Bidding for Demand-side Management Performance Contracts

by Greg Thomas and Ian Shapiro-Baruch

More and more utilities are looking to contract out energy conservation services rather than build new power plants. Bidding for these demand-side management programs poses great opportunities to organizations with retrofitting know-how, like weatherization agencies and energy services companies.

"Demand-side management" (or DSM) is the term widely used by the electric utilities for energy conservation and peak-load shifting, and one well worth becoming familiar with for auditors, retrofitters, contractors, and weatherization companies interested in participating in the process. Rather than contract out the work on a piecemeal, fee-for-service basis, an increasing number of utilities across the country are putting out bids for performance contracts, which require the contractor to provide a measurable quantity of energy savings or demand reduction. The good news is that contractors used to providing quality work and securing substantial savings will be rewarded for their dedication.

The all-round benefits are clear. Reduced loads for utilities reduce the need for expensive new power plants, and help them meet the new stricter requirements of public utility commissions (and in some cases even make a profit—see *HE*, Nov/Dec '90, p.2). For the homeowner, the energy conservation measures are installed at very low cost, often for free, resulting in lower utility bills. And for the energy conservation professional, demand-side management can mean long-term contracts covering thousands of homes.

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The DSM auction.

The real difference between demand-side bidding and other utility conservation contracts is that the energy services company undertakes long-term demand reductions for the utility. Taking on demand-side management contracts involves the risk of a commitment to save a specific amount of energy, at or below a specific amount of dollar compensation per unit of energy. Since bidding is competitive, the need to win bids must be carefully weighed against the risk of bidding too low and subsequently losing money during the contract. So far, only electric utilities have conducted this type of bidding, so the work is limited to electricity energy conservation and load-shifting. Still, this covers a lot of ground: high-efficiency lighting, electric water heater insulation and conservation measures, weatherization of all-electric homes (resistance heating or heat pumps), air conditioning conservation measures, high-efficiency appliances, thermal storage, etc.

It is important to be aware that not all DSM work is undertaken through bidding. Utilities also engage in internal DSM projects, ones that are essentially chosen, planned, and managed in-house. Some of these projects nonetheless require contract work for implementation, which may be awarded non-competitively, or through competitive bidding of a less rigorous nature than the typical, large-scale DSM program.

In order to break into DSM work and to be successful at it, it is important to be familiar with the process as a whole,

BIDDING

its jargon, and typical calculations that go into a bid. Examples provided here were drawn primarily from Niagara Mohawk Power Company's request for proposals of November 1989, for which we (Syracuse Energy Services Company—SyrESCO) bid and were awarded a contract to weatherize 6,000—7,000 apartments. The contract will bring in over $10 million over the course of 4 years. Niagara Mohawk is the largest electric utility in upstate New York.

The technical analysis required for demand-side bidding should not scare away local, small companies or non-profit agencies. Bid preparation is not as daunting as it seems, and support can be obtained from companies familiar with the DSM process. Local companies and non-profits are often more attractive as bidders to utilities because they provide opportunity for access to niche markets (for example, multifamily housing, low-income areas, small businesses). They may also be easier to deal with if they are local, and may offer stronger guarantees to avoid "cream skimming" (bidding on highly profitable projects while leaving in-depth energy conservation work untouched). Finally, there is a public relations benefit for a utility to work with local companies. And non-profit companies may often submit lower bids than other private firms.

Roles for Different Companies and Agencies

Opportunities in demand-side management exist for many types of organizations. A weatherization agency could be part of a utility program to reduce electrical consumption and demand in the buildings that are currently being weatherized. This sort of program would most likely be developed by the utility in conjunction with state or local Low-Income Weatherization Assistance Programs. Each utility across a state is likely to have its own needs, which will affect the type of demand-side program it would find desirable.

Weatherization and community groups that are interested in expanding their current scope of operations can look into developing programs for larger potential markets such as multifamily housing (see sidebar on previous page).

