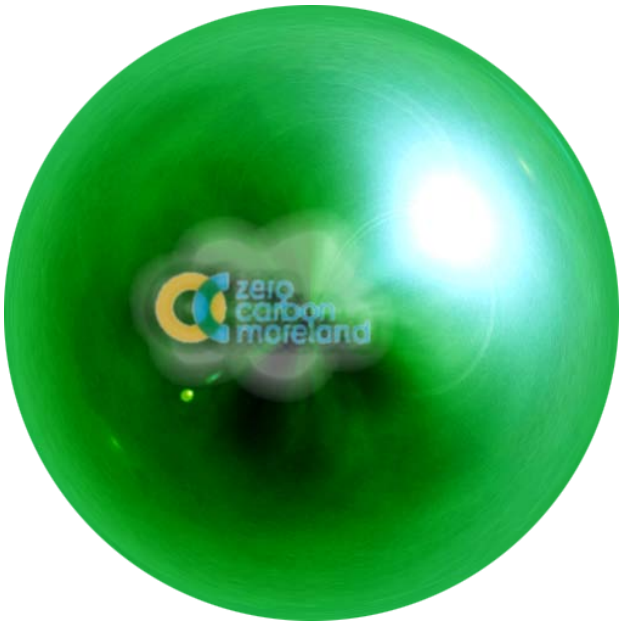
Motivating Environmental Behaviour Change



An Interactive Qualifying Project submitted to the faculty of Worcester Polytechnic Institute in partial fulfilment of the requirements for the Degree of Bachelor of Science.

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ABSTRACT

The Moreland Energy Foundation began the initiative to have their community, Moreland, VIC, Australia, achieve carbon neutrality through the Zero Carbon Moreland (ZCM) program in 2008. We evaluated ZCM to determine how well MEFL has engaged the community and how effective this program has been in causing behaviour change. We also investigated ways to expand the scope of their carbon footprint calculator to improve its accuracy. We found that ZCM has attracted many middle income households that are already environmentally conscious; we made recommendations on how to expand their outreach to other sectors of the community and increase the level of involvement of their members.

EXECUTIVE SUMMARY

Climate change is a major global issue that has received increasing attention in recent years. The best way that people can help reverse climate change is to reduce the carbon emissions that their lifestyles create on a day to day basis; these emissions combine to create a carbon footprint for each individual on Earth. The Moreland Energy Foundation Ltd, or MEFL, has created the program Zero Carbon Moreland (ZCM), through which they have set out to help the residents of Moreland reduce their carbon footprint until they become carbon neutral. Carbon neutrality is only achieved if carbon emissions are reduced as much as possible, while the left over carbon emissions are countered by sustainable investments referred to as carbon offsets.

Zero Carbon Moreland is a part of the Moreland Solar Cities initiative, a sustainability project started by MEFL and funded by the Australian government. MEFL planned to reapply for more funding for their ZCM campaign following the completion of our project. In order to prepare their report, our project group was asked to assist with the evaluation of the ZCM programs. We investigated how effective these programs were with engaging members of the community and causing positive behaviour change in the residents. We also looked to determine if ZCM was filling a need within the community. We were asked to investigate ways to expand the scope of their carbon footprint calculator by including food carbon emissions as well. We used our findings to make recommendations on the best ways for them to engage more members of the community in the future.

To gather an understanding of the Moreland population, we determined the demographics and identified the current sustainability practices of the community. We also spent extensive time studying the importance of sustainability, which included comprehensive research into the causes and effects of a carbon footprint along with Australia's current policies on carbon emissions. Aspects of community engagement and

social equity were researched to help gain a perspective on how to best increase participation throughout the entire community of Moreland. This research included several case studies from around the world detailing ways in which communities successfully implemented sustainability practices. The theory of behaviour change was also examined to determine how to best approach the idea of permanently influencing a person's environmental habits. This research gave us enough background to effectively proceed in our project.

