The Potential for Low-Income Aggregation in Restructured Energy Markets

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ABSTRACT

Low-income residential customers are expected to be the last group of customers to benefit from electric utility deregulation, if they benefit at all. High transaction costs and low monthly utility bills make the residential market less appealing to suppliers of electricity than larger commercial and industrial customers. Also, with the advent of deregulation, energy efficiency efforts may be at odds with marketer and aggregator efforts to group households together to secure low-cost electricity commodity.

The authors describe the potential risks that deregulated energy markets present for low-income consumers. They go on to present one alternative for protecting at-risk consumers—aggregation through local community groups. No program of this type exists yet, although there has been some analysis among low-income advocates of aggregation benefits. The paper presents the advantages and disadvantages of such a strategy, and explores the potential conflict that commodity aggregation represents to enhancing energy efficiency of low-income households. The paper includes an example of how grouping low-income household energy purchases and a commercial customer benefits all parties.

Background

Deregulation of electric and gas utilities is occurring in many states across the United States. For the first time, consumers are able to choose their electricity and natural gas suppliers. Conventional wisdom about the economics of this choice suggests that residential customers will not be the first to benefit from deregulation. Some fear that low-income residential customers may find themselves paying higher prices for commodity, or that they may be left out of the competitive market all together.

In the Fall of 1997, Citizens Energy Corporation began to develop a low-income aggregation program in an effort to protect low-income consumers in Massachusetts. The program was designed to serve as a model for other efforts, and was meant to create viable, visible market power for some low-income communities. Initially, the market power created by a purchasing pool would help low-income consumers to secure low-cost commodity and energy services; eventually, Citizens' objective was to attract additional products and services, such as "green power" and distributed generation resources, to under-served communities.

The market for competitive electric supply opened in Massachusetts on March 1, 1998. The legislation governing the advent of retail competition guaranteed a 10 percent discount to all consumers on both the competitive (generation) and regulated (transmission and distribution) portions of their electric bills. As of March 1, 1998, the "standard offer" provided by the local distribution utilities ($0.028/kWh) was below the market price for electricity. This price will increase over the next seven years as the market moves towards full competition. Once local distribution utilities complete the sale of generating assets, the standard offer is scheduled to

increase while the "transition charge" component on the bill (which reflects stranded costs held by the local distribution utility) decreases. Citizens' program was unlikely to deliver savings in this environment on the commodity portion of low-income consumer utility bills. Instead, the authors chose to prepare for the competitive market by analyzing issues and challenges for assisting low-income consumers to access the market. The results of this analysis are presented here as a way of exploring the viability of low-income aggregation.

Introduction: Why Be Concerned About Low-Income Consumers?

Deregulation of other industries provides some lessons learned as to what low-income residential customers might expect in a deregulated electric utility world. These may represent a worst-case scenario. However, past experiences should get the attention of local, regional, and national stakeholders so that they may help low-income households negotiate the restructured market.

Low-income neighborhoods often lack service from banking institutions, clothing and food retail stores, among others (Oshiro 1997). Lack of available service from these and other industries requires low-income households to do without (automobile insurance, for example), or it raises the costs of accessing these products and services.

Oshiro reviewed the impacts of deregulated natural gas, telecommunications and airline industries on low-income households and found that all consumers did not benefit from industry restructuring (1997). The case of the natural gas and telecommunications industries are particularly informative for those concerned about the impact of electric restructuring on low-income households.

- Competition in the natural gas industry has evolved since the late 1970s. Since 1993, price competition and market supply unbundling occurred in the industry. Full retail competition is just beginning to reach residential customers, while industrial and commercial have had access to deregulated markets over the last several years. Large industrial customers have benefited disproportionately, as they saw their rates fall by as much as 23 percent, while residential prices increased by almost 5 percent (Oshiro 1997).
- According to Oshiro, while 94 percent of all households have telephone service, only 79.8 percent of urban low-income and 81.6 percent of rural low-income households have telephone service (1997). A study quoted by Oshiro found that 40 percent of households in some Camden, N.J. census blocks have no telephone service (1997).

