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NYIT

Energy Advisory Service

INITIAL EVALUATION REPORT

January 31, 1977

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INTRODUCTION

Under contract EY-76-S-02-2977 with the U.S. Energy Research and Development Administration, the Center for Energy Policy and Research of the New York Institute of Technology has organized an ENERGY ADVISORY SERVICE for information dissemination on energy conservation techniques to various target audiences in the New York, New Jersey, and Connecticut area. The Service, in operation since June 1, 1976, thus far has established four channels of communication to disseminate energy conservation information and technical assistance: The NYIT Energy Hot Line, the NYIT/ERDA (MRC-TV) Energy Management Seminar program, the Energy Information Center, and the Referral Service.

To evaluate and compare the effectiveness of these programs for energy technology transfer, we have been maintaining anecdotal and case study data. We have also been assessing the Energy Information Center and Referral Service in an exploratory manner (soon to be replaced by systematic procedures) and we have executed more rigorous evaluation procedures in respect to the hot line and television seminar program.

The purposes of this report are two-fold: (1) we will provide expanded and up-dated information on operating experiences associated with the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar Program, and (2) we will provide recently analyzed data emerging from a study designed to investigate the two channels for their absolute and comparative effectiveness in energy technology transfer. Specifically, research was designed to cast light on the following questions whose answers are also summarized below:

1. In terms of demographics and prior energy attitudes, what kinds of people tend to use the hot line or be drawn to the television seminar?

Most hot line respondents were male, high school or college graduates and middle class. They were relatively well informed about various residential energy conservation practices. They had been personally affected by past energy shortages and felt favorable towards energy conservation as a solution to this country's energy problems, but did not necessarily believe that energy conservation was the "best" solution compared to an array of other possible actions.

Most seminar respondents were male, college educated and upper class. They, too, had experienced past energy shortages directly and favored energy conservation not only as a solution to energy problems but as the "best" solution compared to several other possibilities.

2. How did channel users feel about the channel after experiencing it?

Qualitative and quantitative data showed favorable reactions to the two channels of communication both in terms of several distinct features of channel operation and in terms of channel credibility as a source of energy information.

The high credibility marks given to the hot line and television seminar stood in marked contrast to the credibility attributed to a number of more conventional information sources also evaluated. Perceptions of this sort can only facilitate the effectiveness of hot line and seminar energy conservation communications.

3. How did channel users perform on energy transfer effectiveness measures of knowledge and intention to act?

Among hot line questionnaire respondents, a majority indicated that the hot line answer and printed materials improved their knowledge about one or more discrete energy conservation measures. A good fit was found between the questions hot line callers had actually asked and the areas of new learning they later attributed to the hot line service. Almost all hot line respondents indicated that they already have acted or intend to act on an energy conservation suggestion provided over the phone.

Based on equivalent measures of knowledge and action, the effectiveness of the television seminar for energy technology transfer also proved impressive. Interview data supplemented quantitative findings and provided specific new instances of increased knowledge and implemented energy conservation activities following seminar attendance.

4. Was there any relationship between performance on effectiveness measures and selected demographic and attitudinal variables associated with channel users?

Because of a small sample size, hot line data was not used to examine this question.

Several circumstances and conditions were identified under which the television seminar had a greater or lesser chance of being effective. For example, seminar participation at one of the outlying MRC-TV studios rather than at the World Trade Center was significantly related to better performance on channel effectiveness measures. To find evidence of greater energy technology transfer occurring in regional studios of the MRC-TV system, enhances the

likelihood that the cost-effectiveness of the interactive television seminar program will be high.

No evidence was found that one Energy Advisory Service "target audience" category compared to another performed better on channel effectiveness measures, suggesting that an array of audience types could benefit from future programs offered over this network.

Replicating previous research findings, channel effectiveness measures and income level of participants were shown to vary such that low and middle income groups learned more from the seminar than higher income groups.

Finally, no evidence was found that participants who were sanguine about the problem-solving potential of energy conservation differed from those who were not in respect to new learning and action after the seminar.

On balance, while definitive conclusions are not appropriate at this early stage in the on-going process of channel evaluation, the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar program appear to have been effective for energy technology transfer.

In the NYIT Energy Advisory Service Preliminary Project Assessment, submitted to ERDA on January 1, 1977, we focused on the four on-going channels of communication--the Energy Information Center, the Referral Service, the NYIT Energy Hot Line and the NYIT/ERDA Energy Management program--and we discussed each in terms of the process of development, operating experiences, publicity activities, secondary impacts and recommendations for future implementation of the channel based on our operating experiences to date. As a background to this report, we will highlight aspects of the earlier document.

BACKGROUND

The Energy Information Center

The Energy Information Center is a facility where energy research can be conducted and materials can be found to plan, prepare and implement outreach programs. In addition, the Energy Information Center serves in its own right as a channel for energy dissemination.

The Information Center now contains approximately 3,500 items covering the fields of energy conservation, alternative energy sources, energy usage and energy policy. The materials are selected from technical and non-technical publications in the fields of science, engineering, economics, and the political, social and behavioral sciences (see NYIT Energy Information Center: A First Report, August 16, 1976).

To date, the Energy Information Center has directly or indirectly serviced more than 700 requests for information from business and public officials, homeowners, academic institutions, students, professionals and the media. For example, the Information Center has received requests for technical specifications on various aspects of energy management (e.g. solar, insulation, computerized systems, and HVAC) and for information on specific pieces of energy legislation and extant energy school curricula. These requests are handled by using the resources of the Information Center to either research answers, prepare lists of pertinent reading materials or refer users to other organizations.

As with the other channels of communication, we have monitored the secondary impact of the Information Center, where the term "secondary impact" is defined as "word-of-mouth spreading of energy information as a result of publicity campaigns and energy conservation action taking place because those who were advised under the outreach program in turn encouraged or assisted others to take energy conservation measures." (See NYIT Energy Advisory Service Implementation Plan, p. A1). One example of secondary impact in respect to the Energy Information Center involves a city councilman who attended an Energy Management Seminar and who contacted the Energy Information Center as a consequence. The Energy Information Center provided him with materials which he, in turn, presented at a city council meeting where plans were discussed for the city to undertake an energy conservation program of its own.

The Referral Service

The Referral Service was conceived of as a second channel of communication in our outreach project and as a means of acquiring back-up support and greater leverage in the overall operation of the Energy Advisory

Service. The Referral Service functions as a channel of communication when requests for information or technical assistance which go beyond the scope of our service are referred to appropriate public and private organizations. It provides back-up support when any of these other groups can be called upon to assist in program development with speakers, materials and the like.

To date, we have brought 594 cooperating organizations into our referral roster, we have handled 57 referrals in a ten week period with limited initial publicity, and we have provided a selected referral list and bibliography to some 2,000 people invited to or attending our television seminars.

Our experience thus far leads us to believe that the Referral Service will become an increasingly more important outreach channel. Individuals and community representatives seem pleased to find an agency like ours which can help them to locate other local individuals and groups who have already begun conservation efforts. To better meet requests of this sort, we are organizing the Referral Service roster according to geographic area and we are preparing community-specific lists of energy-related public and private groups, companies and products.

The NYIT Energy Hot Line (516-686-7744)

The objectives of the NYIT Energy Hot Line are at once to provide area residents with up-to-date and immediate answers to practical energy questions and to operate this service in a manner conducive to testing its effectiveness as a channel of energy technology dissemination. In light of the experimental nature of the Energy Advisory Service, whenever conflict between these two hot line objectives has arisen, the requirements of channel evaluation have been allowed to hold sway. For example, in order to examine the relationship between hot line publicity and telephone volume, we are taking care to release extensive but carefully controlled hot line publicity to one priority target audience at a time. In the short run, this approach may have depressed the total number of hot line callers, but it has facilitated hot line evaluation.

To establish the hot line, potential questions were identified and transcribed onto index cards where answers and research materials were also recorded. The index cards were displayed on a rotary stand which is normally used in libraries to retain and retrieve microfiche. To date, the hot line rotary stand contains a total of 265 index cards of which 146 constitute a glossary of energy terms and the remainder deal with specific questions and answers on conservation, alternate sources of energy such as solar and nuclear, fossil fuels, transportation and the environment. Since detailed information is not always readily transmitted over the phone, a decision was made to mail all hot line callers one or more pamphlets which would also answer their queries and provide greater

detail. With answers to most hot line questions prepared in advance and quickly retrievable on the rotary stand, the hot line could be operated without the presence of on-hand energy experts. It was within this context that the student volunteer became particularly important.

Since the establishment of the NYIT Energy Hot Line, we have trained 22 student operators, and handled approximately 550 calls, including 200 during a special four-day energy fair and an average of 11 inquiries per day for the subsequent operating period of 50 working days with minimal publicity. The reaction to the hot line has been favorable (see pps.11,29).

Our experience to date with hot line operation has taught us the value of keeping two facets of operation in good working order: students must be kept motivated and involved as they play a vital role, and bulk orders and re-orders of pamphlets must be arranged in advance as these materials are the main contents of mailings we promise over the phone. Further, we believe that a toll-free hot line telephone number would mesh well with the concerted hot line publicity campaign now in effect.

NYIT/ERDA (MRC-TV) Energy Management Seminar Program

The fourth channel of communication thus far organized and tested was a series of interactive television seminars on energy conservation, broadcast from the World Trade Center and received in 8 regional studios in the tri-state area. The Metropolitan Regional Council TV network (MRC-TV), over which the seminars were broadcast, provided for live discussion with various experts in the energy field, for slide presentations and for videotaped interviews with four energy specialists. The interactive nature of the MRC-TV network enabled participants in every studio to see and hear their colleagues in any other studio and in the broadcast center, and thus permitted questions and discussions of the material presented.

To date, we have conducted five days of live/videotaped seminars over the nine-county MRC-TV interactive network with reservations for the seminar made by 533 architects, engineers, bankers, business persons, homeowners and public officials from all levels of government. As will be discussed below, the seminars were very favorably received, (see pps.20,29).

Among other secondary impacts arising from the TV seminar program, we produced an edited one-hour television film entitled Solar Energy Today for general distribution over cable and open-circuit television and in 3/4" professional video-cassette form for educational uses by requesting organizations.

From our pioneering activities with this media, we have learned that substantial lead time is required to organize the attendance of specialized audiences through the appropriate business, professional and trade organizations and that substantial production costs should be anticipated to assure continued development of high quality, video-

taped material designed for the specialized target audience. However, the large business and professional audiences which can be reached, and the effectiveness of the live/videotaped interactive TV format, indicate that the cost-effectiveness of this channel of communication will be very high.

