# Detecting Behavioral Change from a Visit to a Children's Museum Energy Conservation Exhibit

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## ABSTRACT

How often have you heard someone in the energy efficiency industry say something like, "If we can just get children to be more energy conscious we will have accomplished a lot for the future?"

In 1998, Wisconsin Electric stopped wishing and developed a child-friendly museum exhibit for children's and science museums in their service territory. The exhibit is colorful, fun, and full of interactive activities that teach low-cost and no-cost concepts such as turning off energy-using equipment and closing doors and drapes. The challenge for the evaluation team was to see if the exhibit changed children's behaviors.

The major problem with educational and information efforts is that it is difficult to see measurable energy savings: The potential reduction in energy use associated with the promoted actions is small and it can be difficult to identify large samples of people who received the information. Fortunately, educational strategies typically promote a number of small steps that lead to measurable savings. The program logic model offered a means to identify the small steps and develop a framework for measuring whether the exhibit had an influence on children's energy-using behavior.

The program logic model has evolved as a key tool for evaluation of social service programs. The museum exhibit project was among the first energy programs to use a logic model for evaluation. We found the logic model valuable for structuring the evaluation and effective as a tool for assessing program progress.

## Introduction

In 1998, Wisconsin Electric (WE) designed and built an exhibit for display in children's museums, called the Energy Detectives Clubhouse Museum Exhibit. Through a fun detective game, children learn to think about energy use. The exhibit teaches children that people waste energy without realizing it and that there are simple things we all can do to use energy wisely in the home. WE plans for the exhibit to travel to children's museums throughout its service territory.

WE worked with educators and children's museum staff to design the exhibit. Table 1 identifies the behaviors highlighted by the Energy Detectives Clubhouse Exhibit. The exhibit targets children ages 8 to 12 and their parents, yet younger children can participate in the exhibit with adult assistance.

**Table 1. Behaviors Targeted by the Energy Detectives Clubhouse Exhibit**

| TYPES OF ACTIONS | CHILDREN | PARENTS |
|---|---|---|
| **Turn off** | Radio; TV; Computer; Lights; Printer; VCR; Faucets | Same |
| **Close** | Window shades & drapes; Windows when using A/C; Refrigerator door | Same, plus: Fireplace glass door; Oven door while baking |
| **Do** | Set room temperature 80F in summer 68F in winter; Wear warm clothes and sweaters indoors during cold weather; Do full loads of laundry; Put clean clothes away | Same, plus: Repair faucets; Plant shade trees; Purchase energy efficient appliances; Change furnace filter; Insulate hot water pipes; Clean dryer lint filter; Set refrigerator temperature 36-42F; Defrost freezer; Size pan to stove surface; Clean dehumidifier coils |
| **Use** | Microwave instead of stove | Same, plus: Motion sensors; CFLs; Clothesline |

The exhibit has several components. A Clubhouse 26.5 feet by 29.25 feet and standing 9 to 9.5 feet tall forms the core of the exhibit. The Clubhouse is organized like a five-room house with a bedroom, bathroom, kitchen, living room, basement, and exterior area. To catch the eye and make the exhibit appear inviting and playful, the Clubhouse is painted with bright colors and uses a variety of angles and shapes. Friendly looking, three-dimensional models of family members are located throughout.

For each room in the Clubhouse, the viewer needs to "detect" who is wasting energy. Each room contains models of typical household components that relate to energy use. Modeled in the Clubhouse are: computer and printer, radio on a dresser, vanity lights, shower and toilet, refrigerator, stove, microwave, TV, VCR, room AC, thermostat, floor lamps, windows, window shades, fireplace, furnace, washer, dehumidifier, and hot water heater. Signs alongside the various features describe how members of the household use them. The signs provide the clues to detect who is wasting energy. For example, the TV screen shows the clue *"Dad kept the TV on when he left the room"* and the washing machine sign reads *"Grandma didn't run a full load of laundry."* Many of the written clues are found by opening drawers, sliding panels, or noticing something a little out of place. Some clues emerge after being triggered by a sensor. These features make the exhibit interactive and fun to play in.

