a full range of energy services including commodity energy service, energy efficiency services, and renewable energy?*

The CRSO retained Environmental Futures, Inc., and its partners, The Tellus Institute and EUA Citizens Conservation Services, to produce a taxonomy of issues associated with small customer aggregation and to prepare a review of the feasibility of aggregation for purposes of commodity and energy efficiency services purchases.[1] Bundling energy efficiency and other services with commodity sales as part of an aggregation scheme for small customers appears to have promise, at least conceptually. But significant barriers must still be overcome to ensure the viability of this approach.

Can Small Volume Customers Benefit From Restructuring

There is no question that small volume customers will continue to receive electricity supply service after restructuring. Restructuring legislation typically requires that small volume customers continue to be automatically aggregated and provided electricity supply service by their local utility under a "standard offer" service. They also receive the right to obtain their commodity electricity service from third-party suppliers or aggregators. It is not clear, however, that these other suppliers and aggregators will be able to make a profit serving the small customer market.

Thus, one of the major questions associated with restructuring is whether suppliers and aggregators during the next few years will compete both actively and successfully to capture small volume customers, including low-income customers, away from the standard offer service provided by their local utility. A second related question is whether suppliers and aggregators will offer energy efficiency and renewable energy in addition to commodity energy services. In the long term, there is certainly reason to believe the answer to these two questions will be yes, since the residential energy market, at over $100 billion dollars, is huge in absolute terms (as large as the industrial energy market). On the other hand, the residential market consists of over 75,000,000 customers while there are less than 400,000 industrial customers, suggesting that the cost of attracting and retaining a customer versus the revenue gained significantly favors a marketing strategy focused on the industrial and large commercial customer base.

Aggregation

[1] This work received funding from the U.S. Department of Energy's Office of Utility technologies(OUT). The support of Diane Pirkey of IUT is greatly appreciated.

Aggregation, in which large numbers of customers are grouped together in one buying block, is essential to serving residential customers. Local utilities currently serve an aggregation of all residential customers now and will continue to serve large blocks of customers via the standard offer. After restructuring, third-party suppliers will try to capture groups of customers, or individual customers who will then be grouped and served in the aggregate. The approaches available to these suppliers to capture residential customers fall into two broad categories—active (retail) aggregation and passive (wholesale) aggregation. Active aggregation involves direct contact between prospective suppliers and prospective customers in order to capture individual customers or groups of customers. Passive aggregation does not involve direct contact between prospective suppliers and prospective customers; instead, the utility or another organization acting as the "agent" for residential customers chooses one or more suppliers to serve them.

Study Approach

This study begins by segmenting the residential market into four major groups -- owner-occupied, rental without public assistance, private rental with public assistance and public housing. We determine the size of each market segment in terms of absolute and average annual energy expenditures, and analyze sub-segments by census region and income level. Next we identify the electricity supply opportunities available to customers and suppliers under a representative reference restructuring framework and examine, qualitatively and quantitatively, the opportunities and barriers facing suppliers and aggregators wishing to serve small volume customers under this reference framework.

Data used in the study are obtained from interviews with over 15 representative aggregators, suppliers and small customer groups. Interviews were conducted from December 1997 through February 1998. This information is augmented with data from a review of the relevant literature and statistics.

Market Opportunities and Barriers

Reference Restructuring Framework

Competitive electric marketplaces have been gradually emerging. By May 1998, 14 states had enacted electric restructuring legislation or taken regulatory action to create at least partially competitive marketplaces (California, Connecticut, Illinois, Maine, Massachusetts, Michigan, Montana, New York, Nevada, New Hampshire, Oklahoma, Pennsylvania, Rhode Island, and Virginia). In the California marketplace, a major new entrant termed the extent of restructuring insufficient to create a competitive environment and withdrew. Other suppliers, particularly green power suppliers, have remained active in the California marketplace. While restructuring bills recently were enacted in three states (Connecticut, Illinois, Nevada), such efforts failed in eight other states (Arizona, Colorado, Florida, Maryland, Minnesota, Missouri, Oregon, and Texas).[2] By May 1998 most states had conducted or had ongoing electric restructuring debates.

The states proceeding with electric restructuring have often been motivated by: (1) significantly higher than average electric rates; (2) passage of the Energy Policy Act of 1992 (EPACT),[3] granting nondiscriminatory transmission access to outside electricity suppliers[4] and (3) the anticipated benefits of

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[2] Energy Information Administration, *Status of Electric Utility Deregulation as of May 1, 1998,* National Regulatory Research Institute *Electric Restructuring Box Score (Updated May 14, 1998).*

[3] Pub.L. No. 102-486, 106 Stat. 2776(1992), codified at 15 U.S.C. 79z-5a, 16 U.S.C. 796 (22-25), 824j-l.

