

Power Smart Home Improvements--Using the Latest in Target Marketing, Incentives and Automation to Maximize Program Performance

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The Power Smart Home Improvements program, launched in October 1990 by B.C. Hydro, attempts to maximize energy savings in British Columbia by fully developing those factors considered to be key to high program performance. Customers are targeted using sophisticated qualification methodology; this maximizes the number of installations from the homes audited to a participation level of 45%. The program's incentive system is income-blind and mobilizes customer capital, leveraging the utility's investment in order to fund most of the economically attractive work. (On average, for each dollar invested by the utility, four customer dollars are spent on retrofits.) Information system automation has been used extensively in order to minimize program administration costs, increase productivity and produce timely reporting. This paper discusses lessons learned in component areas, as well as the results of program evaluation surveys.

General Program Description

Context

In 1988, B.C. Hydro launched a series of 25 energy conservation programs for all sectors under the umbrella concept of Power Smart. In December 1988, a market research firm conducted an in-depth baseline study on attitudes and behaviours regarding electricity usage. Seven additional tracking studies had been completed by December 1991.

These studies found that British Columbia residents now pay more attention to electricity usage than they did three years ago, but there has been a slight decline in those who call themselves "strong" conservers in favour of the "moderate" self-assessment. However, improvement has been maintained among those with a "weak" conservation orientation.

With the slowdown in energy conservation behaviour among the moderate and strong conservers, the researchers suggested that communicating more specific and sophisticated Power Smart ideas might re-ignite their interest.

A 1990 survey on residential end-use of electricity in B.C. identified energy-conserving actions that the respondents were most likely to have already done. These included installing weatherstripping or caulking, using a low-flow showerhead or installing energy-efficient or low-wattage lighting.

The respondents were also asked what energy-conserving actions they had planned or would be most willing to take. The researchers state, "Perhaps the most significant in these lists ... is the amount of willingness demonstrated to participate in a home energy audit. Since this is the gateway to informing the homeowner about what can be done to conserve energy, it might be more effective for B.C. Hydro to put a major effort into providing such audits, and then in offering the services indicated by the audit as a follow-up" (Campbell Goodell 1991).

A 1991 article by John B. Robinson on the history of energy efficiency programs reinforced the idea. Robinson says, "It is important that the information be vivid, personalized, concrete and targeted to specific energy users and end uses." He also says that "information programs should be designed to operate in conjunction with other types of programs, such as incentives or standards."

Program Features

The actual planning for a residential retrofit program for B.C. Hydro's 317,800 electrically heated single family housing units (about 27% of total provincial housing stock) began in June 1989. After studying many different utility and government "weatherization" programs in both the United States and Canada, a program was launched in October 1990, with the following features:

- a controlled entry promotion strategy to carefully match the number of audit requests with audit capacity;
- a building systems approach to evaluating five major areas for possible improvements: (1) air tightness, (2) ventilation (mandatory), (3) attic, wall, foundation insulation, (4) controls/alarms (thermostats; CO monitors), and (5) windows/doors;
- a 20% grant and low-interest (5%) loan incentive, up to a total of \$5,000, repayable on the utility bill;
- "one stop shopping" for auditing, incentives and contracting;
- audits and inspections, conducted by B.C. Hydro-trained independent auditors serving specific geographic areas;
- a pool of B.C. Hydro-trained, registered contractors in each geographic area, from which the auditor selects two or three to bid on each project;
- a follow-up visit by different contractors offering to install "free and easy" energy saving devices without charge;
- a highly automated, interconnected system from field audit computers to program office databases.

Broad Program Philosophy and Goals

After reviewing other program operations and drawing heavily on staff experience in conservation contracting, B.C. Hydro developed an approach intended to evolve from a utility-sponsored program to one wholly based on the marketplace. Because of this goal, the program was designed to generate enough business profit to encourage independent auditors and renovation contractors to learn the skills necessary to deliver a quality product and satisfy utility customers. Program managers concluded that if auditors' salaries were supplemented with sales commissions based on jobs completed, and if contractors could increase their current business by eight jobs per month and maintain typical profit margins (usually 30% to 35%), then the program would create sufficient incentive for contractors to learn the necessary skills and eventually maintain a market for efficiency installations on their own.

