

Yolo Energy Efficiency Project (YEEP) EM&V

Project 2 – CPUC No. 1224-04

Evaluation Report

Project No: 04-13 YEEP M&E

Date: January 26,2007

Submitted to:

Yolo Energy Efficiency Project

Submitted by:



HESCHONG MAHONE GROUP, INC.

11626 Fair Oaks Blvd. #302

Fair Oaks, CA 95628

Phone:(916) 962-7001

Fax: (916) 962-0101

e-mail: austin@h-m-g.com

website: www.h-m-g.com

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	1
2. INTRODUCTION	3
3. EVALUATION METHODOLOGY	5
3.1 Outreach Activities	5
3.2 Incubator Projects	5
3.2.1 <i>Natural Cooling Incubator Project</i>	5
3.2.2 <i>Multifamily Energy/Water Efficiency Pilot</i>	6
3.2.3 <i>Local Energy Policy/Ordinance</i>	6
4. EVALUATION RESULTS	8
4.1 Outreach Activities	8
4.1.1 <i>Low Income Residents – Canvass</i>	8
4.1.2 <i>Spanish Speaking Households Reached - Canvass</i>	9
4.1.3 <i>Other Non-English Speaking Households Reached - Canvass</i>	9
4.1.4 <i>Customer – Direct Community Outreach other than Canvass</i>	9
4.1.5 <i>Customer Households – Direct Mail</i>	10
4.1.6 <i>Small Business Customers</i>	10
4.1.7 <i>Low Income Canvass</i>	10
4.1.8 <i>Tabling/Booth</i>	10
4.1.9 <i>Business Groups Presentations</i>	10
4.1.10 <i>Community Groups Presentations</i>	11
4.1.11 <i>City Newsletters</i>	11
4.1.12 <i>Direct Informational Packet to Households</i>	11
4.1.13 <i>YEEP 1 Recruitment Results</i>	11
4.2 Incubator Projects	11
4.2.1 <i>Natural Cooling Incubator Project</i>	11
4.2.2 <i>Multifamily Energy/Water Efficiency Pilot</i>	14
4.2.3 <i>Local Energy Policy/Ordinance</i>	17
5. OVERALL FINDINGS & CONCLUSIONS	19
6. APPENDIX A – INTERVIEW INSTRUMENTS.....	21
6.1 <i>Natural Cooling Incubator Project Interview Instrument</i>	21
6.2 <i>Multifamily Energy/Water Efficiency Pilot Interview Instrument</i>	22

1. EXECUTIVE SUMMARY

This report presents the final results of an evaluation of the Yolo Energy Efficiency Project's Information and Market Transformation Program (YEEP 2). The Yolo Energy Efficiency Project (YEEP) was a hybrid of both information and energy savings measures. YEEP 2 was implemented through incubator and pilot projects. The YEEP 2 project had **two** distinct activities:

1. Information and training through outreach activities,
2. Exploratory Incubator projects
 - a. Natural cooling incubator project,
 - b. Multifamily energy/water efficiency incubator project, and
 - c. Local energy policy/ordinance pilot project.

The program implementation plan was developed as incubator projects allowing the program implementation plan leeway on the type of effort needed for each project. The initial project scope project scope and budget was revised as more information and understanding was gained. Fifteen percent (15%) of the total YEEP 2 budget was budgeted and spent on the incubators.

The general evaluation purpose was to provide a post-implementation assessment of the success and effectiveness of the program. Evaluation findings among the different projects varied. Program success is primarily dependant on whether the information will be made accessible in the public domain and the knowledge gained from the pilot projects would be utilized by others to continue future work in each of the project areas. Evaluation activities included quantitative analysis of success in reaching contact and activity goals and analysis of success in qualitative goals.

The Outreach project consisted of marketing efforts used to advertise YEEP activities and programs. For the Outreach project, twelve marketing goals were set as indicators to track YEEP's contribution to energy efficiency awareness in the region. Seven of the marketing goals were exceeded while five modified with the approval of the CPUC program manager. YEEP's outreach effort attempted to reach every business and resident in Yolo County and utilized several different communication methods, including direct mail, newspaper, radio, community events, and door-to-door solicitation. The outreach efforts by YEEP 2 were done to support reaching the energy savings goals of YEEP1. Community events distributed free compact fluorescent lamps (CFLs), conducted Torchiere turn-in events, located and qualified sites for the income qualified evaporative cooler installations, and informed businesses about the direct install lighting program Lights Lite.

The Natural Cooling incubator project intended to increase the knowledge and implementation of natural cooling strategies for the region through research and community outreach in the form of an Energy Savings Fair. For the Energy Savings Fair, YEEP worked with a retail partner coordinating efforts to promote energy efficient products during a single community event. While there was little customer feedback on the event, the retail partner was pleased to work with YEEP on the project and would like

EM&V of the Yolo Energy Efficiency Project – YEEP 2

to conduct similar events. The background report dealt with the fact that in an area which did not depend on evaporative cooling prior to the advent of affordable air conditioning, evaporative cooling does not have the established market necessary for the introduction of advanced evaporative cooling technologies. In order for the information to be useful and widely disseminated, the report needs a more thought-out structure.

The Multifamily Water and Energy Savings incubator project intended to explore alternative ways to resolve the split incentive barrier in rental housing but addressing water costs which are paid by the owners. A BETA version of an electronic tool to calculate water and energy savings potential in multifamily buildings was developed. Despite not being able to convince the multifamily building partner to incorporate the suggestions provided by Water Energy Efficiency Tool, the project did make a worthwhile attempt to provide an analysis tool for the multifamily sector. Further improvements are needed for the tool to be market-ready, including greater input by market actors.