While deregulation may not have caused poor service or lack of product availability, an open market creates a direct challenge to preserving or enhancing universal service provisions. In deregulated markets there is no obligation to retain low-income protections, or to guarantee that all ratepayers benefit equally.

One market-based alternative for protecting low-income customers is aggregation. Grouping low-income purchases will not be sufficient to protect the interests of low-income customers. However, it is one strategy for reducing the percentage of income paid for basic energy

needs. In addition, aggregation can draw the attention of energy service suppliers to the low-income market. When Citizens first developed the low-income aggregation program both of these objectives drove the program's development: protect some customers and create an identifiable entity that would be served by other product and service providers in the future. The present paper will examine the market barriers to aggregation for low-income customers, and will explore the potential conflicts---and opportunities---between aggregation for commodity and energy efficiency.

Advantages and Disadvantages to Aggregation of Low-Income Customers

The challenges and opportunities of low-income aggregation vary based on the perspective of the market "actor". The following discussion will focus on the advantages and disadvantages of aggregation from a socially motivated aggregator's perspective, from a supplier's perspective and, to some extent, from the customer's perspective. Some social service providers have already expressed interest in serving low-income households in restructured energy markets. These entities, which might include non-profit organizations, community action agencies or community development corporations would be likely to have low-income interests in mind since they are already serving this demographic.

Potential for Customers to Participate in the Market, but Do They Save Money?

The assumption that informs the aggregation concept is that the low-income consumer will save money on one of life's basic necessities through bulk purchases, thereby reducing their energy burden. How realistic an assumption is this? There are three components that contribute to the cost of serving a pool of aggregated low-income customers with energy commodity. These are transaction costs (marketing and outreach, customer service, credit and uncollectibles, and payment processing), capacity costs and energy costs. A pooled group of customers has the opportunity to achieve economic efficiencies on transaction costs and energy costs—and will have to do so to make an aggregation effort worthwhile to the consumer and the aggregator.

Commodity Costs and Potential Savings. Survey and focus group research suggests that low-income households would need to see savings of at least $5.00 per month in order to participate in a low-income aggregation effort (Environmental Futures 1998; Boston Oil Consumers Alliance 1997). Although survey and focus group research can be misleading---since responses may not be supported by consumers' actions in the marketplace---the savings quoted by participants serves as a useful starting point for analysis of savings potential.

The following analysis uses data from Boston Edison Company's (BECO) service territory (1998). BECO offers low-income customers up to a 35 percent discount on their utility rates. According to load profile information available from BECO, the average monthly electric consumption for low-income customers who qualify for BECO's low-income discount rate is about 300 kWh, or $35.00. Electricity commodity represents one-third of overall energy costs (approximately $10.00 to $12.00 per month). Local distribution utilities in Massachusetts have guaranteed 10 percent savings on each component of the utility bill. The discount on supply (the so-called "standard offer") in Massachusetts is currently $0.032 per kilowatt-hour. Clearly, the

current electricity price is too low to achieve measurable savings for low-income households. Over time, however, the opportunity will arise for those customers who have remained with the local distribution utility over the transition period.

The opportunity for low-income households to accrue savings on their utility bills will occur once the local distribution utility is supplying electricity to captive customers at the default price, or once the standard offer has increased to a level above the market price. The standard offer will increase to and will exceed the current market price over the next two years in Massachusetts. Over the seven-year transition period, the standard offer is scheduled to increase to almost $0.05 per kilowatt-hour. The supply portion of the low-income consumers' bill, therefore, would increase from about $8.00 (currently) to about $15.00. Aggregators that can secure supply at the market price of $0.032 per kilowatt-hour will be able to deliver savings of about $5.40 per month to low-income households. While these savings are small, it may be enough to garner interest among some low-income households, particularly if aggregators could achieve savings from other fuels, such as natural gas or fuel oil as well as from energy efficiency.