We used several different methods of gathering relevant data from members of the Moreland community. We collected qualitative data by conducting Most Significant Change interviews to gain perspectives from ZCM members on their experiences with the programs, including insight into the most significant change each interviewee had experienced as a result of ZCM. Other ZCM members participated in a focus group held to discuss their program experiences and get feedback on MEFL's efforts to engage the Moreland community in more sustainable practices. To get quantitative data, we collected utility bills to help analyse the effect ZCM programs have had on energy costs and usage. We also used MEFL's in-house database to evaluate the participation levels, demographics, and other statistics of ZCM members to help identify areas they need to improve.

Further research was also required to reach our objectives. Additional community case studies were researched in-depth with the purpose of finding best practices for community engagement. Social equity was also studied extensively to find how populations with lower incomes and migrants are most effectively engaged in social initiatives. To address our carbon footprint calculator improvements, we focused our carbon footprint research on how to add food. This research included the impact of food on greenhouse gas emissions, how emissions from food can be calculated, and evaluating other calculators which already include food consumption. Our extended research gave us results we could analyse to make proper recommendations that would be most effective for MEFL.

Our analysis included an evaluation of the demographics of ZCM members and compared our results to the 2006 Census data taken from the Australian Bureau of Statistics to determine the extent of ZCM's reach in Moreland. We also examined the different recruitment methods MEFL has used, determining where, when, and how they are recruiting the most members. These evaluations allowed us to identify areas in their recruitment where they could improve. From our interviews and our focus group, we found that involved ZCM members were typically already environmentally conscious people, which points out the lack of members who do not have concerns for the environment. Further research and brainstorming led to the development of new ideas on how MEFL can reach out to all these uninvolved people.

Next, we analysed the involvement of those who had joined the ZCM campaign. In doing this, we evaluated levels of participation based on sign up methods and suburbs, and also determined the most popular ways for members to sign up, calculate their carbon footprint, and create action plans. We also obtained energy bills from two energy companies to determine the impact MEFL's Warm Home Cool Home program had on energy usage. Through our interviews and focus group, we found that the ZCM participants have found MEFL to be a great resource for making these changes in their lifestyles. Those who have participated in programs found MEFL supportive and informative as they make new sustainable changes in their households. MEFL's guidance has helped to create permanent changes for those who have been actively involved, improving their daily environmental habits.

However, we had found that there is certainly room for MEFL to improve their engagement of the entire Moreland community. We suggested making follow up phone calls to those who sign up at MEFL's stalls, since it was found that most people signing up at stalls have not been actively participating in ZCM. We also recommended offering door to door

services, deliveries, and free installations to help entice people over 55 years of age. From database analysis, we noticed that the majority of ZCM members are concentrated in southern Moreland, so we recommended focusing their outreach programs towards the northern suburbs of Moreland. Some new methods of recruitment we suggested included more publicity for MEFL's events and workshops, placing environmental facts throughout Moreland, and using more creative ways to attract people towards their stalls.

Drawing conclusions from the community case studies gave us ideas and strategies that MEFL can use to better engage their entire community. They should try to recruit more non-English speaking residents, and we suggested doing so through social familiarity. We also recommended the use of Participatory Action Research to reach out to Moreland's low-income residents. Community leaders can be of use in building social capital in Moreland by influencing sustainability practices amongst other community members, particularly in residents who are not environmentally conscious. MEFL should also continue lobbying governmental officials for better environmental policies, and gathering ZCM members together would be the most effective way to do this. Such strategies will be necessary for MEFL to get the behaviour change needed to achieve their goal of a zero carbon Moreland.

From the analysis of the data we collected, we were able to see the progress that ZCM has made and make recommendations for how ZCM can continue to develop in the future. More research into carbon emissions from food taught us how dietary choices affect one's carbon footprint. Our findings allowed us to make suggestions on how to best implement food consumption into MEFL's carbon footprint calculator. In completing our objectives, we were able to draw conclusions and make recommendations that MEFL will find useful in engaging more of their community as they continue to strive towards carbon neutrality.