The Local Policy incubator project provided professional support to jurisdictions in Yolo County requesting assistance in the development of local energy policy and potential ordinances. The program activities included working with the City of Davis's Natural Resources Commission to develop Energy Task Force recommendations related to Energy Efficiency in Buildings. An Energy Task Force recommendations report was submitted by YEEP to the City of Davis's Natural Resources Commission. The report found that the recommendations of the Energy Task Force would be met by the continued efforts of the City to enforce the 2005 Title 24 Building Energy Efficiency Standards. However, there was no indication that the City would pursue additional efforts beyond current activities.

2. INTRODUCTION

This report presents the final results of a process evaluation of the Yolo Energy Efficiency Project's Information and Market Transformation Program (YEEP 2). The report includes the evaluation methodology and analysis of the program activities. Section 3 presents the evaluation methodology for the program. Section 4 presents the evaluation analysis. Section 5 summarizes final conclusions.

The Yolo Energy Efficiency Project provides direct installations, technical assistance, marketing and training, and market transformation projects to the residences and businesses of Yolo County through a portfolio approach containing two integrated and complimentary programs:

1. YEEP-1, a hardware incentive program, and
2. YEEP-2, an information and market transformation program.

The broad program objectives include:

- ◆ Realize quantifiable economic and societal benefits of energy efficiency
- ◆ Serve hard to reach and low income markets
- ◆ Develop a climate-specific program
- ◆ Reduce Central Valley residential cooling contribution to peak demand
- ◆ Develop strategies for long-term market transformation in the residential cooling market
- ◆ Coordinate closely with other programs for information and market transformation, and to induce additional savings by increasing subscription to Statewide programs and through low-cost and no-cost measures

YEEP 2 was implemented through incubator and pilot projects. The YEEP 2 project had **two** distinct activities:

1. Information and training through outreach activities – For this project, YEEP carried out an information and education campaign primarily through events (both tabling and special events), presentations, displays in public buildings, advertising in all available media and low-income canvass. A marketing plan was developed which set specific marketing goals which were then tracked throughout the program.
2. Incubator projects are designed to be program research and development. Pilot programs can use the results of incubators as building blocks. As energy efficiency programs aggressively pursue hard to reach markets and market sectors innovation will be required. An incubator project is a low cost, low risk way to explore the potential of a new approach or market sector. Fifteen percent (15%) of the total YEEP 2 budget was budgeted and spent on the incubators.
 - a. Natural cooling incubator project - This project addressed the Central Valley cooling problem by linking development of evaporative cooler marketability with promotion of Statewide HVAC measures. It addressed a supply barrier –

EM&V of the Yolo Energy Efficiency Project – YEEP 2

the lack of availability of high quality natural cooling products in the County – and demand barriers – the lack of information and education about the natural cooling alternative. The project also sought to develop demand for Natural Cooling products among residential customers in Yolo County. The program activities for this project included compiling a research report on the region’s natural cooling opportunities and conducting an Energy Savings Fair at the Woodland Home Depot to publicize natural cooling products.

- b. Multifamily energy/water efficiency incubator project - This project addressed the connection between water and power conservation for the multifamily building market. For this incubator, YEEP analyzed the water and energy conservation opportunities of a multifamily complex and then presented the retrofit proposal to the owners. The program activities included modifying a water and energy conservation spreadsheet tool for commercial buildings, using the modified tool to analyze a multifamily complex, and presenting the results to the building owner.
- c. Local energy policy/ordinance pilot project - YEEP provided professional support to County of Yolo and Yolo cities requesting such assistance, for the development of energy policy and potential ordinances. The program activities included working with the City of Davis’s Natural Resources Commission to develop Energy Task Force recommendations.

The general purpose of the evaluation was to provide a post-implementation assessment of the success and effectiveness of the program. Evaluation activities included:

- ♦ Quantitative analysis of success in reaching contact & activity goals
- ♦ Analysis of success in qualitative goals

The EM&V effort for YEEP 2 primarily used qualitative analysis, and included a process evaluation component.

3. EVALUATION METHODOLOGY

This section details the methodology used for each project.

3.1 Outreach Activities

The evaluation objective for the program outreach activity was to document whether the outreach targets established by the program were met and which marketing efforts were successful in gathering participants to the YEEP 1 incentive programs. The latter objective is important because gathering participants for the YEEP 1 incentive programs translated into measurable energy savings.

For evaluating progress in reaching outreach goals, we reviewed and verified the accuracy of the outreach documentation datasets and materials. Depending on the goal, different items were recorded and collected. They may include:

- ◆ Resident/ business contact information
- ◆ Marketing transmission used (tabling, publications, door-to-door solicitations)
- ◆ Advertising materials
- ◆ Dates of the marketing effort

To determine which marketing efforts were successful in gathering participants to the YEEP 1 incentive programs, participants surveys were used. This evaluation activity was done in conjunction with the YEEP 1 program evaluation. The surveys included questions asking how participants became aware of YEEP and its program. Survey results were analyzed to determine what marketing efforts were the most effective in reaching participants. The survey results are provided as part of the YEEP 1 report.

3.2 Incubator Projects

3.2.1 Natural Cooling Incubator Project

The Natural Cooling Incubator project addressed the Central Valley cooling problem by researching natural cooling opportunities. It addressed a supply barrier – the lack of availability of high quality natural cooling products in the County – and demand barriers – the lack of information and education about the natural cooling alternative. The project also sought to develop demand for Natural Cooling products among residential customers in Yolo County. The program activities for this project included compiling a research report on the region’s natural cooling opportunities and conducting an Energy Savings Fair at the Woodland Home Depot to publicize natural cooling products.

The evaluation objective of this incubator project was to assess the program activities’ appropriateness and success by reviewing the program research report and interviewing the Energy Savings Fair’s corporate partner.

YEEP’s research report addressed market barriers to the local natural cooling market and development of strategies to overcome market barriers. The evaluation review of the

research report sought to determine how the information presented would be effectively used by the key market players.