The Fox Cities Children's Museum, in Appleton, Wisconsin, displayed the exhibit in a four-month run ending April 1999. Attendance at Fox Cities Children's Museum from January 22 to April 28, 1999, the period for which museum staff was able to provide data, was 20,748. WE next displayed the exhibit from May 15 to June 27, 1999 at the Betty Brinn

Children's Museum in Milwaukee. Museum attendance during this period was 12,504 people.[1]

Following the first venue (at Fox Cities Children's Museum) evaluation and on-going discussions with museum staff by WE, WE and the Betty Brinn Children's Museum staff made enhancements to the exhibit for its showing at Betty Brinn. The enhancements suggested additional activities for children to do in the Clubhouse. These activities were designed to be of interest to younger children who are less likely to understand the detective game and to engage all children attending the exhibit for a longer time. Examples of the enhancements included: Pots and pans of different sizes in kitchen with a sign saying *"Can you match each pot to the right size burner?"*; a towel rack and towels in the bathroom with a sign saying *"Hanging up your towels saves energy by keeping them cleaner longer"*; and books about energy placed in the living room along side a sofa with a sign saying *"Read about energy. Share a story with a younger visitor."*

The exhibit also includes an invitation for children to join the Energy Detectives Club and become an Energy Detective. Under Plexiglas cover affixed to the side of a model mailbox, WE displayed all the Club materials accompanied by a sign *"Join the Energy Detectives Club and receive the following."* Children completing a post card and posting it in the model mailbox receive a membership badge and an activity workbook. The activity workbook provides members with continued education about energy. As children complete sections A, B, and C of the workbook and return the associated activity cards, they receive stickers, culminating in a certificate that pronounces them an Energy Detective. Club registration provides WE with a means to identify children who have visited and engaged in the exhibit, which is necessary for program evaluation.

## Evaluation Approach

The evaluation began in January 1999 with the objective of helping WE to build on its first exhibition experience and testing any enhancements to the second showing. The evaluation assessed the success of the exhibit relative to WE's goals for it. This assessment included an appraisal of the response to the exhibit by museum staff, teachers, parents and children and a determination of whether children's energy-using behavior was affected by their visit to the Energy Detectives Clubhouse Exhibit

To design the evaluation, we worked with WE staff to develop a program logic model (United Way of America, 1996). A program logic model is an orderly way of organizing the various program components to ensure that they are directly associated with measurable outputs and outcomes. The program logic model was developed during a half-day workshop with WE program and evaluation staff and evaluation consultants. We then iterated revisions to the model using electronic mail to ensure it was consistent with the program team's vision.

We identified four inputs to the exhibit: the five-room clubhouse, advertising by the museums, the "more information sign" used to interest children in joining the Energy

[1] Additional venues for the exhibit include: U.P. Intermediate School District (Iron Mountain, MI), October 1999; U.P. Children's Museum (Marquette, MI), November 1999 to February 2000; Wisconsin Electric Energy Center (Manitowoc, WI), April-May, 2000; and the Imaginarium Children's Museum (Racine, WI), March, 2001.

Detectives Club, and the Club workbook, stickers and certificates. For each of these inputs we identified the associated activities, the expected outputs, early outcomes, middle outcomes, later outcomes, and long-term impacts. Table 2 displays the entries for two of the inputs—the exhibit and the "more information sign" used to interest children in joining the Energy Detectives Club. Long-term impacts were not measured by this study and so are not included in the table. The long-term impact for each input was "energy savings," or "customer loyalty," or both.

**Table 2. Portion of Logic Model for the Energy Detectives Clubhouse Exhibit**

| INPUTS | ACTIVITIES | OUTPUTS | EARLY OUTCOMES | MIDDLE OUTCOMES | LATER OUTCOMES |
|---|---|---|---|---|---|
| **Exhibit** | • Clue revealing action<br>• Determination and vote for "who is wasting energy" | • Visitors to museum<br>• Number of school groups<br>• Satisfaction of children and parents<br>• Unsolicited comments about exhibit<br>• Good feelings about WE and exhibit<br>• WE cares about children<br>• WE spends money wisely | • Classroom activities<br>• Questions to parents about energy usage | • Children energy usage behavior changes<br>• Children remind parents of energy actions | • Teachers want additional resources<br>• Other museums pick-up exhibit<br>• Other museums contract to build exhibit<br>• Children aware of choice in energy-using behavior |
| **"More Information" Sign in Exhibit** | • Send in card to request booklet | • Number of cards received<br>• Number of booklets, membership cards, letter mailed | • Questions to parents about energy usage | • Children energy usage behavior changes<br>• Children remind parents of energy actions | • Children aware of choice energy-using behavior |

After the evaluation of staff and viewer's response to the exhibit following its first showing at Fox Cities, a number of enhancements were made to improve the learning experience for all children, especially the younger ones. Although we did not revisit the logic model at this time, an additional hypothesis emerged that there would be a better response by children visiting the exhibit at its second venue compared with its first venue.