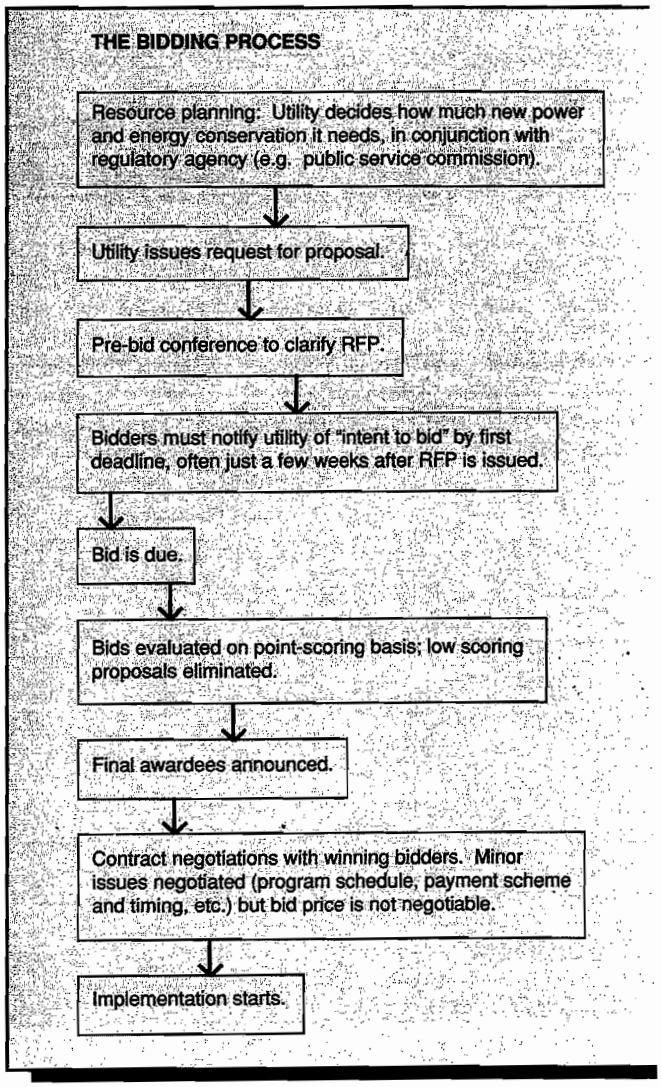
A contractor who can demonstrate experience working with electric-demand reduction technologies, such as energy management systems and high-efficiency lighting, will be in a good position to bid on the subcontracted parts of both internal and contracted demand-side programs.

Energy service companies have become one of the most common demand-side service providers selected through the bidding process. Many of these companies have been founded as subsidiaries of utility companies that got an early start in the development of demand-side programs. Weatherization and community groups that are looking to establish for-profit or income-generating not-for-profit subsidiaries can look into the creation of an energy service company to operate a demand-side program.

For example, SyrESCO was founded as an income-generating not-for-profit in 1984. After working with weatherization, we found a market in providing energy conservation consulting services to other not-for-profit agencies for their own buildings. The multifamily DSM bid will result in growth from a staff of 8 to a staff of 16–2((See *HE*, May/June '88, pp. 5.)

The Bidding Process

Bids are usually solicited by utilities in a document called a "request for proposal,"or "RFP." Shortly thereafter, a pre-bid conference is held in order to clarify questions about the RFP. The first deadline in the bidding process is the "notice of intent to bid," a date by which the utility requires notification of what projects a bidder is planning to submit, the projected demand "capacity" of power reduction (in megawatts), as well as anticipated energy consumption savings (in kilowatt hours) for each project. The bidder then prepares the full bid for submission in time for the final bid. The utility reviews the bids and may request more information from the bidder in the form of clarification, further documentation, or refined calculations. Bids are often awarded on a point-scoring basis, with 40–60% of the total points based on the price (i.e., favoring the lowest-cost bids), but points are also given for a variety of merits such as pric



experience with DSM, the amount of financing that has been secured, and environmental impact (for example, energy conservation projects might get more points than peak load-shifting ones). After bids are awarded, contracts are negotiated with the winning bidders, and then work can begin.

It is important to recognize that the bidding process, with its fast-moving deadlines, has a momentum of its own. To ensure fairness, the deadlines are considered quite sacred. It is the bidder's responsibility to keep up with the deadlines, and meet all minimum eligibility and bid requirements. This momentum has an advantage, which is that the bidding process forces decisions to be made both by the bidder and by the utility, and holdups are more difficult to justify.

Preparing a Bid

Getting acquainted with DSM does mean learning some jargon. First, it is important to distinguish between energy savings (in kilowatt-hours, or kWh) and power or capacity savings (in kilowatts—kW—or megawatts—MW). *Capacity* or *capacity bid* refer to the amount of peak electric power, in megawatts, which is proposed to be saved. The utility typicallly provides formulas to help calculate this capacity. In its RFP, Niagara Mohawk defined peak hours as 8 a.m.–10 p.m., on weekdays only. Their formula required that peak capacity be calculated based on the daily energy savings (kWh) occurring during peak hours, divided by 14 (total peak hours per day). For example, if a bid proposes that 100,000 high-efficiency

DSM Example: All-Electric Multifamily Housing

The demand-side bid that the Syracuse Energy Service Company (SyrESCO) secured with Niagara Mowhawk Power Company focused on the all-electric multifamily housing market. For this bid, SyrESCO limited the housing types to common-wall buildings under four stories high. The target group of buildings includes rowhouses, townhouses, garden apartments, etc.

