Evaluating Consumer Energy Aggregations: A Policy Perspective

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ABSTRACT

Several pilot programs in the U.S. are underway to identify customer aggregation models that can provide some of the expected benefits of utility restructuring to residential and low-income customers. This paper describes several aggregation programs in New York State, including the "NY REACH" program model, and develops a policy-relevant framework for gauging the success of such programs. The NY REACH program includes: activities to improve building energy efficiency; budget counseling; family development; and continuing motivation and support through affiliation with community action agencies.[1] This combination of activities is designed to increase affordability of energy, leading to improved payment behaviors, and improving the characteristics (attractiveness) of the energy aggregation pool. Based on evaluation of NY REACH we propose a two-tiered framework for evaluating consumer energy aggregation programs so that measures of success can be accurately gauged and best practices identified. The tiers include a micro-level "bottom-up" approach and a macro-level "top-only" approach. The focus of this paper is on the macro-level ("top-only" tier), which views aggregation in a broader market context. This focus, developed from field experience, attempts to keep evaluation practice relevant and useful to policy makers.

Introduction

Evaluation of residential energy assistance programs has previously concentrated on energy efficiency technologies, building shell features, and consumer energy use. The advent of consumer aggregations for the purchase of energy (electricity in particular) shifts the focus of evaluation away from energy savings and on to price and service availability. This new type of energy program does not directly have energy savings or the efficient use of energy as a primary goal.[2] Rather, the aim of consumer energy aggregations is to ensure coverage and availability of energy, with desirable prices and terms and conditions of sale to

[1]Evaluation of the New York Residential Energy Assistance Challenge (REACH) program (NY REACH) is sponsored by the New York State Energy Research and Development Authority (NYSERDA). The NY REACH program is funded by the U. S Department of Health and Human Services (HHC) through the New York Division of Housing and Community Renewal (NYDHCR).

[2]One can say that energy savings is, in fact, a secondary indirect result of competitive energy markets in that: (1) The first line of attack in obtaining competitive energy prices and lowest energy bills is to use less energy, and (2) the second best course of action is to alter usage to produce a more attractive load shape for suppliers (e.g., load management). Both of these actions require implementation of energy efficient technologies and techniques or behaviors.

all residential consumers, including low-income consumers. Evaluations of aggregations must include an examination of market coverage and prevailing prices, with careful attention to the supply chain and how it is behaving as a result of the program's intervention. Although aggregation programs include a mélange of interconnected activities and goals, the critical evaluation focus should be on the structure and characteristics of the supply market.

A basic assumption inherent in all buyers' cooperatives and consumer aggregations is that participants will obtain better prices, and terms and conditions of sale, than they would as individuals. Moreover, individuals are more attractive to potential suppliers as part of a larger buying group with shared interests and a more attractive load profile. Any negative characteristics of individual customers, such as poor payment history or an unattractive load, will be balanced with the characteristics of other individuals in the aggregation, and will likely be outweighed by the overwhelmingly large volume of product being demanded by the group. Individual customers that have too small a load, are too risky, or too costly to serve in relation to their individual needs (and who might otherwise be left out of any benefits of utility restructuring), can presumably obtain reasonable service and rates through participating in an aggregation. That is the theory and the expectation for aggregation programs. Through evaluation we attempt to determine whether and how the theory works in practice.

Since electricity aggregations are still experimental, we apply an evaluation framework appropriate for a pilot program. This context recognizes that program elements can and should change over the course of the study, in contrast to more mature programs, where we expect little change and focus more directly on program outcomes in evaluation.

The Current Market for Low Income Aggregation in New York

New York State ranks fifth in the nation in the percentage of people living below poverty level. It has approximately 1.8 million low-income households representing approximately 25% of all residential households in the State. Annual energy expenditures for low-income households total over $2.3 billion, including all forms of energy. Over 55% of this amount is for space heating. Even a modest reduction in energy bills, of 5 to 7%, could yield savings of $115 to $160 million annually. New York receives about $150 million annually in energy assistance through the Low-Income Home Energy Assistance Program (LIHEAP). Savings on the order of $115 to $160 million can have the effect of doubling existing bill paying assistance available to low-income households.

The interest in aggregating customer energy loads, including natural gas, electricity, heating oil, and other fuels holds great promise for reducing the energy burden of low-income households. The potential for reducing the energy burden of low-income households through market-based mechanisms such as aggregation, has surfaced as a reasonable and cost-effective means to assist low-income households in managing their energy costs, particularly as the State transitions to full retail access. Most customers in New York now have the choice of supplier for all forms of energy, but the practical mechanisms for delivering actual choice in some sectors are being worked out. As a result, some interesting electricity aggregation efforts have been initiated to complement existing efforts underway for other fuels.

Aggregation Efforts in New York State

New York State has several aggregation efforts underway. Each is at a very different stage of development and each is intended to serve its own particular purpose. Fundamentally, with few exceptions, the programs are as different as they are similar. It is clear, however, that an opportunity exists for residential customers to lower their energy bills through bulk purchases. Interest in aggregation exists, organizations are being established to aggregate customer loads, and activities are well underway.

