Decem... 31, 1993

LCMR WORK PROGRAM 1991

I. RESIDENTIAL URBAN ENVIRONMENTAL RESOURCE AUDIT - EDUCATION 39

Program Manager: Anne Hunt
Saint Paul Neighborhood Energy Consortium
475 N. Cleveland Avenue, #100
Saint Paul, Minnesota 55104
(612) 644-5436

A. M.L. 91 Ch__ Sec.__ Subd: 13(e) Appropriation: $150,000.00
(accurate as of May 31, 1992) Balance: $ 0

Residential Urban Environmental Resource Audit: This appropriation is to the Commissioner of Administration for a grant to the Saint Paul Neighborhood Energy Consortium (NEC) to develop and implement neighborhood workshops and one-on-one consultations as part of an environmental urban resource audit and a broad educational campaign.

B. Compatible Data: Not applicable.

C. Match Requirement: $0
Funds Raised to Date: $1,521.00 (Northern States Power funds for 2 compact fluorescent bulbs per home)

$16,831.00 (Funds from Saint Paul Water Utility)

II. NARRATIVE

Implementation of the Residential Urban Environmental Resource Audit was delayed pending approval by the Department of Energy (DOE). The project was approved on December 18, 1991. The project start date was postponed six months, but began on January 1, 1992.

III. OBJECTIVES

A. Design and deliver 8-10 neighborhood educational workshops on resource conservation in the home that motivate people to sign up for an Residential Urban Environmental Resource Audit.

A.1. Narrative: Each workshop will provide: 1) a general overview of the five conservation areas - water, solid waste, indoor air quality, electric and natural gas usage; and 2) current information on weatherization options, recycling, "precycling", backyard composting, and alternatives to household hazardous waste (H.H.W.).

A.2. Procedure: Resource conservation educational material will be mailed to 35,000 St. Paul households. Respondents to the mailings will attend a neighborhood environmental workshop.

A.3. Budget:

	LCMR Funds	Matching Funds
a. Amount budgeted:	$35,000	$0
b. Balance amount:	$0	

A.4. Production Timeline:

	1/92	7/92	1/93	7/93	1/94
Develop material	XXXX**********				
Conduct workshops		XXXX**********			

A.5 Status: Nine workshops were delivered on six different topics. These topics were:

- Transportation and energy issues,
- General home resource conservation,
- Water conservation,
- Precycling and waste reduction--two workshops,
- Environmental yard care--two workshops and
- Household hazardous waste--two workshops.

Information and demonstrations were presented by guest speakers and NEC (Neighborhood Energy Consortium) staff on the specific topics (see the attached list of speakers). A slide presentation was developed which detailed home conservation techniques and the explained the Green House evaluation process. The slide presentation motivated people to sign up for the free evaluation. Original educational materials were also developed for the specific workshops. (See attached booklets.) These booklets consolidate existing and new information. Participants also had the opportunity to choose more specific information on other topics. (See the attached list of organizations providing information)

Residents were invited to the workshops through approximately 22,000 brochures mailed in the Merriam Park, Lexington-Hamline and Snelling-Hamline neighborhoods of St. Paul. (See attached brochures.) This target area was bordered by University Avenue, Lexington Avenue, Summit Boulevard and Fairview Avenue. The western border was later extended to Mississippi River Boulevard, which increased the number of homes the program was available to. The target area was chosen for it's mix of housing stock, family size and demograghic make-up. The number of homes which were four units or less in the total target area is 4,620. 2,500 homes received six mailings and 2,120 additional homes received the last three mailings. 551 households in these neighborhoods, or 11.9% responded to the invitations. 489 people attended the workshops.

In addtion to the brochures mailed out through the Green House Program, conservation information was included in an NEC Waste Reduction Guide sent out in October of 1993 to 100,000 homes in Saint Paul. Approximately two pages in the guide dealt specifically with home energy conservation information.[1]

A privately conducted survey of participants that attended the workshop showed that 98%[2] of the participants found the workshop helpful. 92%[3] of those who attended a Green House workshop believed that the workshop information was presented in a manner that was understandable and

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1 The Green House program funded only the two pages of the booklet that related to energy conservation.
2 MPA consultants survey, question # 9
3 Ibid -- #11

useful. This finding was significant given the variety of information being communicated, and was consistant for each workshop.