The purpose of YEEP's Energy Savings Fair was to educate and inform area customers on natural cooling projects. To determine the effect of the Energy Savings Fair on the store customers, an interview was conducted with the Woodland Home Depot store manager as a proxy for customer influence since information on which customers attended the Fair, or were otherwise influenced by it, was not available. The interview explored whether the YEEP program supported local efforts to create more opportunities for natural cooling and customer reactions to YEEP's assistance and information on natural cooling products.

3.2.2 Multifamily Energy/Water Efficiency Pilot

This project addressed the connection between water and power conservation for the multifamily building market. For this pilot project, YEEP analyzed the water and energy conservation opportunities of a multifamily complex and then presented the retrofit proposal to the owners. The program activities included modifying a water and energy conservation spreadsheet tool for commercial buildings, using the modified tool to analyze a multifamily complex, and presenting the results to the building owner.

The evaluation objective was to determine if the program activities were effective and appropriate. Specifically, the water and energy conservation spreadsheet tool was reviewed to assess its ability in providing useful information and analysis. Also, HMG interviewed the chosen multifamily building partner, Woodside Apartments. The interview probed the multifamily partner's experience and background, the reaction and opinion of the analysis tool, and the factors considered by multifamily building owners to invest in water and energy conservation opportunities and solicited information on ways to improve the pilot.

3.2.3 Local Energy Policy/Ordinance

This project provided professional support to jurisdictions in Yolo County requesting assistance in the development of local energy policy and potential ordinances. The program activities included working with the City of Davis's Natural Resources Commission to develop Energy Task Force recommendations related to Energy Efficiency in Buildings. In the Plan for Implementing the Energy Efficiency in Buildings Section of the 2004 Davis Citizens Task Force on Energy Issues Final Report, seven candidates were included for further technical support:

1. New construction in developments
2. New infill construction
3. Major additions or renovations
4. Alterations to the building shell
5. Energy efficiency on resale
6. Energy efficiency with re-roofing

7. Energy efficiency with the replacement or alteration of heating and cooling equipment

Nineteen (19) specific tasks were associated with these areas of support. The evaluation objective consisted of determining if the program activities were effective and appropriate. Specifically, we reviewed the Work Tasks report associated with the above mentioned implementation plan. HMG compared the Work Task report dated February 20, 2006 to the plan which was submitted to the Davis City Council, Natural Resources Commission on June 20, 2005.

4. EVALUATION RESULTS

This section summarizes the evaluation findings for the Yolo Energy Efficiency Project’s Information and Market Transformation Program (YEEP 2) by project.

4.1 Outreach Activities

Table 1 lists the twelve performance goals for YEEP’s marketing efforts, the actual achieved by the program, the percentage of the actual achievements in relation to the goal, and whether or not the goal was met. The goals were reviewed from the outreach electronic documentation datasets.

Outreach Activity	Goal	Actual	% of Goal	Target
Low Income Residents – Canvass	2,000	1,864	93%	Not Met
Spanish Speaking Households Reached – Canvass	600	594	99%	Not Met
Other Non-English Speaking Households – Canvass	100	0	0%	Not Met
Customers – Direct Community Outreach other than Canvass	10,000	31,480	315%	Exceeded
Customers Households - Direct Mail	61,000	61,000+	100%	Exceeded
Small Business Customers	900	900+	100%	Exceeded
Low Income Canvass	4	17	425%	Exceeded
Tabling / Booth	120	191	159%	Exceeded
Presentations - to Business Groups	15	13	87%	Not Met
Presentations to Community Groups	30	38	127%	Exceeded
Customers - City Newsletters	201,000	201,000+	100%	Exceeded
Direct Mail Information Packet, Households	134,000	112,678	84%	Not Met

Table 1: YEEP 2 Outreach Goals

4.1.1 Low Income Residents – Canvass

For this outreach activity, YEEP conducted a door-to-door campaign in census tract areas with high concentration of low-income households to distribute energy efficiency informational material and recruit potential participants to the YEEP-1 incentive programs. The outreach goal was to reach 2,000 residents. The target was narrowly not met, reaching 1,864 residents or 93% of the target. The canvas was in support of the YEEP 1 evaporative cooler installation energy efficiency measure. The target population was income qualified residences of manufactured home parks. It was originally estimated that there were 2000 of these in Yolo County. All that could be located were canvassed demonstrating that the estimate of 2000 was high by a small margin.

EM&V of the Yolo Energy Efficiency Project – YEEP 2

Additionally, low income residents were likely reached through the YEEP marketing efforts. Based on census data and the specific locations of YEEP tabling/booth events, it is estimated that at least 15,000¹ low-income households were provided with energy education through person-to-person direct community outreach. Many more have been reached through our mass marketing and mass outreach techniques, such as mailings, information packets and "free advertising" through publication of informative energy efficiency articles in the local press.

4.1.2 Spanish Speaking Households Reached - Canvass

For this outreach activity, YEEP conducted a door-to-door campaign in census tract areas with high concentration of Spanish-speaking households to distribute energy efficiency informational material and recruit potential participants to the YEEP-1 incentive programs. The outreach goal was to reach 600 households. The target was narrowly not met, reaching 594 household or 99% of the target. Not counted are the many contacts with Spanish speakers at the community outreach events staffed by at least one Spanish speaking staff person and at which program literature in Spanish was distributed.

4.1.3 Other Non-English Speaking Households Reached - Canvass

For this outreach activity, YEEP conducted a door-to-door campaign in census tract areas with high concentration of household that primarily spoke a language other than Spanish or English to distribute energy efficiency informational material and recruit potential participants to the YEEP-1 incentive programs. The outreach goal was to reach 100 households. YEEP was unable to verify any successful marketing effort, resulting in 0 households reached, or 0% of the target.