There are about six different energy aggregation efforts underway in New York, each with shared goals but different means of achieving them. Overarching goals of the programs are to:

1. Reduce the energy burden of low-income households.
2. Provide energy commodity and energy efficiency services to low-income households with a single provider.
3. Provide family development services to increase awareness of energy-use and related energy and household budgeting management.
4. Reduce the amount of customer bill arrearage.

The common theme of these aggregation efforts is to make available the benefits of competitive energy markets to low-income households. Such households lack the market power necessary to negotiate better terms and conditions of purchases on their own; lack access to investment capital to improve household energy efficiency; and lack access to information for making the wisest energy choices. Each of these aggregation efforts are attempting to help overcome these barriers and provide benefits to under-served populations (least likely to directly benefit from competition in energy markets). Three New York aggregation efforts are highlighted in this paper.

National Fuel Gas Distribution Corporation

Perhaps the most successful effort to date is the cooperative effort of National Fuel Gas Distribution Corporation (NFG) and County governments in Erie, Niagara, and Chautauqua counties in upstate New York. This program provides natural gas aggregation services to approximately 5,500 low-income households.[3] Under this program the counties pool and competitively bid natural gas supply needs of NFG customers. Texaco was the first marketer of natural gas to customers in this program. National Fuel Resources (NFR), a subsidiary of NFG is the current marketer. While NFR provides the natural gas, NFG continues to provide transportation services, meter reading, billing, and safety and customer service.

It is estimated that participating customers save 7-8% on their natural gas bills or the equivalent of $80 to $120 annually per household. NFG estimates that its public assistance

[3]Current program enrollment, following welfare reform, is down from a high of approximately 7,000 at program inception.

households use 33% more natural gas than average residential households.[4]

Participating customers must be enrolled in their County's voucher program that provides monthly bill payment assistance (energy allowance) directly to NFG on the customers behalf. The monthly energy allowance is deducted from the total amount of the County's monthly public assistance grant to the household. All low-income customers receiving public assistance are eligible to participate in the program. NFG's continued direct access to government energy assistance payments is perhaps the most critical element of the program's success. Because the existing assistance payment infrastructure did not change, paperwork and dollar flows among parties are not affected. The Counties continue their responsibility for providing energy assistance payments to the energy provider and to true-up total assistance provided to participating customers with their Welfare payments. The County procures the natural gas and NFG distributes it to customers.

Citizen's Action Albany

Citizen's Action Albany (CAA) is a non-profit fuel buying group established in 1986-87 in Albany, NY. CAA has been aggregating and purchasing bulk fuel oil and kerosene for low-income, residential, municipal, and small business customers in 20 to 25 counties since its inception. CAA serves approximately 4,000 customers statewide, with about half being low-income, and many senior citizens. About 12-15 fuel suppliers (dealers) have participated over the years, with 6-8 dealers currently participating. CAA markets its customer load to local dealers and encourages them to participate in its competitive procurement. Unlike other aggregation efforts, the CAA model does not guarantee the dealer a minimum purchase since it does not mandate that members purchase any given amount of fuel. However, like other aggregation efforts, participating dealers must meet minimum criteria in order to participate. CAA has found that dealers who see the benefits and logic in the program are willing to participate. To date, dealer interest is highest in counties that have more dealer competition.

CAA reviews bids and selects the dealers for participation in the program, based on bid responses, and offers the energy commodities to members who wish to purchase at the agreed upon price. They then put the dealer in touch with the customers directly for delivery. CAA does not take title to the commodity nor does it bill customers. These functions continue to be handled by the dealers themselves.

The average participating household purchases approximately 800 gallons of fuel during the heating season with all participating customers paying the same price with the same terms and conditions of sale. Customers save approximately $0.05-0.15 per gallon during the heating season for a total annual savings of between $40 and $120. Aggregated pricing is only available during the heating season when fuel prices are typically highest.

Any interested customer is eligible to participate in CAA's aggregation program. The annual membership fee is $25, however, there is a one time fee of $5 (in lieu of the annual membership) for LIHEAP, Social Services, and Disability recipients. The largest number of customers learn of the program through yellow page ads in the local telephone

[4]Moreover, energy costs for low-income households are typically 10-14% of gross household income, compared to 3 percent for average income residential households.

directory. The second largest number learn of the program through word of mouth. CAA also works with some labor unions which offer CAA services to members as a benefit. CAA tracks fuel prices Statewide and the consumption and bills of its members as a means to verify that savings are being realized, and conducts periodic surveys of its members to ensure that the program is meeting their expectations.

In addition to providing aggregation services, CAA offers energy information and makes customer referrals to LIHEAP and the State Weatherization Assistance Program (WAP). Moreover, through agreements with participating dealers, County Social Services agencies help ensure that customers in emergency situations are taken care of quickly with dealers responding to emergencies within four hours of notification.

