SOUTHERN METROPOLITAN REGIONAL COUNCIL

Evaluation Report

of the

Green Houses

Pilot Project

Sustainable Energy Development Office
Government of Western Australia

MURDOCH UNIVERSITY
PERTH, WESTERN AUSTRALIA

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Southern Metropolitan Regional Council comprises of the seven member councils:
Cities of Canning, Cockburn, Fremantle, Melville and Rockingham and the Towns of Kwinana and East Fremantle

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EXECUTIVE SUMMARY

The Southern Metropolitan Regional Council (SMRC) commenced the Green Houses Pilot project in April 2003 to achieve greenhouse gas reductions through behavioural change. It was undertaken through a partnership with Murdoch University and the Sustainable Energy Development Office (SEDO), who provided significant funding to the project.

The pilot project has tested a new model for achieving energy use behaviour change. The model was developed by Murdoch University researchers and is based on providing participants with goal setting skills together with relevant information to achieve sustained behaviour change.

The model was tested through four communication pathways – website, evening workshop, mailed booklet and the primary school classroom. Residents in the Towns of East Fremantle and Kwinana were chosen for this pilot project.

An extensive evaluation program was undertaken to identify whether the model was successful or not. It involved invited 150 residents to 'participate' as a control group, regular electricity and gas meter readings of 300 homes, obtaining energy bills of participants via the power utilities and attitudinal questionnaires before and after their exposure to energy information and goal setting.

The project achieved a 53.5 tonne reduction in greenhouse gas emissions over 5 months, plus a wide-ranging set of outcomes of value to numerous community environmental education programs. Most importantly, Green Houses identified that:

- energy information alone has only short-term benefit in behaviour change,
- levels of environmental knowledge and attitude increased slightly after the program, while at the same time significant energy reduction was achieved indicating the value of tools for behaviour change, not simply information for improving knowledge and attitudes
- training in goal setting enabled householders to adopt energy behaviours that led to greater reduction (by 5% in the pilot project) and sustained behaviour change beyond information only,
- evening workshops are the most effective communication method for motivating behaviour change (average of 17% over 5 months),
- the 3-pronged community communication approach drew in residents with different demographics and all groups achieved energy reduction (7% online participants, 9% booklet participants), and hence this varied communication approach is of value
- motivating energy use behaviour change within families via their children in Year 6/7 classrooms is ineffective.

- An ongoing dialogue is needed to achieve sustained behavioural change. Newsletters were valued, but, in addition, ongoing encouragement is needed to set energy goals.

From the participants experience of the project, they reported back that:

- 80% were satisfied or very satisfied with the project
- the majority felt their local Council was doing something positive for the environment through offering this project to residents
- over 70% told others about the project and the majority were interested

The model is widely applicable to communities. With these participation rates and energy reduction trends, a program in SMRC households would achieve an annual reduction of 6,700 tonnes of greenhouse gas.

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1 INTRODUCTION

1.1 Climate change - what's the big deal all about?

Climate change is the single most important environmental issue facing the world today, with far reaching implications for all elements of society. A 0.4 - 2°C temperature increase is anticipated by 2030, due to a 50% increase in the atmospheric concentration of greenhouse gases. This increase will have alarming social, economic and ecological repercussions for West Australians. The likely impacts range from storm surges and localised flooding, reduced rainfall events and increasing droughts, water shortages, spread of disease, impacts on crop production and the extinction of native fauna and flora. The need for immediate action to reduce greenhouse gas emissions is paramount.

1.2 Greenhouse gas abatement – a local government response

The widely recognised motto of "Think Global, Act Local" is particularly appropriate when identifying strategies to combat climate change. '*Local government authorities and community groups can make significant contributions to addressing global issues such as the greenhouse effect. The effectiveness of such groups arises from their capacity to make decisions and to take direct action on matters affecting their own responsibilities.* - Draft Western Australian Greenhouse Strategy 2004'.

The Southern Metropolitan Regional Council (SMRC) is a local government with responsibility for developing and managing environmentally sustainable solutions, focussed on waste management and greenhouse gas abatement, for the communities of Canning, Cockburn, East Fremantle, Fremantle, Kwinana, Melville and Rockingham. All member councils are participants in the Cities for Climate protection Program and have targets for their council operations. They decided to pool resources and work regionally on community initiatives to achieve community reduction targets. To guide this the Regional Community Greenhouse Strategic Plan was developed with the aim to reduce greenhouse gas emissions by 15% from 1996 levels. Objectives of the plan include:

- Improving residential energy efficiency through fitting energy efficient appliances, improved house design and transport initiatives, and behavioural change.
- Raising levels of awareness in the general community and within council through ongoing education.
- Regional cooperation and sharing on greenhouse gas reduction.

Residential energy use accounts for over 15% of total emissions in the southern metropolitan region equivalent to 1,347,000 tonnes of CO_2 per year. Of all household activities, home energy use is the largest

contributor of greenhouse gas emissions, creating even more emissions than private transport (SMRC, 2003).

1.3 Residential Greenhouse Gas Reduction - targeting home behaviour

A study by Princeton University demonstrates the importance of human behaviour in energy consumption (Seligman, 1978). In a sample of identical town houses, it was found that energy consumption varied as much as 2 to 1 between households, even though appliances, fittings, house design and the number of occupants was the same. When the ownership of the home changed it was found that the energy consumption of the home with the new residents could not be predicted by the energy consumption of the old residents. Even after the houses were retrofitted the variation in energy consumption was the same as it was before the retrofits took place. A more recent study by the Sustainable Energy centre in South Australia has validated that it is how people use energy in the home that is the most significant factor in household energy consumption (Hinter, 2003).

Whilst a variety of approaches for reducing household energy consumption have been tried, from investing in climate sensitive housing design to installing energy efficient appliances, it appears targeting householder behaviour is often a much more cost effective way to achieve significant emissions reductions (Brog et al, 2002). Changing human behaviour however is no simple task. Public education has played an important role in spreading awareness about the need to conserve energy and other resources, however people still continue to practice unsustainable behaviours, despite this awareness (Young, 2000). It is now widely recognised that an environmental education program cannot simply provide people with information and expect them to change. People and their behaviour are much more complex and unpredictable. In order to be effective in changing environmental behaviour environmental education must provide the necessary skills and motivation for people to change (Contento et al, 1995; Shipworth, 2000). If you want people to make positive changes, you not only need to educate them on *why* this is important, you also need to show them *how* to transform this awareness into action.

1.4 Goal setting – a powerful tool for changing behaviour

One strategy that has been highly successful at achieving positive changes in human behaviour is goal setting. Over the years, extensive research has proven that goal setting is effective at helping people to change in areas they would like to improve, from health and fitness, to academic study and business performance (Cullen et al, 2001; Locke and Latham, 1985). Setting goals can also encourage people to improve their environmental behaviour, as has recently been demonstrated in the Living Smart Program which teaches people how to adopt more sustainable lifestyles (Sheehy, 2003). Previous research suggests that by setting a goal, a person feels more committed to making a change (McKenzie-Mohr and Smith, 1999). **Simply by writing a goal down, a person becomes focused and motivated to perform certain changes, but even more importantly goal setting helps people identify how they are actually going to**

make that change (Kolb & Boyatzis, 1970). Effective goals need to be specific, measurable and achievable so that participants are motivated to continue their efforts once they see that they are making progress (Locke et al, 1981; Mento et al, 1987). The Green Houses pilot project uses goal setting as a technique to increase the effectiveness of the program for creating positive environmental behaviour change.

1.5 The Green Houses Pilot Project

As part of its Regional Community Greenhouse Strategic Plan, the SMRC in conjunction with Murdoch University, developed a program called Green Houses to educate the community about global warming and reduce residential greenhouse gas emissions. The program was run as a pilot project to evaluate its effectiveness and to prepare the foundation for a larger residential greenhouse gas reduction project that can be replicated throughout the entire region.

The Southern Metropolitan Regional Council and Murdoch University partnered to design and implement the pilot project. The Town of Kwinana and the Town of East Fremantle offered to participate directly in the pilot as it was felt that these two councils would represent a cross-section of the communities in the southern metropolitan region. In February 2003, the SMRC successfully applied for joint funding to the SEDO Grants Committee under their special Community and Local Government Funding Round, to implement and evaluate the Green Houses project. The project was run under a modest budget, the largest costs were the employment of a project officer, a full-time position largely due to the time-consuming evaluation component, and the professional development of the website.

Table 1-1 Summary of Green Houses Pilot Project Expenditure

		$ cash	$ inkind	Total $
Salaries	Regional Greenhouse Coordinator	$ 9,672.00		$ 9,672.00
	Project Officer	$ 40,569.00		$ 40,569.00
	other SMRC staff		$ 800.00	$ 800.00
	CCP Officers		$ 2,200.00	$ 2,200.00
	Murdoch University		$ 20,785.00	$ 20,785.00
	Subtotal	**$ 50,241.00**	**$ 23,785.00**	**$ 74,026.00**
Sundries				
Website	Create & Update	$ 5,550.00		$ 5,550.00
Mailout	Getting Participants	$ 921.24	$ 2,279.85	$ 3,201.09
	Mailouts to Participants	$ 742.51	$ 379.92	$ 1,122.43
Workshops	Venue & Refreshments & Equipment	$ 15.00	$ 440.00	$ 455.00
Booklet	Production	$ 59.55	$ 120.00	$ 179.55
Schools	Presentation & Energy wise Picnic	$ 145.27	$ -	$ 145.27
Travel	Project Officer car travel		$ 1,080.00	$ 1,080.00
Other	Other postage costs	$ 13.88		$ 13.88
	Focus Grps	$ 25.00		$ 25.00
	Comms		$ 30.00	$ 30.00
	Subtotal	**$ 7,472.45**	**$ 4,329.76**	**$ 11,802.22**
Total		**$ 57,713.45**	**$ 28,114.76**	**$ 85,828.22**

1.6 Project objectives

The aim of the Green Houses project was to achieve a 15% reduction in overall energy consumption of participating households. The project objectives were to:

- Increase participant's knowledge and awareness of energy issues and environmental impacts of energy use.
- Enable participants to identify energy wastage in their homes and adopt behaviours to reduce this wastage.
- Set goals with participants to reduce their energy consumption and assist them in establishing strategies to make the lifestyle changes required to attain their goals.
- Identify the level of participation in such a project and the awareness and attitudes of those choosing to participate.
- Identify successful communication techniques suitable for a large project that transfers knowledge and feedback to the participant

Through implementing and evaluating this pilot project, the stage is set for a larger residential greenhouse gas reduction project that can be replicated through the Southern Metropolitan Region and other local government areas.

2 PROJECT DESIGN AND IMPLEMENTATION

The project used a combination of education components and communication strategies and extensive evaluation was built into the project to determine if they were effective. Three main education components were used within the project, providing environmental information, goal setting and providing support and feedback. In the intervention groups, the same education components (environmental knowledge, goal setting and feedback) were used but were delivered in different ways, via a website, workshop, information booklet or school classroom.

Throughout the project, **direct community input** was sought to guide project literature and implementation. A sample phone survey was conducted to gauge the local communities attitudes and awareness about climate change and guide content of invitation letters. A focus group was held in Kwinana to get community input on the workshop and booklet design. This was an important element to include in the design stage of the project to ensure it suited the local communities needs. Decisions such as what particular times and evenings were most suitable, what sort of wording was to be used, how to make goal setting sound more appealing and even preferable seating arrangements were all discussed at the focus group.

2.1 Reaching households

Recruiting participants is often one of the most challenging parts of any environmental education program, which is why a diverse range of recruitment methods was employed. The recruitment methods used are listed below.

- Mail out – individually addressed letters to residents living in selected streets
- Advertisements in local papers
- Radio announcements on ABC FM and RTR FM
- Follow up phone calls reminding those who had already received invites in mail
- Information in the form of posters displayed at the council offices and community halls
- Letterbox drop of postcards designed by local primary school children with greenhouse themes
- Listing the incentives to save energy – economic, environmental and social benefits
- Asking online participants to refer a friend who may be interested in saving money

The majority of participants were recruited through personalised mailouts. For evaluative and monitoring purposes households from specific streets in East Fremantle and Kwinana were targeted. Two types of letter were sent out, one for the control groups and the other for the intervention groups. Intervention letters invited people to participate in the Green Houses project with the option of attending a workshop or using a website. The project was presented as a service to help individuals reduce their

environmental impact while saving money on energy bills, as well as an opportunity to meet like-minded people in the community. The control letters simply asked people to be part of a study on household energy use and no mention of Green Houses was made.

Table 2-1 Response rates from different recruitment techniques

Type of advertising	No of people contacted	No of people responding	Response rate
Mail out intervention letters	2460	115	4.6%
Mail out control letters	1760	153	8.6%
Postcards to intervention group	500	0	0%
ABC Radio announcement	Unknown	5	n./a
RTR Radio announcement	Unknown	0	n./a
Local newspaper (3 adverts)	Unknown	0	n./a
Phone calls after the mail out	40	2	5%
Online participants asked to refer a friend	60	3	5%

The response rates (shown in Table 2-1 above) compare well with other energy use projects overseas, but are likely to have been reduced by the level of constraints needed for monitoring purposes. Due to evaluation requirements, householders had to meet the following criteria to participate:

1) Resided at their present address for at least one year – this was because their energy bills for the previous 12 months were required.
2) Easy to access meter boxes – so energy use data could be gathered by the project officer.
3) Western Power and Alinta Gas account numbers had to be supplied in order to gain previous energy use records from the utility companies.

Households that were unable to meet these requirements could not participate in the pilot project, but were sent complimentary information on energy conservation.

2.2 Education Components

The framework in Figure 2-1, demonstrates how the education components (environmental information, goal setting and support and feedback) were incorporated into the program. Each of the education components are described in more detail below.

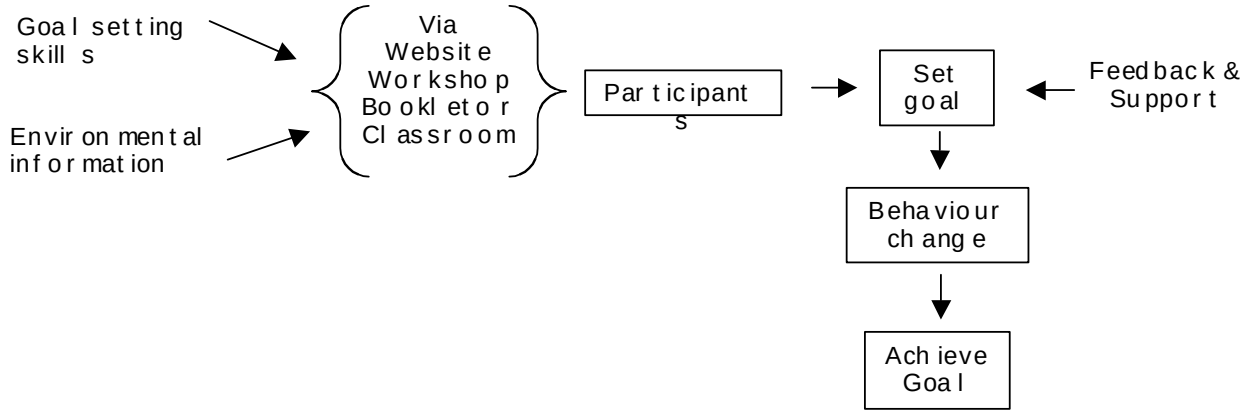

Figure 2-1 A framework of environmental education used in the Green Houses program, adapted from Sheehy & Dingle, 2003.