Prior to program implementation, initial YEEP research indicated that Yolo County contained a large volume of low-income non-English speaking residents. Further research dictated that the majority of non-English speaking residents spoke either Spanish or Russian. Because West Sacramento has a large Russian immigrant population, YEEP expected and planned to reach Russian-speaking households in their West Sacramento evaporative cooler canvass activities.

The canvassing effort was conducted in mobile home parks in order to use the outreach as a platform to reach potential participants for YEEP 1's Residential Evaporative Cooler Installation program. The program installed energy efficient evaporative coolers for low-income, mobile home park residents. After having no success in reaching appropriate households during canvassing, YEEP staff heard anecdotal evidence, gained from speaking with city officials and Russian residents of Yolo County, indicating that the majority of Yolo County's Russian-speaking residents reside in apartment complexes and thus, not reached in the canvass. While Russian speaking households may have received YEEP materials through other marketing efforts, YEEP was unable to verify this effort.

4.1.4 Customer – Direct Community Outreach other than Canvass

For this outreach activity, YEEP conducted direct community outreach in various methods other than canvassing. The outreach goal was to reach 10,000 customers. The

target was exceeded, reaching 31,480 customers or 315% of the target. This was accomplished through 191 outreach events that were conducted by YEEP staff.

4.1.5 Customer Households – Direct Mail

For this outreach activity, YEEP sent direct mailings to all residential households in the county which provided energy conservation news and tips sheets. YEEP also sent insertions of energy efficiency education information into municipal utility bill mailings. The outreach goal was to reach 61,000 households based on 2000 census data. Yolo County households were reached 880,346 times-an average of 14 pieces of direct mail per household.

4.1.6 Small Business Customers

For this outreach activity, YEEP conducted outreach to small businesses through direct mailings which provided energy conservation news and tips sheets. The outreach goal was to reach 900 businesses based on 2000 census data. Yolo County businesses were reached multiple times-an average of 14 pieces of direct mail per household.

4.1.7 Low Income Canvass

For this outreach activity, YEEP conducted door-to-door campaigns in census tract areas with high concentration of low-income households to distribute energy efficiency informational material and recruit potential participants to the YEEP 1 incentive programs. This activity is related to the first three outreach activities as the actual campaign to contact the households. Each canvass campaign lasted approximately 8-10 weeks, and involved YEEP staff returning several times to each block, seeking to reach residents through multiple passes. The outreach goal was to complete 4 canvass campaigns. The target was exceeded, completing 17 canvass campaigns or 425% of the target.

4.1.8 Tabling/Booth

For this outreach activity, YEEP set up informational booths or tables at various community events, such as farmer's markets, festivals, and major sporting events. The outreach goal was to complete 120 tabling promotions. The target was exceeded, completing 191 tabling promotions, or 159% of the target.

4.1.9 Business Groups Presentations

For this outreach activity, YEEP conducted commercial presentations to inform businesses on energy efficiency materials and opportunities. To reach commercial customers, presentations were made to Rotary Clubs, Chamber of Commerce, and social service organizations such as Kiwanis and the Soroptimist Society. The outreach goal was to complete 15 business presentations. The target was not met, completing 13 business presentations or 87% of the target. Although the goal was not met, business were reached through other YEEP marketing efforts. Additionally, staff faced difficulties scheduling presentations to busy commerce and business organizations who often had full meeting schedules up to a year in advance.

4.1.10 Community Groups Presentations

For this outreach activity, YEEP conducted presentations to inform residents on energy efficiency materials and opportunities. To reach residential customers, presentations were made to homeowner and renter groups, at PTA meetings, environmental group meetings, and at social church functions. The outreach goal was to complete 30 community presentations. The target was exceeded, completing 38 community presentations, or 127% of the target.

4.1.11 City Newsletters

For this outreach activity, YEEP sent energy efficiency informational articles to city newsletters which were distributed by mail to residents. The outreach goal was to reach 201,000 customers based on the newsletters' circulation number. Yolo County households were reached multiple times per household.

4.1.12 Direct Informational Packet to Households

For this outreach activity, YEEP sent information packets which were distributed by mail to residents. The outreach goal was to reach 134,000 customers. The target was not met, reaching 112,678 customers, or 84% of the target. After program implementation began, YEEP staff found single, direct mail pieces to have a higher customer impact while remaining more cost effective. Resources were allocated to 'Customer Households Direct Mail' which exceeded its goal.

4.1.13 YEEP 1 Recruitment Results

To determine which marketing efforts were successful in gathering participants to the YEEP 1 incentive programs, YEEP 1 participants' surveys were used as part of the YEEP 1 program evaluation. The surveys included questions asking how participants became aware of YEEP and its program. Survey results were analyzed to determine what marketing efforts were the most effective in reaching participants and are discussed in the YEEP EM&V Project 1 – CPUC No. 1079-04 Final Report.

4.2 Incubator Projects

4.2.1 Natural Cooling Incubator Project

The Natural Cooling Incubator Project activities consisted of compiling a research report on the region's natural cooling opportunities and conducting an Energy Savings Fair at the Woodland Home Depot to publicize natural cooling products. The evaluation objective of this incubator project was to assess the program activities' appropriateness and success by reviewing the program research report and interviewing the Energy Savings Fair's corporate partner.

Natural Cooling Report Review

YEEP's research report addressed market barriers to the local natural cooling market and development of strategies to overcome market barriers. The evaluation review of the

research report sought to determine how the information presented would be effectively used by the key market players.