NY REACH Program

The New York Residential Energy Assistance Challenge (NY REACH) Program is a federally-funded[5] pilot program that seeks to establish a Statewide not-for-profit energy services company to lower the energy burden of low-income customers through aggregation, and provide family development services to inform customers of their energy use, energy efficiency and aggregation opportunities, and provide budget counseling. NY REACH will aggregate all fuels, including electricity, natural gas, heating oil, and kerosene. Although still in its formative stages, NY REACH is designed to aggregate purchasing power for low-income customers and other residential and smaller customers (to balance load), arrange bulk purchases, and help ensure the provision of a range of energy efficiency, health and safety, and customer support services. In addition to the stated goals of the program, NY REACH aims to facilitate the involvement of a Statewide network of community-based organizations to serve similar needs in local communities; to coordinate services with the State's WAP services; and to leverage other State and federal resources to collectively meet the needs of the State's most vulnerable customers. NY REACH implementation contractors are working with the State's utilities through their rate settlement agreements (restructuring activities) to ensure that low-income customers are provided a choice of energy service provider as are all other customers.

A Policy-Relevant Evaluation Framework

The following evaluation parameters were developed for the NY REACH evaluation, but they can be easily applied to any aggregation program. Although in this paper we report on a number of activities and goals for aggregation pilot programs, our experience in New York leads us to focus on the following set of questions. The list is not comprehensive, and it focuses on the "make or break" dimensions of an aggregation pilot, that is, on the aggregation activity itself and the market that constrains it. From among all the questions that need to be asked in an evaluation, these are believed to be the most critical and policy-

[5] Funded by the U.S. Department of Health and Human Services (Public Law 103-252 as a component of LIHEAP) and administered by the New York State Division of Housing and Community Renewal. Primary contractors are the Association for Energy Affordability for the aggregation component, and the New York State Community Action Association for the family development component.

relevant.

1) How is the eligible population for aggregation and energy services defined?

2) What proportion of the eligible population is offered the services (marketing effectiveness of aggregating entity)?

3) What proportion elects to participate?

4) What proportion is eventually provided with service?

5) What prices are offered by suppliers?

6) What prices prevail in the area (*e.g.*, determine the price range or ratio from lowest to highest for the same market segment or population group within a region)?

7) What contract terms and conditions are set by the suppliers?

8) What consumer protections are available from the aggregating entity, from government, from other sources?

9) What services are requested by the consumers and to what extent are they provided by suppliers?

10) How closely do the services (and quality) mirror what was promised contractually?

11) How well overall did the service provider perform in terms of arranging the best deal for consumers and ensuring quality control of provider services?

A Two-Tiered Evaluation Framework

There are at least two very different approaches to evaluating consumer aggregations. They are referred to in this paper as micro-level or "bottom-up" approach and macro-level "top-only" approach. The "bottom-up" approach to evaluation measures indicators and outcomes at the level of the individual family (customer or account), and is rooted in the kinds of analysis often carried out in energy program evaluation. The "top-only" approach focuses on the deal making in the energy market. In the area of aggregation studies, both approaches rely heavily on "logic models" and a causative paradigm. For residential, and particularly for low-income residential customers, the evaluation model for aggregation involves a move from the micro-level to the macro-level.

At the micro-level, much of the effort of aggregation follows a strategy of community organizing. The relevant program goals at the micro-level include informing, educating, persuading, and eventually enlisting families into the aggregation pool. This effort may also involve enlisting institutions, such as community-based organizations, cooperative housing projects, local governments, or state or local institutions in this effort. It is an organizing

effort from the bottom-up, led by community organizers and spokespersons with the goal of cooperation in common self-interest to improve economic well-being. Low-income aggregation program goals also include leveraging of all pre-existing utility, social, and governmental services to lower energy use and support an improvement in the pattern of regular payment for energy by the aggregation members.

At the macro-level, however, the aggregation can only succeed economically through "elite bargaining" in which a single agent for the participants enters the market as their legal representative to make a deal with suppliers. To be credible, the agent must have a large enough and desirable aggregation pool. The ability to deliver a good "load shape" might offer some advantage in bargaining. The real bargaining power, however, might come from the agent providing the supplier with a meaningful profit incentive (*e.g.*, providing a definite, secure, and enforceable market).

The residential market is complex and certainly not a "textbook" free market. For example, the residential market for natural gas and electricity can be viewed as a "left over" part of the market after larger customers have struck the best deals. In our experience, while many potential suppliers express good intentions to serve the residential market, few choose to deal with the residential sector aggregates, and particularly with low-income aggregates. As in any market, more desirable customers offer the potential supplier more profit, greater simplicity of service, and few problems. The profile of the residential customer aggregate, and the low-income aggregate in particular, is not the most desirable to suppliers. Thus, it is important to create conditions that make it in the self-interest of profit-motivated suppliers to offer a price break to the low-income aggregate. For example, to help stimulate markets, some utilities and regulatory commissions have experimented with temporary cash incentives or "shopping credits" to encourage customers to participate in customer choice. A better and more enduring prospect might be, for example, an exemption from the State gross receipts tax and a guarantee of payment by the agent on behalf of customers, mitigating supplier risk. Planning and instituting a guided market can increase the probability of stable profit to the supplier while minimizing supply risk.