2.2.1 Providing environmental information

While an increased level of environmental knowledge will not automatically lead to behaviour change, the provision of information is an essential component of any environmental education program (Dorricott and Dingle, 1999). However it is specific information about positive actions that is the most effective in creating change. Any awareness raising on an issue must include positive messages of how to act, the benefits of these actions and that these actions will make a difference (Kearney and De Young, 1996). The information provided to participants was in the form of a booklet which was either posted to participants, handed out at workshops or available to download from the website, and included:

1) **What** global warming is and consequences of climate change,
2) **Why** energy consumption needs to reduce,
3) **How** to reduce energy consumption in the home including specific actions they could take,
4) **Rewards** of conserving energy e.g. save money on power bills and improved environmental quality.

2.2.2 Goal Setting

Within any environmental education program there will be different levels of knowledge, and motivation amongst participants. The goal setting process encourages each participant to change to the best of their ability by allowing them to set their own goals that are relevant to them, rather than the goal being imposed by an outside source. The goal setting process included three essential steps;

- Assessing and evaluating – participants consider the information they have received and they can apply this to their own lifestyle i.e. what actions can they take and what existing behaviours can they improve on.

- Setting the goal – participants set their goal by writing an overall goal, with specific sub goals and deadlines. Each participant's goal will be different depending on what they are already doing, what they are able to do and their home and lifestyle characteristics.
- Identifying motivations – after the goal is set participants should identify and write down their personal motivations for wanting to achieve the goal. They should be encouraged to find as many reasons as they can, the more reasons or motivation they have for doing something the more effort they will put in.

2.2.3 Providing support and feedback

Support and feedback were provided to intervention participants to encourage them to remain committed to their goals. One of the objectives of the project was to promote long-term behavioural change, so that newly adopted behaviours became habit. Feedback motivates participants to keep up the effort to conserve energy by showing them how much progress they have made towards their goal and how much further there is to go. (Van Houwelingen and Van Raaij, 1998) Feedback was provided through two channels:

1) Intervention participants were shown how to monitor their energy consumption by reading their electricity and gas meters, allowing them to follow their own progress.
2) Intervention participants, including the primary schools, received ongoing feedback about their progress towards their energy reduction goals through monthly Green Houses newsletters. The newsletter contained an update on how many greenhouse gas emissions were being saved in their local community, more energy saving tips and positive case studies to encourage people to maintain their energy conscious behaviours. The newsletters are attached in the appendix.

Support was provided via:

1) the friendly project officer, who was available to help participants with advice on how to overcome obstacles or offer encouragement to stick to their goals.
2) an online discussion page for the website group and follow-up workshops for the workshop group allowed participants to share their experiences, ideas and questions.

2.3 Communication strategies

See Table 2-2 for a summary of the communication strategies (website, workshop, booklet and classroom) used to deliver the education components. The communication strategies are described in more detail below.

Table 2-2 The different Intervention and Control groups used in the pilot project

Strategy	Techniques	No. of participants
Group 1 ***Control* booklet group**	Monitoring Questionnaire Environmental knowledge through booklet	15
Group 2 ***Control* workshop group**	Monitoring Questionnaire Environmental knowledge through workshop	25
Group 3 ***Control* no info group**	Monitoring Questionnaire No information	112
Group 4 ***Intervention* booklet group**	Monitoring Questionnaire Environmental knowledge (booklet) Goal setting process (booklet) Feedback (mail) Newsletter (mail)	26
Group 5 ***Intervention* website group**	Monitoring Questionnaire Environmental knowledge (website) Goal setting process (website) Feedback (email and mail) Newsletter (mail)	60
Group 6 ***Intervention* workshop group**	Monitoring Questionnaire Environmental knowledge (workshop) Goal setting process (workshop) Feedback (mail) Newsletter (mail)	23
Group 7 ***Intervention* school group**	Monitoring Questionnaire Environmental knowledge (workshop) Goal setting process (workshop & website) Feedback (website and in class) Newsletter (mail)	36
TOTAL		**297**

2.3.1 Workshops

The intervention workshops were held over two nights in the council offices of the Town of East Fremantle and Town of Kwinana. Intervention participants who had not already said they would be attending were phoned and reminded about the workshop.

The workshop consisted of three parts:

- providing the environmental knowledge,
- teaching goal setting skills,
- getting participants to set their goals and
- teaching participants how to monitor their energy consumption.

Participants also received a graph of their past energy consumption, a card for recording their energy reduction goals and a card for monitoring their future energy consumption.

2.3.2 Website

Online participants accessed the Green Houses website (www.smrc.com.au/greenhouses) by entering a personal ID number and password. Once logged on, participants were guided through a series of pages that contained information on climate change, tips on how to save energy and instructions on how to set goals. After completing this section, participants could then set their energy reduction goals online. Another feature of the website was a graph displaying participants' previous energy use patterns, which was compared against their current energy consumption by entering current meter readings. The website would then automatically calculate the amount of greenhouse gas emissions they had saved.

2.3.3 Booklet

The information booklet contained information on climate change, tips on how to save energy, a comprehensive guide to goal setting and instructions on how to read gas and electricity meters so participants could calculate their own emission savings. Also included were two sheets of card. One contained a graph to compare current energy consumption against previous consumption and a place to record meter readings. The other sheet was for participants to write their goals on and could be displayed in a prominent place in their home to serve as a constant reminder of their energy reduction goals. A copy of the booklets contents page can be found in the Appendix.

2.3.4 Schools

The school workshops were conducted during the same week as the community workshops, and were held during the day at Calista and Richmond Primary schools. The students were given a similar presentation, adapted for a younger audience. At this presentation, they were given knowledge about the greenhouse effect, some of the possible consequences of global warming and what they could do in their homes to reduce greenhouse gas emissions. The students were asked to brainstorm all the things they could do to save energy, and afterwards were given the list of top ten actions to save energy in the home. The final part of lesson concentrated on goal setting, where the students were asked to write down the actions they were going to do. Once this was completed, students were encouraged to set energy reduction goals with the whole family at home. Teachers supported the meter readings through reminders, assignments and classroom posters. A followup presentation was held at the end of November in order to gather feedback from students and reward their participation by hosting an energy-wise picnic.

2.4 Control groups

The control group were initially asked to be part of an energy use study. A few weeks later they were asked if they would like to attend a workshop on how to reduce energy use in the home. The control workshops were held at the same venues on a single evening in the week following the intervention workshops. The control workshops followed the same outline as in figure, minus the goal setting. The control participants who attended this workshop were put in the control workshop group. Those that had

said they would come but did not show up on the night were sent a booklet that provided the same environmental information that the intervention groups received, minus the goal setting section. These participants were put in the control booklet group. Those who did not respond to the workshop invite were put in the control normal group and received no environmental information.

2.5 Evaluation Methodology

The key sources used to evaluate the project included:

- pre- and post-intervention questionnaires,
- participant feedback forms,
- household meter readings.

An example questionnaire and feedback form can be viewed in the appendix.

2.5.1 Questionnaires

The pre-intervention questionnaire included questions on demographics, self-reported energy use behaviour, levels of environmental knowledge and attitudes towards the global and local environment as well as questions about goal setting. To determine if any behavioural, knowledge or attitude changes had occurred, these same questions were asked in a post intervention questionnaire. With the school groups, it was the parents that completed the questionnaires rather than their children.

2.5.2 Feedback forms

In addition to the questionnaires, intervention participants were asked to share their opinions about the effectiveness of different aspects of the project via a feedback form. They were also asked to suggest ways the project could be improved for future participants, and to share their ideas on ways to involve more people in a larger-scale project.

2.5.3 Meter Readings:

Periodic readings of participants' electricity and gas meters were taken to establish their energy consumption patterns before and after the intervention period. In order to gather baseline data, monitoring commenced 6 weeks before the intervention and then continued periodically for 5 months after the intervention. Energy use billing data for the previous year (2002 – 2003) was also obtained from Western Power and Alinta Gas. The energy consumption during the baseline period was compared to participants' previous levels of consumption during this time. If there was an obvious difference, then the baseline levels were adjusted. Current energy consumption levels during the post intervention period were then compared to participants' previous levels of consumption to determine whether there was a change in energy consumption as a direct result of the project.

3 ENERGY CONSUMPTION

3.1 Energy baseline of groups

When the baseline energy use of all the households was compared, it appeared that there were differences in the energy consumption of the different groups. **The online group and school group were the largest energy users** (see Figure 3-19). However, the number of residents in the home is also likely to have an effect on the baseline energy consumption. Therefore, a one-way analysis of covariance was conducted to determine if there was a difference in the baseline energy consumption of the groups while accounting for the number of residents. When you control for the number of people living in the home there is still a significant difference between the online group and the other groups ($p<0.05$; oneway ANCOVA). However, the households of the schools group are actually the lowest consumers of energy, see Figure 3-1.

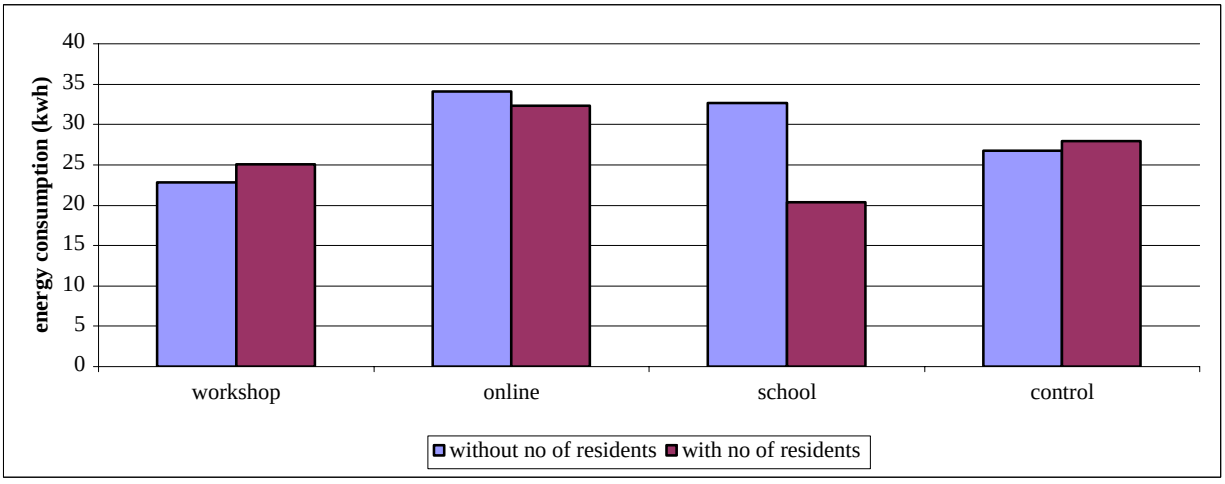

Figure 3-1 Comparison of the baseline energy consumption of the different groups with and without controlling for the number of residents in the home.

3.2 Measured Changes in Energy Consumption

The energy consumption of participants in the post intervention period was compared to their consumption at the same time in the previous year to see if there was any difference.

The intervention workshop, intervention online and the control workshop groups all had a significant decrease in consumption ($p<0.01$, paired sample t-test), see Figure 3-2.

The intervention workshop decreased an additional 5% compared to the control workshop, indicating the value of goal setting.

The intervention booklet group and the control booklet group also decreased but this change was not found to be significant. It is likely, that the limited number of participants in the group affected this result. The schools group was the only group to have increased, although this increase was not found to be significant.

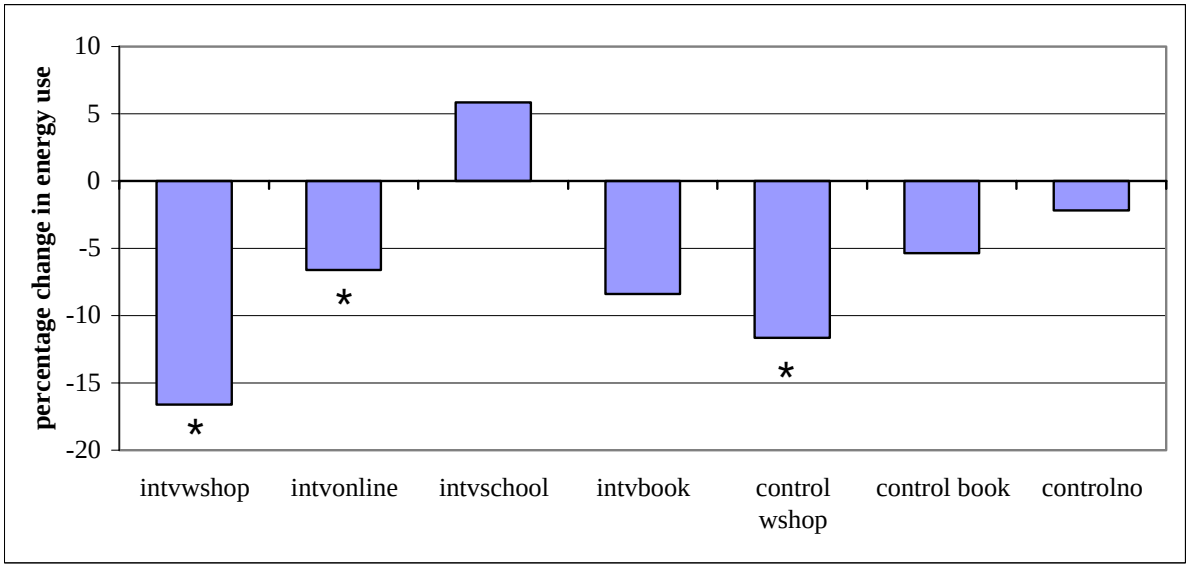

Figure 3-2 A comparison of the average percentage change in energy consumption in the period following the intervention, * indicates a significant difference.

3.3 Energy use trends

As the energy consumption readings were taken periodically for a five-month period after the intervention we were able to see how their savings varied over time, (see Figure 3-3 and Figure 3-4). All groups had a similar savings pattern with the greatest reductions occurring 4-6 weeks after the intervention, (during energy period 2 and 3). The energy reductions then became smaller in energy period 4 and smaller again in energy period 5. Using a mixed between with analysis of variance it was found that **time had a significant effect on energy consumption**, that the intervention type had a significant effect on energy consumption and that their was a significant interaction effect ($p<0.05$; mixed ANOVA). This means that the groups differed in the way their savings changed over time.

Inspection of the figure indicates that the intervention workshop and the intervention booklet were best at maintaining their energy savings.

At the end of energy period 5 the intervention workshop still has over 10% reduction but the control workshop no longer has a reduction.