SOURCES OF DATA

Careful records were kept on the operation of the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar Program and data were gathered with the view in mind of studying these two channels separately for their absolute effectiveness for energy technology transfer, and together for comparison. Several sources of quantitative and qualitative data were used both to keep track of channel operation and to study channel effectiveness. All quantitative data were analyzed on the NYIT Xerox Sigma 9 Computer with descriptive statistics and cross tabulations using the Statistical Package for the Social Sciences (SPSS) and all qualitative data were organized into a framework conducive to interpretation.

Data on the hot line were drawn: (a) from log forms completed by hot line operators on each call between October 18 and December 15 (N=165), (b) from follow-up survey instruments consisting of structured and open-ended questions and sent along with the pamphlets mailed to 124 hot line callers (N=28), and (c) from telephone interviews with a randomly selected sample of hot line callers (N=8). It should be noted that although 124 callers received an evaluation form in the mail, the rate of return was 22% -- average for this method of questionnaire administration¹.

Data on the television seminar were gathered from: (a) attendance sheets routinely maintained by MRC-TV studio coordinators, (b) from a review and transcription of the videotapes of the interactive portions of each seminar conducted in the series, (c) from survey instruments consisting of structured and open-ended questions and distributed at each studio site at the seminar's conclusion to 390 participants (N=126), and (d) from telephone interviews with a randomly selected sample of seminar participants (N=11). In contrast to the hot line evaluation form the rate of return of seminar forms was a more healthy 31.7%.

The information contained in these data sources will be used to successively discuss: (1) the operation of the NYIT Energy Hot Line, (2) the operation of the NYIT/ERDA (MRC-TV) Energy Management Seminar program, and (3) the absolute and comparative effectiveness of the hot line and seminar program for energy technology transfer. (Subsequent reports on comparative effectiveness of these and other channels will include a measure of cost-effectiveness which will depend on a variety of factors including real financial savings from energy conservation attributable to the operation of a particular channel. However, since most energy conserving actions which save money will probably occur only after the passage of some time, a measure of this variable is not included in the present comparative analysis.)

OPERATING THE NYIT ENERGY HOT LINE

We began experimental operation of the NYIT Energy Hot Line at Energy Expo '76, a fair sponsored by the Nassau County Department of General Services, Bureau of Energy Resources. The fair ran from Thursday, September 30 to Sunday, October 3, 1976 in Lido, New York. We commissioned NYIT students to design a hot line exhibit booth which was constructed by NYIT Buildings and Grounds personnel. A telephone was installed in the booth from which fair visitors could call the hot line (516-686-7744) at our expense. During the course of four days, we distributed over 1,000 flyers advertising the hot line and we received 211 calls, largely from students. This trial period permitted us to test out our operating procedures and to give our hot line operators first-hand experience. (Data from this experimental operation has not been included in formal hot line evaluation activities).

The hot line was opened to the general public on October 18, 1976, publicized by a full-page story in the New York Sunday News on October 17th. We received 70 calls during the first week of formal operation; and in addition to the 211 calls arising in conjunction with the Energy Expo Fair, we have received another 269 as of January 1977, for a total of 550. Statistics used in this report, are based on the 165 calls occurring between October 18 and December 15 which we have been able to process.

In respect to these 165 calls, most have come from homeowners but with some representation from the four major target audience categories specified in the NYIT Energy Advisory Service Implementation Plan, on page 3 and NYIT Energy Advisory Service Project Extension Proposal, on page 9. Table 1 below presents a statistical summary of the individuals the hot line has served by target audience category.

Callers have asked a total of 242 questions with 66.7% of the callers asking one specific question; 21.8%, asking two; 7.9%, three; and 3.6%, as many as four discrete inquiries. In order of popularity, the most frequently asked questions have dealt with: (1) residential energy conservation including insulation, HVAC, weatherization, home appliances and lighting--N=130 (53.7%), (2) solar energy including hot water, space, swimming pools and installers--N=49 (20.2%), (3) energy financing and tax policy--N=13 (5.4%), (4) alternate energy sources including nuclear, wood and wind--N=8 (3.3%), (5) location of a solar demonstration site in area--N=4 (1.7%), and (6) heat pumps including their use and installation--N=3 (1.2%). Interestingly enough, men use the hot line more than women (76.5% versus 23.5% respectively). Energy, like politics and science may be an area in which women have reservations about asserting themselves².

TABLE 1

HOT LINE CALLERS BY TARGET AUDIENCE CATEGORY

Category	N	%
#1. Owners/Managers of small industrial and commercial enterprises-----	11	6.7
#2. Energy Influential Industries-----	13	7.9
#3a. Owners/Managers of single family homes-----	126	76.8
#3b. Owners/Managers of multi-family buildings, public institutions and government buildings-----	2	1.2
#4. Participants in the Energy Policy-Making Process-----	11	6.7
	163	100.00

Because our predictions regarding likely hot line questions turned out to be sound, we were well prepared to handle information requests. That is, in hot line operation, we have frequently used the glossary index cards on the rotary stand and we have employed all but twenty-three specific question and answer cards at one time or the other (see p. 5). To put the matter differently, the rotary stand information was appropriate to answering 58.2% of all calls. Another 16.5% of the calls could be answered on the spot, since the exercise of developing the rotary stand system apparently taught our hot line supervisor more facts than he or his staff initially entered in writing. The remaining 24.8% of the calls required some additional research either to provide the answer, to locate pertinent printed materials, or to make a referral. Almost all telephone calls were followed up with a mailing which in a majority of cases (53.7%) contained one or two pamphlets. Pamphlets which answered the most hot line questions included: Solar Energy for Space Heating and Hot Water (ERDA), How to Save Money by Insulating your Home, (FEA), I've Got a Question About Using Solar Energy, (ERDA), How Solar Heating and Cooling Works, (Honeywell for ERDA).

As Table 2 shows, although some of the hot line calls have come from New York City, New Jersey and Connecticut, and from beyond the tri-state region, 81% have been from Long Island homeowners and business persons for whom the hot line is a local call. From various personal communications with New Jersey and Connecticut energy agency personnel, we have reason to believe that the lack of a toll-free hot line telephone number is impeding many metropolitan residents from making full use of this service.

TABLE 2
GEOGRAPHIC LOCATION OF HOT LINE CALLERS

Geographic Area	N	%
Long Island (Nassau and Suffolk Counties)-----	129	81.1
New York City (all 5 boroughs)-----	15	9.4
Westchester County, New York -----	4	2.5
New York State (all other locations)-----	5	3.1
New Jersey-----	1	.6
Connecticut-----	3	1.9
Beyond tri-state region-----	2	1.3
	<u>159</u>	<u>100.0</u>

Awareness of the hot line has come from many different sources. From the 165 log forms, we can report that 16.6% of the callers have learned about the service from a "word-of-mouth" dynamic--for example, one friend telling another, or one organization in the Referral Service roster directing their users to us. Other sources of awareness include: media coverage--54.3%; the Energy Expo '76--14.6%; the Hot Line flyer--6.1%; through personal contact with staff members--5.5%; and as a result of the television seminar--.6%.

The NYIT Energy Hot Line attempts to tailor its service to the needs of each individual who calls. Some callers need a great deal of help to expedite or understand energy conservation activities; others require only nonpartisan advice to reaffirm what they already know to take action for themselves. The following unedited excerpts from "open-ended" comments found on evaluation forms illustrate that users have had favorable reactions to the various forms of assistance they have received from the hot line:

--I have only called once and feel the reply I received was good, although it took 2-3 weeks for an answer. Until that time, I had no idea where to call to get the information without hiring outside help for a basic problem.

- The material I got was good.
- For the general consumer, a good beginning. I think it can be improved by providing more detailed comparisons of various products available as tested by the Energy Center. Also cost-effectiveness of certain energy saving devices.
- Good consumer service.
- Used for one inquiry only. Intend to use for additional information.
- Timely and in addition to being very helpful, also courteous.
- Great idea. Its been a big help.
- For general information, your hot line is excellent. However, more technical information should be available for those who want to do things themselves.
- Good idea, but not well known to public.
- Nice to have if you have questions or problems (which the lighting company doesn't help you with).
- Very clear and rapid information, but you need to prepare a file of answers for difficult or specialized questions. Needs more funds.
- General info provided is very useful and enlightening. Mailed material a definite plus, because it is always available for study and reference.

OPERATING THE NYIT/ERDA (MRC-TV) ENERGY MANAGEMENT SEMINAR PROGRAM

We began conducting the first set of interactive television seminars on Wednesday, November 10th, and continued programming on November 22nd, December 3rd, December 13, and December 17. Each seminar, 2½ hours in length, was conducted in the morning and then again in the afternoon for a total of ten different seminars in the present series. Seminars used a combination of videotaped and live materials for the dissemination of detailed energy conservation information to a variety of audiences who participated in the program through two-way video circuits connecting a multiplicity of Metropolitan Regional Council television studios in the New York, New Jersey and Connecticut region.

We produced videotaped interviews with Fred S. Dubin, President, Dubin-Bloome Associates, P.C.; John W. Honeycomb, Manager, Energy Programs Department, IBM; Edwin M. Canuso, Vice President, Long Island Savings Bank; and Jeffrey Cohen, Deputy Commissioner, New York State Energy Office. By playing these cassettes during each seminar we were able to present the views of these prominent energy authorities with minimal inconvenience to them and without requiring their presence. However, by inviting different energy experts to appear live for each day of programming, we managed to convey all seminar materials in a personal, informal style (see Table 3, NYIT Energy Advisory Service Preliminary Project Assessment, p.16, for the names and affiliations of various discussants).

In addition to using videotaped and live materials, the seminar series had two other distinguishing features which expediency compelled us to incorporate only this time around. That is, in order to proceed directly with channel experimentation and to begin evaluation procedures as soon as possible, each seminar presented an overview of several areas of energy conservation including practical applications of solar energy, energy conserving building design, energy management systems, energy financing and energy legislation and tax policy, and each seminar was intended to appeal to a variety of target audience categories. Concerning the first feature, while we favor future seminars which cover a few substantive areas in detail, this format allowed us to go on the air in record time and therefore, to produce evaluation data almost immediately. That is, planning began in September, the first seminar was aired in November, and evaluation data is already available for presentation below. Concerning the second feature, while we also endorse seminars tailored to a specific target audience's needs and interests, the present format permitted us to assess whether one target audience would benefit more than another from a learning experience over this channel of communication.

An important task in organizing the MRC-TV seminar program was recruiting audiences. Invitations covering the five days of programming and a program guide were prepared and widely distributed during a recruitment campaign which began in earnest two weeks before the first seminar and ran through to the last day of programming. We have believed all

along that a suitable procedure for recruiting audiences would be to work with business, professional and trade associations to develop program content and to recruit seminar participants from among their ranks on an intensive basis. Those associated with the MRC-TV network have assured us of the soundness of our initial strategy. Their experience has shown that with a sufficiently long lead time to carry out a recruitment strategy, populating the World Trade Center and outlying studios is not a difficult task. However, without benefit of long lead time, we adopted a different procedure which was recounted in detail in the NYIT Energy Advisory Service Preliminary Project Assessment, (see p.p. 17-18).