The Micro-Level ("Bottom-Up") Approach

At the micro-level, evaluation tasks include tracking the formation of the aggregate. In addition to a typical process evaluation, the impact assessment at the micro-level must deal with such things as reducing energy use and energy burden, and improving the regularity of full payment of the unsubsidized portion of the energy bill. At this level, social interests such as family development, energy education, and information on "choice" are also important. The unit of analysis is typically the family, customer, or ratepayer account. The two centers of activity for NY REACH are the Public Interest Energy Service Company (PIESCO), and the community based organizations (CBOs) that are responsible for the Family Development Pilot (Figure 1). The components that must be taken into account in a bottom-up approach are indicated in Figure 1, an overall logic diagram for NY REACH (the program imputs are depicted on the left, with outcomes on the right). The elements that

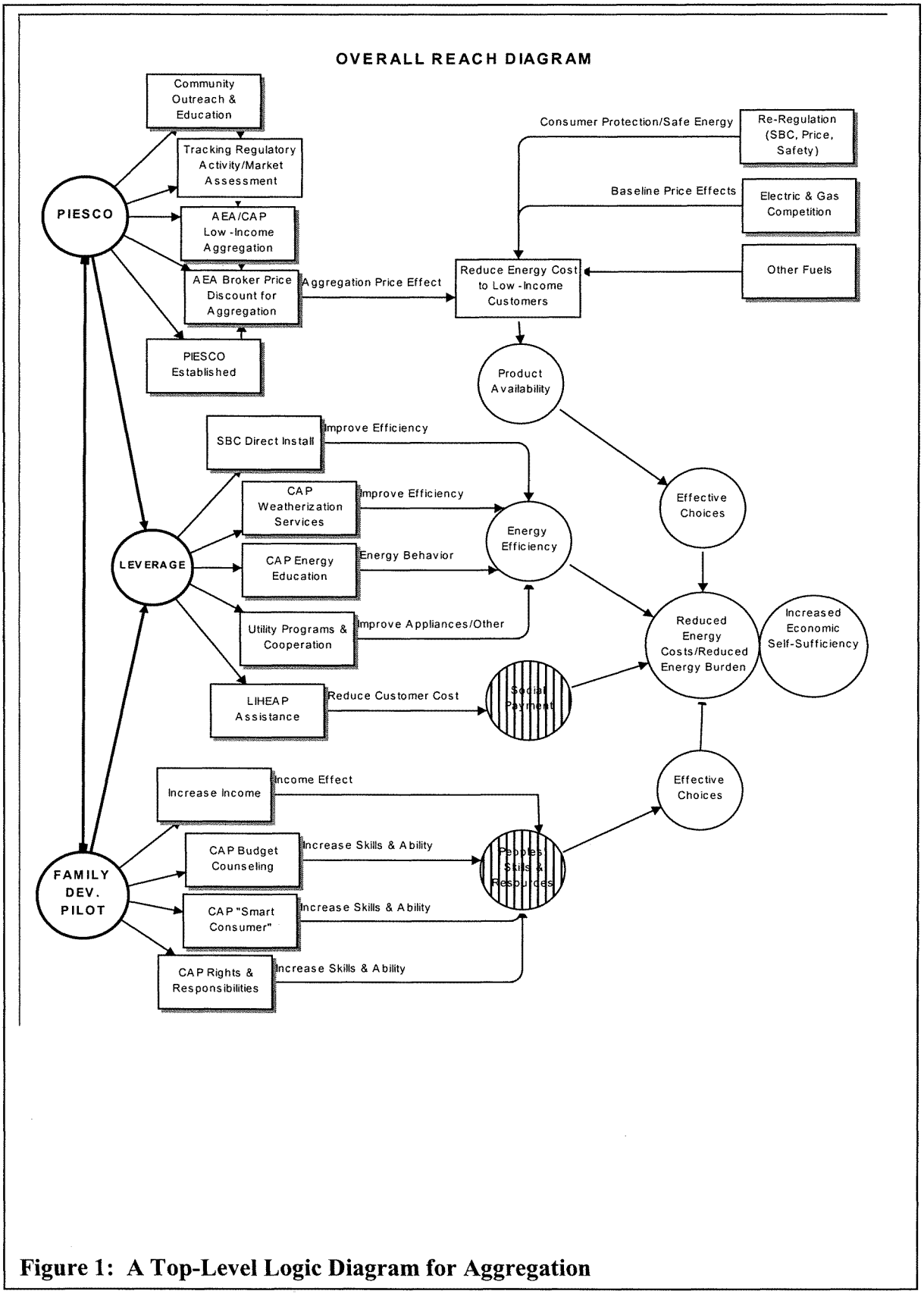

Figure 1: A Top-Level Logic Diagram for Aggregation

directly concern aggregation, shown at the top of Figure 1, represent the set of activities that influence product availability. However, the other program elements need to be taken into account in a bottom-up approach.