Many of the target buildings at one point or another received some sort of state or federal financing for construction or rehabilitation. Some of the buildings are managed by housing authorities, some by management companies, and others by private owners.

Due to the focus on first costs by the federal, state, and private financiers, many developers chose to heat these buildings electrically. Electric heat is easy to submeter and has a low installed cost. This focus on first cost ignores the long-term operating costs of the buildings' occupants. In some cases, poor construction quality results in leaky buildings with lots of thermal defects, as well.

Advantages of the Multifamily DSM Market

This housing stock has not been extensively addressed by weatherization programs. Many of the smaller or more rural weatherization agencies have found it difficult to address multifamily buildings due to the large size of individual housing projects. A 200-unit complex with 24 buildings is not unusual. The installed cost of the retrofit of a single project of this size might be larger than the full-year budget of a small weatherization agency.

In terms of a demand-side bid, the large size of a complex is an advantage. SyrESCO does an intensive energy audit on each building type in a complex and then extends its findings out to similar buildings. This ability to replicate audit findings enables us to cost-effectively subcontract out air-sealing work. The air sealing is performed to written specifications that would not be cost-effective to prepare for the idiosyncratic construction of single-family homes. Other economies of scale also improve the pricing of a multifamily demand-side bid as compared to providing services to single-family homes.

Electrically heated multifamily housing is an excellent example of a case where the interests of the utility, the ratepayer, and the general public coincide. Since many residents of these homes have low incomes, they often have fuel bills subsidized through tax dollars. The DSM retrofit then can result in lower public costs. For landlords, the retrofit work means less tenant turnover from cold drafts and high fuel bills. And for utility companies there are public relations benefits in addition to electric-demand reductions.

One advantage of this market to a weatherization-oriented energy service company is the reluctance of larger, more commercial energy service companies to deal with low-income housing. The problems of working with low-income housing don't intimidate those of us who already work with it five days a week!

Technical Approach

SyrESCO conducts an intensive instrumented energy audit that goes as far as opening up siding and sheetrocked walls to achieve an understanding of the energy dynamics of the sample buildings. This information provides the basis for the use of building science to integrate considerations of energy consumption, moisture, air quality, and occupant health and safety.

After completing detailed specifications, we focus on bidding, contractor training, and ongoing inspections. Training a contractor in air sealing is best done in cold weather when you can do frequent infrared scans of their work.

Treatments include:

- **Air sealing.** This includes caulking and sealing wall top plates, plumbing and electrical penetrations, common-wall defects, interior trim, etc. Weatherstripping is not an appropriate retrofit due to the short expected life of most weatherstripping products.
- **Insulation Defects.** Many buildings require adding or reinstalling insulation to repair such defects as uninsulated dropped-sheetrock ceilings, soffits, overhangs, and insulation voids.
- **Domestic Hot Water.** All units not already treated receive low-flow showerheads and faucets, and water-heater tank and pipe insulation. Tank temperatures are turned down to achieve a consistent draw-down time before and after the retrofit. Savings from this measure are very subject to the behavior of clients ("customers" in utility terms). As part of SyrESCO's program, client education is provided to help prolong savings.
- **Thermostat Replacement.** Poor-quality thermostats are replaced by units with a reduced fluctuation range, providing comfort at a lower setting. Thermostats located on the baseboards in non-elderly housing will be replaced by wall-mounted "setup" thermostats or light-sensitive setback thermostats ("lightstats").
- **Exterior Lighting.** Incandescent and mercury-vapor exterior and entry lighting are replaced with high-efficiency lighting. Interior lighting retrofits will not be appropriate in climates without a significant summer air-conditioning load due to the "free" waste heat provided by lights in the winter in buildings with electric-resistance heat.

light bulbs be installed, each of which saves 60 watts, and it can be documented that these light bulbs are turned on for an average of 3 hours per day, the corresponding capacity bid would be:

(100,000 bulbs x 60 watts per bulb / 1,000 W/kW)
x (3 hours on per day/14 hours in peak day)
= 1,286 kW (or 1.286 MW)

For Niagara Mohawk, the capacity bid was primarily used to associate a megawatt savings for each project, in order to achieve the target total of 50 MW savings for all projects with the RFP. The minimum bid size was required to be more than 100 kW, which, in the above light bulb example, would have required the installation of approximately 8,000 light bulbs. However, the amount the utility would pay for energy conservation was tied to energy savings (in kWh), rather than demand reduction (kW).