Due to the highly competitive internal budgeting process at B.C. Hydro, and the relatively low marginal costs, all aspects of the program had to be carefully scrutinized to ensure that a quality product with real energy savings could be delivered for less than \$.05/kWh (Canadian) using the total resource cost test (TRCT). This challenge dictated a high level of automation, opening the way to increase staff productivity.

During the first full year of operation in five geographically dispersed communities (October 1990 to September 1991), installations were completed on a total of 1,400 single family homes. A similar number was targeted for the second year. Yearly production will rise to 7,600 single family homes by the year 2000. A program for multi-family units will be initiated in mid-1992 as well, with a target yet to be determined.

Evolution of Marketing

Evolving Marketing Strategies

The marketing approach has evolved through the program to test different methods and respond to new information and changing circumstances.

Need to Control Customer Entry into the Program.

Because previous research showed that a large number of people would be interested in receiving an energy audit, B.C. Hydro decided to control the entry of customers into the program. This offered two benefits. It avoided the high dropout rates and customer dissatisfaction experienced by other North American programs when there was a long waiting period between enrolment and delivery of the audit. Also, it would provide a steady stream of enrollees to keep the limited number of auditors and contractors busy but not overburdened.

Customer Selection from B.C. Hydro Data Base.

B.C. Hydro's customer database was electronically searched to identify customers with electrically heated homes, a minimum annual electricity consumption (12,000 kWh), and satisfactory payment records. This list formed the base list for enrolment.

Testing of Enrolment Approaches. Since Power Smart Home Improvements was planned to run for a minimum of ten years, marketing consultants designed a six-month experimental program to test various marketing strategies in areas across B.C. before choosing the final marketing strategy.

Different messages (financial or non-financial), enrolment methods (reply card, toll-free telephone number, telemarketing, door-to-door canvassing) and target markets (by demographic profile) were tested.

The variables included in the initial direct mail campaign are summarized in Table 1 and discussed in the next section.

Selection of Primary Marketing Approach. Analysis of the cost per contact showed that the reply card represented the most inexpensive way to contact potential clients, but that the cost per enrolment worked out almost the same for the reply card and telemarketing. Telemarketing was chosen because it had a much higher percentage of people enrolling, so that fewer people needed to be contacted to fulfil the enrolment targets.

After the six-month test, the main marketing activity consisted of a direct mail-out followed by telemarketing. The direct mail piece states that a B.C. Hydro representative will call and also gives an 800 number to call to enrol early or ask for more information. The emphasis on comfort rather than financial benefits was selected, mainly because office and field staff liked it better. (Market research showed that while financial incentives initially attracted customers to the program, comfort was the main interest of homeowners after they completed the improvements [Marktrend 1991]).

Instead of targeting neighbourhoods most likely to enrol, B.C. Hydro decided to systematically cover each area by

mailing brochures to eligible customers on a batch basis before starting another area, since all customers who qualified eventually were to receive the offer.

Progression of Marketing Efforts. As the program matures the marketing methods continue to evolve. Word-of-mouth enrolments have increased dramatically. People call the 800 number or their local B.C. Hydro office after talking to a friend, neighbour or relative who has participated in the program. Word-of-mouth enrolments provide the highest percentage of renovations sold per audit conducted (51%).

Contractors registered in the Power Smart Home Improvements program receive a slightly modified version of the direct mail piece which they can distribute. The contractors talk to interested people in their places of business or by soliciting customers door-to-door. At first, many contractor leads were soft, but after sales training, contractor leads improved. Now the contractor leads have the second best percentage of renovations sold per audit (44%).

Other marketing venues have also been tested, including newspaper advertising, posters and mall shows. Results have been inconclusive. In addition, auditors and B.C. Hydro marketing representatives make presentations to residents of single-family townhouses, both in cooperative housing groups and individually owned residences, in hopes of enrolling a large number of eligible customers from one complex. Preliminary results indicate that the presentations are leading to enrolments, but it is too early to determine the potential uptake of the approach.