At an even higher level of abstraction, there are many other factors that need to be considered in evaluation, as illustrated in Figure 2. In Figure 2, the aggregation effort is shown in the box in the lower left corner. Assuming the discounted product can be delivered through the aggregation, there are many national policy and other factors that interact with the aggregation effect and largely influence whether the aggregation effort is meaningful or not. Moreover, each effort is associated with a discrete piece of the program logic. For example, steps related to the establishment of the market agent for the low-income aggregation in New York are shown in Figure 3. In a bottom-up evaluation, a number of diagrams, similar to Figure 3, are required to detail the program logic in each area of the program's operation.

In each of these program areas, there is a need to assess causality. There are several different types of causality, but the basic idea is that of "determination" in which one thing leads to or "produces" another (Bunge 1979).[6] Evaluation of causality relies on combining the logic of relationships (*e.g.*, as indicated in Figures 1, 2, and 3) with the impact and process evaluations to reach conclusions.

In the bottom-up approach, we want to determine the combined effect of aggregation, family development, and the leveraged activities (Figure 1). This requires a strategy of "splitting apart" project activity into component assessments, then combining across activities to assess total results. Because this process relies to largely on the program logic, the process evaluation might play as large a part as the impact evaluation in establishing results. A full bottom-up analysis takes into account all activities and results, linking and interpreting them in terms of one or more "effect chains."

The method of evaluation generally follows that established by Chen (Chen 1990).[7] Using the "theory of the program" as the framework for evaluation insures that the evaluation ties back directly to the program concepts envisioned by planners and approved by the funding agency. Such an analysis differentiates among three levels of results:

(1) Immediate outcomes ("proximate results"). For example, in the Family Development component, immediate outcomes are the direct results of education regarding "rights and responsibilities" and "customer choice," and of family budget development. All activities in this area support the attractiveness of the aggregate to the potential supplier and the activities and certain direct outcomes are observable.

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[6] The resource used for developing a practical working definition of causality is Bunge, 1979.

[7] The "theory driven" approach to evaluation emphasizes the use of "program logic." In this approach, the logic of the program is a tool in the development of causal linkages or "effect chains" (Chen, 1990) A current major development in method, "theory driven" evaluation is a prominent feature of new presentations at the recent annual meetings of the American Evaluation Association.