[4] Pursuant to EPACT, FERC issued orders 888 and 889 on April 24, 1996, designed to fosteer wholesale electric

harnessing market forces to provide consumers with a wider selection of choices concerning their energy supply.

Access to deregulated electricity supply service. In a restructured electric market, electricity supply service is offered separately from electricity transmission and distribution (T&D), much like long-distance telephone service is offered separately from local telephone service. Customers are able to buy their electricity supply at unregulated prices from competing providers, but continue to have that electricity delivered to them by their local utility at a regulated rate for T&D service. For example, before restructuring a residential customer might be paying 8 cents/kwh for electricity service. After restructuring, all else being equal, that customer might pay 3.6 cents/kwh for supply service and 4.4 cents/kwh for T&D service.

At this time it appears that a reference restructuring framework that reflects the norm in states undergoing deregulation would extend staggered access to retail generation service for small commercial and residential consumers beginning in 1998, and full access no later than 2002.

Standard offer service. Most restructuring legislation establishes a "standard offer" or default electricity generation service for those customers who do not wish to buy their electricity supply from a competing provider. Typically, existing utilities are required to provide this standard offer service to residential and small business consumers during a specified transition period (3 to 5 years in most states). Utilities are expected to provide the service using electricity supply they will buy in the new wholesale markets. Thus, the initial prices set for standard offer service have been in the range of 2.5 to 3.5 cents per kWh to approximate the wholesale market price of electricity supply in the regions where it is being offered.

The scope and pricing of standard offer electricity supply service are proving to be key, controversial components of electric restructuring for several reasons:

(1) the price of standard offer service affects the level of rate reduction customers receive at the outset of restructuring;
(2) the standard offer price is likely to be set at the same time as stranded costs (a controversial topic) are determined and the two are likely to be linked;
(3) standard offer service affects the ability of suppliers and aggregators to convince customers to switch to alternate electricity suppliers;
(4) standard offer service affects the utility's rate for its remaining monopoly services;
(5) it is difficult to estimate what the standard offer price should be since there is relatively little published data or analyses on the level of customer-related costs and profit associated with providing electricity supply service to residential customers on a competitive basis.

In several states—e.g., Rhode Island, Massachusetts, California—the price of standard offer service has been set at or below the wholesale cost of electricity supply.

Rate reduction. Policymakers in several states have sought to provide consumers with an immediate reduction in rates at the outset of restructuring, in the order of 5 percent to 10 percent. These rate reductions

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competition by eliminating monopoly power over electricity transmission. Under FERC Orders 888 and 889, public utilities controlling transmission facilities used in interstate commerce must: (1) file open access nondiscriminatory transmission tariffs containing minimum terms and conditions; (2) take transmission service for their own wholesale electric transactions under such tariffs; (3) develop and maintain real-time information systems providing existing and potential users with equal access; (4) separate transmission from generating, marketing and communications functions. 61 Fed.Reg. 21540 (May 10, 1996), 61 Fed.Reg. 21737 (May 10, 1996).

have been achieved in a variety of ways, most of which involve requiring utilities to recover stranded costs and certain other costs over a longer time period. This is similar to reducing one's annual mortgage payments by converting from a 15-year mortgage to a 30-year mortgage. The other way in which states have achieved immediate rate reductions has been to allow utilities initially to price standard offer service at or below the wholesale cost of electricity supply, with the expectation that the price would rise to retail price levels, including recovery of any initial under-recoveries, over a 3-to-5-year transition period. Our reference restructuring framework assumes a 5 percent rate reduction overall.

Stranded costs. Recovery of stranded costs in most instances is allowed via a universal unavoidable charge, sometimes known as a competitive transition charge (CTC), for a period of 4-15 years. This charge must be included in the bills of all customers, whether they receive standard offer service or electricity from an alternate supplier. In most states undergoing deregulation, utilities have been allowed to recover all or almost all of their stranded costs. This has often resulted in considerable controversy. New Hampshire's deregulation law only allowed Public Service Company of New Hampshire (PSNH) 60 percent recovery of stranded costs, prompting PSNH to challenge deregulation in the courts and thereby delay its implementation. States will experience a delay in deregulation until stranded cost recovery is resolved.