Table 1. Direct Mail Campaign Test Variables

<u>City</u>	<u>Comm. Strategy</u>	<u>Follow-Up</u>	<u>Targeting</u>
Nanaimo	financial benefits	door-to-door	general
Richmond	financial benefits	telemarketing	general
Surrey	financial benefits	telemarketing	general
Langley	non-financial benefits	telemarketing	general
Tsawwassen	non-financial benefits	telemarketing	high probable uptake
Vernon	financial benefits	reply card	general
Prince George	non-financial benefits	800 #	general

Currently telemarketing is used to fill enrolment quotas that are not provided by word-of-mouth, contractors or other means. Telemarketing is also used extensively when introducing the program in a new area. Currently telemarketing has the lowest percentage of renovations sold per audit (25%). Part of the reason for this is that some of the auditors do not pursue their telemarketing leads with the same vigour as the word-of-mouth and contractor leads. However, other auditors turn half of their telemarketing leads into jobs.

In addition to responding to rising customer interest, the auditors have become more adept at signing up customers for renovations after the audit is completed. The average number of renovations sold per audit has risen from 12% to 45% between February 1991 and March 1992.

A summary of some Power Smart Home Improvements marketing statistics is included in Table 2.

Marketing After Exhausting Direct Mail Leads. After all identified eligible customers in an area have been sent a brochure, the level of marketing activity depends on the auditor's need for clients.

Some activities which may be tried are newspaper ads and news releases in local media about happy customers and contractors. Depending on the response, more advertisements may be placed. Eventually, a second round of mail-outs is planned. The second round will most likely have a lower response rate but will attract homeowners who moved into an area after the first mailing and those who did not participate originally but are now ready to do so.

Results from Surveys of Customers, Auditors and Contractors

Customers

A market research firm surveyed B.C. Hydro customers who had been exposed to the Home Improvements program to evaluate the level of satisfaction with the program and the effectiveness of the marketing plan.

Classification of Respondents. Survey respondents were divided into three categories:

- Non-responders - people who received the brochure but never responded;
- Dropouts - people who dropped out after being audited:
 - Stage One Drop-outs - people who were audited and then dropped out of the program;
 - Stage Two Drop-outs - people who were audited, received bids from contractors and then dropped out of the program;
- Participants - people who were audited and received a grant and loan to install the recommended renovations.

Table 2. Marketing Statistics for July - December 1991

	<u>Telemarketing</u>	<u>Word of Mouth</u>	<u>Contractor</u>
# of contacts	675	1122	218
# of audits	411	799	168
# of renovations sold	103	408	74
% of renovations sold/contact	25%	51%	44%
% of audits/contact	61%	71%	77%
% of renovations sold/enrollment	15%	36%	34%

Results. Customers' evaluations of Power Smart Home Improvements were favourable in all respects including the clarity of program information, the loan/grant offer, the results of the audit, contractor bids and the quality of the renovation work.

Overall satisfaction ratings among both the participants and the dropouts were high, as shown in Table 3.

One out of two non-responders did not participate in the program because they saw no need for improvements to a home that they perceived to be energy-efficient by virtue of being new or recently renovated. Virtually all the rest said they still intended to request an audit (but never did) or said they were undecided.

The major reasons the dropouts left the program after the audit were either that too little work was required to justify a contractor, or they were unable or unwilling to afford the costs of making the recommended improvements. Stage two dropouts indicated disappointment at having to drop out of the program after receiving the bids. Most said they could not afford to have the work done. They reported less satisfaction with their experience.

Non-responders and dropouts were more likely than participants to have previously upgraded the energy efficiency of their home. This suggests that the program may be attracting a segment of homeowners who would not have initiated energy-efficient renovations without program support. The program appears to be reaching beyond "early-adopters" to those less inclined to undertake energy efficient renovations on their own.

Table 4 summarizes the reasons for initial interest in Power Smart Home Improvements.

Participants were first attracted to the program by the prospect of saving money (32%) rather than making their homes more comfortable (16%). However, after participating in the program, they considered the added comfort of an energy-efficient home the most important benefit (41%), higher than cost savings implied by lower energy consumption (25%). We consider this a significant attitudinal change.