This is where the *price bid* comes in. The bidder offers to save energy at a certain bid rate (cents per kWh), and often the lowest bidders get the work. The lowest bidders must also, however, meet certain other criteria. The bids generally must be below the utility's cost of producing new power. In the case of Niagara Mohawk RFP, for example, the avoided cost for 1990 was 6.7¢/kWh (peak) and 3.2¢/kWh (off-peak). This *avoided cost* is the utility's estimate of the cost of producing power. In other words, if the lowest bids were more expensive than it would ha cost the utility to produce the power, the utility is bett off not undertaking the demand reduction program.

In the light bulb example above, the calculation requir knowing how long a typical residential light bulb is turn on during a peak day, as well as the energy savings per bul Finding authoritative sources for energy savings calculatio is an important part of providing credible bids, as RFPs c for as much documentation as possible. Where documen tion is not available, and assumptions need to be made, the assumptions must be clearly identified, with full justificatic provided. The most important areas requiring documen tion include capacity reduction (kW or MW) calculatior energy savings (kWh or MWh) calculations, predicted life the energy savings technologies to be used, available mark (how many customers a bidder can realistically hope reach), and customer behavioral issues.

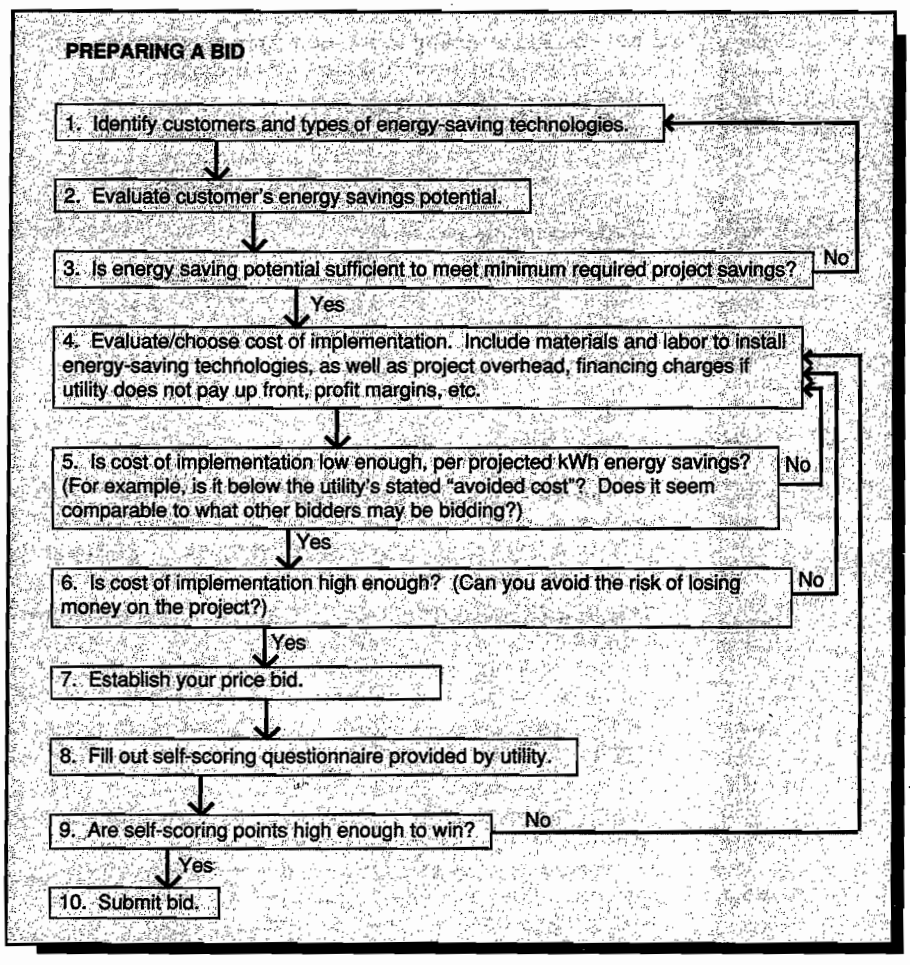
Lifetime

Technology life—how long a particular conservatio measure can be expected to last—is significant for sever reasons. Utilities want to know that electric power savin are going to last in order to recover the investment i conservation. They also prefer a long life (for example, 1 years), in order to compare DSM projects among then selves and against supply side projects (e.g., new powe plants), as well as to minimize the number of DSM co tracts they have to undertake.