Stranded benefits. In most states undergoing deregulation, energy efficiency services will continue to be offered by the utility at 1997 funding levels for a fixed period. Renewable resource portfolio standards, to the extent they exist, will likely be modest. Existing lifeline service requirements will be preserved during the transition period; credit discrimination protection standards in many states require further regulatory action.

Implications for retail competition. Third-party suppliers attempting to capture market share in deregulated markets, whether by retail or wholesale aggregation approaches, face a variety of obstacles. Most significant during the next several years will be the standard offer service. Many suppliers believe pursuing residential customers will remain problematic until the standard offer service period expires and a more competitive marketplace emerges. While provisions for standard offer service in deregulated states have defined end dates, and for the purposes of this study we are assuming such end dates, suppliers worry that states may feel pressure to extend these end dates into the future, thus continuing to make it difficult for suppliers to compete for residential customers.

Technical Issues

The absence of load profiles and time of day meters along with certain billing issues have been suggested as potential problems associated with serving small customers. Interviews with aggregators and power marketers, however, indicate that estimating loads for small customers is adequate for most suppliers' needs. While concerned with a local distribution company's (LDC) retention of load profile, load shape, and load size data for the small customer market segment, a majority of respondents indicated they would rely upon the LDC for load profile, load shape, and load size data. Most suppliers also indicated access to information on load size was not a barrier, nor a potential barrier, to providing commodity energy services.

Likewise, none of the suppliers interviewed believed that a lack of time-of-day metering significantly impaired their ability to serve small customers. The relatively high cost of hourly meters and other "smart" metering devices may preclude the offering of some load management services to small customers for the near term, but the industry will not founder on these issues.

Billing has traditionally been handled by the local utilities. Over the long term, however, power marketers feel confident they can handle the billing function themselves, and for brand recognition purposes may begin performing billing on their own or through a subcontractor. For now, however, most suppliers are relying upon the LDC for billing and metering services. A more pressing issue for power marketers involves the accuracy and timeliness of the billing carried out by the local distribution utility. Many independent power marketers and aggregators are concerned about a level playing field in their competition with the traditional utilities and want to make sure they are at no disadvantage with regard to billing.

Power marketers particularly want to make sure that utilities share on a timely basis relevant customer information, including end uses, usage, and customer preference information. Over the long term interface via the Internet and standardized reporting formats may develop, but who controls the information technology and its timeliness and ease of use will be important issues.

Some consider the size of the customer pool to be the single most important key to success in helping consumers purchase power from renewable sources or cleaner than average electricity. The bigger the pool, the more savings consumers will be able to achieve, and the more attractive a package of environmentally-benign power customers will be able to receive. However, while size is critical, the diversity of load can be equally important in creating a favorable buying profile. Aggregators serving small customers may thus need to consider the economics of load modification and/or including these customers together with large commercial, institutional, or industrial buyers to improve the group load profiles.

Analysis of Market Barriers and Opportunities in Restructured Markets

Small margins, high transaction costs, poor information, an immature market and uncertain rules plague the flourishing of an unfettered market for commodity electricity, gas, and energy efficiency. The prospect of serving small customers with electric power from renewable sources in a deregulated marketplace is more hopeful, although still problematic. Notwithstanding the recent New Hampshire, Massachusetts Electric, and Pennsylvania pilot programs, in which small residential and commercial programs were served with competitively priced electricity provided by many local, regional and national companies, supplier interest and aggregator success in serving small customers in fully deregulated states remains uncertain. These are the conclusions drawn from a literature search and interviews completed with fifteen commodity supply and aggregation firms over the past three months.

The small margins available to suppliers proceeds from the pricing of standard offer at close to wholesale costs. The high transaction costs speak to the relatively large marketing and services efforts required to capture and retain a single customer with a small base of kilowatt hours and/or therms. The immature market reflects the absence of a marketing infrastructure developed to serve an emerging marketplace. The uncertain governing rules were the reality in the postponed California marketplace and in most of the other locales where partial restructuring reigns. Many of the new commodity suppliers and aggregators believe that the local utilities benefit from the uncertain rules and that these utilities will work to undermine the operation of a deregulated market as long as possible so that they can retain their dominant positions with small and large customers.