As a result of our recruitment activities, 533 individuals called the Center for Energy Policy and Research to reserve a place for one of the seminars. Actual attendance during the five days of seminars amounted to 465 with 173 individuals participating at the broadcast center and 292 at one of the outlying studios. The busiest studios were at the World Trade Center (N=173), Islip, New York (N=85), and White Plains, New York (N=66). To prevent overcrowding, we were forced to decline reservations for seminars held on the morning and afternoon of December 3 at the World Trade Center and on the morning of December 13 at Islip. Attendance figures were the highest on December 3 and in general, morning sessions were better attended than the afternoon.

Of the 465 who attended the seminar series, 390 received evaluation questionnaires at the seminar site to complete and return on the spot or through the mails. Forms were received from 126 participants, of whom 72 attended at the World Trade Center and 54 at one of the regional studios. From these forms, we can report that the seminar attracted participants who represent each of the Energy Advisory Service major target audience categories. Table 3 below presents a statistical summary of the numbers of seminar participants by target audience category.

In an open-ended question contained in the evaluation form, participants were asked to indicate their reason for coming. In order of frequency of reference, the various comments were categorized as follows: basic interest in the subject of energy conservation--91 references; a job requirement--21 references; because of the experimental nature of the interactive television network--4 references; to view on behalf of colleagues--4 references, and to meet new contacts in the energy field--2 references. Participants were also asked in the evaluation form to relate how they became aware of the seminar program. Table 4 presents a summary.

TABLE 3

NYIT/ERDA (MRC-TV) ENERGY MANAGEMENT SEMINAR
EVALUATION RESPONDENTS^a BY TARGET AUDIENCE CATEGORY

Target Audience Category	N	%
#1. Owners/Managers of small industrial and commercial enterprises----- industrial (N=4) commercial (N=4)	8	7.1
#2. Energy Influential Industries----- builders/contractors (N=7) real estate developers (N=1) architectural firms (N=11) energy conservation equipment suppliers (N=4) energy engineering consulting firms (N=10)	33	29.5
#3. Owners/Managers of single family homes, multifamily buildings, public institu- tions, and government buildings----- school (N=8) hospital (N=2) library (N=3) home (N=2)	15	13.4
#4. Participants in the Energy Policy Making Process----- energy agency (N=4) health agency (N=1) education agency (N=4) administrative agency (all others) (N=23) legislature (N=1) regulatory agency (N=5) utility (N=7) bank (N=3) media (N=2) citizen group (N=3) research institute (N=3)	56	50.0
	126	100.0

^aIt was not possible to categorize the 465 actual seminar participants by target audience type.

TABLE 4
RESPONDENT SOURCES OF AWARENESS
Of
NYIT/ERDA ENERGY MANAGEMENT SEMINAR SERIES

Source	N	%
Seminar Invitation	35	29.7
Contact with CEPR Staff	13	11.0
Word-of-mouth	49	41.6
Article in in-house organ	7	5.9
Article in news media	2	1.6
NYIT Energy Hot Line	4	3.4
Other	8	6.8
	118	100.0

At least for participants who returned evaluation forms, the primary ways of learning about the seminar were the invitation and a word-of-mouth dynamic.

Observers of seminars-in-progress were struck by the animation of some of the interactive exchanges. Many respondents indicated that they had actively participated in the seminar by commenting, answering or asking questions (25.7%). Since each seminar was preserved on tape by the MRC-TV technical crew, we were able to rerun tapes to gather data about the nature of the discussions occurring between each videotape segment and involving the host, panelists and members of the audience either at the World Trade Center or at one of the outlying studios. To illustrate the diversity of concerns which arose in conjunction with the various videotaped segments, examples of questions are reconstructed below:

Questions Regarding Practical Applications of Solar Energy

- Is it practical to retrofit a building for solar? Are there any examples of solar retrofit which are federally subsidized? (World Trade Center, identity of speaker unknown).
- Are there any efforts for the solar industry to police itself, or by outside concerns to maintain certain standards? (Nassau County, New York, identity of speaker unknown).
- What are the prospects of solar heat being used as a coolant? (Bergen County, New Jersey, banker).
- When are we going to have a performance code for solar in New York City? (World Trade Center, identity of speaker unknown).
- Considering the problem of vandalism in the inner city, what are the replacement costs for solar collectors? (World Trade Center, Commissioner, New York City Public Service Commission).
- What are the construction costs for rooftop solar collectors for 10,000 square feet roofspace? (World Trade Center, architect).
- Before going to solar on a large scale, shouldn't we weatherize first on a national scale? (Westchester County, New York, New Jersey college professor).
- Does frequency of maintenance of solar systems reduce its cost-effectiveness--e.g. cleaning collectors, and what are the statistics on overnight solar storage capacity? (Westchester County, New York, energy control device firm representative).
- What is involved in retrofitting a house for solar and where can I get information? (Westchester County, New York, citizen group member).
- With stones to be heated by solar in the basement, should you insulate sides and bottoms? What is the best container material and shape and where is the most efficient place to put it? (Union County, New Jersey, identity of speaker unknown).
- Do solar collectors have to be on roof? (Suffolk County, New York, identity of speaker unknown).
- Have there been any successful commercial applications of solar in large firms? (World Trade Center, citizen group member).

Questions Regarding Energy Conserving Building Design

- What are the advantages and disadvantages of deciduous and coniferous trees? (Bergen County, New Jersey, banker).
- Where can we get more technical information on solar for architects? (World Trade Center, architect).
- Why should we have any windows on buildings and homes? (Middlesex County, New Jersey, president, drafting firm).
- What standardization or changes in building codes will promote energy conservation? (Nassau County, New York, County Energy Office official).

Questions Regarding Energy Management Systems and Techniques

- What are the figures for fumes, toxic nature and flammability of urethane, urea and formaldehyde? (Middlesex County, New Jersey, identity of speaker unknown).
- What practical steps can be taken to really reduce electricity peak load? (World Trade Center, New York State Public Service Commission official).
- Is a heat pump covered in special LILCO (Long Island Lighting utility) electric rate? (Suffolk County, New York, County Water Department official).
- If you had to compare pay-back periods for insulation, solar hot water and solar hot air, which would be more economically attractive? (Westchester County, New York, college professor).
- If there are so many incentives to an energy management program, why aren't they more widespread? (World Trade Center, identity of speaker unknown).
- Do you (NYIT Energy Advisory Service) have consultants to do an energy audit in a high school? (Essex County, New Jersey, high school teacher).
- Are there any ways to save energy costs without major capital investments? (World Trade Center, identity of speaker unknown).

Questions Regarding Financing Energy Conservation

- Which banks in the area have energy conservation mortgage and loan policies? (Suffolk County, New York, Assistant to County Executive).
- Are there other sources of conservation financing outside of banks and federal funds? (World Trade Center, New York City Department of City Planning official).

- What federal grant monies are available for solar for institutional buildings? (World Trade Center, architect).
- Have any other banks decided to give special consideration to loans for energy conservation? (World Trade Center, energy consultant).
- What collateral is usually required for energy conservation home improvement loans? (Nassau County, New York, County Energy Office official).
- What can a citizen do to discover which banks give energy conservation loans? (World Trade Center, identity of speaker unknown).
- What do we do about the lack of up-front money to invest in devices which we know will save the city money in energy costs? (World Trade Center, New York City Public Library official).

Questions Regarding Energy Legislation and Tax Policy

- Does any state and local legislation exist which provides for increased tax exemptions for shorter pay-back periods for retrofit programs? (Suffolk County, New York, Islip city official).
- How can we induce the government to establish tax credits for energy conservation? (Suffolk County, New York, identity of speaker unknown).
- What are the legal procedures involved in retrofitting structures listed in the Historic Registry? (Westchester County, New York, Community Development official).
- What legislation on energy conservation is likely in the future--tax incentives, refunds or income taxes? Will there be federal intervention? (World Trade Center, identity of speaker unknown).
- What is the "sun rights" controversy all about? (Suffolk County, New York, identity of speaker unknown).

General Questions

- It appears that the Energy Center (Center for Energy Policy and Research) is the only one to be taking specific action with education on energy conservation and savings in capital output. Is the Energy Center the only practical program in the United States? (World Trade Center, business person).
- Are there plans for future seminars? (World Trade Center, identity of speaker unknown).
- All this information about energy conservation is fine, but what is being done to change attitudes on energy? (World Trade Center, New York City Department for the Aging, Administrative Manager).

--What is being done to publicize new ideas--e.g.
modifications to internal combustion engines?
(Westchester County, New York, identity of speaker
unknown).

Seminar participants came away from their experience with many reactions. The evaluation form provided space to supply candid, general comments, and 69.8% of the sample took the opportunity to compose one or more remarks. We identified 148 discrete comments which basically revolved around six topics.

The most popular topic for commentary concerned an assessment of the seminar in general and of the interactive television network over which it was broadcast. We detected 85 comments of this sort with 89.4% favorable and only 10.6% critical. Common phrases used to describe the seminar included "excellent means of public information... encouraging...good idea...seems to work and has promise...very good... great...good...a useful medium...fine and interesting...it is a good communication tool...very effective." What follows are unedited examples of some typical positive and negative assessments of the seminar and network offered by representatives of various target audience categories:

- Manager, Mortgage Division, New Jersey bank: My first experience with this type of seminar--found it very interesting and useful in getting opinions from other locals.
- Electrical Engineer, Office of Energy Conservation, Board of Education, New York City: Not bad, I picked up an idea from a questioner in Long Island. Also a thought from Mr. Honeycomb (Manager, Energy Programs Department, IBM, on videotape).
- Architect, self-employed: No one was in charge at this location (Stamford)--questions couldn't be submitted.
- Electrical Engineer, New York State Public Utility Commission: Effective way of bringing together a diverse audience.
- Head Custodian, public school: Very interesting, I have never been to a televised seminar. It makes you feel that you are in a large group with a lot of action taking place.
- Vice President, contracting firm: There should be a leader available for each discussion to lead groups, acquaint people, etc.
- Residential heating and cooling representative, electric utility: Excellent technique, highest ratings for holding attention span of participants at the various studios.
- Architect, architectural firm: The interactive system offers to a greater number of people the opportunity to attend these seminars. I like it.
- Manager, Property Improvement Department, New Jersey bank: The seminar gives one some idea what other institutions are doing in other states about energy conservation.