To conduct the evaluation, we interviewed five museum staff members at each of the museums involved in the first and second venues. These interviews were conducted close to the end of the exhibit run in order to fully capture staff perceptions of the exhibit. The first venue occurred early in the school year enabling us to also interview seven teachers who brought classes to the exhibit. The second venue occurred during the last month of school, so summer vacation precluded teacher interviews.

Using the list of names of children who sent in post cards requesting a copy of the Energy Detectives Club booklet, we identified a population of children who had visited and engaged with the exhibit. This list was critical both to identify names and phone numbers and because some visitors to the museum might not have actually explored the exhibit. The comparison group was developed from a purchased sample of households with children in the targeted age range in the zip code areas surrounding the museum. Households were asked whether the children had visited the museum during the time when the exhibit was on display. Those children who had visited the museum were asked the participant questions, while those who had not were asked the questions for nonparticipants.

In May, we conducted a phone survey of the 64 children who had viewed the exhibit at the first venue (Fox Cities) and a comparison group of 58 children from the surrounding area. In late August and early September, we surveyed 56 children who had viewed the exhibit at second venue (Betty Brinn) and a comparison group of 54 children from the surrounding area. Table 3 summarizes the data collection effort for the two locations.

**Table 3. Summary of Data Collection Effort**

| DATA COLLECTION DESCRIPTORS | FOX CITIES | BETTY BRINN | TOTAL |
|---|---|---|---|
| **Exhibit Period** | Jan - Apr 1999 | May 15 - Jun 27, 1999 | |
| **Evaluation Period** | May 1999 | Aug - Sep 1999 | |
| | ***Interviews*** | | |
| **Museum Staff** | 5 | 5 | 10 |
| **Teachers Who Saw Exhibit** | 7 | None | 7 |
| ***Parents and Children:*** | | | |
| **Children Who Saw Exhibit and Joined Club** | 56 | 50 | 106 |
| **Children Who Saw Exhibit but Did Not Join Club** | 8 | 6 | 14 |
| **Children Who Did Not See Exhibit** | 58 | 54 | 112 |

We designed the survey to first obtain parents' assessments of their children's behaviors and to learn about the types of questions children asked their parents about energy. Then we asked the children some brief questions about their behaviors and, for those who had seen the exhibit, their assessment of the exhibit and workbook.

The survey proved somewhat challenging to administer. Early in the interview process, a parent expressed discomfort at our request to interview her child. In response to this complaint, we modified our approach and told parents that they were welcome to stay on the line while their child was being interviewed. This solution worked very well. Cooperation in the survey was high and no additional complaints were received.

## Evaluation Findings

In developing the logic model, we identified a number of quantitative outputs that could be used to measure response to the Energy Detectives Clubhouse Exhibit. Table 4 provides a listing of the outputs and the associated values of these outputs for the first two venues: Fox Cities and Betty Brinn.

**Table 4. Quantitative Outputs for the Energy Detectives Clubhouse Exhibit**

| OUTPUTS | MEASURE OF OUTPUT | |
|---|---|---|
| | **Fox Cities Experience** | **Betty Brinn Experience** |
| **Number of Visitors** | 20,748 (4 months) | 12,504 (6 weeks) |
| **Number of School Groups** | 67 | 100 groups (3,000 children) |
| **Number of Postcards Received** | 261 | 338 |
| **Number of Booklets, Membership Cards, Letters Mailed** | 261 | 338 |
| **Number of A Cards Received** | 22 | 33 |
| **Number of B Cards Received** | 7 | 15 |
| **Number of C Cards Received** | 4 | 16 |
| **Number of Certificates Awarded** | 4 | 16 |
| **Number of Advertisements Placed** | Advertised in parenting magazines. In museum member newsletter. Sent flyers to teachers in region's elementary schools and packs of flyers to 2nd and 3rd grade teachers in Appleton for their students to take home. | Press release to 130 media sources. Description included in "huge summer guide" published by CNI newspapers—several thousand subscribers plus free distribution. In museum member newsletter. WE publicized to its customers and employees in *re.source*. |

More than 33,000 children and adults visited the museum during the time the exhibit was on display at the two children's museums, including 167 school groups. Given the location of the exhibit in each museum, it is reasonable to believe that most of these visitors at least saw the exhibit. Nearly 600 children submitted a card to join the Energy Detectives Club and thus were known to actually have visited and engaged with the exhibit. Both museums advertised the exhibit to elementary school children and elementary school educators.