96% of the attendants were motivated to make more changes in their households due to information they received at the workshops and 97% would be willing to recommend the workshop to others.[4] 74% or more of these participants said that they learned about current information on low cost ways to lower energy bills, backyard composting and safe non-toxic cleaners.[5]

Program Significance and Recommendations For Future Implementation: The positive results of the indepent survey show that the workshops were successful. Reasons for success include creative, motivational brochures to encourage workshop attendance. Guest speakers shared their expertise on specific topics, which made the workshop a valuable experience. Creative activities[6] for children were offered at each workshop to encourage full family participation, and convenience for parents. All workshops were offered in convenient neighborhood locations in buildings which were fully accessible for those with disabilities.

Possible improvements for future workshops may include expanding the concept of small group learning exercises. A hands on label reading activity developed by the Minnesota Pollution Control Agency was used during the "Is There a Better Way to Have a Clean House" workshop. Participants in this exercise, became more connected with their neighbors and developed a more comprehensive understanding of what commonly purchased items contain hazardous materials. It is possible that this understanding had an effect on participants future purchasing decisions.[7]

Inviting more local businesses[8] in to participate in workshops to promote conservation products in conjunction with the needs identified in homes during the audits could create partnerships that increase local small business productivity and provide convenience for residents.

If a future objective would be to target the residential urban environmental audit program specifically to low income groups, several methods could be employed. One method to determine the needs of under represented groups would be to hold focus sessions. The focus session could help determine if neighborhood workshops are an effective communication tool or if other methods would be more effective. A survey could be conducted to determine which services provided by the Green House program would be most valuable for groups such as renters and lower income participants. Program design and outreach could then be tailored to those needs. These suggested changes may strengthen the social value of future program expansion.

A.6. Benefits: This objective will consolidate environmental information; motivate residents to seek additional information and resources on resource management; and make referrals to other available programs.

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4 Ibid --abstract #14 and 20

5 Ibid--#7

6 Activities for children were provided by outreach staff from the Science Musuem of Minnesota, and included creative sculptures using "garbage", using a "Water Trunk", seed planting, and videos on related topics.

7 MPA Consultants survey–abstract 13, 22% made one or two changes on household waste and toxic waste after attending a workshop.

8 A neighborhood bicycle shop displayed products that encouraged using the bicycle a viable source of transportation. Produc' ded child carriers, bags for groceries, and safety gear.

B. Provide Residential Urban Environmental Resource Audits to 300 homes.

B.1. Narrative: The NEC's trained consultant will motivate households to change their consumption habits through an examination of resource utilization and individual behavior.

B.2. Procedure: The Residential Urban Environmental Resource Audit will check furnace safety and efficiency, water usage, indoor air quality, radon levels and survey H.H.W. Secondly, low cost conservation products (e.g. high efficiency light bulbs, low flow shower heads and hose nozzles) will be installed. Finally, the audit will also provide more detailed water conservation, recycling and backyard composting information and make recommendations on consumer purchasing and "precycling" habits. Radon detectors will also be installed and later removed by the resident for laboratory analysis.

B.3. Budget:	LCMR funds	Matching Funds
a. Amount budgeted:	$115,000	$16,831.00 $ 1,521
b. Balance amount	$0	

B.4. Timeline for Audits:

	3/92	7/92	1/93	7/93	1/94
Conduct 300 audits	XXXXXXXXX	**********	**********	**********	
MPCA survey of HHW	XXXXXXXXX	**********	**********	**********	
Monitor consumption data	XXXXXXXXX	**********	**********	**********	

B.5. Status: 315 Green House Evaluations were completed over the course of the project. 56 evaluations were part of a pilot phase which occurred during 1992. These evaluations were designed by the Green House Program Manager and were performed by an NEC energy evaluator. During this pilot phase basic procedures were developed, testing equipment determined and conservation products researched. A general checklist of areas in the home to be tested or measured was developed following a basement to attic walk-through approach.