For the evaluation, the March 2005 draft version of the research report, “Yolo County Natural Cooling Potential and Challenges”, was reviewed. A final version of the report was not available at the time of this report. The draft report examined the current market for natural cooling technologies in Yolo County with emphasis placed on evaporative cooling systems. The report looked at the region’s characteristics that made it favorable to natural cooling strategies and the reasons behind lack of market readiness. The report sections included:

- ◆ Description on Yolo County climate conditions
- ◆ Comparison of cooling equipment that could be used in the region
- ◆ Market acceptance of advanced evaporative coolers
- ◆ Market availability of advanced evaporative coolers
- ◆ Improvements needed on thermostat options
- ◆ Lack of installation contractors
- ◆ Customer unfamiliarity on best operation strategies for evaporative coolers
- ◆ Water usage effect on evaporative coolers’ market acceptance
- ◆ Evaporative cooler development and current utility rebate opportunities
- ◆ Demonstration facility recommendations
- ◆ An advanced evaporative cooler case study
- ◆ Supply/delivery chain strategy

The report did not provide information on the intended audience and how the information compiled in the report would be disseminated to increase public knowledge. Therefore, the evaluation could not assess the report’s impact and usefulness. The evaluation review did indicate the following:

1. The report covered a wide variety of issues regarding evaporative cooler topics
2. Report organization was difficult to follow, causing uncertainty on the relationship between the different report issues.
3. References and sources should be cited to allow better understanding on the analysis presented in the report.

Natural Cooling Energy Savings Fair

YEEP coordinated and co-sponsored an Energy Savings Fair at the Home Depot in Woodland, CA in July 2005 to promote natural cooling equipment. The Woodland Home Depot was chosen because it was the only big box home improvement retail store centrally located in Yolo County. YEEP staff held meetings with the store leading up to the event. Advertising was published by the Sacramento Bee newspaper and city newsletters, with sponsorship noted by both YEEP and Home Depot.

EM&V of the Yolo Energy Efficiency Project – YEEP 2

For the Energy Savings Fair, YEEP staffed informational booths providing product displays, literature, and energy conservation tip handouts. Compact fluorescent bulb kits, as part of the YEEP 1 Compact Fluorescent Giveaway Program effort, were handed out to interested customers. Information on YEEP 1 Sunscreen Rebate Program was made available in conjunction with stocking of the actual sunscreen material at the store. Signage was placed around the store to point out ENERGYSTAR® products, including sunscreens, evaporative coolers and whole house fans. Home Depot stocked evaporative coolers that qualify for the PG&E rebates and were considering stocking automatic ceiling vents (specifically the Up-Dux product) for evaporative cooled homes.

An evaluation interview was conducted with the current Home Depot store manager using the Natural Cooling interview instrument found in Appendix A – Interview Instruments. The store manager at the time the Energy Savings Fair was held was no longer employed by Home Depot and was reluctant to speak on behalf of the company. The current store manager, however, was able to provide sufficient information regarding YEEP’s Energy Savings Fair. While he was not part of the Woodland Home Depot staff during the Energy Savings Fair, the current store manager was managing another Home Depot store during the Energy Savings Fair period and received accounts on the Energy Savings Fair from the Home Depot regional corporate office and Woodland Home Depot employees who were employed during the Energy Savings Fair.

The first part of the interview concerned how the Energy Savings Fair supported local efforts to create more opportunities for natural cooling. Since the current manager was not employed at the Woodland Home Depot prior and during the Energy Savings Fair, he was unable to relate Home Depot’s expectations of YEEP going into the Energy Savings Fair and coordination between YEEP and Home Depot. The information he gained from Home Depot’s corporate office and store employees indicated that the YEEP staff was easy to work with during the event and that their customers enjoyed the information made available to them that day. The current store manager also related the single most important service YEEP can provide to their customers is education on energy conservation strategies and projects. When questioned on previous experience working with other organizations, such as utilities, on energy or environmental matters, the current store manager replied that he has never been approached to conduct a similar activity either at the Woodland store or other Home Depot stores he has managed. He added that Home Depot is very willing to explore any opportunities to conduct similar sort of activities if approached by other organizations.

The second part of the interview dealt with customer responses to the assistance and information provided by YEEP during the Energy Savings Fair. The current store manager indicated store employees received positive feedback from customers on the Energy Savings Fair during the day of the event but did not remember any feedback received in the time following the Energy Savings Fair. The current store manager backs up this opinion replying customers have not related any YEEP influence regarding their purchasing decisions. While the current store manager did acknowledge customers are buying more energy efficient equipment, he was unwilling to share any general sales data. He believes it is the increasing utility prices which is driving this trend.

In summary, the Woodland Home Depot store manager interview indicated that the Energy Savings Fair did not have a lasting effect on the store’s customers, but was useful

in setting a forum where customers could receive information and advice on energy efficient opportunities. Additionally, the store would be interested in coordinating similar activities with other organizations and credits YEEP for taking the initiative in holding the Energy Savings Fair.

4.2.2 Multifamily Energy/Water Efficiency Pilot

For this pilot project, YEEP developed the Water and Energy Efficiency Tool (WEET), an electronic analysis spreadsheet tool derived from the Watergy™, a Microsoft Excel-based model offered by the Federal Energy Management Program of the Department of Energy on their website¹. The Watergy model uses a water/energy relationship that makes assumptions to analyze the potential for water savings and associated energy savings. The spreadsheet allows input of utility data (energy and water cost and consumption data for the most recent twelve months) and facility data (number and kind of water consuming/moving devices and their water consumption and/or flow rates). It then estimates annual savings for direct water, direct energy, and indirect energy, as well as total cost and payback times for a number of conservation methods. Watergy also makes simple assumptions about capital and labor costs of equipment and fixture replacements. All assumptions Watergy uses can be modified by the user. Some of the potential conservation opportunity estimates Watergy currently makes are:

1. Installation of 1.6 gallon flush toilets and water conserving urinals
2. Installation of automatic faucets
3. Installation of faucet aerators
4. Low flow showerheads
5. Boiler blow down optimization
6. Efficient dishwashers
7. Efficient washing machines
8. Landscape irrigation optimization

For the WEET pilot program, modifications were made to the Watergy™ model with inputs set to characteristics seen in multifamily buildings. YEEP modifications included the inclusion of central hot water heating systems and fine-tuning energy savings calculations based on parametric runs completed by the Davis Energy Group for identified measures.