Two important behavioral issues ar "snap-back" effects (for example, if homeowner turns the water heate temperature back up after it was r duced to conserve energy), and "fre riders" (customers who would hav implemented energy savings themselve anyway, but took advantage of low-cost no-cost implementation paid by th utility through the DSM contract) Documentation is sought that will eithe show that snap-back effects and fre riders are non-existent, or can be pre vented, or have been accounted for i the bid.

In order to measure the energy sa ings, the monitoring plan proposed b the bidder is of considerable interest t the utility. The Niagara Mohawk RF gave additional bid points for saving which were measured, but allowed bid ders to propose that savings be esti mated, or a combination of measure and estimated. The issue of account ability—how well energy savings can b measured and guaranteed—is still on of considerable debate for the DSM concept as a whole.

Accountability for producing mea surable energy savings is also one of the major challenges facing Weatherizatior Assistance Program grantees who ar starting to work with utilities. Histori



cally, weatherization program performance monitoring has been largely based on verifying the installation of materials by following the 60%-to-40% labor-to-materials ratio and by inspecting completed installations. Agencies may be evaluated on their actual energy savings occasionally, but currently there is very little monetary or other significant feedback to individual agencies based on savings achieved.

Systems such as targeting investment based on consumption, pre- and post-audit fuel bill analysis, and quick and easy documentation of estimated savings for a building will make it easier for utilities to implement conservation programs through existing weatherization programs. The challenge will be to increase savings accountability while not taking decision making out of the hands of skilled energy auditors and putting it into computers. Computerized energy audits should enhance the decision-making skills of energy auditors, not make decisions for them.

Financing DSM Work

Although the utility ultimately pays for DSM work, there may still be a need for a high degree of independent financing to be sought by the bidder, depending on what the bidder proposes within the framework of the utility's requirements for compensation. In the Niagara Mohawk RFP, the work will be required to be completed by October 1994, with energy savings preferred over an ensuing 15-year period. If a bidder proposed being compensated only after energy savings had been measured, the project would need to be almost entirely financed, carrying with it a high finance charge (and the challenge of borrowing a lot of money). Alternatively, the RFP accepted "front loading," or charging the utility more at the beginning of the program, but penalized such proposals through the bid point-scoring system. In order to determine the best financing arrangement for a bid proposal, a business plan with careful cash flow analysis is necessary, accounting for all project costs as well as finance charges, inflation, and start-up costs.

How to Get Involved

For the energy conservation service providers, the best way to get involved is to call utilities in the geographical area where you want to work. RFPs are often put out on short notice, without much publicity and with deadline schedules that move quickly, so secondhand information may come too late. Ask to be put on the mailing list of each utility in the region. Peter Fox-Penner of Charles River Associates in Massachusetts says, "Keep an eye out for California, especially PG&E, Idaho, Ohio, Pennsylvania, Bonneville Power Administration, Tennessee Valley Authority, the Los Angeles Department of Water and Power, and for ongoing programs, Massachusetts and Maine." Another source of information on RFPs for both demand and supply is *Current Competition* newsletter, published by Hope Robertson. (Tel: 201/996-6554). The Association of Demand-side Management Professionals (see article on p. 9) also publishes a newsletter. (Tel: 415/528-5566.)

A weatherization contractor unclear on the concept of DSM bidding...

"If elected, I promise a clean filter in every furnace, and a compact fluorescent in every fixture."

In terms of background material on DSM, a good review is provided in the proceedings to the annual DSM conference, held last in Albany, N.Y., in April 1990. Entitled "DSM Bidding: Challenges and Opportunities," the proceedings are available from Synergic Resources Corporation, 215/667-2160, for $79.95. Edison Electric Institute recently published a two-volume set on competitive bidding, entitled *Current Status and Issues and Descriptions of State and Utility Activities* (cost $100 each or $140 for both, Tel: 202/508-5000). The Electric Power Research Institute in Palo Alto, Calif., publishes (fairly expensive) technical reports on the subject. EPRI's Guide includes abstracts of these reports. (Tel: 415/855-2411.)

Another good place for background information is, again, the local utility, especially for local electric power market statistics. These numbers can be used to back up bid energy savings claims. Finally, state public service commissions may be a ready source of information, as they are often more interested in the success of DSM programs (and in many cases have mandated them) than the utilities themselves.

The magnitude of DSM energy conservation programs being undertaken by utilities across the country, in scope and in the money involved, demands the attention of all conservation professionals, since the entire field will be affected by it. Small companies and agencies need not be scared off by the technicalities of the demand-side bidding process, most of which comes quickly with bid experience or, alternatively, can be contracted out to consultants. In fact, small weatherization organizations, with all their expertise and experience, have much to offer utilities. ■