Table 5 summarizes the respondents' opinions on the most and least important benefits.

After having the energy audit, 46% of the dropouts said they did at least some of the work recommended by the auditor on their own. This implies that "do-it-yourselfers" enter the program mainly for the home energy audit to identify areas that need work, and then take the results and do the work themselves. In many ways, this is a benefit to the utility, since much of the recommended work gets done and savings are realized at a limited cost to the utility.

Although participants appeared to be cost-conscious to some extent, three-quarters of the contractors were chosen on the basis of their professional manner rather than the lowest bid.

Content recall questioning indicated that customers remembered more after reading the brochure with the financial emphasis than the one with the comfort emphasis. When more brochures were needed, the version emphasizing the financial message was reprinted.

Table 3. Satisfaction with the Home Improvements Program

	Participants %	Dropouts	
		Stage One %	Stage Two %
Very satisfied	69	56	34
Somewhat satisfied	28	30	38
Somewhat dissatisfied	0	10	20
Very dissatisfied	0	1	8
Don't know	2	3	0

Table 4. Main Reasons for Initial Interest in the Home Improvements Program

	Dropouts		Participants %
	Stage One %	Stage Two %	
To save money/electricity bill too high	30	40	32
To conserve energy/electricity/make home more energy-efficient	29	24	15
Received phone call from solicitor	13	9	5
Financial incentive/grant and loan	4	8	20
Home was too cold/to make home more comfortable	4	9	16
Curious about what needed upgrading/attention/more energy-efficient	8	9	*
Needed thermal glazed windows	2	1	12
Needed/wanted to upgrade insulation	2	2	19
Upgrading/completing house			11

Table 5. Importance of Program Benefits

	% saying most important			% saying least important		
	Non-Responders	Drop-outs	Participants	Non-Responders	Drop-outs	Participants
Saves money	47	41	25	6	6	10
Added comfort	16	19	41	14	12	9
Free home energy audit	10	19	3	25	22	55
Other	2	4	3	*	3	*
Don't know/not sure	9	4	2	27	26	13

Auditor and Contractor Surveys

Auditors and contractors were surveyed to obtain suggestions on how to improve the program and to identify any existing or developing problems. The survey results were sent to the program managers who acted upon the information. This pleased both the auditors and the contractors.

Lessons Learned--Marketing

1. The controlled entry of customers makes the program more manageable.
2. It is important to have accurate information in the customer data base and to have an accurate method of selecting eligible customers. Because of inaccuracies in the home heating codes and misjudgment of the minimum electricity consumption needed to identify an electrically heated home, an average of 40% of customers identified as being eligible for the program have in fact not been qualified. (Most heat with natural gas.) This resulted in a substantial amount of marketing money being spent unnecessarily.

Steps have been taken to reduce the number of unqualified customers included in the marketing targets. A potential customer is now identified using the differential between the home's seasonal minimum and maximum energy consumption, and the use of natural gas as shown in company records.

3. Direct mail followed by telemarketing is a good method to use during start-up to enrol customers for new areas. However, the telemarketers must be selective in their enrolments. To limit soft leads, the Power Smart Home Improvements telemarketers are paid an hourly rate instead of by the number of leads.
4. It is important to develop non-advertising methods of enrolment as soon as possible.
5. Customers recall more about the program when a financial emphasis, rather than a comfort emphasis, is used in advertising the program.
6. Later in-home interviews confirmed that 20% of people audited reported that, in addition to work performed by contractors, they did some or all of the recommended work on their own without incentives. The measures which were installed by the largest number of people include draftproofing, insulation and windows.

Response to Loans

While many other utility programs have dropped or de-emphasized loan programs in favour of rebate or 100% direct installation programs, B.C. Hydro adopted a primarily loan-based program with a small grant as an incentive for larger investments on the part of the homeowner.

Selection of a Grant/Loan Package as the Primary Incentive

At the time B.C. Hydro decided to initiate this program, a neighbouring B.C. utility already had a similar loan program in place, and B.C. Hydro felt that it should not have a significantly lower incentive. In addition, B.C. Hydro uses loans for many of its other programs and had successfully run a residential insulation loan program in the late 1970s and early 1980s.