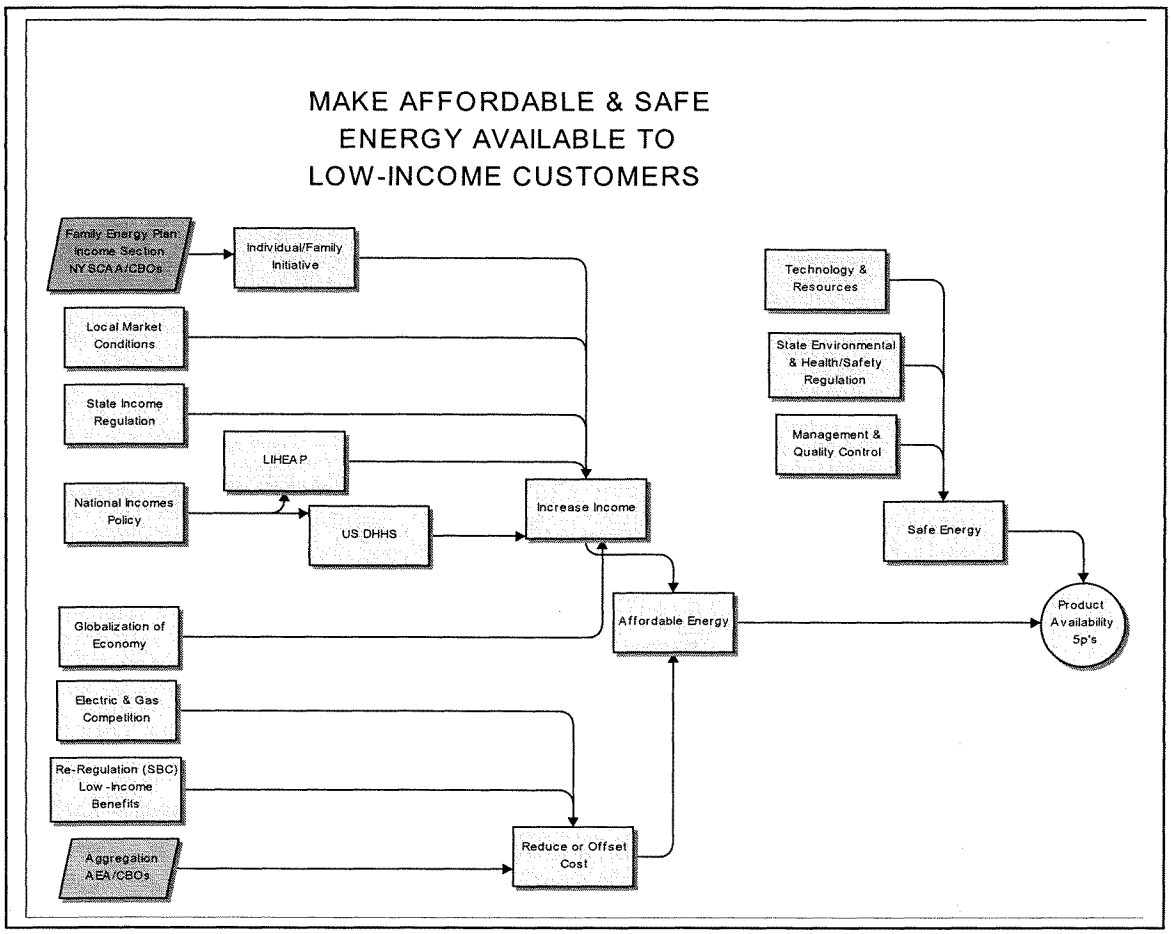

Figure 2: National Policy & Globalization Also Affect Outcomes

(2) Intermediate results. Intermediate results are often not observable during the time period of the evaluation effort. Evaluation focuses on demonstrating that the pre-conditions for intermediate results have (or have not) been attained. If the immediate indicators in these areas are consistent and positive the prospect for success at the intermediate level will be assessed as positive. The intermediate results, for example, might be an increased ability to cope with payments, and a reduced energy burden.[8]

(3) Attainment of final goals (long-term results). Long-term results are not observable during the evaluation period, unless the evaluation period is after-the-fact. Using the program logic, however, it is possible to estimate upper- and lower-limits of potential attainment in terms of energy affordability and economic self-sufficiency as a result of the aggregation and other interactive components of the system.

[8]Aggregation projects are similar in this respect to education programs, such as Operation PUSH/Excel. On the critical issues surrounding evaluation of Operation PUSH/Excel see Stanfield 1999 and House 1999.

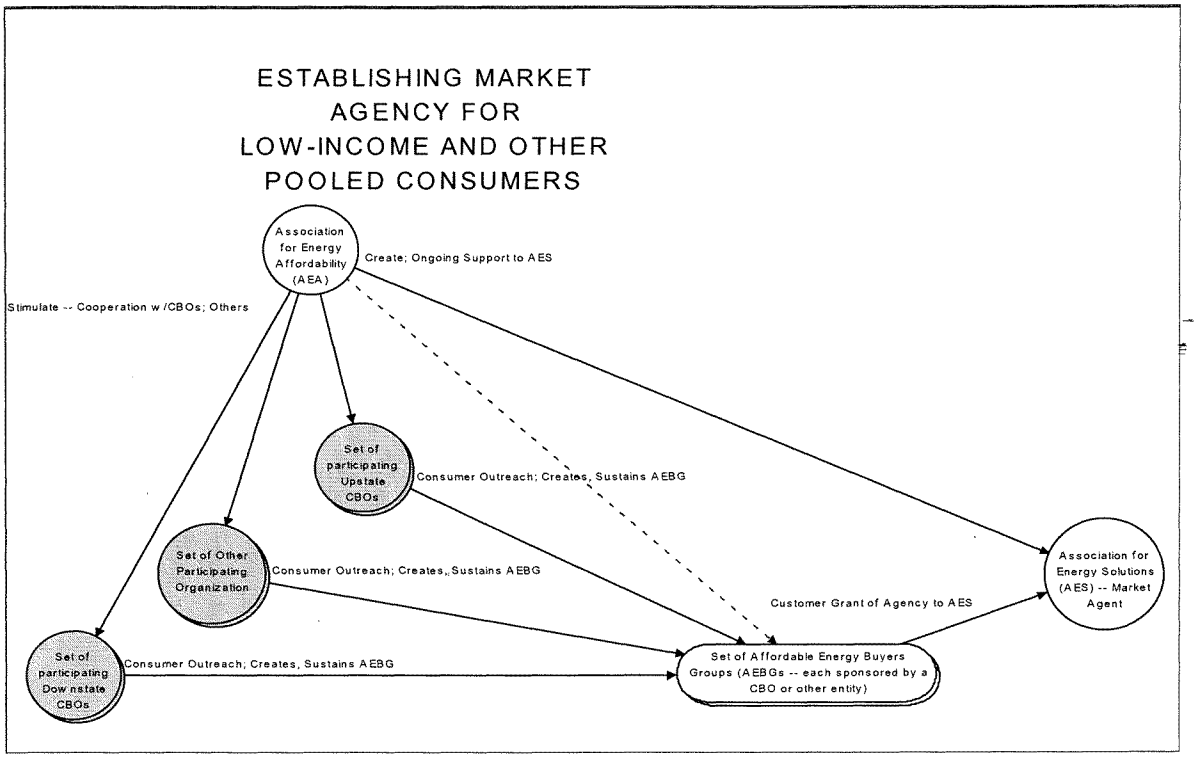

Figure 3: Establishing Agency in a Aggregation Effort

In summary, the magnitude and direction of immediate results are used to assess attainability of intermediate pilot results. The interpretation of intermediate pilot results is made in terms of an argument of consistency from which expected final results might be estimated.