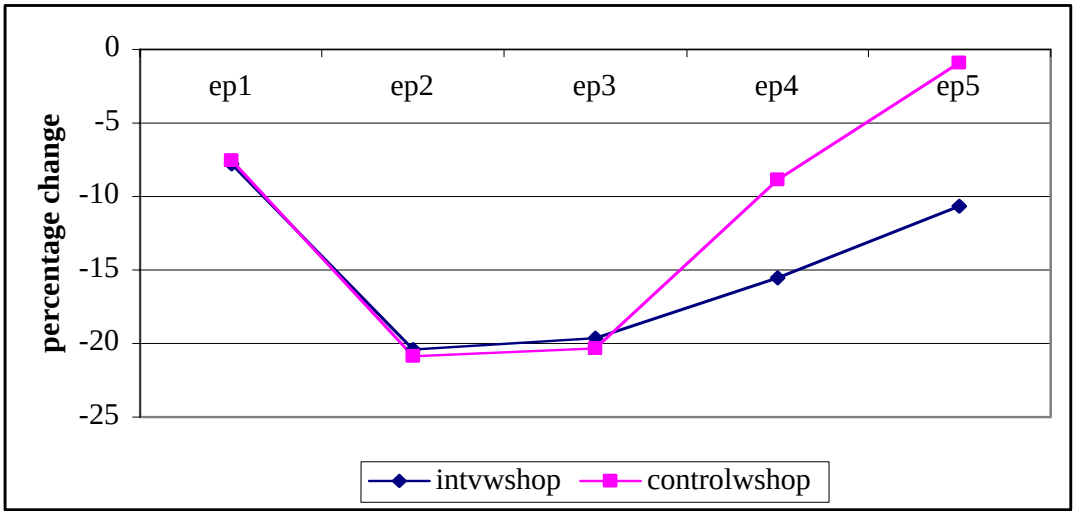

Figure 3-3 Comparison of the two workshop groups energy reductions over time

The dates for the energy periods (ep) are as follows:

ep1	20/10/03 – 3/11/03;
ep2	3/11/03 – 17/11/03;
ep3	17/11/03 – 8/12/03;
ep4	8/12/03 – 5/1/04;
ep5	5/1/04 – 16/2/04.

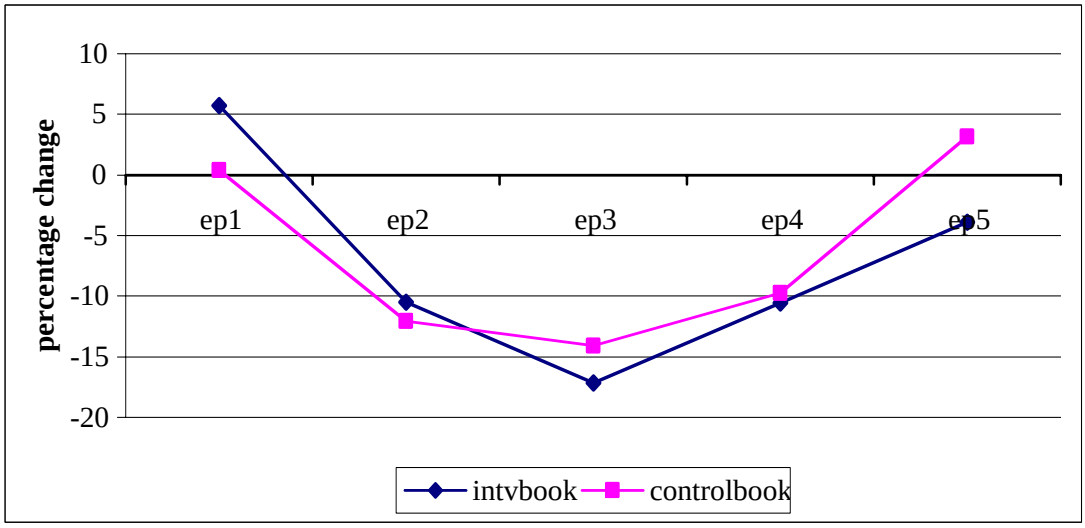

Figure 3-4 Comparison of the two booklet groups energy reduction over time.

4 PROJECT OUTCOMES

4.1 Community Input

4.1.1 Phone Survey – climate change

In a phone survey of 40 residents, it was found that the community did not rate climate change as an urgent issue compared to other issues such as water scarcity and air pollution, see Figure 4-1 below. It was noted that many people felt as though global warming was something out of their control, and therefore little they can do about it.

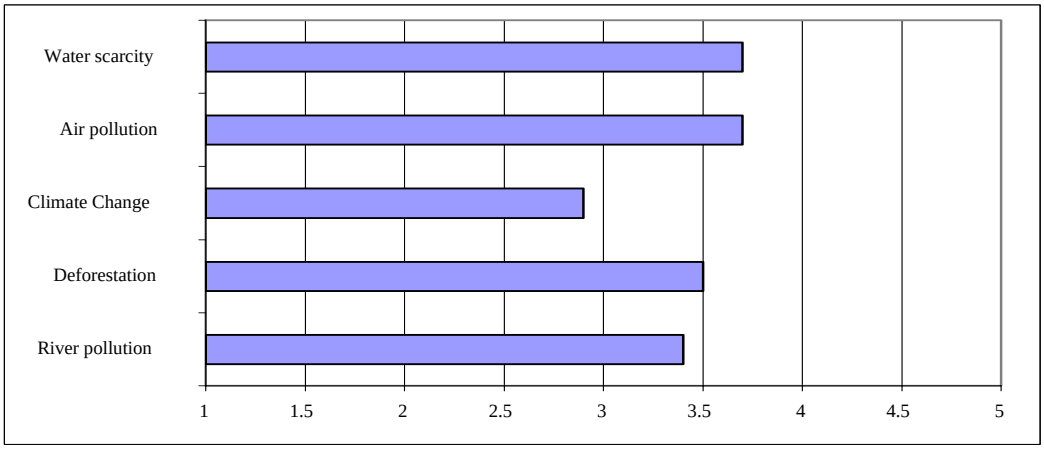

Figure 4-1 Participants rated how urgent they thought different environmental issues were on a scale of 1 to 5 (5 being of great urgency, 1 being of no urgency)

The biggest motivators for encouraging respondents to save energy included saving money, preserving resources for future generations and having cleaner air as shown in Figure 4-2. This can be compared to Figure 4-5, which shows drivers participants identified.

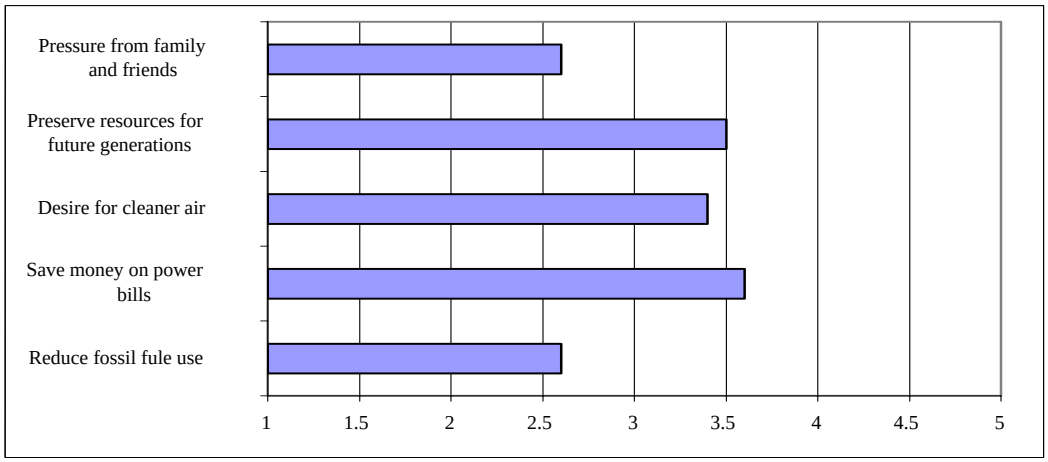

Figure 4-2 Participants rated how strongly different factors would motivate them to save energy in their home on a scale of 1 to 5 (5 being a strong motivator and 1 being no motivator.

4.1.2 Phone Survey - barriers

When questioned about the invitation letters and brochures they had received, 100% of surveyed households said it was easy to understand and the majority were aware of what the project involved. When asked what aspects of the project they thought sounded appealing, some said they liked the fact that it brought energy conservation to their attention, some liked the quiz and others found the ideas on how to save energy in the home interesting. Many people said they could not remember all the information and admitted they had not read the letter and brochure fully, but had just skimmed over it. When questioned if they thought that people were interested in saving energy, responses were generally yes. However some went on to say they felt they were already doing enough or that it was "the other" who did not seem to care such as "young people" or "the rest of society". The most common reasons why people declined to participate in the program were;

- Lack of time
- Lack of interest
- Too many other commitments (to family, work, other community groups)
- Already doing as much as can be done (installed efficient appliance, reads meters)
- Ineligible such as moving house or having been in their home for less than a year.

4.1.3 Focus groups

A focus group was held in Kwinana with a small group of residents, aged 26-54. The main outcomes from the discussion are listed below.

- Various alternative names for goal setting were discussed, it was agreed that eco aims was the best alternative.
- Suggestions on how to make the workshop more appealing – complimentary food; friendly, relaxed venue with comfortable seating; knowing the benefits to self "what will I gain from attending"; timing is convenient, preferably after work and not to long (1-1.5hrs); child minding facilities available.
- The sort of information they were most interested in were energy saving ideas, practical tips, pictures and step by step guide to difficult actions. Also hearing stories of what other "everyday" people have done and other participant ideas that have worked for them.
- When asked what parts of the booklet they liked – everyone agreed they liked the top 10 steps to saving energy.
- They thought the material on monitoring easy to comprehend but that practice would be needed in the workshop.
- Suggestions on what should be included in the newsletters - Financial savings, total community savings. How many cars is that equivalent to? How many trees? More tips on

how to save. Who is the top saver and how did they do it? Should be no more than 1 A4 page double-sided

- The group agreed it would be a good idea to have a follow-up workshop one month later to discuss obstacles, success stories and a chance to feel re-inspired about saving energy.

4.2 Participants Eco-aims

In the workshop group all participants set energy reduction goals. In the online group 75% set goals and in the booklet group 66% set goals. The different levels of achievement between the three groups can be seen in figure 4-3. The participants in the workshop group made considerably more progress towards achieving their goal.

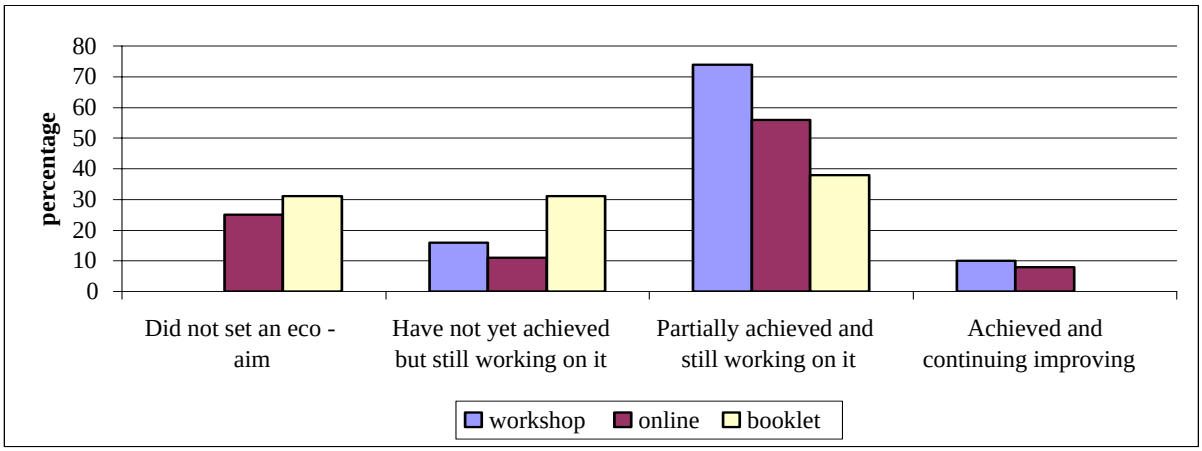

Figure 4-3 Level of goal achievement in the different groups.

Of all the participants who did set goals, 36% revisited their goal to re-read, re-write or expand it. When participants were asked how important it was that they achieved their goals, approximately half said it was somewhat important, while the other half said it was very important, see figure 4-4. There was a small percentage of participants from the online group who thought achieving their goal was not important.

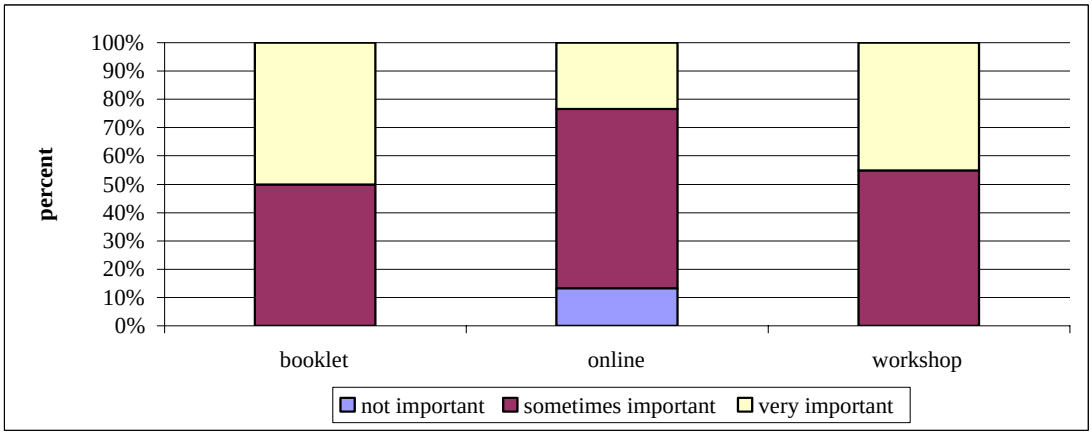

Figure 4-4 How important was it to participants to achieve their goal for the different groups.

To determine the content and level of goal setting, copies of workshop participants' eco aims were collected during the workshop. The online groups eco aims were retrieved from the website but the booklet groups eco aims were not collected. According to the feedback forms three quarters of the website participants set eco aims however only seven were saved on the website. A number of participants mentioned that they had trouble saving their eco aims online and others may have written their eco aims elsewhere. Eco-aims from the workshop and the website groups were well set and contained many of the characteristics of a good goal i.e. they contained a number of specific actions to be taken, were measurable and had a deadline.

The majority of the school students set individual goals, only 30% in Kwinana and 50% in East Fremantle set goals with their families. The goals related to actions that students were easily able to do by themselves e.g. taking shorter showers, turning appliances off at the wall and turning off lights.
Examples of the type of goals set by each group are listed in Table 4-1.

Table 4-1 Examples of the type of goals set for each intervention group.