A primary program objective is to transfer this program to the private marketplace eventually. To encourage this, B.C. Hydro attempts to create a "joint venture" with customers, making use of their purchasing power, and directing renovation investments that would probably be made anyway into areas that will increase energy efficiency.

Although B.C. Hydro had considered arranging with banks to carry the loans, it was able to finance the loans itself at less cost and inconvenience to customers.

B.C. Hydro uses the Least Cost Resource Test (LCRT) to evaluate the economic viability of each Power Smart program. The Home Improvements program presents some challenges in that some of the individual measures that make up the systems approach to the home have marginal economic viability. Ventilation systems are expensive and produce no energy savings. Windows are also pricey and determining the marginal cost can be difficult.

B.C. Hydro's long run marginal cost of new electricity supply is 6.4¢/kWh, and it has a number of large scale hydroelectric projects to be developed. This makes the Least Cost Resource Test a severe one for any demand side management program. At 3.4¢/kWh, the Home Improvements program is more expensive than many industrial and commercial programs, but it does successfully pass the test.

Setting up the Loan

Auditors explain the incentive package as part of their visit to the house. The chosen contractor works with the customer to fill out the loan agreement and explains the repayment arrangement. Once the job has received its final inspection and customer sign-off, the contractor is paid and the amount of the loan is sent to B.C. Hydro Customer Accounts for collection.

Loan procedures that had been worked out during the 1978-83 loan program were easily adapted by accounting staff. B.C. Hydro bills most of its customers on a bimonthly basis, so loan customers receive one payment notice as part of their normal utility bill and a separate bill on alternate months. The typical monthly payment on a \$4000, five-year loan at 5% interest is \$75 Canadian. Loans must be repaid in full should the house be sold prior to the end of the loan period. With this approach, loan processing and billing is estimated to cost \$7 per \$1000 loaned.

Over the past 10 years of providing loans for other customer programs, B.C. Hydro has experienced a default rate of less than 0.1%.

Loans Initiated and Installations Completed

Loans completed to April 30, 1992, totalled \$4.64 million, while total grants amounted to \$1.25 million. The average project total cost was \$3,800, with a range of project total costs from \$2,000 to \$34,000. (Customers make separate arrangements with contractors for any amount exceeding \$5000.) Telemarketers made 27,000 calls, leading to 4253 audits and 1555 completed energy efficiency installations.

Lessons Learned--Grants and Loans

1. A small grant in combination with an easy to obtain, low-interest loan can mobilize significant amounts of customer-supplied capital to upgrade the energy efficiency (and general condition) of residential housing.
2. As was the case in past B.C. Hydro programs, the Power Smart Home Improvements automated information system makes it possible to process loans with relatively little staff time and bureaucracy.

3. A market research company examined the possibility of reducing the amount of the grant and raising the amount of the loan. They tested the price sensitivity of the grant/loan ratio among people who had participated and people who had never heard about Power Smart Home Improvements. The researchers concluded, "The participation rate ... would be significantly reduced if the grant were lowered ..., even with an increased maximum loan" (Brenda Farrell 1991).
4. While there is a significant segment of customers who are unwilling to take out loans because they cannot afford the added monthly payments or they do not like to borrow at all, it appears that most customers who seriously intend to do home renovations are quite willing to take out loans. They have often demonstrated willingness to undertake renovations in excess of the loan/grant maximum to get the improvements they desire. At present the program has enrolled less than 1% of the total target population.

Automated Information System

A sophisticated information system maintains up-to-date records for quick financial reporting, program management and maintenance of easy communication between auditors in geographically dispersed locations. Figure 1 outlines the flow of information.

Information Flow

Customer Selection. As described in earlier sections, customers are selected based on usage from B.C. Hydro's mainframe. Selected customers receive direct mail with telemarketing follow-up. All of this activity is tracked by the automated information system.

Once a customer agrees to have an audit, enrolment is noted on B.C. Hydro's mainframe computer to take advantage of the province-wide telecommunications network and to capture the most recent year's electricity consumption.