- Vice President, mechanical contracting firm: An excellent idea to bring large masses of people together and transmit their input to this most important subject. Thank you for having me attend.
- Design and Sales Engineer, HVAC contracting firm: Excellent way of reaching a large number of people without long distant travel.
- Newspaper Reporter, Long Island Paper: The quality of the presentation, I thought, was not effective. Mostly it was a dry discussion that would not interest ordinary members of the public.
- Citizen Group Member: The most valuable thing you could do with the circuit would be to get the audiences involved and talking with each other. They have a lot to offer each other. Each person is doing something in energy conservation and wants to hear of others. County officials could talk to each other. Individual contractors, etc.
- President, architectural firm: The medium used was excellent and effective. When someone in the same studio location asked a question and it was immediately replied to, the feeling of direct contact was strong despite the miles of physical remoteness of the studio.
- Architect, self-employed: I firmly believe an all-out effort must be made to overcome these obstacles (to energy conservation and solar utilization) and with seminars as you have going, it's the beginning of what will become as standard as indoor plumbing.

The next most popular topic for commentary--representing 28% of the total--dealt with constructive suggestions to improve the seminar format. These ranged from actions to which we are already committed: designing seminars for specific audience types covering fewer subjects in greater detail, to suggestions for round table seating as a means of encouraging discussion, and to both requests for taped speakers to be available for direct questioning and a recognition of the flexibility afforded by the videotape presentations. Examples of comments follow:

- Architect, City University of New York: Information transmitted not detailed enough--because seminar was directed to too many people from different professional levels.
- Manager, Engineering firm: It would have been better for us if we had attended an engineer's session.
- President, architectural firm: I do believe that if you were able to develop the type of program that would be geared toward the professional architect, engineer, etc., your efforts would be very successful.
- National Retail Merchant Association Representative: From our point of view it will not educate or stimulate our member stores beyond their present state of knowledge of the art.

- Energy Coordinator, New Jersey County: The scope of the seminar should be reduced to only one or two topics per seminar. This would allow the viewer to better absorb the subject.
- Partner, architectural firm: An attempt should be made to make the discussion more of a round table seminar with more participation by the audience--such as occurred at the end of seminar.
- Project Manager, Energy Management Systems Equipment Manufacturer: I believe program would be more effective if programmed (taped) speakers were available for direct questions.
- Architect, architectural firm: I felt that taped speakers were particularly knowledgeable, and I realize that they are far too busy people to have been available in person to answer questions.
- Architect, Department of Housing and Urban Development: Good for presenting the views of a number of different authorities at any convenient time without requiring their presence.

A third area of general commentary concerned references to the objectivity and comprehensiveness of seminar content. Only 6% of all comments fell into this category. For example, we were reproached for going into greater detail about solar energy than other energy conserving technologies, and we were questioned about the propriety of inviting panelists who represented energy conservation equipment firms:

- Assistant to business manager, New York Public Library: While I felt that Mr. Dubin's presentation (on solar energy) was very fine and that he was extremely knowledgeable and articulate in disseminating his knowledge to us, I also felt that the amount of time dedicated to solar energy was too much.
- Statistical Analyzer, New York State Energy Office: Too much emphasis on solar. Should give more attention to coal.
- Project Manager, Land Developing firm: You are looking at a futuristic but real science--solar energy. Why abandon the present system? Let's improve the present systems that buildings are using--and at the same time work on things such as solar energy. Has anyone done anything about posing legislation to restrict and force HVAC manufacturers to improve their systems? There are many things that can be done to conserve energy--unfortunately I did not hear them in this seminar.
- Architecture student: I think Part I (Solar Energy) should have been the major portion of telecast. The others are important but, the comprehension of how the different systems operate and how best they can be used, and how a design-oriented approach would be done is far more important at the present time.

--Architect, quasi-governmental agency: I do not generally give credence to manufacturers' representatives who really are there to sell their products (e.g. insulation).

The remaining major topics dealt with: (1) the NYIT Energy Hot Line (5%) either with respondents posing a specific question for the hot line in their evaluation forms or indicating pleasure in learning about its existence, (2) volunteering assistance to the Energy Advisory Service (3%), and (3) making suggestions and requests regarding future use of the videotaped materials (2%). For example, an architect working for the government commented, "I was not aware of the hot line--this may become a very valuable tool for me. Thank you"; a mechanical engineer working for Westchester County said, "I would like to appear on future programs or be involved in your future work"; and a League of Women Voters official asked, "Will these tapes be made available for still wider dissemination of information?"

THE ABSOLUTE AND COMPARATIVE EFFECTIVENESS OF THE HOT LINE
AND TELEVISION SEMINAR FOR ENERGY TECHNOLOGY TRANSFER

A systematic study was designed as an exploratory investigation of the absolute and comparative effectiveness of the hot line and television seminar program as channels of communication for energy technology transfer. Channel transfer effectiveness was defined in terms of a channel user's self-proclaimed change in knowledge of energy conservation technologies or intention and/or behavior in respect to energy technology utilization. Several operational measures of knowledge and intention were devised. They were incorporated into a hot line evaluation form sent along with pamphlets, into a seminar evaluation form distributed at the studio site, and they were probed for in interviews with a small number of channel users some time after actual channel use. (See appendix, for the hot line and seminar evaluation forms.)

For the hot line, the "knowledge" variable was measured by having respondents indicate if the "hot line helped" them to learn about "energy conservation" in general and about several residential energy conservation practices in particular. The "intention" variable was measured by having respondents react to the question, "Will you act or have you already acted on any of the suggestions provided over the hot line?" in terms of the structured options of "will", "have", and "won't", and by having respondents provide examples of what they will or have done.

For the seminar, the "knowledge" variable was measured by asking respondents to answer the query, "Have you learned any new ways (to conserve) today?" in terms of the options, "many new ways", "a few new ways", and "no new ways", and by asking them to provide specific examples of their new learning. The "intention" variable was tapped by providing respondents with the options "very likely", "likely", "unlikely", and "very unlikely", in response to the question, "How likely do you think it will be that you will act on any suggestions made in this seminar?" and by having respondents provide relevant examples of their likely activities.

The channel effectiveness study hoped to cast light on four basic questions:

1. In terms of demographics and prior energy attitudes, what kinds of people tend to use the hot line or be drawn to the seminar either in the World Trade Center studio or the outlying studios?

2. How did channel users feel about the channel after experiencing it?
3. How did they perform on the energy transfer effectiveness measures of knowledge and intention?
4. Was there any relationship between performance on channel effectiveness measures and selected demographic and attitudinal variables associated with the channel user?

Concerning the first question, existing literature suggests that demographic subpopulations often differ in respect to their preference for ways of obtaining information and that "motivated selected exposure" to only supportive ideas may occasionally cause individuals to discriminate among different learning modes.³ Since a channel of communication must be experienced before it can begin to be effective, evaluation procedures call for an inquiry into the demographic and attitudinal characteristics of the individuals attracted to different channels. Conventional demographic variables such as sex, occupation, education, income and the like, were used in the study and the attitudinal variables which were tapped included degree of concern with the energy situation, and attitude toward energy conservation as a solution to United States energy problems. The second and third questions represent core areas of concern in channel effectiveness evaluation. The fourth question deals with the possibility that the effectiveness of a channel might be better understood if various conditions and circumstances under which it performs well could be identified.

In the next four sections we will successively report data describing and comparing (1) channel users' demographics and energy-related attitudes, (2) their reaction to the channels, (3) their performance on the energy technology transfer effectiveness measures, and (4) the conditions and circumstances under which a channel had a greater or lesser chance of being effective.

Data will be drawn from 28 hot line evaluation forms, from 126 seminar evaluation forms and from telephone interviews with 8 randomly selected hot line callers (from the entire pool of service users) and from 11 randomly selected seminar participants (from among all those who attended).⁴ We appreciate the sampling and statistical implications of drawing inferences about the hot line from 28 cases and we advise caution in viewing detected hot line patterns.

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*A table of random five-digit numbers was used to select 15 hot line callers and 15 seminar participants to interview. Every attempt was made to reach the cases selected by this procedure. Replacements were not chosen even though successful contact was not always established.

Demographic and Attitudinal Characteristics of Channel Users

In general, the hot line questionnaire respondents were male (89.3%), high school (42.3%), or college (42.3%) graduates earning salaries in the \$20,000-25,000 range, and middle class (85.2%), by their own account. Although we received evaluation forms from representations of each of the major categories of Energy Advisory Service target audiences, 50% of responses came from homeowners--not quite as many as the percentage of homeowners to actually call the hot line (see p. 10).

In comparison, seminar participants also were male (87.0%) but were better educated (78.8% with college or higher degrees) and in higher income brackets (41.3% earned \$30,000 or better). The target audience categories represented in seminar evaluation returns have been presented elsewhere (see p. 15).

Hot line respondents appeared to be unusually well informed about useful residential energy conservation practices. Respondents were asked to determine whether the following eight practices saved or wasted energy: switching from regular to fluorescent light bulbs, closing drapes at night in winter, putting in storm windows, using a frost free refrigerator, having your furnace serviced, improving home insulation, replacing gas stove pilot lights with electric igniters, and installing a heat pump. A full 85.7% of the sample gave the correct answer to all eight actions, 7.1% made one mistake, and another 7.1% made two or more errors. Whether these findings are due to sampling error or genuinely reflect a characteristic of typical hot line callers cannot be determined. Nevertheless, these statistics contrast with results drawn from studies using random samples of the general population. For example, in one study homeowners were asked to comment on the energy implications of some of the same practices described above: only 57% correctly knew about fluorescent lights and 57.3% understood the waste involved in frost free refrigerators.⁴

In general, hot line respondents felt personally affected by the energy situation and favorable towards energy conservation as a solution to the current problem, but they were neither overwhelmingly concerned about the availability of nonrenewable energy sources in the future nor convinced that energy conservation was the "best" solution to the energy situation when compared to other possible strategies. That is, 85.3% stated that past energy shortages had affected their homes and particularly their places of business and in ways which they could specify; and 57.1% gave "using energy wisely" the top rating as a solution to energy problems. However, less than a majority (48.1%) thought that United States energy supplies would be in "severe" shortage by 1987 and only 42.9% thought that energy conservation would be equal in importance if not the most important solution to the energy situation compared with one or more of the following other possibilities: "developing solar energy", "developing nuclear energy",

"getting more information to people", "adjusting United States foreign policy", and the actions of "concerned people", "the Federal government", "scientists", and "oil companies".

Seminar respondents, on the other hand, also felt themselves to be personally affected by past energy shortages (71.3%), citing specific impacts at work, at home, in transportation habits, increased costs and consciousness of the energy condition, and 61.3% gave energy conservation a top rating as a solution to energy-related problems. A larger percentage of seminar participants than hot line callers thought that energy supplies would be in severe shortage in a decade (65.5%) and that energy conservation was equal in importance if not the "best" possible solution to the energy situation compared to various other possibilities (64.3%). Table 5 below presents the percentages of hot line and seminar respondents who gave the highest possible rating to each of nine solutions to the energy situation and it rank orders hot line and seminar respondents' most favored solutions for the sake of comparison. This table shows remarkable similarity between these two sets of channel users in terms of the high marks given to "developing solar energy", "using energy more wisely" (energy conservation) and "getting more information to people." Where the two sets most differ concerns "scientists", with the better educated and more professional seminar respondents far less confident about their future role.