Energy efficiency services: where is the demand? While there may be marketing advantages to offering energy efficiency services to small customers, the perception among aggregators and suppliers is that customer demand may be weak. At the end of a decade in which energy audits and efficiency measures for participating customers have not been priced at full cost but instead have been subsidized by all ratepayers, it

may be difficult to convince small customers to pay the full cost.[5] Suppliers have not yet shown much of a commitment to market efficiency services aggressively to small customers. While recognizing large potential markets for energy efficiency services, marketers have thus far not targeted small customers for energy efficiency services.

Small customers accustomed to free energy audits, lighting products available at 30-50% off retail prices, free or greatly subsidized burner tune-ups and hot water heater insulating jackets are not likely to demand efficiency services at market rates in the near term. The prospect of declining electric and gas rates does not brighten the potential for energy efficiency services. Power marketers are not inclined to offer these services below cost to attract small customers because they do not perceive a customer demand for efficiency services. The aggressive advocacy for system benefits charges to pay for demand side management services, low income services, and R&D investments in California and New England in suppliers' eyes does not reflect a demand for energy efficiency services from small customers in the non-subsidized marketplace.

For larger customers, energy service companies (ESCOs) are teaming up with power marketers and brokers to supplement commodity service with ESCOs' comprehensive auditing, financing, equipment installation, and long-term savings guarantees. For ESCO clients, these strategic alliances promise a one-stop shopping service offering equipment replacements, lower energy costs, and lower energy rates. ESCOs can convince many of their larger customers to reinvest their rate savings to cost-share the efficiency investments undertaken simultaneously. In so doing, paybacks are shortened and/or a more ambitious package of capital improvements can be financed. This is an attractive strategy for ESCOs serving large clients such as schools, hospitals, municipal and state buildings, military /bases, office buildings, and factories.[6]

A half dozen ESCOs are active in serving public housing authorities; two ESCOs serve single family households. Those serving single family households have not yet featured commodity aggregation as a service, but several of those serving the public housing market have formed strategic partnerships or offered to act as consultants to PHAs able to purchase wellhead gas or procure alternative sources of electricity.[7] In January, 1998, the Kern County Housing Authority in California supplemented HUD's standard energy performance contract Request for Proposals with a request for services to procure electricity. This was the first instance of a PHA linking energy efficiency to commodity purchases.

Yet only about a dozen PHAs request energy efficiency services each year through performance contractors; in the private multifamily marketplace, a strong interest in aggregating clients to purchase electricity has not yet been matched by an inclination to secure efficiency services. Despite attempts by ESCOs to interest large private management companies in California and elsewhere to link efficiency services to their efforts to secure commodity fuels, the response thus far has been very weak.[8] Since no ESCOs routinely offer their services to small commercial customers, no possible linkage is presently feasible in this market segment.

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[5] See Fryer, *Ibiden*, and Rhineholt, David "*Purchasing Energy in a Competitive Marketplace: The Potential and Pitfalls of Restructuring*" presentation to Ohio Partners for Affordable Energy Conference, November 24, 1997. Interviews with power marketers in February, 1998 confirm this conclusion.

[6] Based on interview with Terry Singer, Executive Director of the National Association of Energy Services Companies, October 1997.

[7] EUA Citizens Conservation Services, Honeywell, Viron and Landis & Stafa area all offering to assist their PHA clients to secure wellhead gas and electricity, where competitive markets exist. Interviews with housing authorities and industry consultants reveal these offerings.

[8] EUA Citizens has met with three of the nation's largest private multifamily companies over the past six months to explore this option, drawing no serious interest to date. These companies are all actively considering commodity fuel purchases.

The prospects for green power: promising. The New Hampshire and Massachusetts pilot programs as well as California's deregulated electric marketplace, occasioned a scramble among marketers to distinguish themselves to certain customer classes. Many have offered green power at a premium, and several have made their green sources of power--wind, hydroelectric, and biomass--as a major feature of their marketing approaches.[9] Green Mountain Energy Resources, active in California and New Hampshire, offered customers "ecocredits" for gardening and other environmentally benign activities. The ecocredits could be traded in for rate discounts or donations to charities.[10] A number of utilities are already offering their customers the opportunity to access specified green kWh monthly for additional premiums on their bills. [11]

Most of the major power marketers have either directly acquired wind, hydroelectric, and/or biomass plants or development companies, or entered into strategic partnerships with owners of such renewable generating stations. Given the response to consumer polls and preferences in the Massachusetts Electric pilot program, these acquisitions and partnerships seem warranted. Among the 4,700 residential customers who participated in the Massachusetts Electric pilot in 1997, 31% selected a supplier offering a "green" option, even though that option was more costly than other alternatives (although less costly than standard service).[12] A customer survey commissioned by the California League of Conservation Voters in 1996 found that 70% of the respondents were willing to pay up to 10% more for green power.[13] The demand for green power by the residential customers in a deregulated marketplace could help increase the nation's supply of renewable power.