Auditor Selection. Prospective clients are passed to the program administration database. There, they are assigned to an available auditor and transmitted to the auditor's office computer, also known as the base station.

Audit. On arrival at the auditor's base station, the prospect is placed in the "to be called" queue. The auditor will call the prospect, verify program eligibility requirements,

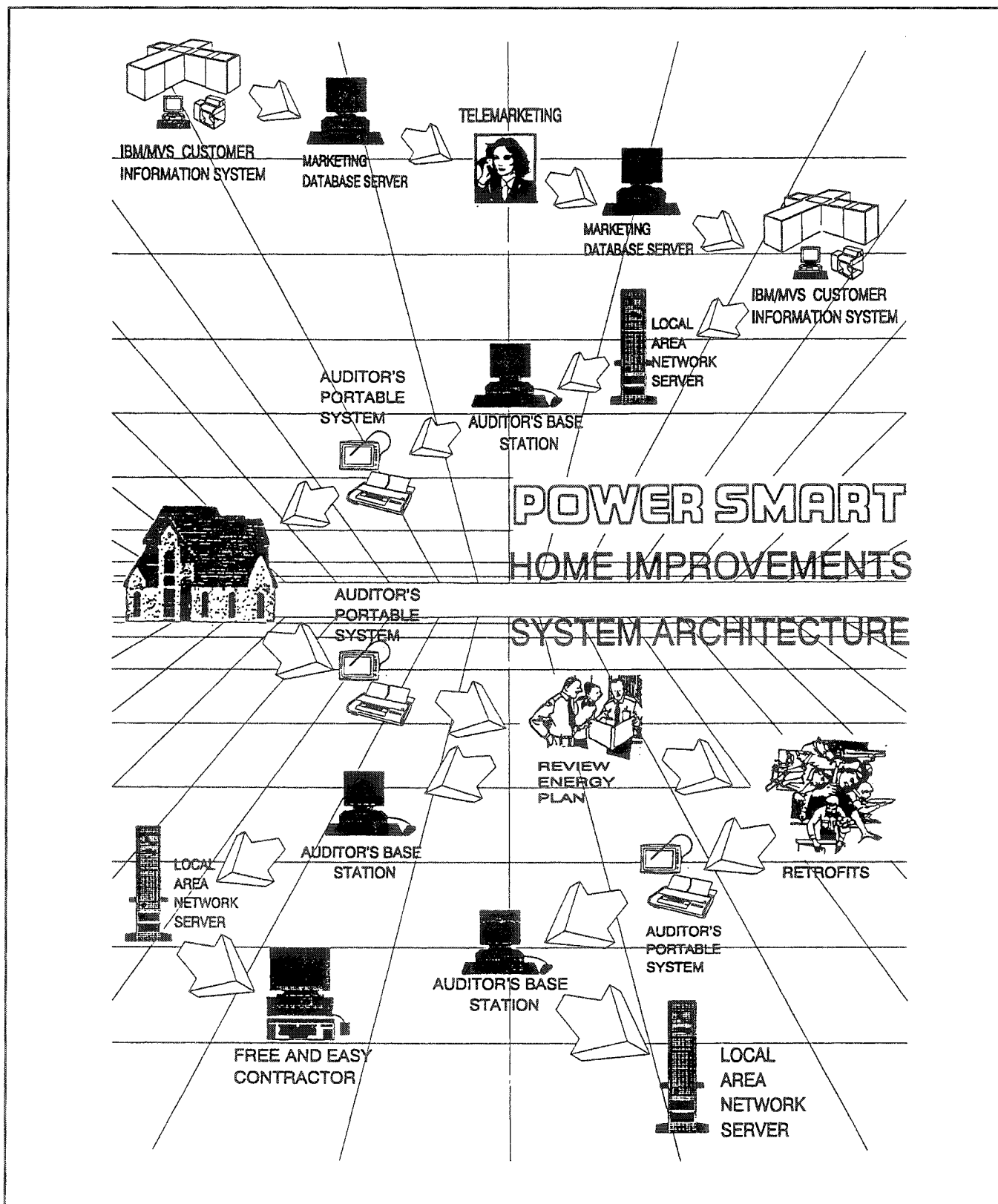


Figure 1. Information Flow

verify interest in the program, and make an appointment to perform an energy audit.