Keeping in mind that thus far hot line publicity has been aimed largely at homeowners and that seminar publicity was targeted to a wide spectrum of professional audiences, these findings would seem to imply that the hot line and the seminar attracted users with certain specifiable demographic and attitudinal characteristics. (It is an entirely different matter, however, whether channel users with nonmodel characteristics--for example, females--came away from their experiences any the less affected.)

Furthermore, people attracted to the seminar were equally enthused about the hot line, although the converse does not seem to apply. That is, several seminar participants indicated delight in learning about the hot line service (see, p.23) and have subsequently called the hot line. On the other hand, however, although almost all hot line callers received a personal letter and invitation to the seminar series, to the best of our knowledge no more than two decided to attend.

TABLE 5
 PERCENTAGES AND RANK ORDERS OF HOT LINE AND SEMINAR
 RESPONDENTS WHO GIVE HIGHEST RATING TO
 VARIOUS ENERGY SOLUTIONS.

Solution	Hot Line % (N=28)	Seminar % (N=126)	Hot Line Rank Order	Seminar Rank Order
Developing solar energy	63.0	52.5	1	2
Developing nuclear energy	25.9	18.9	7	7
Getting more informa- tion to people	50.0	47.5	4	3
Using energy more wisely	57.1	61.3	2	1
Adjusting foreign policy	8.7	17.1	8	9
Concerned people	38.5	39.8	5	5
Federal government	34.8	43.7	6	4
Scientists	52.0	36.7	3	6
Oil companies	4.3	18.2	9	8

User Reaction to the Hot Line and Seminar

In general, users' reactions to the two channels were favorable. We have already provided verbatim comments from users to this effect, but quantifiable measures of channel performance were also incorporated into the evaluation questionnaires.

Hot line respondents were asked to judge several features of the hot line independently from "1" to "5" with "5" representing the best response. The percentages of respondents giving each of four features either a "4" or a "5" follows: "Opportunity for general education"--65.4%, "Adequacy of hot line answer"--79.2%, "Audibility of hot line operator"--68.0%, and "Usefulness of mailed materials" (where applicable)--65.4%.

Seminar participants were asked to similarly judge nine features of the presentation. Table 6 below matches the features and the percentages of respondents to give either a "4" or a "5" response.

TABLE 6
PERCENTAGES OF SEMINAR RESPONDENTS TO GIVE VARIOUS
SEMINAR FEATURES TOP RATINGS

Feature	N	%
1. Opportunity for general education	80	70.2
2. Opportunity for broad exchange of ideas.	48	41.4
3. Quality of live speakers (host and panelists)	64	57.7
4. Taped segment on practical applications of solar energy and energy conserving building design. (Dubin interview)	88	73.3
5. Taped segment on financing of energy conservation. (Canuso interview)	33	31.4
6. Taped segment on energy legislation and tax policy. (Cohen interview)	34	36.6
7. Taped segment on energy management systems. (Honeycomb)	48	48.0
8. Quality of sound and visibility of people on the screen.	75	67.6
9. Value of visual materials.	41	36.9

As this table shows, the seminar aspects receiving highest marks were the taped segment on "solar energy and energy conserving building design", followed closely by "the opportunity for general education" and then the "quality of sound and visibility of people on the screen."

Reactions to the channels were also measured in terms of absolute and relative credibility. In rating the credibility of the hot line and the seminar from "1" to "5" as a source of energy information, 51.9% of hot line respondents and 36.2% of seminar respondents gave a "5"--the highest rating; 25.9% of hot line users and 37.1% of seminar participants gave a "4"; and 22.2% of hot line users and 18.1% of seminar participants gave a "3". There were no channel credibility responses below "3" in either the hot line or seminar samples. These ratings stand in marked contrast to the credibility attributed to a number of more conventional sources of information included in both evaluation questionnaires. Table 7 below presents a summary of the percentages of respondents to give each of these other sources of information the highest rating of "5". A rank order of hot line and seminar credibility responses is also provided.

For hot line respondents, the NYIT Energy Hot Line, professional journals and the Federal government were most trusted to give reliable information about energy problems. For seminar respondents, the same pattern held except that the seminar presentation was outranked by professional journals. Finally, a composite index of comparative information source credibility was compiled from these separate credibility ratings, wherein 60.7% of hot line respondents rated the hot line as either equal in credibility or more credible than each of the other sources of information listed above and wherein 63.5% of seminar respondents similarly reacted to the seminar. The high credibility marks associated with these two channels of communication may be of major significance. For example, in a recent study: "Energy Problems: Public Attitudes and Behavior", a stratified random sample of 600 was drawn and 515 interviews were successfully conducted by a professional firm. One major finding concerned the low credibility associated with traditional energy information sources such as family, television news, newspapers, national politicians, the church, national magazines, the Federal government and independent research.⁵ Considering their overall results, the authors of the study conclude:

...it is clear that the public will readily adopt appropriate (energy conservation) behaviors if and when they are convinced that we will have a serious supply problem. It is also clear that "normal" approaches to educating the public will not have any more success than they already have had. The problem is one of credibility, the credibility of the message itself and of those presenting it.⁶ (Italics added)

The fact that great credibility was attributed to the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar program can only facilitate the effectiveness of their energy conservation communications.

TABLE 7
 PERCENTAGES AND RANK ORDERS OF HOT LINE AND SEMINAR
 RESPONDENTS GIVING HIGHEST CREDIBILITY RATINGS
 TO VARIOUS SOURCES OF ENERGY INFORMATION

Source of Information	Hot Line % (N=28) ^a	Seminar % (N=126) ^a	Hot Line Rank Order	Seminar Rank Order
Newspapers	3.8	5.1	5	5
Oil companies	0	1.8	7	7
The Federal government	18.5	12.4	3	3
Network TV and radio	4.2	7.0	4	4
National politicians	0	1.0	9	9
Local politicians	0	1.0	8	8
Friends and family	3.8	2.0	6	6
Professional journals	36.0	46.7	2	1
NYIT Energy Hot Line NYIT/ERDA Energy Management Seminar	51.9	36.2	1	2

^aWhere one or more sources of information shared identical or 0 percentages, rank order position was established by comparing percentages of respondents who gave the next highest credibility rating of "4".

Channel User Performance on Energy Transfer Effectiveness Measures

Channel energy transfer effectiveness was defined in this study in terms of user-asserted increases in knowledge of energy conservation technologies and user-asserted changes in intention and/or behavior in respect to energy technology utilization. Multiple measures of knowledge and intention were employed in both the hot line and the seminar evaluation forms. We recognize that there are other important measures of effectiveness which must be explored, for example, channel cost-effectiveness. However, since ideas and motivations often must germinate, even if different measures had been employed, we believe that a clear picture of channel effectiveness will not be available for some time. Keeping these caveats in mind, the results to be reported below suggest that a promising start has been made by the hot line and television seminar in energy technology transfer.

In respect to the hot line, one measure of "knowledge" concerned whether the hot line answer or mailed materials helped individuals to learn about energy conservation in general: 42.9% of the sample responded "yes" to this question. In another measure of knowledge, respondents were asked to react to a list of things "that some people think saves energy in the home and that others think wastes it" by checking one or more of the following categories: "saves energy", "no effect", "wastes energy", "don't know", and "hot line helped". The energy conservation practices used in this question included: "having your furnace serviced", "improving home insulation", "using a frost free refrigerator", "replacing gas stove pilot lights with electric igniters", "putting in storm windows", "installing a heat pump", "switching from regular to fluorescent light bulbs", and "closing drapes at night in the winter." 35.7% of the sample never checked the "hot line helped" category for any of these practices; however, 46.4%, checked it for one practice, 10.7%, for two, 3.6% for three, and another 3.6% for four. That is, 64.3% of the total sample indicated that the hot line answer or mailing helped them to learn about one to four specific energy conservation measures.

To further explore the hot line's impact on the knowledge variable, we determined that frequency with which the "hot line helped" category was checked by people who had actually made an original inquiry about an item. Even considering the small size of the hot line sample, the results of this comparison were encouraging.

Among the hot line callers to return a questionnaire, two had originally made inquiries about oil furnace servicing and both checked the "hot line helped" category in the questionnaire. In addition, reflecting mailed materials, two more individuals who had called the hot line for other reasons indicated increased knowledge about this subject. Seventeen of the questionnaire respondents had originally asked the hot line about insulation, and eleven of them gave credit to the hot line for its assistance. One of the questionnaire respondents had originally inquired about storm windows,

but the "hot line helped" category was not marked in his/her questionnaire. Two respondents had called about heat pumps. While neither indicated that the "hot line helped" them in this regard, four other people said that the hot line was helpful on this subject. One respondent who had originally asked about electric igniters and another, who had not, checked the "hot line helped" boxes on their forms. No sample respondents asked about frost free refrigerators, fluorescent lights or closing drapes, but two, three and two respondents respectively attributed assistance about these areas to the hot line.

To measure intention and/or behavior in respect to energy technology utilization, hot line users were asked to answer, "Will you act or have you already acted on any of the suggestions provided over the hot line?" Only one person indicated he would not act at all. Table 8 below presents a summary of responses.

TABLE 8
HOT LINE RESPONDENTS' INTENTION TO ACT

Response	N	%
Will act	9	34.6
Have already acted	14	53.8
Will act and have acted	2	7.7
Won't act	<u>1</u>	<u>3.8</u>
	26	100.0

In addition, hot line users were asked to specify in what areas they would act; 60.7% of the sample mentioned one discrete action; 17.9%, two, and 7.1%, three. In other words, 85.7% of the sample could identify at least one energy conservation action they had taken or were intending to take. The most popular areas of action involved insulation, HVAC, weatherization, home appliances and lighting.

To push further into the meaning of these statistics and to assess whether intention to act was turned into actual behavior, 8 of the hot line callers were randomly selected for follow-up telephone interviews. Illustrative findings are reproduced below.