	Eco Aim	**Why? (Motivation)**	**How? (Sub-Aims)**	**When? (deadline)**
Website goals	I aim to reduce our energy bills by 10%.	Mainly to save money, but also to feel as if we are contributing to improving the environment.	I am going to check the hot water system temp. I am going to check the fridge seals I am going to get the fridge seals replaced if required I am going to attempt to turn TV off at switch more often than not I am going to use cold water for most washes.	Do all tonight
	We will reduce energy consumption by 15% this summer.	To reduce wastage	Shorter showers, reduce thermostat on hot water system turn appliances off, not on stand by	By 31/3/04
Workshop goals	Reduce energy use even more. Set a good example to others – educate.	Save the planet. Educate others in environmental ethics.	Turn off computers completely – not on standby. Unplug phone charger. Encourage housemates to turn off appliances too. Check thermostat on hot water. Insulate ceiling and get window treatment – curtains.	Next couple of days. Achieve this summer.
	We aim to reduce our energy use by 15%	To save money and to become more environmentally friendly.	Washing clothes in cold water. Use fans, over airconditioner. Wear warmer clothes/cooler clothes rather than heater/cooler. Use microwave more often, rather than the oven. Take shorter, cooler showers.	One month

School goals	Try to use less energy on everything.	To save energy and money.	Turn everything down and use less things. I will tell people off if they have been in the shower to long. I will try to take cooler showers.	I will try to achieve my goals by the end of the year.
	I want to save at least $50 on each bill.	So I will get half	1) Turn off the computer monitor. 2) Tell mum to have quicker showers. 3) Have less appliances on. 4) Have fewer lights on.	By the next electricity bill.

4.3 Questionnaire Results

The pre- and post-intervention questionnaires were coded and entered into the Statistical Package for the Social Sciences (SPSS). Using SPSS the data was analysed to determine differences between groups, differences between the pre and post intervention and relationships between variables. For the majority of the analysis, parametric tests were used. However where the assumption of normality or homogeneity of variance was violated, a non-parametric alternative was used.

When people first signed up to participate in the project they were separated into 4 groups, workshop, online, school or control. The responses from the pre intervention questionnaire were sorted into these 'original' groups to make them comparable and to determine if there were differences in the type of participant who was attracted to the different types of intervention. After the intervention, the groups were divided into intervention workshop, intervention online, intervention school, intervention booklet, control workshop, control booklet and control normal depending on what activities they participated in. These groups were used to detect changes that occurred as a result of the different communication strategies.

4.3.1 Reasons for participating

The main reasons for participating were to do something positive for the environment, to make the home more energy efficient and to save money. The only significant difference ($p<0.05$; chi square test for independence) between the groups reasons for participating was in the schools group, where 59% of participants wished to save money, while less than half that many in the other groups listed money as a reason for participating (see Figure 4-5 below).

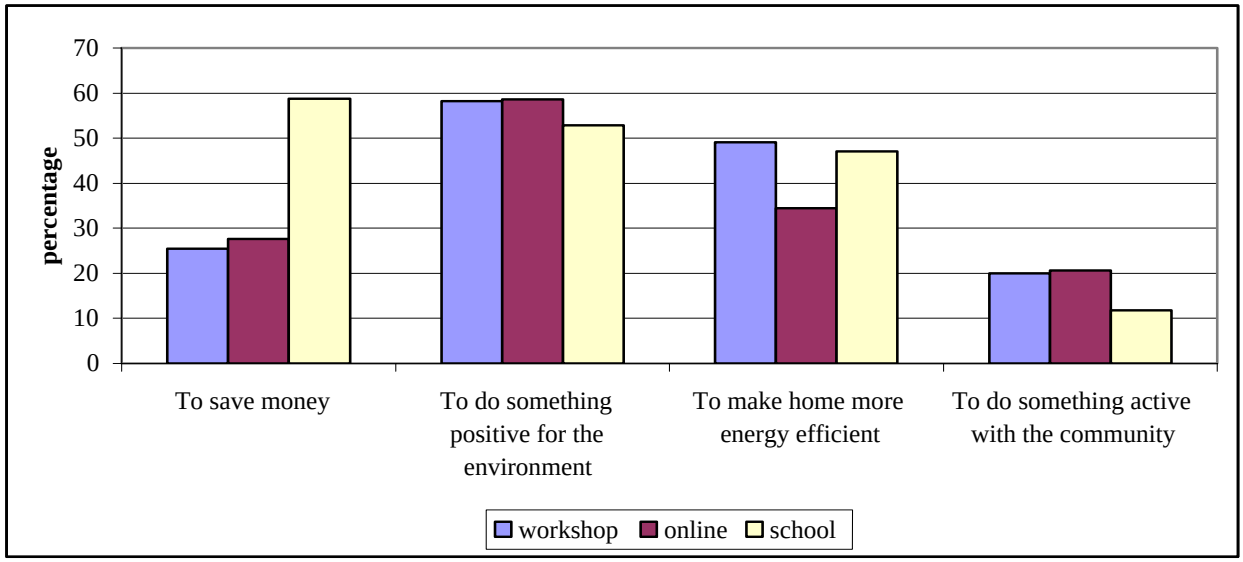

Figure 4-5 Most important reasons for participating in the program for the different groups

4.3.2 Demographics

There were slightly more female participants (55.2%) than male (44.8%). This was consistent across all groups and **nearly all participants had English as their first language**. The age demographic attracted to the program was high with very few participants under 25 and the majority of participants over 40. **The age range did however differ between the groups, with participants in the online and schools groups being significantly younger than participants in the workshop and control groups** ($p<0.05$; chi square test for independence). The age composition of the different groups is shown in Figure 4-6.

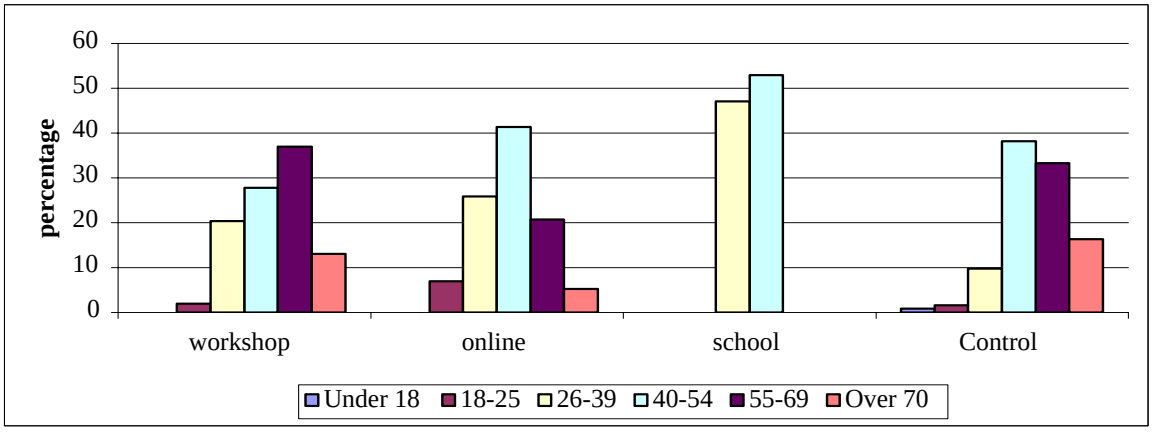

Figure 4-6 Age demographics of the different groups

There was also a significant difference in participant's occupations ($p<0.05$; chi square test for independence) as seen in figure 4-7. **The online group had a significantly higher proportion of participants with professional occupations,** while the school group had a higher proportion of home carers. Both the workshop and control group had a higher proportion of retired people. There were no significant differences in the education and income levels of the different groups.

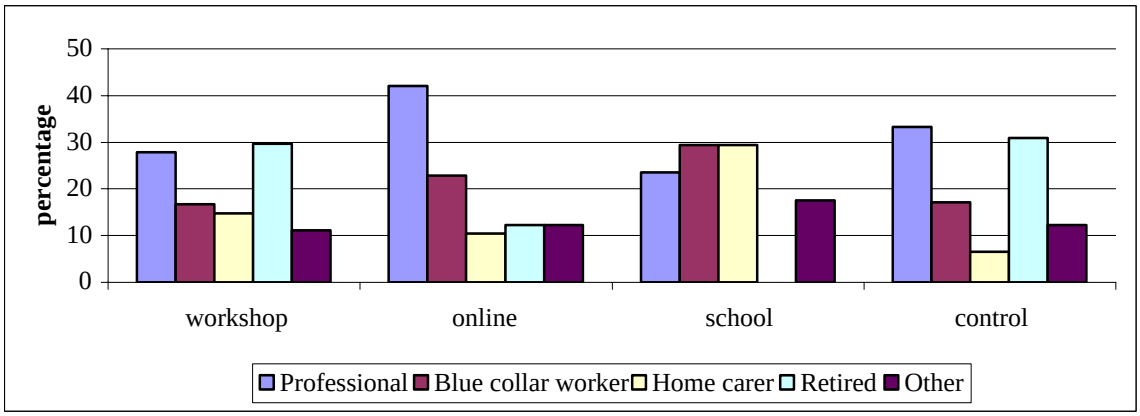

Figure 4-7 Occupations of different groups.

4.3.3 Household characteristics

The program was largely attracting those in a free standing home and those who where either paying or had finished paying their mortgage, (see Figures 4.8 and 4.9). **A significant difference** was found between the **number of residents living in the households of different groups** ($p<0.05$; kruskall-wallis test). The schools group had an average of 4.1 residents, significantly higher than the average of 2.5 for the other groups.

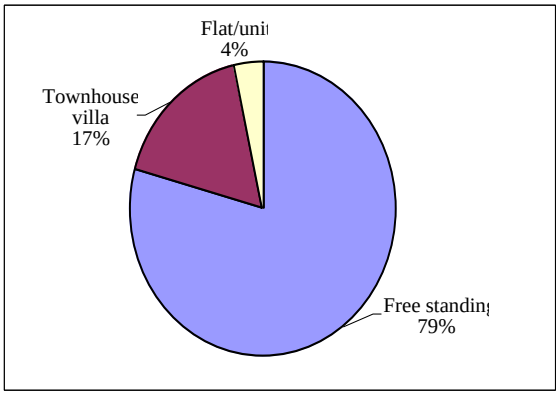

Figure 4-8 Type of house.

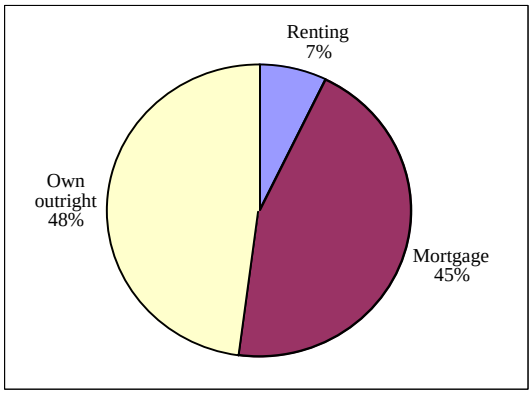

Figure 4-9 Type of home ownership.

4.3.4 Barriers to change

Over 80% of participants thought they had the ability to change the impact of their household activities on the environment. When asked what factors were preventing them from making these changes participants responded with; keeping motivated, trying to influence other members of the household and money, see Figure 4-10. Noticeably, lack of interest was the least important reason. There was no significant difference between the groups as far as barriers to change was concerned.

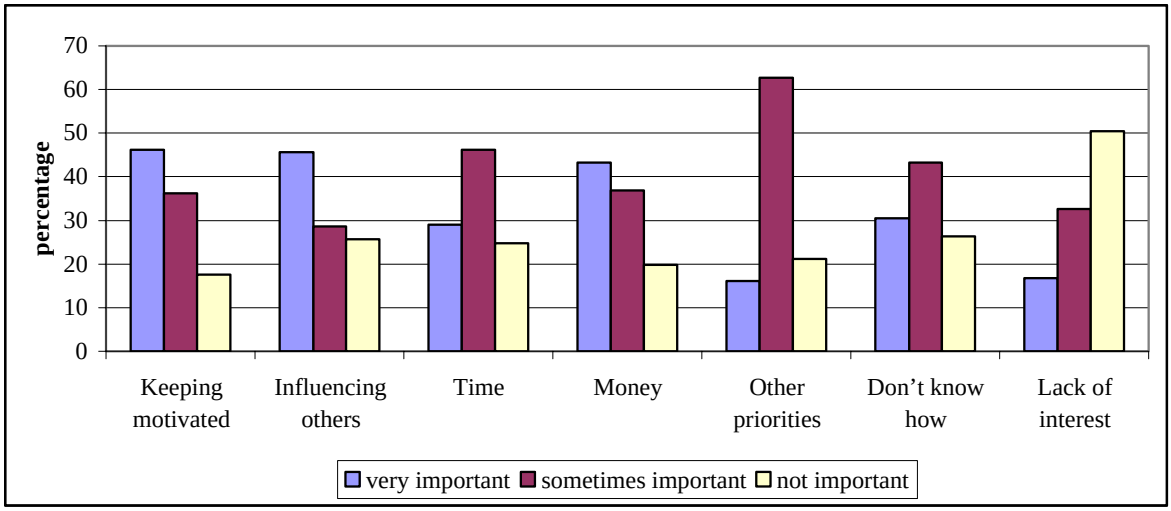

Figure 4-10 The importance of different factors in preventing participants from making environmental changes.

4.3.5 Goal setting experience

When participants were asked how they set goals, most said they simply had a specific idea in mind A third said they formalised their goals by writing them down or telling others. **Only 7% of participants said they did not set goals in their daily lives**, see Figure 4-11.

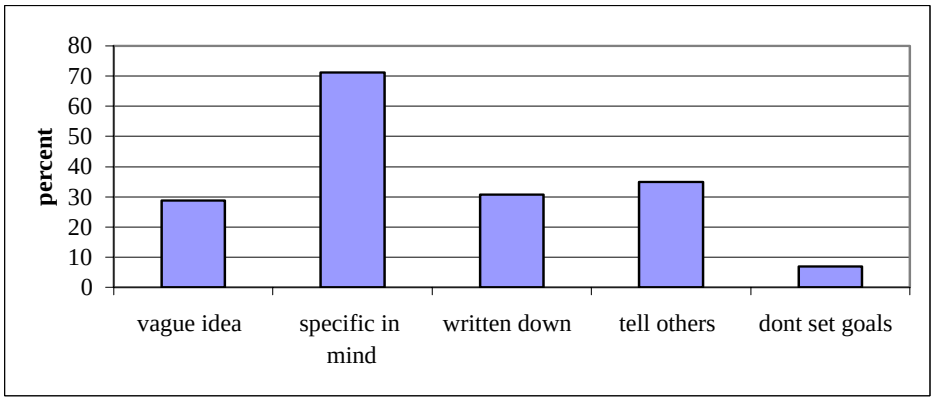

Figure 4-11 What techniques participants use to set their goal (Note: They could choose more than one technique).

Participants rated on a scale of 1 to 6 (1 being the lowest 6 the highest) how effective they thought goal setting was, how specific they made their goals, how difficult they made their goals and how determined they were to achieve their goals, see Figure 4-12. Over half of all participants (58.5%) said they usually achieved their goal. **The areas of health (82.4%) and finances (76.5%) were the most common areas for setting goals. The environment was the least common area for goal setting** with only 29.4% of participants setting environmental goals (see Figure 4-13). No significant difference was found between the groups for any of the goal setting questions.