Marketing. Once an aggregator identifies savings to pass on to the consumer, they will need to keep transaction costs to a minimum. Low-income communities can be advantageously positioned to organize around significant market issues. In fact, low-income consumers can be accessible if aggregators tie into the existing low-income community networks. An aggregator that is set up as a cooperative or non-profit program, perhaps one that evolves from within the existing network of human service providers may be able to access low-income customers at a relatively low cost.

One potential strategy for grouping energy service purchases of these households at a low cost is to provide a check-off option during the annual Low-Income Heating Energy Assistance Program (LIHEAP) application process. An estimated 352,000 households or 16 percent of total Massachusetts residences qualify for the federally funded LIHEAP (U.S. Department of Health and Human Services 1998). During fiscal year 1997 the Massachusetts Department of Housing and Community Development (DHCD) provided financial assistance to defray heating costs to 119,017 of these low-income households. Fourteen community action agencies across the state administer the LIHEAP program. One low cost marketing option is to have clients affirmatively opt out of an aggregation effort at application time in order to avoid participating. This strategy would virtually eliminate the outreach and marketing program costs, thereby reducing the cost of providing supply to this client group. A positive check off is another possible alternative in which low-income households affirmatively opt for an aggregation when they apply for LIHEAP.

Potential to Create a Visible Buyer's Group. Perhaps the most significant advantage to bundling low-income energy purchases is the potential for establishing their market presence. A low-income market voice enhances consumer access to future energy markets and services. This strategy can work to the advantage of energy marketers, suppliers, and---most significantly---to consumers. The retail electricity market creates the opportunity to organize and aggregate energy purchases, thereby providing access to household energy consumption data. Grouping these purchases creates an identifiable market that can allow consumers to access information, conservation products, and generation technologies more easily. It also helps to familiarize consumers with the opportunities for further savings and operational efficiencies. Lack of information about specific energy uses can

be a barrier to reducing household energy costs and increased energy conservation. The information necessary to set up an aggregated pool can ease access to information about consumption, and may motivate consumers to take behavioral and purchasing actions to reduce costs. We discuss this ancillary advantage to aggregation in more detail below.

Electric Buying Pool Case Analysis

Relative to individual households, master-metered all-electric apartment buildings are attractive customers for electricity commodity resellers. They benefit from a single meter, higher use, and a better load profile than individual households do. Also, a single decision-maker represents many households. Even with these advantages, however, few if any multifamily buildings in Massachusetts have purchased electricity competitively in the deregulated market, primarily because the standard offer is below the market price, and there is no effective competitive market. While an all-electric multifamily building has distinctly different characteristics than a single-family low-income household, aggregating the purchases of both entities can lower transaction costs.

Volume. At a minimum, joining a buying pool will increase the attractiveness of a multifamily development because it will be a part of a larger purchase. Volume is a major factor for determining savings for available to consumers. Power marketers can purchase wholesale power in 25 to 50 MW blocks and pass the wholesale savings on to the customer. Until the market matures, most "deals" will be limited to large, very attractive customers or groups of customers that have pooled their resources together. Rather than simply joining multifamily developments together, however, the authors suggest that additional benefits can be achieved by pooling together multi-use customers such as multifamily developments and commercial buildings. This approach magnifies the scale of the potential buying power of a multifamily development significantly. In addition this partnership has several other potential benefits including improved load profile and opportunities for more efficient operation and long term efficiency investments.

Standardized Contracts and Transaction Costs. Joining a buying pool also helps address the steep learning curve associated with buying electricity competitively. Individual building owners can benefit from standardized contracts prepared collectively for members of an organized buying pool.