Of surveyed participants, over 80% reported using the Club workbooks (see Table 5). This suggests that most children who received a workbook actually used it, although only 55 children of the children joining the Club returned cards to WE. As of September 1999, 20 children had returned all three cards and received Energy Detectives Club Certificates.

Through the exhibit, WE hoped to influence the energy-use behaviors of children ages 5-12; the primary target was children ages 8-12. WE achieved its objectives. This outcome was measured by considering the frequency with which parents reported that their children "always" or "usually" engaged in each of the ten energy-saving behaviors directly promoted by the exhibit. These behaviors included such things as closing the refrigerator door, closing the front door, and putting clean clothes away so that they don't get mixed up with dirty clothes.

Surveyed children who saw the enhanced exhibit at Betty Brinn showed a significantly higher rate of energy-saving behaviors than nonparticipants (see Table 5). According to parental reports, Betty Brinn participants engaged in each of the ten targeted energy-use behaviors 70% of the time, compared with 60% for nonparticipants.

**Table 5. Frequency of "Always" or "Usually" Engaging in Each of the Ten Energy-Saving Behaviors**

| GROUP | PARTICIPANTS | | NON-PARTICIPANTS | | $X^2$ |
|---|---|---|---|---|---|
| | Percent | n | Percent | n | |
| **All Betty Brinn Children** | 70% | 56 | 60% | 54 | .001 |
| **Older Fox Cities Children (8 To 11)** | 70% | 27 | 62% | 49 | .07 |
| **Younger Fox Cities Children (5 to 7)** | 63% | 37 | 73% | 9 | .06 |
| **Boys**[1] | 70% | 24 | 57% | 48 | .001 |
| **Girls**[2] | 70% | 59 | 66% | 55 | .18 |

Note: Chi-squared is Fisher's Exact Test (two-sided).
1. Includes all Betty Brinn boys and older Fox Cities boys.
2. Includes all Betty Brinn girls and older Fox Cities girls.

A similar behavior change was observed in the older children (8 to 11) who saw the exhibit at Fox Cities. Parents reported their participating children "always" or "usually" engaged in each of the ten targeted energy-use behaviors 70% of the time, compared with 62% for nonparticipants. (This difference approached statistical significance.) Younger Fox Cities participants did not show the hoped-for behavior change. Only 63% of participants "always" or "usually" engaged in each of the ten targeted energy-use behaviors, comparable

to the behaviors of the Betty Brinn and the older Fox Cities nonparticipants. (The younger Fox Cities nonparticipants reportedly engaged in these ten behaviors more frequently than did the participants; however, the sample of younger Fox Cities nonpaticipants was quite small.) Thus, the exhibit enhancements included at Betty Brinn, which specifically sought to broaden the age appeal and understandability of the exhibit, appeared to have been effective in reaching younger children.

Boys, who in the general population appeared to engage in energy-saving behaviors less frequently than girls, showed the greatest change in behavior after seeing the exhibit. Participating boys "always" or "usually" engaged in the collective targeted energy-use behaviors 70% of the time, compared with 57% for nonparticipating boys.

**Table 6: Behavior Change in Response to the Energy Detectives Clubhouse Exhibit**

| DESIRED OUTCOMES | OUTCOME MEASURES | |
|---|---|---|
| | **Fox Cities Experience** | **Betty Brinn Experience** |
| **Changes in Children's Energy Use Behavior -->Confirmed** | Older participants (8 to 11) had significantly higher energy-saving behaviors than nonparticipants. 70% of parents said older children "always" or "usually" engaged in the behaviors, versus 62% for nonparticipants. | All participants (6 to 11) had significantly higher energy-saving behaviors than nonparticipants. 70% of parents said children "always" or "usually" engaged in the behaviors, versus 60% for nonparticipants. |
| **Children Remind Parents of Energy Actions; Questions to Parents Reflect Increased Awareness of Energy Conservation -->Confirmed** | In both places, participants significantly more likely than non-participants to speak to parents about turning off lights, water, TV, or radio (34% versus 18% of those asking parents about energy usage). Another 34% of participants versus 25% of nonparticipants asked parents about how to save energy or money spent on energy. | |
| **Children Remind Teachers of Energy Actions -->Confirmed** | "When they went out to recess, they wondered why I left the lights on.... They remind each other to turn the water off while they are soaping their hands." | (teachers not interviewed) |
| **Children Use Workbooks -->Confirmed** | 83% of children who received workbook used it | 82% of children who received workbook used it |
| **Classroom Activities -->Confirmed for Some** | 3 of 6 teachers said they followed visit with discussion | (teachers not interviewed) |
| **Teachers Want Additional Resources -->Confirmed** | Teachers want list of follow-up activities for classroom; information; materials | (teachers not interviewed) |

Note: Conclusions based on evaluation survey activities.