Woodside Apartments (Woodside) in Davis, CA was used as the test project for WEET. YEEP entered the property inputs into the model and provided the analysis results to Woodside. The WEET analysis for Woodside is provided in Figure 1, suggesting a building retrofit to install faucet aerator, low-flow showerheads, recirculation controls, and energy efficient clothes washers. The recommendations for faucet aerators and low-flow showerheads provided the majority of the savings opportunities. After studying the

¹ http://www.eere.energy.gov/femp/information/download_watergy.cfm

EM&V of the Yolo Energy Efficiency Project – YEEP 2

WEET results, building management decided against incorporating any of the study suggestions relying on the advice of the property building manager. The property building manager cited that his main concerns were the availability and cost of qualified personnel to complete the retrofit and tenant negative reactions to the faucet aerators and low-flow showerheads.

Woodside Apartments: Energy Conservation Proposal
prepared for TCC Properties, December 2, 2005

Water and Natural Gas Conservation Measures	Current Water Usage GPY	Water Savings GPY	Water Bill Savings	Hot Water Savings (GPY)	Natural Gas Savings (Th/Yr)	Natural Gas Bill Savings (\$/Yr)	Total \$ Savings	Retrofit Project Cost (\$)	Rebate Amount	Cost After Rebate	Owner Simple Payback (years)
Bathroom Faucet Aerators	448,403	105,464	\$121	132,207	648	\$777	\$898	\$360	\$180	\$180	0.2
Kitchen Faucet Aerators	448,403	105,464	\$121	132,207	648	\$777	\$898	\$360	\$180	\$180	0.2
Replace Showerheads	837,227	134,877	\$155	183,638	972	\$1,167	\$1,322	\$720	\$360	\$360	0.3
Recirculation Controls	--	--	--		240	\$288	\$288	\$1,400	\$750	\$650	2.3
Replace Clothes Washers	150,672	54,452	\$63	14,055	69	\$82	\$145	\$2,175	\$1,200	\$975	11.9
Other Water Usage Toilets	772,692										
Miscellaneous	444,580										
Total Indoor	3,101,975	400,258	\$460	462,107	2,576	\$3,091	\$3,551	\$5,015	\$2,670	\$2,345	0.7
Landscape water usage	565,833							Water rate/gallon 0.0011497			
Pool Usage	53,669							Water rate/CCF 0.86			
Other (--pool leak--)	53,669	53,669	\$62					Nat gas rate/therm \$1.20			
	Current	After Retrofit									
TOTAL GAL./YEAR Model	3,775,146	2,701,717					GAL./YEAR - Water Bills 3,856,197				

LIGHTING: Replace Incandescent with Compact Fluorescent	Qty	Hrs/Wk	Current Lamp Watts	kWh Saved /Yr	Saved/Yr	Cost per Lamp	Total Cost	Rebate	Cost After Rebate	Tenant Simple Payback
Bathroom 4-Lamp Inc Strip to Spiral 14 Watt	108	19	60	4,908	\$589	\$12	\$1,312	\$638	\$674	1.9
Kitchen (Fan w/ 4 Sockets) 9W- A lamp	72	19	40	2,205	\$265	\$15	\$1,091	\$287	\$804	1.4
Kitchen (Fan with 1 Socket) 18927 Spiral 27 watt	18	19	100	1,298	\$156	\$13	\$240	\$169	\$71	3.4
Kitchen Fixture over Sink 11314 A lamp 14 watt	54	19	75	3,254	\$391	\$15	\$818	\$423	\$395	2.1
TOTAL	252			11,666	\$1,400		\$3,461	\$1,517	\$1,944	1.8

Figure 1: Woodside Apartments' WEET Results

Multifamily WEET Partner Interview

An evaluation interview was conducted with the management representative, the Woodside building manager using the interview instrument found in Appendix A – Interview Instruments. The first part of the interview gathered property background information. Woodside uses subcontractors for building retrofits depending on the extent and expertise needed for the project. There has been no previous water efficiency retrofits completed at Woodside. The water and natural gas of the common areas and the water of the tenant units are included in the tenants' rental payments. The property building manager is the primary decision-maker for building retrofit projects with the building owner relying on his judgment.

EM&V of the Yolo Energy Efficiency Project – YEEP 2

The second part of the interview gathered information on the services YEEP provided for this project. YEEP was given onsite access to Woodside to collect the information needed for the analysis. This included measurements made to the building systems. The building manager indicated his communication with YEEP was positive and they were conscientious in not burdening his staff and the tenants. He did not study the WEET analysis in detail, instead relying on the conversations he had with YEEP staff to learn the analysis results. His primary criticism of the WEET analysis was that it did not include labor cost in the results.

WEET Review

WEET was reviewed by HMG staff experienced in water and energy efficiency analysis for multifamily buildings with the intent of looking at the tool based on usefulness from the multifamily building owner perspective. Overall, the HMG technical reviewer concluded that the tool would require improvement in providing easily-understood results. However, the intent in tailoring a tool specifically for multifamily buildings has previously not been undertaken despite the energy and water savings opportunities for this market. If the lessons learned from the study are distributed to the building science community, the information could be used to improve knowledge on multifamily building water efficiency.