Two lingering issues still exist with regard to green power: (1) its definition; and (2) documentation of its dispatch and utilization along the power grid. "Green", "renewable", and "clean" power can be defined in a number of ways. For some, the low particulate, NOx , and sulfur emissions from natural gas qualify natural gas as "clean" power, although not renewable power. For others, "green" should embrace low head hydro, but not large hydro, due to its detrimental impact on river valleys even though it involves a renewable resource. Nuclear does not produce carbon dioxide or NOx emissions, but is not deemed "clean" or "green" by most marketers.

In California, environmental organizations have rallied around the Center for Resource Solutions' work to establish a "Green-e" certification program: one that certifies providers that meet the criteria of (a) generating electricity from sources that are 50% renewable or better; and (b) have air emissions as good or better than California's present air quality standards. If successful, this kind of Green Seal of Approval could mitigate a potential problem in defining green power.[14]

Over the long run, power marketers hoping to achieve credibility with their customers must ally with established environmental organizations, seek certification from an objective third party, and disclose their fuel mix and emissions. In this era of customer unfamiliarity with suppliers, the electron commodity, and the distinctions between "green", "clean" and "renewable" technologies, strategies to achieve such credibility will be pursued. The visibility and budgets of many environmental organizations--especially those such as Working Assets which broker and select power options for their members--may prosper. For renewable

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[9] Fryer, Lynne, "*The New Hampshire Retail Wheeling Pilot Program: Learning Experience, Chaos, or Price War?*" E Source Strategic Memo, November 1997.

[10] George Raine, "Plugging into green power: Renewable energy takes center stage as deregulation looms" *San Francisco Chroncile,* August 24, 1997

[11] Newswire, February 18, 1997: Central and South West Corporation announces their "Clear Choice" program for their customers in three Texas utility service territories; hydroelectric is the electricity source in this program. Public Service Company of Colorado and the Traverse City Electric Company have also offered their customers this kind of program.

[12] George Raine, "Plugging into green power: Renewable energy takes center stage as deregulation looms" *San Francisco Chronicle,* August 24, 1997

[13] *Ibiden.*

[14] *California Energy Markets*, November 7, 1997.

technologieswhich can now generate power at close to the cost of fossil fuels in certain locations (e.g. hydro, biomass, and wind), the prospects for growth are quite good.

Feasibility Analysis

Will There Be Buyers and Sellers?

In order to answer this question we assessed the feasibility of suppliers and aggregators capturing customers from standard offer service for five representative service packages:

A. Electricity supply only;

B. Electricity supply plus natural gas supply;

C. Electricity supply plus energy efficiency services;

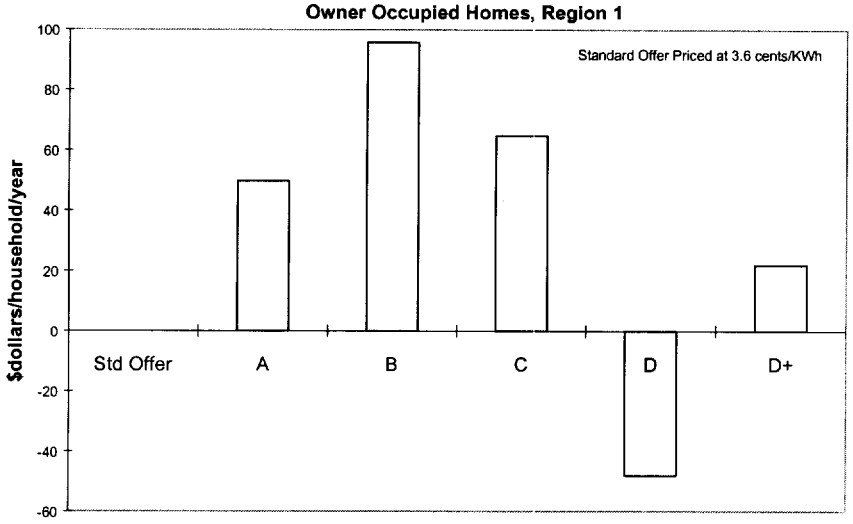
D. Greener than average electricity supply, 80% NGCC and 20% non-hydro renewables;

D+. Same as D, but with natural gas supply and energy efficiency services.