A full-time evaluator was hired in January 1993, and trained to perform evaluations during the main phase of the program. The evaluator completed training in the following subjects: performing residential conservation and insulation audits, energy conservation, water conservation and solid waste reduction. The evaluator also completed training courses from the Environmental Protection Agency in Indoor Air Quality and from the Minnesota Pollution Control Agency in Household Hazardous Waste Phone Training.

The 259 evaluations performed during the second phase of the program were improved by separating out the survey portion of the checklist and distributing to participants at the workshop. Participant's consumption and conservation habits could then be discussed at the beginning of the home evaluation, concentrating on specific priorities for that particular home. Also a recommendation form was created which the residents received upon completion off the evaluation. This form listed and affirmed resource conservation activities already practiced in the home. It also listed tests results, devices installed and recommendations for further action.

Energy Conservation-natural gas and electric:

▪Furnace safety and efficiency tests were performed on homes evaluated[9]. 24% of the homes had furnaces operating below factory standard efficiencies[10] and were strongly encouraged to have their heating system cleaned and tuned. Every resident was given information on carbon monoxide and heating system maintenance.

▪Insulation levels were checked and an insulation audit was recommended if insulation was inadequate. 25% of the homes could find benefit from adding more insulation.

▪ Of the 152 homes tested with the blower door[11], over 72% needed to add materials which would "weatherize" or seal cracks and openings where heat could escape. Residents received weatherization materials as part of the Green House Evaluation.[12]

▪Water heaters were tested and the water temperature setting was lowered in 14% of the homes. 32% of the homes received insulative water heater blankets which will save an estimated 1,500 ccf per year.[13]

▪Electricity conservation was promoted by educating residents and supplying them with ways to reduce their consumption. 433 compact fluorescent light bulbs were installed in the homes. This translates into a total savings of 19,300 kwh per year[14] for all the homes evaluated. 87% of participants were encouraged to reduce refrigerator electricity use by cleaning the coils[15]. These participants received brushes for this task and it is estimated that they will reduce electricity consumption by 11,900 kwh per year.

Water Conservation: Each evaluation included measurement of water usage in the home. The sinks, showers, and toilets were measured by the evaluator and where possible, water saving devices were installed. Information was collected for all 315 audits so the following numbers include data from evaluations performed during the pilot phase.

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9 All homes with barometric draft furnaces were tested, a small amount of homes with induced draft furnaces with high efficiency design were not tested.

10 A Annual Fuel Utilization Efficiency of less than 60% is considered below factory standards.

11 The Blower Door is a device which uses a fan to temporarily create a vacuum in the home and allow the evaluator to estimate air infiltration and identify air leaks.

12 Weatherization materials distributed include: 780 pairs of pulley seals, (cover the sash cord pulleys) 21 door sweeps, 39 sets of door weather-stripping and 25 boxes of rope caulk.

13 The Residential Conservation Services Auditor Handbook estimates that blankets save 1-2 ccf of natural gas per month.

14 This amount was calculated by multiplying the total wattage reduced by the number of hours the lights are on. The average hours per day per light was assumed to be 5 as documented by the Residential Conservation Services Auditor Handbook.

15 Home Energy Journal reported a mimimum 3% reduction in refridgerator edectricity use if the coils are cleaned twice per year. The Residential Conservation Service Auditors Handbook estimates average refrigerator use to be 140 kwh/month.

▪The toilet device used was a Select-A-Flush® which saves water by providing the option for an economy flush. 257 Select-A-Flushes® were installed with an average savings of 1.95 gallons per economy flush.

▪Low-flow showerheads were installed in 43% of the homes. The average savings per showerhead was 1.13 gallons per minute.

▪225 faucet aerators were installed in bathrooms and kitchens. The average savings per aerator was 0.74 gallons per minute.

▪Residents also received information about wise water use habits and were encouraged to reduce unnecessary waste such as leaky fixtures. Leaks were identified in 28 homes and all participants were given information on fixing leaks.

Indoor Air Quality:

▪All participants completed a survey on air quality problems in their home.[16] This survey identified 15 homes with potential problems and in most of these homes the problem was identified. 14% of the heating systems checked were producing excess carbon monoxide and 4% were backdrafting. Three water heaters were backdrafting and producing carbon monoxide. Because these problems are health threats, it was recommended that these problems receive immediate attention from a heating system specialist.