Improvements suggested for WEET include:

1. Professional easy-to-use interface – WEET contained incorrect grammar and spelling issues, confusing input instructions, and unformatted print-ready forms.
2. Greater transparency on calculation methods – The user should be able to easily follow WEET calculations and analysis. This was specifically seen on how demand charges are determine for the utility rate section and the calibration factors used in the analysis.
3. Greater flexibility in user inputs – WEET should allow a range of inputs for conditions that may vary between buildings, resulting in a more accurate analysis. This includes water heater fuel type, seasonal variations for cold water temperature, multiple control strategies, differentiation between central hot water heaters and individual dwelling unit hot water heats, and toilet fixture types other than “gravity”
4. Increasing input accuracy – Where possible, WEET should provide the user the least-error possible options. This includes offering a range of inputs, such as pull-down or look-up menus, or better test conditions to determine inputs needed in the model. One example is to add a look-up appliance database based on a unit’s make and model number to determine water heater efficiency inputs instead of the current fill-in value. Another example is the input testing instructions for GPM measurement. WEET instructions should be revised using a larger one gallon container instead of recommending taking the average of three tests on a quart container.

4.2.3 Local Energy Policy/Ordinance

One component of the YEEP-2 is the technical support of the Cities and the County in their effort to increase energy efficiency in buildings. YEEP contacted the building departments in Yolo County and found that the need was being met and would be met with more training. The program activity focused on providing technical support to the City of Davis's Natural Resources Commission to develop Energy Task Force recommendations related to Energy Efficiency in Buildings. YEEP was tasked with supporting Recommendation #1, Energy Efficiency in Buildings, to the extent requested by the City of Davis. YEEP concluded that most of the issues raised by the Task Force are answered by the new 2005 Title 24 building standards. The details of the YEEP activities are provided below.

In the Plan for Implementing the Energy Efficiency in Buildings Section of the 2004 Davis Citizens Task Force on Energy Issues Final Report, YEEP identified seven candidate opportunities for further technical support and 19 tasks associated with those areas of support. All of the opportunities were in support of the goal to reduce per capita energy consumption in Davis. The Work Tasks report, submitted to the Natural Resources Commission in February 2006, summarized the results of the activities related to Tasks 1-16. YEEP also submitted a final report at the end of March 2006 that summarized Tasks 17-19 activity.

Tasks 1 through 8 supported residential and commercial new construction, with Tasks 7 and 8 specifically supporting infill. YEEP staff reviewed the existing (1992) General Plan Energy Element for subdivision planning and provided recommendations for revisions and additions. YEEP recommended updating the Energy chapter when the General Plan is next revised. It is not clear from the YEEP documentation whether and when the City will revise the plans. Specific suggestions included: increased emphasis on natural cooling and increased energy efficiency and energy production from landfill and water treatment plant. Details on how this could be done and how to incorporate the requirements into the General Plan were not included in the report. The report also discussed photovoltaic systems, shading and night ventilation, although it is not clear whether YEEP recommends including these elements in the General Plan.

YEEP staff worked with the Building Division staff, Davis Energy Group and the Task Force to consider having each new subdivision required to be more efficient than existing subdivisions. The discussions identified the difficulty with the proposal and the proposal was dropped. YEEP instead supported the use of a percent improvement over the current Title 24 in subdivision development agreements. The proposed approach allows the City Council to set a performance based target at the time of the subdivision development agreement approval. Several energy enhancement credits and associated percent savings are provided in the YEEP report, based on analysis done by Davis Energy Group.

Tasks 9 through 13 addressed energy efficiency in existing buildings, including additions and alterations. The report described the 2005 Title 24 requirements, but does not provide recommendations on proposed changes. While the report gives several examples of compliance issues associated with additions and alterations the write up is neither comprehensive nor cohesive. It is unclear what the recommendations are for these tasks.

Task 14 addressed energy efficiency requirements on resale. The report "recommended that enhancements to the energy efficiency requirements of the Davis Resale Inspection

EM&V of the Yolo Energy Efficiency Project – YEEP 2

program for residences and commercial buildings be considered”. The report then described several obstacles to this approach and concluded with, “if the City wants to pursue resale inspection for commercial property grant funding could be secured to pay for the development, piloting and first years of implementation”. It is unclear whether YEEP is recommending this approach or cautioning against it. The conclusions and recommendations for this task are unclear.

Task 15 addressed energy efficiency requirements with re-roofing. The report discussed the existing Davis City Building Division Re-Roofing policy and concluded with, “the YEEP project did not have time to develop the materials needed to answer all of the cost and building quality concerns that a change to the re-roofing policy would generate”. The conclusions and recommendations for this task are unclear.

Tasks 17 through 19 involved Building Division 2005 Title 24 Outreach Material. After reviewing the tasks with the Natural Resources Commission, YEEP determined that the tasks should not be pursued in order due to lack of City staff availability and funding.

The report concluded with the following recommendations, which address only a few of the candidate opportunities and tasks based on City feedback:

1. Explore the grant potential for enhancing the residential resale inspection ordinance and/or the potential for a pilot commercial resale inspection program.
2. Support the exploration of getting a grant to adding a cool roof requirement to the City re-roofing policy.
3. Explore the grant potential for conducting a pilot project the get flat roof insulated when they are re-roofed with attention paid to the need for a financing mechanism for defraying the added cost. The pilot project would be addressing the problem of rental units where the cost of the energy efficiency improvement is paid by the owner but the utility cost savings benefits the renters.
4. Use of a table with generic values for the percentage improvement generated by different energy efficiency measure given in the report

HMG attempted to contact Task Force members who interacted with YEEP staff on these issues, but there was miscommunication between City staff on YEEP’s involvement with the Natural Resources Commission.

5. OVERALL FINDINGS & CONCLUSIONS

The evaluation findings are based on the review of program materials and interviews and interview with YEEP participants and partners. Overall, YEEP completed activities supporting each of the four YEEP 2 projects.