The evening before the scheduled appointment, the next day's audits and inspections are transferred from the base station to the auditor's pen-based portable computer. Data is entered with a tethered pen instead of a keyboard, making the system easier to use and more intuitive. All information on the dwelling and its occupants are uploaded.

At the house, the auditor and the homeowner walk around together, and the auditor discusses his or her observations with the homeowner. At the end of the walk, the auditor spends a few minutes summarizing the observations and recommendations on the portable computer. Once completed, they are printed for the homeowner. The homeowner and the auditor discuss the "energy plan" and the work (if any) that could be done to make the home more comfortable and energy efficient.

The main reason that a pen-based computer was selected for use as the portable was to enable the auditors to carry the computer with them during the walk and print the report immediately. This proved to be possible but unpopular among the auditors for several reasons.

First, the computers are perceived as a high value item and the auditors were worried about dropping, losing or damaging them. Second, auditors felt they needed both their hands to open windows, examine surfaces, etc., which would involve constantly putting the computer down and lifting it up again.

Third, and most important, during the visit, auditors spend time in building rapport with the homeowners. They point things out, they demonstrate and they educate. If their heads are down and their minds occupied in operating a computer, their relationship with the homeowners is much less personal. All the auditors feel that creating and maintaining the relationship with the customer is one of the key reasons for the high enrolment of the program and should not be sacrificed to automated efficiency.

In view of this field experience, the audit is being redesigned to improve the efficiency of data entry and the quality of output. The concept of carrying the computer around the house has been abandoned until there is a new generation of smaller and lighter computers. When a "strap-on" or "belt clip-on" model is available, the viability of this "carry around" concept will be re-tested.

Contracting. The homeowner can choose one or more approved contractors to bid on the retrofit, the portable

computer can be used to suggest two or three contractors at random, or the auditor can select up to three based on personal preference.

The homeowner contracts directly with the contractor. When the homeowner signs a contract, the contractor sends it via facsimile to the auditor. If there is anything unusual about it, the auditor reviews it with the contractor before any work begins. When the work is completed, the contractor asks the homeowner to sign the completion portion of the contract. The contract is then transmitted to the auditor and to the program office.

This process of preparing bids and preparing and transmitting contracts is the next area to be automated.

Inspection. When the retrofit has been completed, the contractor contacts the auditor, who schedules an inspection visit with the homeowner. The evening before the inspection, the customer information is transferred to the computer, including the audit information, so that the auditor has the complete history of the customer for the inspection.

At the home, the auditor inspects the work with the homeowner to verify that it was properly completed and the recommended priorities were observed. Assuming no faults are found and that the homeowner is satisfied, the auditor marks the job for funds release on the portable computer, authorizing payment to the contractor. Customer data is then returned to the program office.

Hardware

Host System. B.C. Hydro uses several mainframe computers to maintain its billing and customer data. The regional offices are on line to this system via dedicated telephone or private microwave circuits.

In the future, the system will allow regional B.C. Hydro offices to query the program office database using their mainframe terminals.

Auditor's Base System. At their offices, the auditors have a personal computer with 2 MB of main memory and a 60 MB hard disk. The office machine (or base station) is used to hold all of the active customer data for the auditor and also to handle communications with the program office. An out-board fax capability allows direct receipt, sending and printing of faxes.

Auditor's Portable Computer. Each auditor is also equipped with a battery-powered, pen-based computer and

printer. The printer uses ink jet technology to print high quality output on plain paper.

Each evening, the auditors connect their portable computer to their base station via a communications cable, and software moves data on all clients that are to be audited or inspected the following day to the portable computer. In the clients' homes, the computers are used to record audit and inspection results and to print reports.

When the auditors return from the field, they re-connect their computers, the day's activity is moved to the base station and the next day's clients are moved to the portable computer to re-start the cycle.