The Macro Level ("Top-Only") Approach

An alternative is to leave all of the components other than the deal-making and the market out of the evaluation. The justification for this perspective is that all other elements, such as family development, home weatherization services, and energy education are familiar activities that pre-date the specific aggregation effort under evaluation. While a low-income aggregation might attempt to leverage all relevant existing services and bring them to bear in a coherent fashion, the net result is still the impact of the individual services.[9]

[9] While the differentiating features of aggregation projects are the aggregation activity and the market constraints, aggregation programs typically attempt to achieve a "best leverage" across diverse program activities as well as outside programs and resources. The program logic will point towards synergy – by combining and leveraging resources, the joint result should be meaningfully better than the sum of results available from the components individually. The role of the evaluator is to test to see if this happens, then to quantify the size of the effect. Until then, there are "effect size" estimates available for components such as weatherization, and others can be "ball parked". We emphasize that the key elements in aggregation projects are the aggregation itself and the structure and characteristics of the market. The other elements then become important in their turn.

Each of the pre-existing elements to be leveraged has its own history of program design and evaluation. Also, new elements which concern the building of the aggregation from a community development and a social work perspective can be left out of the evaluation unless they fail in some way, or create a barrier to a deal. All might also be addressed by reasonable assumptions to quantify their impacts within fairly tight bounds, based on prior experience. The focus emphasizes the aggregation in the energy market, not the aggregation itself. From a policy perspective, the primary quantitative result is the price break provided and terms and conditions of sale. The primary qualitative evaluation result is an analysis of the deal and how the market facilitated and/or constrained it.

The cost of evaluation is significantly controlled at a macro-level, avoiding measuring at the level of individual families, except in brief summaries from agency records and a sample of satisfaction interviews and/or surveys. The precedent is in the way many economic studies are done – not the typical approach of energy evaluation or of sociologists, psychologists, or anthropologists – but a main line approach within economic analysis. In this approach, the evaluation abstracts only the new elements in the mix. The existence of the aggregation can be taken as a fact once it comes into being. All the rest is conceptualized as background, not different from what the CAPs, WAP, utilities, and the social service agencies already do. Any improvements in the background will be picked up by future impact evaluations focusing on these specific elements. The "holistic" effect would not be captured, but it could be conjectured and bounded from other background information, and also described anecdotally.

The basic principle followed in this "top-only" approach is: evaluation in a demonstration program should test only the new elements of the program concept. The evaluation would be limited to the story of the formation of co-operative aggregation and quantify its actual or potential incremental effect. The focus of the evaluation would be on the two or three potential suppliers, the forces that shape the market, and the deal.

This type of evaluation is primarily a performance evaluation. Process and impact would be downplayed and cast as aspects of a performance assessment. In addition, the evaluation would assess the program against a smaller set of quantitative performance metrics. One of these would be the price break negotiated. The process evaluation would limit itself to assessing barriers in the aggregation effort, how they were they overcome, and what barriers remain for the future? The evaluation would be kept on a macro level as a strict, lean, but fully adequate test of the new program elements. On the impact side, the evaluation would draw on prior knowledge of outcomes of program elements, but not attempt to re-create it. The impact evaluation would note the number in the aggregation over time, and the composition of the aggregation in terms of types of customers and organizations over time, but focus on the specifics of the market. In particular, the history of the bargaining, the existence of "guided market" background factors, and any eventual deal for better rates. The ultimate performance result would be the amount of the discount negotiated due to aggregation.

In short, the focus of the evaluation would be solely at the elite level of the actual market, the market players, and the deal. The evaluation would be carried out from an economic perspective. "Economics is the study of how societies use scarce resources to produce valuable commodities and distribute them among different people" (Samuelson & Nordhaus, 1998, p. 4).

For an aggregation program, energy (in its different commodity forms, such as therms or kWh) is produced using scarce (often non-renewable) resources and distributed among different people. The fundamental assumptions in this definition of economics are scarcity and efficiency. Economic goods, by definition, are goods which are scarce or limited. Efficiency is defined as increasing the welfare of individuals without making any other individual worse off. Thus, "[Economics] examines the distribution of income, and suggests ways that the poor can be helped without harming the performance of the economy" (Samuelson & Nordhaus, 1998, p. 5).