- Case #044, a homeowner, was interested in reducing his fuel costs. He was specifically concerned with heat loss due to insufficient insulation in his attic. The hot line operator provided some background information on attic insulation, answered a question unique to the caller's situation and sent pertinent pamphlets to further clarify questions. When we followed-up our work, we found that he had reinsulated his attic and caulked and weatherstripped. He was able to lower his thermostat a few degrees with no measureable loss in comfort and he was planning to insulate the very cold north and west walls of his home.
- Case #030, a homeowner, made three inquiries to the hot line: how much insulation would he need in his attic, was an attic ventilation fan necessary, and what would be the proper calibration on his oil burner? Each of his questions were answered on the hot line. When later contacted for an interview, he reported having taken several energy conservation steps such as shutting off the electric heat in his basement, reducing the thermostat level, and calling in a service person to adjust oil burner calibration.
- Case #121, a retired chemical engineer, was planning to use a heat pump in his new home in North Carolina. He was one of the hot line callers to complete an evaluation form, but at the time of mailing, he had not yet received any printed materials from us. Upon being contacted again, he now says that the hot line helped him to learn more about heat pumps.
- Case #007, called the hot line at our trial run from the Nassau County Energy Expo '76 energy fair. This homeowner was interested in how he could conserve energy to save money in his home. We gave him some informative tips over the phone and sent him pamphlets on home energy conservation, including insulation and hot water heating. When a follow-up interview was conducted a number of months later, we learned that he had adopted some of the conservation tips on saving electricity, but as yet had not reinsulated his attic.
- Case #055, also a caller from our trial run, was interested in saving money by conserving energy in his home. We sent him pamphlets on proper home insulation. When we contacted him again, we found that he had indeed utilized our materials--not for himself but to help a neighbor finish an insulation job.

--Case #137, a homeowner, was looking for information on solar space heating for use in his own home and in the homes which he offers for rent. We sent him pamphlets and other information on solar energy for home use and we referred him to the National Solar Heating and Cooling Information Center for up-to-date information on government solar grants. A follow-up interview with him revealed that he was not completely pleased with our service; he was satisfied with the answers given over the phone, but he had never received our promised mailing. Since, according to our records, a mailing had originally been made, the interviewer promised to send duplicates immediately.

--Case #077, a homeowner, made inquiries about measuring the efficiency of his oil burner. At the time of his call, the hot line was not prepared to answer this question. Research was conducted using the Energy Information Center materials which were copied and mailed to the caller. Later the caller indicated that he had bought one of the measuring devices described in the hot line answer.

--Case #002, a homeowner, originally inquired about the fine points of a "do-it-yourself" insulation project. Since calling the hot line, he has added attic insulation using "loose fill" which was described to him over the phone and illustrated in one of the pamphlets we mailed.

In respect to the effectiveness of the television seminar, knowledge and intention measures were also included in the evaluation form.

Seminar participants were asked to indicate if they had learned "many new ways", a "few new ways", or "no new ways" to conserve energy at the seminar: 6 respondents (4.9%) indicated "many"; 69 (56.1%), a "few"; and 48 (39.0%), "no new ways." In other words, 75 respondents (61.0%) reported learning something at the seminar. In addition, participants were also asked to give examples of areas in which their knowledge had been increased; 92 discrete references were made. The most popular categories dealt with commercial energy management and energy audits, including HVAC applications, heat pump, lighting and computerized energy management systems (27 references); solar energy, including hot water and space heating (26 references); residential energy conservation technology, including insulation and HVAC (15 references); and energy conserving building design (12 references).

To measure intention to act, participants were asked to project the likelihood of action in terms of "very likely", "likely", "unlikely" and "very unlikely." Results were as follows: 39 respondents (32.8%), very likely; 46 respondents (38.7%), likely; 23 respondents (19.3%), unlikely; and 11 respondents (9.2%), very unlikely. Specific areas in which action would occur was also supplied by 62.7% of the respondents. Frequently mentioned areas included commercial retrofit (19 references), computerized energy management systems (7 references), energy audits (3 references), heat pumps (4 references) and activities associated with energy conserving building design (15 references).

Data presented below from interviews conducted with 11 randomly selected seminar participants gives substance to these knowledge and action figures and provides documented evidence of the effectiveness of the NYIT/ERDA (MRC-TV) Energy Management Seminar program for energy technology transfer.

- Case #017, a project engineer at a major energy consulting firm had stated in the evaluation form that he learned "no new ways" and that the question about likelihood of action was not applicable, since energy conservation was his company's life bread. He had commented on his preference for a seminar designed specifically for the engineer in mind. Upon being personally contacted he reported: I was not influenced at all by the seminar. I already had a broad knowledge of everything presented. There was no technical information of any kind that I could use on my job.
- Case #093, an electrical engineer working for a private concern, had noted that he learned "a few new ways", and that anticipating a money saving in the range of \$1000-5000 a year, it was "likely" that his company would act in the area of lighting reduction. When personally contacted he said: The seminar reinforced the rationale to institute a program of removing excess lighting in the fifty-odd buildings my company owns in New York City. We foresee as much as \$3500-4000 savings in our largest building alone.
- Case #080, an architect working for an architectural and planning firm, said he learned "no new ways" of conserving at the seminar and that the question concerning likelihood of action was "not applicable." He had commented on the evaluation form that he regretted the absence of specific procedures and detailed information. However when personally contacted, he reported: IBM's part has influenced me to the effect that I have been emphasizing the importance to my clients of employing energy conserving design and equipment in their plans.

--Case #020 was an electrical engineer employed in the newly formed New York City Energy Conservation Task Force which has responsibility to monitor energy use in all city agencies. At the time of the seminar he had indicated that he had not learned any new ways and was not likely to act, but when recontacted he said: the seminar influenced my thinking about implementing a solar hot water heating system in one of the New York City government office buildings.

--Case #089, a mechanical engineer working for the same city agency as above, indicated that he had learned "a few new ways" especially about the design of the building skin and lighting levels, and that although he expected money savings from conservation to be "considerable", he doubted much action because of lack of funds. He related during the interview that: the seminar aroused enthusiasm for the economic advantages of solar energy and waste heat reclamation. I am currently involved in producing a feasibility study to incorporate those technologies in one or more of the school buildings under the New York City Board of Education control.

--The random selection process lead to an interview with the city councilman already referred to in this report in the context of a secondary impact example. As a consequence of attending the seminar, case #002 had requested us to prepare a packet of energy conservation materials which he would present at a city council meeting (see p. 4). The follow-up interview revealed that the city council not only has approved plans for a comprehensive energy audit of all city office buildings, but that a consulting firm was being chosen to do the audit and make recommendations.

--Case #120, a New Jersey banker in charge of new mortgages, had indicated in the evaluation form that he learned "a few new ways" to conserve and he was "likely" to act by considering changes in his own home and "larger measures in the building industry." Upon being interviewed, he said: We wanted to become knowledgeable about the home aspects of energy conservation and we are now thinking seriously of initiating a specific loan program for home improvement loans incorporating energy conserving measures.

--Case #008, an architect in an architectural firm, had said he learned "no new ways", but that action was "likely" in the architecture and design of solar systems. His later reaction to the seminar was: It was good to get a general idea about what the consensus was and the extent to which the public was being informed. But there was nothing helpful presented to me and it has not influenced me one way or another.

--Finally, the comments of a banker, manufacturer, and citizen group member who did not return evaluation forms follow: The banker: I am definitely leaning toward pushing financing of energy conserving improvement especially solar. I wish that I had a chance to discuss the matter in much more detail with either the panel or other experts in attendance. The manufacturer: not enough technical substance for me. Did not stay for the whole seminar, however; and the citizen group member: A little too much squeezed in, but I left much better informed. We are installing insulation in our home.

The Relationship Between Effectiveness Measures and Selected Channel User Variables

The results reported in the previous section suggest that on balance and even at this early date, the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar program are effectively transferring energy technology communications. An attempt was made to more closely define the circumstances and conditions under which these two channels had a greater or lesser chance of being effective. We decided to examine the relationships between effectiveness measures and selected channel user variables by employing contingency table analysis or two-variable cross tabulations.

Table displays of cross tabulations, based on percentage figures, will show how two variables vary (or change) together. For example, we may find that the effectiveness measure of knowledge and the income level of seminar participants tend to vary in such a way that middle income groups learn more from the seminar than higher income groups. From a chi square test of significance, we may also learn that the relationship is statistically significant and not due solely to random chance. By this method, we may be able to identify conditions under which channel performance is improved. However, because of the small number of hot line evaluation forms which were returned, cross tabulations and chi square tests can be meaningfully computed only for television seminar variables.

The first relationship to be examined in this fashion concerns the studio location of seminar participants (World Trade Center versus outlying studios) and both seminar technology transfer effectiveness measures of knowledge of new ways to conserve energy and projections of likely energy conserving actions. Tables 9 and 10 below present the cross tabulations.

TABLE 9
THE RELATIONSHIP BETWEEN STUDIO SITE AND KNOWLEDGE

Knowledge of New Ways to Conserve	Studio Site	
	World Trade Center	Outlying Studios
Some	56.3%	67.3%
None	<u>43.7%</u>	<u>32.7%</u>
	100.0%	100.0%
	(71)	(52)

TABLE 10
THE RELATIONSHIP BETWEEN STUDIO SITE
AND LIKELIHOOD OF ACTION

Likelihood of Energy Technology Utilization	Studio Site	
	World Trade Center	Outlying Studios
Very likely	28.3%	38.5%
Likely	29.9%	50.0%
Unlikely	29.9%	5.7%
Very Unlikely	<u>11.9%</u>	<u>5.8%</u>
	100.0%	100.0%
	(67)	(52)

The first relationship ($\chi^2=1.09193$, 1 d.f., $p=\text{not significant}$) shows that 67.3% of the participants attending one of the outlying MRC-TV studios report learning "some new ways" to conserve energy compared to 56.3% of those at the World Trade Center who experience "some" new learning. This pattern is even more pronounced and statistically significant in the next relationship ($\chi^2=13.97753$, 3 d.f., $p=.003$) where 88.5% of the outlying studio

participants project either "very likely" or "likely" energy conserving actions versus only 58.2% at the World Trade Center. Thus it would appear that participants perform better on the measures of energy technology transfer effectiveness if they attend the seminar in Long Island, Westchester, New Jersey or Connecticut than in Manhattan, the broadcast site.

Several explanations are possible. For example, since participants at the World Trade Center at once experienced conditions associated exclusively with an interactive television network and with conventional seminars where there is face-to-face contact between seminar leaders and their audience, they may have been distracted by the contrast and, accordingly, less affected by the seminar.

We have stated in the past that one reason for expecting high cost-effectiveness from interactive television seminars is that this channel of communication permits the conduct of seminars for as many as several hundred participants distributed over a wide area who have to travel only a few miles to the nearest studio location. To find evidence of greater energy technology transfer at the outlying studios of the MRC-TV interactive network makes this expectation that much more credible.

The next relationship we examined concerned seminar date and both knowledge and intention effectiveness measures. Since the same videotaped interviews with four energy experts were replayed on each day of programming, we did not expect much variation in learning or action over the course of all days except the first. (The premier run of the Energy Management Seminar had been plagued with technical problems which were remedied in the afternoon and all subsequent sessions.)