ACKNOWLEDGEMENTS

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There are four members of the MEFL staff whom we must give extra thanks to:

Emma de Campo – Zero Carbon Moreland Household Manager

Cory Jemison – Energy & Greenhouse Analyst

Paul Murfitt – Chief Executive Officer

Elle Morrell – Community Engagement Manager and our liaison for this project

We must also thank those who participated in our interviews and focus group for their participation and great insight.

Finally, we would like to thank our project advisor, Professor Holly Ault, for all the guidance and feedback over the past two terms. Her persistence in helping us was instrumental to the completion of this project.

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AUTHORSHIP

Jackson Fields focused primarily on the behaviour change section in the background. While in Australia, Jackson analysed all of the in-house data and helped to plan and conduct the focus group.

Kathryne Kulzer focused on the community engagement and social equity sections of the background. She helped to conduct the Most Significant Change interviews, transcribe them, and analyse them. Kathryne also researched and analysed the community case studies found in the appendices, along with researching how to engage low income and diverse residents of a community.

Bradford Marx researched the issue of sustainability, its presence in Australian policy, and the different aspects of what goes into a carbon footprint and how to calculate it. He completed the research on food emissions and how to incorporate them into the carbon footprint calculator. He also helped to plan, conduct, and analyse the focus group.

Emily Pearce investigated and analysed the demographics and common practices of the Moreland community. She helped to conduct the Most Significant Change interviews, transcribe them, and write the MSC stories that can be found in the appendix. She also took charge of collecting and organizing the utility data and analysing the information.

All four members of the group wrote the corresponding parts as a part of the methodology, results, and conclusions with the topics mentioned above. Also, each member equally contributed to the editing of the report.

CHAPTER 1: INTRODUCTION

The burning of fossil fuels, which include natural gas, petroleum, and coal, have helped enable many advancements in society but have also made a large contribution towards the emission of greenhouse gases such as carbon dioxide, methane, and nitrous oxide (US EPA, 2010a). Greenhouses gases trap heat in the atmosphere, causing the temperature of the Earth to increase, contributing to the phenomenon that is widely known as global warming. The increasing amount of greenhouse gases being emitted into the atmosphere over the past century has made global warming a great concern throughout the world. To decrease greenhouse gas-impacts, standards for reduced emissions are beginning to be implemented and new technologies have helped people to become more environmentally responsible.

In 1987, the Brundtland Commission, the world's commission on environment and development, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Victoria DSE, 2005). The objectives of the state of Victoria's Environmental Protection Agency (EPA) are similarly to protect, care for, and improve their Australian environment. They believe that achieving sustainability requires creative and innovative approaches to business in the future (EPA Victoria, 2006). The Agency has also developed a protocol for environmental management that encourages the use of cost-effective methods for greenhouse gas mitigation. With greenhouse gas emission as a relatively new concern in the world, the protocol also calls for integration of greenhouse gas emissions and other energy issues into existing environmental management procedures and programs (EPA Victoria, 2002).

The focus of this project is Moreland, a small city of 50.9 square kilometres, located 4-14 kilometres north of central Melbourne (Moreland City Council, 2010a). The residents of the Moreland community are already environmentally conscious, primarily due to the fact that the Moreland City Council works closely with the Sustainable Moreland Advisory Group

as well as the Moreland Energy Foundation (MEFL). The Advisory Group is a committee made up of council staff, Moreland residents, and local representatives of other environmental organizations. They advise the Moreland City Council on strategies, programs, and policies on sustainability, as well as promote community awareness of the environment. These organizations also work in conjunction with MEFL, who has developed the Zero Carbon Moreland program with the goal of eliminating greenhouse gas emissions completely by 2030 (Moreland City Council, 2010b). MEFL collaborates with the community to improve sustainability practices with a focus on decreasing greenhouse gas emissions. MEFL sponsors many different programs and lectures to inform the residents of their community about the effects of greenhouse gas emissions and how as a community they can decrease those effects (Moreland Energy Foundation, 2010a).