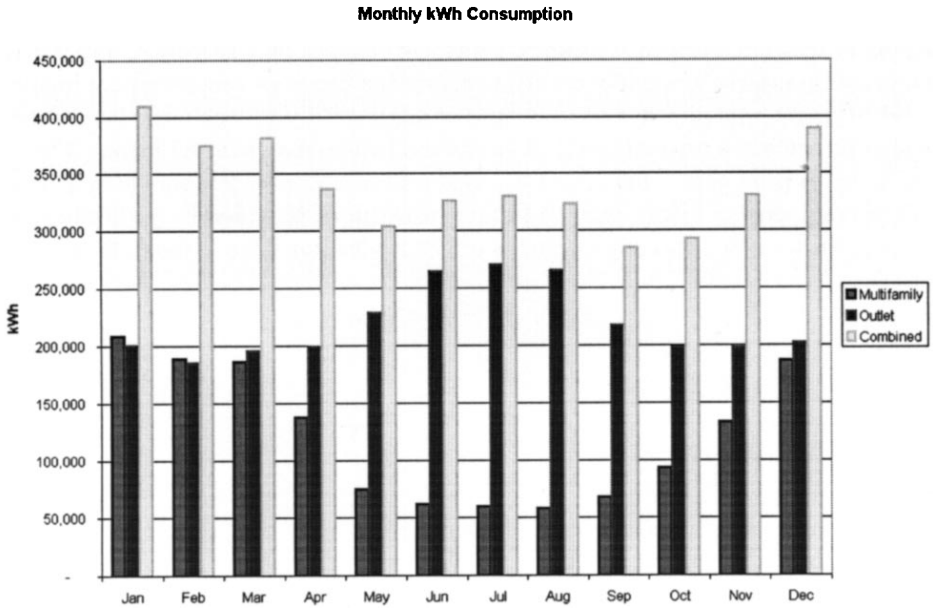
Improved Load Profile. Another more subtle benefit from joining a buying pool is an improved load profile. The authors analyzed hourly load data for a master-metered all-electric multifamily development, two wholesale retail stores, and Boston Edison's two residential rate classes for their general use (G-2) and low-income discount (R-2) rate categories. Based on this assessment we determined that opportunities exist to negotiate lower cost electric contracts with a buying pool that blends residential and commercial rate classes. The authors caution, however, that each distribution company has its unique load profile which will play a role in determining potential savings, particularly on capacity.

Electric suppliers have several criteria that they use to judge the "value" of potential customers including total kWh consumption, coincident peak to determine capacity, load factor, and

off-peak vs. on-peak hours of operation. After total kWh consumption, the next most important criterion is load factor. The following example demonstrates how a low-income all-electric high rise development and a wholesale retail outlet can maximize annual load factor when their usage is pooled together.

The formula for calculating individual load factors is Total kWh / (Peak kW * Total Hours). Currently most electric sales negotiations are based on annual load factors. The source for this load information, however, comes from 15-minute kW demand data recorded by the local utility or meter service provider. Careful analysis of load data can help match different end users for a potential buying pool. At first glance the only potential benefit that we saw for low-income customers was to find a large commercial customer or group of medium commercial customers with a high annual load factor. When we analyzed the hourly utility data for each sub-category (load factor, off-peak and on-peak usage, for example), the combined load factor was generally higher than each individual load factor.

Figure 1: All-Electric Multifamily and Wholesale Outlet Monthly kWh Consumption



Source: Boston Edison Load Data (1998).

Based on these load profiles we determined that the wholesale retail outlet and the low-income, master-metered, all-electric high rise development were a good potential match (see Figure 1). The wholesale retail outlet has a high summer kW due to cooling and significant refrigeration loads. The high-rise development has a high winter peak demand due to their electric-resistance heating. In addition, other subtle differences in daily consumption patterns augment the benefit from combining these two electric customers. Another major variable is the coincident peak system

demand and the relationship of the different load profiles to peak demand. The marketer usually assesses this component of the price on an individual basis.

As the following table (see Table 1) demonstrates, pooling the electric loads improves the combined daily or monthly load profiles slightly. More importantly, however, the pooled electric loads improve the multifamily annual load factor from 42 percent to 62 percent and the wholesale outlet load factor from 52 to 62 percent. Peak winter heating load from the multifamily building essentially balances the wholesale outlet club's peak summer cooling load. The annual load profile is critical to suppliers of electricity whose efficiencies are based on their ability to sell consistent amounts of electricity throughout the year. Similar benefits can be achieved with other combinations of residential and commercial customers.