The Outreach project consisted of marketing efforts used to advertise YEEP activities and programs. For the Outreach project, twelve marketing goals were set as indicators to track YEEP's contribution to energy efficiency awareness in the region. Seven of the marketing goals were exceeded while five were not met. YEEP's outreach effort attempted to reach every business and resident in Yolo County and utilized several different communication methods, including direct mail, newspaper, radio, community events, and door-to-door solicitation. After the EM&V study results were received covering the outreach efforts of the Davis Energy Efficiency Program, YEEP outreach activities were changed to maximize support of YEEP 1 energy efficiency measures. A change order to the original goals of YEEP 2 was discussed but not deemed necessary because YEEP 2 was not claiming energy savings.

The Natural Cooling incubator project was a pilot program intended to increase the knowledge and implementation of natural cooling strategies for the region through research and community outreach in the form of an Energy Savings Fair. The draft version of the report required a more thought-out structure on how the information will be used to increase the natural cooling technologies market and who will be using it. For the Energy Savings Fair, YEEP worked with a retail partner coordinating efforts to promote energy efficient products during a single community event. While there was little customer feedback on the event, the retail partner was pleased to work with YEEP on the project and would like to conduct similar events with other community organizations.

The Multifamily Water and Energy Savings incubator project with a pilot program intended to develop an electronic tool to calculate water and energy savings potential in multifamily buildings. Despite not being able to convince the multifamily building partner to incorporate the suggestions provided by WEET, the project did make a worthwhile attempt to provide an analysis tool for the multifamily sector. Further improvements to the tool and additional incubators are needed to complete the exploration of the potential for a water/energy savings program jointly implemented by water and energy utilities.

The Local Policy incubator project was a pilot program providing professional support to jurisdictions in Yolo County requesting assistance in the development of local energy policy and potential ordinances. The program activities included working with the City of Davis's Natural Resources Commission to develop Energy Task Force recommendations related to Energy Efficiency in Buildings. An Energy Task Force recommendations report was submitted by YEEP to the City of Davis's Natural Resources Commission.

6. APPENDIX A – INTERVIEW INSTRUMENTS

The Questions for each interview guide are sorted by “Subject” area. The “Subject” line question is the issue we are trying to discern and were not asked directly. The “sub-questions” below the Subject questions are guidance questions that the interviewer used to get at the primary (Subject) questions. These were interview guides and not a survey, so the interviewer explored additional relevant topic threads that interviewee may bring up, if it appears that doing so helped better answer the primary questions.

6.1 Natural Cooling Incubator Project Interview Instrument

1. Subject: How did the YEEP program support local efforts to create more opportunities for natural cooling?
 - a. What were your expectations of YEEP going into the Energy Savings Fair?
 - b. Describe your coordination with YEEP staff?
 - c. What is your opinion of the overall YEEP staff’s support in conducting the Energy Savings Fair? How effective do you think YEEP was in meeting your expectations?
 - d. Would you have wanted additional support from YEEP beyond (other than) the Energy Savings Fair? (*Additional supporting documentation, staff training, etc.*)
 - e. Did you have any previous experience working with other organizations, such as PG&E, on energy or environmental matters? – (*Ask so that you understand their perspective; try to ask specifically about their knowledge/interest in natural cooling equipment*)
2. Subject: Do you think customers were satisfied with the assistance and information provided by the YEEP on natural cooling products?
 - a. What were YEEP’s expectations of Home Depot in order to conduct the Energy Savings Fair?
 - b. What type of information and advice did YEEP present to customers to help them understand possible natural cooling choices?
 - c. Have you received feedback from customers on the Energy Savings Fair? On natural cooling equipment? What was their level of satisfaction with the YEEP staff’s expertise and assistance?
 - d. Were there increased sales in natural cooling products during and after the Energy Savings Fair?
 - e. Do you expect to see increased interest/sales in the spring and summer (*leading up to and during the cooling season*)

6.2 Multifamily Energy/Water Efficiency Pilot Interview Instrument

QUESTIONS:

1. Subject: What is the property background of the building manager?
 - a. Describe all past, present, and future energy efficiency and water efficiency projects completed or planned for the property.
 - b. Are energy efficiency and water efficiency projects usually completed in-house or do you hire subcontractors?
 - c. Is the domestic hot water supplied by individual water heaters or a central boiler system? What is the specific type?
 - d. What is the age of the hot water system? Is it still under warranty?
 - e. Who pays for the water and natural gas for the common areas (pool, spa, central kitchen, laundry) – the tenant or the owner? If the owner, is the cost transferred to the tenants as part of their monthly rent?
2. Subject: What is the perspective of the building manager?
 - a. Do you manage any other property for the owner?
 - b. What is the decision-making structure that you have with the property owner?
 - c. Do you have any previous experience on energy efficiency, water efficiency, or other environmental topics? With YEEP? With other organizations?
3. Subject: How did YEEP's Water Energy Efficiency Tool (WEET) support efforts to provide information and opportunities for the local multifamily market?
 - a. What were your expectations of YEEP when approached with the WEET tool and analysis? What were the expectations of the building owner? When and how were you approached about the project?
 - b. Describe coordination and interactions between you, the property owner, and the YEEP staff.
 - c. What is your opinion of the overall YEEP staff's support?
 - d. How effective was YEEP in meeting your and the building owner's expectations?
 - e. Did you find the WEET tool easy or difficult to use? What difficulties did you experience?
 - f. What is your opinion of the information provided by the WEET analysis? Is the information accurate? Is the information useful to you? Would you use this tool again?
 - g. Would you have wanted additional support from YEEP beyond (other than) what was provided? Beyond the measures provided in the analysis or in other water efficiency or energy efficiency matters? (*Additional supporting documentation, etc.*)

EM&V of the Yolo Energy Efficiency Project – YEEP 2

4. Subject: What are the factors for participation in a multifamily water energy efficiency program?
 - a. What were the reasons you decided not to participate in the YEEP project?
 - b. Describe the decision-making process in choosing to participate in an energy efficiency or water efficiency project. What importance do cost, time, labor, project complexity, and tenant behavior play in your decisions?
 - c. How could the program be changed to better serve MF buildings?