The influence of the exhibit is also evident in the children's comments and questions (see Table 6). Participants at both venues were significantly more likely than nonparticipants to speak to parents about turning off lights, water, TV, or radio (34% versus 18% of those asking parents about energy usage). Another 34% of participants versus 25% of nonparticipants asked parents about how to save energy or money spent on energy.

Surveyed teachers liked the exhibit. Half of the surveyed teachers said they followed the visit to the exhibit with a classroom discussion: *"We talked about conservation and conservation measures." "I tied it into a science module on the environment." "We talked about exhibit ideas when some students showed their workbooks to the class."*

Children, parents, teachers, and museum staff held positive opinions about the exhibit and WE's sponsorship of it (see Table 7). Museum staff reported the responses they observed from children and parents (termed "unsolicited comments" in the table). Staff's own assessments described the exhibit as "dynamic-looking" and "professional-looking." The exhibit is a crowd-pleaser. People attending the museum are attracted to enter the exhibit. The exhibit received high praise for being durable and easy to maintain. Comments of museum staff and teachers indicated that the exhibit succeeds in bringing to life an important idea that might otherwise be too abstract or dull for children to appreciate.

**Table 7. Attitudinal Response To the Energy Detectives Clubhouse Exhibit**

| DESIRED OUTCOMES | OUTCOME MEASURES | |
|---|---|---|
| | **Fox Cities Experience** | **Betty Brinn Experience** |
| **Children are Satisfied -->Confirmed** | 100% of participants surveyed liked the exhibit | 100% of participants surveyed liked the exhibit |
| **Unsolicited Comments Reflect Positively on Exhibit -->Confirmed** | Sight of the exhibit "generates excitement". "It really does draw people in." | "The kids would cheer when they heard they would see it. They would 'ooh' and 'aah' about how neat the house looked." |
| **Solicited Comments Reflect Positively on Exhibit -->Confirmed** | "Whimsical, humorous, fun-filled" "Nickelodeon, fun atmosphere" *(staff)*; "I would definitely recommend it. It was a great experience." "I like that this was something that was not simply to entertain. It was entertaining, fun and they learned something." *(teachers)* | "It's a fun way to educate. It's on the family level, for kids and parents, too." "It's a great idea. It takes a potentially dry topic and makes it come alive." |

*Continued*

| DESIRED OUTCOMES | OUTCOME MEASURES | |
|---|---|---|
| | **Fox Cities Experience** | **Betty Brinn Experience** |
| **High Opinion on Exhibit's Quality -->Confirmed** | "Impressive" "dynamic-looking" "professional-looking" *(staff)*; "It was well done, presented nicely. The questions were age-appropriate... I had no fear the kids would break it." *(teacher)* | "The exhibit has a great look and feel to it." "It is quite an undertaking. It's a piece they can use for a long time." |
| **Opinion that WE Spent Money Wisely -->Confirmed** | "It's a good exhibit and a good message." "From an operations perspective, it's fabulous. It holds up to traffic, stays clean, easy maintenance, no problems." *(staff)*; "It's a subject that is not covered appropriately in the science book. It's a good exhibit. Hands-on." *(teacher)* | "WE should be commended on venturing into this area." "I definitely think the exhibit is a huge benefit to the community. Energy is an abstract concept. The exhibit goes to their level and gives kids the information. This is not done in the schools or in the home, usually." |
| **Opinion that WE cares About Children -->Confirmed** | "It serves the child while pleasing the adult." *(staff)*; "We need to foster an awareness of conservation. If the kids don't learn it now, they won't learn it." "It was not as spectacular as the dinosaur exhibit, but it was free! And this is information the children can take home with them and use and make a part of their life." *(teachers)* | "WE is trying to teach kids about saving energy. This comes across in a nice way for even the youngest child to understand." "There is a high level of enjoyment, surprise, discovery." |
| **Good Feelings (Trust and Belief) about WE and Exhibit -->Confirmed** | "We were thrilled to have the exhibit and be the first to host it." *(staff)*; "I think they got the message that WE cares about the environment." *(teacher)* | "We are thrilled that WE let us have the exhibit. We have gotten a lot of positive feedback." |

Note: Conclusions based on evaluation survey activities.