Table 1: Average Daily Load Factor for the Week of August 5-12

	All-Electric Multifamily Load Factor	Wholesale Outlet Load Factor	Combined Load Factor
Week of Aug 5 – 12 (Average)	76%	75%	77%
Month of August	68%	70%	72%
Annual	42%	52%	62%

Source: Boston Edison Load Data (1998).

Utility Bill Monitoring Services. As part of the pooled purchase process the authors would recommend that pooled customers build the cost of utility monitoring services into their contracts. This would serve two purposes; first it would help organize their utility data for purchase negotiations. Second it would allow them to monitor ongoing utility costs and consumption for efficient operation of existing utility services. The author's experience is that few multifamily property managers monitor their utility consumption effectively other than to tally the year end costs and estimate utility costs for next year's budget. Including electronic utility bill monitoring services in the utility procurement process will provide a built-in mechanism to address this problem.

Efficiency Investments. Pooled energy procurement will not make a building more energy efficient directly. However, with proper program design it can help sow the seeds of long term investments in energy efficiency investments. First, by organizing historic utility bills electronically as part of the competitive procurement process individual building owners will initiate what is often the most time consuming process of performing an accurate energy analysis of a building.

Second, members of a buying pool should aim to procure energy savings on both the commodity and demand side. To the extent that commodity savings are significant, building managers could document monthly cost savings from competitive utility procurement and allocate

the savings to more capital intensive energy-efficiency investments. One of the authors has used this technique frequently in energy performance contracts to leverage comprehensive measures for specific building developments. Pooled commodity procurement can maximize the potential cost savings available and defray the cost of higher interest payments for comprehensive energy performance contracts. Third, a well-run utility procurement buying pool should assist in building the expertise to coordinate the bulk purchase of energy efficiency devices while providing performance contract and related efficiency program support services.

Reconciling Energy Efficiency and Commodity Purchase: The Challenge

The three key components of energy management include efficient purchasing, efficient operation, and efficient equipment (Herzog 1997). It is critical that aggregators and consumers focus on an integrated approach to energy management in order to achieve savings and reduce demand. Acquiring low cost commodity, however, may be at odds with the purchase of efficient equipment. In fact, perhaps the most significant potential disadvantage to the customer is that aggregating low-income consumers, in contrast to establishing some other service mechanism, reduces the incentive to ensure comprehensive cost reduction through increased energy efficiency and lower-cost commodity. The conflict results from the varying interests for each "actor" in the aggregation effort.

- The supplier profits from the sale of kilowatt-hours.
- The aggregator aims to acquire the most desirable client base possible—with a high load factor and generally flat load profile.
- The consumer would like to pay less for energy and may be motivated to reduce her environmental impact as long as this objective can be cost-effectively achieved.

Reduction of energy consumption is consistent with the consumer's goals, but may be largely incompatible with that of the supplier and aggregator.

How might this conflict be addressed to ensure that the interests of the consumer are truly protected, and energy efficiency benefits acquired through demand-side management and weatherization programs do not flounder? One obvious alternative is to ensure that public policy requires investments in energy efficiency. The greater challenge is to create market-based incentives for enhanced levels of efficiency.

No matter whether an aggregator aims to make a profit from providing its services, or chooses to offer non-profit energy services, the entity must be able to at least cover its administrative costs. This objective is not trivial in an industry in which saving potential is minimal. Aggregators earn revenue (or seek to cover costs) in one of two ways: either they retain a portion of the savings accrued by their clients or they retain a portion of the price per kilowatt-hour offered by the supplier.