We considered feasibility for a base case, standard offer priced at wholesale cost; we also considered a sensitivity case, standard offer priced at retail. We assessed the economic feasibility from the perspective of prospective customers for the services and prospective providers of the services.

Our analyses assumed that the average customer would require an annual savings of at least $50 in order to switch from standard offer service. For packages D and D+, we assumed that some customers would be willing to switch to greener than average service at a price of electricity equal to the price before deregulation. Below are the results from the customer's perspective for single-family households in the Northeast. The supporting
numbers are presented in Table 1.

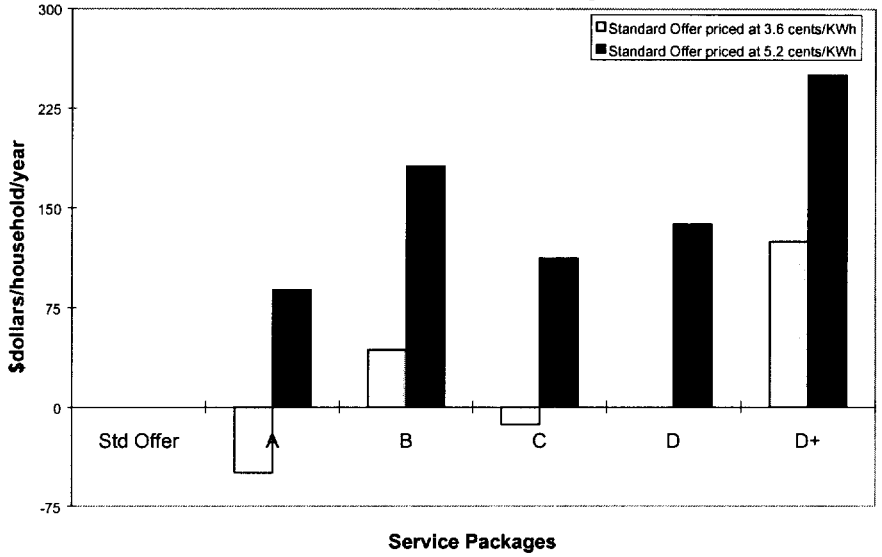
Figure 3.1: Customer Savings
Owner Occupied Homes, Region 1



For providers, we measured feasibility using two indicators of retail margin, the ratio of standard offer price to wholesale electricity supply cost, and the operating margin per customer – what remains after paying wholesale costs – available to a supplier to recover customer-related costs and generate a profit.

Below are results from the provider's perspective for single-family households in the Northeast. The supporting numbers are presented in Table 1.

Figure 3.2: Operating Margins Available to Suppliers
Owner Occupied Homes, Region 1



Our analyses yield the following key results:

Pricing of standard offer is a critical determinant. Suppliers and aggregators wishing to capture residential customers are primarily competing against standard offer service. For a competitive market to develop, the price of standard offer service must be set to recover all of the costs a utility incurs to provide that service, not only its wholesale electricity supply costs but also its customer-related costs and a profit margin.

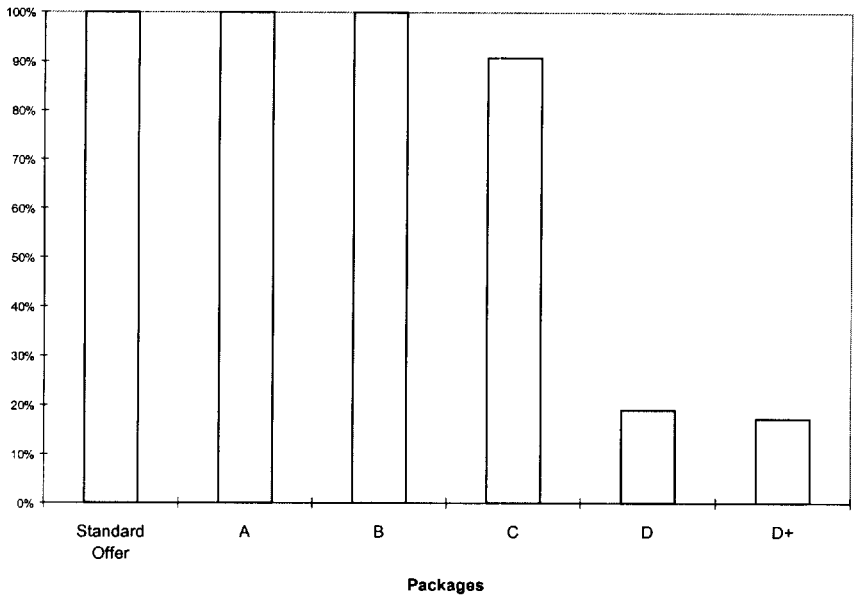
Customer-related costs are a critical determinant. The customer-related costs a supplier incurs to capture and serve a residential customer in a particular market segment will determine the feasibility and relative attractiveness of serving that market. These are costs above and beyond the wholesale electricity supply costs incurred to serve customers. As a result, the most attractive market segments are those in which a supplier can capture a group of customers through a bidding process and then serve them as a group. The least attractive market segments are those in which a supplier must capture customers through individual contacts and then serve them individually.