▪48% of the homes had gas leaks. These leaks were identified, marked and the resident was given information on how to have them repaired.

▪Radon tests were given out to 216 homes. Of the 157 tests which were properly completed by the resident, 24% of the homes had levels above the EPA recommended maximum of 4 picocuries/ liter. These homes received mitigation information.

Waste Reduction and Recycling:

▪In an independent survey[17] of 92 participants 75.0% said that as result of the program they have "somewhat decreased" the amount of garbage generated each week. 82.6% of the stated that they have started buying items with less packaging.

Household Hazardous Waste:

▪128 participants completed a written Green House survey[18] of the household hazardous waste stored in their home. 43% of the homes had paints or adhesives, 40% had some type of hazardous cleaners, 15% had pesticides and 7 households had banned pesticides in their home. Every participant was given information to help them identify and properly dispose of hazardous materials. Suggestions for safer alternatives to these product were included in the educational materials.

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16 Survey was adopted from the Indoor Air Quality checklist developed by the American Lung Association.

17 Addendum to survey conducted by MPA Consultants.

18 The household hazardous waste portion of the Green House survey was developed by adapting a checklist produced by the Seattle Toxics Coalition. It is one part of the overall survey. (See attached copy.)

Program Significance and Recommendations For Future Implementation:
Residential Urban Environmental Resources Audits are one of the only methods through which residents receive a "one stop shopping approach" to household conservation information. There is a great deal of technical and educational information available to residents but often they are not aware of how to access it. The Green House Evaluation is an efficient way to deliver technical information and conservation devices that may be difficult for an individual to obtain on their own.

The best indicator of the success of the Green House Evaluation is the impact it had on the residents participating in the program. The high survey ratings show that home audits are a very effective tool for disseminating conservation information to the public. In a survey of 100 participants, 99%[19] said they made at lease one change, and 70% made more than one change in their home as a result of having the Green House Evaluation. The residents also gave all of the conservation devices they received through the evaluation a high rating.

Areas for improvement for future programs

- Planned follow up on homes that have evaluations to see when behavioral changes occur.
- Targeting high users for gas, electricity and water.
- Using a better reminder system to encourage a greater number of participants to mail in radon tests.
- Including a leak repair component to increase water savings
- Further condensing of educational materials
- Targeting the evaluation to seasonal mini-audits (energy issues in the fall, indoor air quality issues in the winter, yard care or household hazardous waste issues in the spring, transportation and water issues in the summer) These mini-audits could be modules that are added to a traditional energy audit, increasing the marketing appeal and cost efficiency of existing programs.
- A special program could be targeted to renters, working with property owners on the financial incentives of conserving resources and the importance of safety issues.
- Continue to work with utilities and agencies to support this type of program in a joint effort.

Workshop Speaker List
David Whiting, Extension Service, on environmental yard care methods.
Oakley Surine, volunteer Master Gardener, on backyard composting.
Joe Wozniak, Ramsey County Public Heath, on household hazardous waste
David Bartholomay, Dakota Ventures, on water conservation.

[19] question #20.

Cynthia McArthur, youth educator, on bicycling as alternative transportation.
John Bailey, Institute for Local Self Reliance, on the real costs of automobiles to local economy.
Michelle Levenson, MTC Marketing, on using the MTC bus system or Rideshare as examples of alternative transportation examples.
Peter Kuzj, Minnesota Department of Health, Indoor Air Quality, on indoor air quality issues.
Tom Anderson, Saint Paul Water Utility, on Saint Paul water supply source and treatment.
Sally Patick, Green House Program Manager, on general resource conservation topics.
Tim Reese, Green House Program Evaluator, on general resource conservation topics.

B.6. Benefits: This objective will assure that residents install effective conservation devices, and alter usage and behavior patterns. It will educate people on better environmental stewardship in their homes.

IV. EVALUATION

The NEC will be monitoring pre- and post-consumption data on the home's water, electric, garbage and heating fuel costs. With the installation of a number of energy and resource conservation devices, the resident/homeowner will see a decrease in the percentage of income spent on utilities as well as an increase in disposable income. The side benefits will be a positive effect on the environment and decrease in dependence on fossil fuels and non-renewable resources.