Tables 11 and 12 below present a somewhat different picture. There were significant relationships between particular seminar date and both learning and action. That is, the relationship between seminar date and knowledge ($\chi^2=9.21690$, 4 d.f.) is significant at .05 level and indicates that participants on December 13th learned the highest percentage of new energy conserving techniques (77.8%) and as expected, that participants at the seminar debut learned the smallest percentage (35.3%). On the other hand, however, in the relationship between seminar date and intention to act ($\chi^2=21.47102$, 12 d.f., $p=.04$), while a respectable 27.8% of the participants on December 13th were "very" committed to action, the highest percentage of strong intention to act was detected among participants on the first day of programming (50%). From the available data, it was not possible to locate meaningful explanations for these discrepancies, but an answer must surely lie in the fact that various seminars were conducted before different size audiences and with different live hosts and panelists.

TABLE 11

THE RELATIONSHIP BETWEEN SEMINAR DATE
AND KNOWLEDGE

Knowledge of New Ways to Conserve	Seminar date				
	11/10	11/22	12/3	12/13	12/17
Some	35.3%	58.3%	37.6%	77.8%	58.3%
None	<u>64.7%</u>	<u>41.7%</u>	<u>42.4%</u>	<u>22.2%</u>	<u>41.7%</u>
	100.0%	100.0%	100.0%	100.0%	100.0%
	(17)	(12)	(33)	(36)	(24)

TABLE 12

THE RELATIONSHIP BETWEEN SEMINAR DATE
AND LIKELIHOOD OF ACTION

Likelihood of Energy Technology Utilization	Seminar date				
	11/10	11/22	12/3	12/13	12/17
Very likely	50.0%	7.7%	36.7%	27.8%	39.1%
Likely	31.3%	38.5%	43.3%	44.4%	26.1%
Unlikely	0	46.1%	6.7%	25.0%	26.1%
Very unlikely	<u>18.7%</u>	<u>7.7%</u>	<u>13.3%</u>	<u>2.8%</u>	<u>8.7%</u>
	100.0%	100.0%	100.0%	100.0%	100.0%
	(16)	(13)	(30)	(36)	(23)

One distinguishing feature of the television seminar was that it was designed to appeal to a variety of Energy Advisory Service target audiences. Since seminars tailored to a specific target audience's needs and interest would require long preparation time, this strategy permitted us to quickly proceed with channel experimentation. It also gave us the opportunity to assess whether it would be easier or harder to accomplish energy technology transfer over this channel for one target audience versus another.

As presented in Tables 13 and 14 below, we examined the relationship between major Energy Advisory Service target audience categories (see p.15) and knowledge ($\chi^2=2.41071$, 3 d.f.) and between major target audience categories and action ($\chi^2=7.75740$, 9 d.f.). Neither relationship is statistically significant. Thus, it would appear that all categories of Energy Advisory Service target audiences could share an equal chance of benefitting from exposure to subsequent seminars conducted over this innovative channel of communication.

TABLE 13
THE RELATIONSHIP BETWEEN TARGET AUDIENCE CATEGORY
AND KNOWLEDGE

	Target Audience Categories			
	I	II	III	IV
Knowledge of New Ways to Conserve	Industrial Firms	Energy Influential Firms	Homes and Public Institutions	Decision-makers
Some	37.5%	56.3%	64.3%	64.3%
None	62.5%	43.7%	35.7%	35.7%
	100.0%	100.0%	100.0%	100.0%
	(8)	(32)	(14)	(56)

TABLE 14
THE RELATIONSHIP BETWEEN TARGET AUDIENCE CATEGORY
AND LIKELIHOOD OF ACTION

Likelihood of Energy Technology Utilization	Target Audience Categories			
	I Industrial Firms	II Energy Influential Firms	III Homes and Public Institutions	IV Decision- makers
Very likely	28.6%	38.7%	20.0%	29.6%
Likely	28.6%	38.7%	53.3%	38.9%
Unlikely	14.3%	16.1%	26.7%	22.2%
Very unlikely	28.5%	6.5%	0	9.3%
	100.0%	100.0%	100.0%	100.0%
	(7)	(31)	(15)	(54)

The demographic characteristics of sex, education and income were employed in the evaluation. Since large percentages of participants were male and college educated, these variables were not explored in contingency table analysis. However, previous research has shown a relationship between income level and energy conservation practice with highest income groups not always scoring the strongest on measures of energy action.⁷ One explanation of this finding is that upper income consumers who can afford to pay increased energy bills "will continue to pay and use energy as they please."⁸

When we explored the relationship between income levels and both measures of channel effectiveness, a similar pattern materialized. Income level and knowledge is significantly related ($x^2=7.93640$, 2 d.f., $p=.02$) such that learning is greatest in the lower income range (80%), next in the middle income group (68.8%) and last among the upper class (45.5%) (see Table 15). The relationship between income and likelihood of action ($x^2=4.06743$, 6 d.f.) while showing a slightly different pattern, is not statistically significant (see Table 16).

TABLE 15
THE RELATIONSHIP BETWEEN INCOME LEVEL
AND KNOWLEDGE

Knowledge of New Ways to Conserve	Income Level		
	Low	Middle	High
Some	80.2%	68.8%	45.5%
None	<u>20.0%</u>	<u>31.2%</u>	<u>54.5%</u>
	100.0%	100.0%	100.0%
	(15)	(48)	(44)

TABLE 16
THE RELATIONSHIP BETWEEN INCOME LEVEL AND
LIKELIHOOD OF ACTION

Likelihood of Energy Technology Utilization	Income Level		
	Low	Middle	High
Very likely	40.0%	29.8%	33.3%
Likely	20.0%	44.7%	40.5%
Unlikely	26.7%	19.2%	14.3%
Very Unlikely	<u>13.3%</u>	<u>6.3%</u>	<u>11.9%</u>
	100.0%	100.0%	100.0%
	(15)	(47)	(42)

We had assumed from the start that best performance on channel effectiveness measures would be located among participants who were favorably disposed towards the subject matter of the seminar--energy conservation as a solution to current energy problems. To examine this possibility, an index was created from scores obtained on 9 questions dealing with most favored solutions to the energy situation. This index discriminated between respondents who perceived energy conservation as a solution equal in importance or more important than all others and those who placed no special significance on it. Furthermore, since discussions of solar energy were couched in a conservation context, solar energy (as an "excellent", "good", and "poor") solution to energy problems was also associated with the two measures of channel effectiveness.

When energy conservation as the "best" solution was crossed with knowledge ($\chi^2=1.06070$, 1 d.f.) and with action ($\chi^2=4.49852$, 3 d.f.) neither relationship emerged as significant (see Tables 17 and 18). In contrast to our expectations, then, data indicates that participants who are sanguine about energy conservation do not differ from those who are not in terms of energy learning and energy action.

TABLE 17

THE RELATIONSHIP BETWEEN ENERGY CONSERVATION
AS "BEST" SOLUTION AND KNOWLEDGE

Knowledge of New Ways to Conserve	Energy Conservation as a Solution	
	Best	Not Best
Some	57.0%	68.2%
None	43.0%	31.8%
	100.0% (79)	100.0% (44)

TABLE 18

THE RELATIONSHIP BETWEEN ENERGY CONSERVATION
AS "BEST" SOLUTION AND ACTION

Likelihood of Energy Technology Utilization	Energy Conservation as a Solution	
	Best	Not Best
Very likely	30.3%	37.2%
Likely	36.8%	41.9%
Unlikely	25.0%	9.3%
Very Unlikely	7.9%	11.6%
	100.0%	100.0%
	(76)	(43)

However, when solar energy was associated with the two measures of channel effectiveness, the anticipated patterns emerged (see Tables 19 and 20). While not statistically significant, the relationship between solar energy and knowledge ($\chi^2=2.28263$, 2 d.f.) indicates that 63% of those who saw solar energy as an "excellent" solution learned "some" new ways to conserve at the seminar compared to 45% who felt solar energy was a "poor" solution. The relationship between solar energy and action ($\chi^2=12.74040$, 6 d.f.) was significant at the .04 level, and shows that 40.5% who viewed solar energy as an "excellent" solution were "very likely" to act in various conservation areas (including, but by no means only, solar) compared to 15.8% who were pessimistic about this technology's potential.

TABLE 19

THE RELATIONSHIP BETWEEN SOLAR ENERGY
AS A SOLUTION AND KNOWLEDGE

Knowledge of New Ways to Conserve	Solar Energy as a Solution		
	Poor	Good	Excellent
Some	45.0%	61.1%	63.4%
None	<u>55.0%</u>	<u>38.2%</u>	<u>36.6%</u>
	100.0%	100.0%	100.0%
	(20)	(18)	(82)

TABLE 20

THE RELATIONSHIP BETWEEN SOLAR ENERGY
AS A SOLUTION AND ACTION

Likelihood of Energy Technology Utilization	Solar Energy as a Solution		
	Poor	Good	Excellent
Very likely	15.8%	22.2%	40.5%
Likely	26.3%	55.6%	35.4%
Unlikely	42.1%	16.7%	15.2%
Very Unlikely	15.8%	5.5%	8.9%

These two sets of data contain a paradox. On the one hand, the data concerning energy conservation as a solution suggests that the disconcerting conclusions of a recent study may be correct. The Gallup Poll organization recently conducted eight group discussions to probe consumer attitudes regarding energy conservation. The study reveals two points of interest:

1. There was general agreement (in the groups) that monetary savings are the most effective incentive to conserve energy. Patriotism, enlightened self-interest and concern for one's progeny are weak motivators, and
2. The financial motivation to cut down on one's energy use has nothing to do with a conservation ethic. It is a response of those who do not want to change their living standards but who are experiencing severe inflationary pressures.⁹

Thus one explanation of our first finding might be that even people who believe in the problem-solving potential of energy conservation will conserve only when they can save money. Other data from our study support this view. For example, 83 seminar respondents were able to provide at least one (and sometimes as many as four) examples of intended energy actions. However, 83.1% of these people were so certain that their actions would save money that some could even supply an estimated dollar savings figure.

Standing at odds with this interpretation, however, are the data relating to solar energy as a solution to future energy supply shortages. Solar energy is a conservation technology in its own right, but its cost-effectiveness (beyond domestic hot water applications and in lieu of electric resistance systems) is just now becoming attractive.¹⁰

If economics is truly the primary incentive to conserve, it seems strange that respondents who endorse solar technology should show a special affinity for any number of other energy conserving practices. The lesson to be learned from this point is not just that solar should be used as a vehicle to promote general energy conservation (although this would be one legitimate conclusion), but that a new avenue of research has been brought to light. There may be an incentive which leads solar advocates to conserve, but which is not intrinsic to solar alone. If a new motivation to conserve--beyond the economic--could be identified by further research then public education activities would be a prime beneficiary.