Broadening the service package by including energy efficiency or other fuels can improve feasibility. The annual savings a supplier providing supply service (Package A) can offer a prospective customer are relatively limited since the supplier's cost of providing that service is unlikely to be significantly less than the utility's cost of providing standard offer service. By providing both electricity supply and natural gas (Package B) or electricity supply and energy efficiency measures (Package C), suppliers can offer prospective customers a higher level of annual savings. Since customers pay for the energy efficiency measures in Package C, suppliers can achieve essentially the same operating margin as with Package B.

Competing on clean/green energy could be easier than competing on price. Instead of offering annual savings to customers in order to persuade them to switch from standard offer service, suppliers can offer greener than average electricity (Packages D and D+). A key selling point to greener than average electricity is the associated reduction in emissions. By identifying the fuel mix used to generate electricity for each package, we constructed an emissions index[15] as shown in Figure 3.3. Packages D and D+ can offer dramatic reductions in emissions at little or no extra cost to the consumer or the producer.

[15] The emission index compresses CO_2, SO_2, NOX, and particulates into a single value such that CO_2=1, SO_2=20, NOX = 40, and particulates = 400. From *Energy Innovations.* 1997. (Washington, DC: Alliance to Save Energy, American Council for an Energy-Efficient Economy, Natural Resources Defense Council, Tellus Institute, and Union of Concerned Scientists).

Figure 3.3: Emissions Relative to Standard Offer



By offering customers greener than average electricity along with natural gas and energy efficiency (Package D+), suppliers can actually offer customers savings relative to standard offer service while retaining a much larger operating margin than possible with any other package. Because suppliers have such a relatively large operating margin, they can, if necessary to attract customers to Package D+, offer additional savings. Thus Package D+ may offer the greatest potential for establishing a competitive retail market because it can be marketed on both cost savings and exceptionally low emissions.

Table 1 Standard Offer Priced at 3.6 cents/kWh:
Owner Occupied and Public Housing Segments Region 1

Customer Perspective

	Owner Occupied						Public Housing					
		Competitive Service Packages[1]						Competitive Service Packages[1]				
Annual Expenditures per Household	Std Offer	A	B	C	D	D+	Std Offer	A	B	C	D	D+
Electricity Generation	311	261	261	237	359	326	190	163	163	148	219	199
Other Electric Services	593	593	593	539	593	539	307	307	307	279	307	279
Other Household Energy	837	837	791	837	837	791	408	408	386	408	408	386
Energy Efficiency	0	0	0	64	0	64	0	0	0	39	0	39
Total HH Energy Expenditures	1741	1691	1645	1676	1789	1719	905	878	855	873	934	902
Customer Savings ($/hh/yr)	--	50	96	65	-48	22	--	27	50	32	-29	3
(%)	--	2.9%	5.5%	3.7%	-2.8%	1.3%	--	3.0%	5.5%	3.5%	-3.3%	0.3%