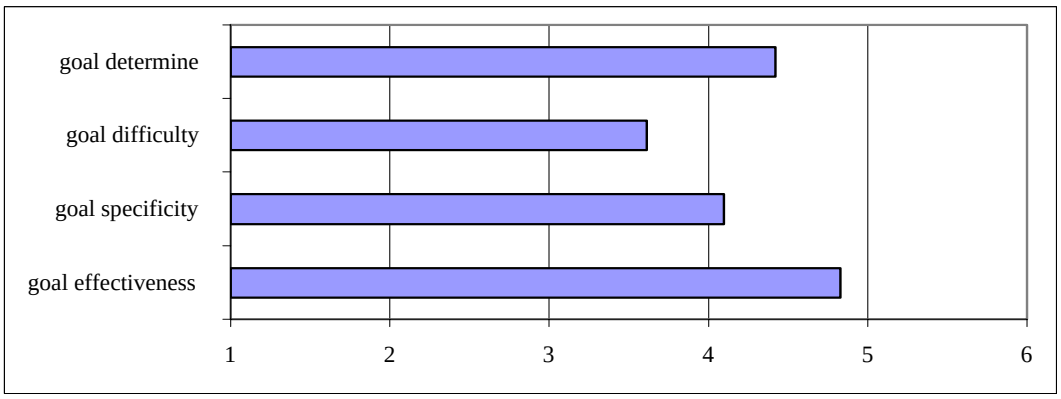

Figure 4-12 **How participants rated different aspects of their goal setting on a scale of 1 to 6 before the intervention.**

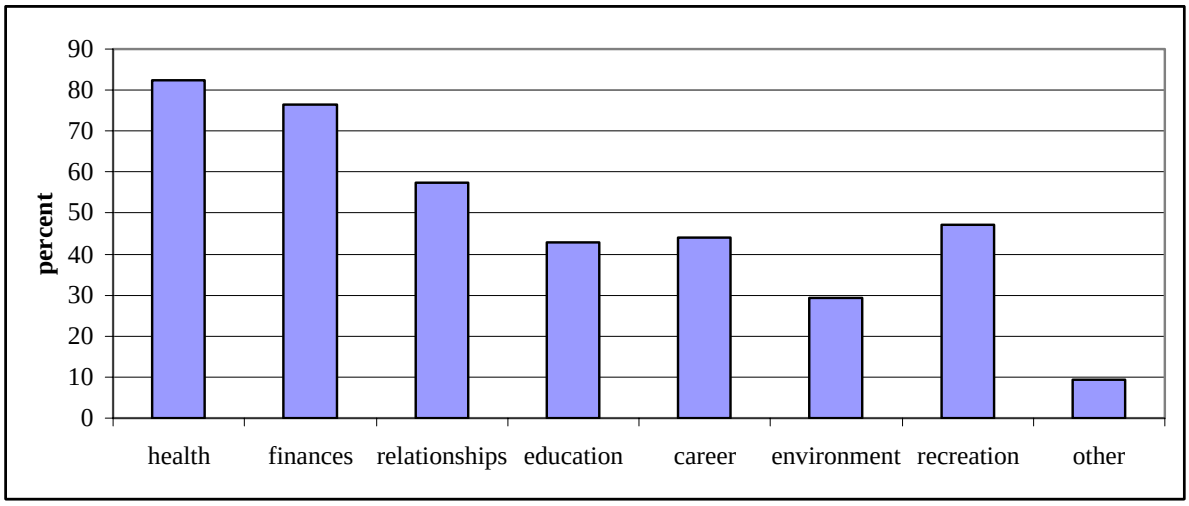

Figure 4-13 **Percentage of participants who set goals in different areas.**

4.4 Changes in questionnaire scales

Questionnaire scales were used to determine participants levels of environmental knowledge, general environmental attitudes, energy specific attitudes, energy specific behaviour and self-efficacy. A comparison of the original groups in the pre-intervention questionnaires show that the only significant differences between the groups was for the self-efficacy scale. Self-efficacy refers to a persons belief in their ability to achieve something, in this case their energy use. The online groups and school group was found to have a significantly higher self-efficacy score than the workshop or control group ($p<0.05$; kruskal-wallis test), see Figure 4-14 below.

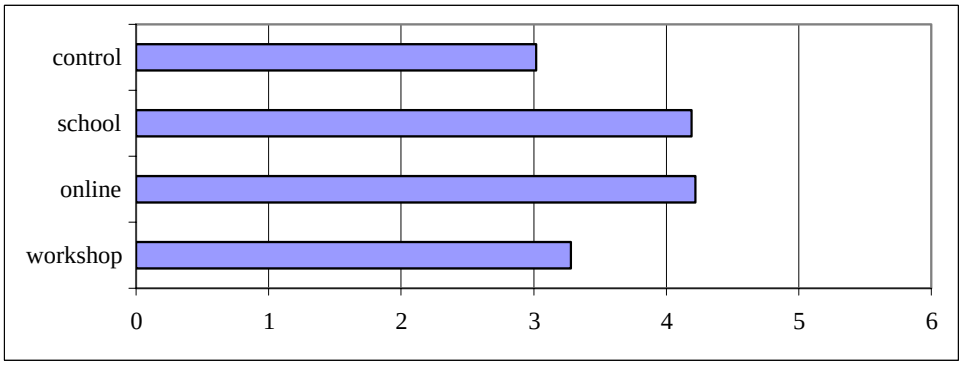

Figure 4-14 Comparison of the self efficacy score of the different groups.

The following graphs show the changes in knowledge, environmental attitudes, behaviour and self efficacy that occurred between the pre and post intervention questionnaires. There was a significant increase in knowledge by the control workshop group ($p<0.05$; paired sample t-test), while **the intervention workshop group had the overall highest level of environmental knowledge in the post intervention questionnaire**, as seen in Figure 4-15.

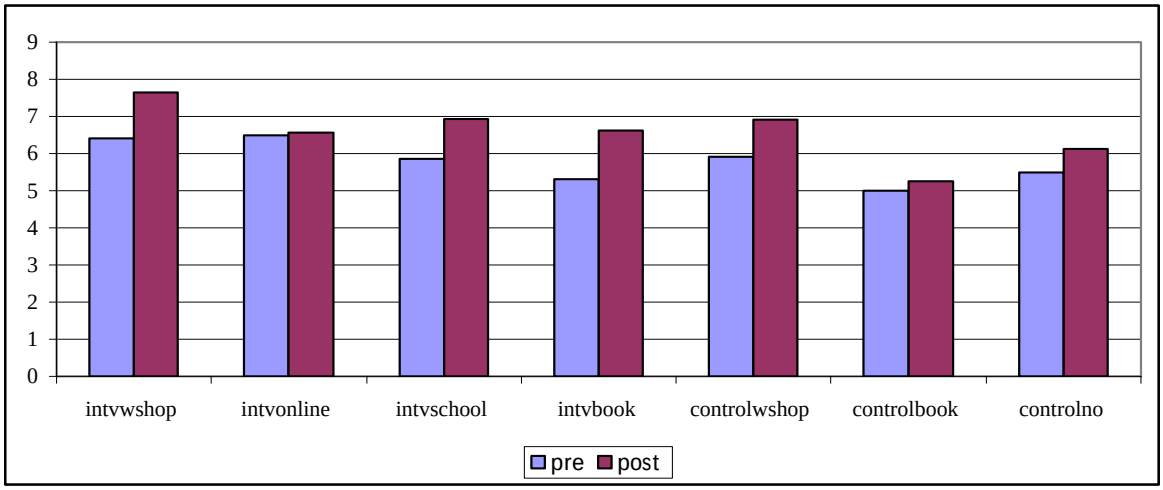

Figure 4-15 Changes in participant's levels of environmental knowledge between the pre and post questionnaires.

The online group had a significant increase in their general environmental attitudes ($p<0.05$; paired sample t-test) see Figure 4-16 below. The school and intervention booklet group had the highest level of environmental attitudes in the post intervention questionnaire. There were no significant changes in the energy specific attitudes.

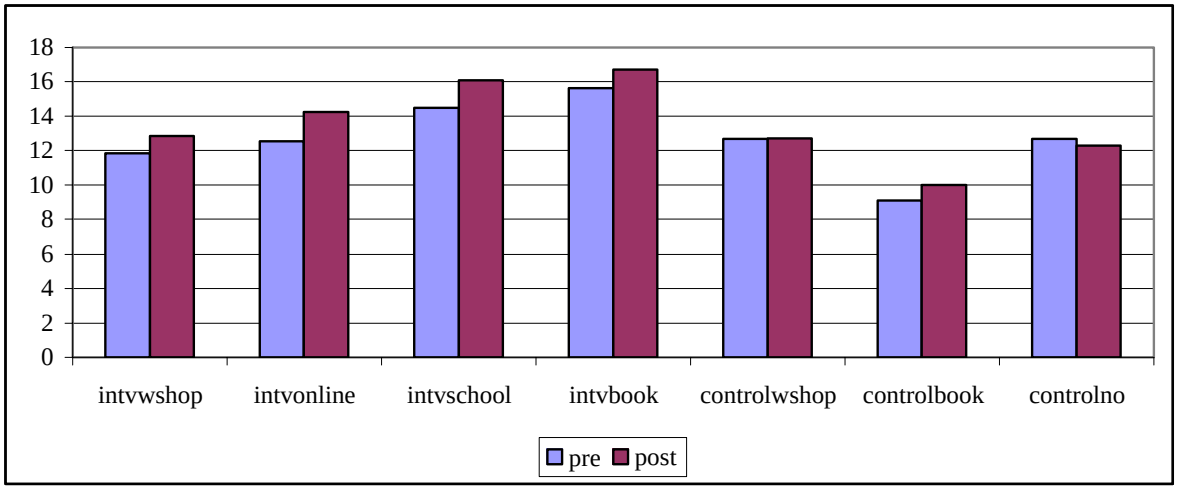

Figure 4-16 Changes in participant's levels of general environmental attitudes between the pre and post questionnaires.

All the groups, except for the schools group and the control normal group, had **significant increases in self reported positive energy behaviours** ($p<0.05$; paired sample t-test), see Figure 4-17.

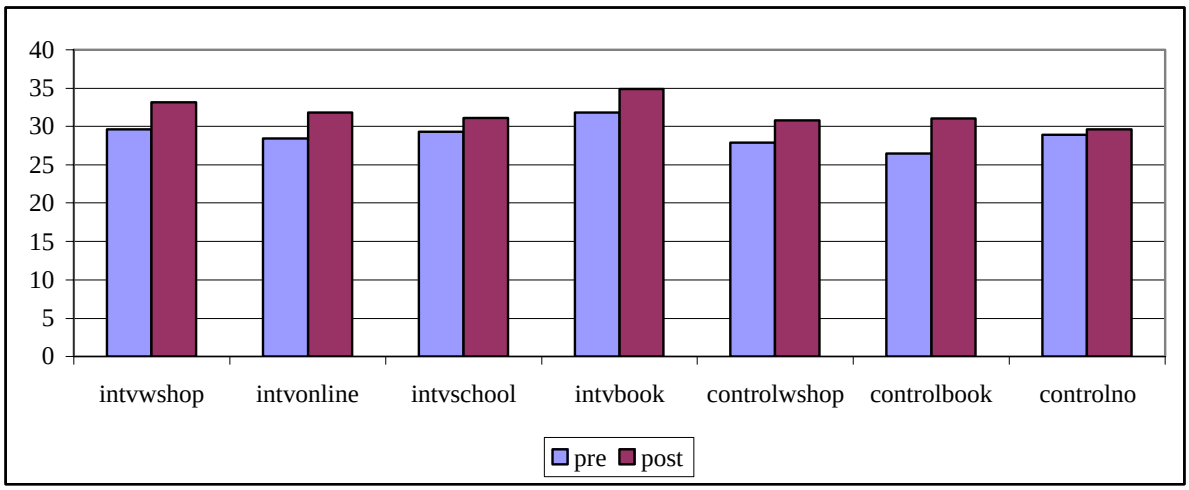

Figure 4-17 Changes in participant's levels of self reported positive energy behaviours between the pre and post questionnaires.

Another interesting finding was the changes in self-efficacy. All the groups except the intervention workshop and control normal group had lower self-efficacy in the post intervention questionnaire, as shown in Figure 4-18. For the intvonline group this decrease was found to be significant ($p<0.05$; paired sample t-test)

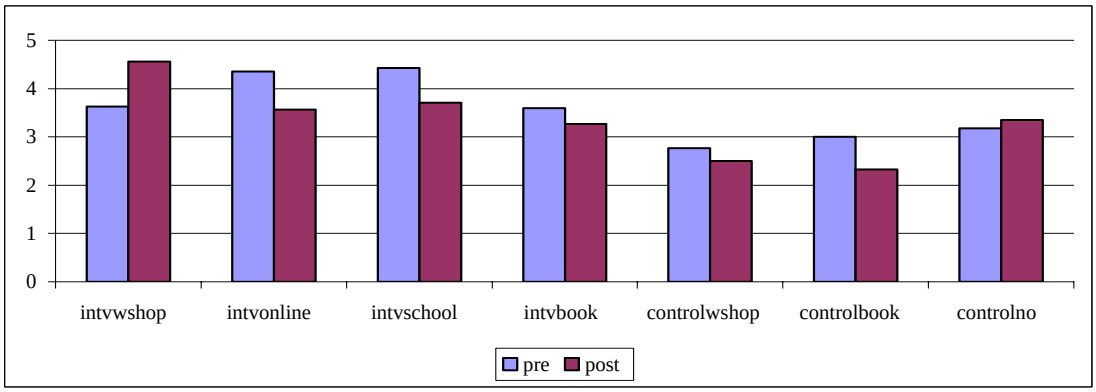

Figure 4-18 Changes in participant's self-efficacy scores between the pre and post questionnaires.

Although there were no significant changes in any groups' opinion about the effectiveness of goal setting, participants in the intervention workshop and intervention booklet groups did have a significant increase in their determination to achieve their goals ($p<0.05$; paired sample t-test). Another significant change that occurred in the intervention workshop group was that the goals they set became more specific ($p<0.05$; paired sample t-test).

4.5 Participant Feedback

4.5.1 Participant satisfaction

Overall, **86% of participants who responded were either satisfied or very satisfied with the program**. Participants were satisfied with all the different aspects of the program, in particular the type of information that was provided. The workshop group had the highest level of satisfaction, see Table 4-2.

Table 4-2 Participants rated their level of satisfaction with different aspects of the project on a scale of 1-7 (1 being very unsatisfied and 7 being very satisfied).

	Booklet	Online	Workshop	Overall
Newsletter	5.6	5.7	5.7	5.7
Type of information provided	5.9	5.7	6.2	5.9
Green Houses website	N/A	5.7	N/A	-
Eco Aims (goal setting)	5.2	5.4	5.8	5.5
Green Houses booklet	5.4	5.3	6.1	5.6
Workshop	N/A	N/A	6.1	-

4.5.2 Program effectiveness

Participants were asked to rate the effectiveness of different components of the program in helping them change their behaviour and save energy in the home, (see Table 4-3). The workshop group thought the workshop was the most effective aspect, while the online group thought the website was the most effective factor. The booklet group indicated they thought it was the type of information provided that was most

effective. **All groups rated the eco-aims as being effective, with the workshop rating it the most effective.**

Table 4-3 Level of effectiveness of different aspects of the project rated by participants on a scale of 1-7 (1 being very ineffective and 7 being very effective).