In developing the program logic model, we identified later outcomes and impacts that are not referenced in Tables 4-6. These are: public awareness of advertising; children's awareness of choice in energy-using behavior; other local museums display exhibit; utilities or museums elsewhere contract with WE to display exhibit; energy savings; and customer loyalty. Other than awareness, which will not be measured, these long-term outcomes and impacts await a long-term evaluation.

## Conclusions

The Energy Detectives Clubhouse Museum Exhibit experienced a successful start. Through the exhibit, WE hoped to influence children's energy-use behaviors. WE achieved its objectives. Surveyed children who saw the enhanced exhibit at the Betty Brinn museum showed a significantly higher rate of energy-saving behaviors than nonparticipants.

We hypothesized that the enhancements made to the exhibit for its showing at Betty Brinn would increase its teaching effectiveness by enabling children, especially younger ones, to increase their involvement with the exhibit. Consistent with our hypotheses, we found that the behavior of Betty Brinn participants differed more from the behaviors of their peers than did the behavior of Fox Cities participants, with the behaviors of the younger children most affected.

Given the rather high frequency of energy-saving behaviors among the sampled nonparticipants (approximately 60%), it appears that the Energy Detectives Clubhouse Exhibit does not present new information to children. Rather, it appears to reinforce a message they are hearing elsewhere (such as at home or in school). This inference received some support from the teacher interviews. In addition, the exhibit appears to increase the appeal of energy-saving behaviors to the participants and to provide the participants with motivation to engage in the behaviors. Thus, children who may have been told on a number of occasions to "turn out the lights" may now associate such behavior with an important goal (conserving energy) and with something exciting (the exhibit). Certainly, interviewed teachers and staff all thought the exhibit was inviting and exciting and made the abstract idea of saving energy more concrete.

It is difficult to know how long these effects will last. Our participant sample included mainly children who saw the exhibit and joined the Club, along with a small number of children who saw the exhibit and did not join the Club. The children who joined the Energy Detectives Club represent a small percent of all children who saw the exhibit. It may be that the children who join the Energy Detectives Club were more interested in energy than other children. However, one can also posit many plausible explanations other than participants' greater interest in energy and conservation. For example, the children who joined the Club may simply be those who like to participate in things (such as filling out request cards, joining clubs, posting letters, receiving items through the mail), or who are curious, or who thought the exhibit was fun. So although Club participants were self-selected, it is not clear that the self-selection introduces any sample bias into the findings of behavioral effects from visiting the exhibit.

The duration of the behavioral effects likely will depend on their reinforcement over time. Learning is enhanced by the use of interactive learning opportunities, which the exhibit provided. Learning also is better retained through repetition. As noted, the relatively high level of energy-saving behaviors among nonparticipants suggests that the exhibit succeeded by reinforcing messages that children have already heard. The exhibit did not simply repeat a perhaps-familiar message; it made the message come alive, and have relevance and importance to the children, and it accomplished this through fun.

The program logic model approach to the evaluation provided the framework from which to identify measurement opportunities for the exhibit. Perhaps the most important benefit from the program logic model for the evaluators was that it offered us a way to work with the program design team to make explicit their theories about how the exhibit might

work that had guided their development of the exhibit. The program logic model was also useful for identification of sub-issues to consider in the analysis of the survey of participants and nonparticipants.

Some of WE's goals and objectives were qualitative and thus could not be measured quantitatively. Other goals were long term or, as with energy savings, very difficult to measure given the difficulty of locating a large number of families with children who saw the exhibit and the anticipated small size of the savings. The logic model enabled us to identify many points of investigation from which a qualitative assessment of the exhibit's success could be made with some confidence.

The use of program logic models to explicate the relationship between program features and desired and expected outcomes and impacts was clearly valuable in this program. We believe this tool can be useful in many energy program evaluations, especially for information and education programs and market-based programs where the impacts are likely to occur in the somewhat distant future and intermediate outputs and outcomes of the program must be identified and tracked.

## References

United Way of America. 1996. *Measuring Program Outcomes: A Practical Approach.* Alexandria, VA: United Way of America.