Provider Perspective

	Std Offer	A	B	C	D	D+	Std Offer	A	B	C	D	D+
Electric Generation Service Price ($/mWh)	36	30	30	30	42	42	36	31	31	31	42	42
Electric Generation Wholesale Cost ($/mWh)	36	36	36	36	42	42	36	36	36	36	42	42
Ratio of Retail Price over Wholesale Cost	1.00	0.84	0.84	0.84	1.00	1.00	1.00	0.86	0.86	0.86	0	0
Revenues												
Electric Generation Revenues ($/hh/yr)	--	261	261	237	359	326	--	163	163	148	219	199
Other HH Energy Revenues ($/hh/yr)	--	0	531	0	0	531	--	0	237	0	0	237
Efficiency Revenues ($/hh/yr)	--	0	0	64	0	64	--	0	0	39	0	39
Total Gross Revenue per Household	--	261	792	300	359	920	--	163	400	187	219	476
Number of Households per Site	--	1	1	1	1	1	--	100	100	100	100	100
Total Gross Revenue per Site	--	261	792	300	359	920	--	16272	40008	18660	21949	47551
Disposition of Revenues												
Wholesale Electricity Costs	--	311	311	282	359	326	--	19004	19004	17256	21949	19929
Wholesale Costs of Other Supplies	--	0	438	32	0	470	--	0	25980	1932	0	27911
Operating Margin												
Remaining Operating Costs and Profits	--	-50	43	-13	0	125	--	-2733	-4977	-527	0	-290

[1] **Competitive Service Packages:**

- A: Electricity Supply Only
- B: Electricity Supply Plus Other Fuels
- C: Electricity Supply plus Electricity Efficiency
- D: Cleaner than average electricity
- D+: Cleaner than average electricity plus Other Fuels and Electric Efficiency

Conclusions

Because standard offer service in most locations is being priced close to wholesale costs, we do not yet have a true market test of deregulated electricity for the small customer. However, even when standard offer service is priced at a retail market price, one cannot be optimistic that it will be feasible to capture customers for standard offer service without either offering a bundle of energy and other services or having an entity organize small customers into buying groups

Energy efficiency is one such service which can be added to attract customer interest and to serve as a profit center. However, the information barriers afflicting small customers, and their previous experience in receiving energy efficiency offerings at reduced cost, do not inspire optimism about the efficiency industry's treatment in the small customer marketplace. Efficiency measures will not be attractive to small customers unless they are successfully packaged with lower rates and marketed such that annual savings to customers are visible and meaningful.

There is evidence that some residential customers will pay a small premium for "clean" or "renewable" energy. Once the issues of certification and dispatch tracking are resolved, the future of

renewable electric technologies appears promising. To the extent that distributed power from photovoltaics, fuel cells, wind systems and other small systems is brought down to the neighborhood and customer level, these technologies will be like the personal computers of the energy marketplace.

Our analysis indicates that:

- It is technically feasible to aggregate small customers in a way in which these customers enjoy access to a full range of energy services including commodity energy service, energy efficiency services and renewable energy.

- It is economically feasible to provide a limited range of commodity electricity, energy efficiency, and renewable electricity services through standard offer service. This is essentially a system much like what exists in the regulated marketplace, in which a regulator-approved provider of standard offer service acts as "agent" for the aggregation of customers on that service.

- A lack of familiarity by small customers with the components of their electricity bill, electricity rates, and the identity and track record of alternative suppliers will delay their selection of alternative suppliers.

- It is not economically feasible for suppliers and aggregators to provide commodity electricity service and other related services directly to customers – i.e. retail competition -- if the price of standard offer service does not reflect the full cost of that service (i.e., wholesale costs, administrative costs, customer-related costs and profit).

- The retail electricity marketplace may offer sufficient profit margins to sustain marketing to small customers if the price of standard offer service fully reflects retail service costs. These profit margins may be achieved or improved by including other services (gas, telecommunications, home security, computer services, billing and metering, energy efficiency services).

- The demand for energy efficiency services among small customers may be modest because some of these services have not been priced at full cost in the past, and small consumers do not fully understand or appreciate their value.

- A segment of the residential market will want to buy electricity from renewable sources, and be willing to pay a modest premium to acquire it from these sources.

The salient public policy implications are that:

- Standard offer service can be designed to provide full energy services to small customers. The scope of standard offer service can be broadened to include energy efficiency, electricity from renewable sources, and cleaner-than-standard energy options.

- The scope and pricing of standard offer service will determine the feasibility of suppliers and aggregators capturing customers away from that service.

- State legislators and/or regulators should authorize and encourage affinity or natural aggregation agents. Public housing authorities, existing consumer purchasing co-operatives, and municipalities are all possible agents.

- Customer education about commodity fuels, renewables, and energy efficiency is essential: there is still staggering misinformation and ignorance hampering the development of a competitive market.

- Certification and close monitoring of suppliers and aggregators is essential. Otherwise, there is the potential for unethical and undercapitalized companies to victimize customers.

- The renewables industry has potential, but short-term confusion about what constitutes "clean" or "renewable" technologies may inhibit progress. Standardization of definitions and certification of dispatch from renewable generating stations remain issues warranting attention.