V. CONTEXT

A. During the next decade, Minnesotans will be faced with a forty percent increase demand for electricity; increased fuel and garbage disposal costs; and a possible shortage of water. Area residents are inadequately prepared to make the necessary changes in life style and consumption habits.

B. This project will complement current work of the NEC as well as the Environment and Energy Resource Center, Minnesota Pollution Control Agency, Ramsey County Extension Service and the Land Stewardship Project. It will also consolidate other existing technical and educational information available in Minnesota and the country.

C. Residential resource conservation projects to this date have not been funded by the LCMR. Community energy council programs have been previously funded. It is anticipated that funding beyond the FY 92-93 biennium may be necessary if other long term funding sources are not secured.

D. Not Applicable.

E. Biennial Budget System Program Title and Budget: Not Available at this Time.

VI. LIFICATIONS

1. Program Manager: Anne Hunt
   Executive Director
   Saint Paul Neighborhood Energy Consortium

   Sally Patrick
   Green House Program Manager
   Saint Paul Neighborhood Energy Consortium

2. Major cooperators:

   a. Marcia Honald
      Project Manager
      Environment and Energy Resource Center

   b. Leslie Goldsmith
      Supervisor, Special Waste Unit
      Minnesota Pollution Control Agency

   c. Clifford A. Nash
      Conservation Director
      Saint Paul Water Utility

VII. REPORTING REQUIREMENTS

Semi-annual reports will be submitted not later than ~~July 1, 1993; January 1, 1994; and a final report by July 1, 1994.~~ *January 1, 1992; July 1, 1992; January 1, 1993; and a final report by June 30, 1993.* A regular report will be sent on July 1, 1993, but final report will be sent on December 31, 1993. Funds for this LCMR project were delayed and not available for project until December of 1992, consequently timeline was delayed for six months.

GREENHOUSE PROGRAM
EXPENSES
SINCE PROJECT INCEPTION

	ACTUAL SINCE JANUARY 1992	DETAIL	WORKSHOP	EVALUATION
SALARIES	74038.90			
COORDINATOR		67292.88	16823.22	50469.66
AUDITOR		6746.02	674.60	6071.42
FICA TAX	5600.44			
COORDINATOR		5090.15	1272.54	3817.62
AUDITOR		510.28	51.03	459.25
MN UC FUND	546.88			
COORDINATOR		497.05	124.26	372.79
AUDITOR		49.83	4.98	44.85
WORKERS COMP	814.37			
COORDINATOR		740.17	185.04	555.13
AUDITOR		74.20	7.42	66.78
DISABILITY INS	187.22		46.81	140.42
HEALTH INS	4076.95		1019.24	3057.71
DENTAL INS	791.92		197.98	593.94
TEMP CONTRACT SRVC	772.70		772.70	
CONSULTANTS	8800.00		2200	6600
LEGAL SRVC	141.05		35.26	105.79
FINANCIAL AUDIT	1950.00		487.50	1462.50
STAFF TRAINING	2979.93		744.98	2234.95
RENT/UTILITIES	7180.95		1795.24	5385.71
PROPERTY/LIABILITY INS	401.23		100.31	300.92
TELEPHONE	849.21		212.30	636.90
OFFICE SUPPLIES	1007.77		251.94	755.83
WORKSHOP	2226.20		2226.20	
PRINTING	9004.78		2251.20	6753.59
DUPLICATING	623.65		155.91	467.74
POSTAGE	830.33		207.58	622.75
BULK MAIL	1693.23		423.31	1269.92
OFFICE EQUIPMENT	504.99		504.99	
COMPUTER MAINTENANCE	1708.33		427.08	1281.25
ADVERTISING PUBLIC SERVICE	897.83		224.46	673.37
MILEAGE/TRAVEL	1658.65		82.93	1575.72
CONSERVATION MATERIALS	12361.70			12361.70
AUDIT SUPPLIES	8892.85			8892.85
DESIGN & LAYOUT	2489.57		2489.57	
SUBSCRIPTIONS	534.75		133.69	401.06
VOLUNTEERS EXPENSES	127.19		127.19	
MISC EXPENSE	116.00		58	58
TOTALS	153809.55		36319.46	117490.09