Head Office Database. The program database resides on a large personal computer. This machine provides data storage and runs most of the reports for the program. It also acts as the main server for the local area network that ties the program office computers together.

Day-to-Day Information Needs

Management Information Reporting. Program activity and results are reported regularly to senior management using Key Performance Indicators (KPIs). This is summary data that readily allows utility executives to assess the health and vitality of the program by reviewing a few key indicators. KPI data consist of items such as kWh saved by area and economic benefits by area.

Also, senior management often demand special analyses and summaries to respond to inquiries from the board, the government, the regulators, or the public.

Because of the intensive automation, all program data is available for quick retrieval. Typically, fast answers are of great advantage when strategic questions such as the impacts of budget changes are being considered. For example, careful analysis of a "short term" slowdown request showed that the program would have stopped in some communities. In these communities, the infrastructure that supports the program, such as skilled trades, would have been lost. Thus, the future targets would have been jeopardized, since the needed resources would have dispersed and would be resistant to return to a cyclical employer. This information was relayed to senior management, who decided to cancel the cutback in view of the risks.

Program Operation Information. The day-to-day operation of the program requires a much finer level of

detail than that supplied to senior management. One example is the sales reporting process.

One of the main concerns of the field manager is the sales (retrofits) volume of the program. Weekly program activity is summarized by auditor, giving the number of calls, audits, contracts, completions and inspections. The activity is also given in ratio form. For example, the audits/completions ratio is closely tracked from week to week and over the program to date.

When the program began, program managers felt that completing retrofits on 25% of audits would indicate success, and that 33% would be a high goal. Currently, the program is running at 45%, probably unique among programs where the customer pays for 80% of the retrofit (Vories 1989, Berry 1990), and close to the 50% rates achieved by some of the most successful "Energy Fitness" programs that provide free measures.

The sales statistics also help in monitoring the auditors to ensure that they meet their minimum goals and to administer the performance bonus program. (There is a bonus to the auditor of \$50 for each "sign-up".)

Future Evaluation Design

The first year of program operation is almost complete, and design of the evaluation approach is underway.

To monitor the actual energy savings contributed by the Home Improvements program, a control group of 5,000 homes is being drawn at random from the areas in which the program is active. Before inclusion in the control group, each household will be checked to make sure it is not a participant in the program. The energy use of the control group will be monitored, and this will be considered the "untreated" consumption level.

The consumption of the control group and the program participants will be compared statistically, using the standard heating/cooling load calculation software. The net annual consumption for both groups will be compared, as well as the year-to-year trend in the net annual consumption for both groups.

In any statistical comparison, a few observations at the extremes of the distribution can have undue influence. To avoid this, the most extreme outliers may be examined individually to see why their consumption is so far from the norm. Depending on the circumstances, abnormal outliers may be dropped, yielding a trimmed sample for comparison.

Lessons Learned--Information System

Following are some of the unexpected observations made during the first few months' operation of the information system.

1. The high hopes that auditors would instantly input audit data on the portable computer so that results could be printed without additional input were not realized, due to the psychology of the sale as described above.
2. Auditors seemed to prefer the familiar--a telephone or a handwritten note sent via facsimile--to the use of E-mail.
3. An initial target of the program was to create an environment as paper-free as possible. However, continuing requests for written reports have been received from both the auditors and B.C. Hydro's head office. People are still more comfortable with hard copy.
4. Automating as much of the program as possible resulted in a very high ratio of computers to people (1.8 computers/person). Savings and efficiencies appeared to justify this, although in retrospect the forecasts of administration savings due to automation were too timid. During the short life of our program, it has gone through two senior management changes and one change of provincial government. The level of automation has enabled the program to respond to changing directives from senior management and from the government much faster and more effectively than other programs that are less automated.

Conclusions

All in all, program management is very pleased with the performance of the program to date. Both installation

completions and the effectiveness of the automated information approach have exceeded expectations. It is believed that a primary reason for this has been the quick status reporting of the program, which allows for immediate identification of problem areas so that the management team, working closely with auditors and contractors, can address them quickly and ensure that program performance is not affected for long. Quick and effective management action leads to high morale and dedication to improving performance on the part of all participants.

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