	Booklet	Online	Workshop	Overall
Newsletter	5.3	5.5	5.3	5.4
Type of information provided	5.5	5.4	6.0	5.6
Green Houses website	N/A	5.6	N/A	-
Eco Aims (goal setting)	4.7	5.3	5.6	5.3
Green Houses booklet	5.0	5.3	5.7	5.4
Workshop	N/A	N/A	6.2	-

Participants were asked what was the most important part of the program in motivating them to change their behaviour and take action. A list of all the factors along with selected participants comments are in Table 4-4 below.

Table 4-4 Motivating factors contributing to behaviour change.

Component	Comments from participants
Information (booklet)	"Knowledge - knowing what behaviours I could change and how easy it was to do."
To save money	"Cost, as a pensioner every cent counts."
To help Environment	"Understanding that small gains are important."
Eco Aims (goal setting)	"Setting an Eco Aim – I found it a concrete way of setting a goal and sticking to it rather than my usual procrastination."
Newsletter	"Newsletter – gives good tips and made me more aware."
Workshop	"Workshop, talking to other participants about energy saving tips and experiences."
Website	"Looking at graphs on website, not only shocked me but makes me more determined to save energy each week."

Participants rated their effort at conserving energy on a scale of 1 (poor effort) to 7 (strong effort). Across all groups, the score was higher after participating in the program compared to before (see Figure 4-19 below). The workshop group increased more than the online group and the booklet group. An overwhelming 91% of respondents thought that they would continue to be energy conscious for a long time after the program was completed.

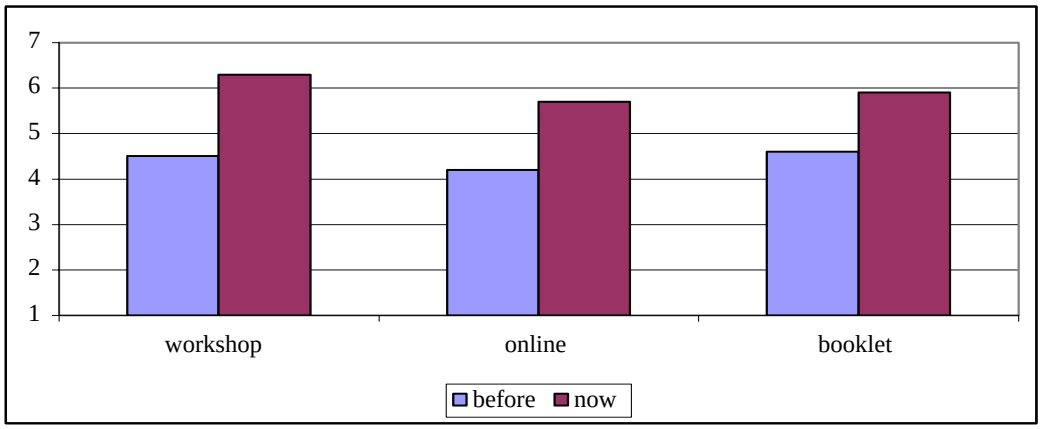

Figure 4-19 **Participants rated their effort at conserving energy before and after the program on a scale 1 (poor effort) to 7 (strong effort).**

4.5.3 Participant actions

Participants were asked to list what energy saving actions they were now performing in their home. **The booklet group on average performed 2 actions per household, while the online group averaged 2.5 actions per household and the workshop group averaged 3 actions per household.**

Popular actions included;

- Reducing shower length/ temperature
- Turning off the lights
- Switching appliances off stand-by power
- Lowering thermostat on hot water system
- Washing clothes in cold water
- Only washing full loads in dish washer/ washing machine

Only 12% of respondents did weekly meter readings and 8% monthly meter readings to monitor their energy use. Two families read their power bills so they could compare their energy savings and thought this was a simpler way of keeping track of their progress.

4.5.4 Additional Benefits

A 100% of all respondents said they felt like they were doing something positive for the environment by participating in the Green Houses program. Half of the workshop participants and a third of the online and booklet groups said they felt more a part of the community after participating in the program, see Figure 4-20.

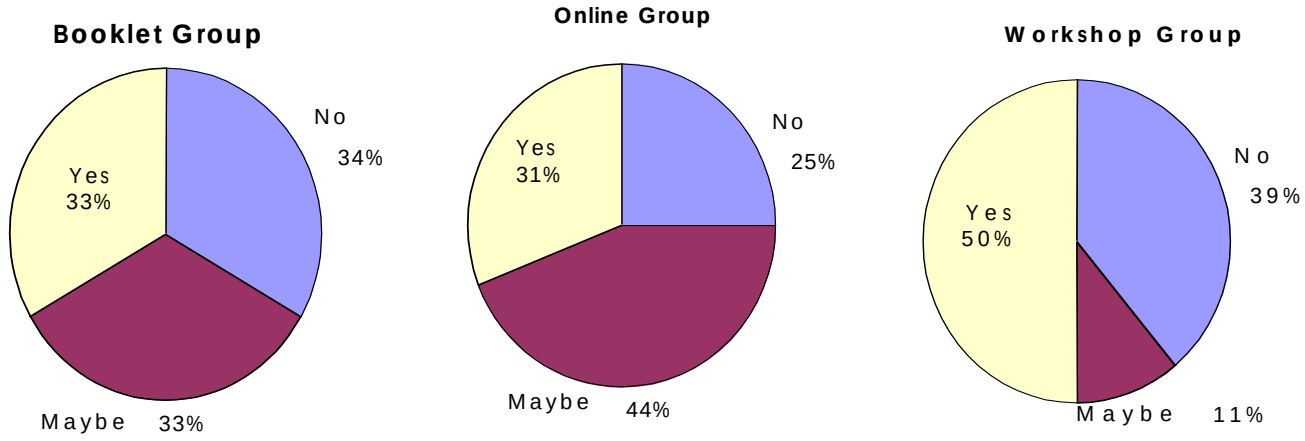

Figure 4-20 Percentage of participants who felt more a part of the community.

In Figure 4-21, many participants (three-quarters of participants in the workshop group) felt that their local council was doing something positive for the environment by supporting the Green Houses program.

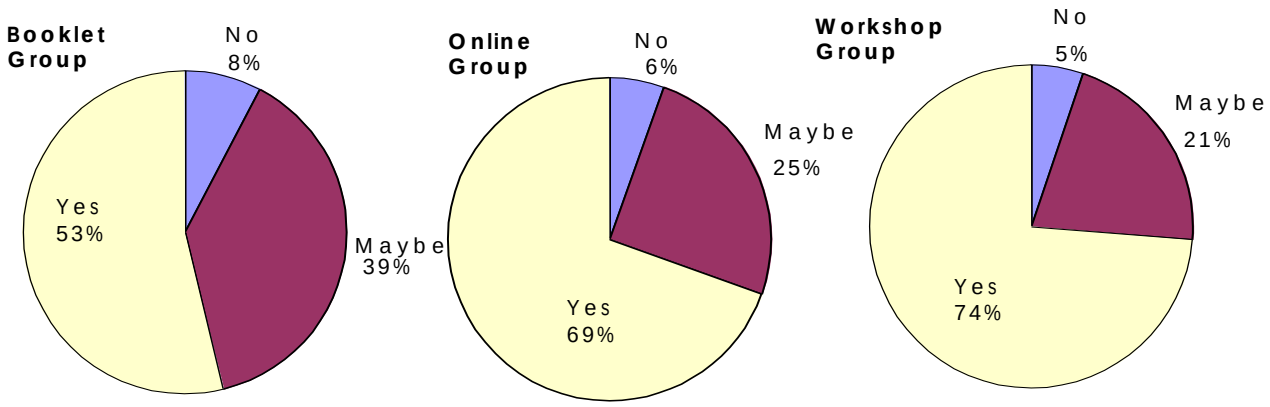

Figure 4-21 Percentage of participants who felt the council was doing something positive.

From the booklet group, half the respondents told others about the program. The percentage of participants who told others from the online group was slightly higher at two thirds. While almost all participants from the workshop group told others about the project. When participants did tell others about the program, the majority of people they told were interested.

4.5.5 Suggestions for Improvement

Participants suggested a number of ideas on how to get more locals involved in the program including;

- Additional publicity – more information in local newspapers and radio, displays about the program in the local shopping centre.
- Combine with other topics - join forces and do a presentation / info evening on conserving energy, waste and water.
- Organise fun community event - Green Houses solar BBQ at local parks.

- Target individual streets - work on one street at a time, then a block, then a precinct.
- Door knocking – since a home call is more personal than email, letter or website.

Participants were generally very happy with the way the program was run, however some individuals thought it could be improved by:

- Holding more workshops at different times (i,e. during the day)
- Combining energy with other topics such as water wise gardens etc.
- Provide realistic and actual practical examples of energy saving situations (stories from previous participants)
- Including more information on different energy efficient appliances – which brands are better etc.

4.6 Feedback from Schools

Instead of a feedback form, students were given a short quiz on greenhouse gas emissions and a few questions asking them their impressions of the project. When answering a quiz on greenhouse knowledge, all students scored very well, and seemed to understand why it was important to save energy. Their comments on the feedback form suggest they enjoyed using the website to enter their meter readings and felt good about being involved in the Green Houses project. Another important source of feedback was the teachers involved in Green Houses project. Informal interviews were held with the three teachers to ascertain their views on how well the program went within the school. The main points are listed below.

- The Eco-Aims (goals) were understood and written up well in class, although most students did not actually set goals with their families.
- The energy-wise picnic was a great hit with the students at both schools, particularly at Richmond where lots of fresh foods and home baked foods were brought in to share.
- It was good to have a guest presenter for a couple of classes in order to get students to focus, it made it more exciting for them.
- Unfortunately the parents were not involved much as it was primarily a school activity. Perhaps holding evening workshops for parents would help them to become more involved in the future.
- Some parents though, were exposed to the subject of climate change through their children, so the school project managed to engage a few people who would not have normally chosen to attend a workshop.
- The website was worthwhile, especially the home energy use charts, but perhaps a longer time period is needed to monitor so comparisons can be made. Students also said they would like more games, activities on the website.
- The newsletters were used as a classroom reading activity and students were encouraged to take it home to parents.

5 DISCUSSION

Evaluation shows that the Green Houses project and its goal setting model were effective at reducing energy consumption in households. The project has also been able to identify the advantages and disadvantages of various strategies for delivering environmental education, and which of those methods appeal to different segments of the community. **Over a period of five month the Green Houses participants saved a total of 53.5 tonnes of greenhouse gases.** Based on the results from the pilot project, Green Houses offers great potential for reducing greenhouse gas emissions in the wider community. If the Green Houses project was introduced to just 10% of households in the Southern Metropolitan Region, and each achieved a 15% reduction in each household, there would be a saving of approximately 16, 600 tonnes of greenhouse gases per year.

5.1 Effectiveness of the education components

5.1.1 Environmental information

The environmental information provided to both the intervention and control groups was based on specific, simple low cost actions that were easy to implement in the home and step-by-step instructions were provided for unfamiliar actions. The type of information provided, received the highest overall satisfaction rating from participants, 5.9 on a scale of 1 to 7. There were also many positive comments from participants.

"The best part of the program was the knowledge, knowing what behaviours I could change and how it easy it was to do"

"Being informed as to where most of the energy is used and receiving concrete ways of reducing energy wastage"

Both the control groups who were given environmental information (control workshop and control booklet) reduced their energy consumption. This indicates that the environmental information provided was effective at helping participants change their energy behaviour. In addition, all groups also increased their environmental knowledge and environmental attitudes although these changes were not found to be significant. This would partly be because those participating already had quite high levels of environmental knowledge and attitudes.

5.1.2 Goal setting

Intervention participants were satisfied with the use of goal setting in the program (5.5 on a scale of 1 to 7) and thought that it was effective in helping them change their behaviour (5.3 on a scale of 1 to 7). The eco aims were well set by participants and contained many of the characteristics of a good goal i.e. they were

specific, measurable, challenging and included a deadline. A number of participants commented on how effective the inclusion of goal setting (eco aims) was in the program.

"Setting an eco aim – I found it a concrete way of setting a goal and sticking to it rather than my usual procrastination".

"Eco aims – actually made me set a goal and do something to try and achieve it".

No negative comments were received about the inclusion of the eco aims, probably because many participants had already had positive experiences with goal setting. Only 7% of participants had not used goal setting prior to the program. The challenge was not to convince participants that goal setting was a good idea but to get participants to formalise their goals by writing them down and showing them that goal setting can also be used for the environment.

By comparing the control groups we can see that the use of goal setting as a behaviour change technique did have an effect on participants energy reductions. The intervention groups that set eco aims achieved a greater reduction of approximately 5% than the corresponding control group that only received environmental information. In addition those groups that set eco aims significantly maintained their energy reductions better than the other groups. **This indicates that the use of goal setting in environmental education programs does create greater behaviour change for a longer period of time.** The likely reason for this is that setting eco aims gives participants' specific direction about the changes they want to make and continually acts to motivate them until they have achieved their goal. A third of participants revisited their goal to re-read, re-write or expand on it after it was first set and most participants felt it was very important to them to achieve their goal.

"Setting a goal and being upset if I don't achieve it".

5.1.3 Support and feedback

Many environmental education programs simply give participants a lot of information, thank them for their participation and then send them away with no further contact, assuming that they will make the relevant changes. However, once a participant leaves a program they are confronted by other priorities, a lack of time and possibly a lack of support from other family members and the motivation and good intentions can soon disappear. For this reason a number of methods of feedback and support were built into the program so that participants could feel more empowered and motivated by knowing that there were many others participating in the program, rather than feeling alone in attempting to make changes.

"Thanks for the chance to be part of something bigger than just ourselves".

"Making us feel like we could really make an impact on a communities total energy use".

The continued contact after the main components of the program were completed, acted to remind participants of their good intentions and keep them motivated to make those changes despite the barriers they were experiencing.

"Just the fact that the programme was in place and being reminded by information updates kept it to the forefront of my awareness".

"I need to be motivated on a regular basis otherwise my attention lapses".

This accounts for why the newsletter rated highly on the satisfaction (5.7 out of 7) and effectiveness (5.4 out of 7) scales. The newsletter and other forms of feedback and support (online forum, follow-up workshops) are an integral part of the program and are likely to have contributed to the maintained energy conservation behaviours in the intervention groups. However, energy conservation still peaks a few weeks after the initial workshop and then gradually declines. To prevent this from occurring other means of providing participants with support and reminders to save energy and set goals should be investigated. Such as periodic workshops on the same or different topics, social events or field trips and periodic mail-outs of new eco aim cards.

5.2 Effectiveness of the communication strategies

5.2.1 Workshop

The participants in the workshop group were largely made up of retirees and professionals. There was significantly higher proportion of retirees in the workshop group than any of the other groups. As such this group was also significantly older than the online or school group. The higher number of retirees is likely to be because they felt they had more time to attend a workshop and were less likely to have barriers to attending, such as young children. The main reasons for participating were to do something positive for the environment and to make their home more energy efficient.