SUMMATION

In terms of the four major questions on which this evaluation study has focused, we have been able to specify the demographic and attitudinal characteristics of people using the hot line and participating in the television seminar, and we have supplied both quantitative and qualitative data showing favorable reaction to the two channels of communication in regard to several distinct features of channel operation and in regard to channel credibility as a source of energy information. We have been able to identify a number of circumstances and conditions under which the seminar was particularly effective (for example, being in attendance at one of the MRC-TV outlying studios), and over all, we have furnished impressive evidence from a number of sources that people who called the hot line or participated in the television seminar came away from their experience with new knowledge of energy conservation technologies and new intention to take conservation actions.

On the basis of the "knowledge" and "action" measures of channel effectiveness employed in this study, we conclude that the NYIT Energy Hot Line and the NYIT/ERDA (MRC-TV) Energy Management Seminar have been very effective for energy technology transfer.

ENDNOTES

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²Lynn B. Iglitzen, "Political Education and Sexual Liberation," Politics and Society, II (Winter, 1972), 241-254.

³Harold Mendelsohn, Thomas Espie, Gregory M. Rogers, "Operation Gap-Stop: A Study of the Applications of Communication Techniques in Reaching the Unreachable Poor." Television Quarterly, (Summer, 1968), 39-52; Jonathan Freedman and David O. Sears, "Selective Exposure," in Advances in Experimental Social Psychology, ed. by L. Berkowitz (New York: Academic Press, 1965), 57-97.

⁴Rovina Kilkeary, "The Energy Crisis and Decision Making in the Family," Research supported by Grant GY 11543, National Science Foundation, 1975, 13-14.

⁵Phyllis T. Thompson and John Mactavish, "Energy Problems: Public Beliefs and Behavior," Research privately funded; Urban and Environmental Studies Institute, Grand Valley State Colleges, Allendale, Michigan, 1976, 41.

⁶Ibid., 48-49.

⁷Rovina Kilkeary, "The Energy Crisis and Decision Making in the Family," Research supported by Grant GY 11543, National Science Foundation, 1975, 18; Eunice S. Grier, "Changing Patterns of Energy Consumption and Costs in U.S. Households," Paper presented at Allied Social Science Associations Meeting, (Washington, D.C., The Washington Center for Metropolitan Studies, 1976), Table 10, Appendix.

⁸Rovina Kilkeary, "The Energy Crisis and Decision Making in the Family," Research supported by Grant GY 11543, National Science Foundation, 1975, 19.

⁹The Gallup Organization, "Group Discussions Regarding Consumer Energy Conservation," Conservation Paper Number 49, Research supported under Contract #CO-04-60426-00, Federal Energy Agency, March 26, 1976, 11.

¹⁰U.S. Energy Research and Development Administration, An Economic Analysis of Solar Water and Space Heating, MITRE Corporation, (Washington, D.C.: Government Printing Office, 1976); U.S. Department of Health, Education, and Welfare and Federal Energy Administration cooperating, Buying Solar, by Joe Dawson, (Washington, D.C.: Government Printing Office, 1976).

A P P E N D I X

CENTER FOR ENERGY POLICY AND RESEARCH

New York Institute of Technology, Old Westbury, New York 11568

(516) 686-7578

No. _____

NEW YORK TECH ENERGY HOT LINE QUESTIONNAIRE

Thank you for completing the New York Tech Energy Hot Line Questionnaire. Your answers will be held in strict confidence and used only for this project. Under no circumstances will information be released. If you have any questions about the questionnaire, please call Dr. Gale Spak at (516) 686-7578. If you have any more questions about energy conservation, don't hesitate to use the Hot Line again at (516) 686-7744.

1. What do you consider the best features of the Hot Line? (In the spaces provided below, rate each of the following items from 1 to 5, with 5 being the BEST rating. Rate each item independently.)

____ Adequacy of Hot Line answer.
____ Opportunity for general education.
____ Audibility of Hot Line operator.
____ Usefulness of mailed materials.

2. Rate the following sources of information from 1 to 5 in terms of how much you trust each to give reliable information about energy matters. Use 5 to indicate that the source is VERY TRUSTWORTHY.

Newspapers _____ / oil companies _____ / Federal government _____
network TV & radio _____ / national politicians _____ / friends & family _____
professional _____ / local politicians _____ / N.Y. Tech Energy
journals _____ / Hot Line _____

3. Will you act or have you already acted on any of the suggestions provided over the Hot Line?

Yes, I will _____ } In what areas? _____
Yes, I have _____ }
No, I won't _____ } Do you estimate that any money will be saved?

Yes _____ (about how much) _____

No _____

4. There are a lot of ways that people can save energy and no one can know them all. We would like to find out what ways people know about and in particular, what ways people learned about by calling the Hot Line and/or reading the materials we sent. Below you will find a list of things that some people think saves energy in the home and that others think wastes energy.

Please indicate for each what you think by placing a check in the appropriate box. Please also indicate if you feel that the Hot Line helped you to learn about the item.

	Saves Energy	No Effect	Wastes Energy	Don't Know	Hot Line Helped
having your furnace serviced					
improving home insulation					
using a frost-free refrigerator					
replacing gas stove pilot lights with electric ignitors					
putting in storm windows					
installing a heat pump					
switching from regular to fluorescent light bulbs					
closing drapes at night in winter					
Learning about energy conservation.....					

5. Below you will find a series of actions and types of people who might help bring about a solution to America's energy-related problems. Please rate each item by placing a number from 1 to 5 in the space provided, with 5 indicating that the item will HELP the most.

Developing solar energy___/ developing nuclear energy___/
 getting more information to people___/ using energy more wisely___/
 U.S. foreign policy___.
 Concerned people___/ the Federal Government___/ scientists___/
 oil companies___/ The Lord will see to it___/ OTHER_____

6. Has the energy shortage problem affected you and your family in any way? That is, has it changed the way things are done or caused any problems?

Yes___ No___. If yes, in what ways_____

7. People have different ideas about how serious the energy shortage is. Over the next 10 years do you think there will be a severe shortage____/ a mild shortage____/ no shortage_____.
8. In what year were you born?_____ 9. What is your sex?_____
10. What is the highest grade that you completed in school?_____
11. Is there anyone in your household who completed a higher grade than you in school? Who?_____ What grade?_____
12. What is your occupation?_____
13. Do you consider yourself to be of the: lower class____/ middle class____/ upper middle class____/ upper class_____.
14. Please indicate which category below best describes the total combined income in 1975 of all members of your household from all sources--wages, dividends, social security, and so forth--before taxes and deductions:
Under \$1,500_____	\$15,000 to 19,999_____
\$1,500 to 4,999_____	\$20,000 to 24,999_____
\$5,000 to 9,999_____	\$25,000 to 29,999_____
\$10,000 to 14,999_____	\$30,000 and over_____
15. What type of structure do you live in? single family house____/ co-op, condominium____/ rental apartment in multiple family dwelling____/ rented unit in private house____/ other_____.
16. Your general comments: on the New York Tech Energy Hot Line

CENTER FOR ENERGY POLICY AND RESEARCH

New York Institute of Technology, Old Westbury, New York 11568

(516) 686-7578

NYIT/USERDA ENERGY MANAGEMENT SEMINAR QUESTIONNAIRE

Thank you for participating in the NYIT/USERDA Energy Management Seminar. We hope you have found the information valuable. To help us improve and evaluate the seminar, won't you please take a few minutes to complete the following questionnaire? When you are done, please hand it to the studio coordinator or mail it back to us at the above address.

Your answers will be kept strictly confidential. All data will be summarized within larger groupings for statistical purposes.

Studio location _____ Date _____ Morning _____
Afternoon _____

Name _____ Business or home address _____

1. There are many opportunities and technologies to conserve energy in your place of work and at home. We would like to find out if you learned about any new ways today.

Many new ways _____)

What ways, for example? _____

A few new ways _____)

No new ways _____)

2. How likely do you think it will be that you will act on any of the suggestions made in this seminar?

Very likely _____)

In what areas will you act? _____

Likely _____)

Unlikely _____)

Do you estimate that any money will be saved? Yes _____ (about how much) _____

Very unlikely _____

No _____

3. Has the energy shortage problem affected you and your place of work in any way? That is, has it changed the way things are done or caused any problems? Yes _____ No _____. If yes, in what ways?

_____
_____

4. Below you will find a series of actions and types of people who might help bring about a solution to America's energy-related problems. Please rate each item by placing a number from 1 to 5 in the space provided, with 5 indicating that the item will HELP the most. Please rate each item independently.

Developing solar energy____/ developing nuclear energy____/

getting more information to people____/ using energy more

wisely____/ adjusting U.S. foreign policy____/.

Concerned people____/ the Federal government____/ scientists____/

oil companies____/ OTHER_____.

5. People have different ideas about how serious the energy shortage is. Do you think that there is:

a severe shortage____ a mild shortage____ no shortage____?

6. What year were you born_____?
7. What is your sex_____?
8. What is the highest grade that you completed in school_____?
10. For what kind of concern do you work?_____

11. What is your particular job and job title?_____

12. Please indicate which category below best describes the total combined income in 1975 of all members of your household from all sources--wages, dividends, social security, and so forth--before taxes and deductions:

Under \$1,500_____

\$15,000 to 19,999_____

\$1,500 to 4,999_____

\$20,000 to 24,999_____

\$5,000 to 9,999_____

\$25,000 to 29,999_____

\$10,000 to 14,999_____

\$30,000 and over_____

13. Rate the following sources of information from 1 to 5 in terms of how much you trust each to give reliable information about energy problems. Use 5 to indicate that the source is VERY TRUSTWORTHY.

newspapers____/ oil companies____/ Federal government____/
 network TV & radio____/ national politicians____/ friends & family____/
 professional____/ local politicians____/ NYIT/USERDA Energy
 journals Management Seminar____/

14. What do you consider the best features of the NYIT/USERDA Energy Management Seminar? In the space provided, rate each of the following items from 1 to 5 with 5 being the BEST rating.

Quality of live speakers____
 Opportunity for broad exchange of ideas____
 Quality of sound and visibility of people on the screen____
 Opportunity for general education____
 Value of visual materials____
 Segment on practical applications of solar energy and
 energy conserving building design (F. Dubin)____
 Segment on financing of energy conservation (E. Canuso)____
 Segment on energy legislation and tax policy (J. Cohen)____
 Segment on energy management systems (J. Honeycomb)____

15. Did you participate in the discussion, e.g. commenting, answering or asking questions? Yes____No____.

16. How did you become aware of this seminar? _____
 _____

17. What made you decide to come? _____
 _____

18. Your general comments on using an interactive television network for a seminar of this sort: (Please use the reverse side of this page.)