The compensation structure will obviously influence the aggregator's business strategy. An aggregator that is rewarded on the basis of savings will be motivated to look at total energy savings, including energy efficiency opportunities. In either case, aggregators will seek ways to restrict the costs to serve an aggregated pool. Both compensation and control of high transaction costs present potential conflicts for the aggregator. In order to maximize revenue on a per kWh basis, the aggregator will be motivated to sell kilowatt-hours—not to maximize total energy savings. Those

entities that profit from savings will face more directly the inherent conflict between commodity and energy efficiency procurement. Maximum commodity savings accrue when an aggregator groups clients with high usage, a low coincidence factor, and off-peak consumption. Revenues acquired from energy savings may motivate the aggregator to "cherry pick" clients. In either case, creating an appealing purchasing group based only on commodity purchases may be at odds with the objective of assisting low-income households to reduce their overall energy burden.

According to personal communication with several power marketers, reductions in commodity cost depend to some extent on the coincident peak demand capacity for a customer (when compared with the peak for its rate class). Consumers who are aware of their peak demand may be motivated to reduce it, particularly as it relates to the utility's and rate class' peak demand. Consumers who are able to reduce peak demand, as well as group energy purchases, will be likely to achieve the lowest overall commodity and utility bill. A non-profit aggregator can play an important role in advising customers on this approach and should be rewarded based on success in integrating efficient purchasing, operation and equipment into their clients' facilities.

Commodity aggregation is not the only answer to the challenges that low-income consumers face in restructured energy markets. Along with other consumer protections, group energy purchasing does represent a possible strategy for delivering savings to low-income consumers.

References

Alwitt, Linda F. and Thomas D. Donley 1996. *The Low-Income Consumer: Adjusting the Balance of Exchange.* London: Sage Publications,

Biedrzycki, Carol. *Residential and Low-Income Electric Customer Protection.* A Report published by the Texas Ratepayers' Organization to Save Energy, Inc. dated February 2, 1998 from URL http://www.ncat.org/liheap/old/pubs/txreport.htm.

Boston Edison Company. "Electric Rate Data." URL: http://156.73.241.7/ediweb/index.htm

Boston Oil Consumers Alliance. "Electric Utility Restructuring: Survey of Our Members." *Boston Oil Consumers Alliance Newsletter* Summer 1997.

Colton, Roger. The Anticipated Impact on Services: Electric Utility Restructuring and the Low-Income Consumer. Facts on File: Nos. 9-12, Fisher, Sheehan & Colton, Public Finance and General Economics: October 1997.

Colton, Roger. "Consumerco, A Consumer Cooperative: Electric Utility Restructuring and the Low-Income Consumer." *Facts on File*: No. 15, Fisher, Sheehan & Colton, Public Finance and General Economics: October 1997.

Colton, Roger. Personal Communication, March 12, 1998.

Colton, Roger. 1996 *Assessing Impacts on Small-Business, Residential and Low-Income Consumers.* The Electric Industry Restructuring Series, National Council on Competition and the Electric Industry

DuBois, Jeanne. (Dorchester Bay Economic Development Corporation) Personal Commuication, February 1998.

duPont, Peter and Deirdre Lord. "Reality Check: Comparing Policymaker Perceptions with Consumer Energy Behavior." *American Council for an Energy-Efficient Economy, Summer Study for Buildings* August 1996.

Environmental Futures Inc. *Senior Citizens Perspective on Aggregation.* Environmental Futures Inc Report to Citizens Energy Corporation, Boston, MA: March 1998.

Environmental Futures Inc. *Massachusetts Electric Company Choice: New England, Report on Pilot Program Enrollment.* Environmental Futures Inc. Report to the Massachusetts Department of Public Utilities, Boston, MA: January 6, 1997.

Herzog, Peter and John Carmody. 1997 *Energy-Efficient Operation of Commercial Buildings: Redefining the Energy Manager's Job.* New York, NY: McGraw-Hill Book Company

Jennings, Larry. (Interfaith Power) Personal Communication. November 1997.

Oshiro, Carl K. 1997 *Universal Service in a Restructured Electric Industry.* San Francisco, CA: The Consumer Research Foundation.

United States Department of Health and Human Services: Administration for Children and Families. "Low Income Home Energy Assistance Program (LIHEAP)."
URL www.acf.dhhs.gov/programs/liheap. May 12, 1998.