The intervention workshop and the control workshop groups achieved the largest reductions in energy consumption out of any of the groups (-16.6% and –11.6% respectively). This suggests that **the workshop format with face-to-face contact and personal communication is the best way to optimise the effectiveness of the education components**. The workshop highlighted the most important information and allowed participants to ask questions. When attending the workshop, participants not only had contact with the facilitator but also with other participants in their local community. Participants were given the opportunity to discuss the energy saving ideas and the barriers to making these changes amongst themselves. This would have generated additional motivation, and new ideas and demonstrated that they were not alone in wanting to make changes.

"The best part was talking to other participants about energy saving tips and experiences".

The intervention workshop participants experienced a number of changes that none of the other groups did. Firstly their goal determination and goal specificity significantly increased. This indicates that **the workshop format was the best strategy for teaching participants goal setting skills and getting them to set personal eco aims.** Every participant in the intervention workshop set an eco aim, a much higher proportion than the other groups. In addition their self-efficacy increased, while in all the other groups it decreased, indicating that they felt more empowered to take action after the workshop. This is because the formal setting of eco aims in the workshop meant that when participants left the workshop they had already considered how the information and actions they had learnt could be incorporated into their lifestyle, they knew exactly what actions to take when they got home and they had committed to these actions in their eco aim. Noticeably the workshop participants have made the most progress towards achieving their goals.

This group provided the most positive feedback on their experiences with the project and had the highest levels of satisfaction with all components of the program. In addition half of participants in the workshop group felt more a part of the community as a result of participating in the project, considerably more than the other groups because they were able to meet other participants in person. Three quarters of workshop participants also felt that the council was doing something positive for the environment by supporting the Green Houses project. Again this was higher than the other groups and is because participants met council representatives at the workshops and the workshops were held on council premises. Thus the involvement of the councils in the program was much more visible to the workshop participants.

5.2.2 Website

The online group's reasons for participating were the same as the workshop group, however the group was significantly younger and had a significantly higher proportion of professionals. Thus **the website approach is reaching a different demographic of participants than the workshop** approach. Having the option of participating in an online option of the program removes the barrier of time for some people. This group also had higher energy consumption levels to begin with, using more energy than the workshop or school groups. The online group also had higher levels of self-efficacy in the pre intervention than the other groups. This suggests that online participants are more confident in their ability to make changes, are self-directed learners and felt they didn't need that additional support and direction of a workshop.

The online group did achieve a significant reduction in their energy consumption although it was not as large as the other groups (-6.6%). Participants in the online group also significantly increased their environmental attitudes and the number and frequency of their self-reported energy saving behaviours. This suggests that the online strategy is effective for delivering the environmental information. In addition the **goals that were set by online participants were of a high quality and contained many of the**

characteristics of a good goal i.e. were specific, measurable, challenging and had a deadline. This suggests that the online strategy is also effective for teaching participants goal setting skills. Although only seven eco aims were saved on the website the feedback form determined that three quarters of the website participants actually set goals. A third of the participants felt more a part of the community as a result of participating in the program indicating that the newsletter had gone some way to helping the online group feel a part of the larger program and the community.

Some online participants did experience difficulty using the website, very few managed to save their goals online and there were also some reported problems with logging on. There is a need to improve the website so that it is more user friendly and can reliably save participant information once it is entered. More contact with participants via email would also help ensure that the website is being used correctly. The website strategy has the potential to reach a segment of the community that are not willing to come to workshops, and can reach a larger amount of people in a cost effective manner. **The significant reduction in energy consumption of the website participants demonstrates that the online strategy is effective for creating behaviour change and with improvements to the website, its effectiveness is likely to improve.**

5.2.3 Booklet

Participants in the booklet group had originally signed up to attend a workshop and when they were no longer able to attend the workshop they were sent a copy of the information booklet. While the booklet group had the same reasons for participating and characteristics of the workshop group, they did not achieve the same reductions. The intervention booklet group achieved a reduction of -8.4% and the control booklet a reduction of -5.4%. Both booklet groups significantly increased their number of self-reported energy conservation behaviours. Again the inclusion of goal setting increased the amount of energy reductions achieved compared to those just receiving information. Although the booklet groups' eco aims were unable to be accessed, two thirds of the group did set their eco aims. In addition they significantly increased their goal determination and 50% of particcipants felt that it was very important for them to reach their goal. This suggests the instructions on goal setting were followed in the booklet. Like the online group a third of the participants felt more a part of the community as a result of participating in the program indicating that the newsletter helped them feel a part of the larger program and the community.
Since they originally signed up for the workshop, the booklet group already had a strong interest in energy conservation and were willing to make changes. Thus they cannot be considered the same as a group of random households who were sent the booklet with no other contact and no expression of interest. Although the pilot project did not offer the initial option of receiving an information booklet this option could be included in future versions of the program and could potentially attract more participants by again requiring a smaller time commitment.

5.2.4 Schools

Although the students themselves managed to increase their environmental awareness and provide positive feedback about their involvement in the project, their actual households did not manage to achieve any reductions in energy consumption. When questionnaires were sent to parents, the majority said saving money was the largest reason for participating significantly more than the other groups. Since parents in the schools group had young children, all of them were under 55, which made them by far the youngest group. From this group, 30% of parents were home carers and 30% were blue collar workers. These households naturally had more occupants per house on average than the other groups, and 82% were still paying back mortgages, a much higher proportion compared to the other groups.

Thus, while the schools group had the potential to again reach a different segment of the community, the environmental knowledge and behaviours taught in the schools were not being transferred to the home or the parents. In fact the schools group was the only group to not report any behaviour changes in the questionnaire. The teachers gave positive feedback about the implementation of the program and the children enjoyed participating in the program. In particular they found the topic interesting and enjoyed receiving the newsletters and using the website. They were also quite comfortable with the setting of individual eco aims as they had already covered goal setting as part of the school curriculum.

The childrens' eco aims while well set mainly consisted of actions that they were able to undertake easily although they were unlikely to have a significant effect on energy consumption. This is likely to be because the children did not have the ability or opportunity to carry out some of the behaviours by themselves or because they were not able to influence parental behaviour to any significant extent. In the future the information provided should have behaviours more relevant to the children.

If family goals are to be set then these need to be facilitated with the parents and children together, rather than expecting the child to facilitate the goal setting with their parents. Parents must be actively involved in education programs that are consistent with and support activities in schools, so that sustainable behaviours in the classroom are being reinforced in the home. There is a large potential to use the lessons learnt here to develop a successful schools program. The next stage of the Green Houses project could involve investigating ideas on how this might be achieved.

5.3 Reaching households

A number of different techniques were used to reach households and the most effective technique by far was letters of invitation. Response rates for letters of invitation were highest when peoples' names were put on the envelopes, as opposed to simply addressing letters to "the householder". Letters addressed to individuals appear to be more personal and relevant and are less likely to be overlooked as junk mail.

There was also a higher response rate from the control letters than from intervention letters (8.6% compared with 4.6%). This suggests that people feel more comfortable making small commitments rather than large commitments. Future response rates can be improved if a more up-to-date database is used as over 18% were returned unopened. Response rates are also likely to improve in future programs, as there will not be the same requirements, which excluded some people from the pilot. It was also found that response rates were improved when participants could respond via a reply paid envelope and a RSVP form rather than having to ring a number. Getting participants to commit in writing their intention to participate also increased their attendance rate. This has also been shown in other environmental education programs (Werner et al, 1995).

Many participants suggested that greater publicity about the program should be used to recruit more participants. However the response rate received for newspaper articles and radio presentations suggests publicity alone should not be used to recruit participants, rather it should be used in combination with the letters of invite. This can then act to reinforce the benefits of the program and can help to increase the response rates of the letters of invite if potential participants have already heard positive information about the program from other sources.

Letters of invite and publicity of the program should highlight the specific personal benefits that will be received through participation. They should include real case studies of successful participants rather than concentrating on abstract environmental benefits. The identified barriers of time, interest and other priorities should also be addressed. One way this could be addressed is to trial the foot in the door technique, which is simply getting participants to commit to a small action at first and then following it up with larger commitments such as attending a workshop (Freedman and Fraser, 1966). So those participants who are only willing to commit to the online or booklet strategies may down the track be willing to attend a workshop. In order to maximise participation, all of the communication strategies (workshop, website and booklet) should be offered.

"Now that I have seen the program I think I could do a better job of being involved in the program in the future".

5.4 Has the project been successful?

The Green Houses project was a success in that it managed to fulfil the following objectives it set out to achieve.

- ✓ **Increase participant's knowledge and awareness of energy issues and environmental impacts of energy use.**

  An increase in environmental knowledge and attitudes was found across all groups.

- ✓ **Enable participants to identify energy wastage in their homes and adopt behaviours to reduce this wastage.**

All groups except for the school group and normal control group reported a significant increase in energy conservation behaviours.

✓ **Set goals with participants to reduce their energy consumption and assist them in establishing strategies to make the lifestyle changes required to attain their goals.**

Within all communication strategies the majority of participants set eco aims and all groups rated the use of goal setting as effective for helping them change their behaviour. At this stage all participants who set goals have either achieved them or are continuing to work towards them.

✓ **Identify the level of participation in such a project and the awareness and attitudes of those choosing to participate.**

The pilot project was able to achieve the required participation rate and a number of ways to increase participation have been identified. Only 2% percent of participants dropped out of the project. All participants had quite high levels of environmental awareness and attitudes to begin with.

✓ **Identify successful communication strategies suitable for a large project that transfers knowledge and feedback to the participant**

The small workshop approach was identified as the most successful approach for optimising the education components and creating behaviour change. However advantages were found with all communication strategies and combination of strategies should be used in future programs.

✓ **Through implementing and evaluating this pilot project, the foundation is set for a larger residential greenhouse gas reduction project that can be replicated through the Southern Metropolitan Region and other local government areas.**

The updated Green Houses project is now underway an findings from this pilot project will be incorporated into the model over 2004.

5.5 Conclusion

Extensive evaluation of the Green Houses pilot project has demonstrated that the program is a success with participants saving 53.5 tonnes of greenhouse gases in just five months. Behaviour change is a crucial objective of environmental education programs and the hardest to achieve. People's individual motivators and barriers to behaviour change are often complex and varied. The Green Houses pilot project developed a set of education components and communication strategies, which can be adapted to meet the needs of a diverse range of people. Evaluation has demonstrated the benefits of including all of the education components and the benefits of the different communication strategies for attracting a range of participants to the program. The strength of the Green Houses program lies in this holistic and multi-pronged approach which creates a diverse range of outcomes including; reduced energy consumption and the saving of greenhouse gases, community recognition of local governments role in combating climate change, opportunities for community development and economic benefits to participants.

6 RECOMMENDATIONS

In order to improve the project for implementation on a wider scale, the following actions are recommended:

1) Implement the Green Houses project on a wider scale

Now that the project has been proven to be effective at achieving positive behaviour change in households, it is recommend that it be introduced into the other councils in the southern metropolitan region and offered more widely throughout the community.

2) Continue to offer all the education components and communication strategies

It is important that all education components of the project are used and the three different communication strategies are included in future versions of the project to maintain the effectiveness and integrity of Green Houses. This will ensure that a broader cross section of the community is attracted to the program.

3) Include more topics in the Green Houses program

The pilot project has demonstrated that the education techniques and communication strategies have been effective at targeting energy. There is no reason to suggest that other topics such as water and waste would not work equally well if they were included in the programme and would make the project appeal to a wider audience - the focus would be on conserving resources as opposed to just energy.

4) Continued support and feedback

Investigate avenues for creating n ongoing dialogue to achieve sustained behavioural change. Newsletters were valued, but, in addition, ongoing encouragement is needed to set energy goals. The inclusion of additional topics in the previous point should support ongoing goal setting.

5) Recruiting participants

When trying to recruit participants, the following strategies are recommended:-

- Use a current database to retrieve addresses from e.g. the electoral roll
- Actively involve previous participants and existing community groups – encourage them to refer friends and relatives. Provide personal success stories from previous participants.
- Consider a range of recruitment techniques and be creative with incentives (remember programs don’t always have to offer material rewards)

- Try a foot in door strategy – Previous research has demonstrated that once you get people to commit to a small action, you have more chance getting them to commit to a large action i.e. coming to a workshop.

6) Invest in more advertising and publicity

Publicise the project in local papers, posters on bus shelters and in shopping centres. Organising interviews on talk back radio can also be good publicity. Host a community event like a solar barbeque where people can come and find out more. Advertising through existing networks such as the cool communities newsletter is another option.

7) Increase attendance at workshops

To get more people to the workshops, a suggestion is to send out RSVP forms with reply paid envelopes and then calling and confirming that people will be attending, as once a written commitment has been made people are more likely to come.

8) Improve website

The website component of the project should be improved so that participants can easily log on and follow the activities. They must be provided with individual log in codes so that they can save and return to their goals once they have been entered. More correspondence through email is suggested as this will ensure that all participants are actively involved and using the website correctly.

9) Further develop schools project

Although this project was never originally intended as a school activity, the experience and feedback we gained from running this pilot at Calista and Richmond indicates there is great potential for expanding energy awareness through schools. Currently, there seems to be a gap in school environmental education programs relating to energy. Perhaps there is an opportunity to trial a Green Houses type school project that involves both students and parents, with energy conservation activities in the school and as well as in the home.

10) Continue evaluation

It is recommended that some sort of evaluation continues to be incorporated into the program, even if it only includes monitoring energy bills and participation feedback forms.

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8 APPENDICES

8.1 Pre Questionnaire

1. Please indicate from what sources you have heard about the Green Houses program, you can tick more than one.

Letter ❑ Your son/ daughter ❑ Postcard ❑ Newspaper ❑
Newsletter ❑ Radio ❑ A friend ❑ Other _____

2. Please indicate which statement best matches your reasons for participating in the Green Houses Program.

To save money ❑ To do something active with the community ❑
To reduce greenhouse gases ❑ To do something positive for the environment ❑
To meet like-minded people ❑ To get scientific information about climate change ❑
To make home more energy efficient ❑ Other_____

3. If you wanted to significantly change the amount of impact your household activities have on the environment, do you think you would have the ability to make those changes (please tick)?