Low-income aggregation can be approached using the framework of "instrumental economics" (Lowe 1935).[10] In market economics, participants are forced to follow a set of behavioral rules: buyers seek the lowest price; sellers try to sell high.[11] For the competitive market model to work on its own, there must be a large number of independent sellers and buyers.[12] Contemporary energy markets typically contain a relatively small number of independent sellers interested in sales to the residential class, and almost none interested in low-income consumers.[13] In this partially competitive market situation, aggregation offers the possibility of creating a small number of agents capable of negotiating on behalf of the residential class. Besides forming aggregates to provide purchasing volume, aggregators can try to shape load in ways that might induce a price break from suppliers. If successful, this effort at "instrumental economics" supplements the primitive competitive model with a set of practical administrative procedures to bring the economic system closer to equilibrium than would otherwise be achievable. In this perspective, the task of the aggregator is to secure the price break while the task of the CAPs is to insure the requisite "micro behavior" in the areas of payment and energy use that are necessary in order to achieve the desired ends. If the aggregation approach can be made to work, it will help at least a segment of low-income customers to move toward energy affordability while facilitating market relations.

In this "top-only" approach to evaluation, the structure of the supply market should be examined to provide an overview of pricing and margins. The ability of the aggregation activity to attain a buying group with characteristics that can achieve a price break is interpreted in relation to the structure of the supply side of the market. The meaning of the results, as in the bottom-up approach will then be bounded by family budgets, income trends, policy, energy use, and payment information.

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[10]Also, see Lowe 1965.

[11]Of course, a marketing perspective takes into account many alternatives to this basic economic model, but the economic theme still underlies these alternatives.

[12]In perfect competition, there are very large numbers of buyers and sellers, the product is perceived as homogeneous – like a commodity, and there is no barrier to market participation or information about the market. The market in which low-income aggregation takes place does not even begin to approximate the ideal of perfect competition. Yet it is that ideal that grounds the claims for the value, relevance, and efficacy of market solutions.

[13] There are, in fact, about eight conditions for a competitive market to function more ore less automatically ("the invisible hand"). To the extent these conditions are lacking, "the invisible hand" is missing.

Note on Flexibility for Policy-Relevance

Finally, in either the bottom-up or top-only approach, evaluators must be ready to deal with the large uncertainties faced by programs. This is because the aggregation projects evaluated are new phenomena, and the rules of the relevant markets are still being established. In this context, program managers must be free to continually adapt to the market and change program strategies during the course of the evaluation. This perspective contrasts with an earlier view that, for evaluation purposes, a program must be operated consistently for the duration of a full program cycle. There are tools for this kind of evaluation, in particular the "CES Approach" (Bunge 1966) in which the program is viewed as a material entity with a composition "C," in interaction with its environment "E," and with a structure "S." This is a systems perspective. In contrast other types of programs, in which a program is proposed and evaluated within a more or less stable environment, aggregation efforts are taking place in an unstable, even chaotic environment. This environment is characterized, for example, by an ever-changing entry and withdrawal of supply entities, changes in focus by participants, and the continuing introduction of new market structures and characteristics. The "rules" keep changing. This situation produces both rapid introduction of barriers that cannot be anticipated, and unexpected branching of opportunities. Such a dynamic context requires program managers to be "free administrators,"[14] keeping to the program goal, but changing the composition and structure of the program as necessary. For evaluators, this means starting with one theory of the program and an initial set of logic diagrams, and being ready to end with a different program theory and new logic diagrams.

Conclusion

Several current pilot programs in the U.S. are attempting to identify workable customer aggregation models. This paper describes several aggregation experiments in New York State, in particular the "NY REACH" model. Based on evaluation of NY REACH this paper presents a two-tiered framework for evaluating consumer energy aggregation programs. It recommends a strategic focus on the macro level ("top only") evaluation to serve the most critical need for policy-relevance. The evaluation then focuses on the aggregation itself and on the market context that enables and constrains the "deal". Conceptual tools to support macro level ("top-only") evaluation have been introduced, and the need for flexibility on the part of program administrators and evaluators to follow market changes has been emphasized. Evaluators dealing with aggregation programs will have to consider both tiers of the evaluation effort, and adapt these concepts and approaches to their specific situations. The hierarchical emphasis on the macro-level ("top-only") approach is based on our work in New York, and a review of aggregation efforts around the United States. For future evaluations of aggregations, we suggest a focus on the macro-level: the aggregation and the market in which the "deal" is reached. Until (or unless) residential

[14] The "free administrator" is Donald Campbell's "experimental administrator": "*Experimental administrators* have justified the reform on the basis of the importance of the problem, not the certainty of their answer, and are committed to going on to other potential solutions if the first tried fails" (Campbell 1975).

aggregations begin to function, that is the primary area for evaluation. This question, in turn, raises the need for policy makers to consider structuring "guided markets" by providing meaningful profit incentives to energy suppliers to serve the residential market segments, including the low-income segment.

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