Strongly Agree ❑ Agree ❑ Undecided ❑ Disagree ❑ Strongly Disagree ❑

4. What factors do you think may be important in preventing you from making those changes (please circle)? (Very Important, sometimes important, not important)

Keeping motivated Influencing other household members Time Money Other priorities
Don't know how Lack of interest

5. Please indicate whether you believe the below statements to be true or false? (True, False, Unsure)

a) Lights are the biggest consumer of energy in the home
b) Natural gas produces less greenhouse gases than electricity
c) Most scientists believe that climate change is occurring
d) Global warming is largely the result of human activities
e) More than half of Western Australia's electricity comes from wind and solar energy
f) The greenhouse effect is caused by a hole in the earths atmosphere
g) Turning the TV off by the remote control means the TV is not using any electricity
h) Australian households generate almost one fifth of Australia's greenhouse gases
i) The burning of coal releases greenhouse gases
j) Greenhouse gas emissions in Australia are decreasing
k) Australia is the highest per capita emitter of greenhouse gases in the world

6. Please indicate how often you carry out the below behaviours? (Never, Rarely, Sometimes, Regularly, Always)

Only run full loads in the washing machine
Turn lights off when leaving the room
Hang washing out rather than using a clothes dryer
Turn off pilot light or electric booster switch on your hot water system when going away on holiday
Turn appliances off at power point rather than leave on standby function
Purchase energy efficient light globes
Put on a jumper or use a blanket to keep warm rather than the heater
Make an effort to have shorter or cooler showers
Use cold water only in the washing machine
Minimise the area to be heated in winter by closing off areas
Close curtains in the evening to minimise heat loss in winter

7.Listed below are statements about the relationships between humans and the environment. For each statement please indicate whether you Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D) or are Unsure (U).

a) We are approaching the limit of the number of people that the earth can support
b) Humans have the right to modify the natural environment to suit their needs
c) When humans interfere with nature it often produces disastrous consequences
d) Human ingenuity will ensure that we do not make the earth unlivable
e) Humans are severely abusing the environment
f) The earth has plenty of natural resources if we just learn how to develop them
g) Plants and animals have just as much right as humans to be able to exist
h) The balance of nature is strong enough to cope with the impacts of modern industrial nations
i) Despite our special abilities humans are still subject to the laws of nature
j) The so called ecological crisis facing humankind has been greatly exaggerated
k) The earth is like a spaceship with very limited room and resources
l) Humans were meant to rule over the rest of nature
m) The balance of nature is very delicate and easily upset
n) Humans will eventually learn enough about how nature works to be able to control it
o) If things continue on our present course we will soon experience a major ecological catastrophe

8.Listed below are statements about energy consumption and the environment. For each statement please indicate whether you Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D) or are Unsure (U).

a) Consumers have the right to use as much energy as they want and can pay for
b) Everybody including myself has to be involved in reducing energy consumption
c) While others may tolerate a house without air conditioning in summer, my own need for being cool is high
d) I am unable to reduce the amount of energy I use in my home
e) Having the house at a constant temperature all year round is not necessary for my family's health and well-being
f) The amount of energy I consume in my home makes no difference to the amount of energy consumed overall in WA
g) It does not take a lot of effort to save energy in the home
h) I would be able to influence other members of my household into reducing the amount of energy they use
i) In the past technology has coped with all major crises and it will no doubt soon discover a solution for global warming
j) It is not worth the trouble to turn appliances off at the power point every time
k) Over consumption of energy by individuals has contributed to increasing greenhouse gas production
l) It is essential to my family's health and well-being for the house to be warm in the wintertime
m) I would be unable to influence other members of my household into reducing their energy use
n) Making the effort to save a little bit of energy each day is worth it
o) If I wanted to I would be able to reduce the amount of energy I use in my home
p) It is not my responsibility to reduce greenhouse gas emissions
q) You can still have a comfortable home while minimising energy consumption
r) Industry and government are the only ones able to prevent climate change
s) Individuals can make a difference to the amount of greenhouse gases produced

'A goal can be considered a vision of something you want to achieve'

9. Do you consider setting a goal to be an effective way of changing your behaviour or achieving something you want?

Not Effective Highly Effective

1 2 3 4 5 6

10. When you set a goal do you usually: (you can tick more than one)

Have a vague idea of something you want to do ❑ Write it down ❑
Have a specific goal set in your mind ❑ Tell others ❑ Don't set any goals ❑

11. When you set a goal how specific is it?

Not Specific (1-6) Very Specific

12. How often do you set goals? (please circle one answer)
Daily Weekly Monthly Yearly Never

13. When you set a goal how determined are you to achieve it?
Don't care (1-6) Very Determined

14. When you set a goal how difficult do you make the goal?
Easy (1-6) Very Difficult

15. When you set a goal do you give yourself a deadline for achieving it? (please circle one)
Always Usually Sometimes Never

16. How often do you achieve your goals? (please circle one)
Always Usually Sometimes Never

15. In what areas of your life have you set goals?
Health ❑ Career ❑ Finances ❑ Environment ❑ Family/relationships ❑
Recreation ❑ Education ❑ Other: _____

PERSONAL DETAILS

1. Is English your first language? Y / N
2. Sex: _____ 3. Age: _____

4. Please tick the category that bests describes your occupation (tick only one).

Professional	❑	Production or transport worker	❑
Tradesperson	❑	Labourer or related worker	❑
Student	❑	Home carer	❑
Clerical	❑	Retired	❑
Sales or Service Worker	❑	Unemployed	❑

Other _____

5. Please tick the highest level of education you have achieved?
Year 10 ❑ Undertaking a university degree ❑ Year 12 ❑
Completed a university degree ❑ TAFE certificate ❑ Post graduate education ❑
Apprenticeship ❑

6. Please tick your current <u>total</u> household income

Less than 35,000	❑	65,000 – 80,000	❑	35,000 - 50,000	❑
80,000 – 100,000	❑	50,000 – 65,000	❑	Greater than 100,000	❑

7. How many people currently reside in your home? _____

8. How would you best describe your current home?
Freestanding house ❑ Semi detached townhouse or villa ❑ Flat, unit or apartment ❑

9. What is your current form of home ownership?
Renting ❑ Mortgage ❑ Own outright ❑

10. Are you regularly involved in any community groups (e.g. P&C, Sports Club, Conservation Group)
Y / N _____

8.2 Feedback Form

1) How satisfied are you with your experience in the Green Houses program?
Very dissatisfied Dissatisfied Unsure Satisfied Very satisfied

2) How satisfied were you with the following aspects of the program? (N/A = not applicable; 1 = Very unsatisfied; 7 = Very satisfied)
Green Houses booklet Workshops Eco Aims Newsletter Type of information provided
Green Houses website

3) How effective do you think the following aspects of the program were in helping you change your behaviour and save energy in your home? (N/A = not applicable; 1 = Very unsatisfied; 7 = Very satisfied)
Green Houses booklet Workshop Eco Aims Newsletter Type of information provided
Green Houses website

4) Do you have any suggestions on how the Green Houses program could be improved? *(Including and comments on the invitation to participate, workshop format and venue or website usability.)*

5) At what stage are you in achieving your eco aim? Tick only one.
Am unlikely to achieve it ❑ Have not yet achieved but still working on it ❑
Partially achieved and still working on it ❑ Achieved and finished ❑
Achieved and continuing improving ❑

6) After setting your eco aims did you revisit your eco aim at all? Ie reread, reword, rewrite or expand on them. Y/N

7) How important was it to you to achieve your eco aim?
not important somewhat important very important

8) How would you rate your efforts to be energy conscious, now and before the program started?

	Poor Effort						Strong Effort
Now	1	2	3	4	5	6	7
Before	1	2	3	4	5	6	7

9) What actions have you taken to save energy in your home?

10) Have you been monitoring your energy consumption through regular meter readings?
Y/N If Yes how often?_____

11) What was the most important component of the program for helping you change your behaviour and take action? Why?

12) Do you think that you will continue to be energy conscious after the program is complete?
Have already stopped Probably for a little while Will for a long time

13) As a result of participating in the Green Houses Program do you think you (Yes, No, Maybe)
Feel more a part of the community
Feel like you are doing something positive for the environment
Feel like the council is doing something positive for the environment

14) The people you have told about the program, are they?
Not interested a little interested interested very interested didn't tell

15) Do you have any ideas on how to get more locals to participate?

8.3 Newsletters

12th November 2003
Issue 1

Green Houses Newsletter

Project Update:

- Emissions reductions achieved in Kwinana and East Fremantle
- Saving energy when using air conditioners
- Why did you participate? – survey findings
- Eco Aims – the key to achieving lasting change

Community taking care of climate change

Congratulations all Green Houses participants. In simply two weeks you have decreased your energy consumption by **10 percent** compared to the same time last year. We have been monitoring these changes on a fortnightly basis and will continue reading gas and electricity meters until the end of January 2004 – so keep up the good work!

★Special congratulations to Jane Brinsden and family of East Fremantle who have succeeded in reducing their energy use by a big 23 percent! Jane says she has put her Eco Aims into action by:-

- Turning down her hot water thermostat
- Switching to cold water for washing clothes
- Reducing shower times
- Turning appliance off at the wall
- Importantly Jane has got the whole family involved, so it's a combined effort!

Kwinana participants have saved the equivalent 548 kilograms of carbon dioxide, while East Fremantle participants have saved the equivalent of 534 kilograms. Well done to both communities - together your savings are equivalent to planting 54 trees!

Ways to keep cool this Summer

As we head into Summer, the use of air conditioners, coolers and refrigeration will increase so remember some of our tips for keeping energy costs down:-

- ✓ At the start of the day, close the windows, curtains and blinds to keep the heat out and once the sea breeze is in, open windows to the SW and NE to let the breeze cool your home
- ✓ Use ceiling fans - they cost a fraction of what it costs to run air conditioners
- ✓ Avoid using the oven especially during the day as it heats up the house
- ✓ Better still cook outside if you have this option

If you are using air conditioners, there are some simple things you can do to save energy when using them:

- ✓ The temperature of a cooled room in summer should be about 23-26°C Remember the humidity indoors will be low, so it will feel cooler. Check the temperature after the air conditioner has been running for 30 minutes.
- ✓ Clean the filter regularly to maximise efficiency
- ✓ When a hot day is expected, turn on the air conditioner early for a short period (eg 1-hour) rather than wait till the building becomes hot as it operates more efficiently when the outside air temperature is cooler.

Dates for Follow - up workshops

Kwinana
Mon 17th November
7.30 – 8.30pm at
Kwinana Town Council

East Fremantle
Wed 19th November
7.30 – 8.30pm at
East Fremantle Town Council

Let us know in advance if you have any energy - related questions you would like us to answer at the workshop. We will also be providing :-

- Tips on solar hot water systems
- Instructions for building a backyard solar oven
- How your home can tap into renewable energy

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Findings from the questionnaire

We really appreciate your involvement in the Green Houses project and are interested in finding out ways to improve the program for future participants. The questionnaire we sent out is one of the tools we use to help us with our evaluation. These are some of the things you have told us.

When asked 'What are your reasons for participating in the program?'

58% said to do something positive for the environment
45% said to make home more energy efficient
32% said to save money
31% said to reduce greenhouse gases
20% said to do something active with the community
3% said to meet like-minded people

When trying to make changes in the home, there can be many factors that prevent us from doing so. Most people viewed the following factors as obstacles to change, (in order of largest to smallest obstacle)

1) **Keeping motivated**
2) Influencing other household members
3) Money
4) Don't know how
5) Time

Come to the follow up workshop where we can discuss ways of overcoming these obstacles. If you missed out on the workshops last time, you are welcome to attend the next ones (details overleaf).

Reminder about Eco Aims

If you haven't had a chance to set your Eco Aims, it's not too late. The booklet that you received has a list of simple instructions on how to write them. It is important that your Eco Aims are put in a highly visible area so they act as a reminder to save energy. Remember it only takes a few changes to your behaviour that can really save money on your bills and help reduce greenhouse gas emissions.

We're on the Web!

See us at:

www.smrc.com.au/greenhouses

NAME
STREET
SUBURB

29th January 2004
Issue 3

Green Houses Newsletter

In this Issue:

Update on Energy Savings for Nov - Jan

Kwinana
11% reduction of greenhouse gas emissions

East Fremantle
8% reduction of greenhouse gas emissions

Some feedback from satisfied participants: –

"I am enjoying the programme... it is not only saving me money but encouraging the household to be more aware of wasting resources." – Kwinana online participant

"Making us feel like we could really make an impact on a communities total energy use. The easy to follow behaviour modifications were great." - Kwinana online participant

"Do it all over Perth!" – East Fremantle workshop participant

Saving energy becomes a habit

Great news everyone! In just 12 weeks Green Houses participants have saved a total of 37 000 kWh of energy. *It would take approximately **1500** trees to soak up this much carbon dioxide!* Congratulations on all your efforts.

We are pleased to report that not only have you significantly reduced your greenhouse emissions, you are actually *maintaining your efforts to save energy*. This is precisely what the Green Houses team was hoping to see – long term behavioural change. In early December, emissions reduction peaked at 15% for both areas. Over Christmas, energy use went up again because of it being the holiday season, with more visitors and spending more time at home. Now that we have started the new year, it's time to get back into those good energy saving habits. Making small behavioural changes in your home is an important starting point, yet the real challenge is to stay energy conscious and to maintain these behaviours until they become habit – just like riding a bike. This way, looking after the environment and saving money will be an ongoing practice, accepted as the normal thing to do.

Being energy conscious – simple as riding a bike.

Rising electricity demand in WA

As most of you would have read in your last electricity bill, Western Power says **the State needs to spend around $100 million a year on new power stations to meet growing demand for electricity.**

84% of our electricity comes from burning coal - we are one of the top coal-burning countries in the world. 24 coal power stations in Australia amount to our largest greenhouse emissions source. In WA, the three power stations at Muja, Kwinana and Collie emit around 10,000,000 tonnes per year, meeting residential and industrial electricity demand (Diesendorf, WWF publication, 2003).

To address greenhouse emissions, electricity use from coal-fired power needs to be reduced. The reductions achieved by Green Houses participants have shown how we all can reduce our energy use through simple, low cost measures. Through conserving our energy use, we can together manage our state's electricity demand and, along with renewable energy, such as solar and wind, move to a greenhouse-friendly future.

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Sustainable Energy Development Office

MURDOCH UNIVERSITY

TOWN OF EAST FREMANTLE

The benefits of using cold water

When you use cold water for washing, not only do you save energy and greenhouse gas emissions, according to Positive Health magazine (Issue 74, March 2002) there are also many other benefits:-

- Using cold water for bathing was adopted by the Romans as a practice to cure stomach problems and headaches.
- Many naturopaths recommend cold water immersion as a way to supercharge the system, improve breathing and muscle tone and decrease fatigue.
- Beauty therapists believe cold water refreshes and improves skin tone, and it doesn't dry your skin out like hot water can.
- Hairdressers often advise rinsing hair in cold water as it seals the hair shaft – making it look shinier.
- Washing clothes with cold water has benefits too, as many new detergents work best in cold water.
- Colours are less likely to fade or run, your clothes won't shrink, and they'll last longer.

Looking back and looking forwards

Evidence of climate change continues to build. The global surface temperature averaged over 2003 was the third warmest year since 1861, just behind 2002. The warmest year is 1998 (+0.55°C). In 2003 the Arctic ice area approached the record low of 2002 (WMO, Dec 2003).

However together we can make a difference. The success of Green Houses has spurred us on to look towards a bigger program for the region based on the same principles to run over a longer timeframe.

We're on the Web!

See us at:

www.smrc.com.au/greenhouses

"It gave me an understanding that small gains are important"
(East Fremantle online participant)

"Thanks for the chance to be part of something bigger than just ourselves."
(Kwinana online participant)

Thank you all for the valuable feedback we have already received. If you have any more, it would be appreciated to help shape our next program.

NAME
STREET
SUBURB

8.4 Booklet Contents

Contents

Green Houses encourages people to tap into their own positive energy by setting goals to help the environment and save money.

8.5 Eco Aim Card

Your Green Houses Eco Aim

Have a good think about what goal you want to set to make your lifestyle more energy aware. When you are ready fill out the boxes below.

Write down your aim.

Why do you want to achieve this aim? (Motivation)

How will you achieve your aim (sub-aims)?

-

-

-

-

When will you achieve your aim by?

The difference between a dream and a goal is the written word' - Anon