The Moreland Energy Foundation wants to successfully communicate these sustainability practices to the community and engage their audience. They currently have a variety of means of communicating with the public, but want to expand their venues in order to accomplish their goals. They hope that by tailoring programs to the community, and making them convenient and relevant, there will be a greater participation rate, which will make a difference in achieving their goals. This process involves not only collecting information on viable sustainability programs, but also gathering information about what the community wants and needs. Once the community has begun to believe in the initiative of sustainable living, behaviour changes might follow. This goes along with the concept of critical mass. Critical mass is the idea that when momentum is built within a group of people, it becomes contagious to others and causes progression in achieving a goal (Berry, 2009).

In order to achieve lasting change, we will explore how to promote individuals' behaviour changes. Behaviour change is not an easy process - social change takes time and motivation to accomplish, and is often accompanied with relapses (Olsen & Bosworth, 2000).

By establishing programs that are easy and convenient to follow and by developing a sense of community where members reinforce each other's behaviour, sustainability is possible (McMakin, 2002). To achieve the environmental goals of MEFL (see Appendix A: Sponsor Description), MEFL recognizes that "the whole Moreland Community [needs to] get involved" (Moreland Energy Foundation, 2010b). To make this vision happen, we need to understand how to most effectively adopt and reinforce environmental practices within their community.

CHAPTER 2: BACKGROUND

In this Background section, we studied the demographics of Moreland to get a better understanding of the community that the Moreland Energy Foundation is targeting. This included researching the programs that MEFL has already implemented in their community. We also researched some of the topics that Moreland is concerned about, including carbon emissions and their effects on the environment. We researched further to determine what current Australian and global sustainability policies address these topics. We also evaluated methods of engaging whole communities as well as low-income residents to participate in initiatives. Finally, we studied how to effectively change behaviour within a community; specifically what is necessary to motivate people to adopt more environmentally sustainable practices.

2.1 SITE DESCRIPTION: MORELAND AUSTRALIA

Our study considered the city of Moreland, located in Melbourne, Victoria, Australia. We worked closely with its community on our project to help the Moreland Energy Foundation Limited (MEFL) with goals for the community to become more sustainable.

2.1.1 HISTORY AND COMMUNITY PROFILE

In order to successfully work with the Moreland community, we first needed to learn something about them. The small city of Moreland is located 4-14 kilometres north of central Melbourne and covers 50.9 square kilometres (Moreland City Council, 2010a). It is composed of 12 distinct suburbs: Brunswick, Brunswick East, Brunswick West, Pascoe Vale, Pascoe Vale South, Coburg, Coburg North, Hadfield, Fawkner, Glenroy, Oak Park and Gowanbrae, as shown in Figure 1.

FIGURE 1: MAP OF MORELAND SUBURBS (MORELAND CITY COUNCIL, 2010C)

The community of Moreland consists of almost 150,000 people. The greatest segment of the population in 2006 was 35-49 years old (22.2%). The community profile also reports that about one-third of residents were born overseas (most from Italy), and 28.2% are from a non-English background, which is higher than average when compared to all of Melbourne (Moreland City Council, 2010c). The majority of residents speak English, though most know a variety of additional languages due to their varied backgrounds (Moreland City Council, 2010a). Regardless of this diversity, the Moreland Energy Foundation attempts to reach out to everyone with educational materials on environmental issues and sustainability.

2.1.2 CURRENT SUSTAINABILITY PRACTICES IN MORELAND

Though the Moreland Energy Foundation itself focuses on energy consumption, the residents also use a variety of additional strategies to combat other factors that contribute to carbon emissions and further environmental concerns that MEFL has not yet addressed. One of these strategies is waste reduction, which is sponsored by the Moreland City Council.

About 1/3 of the community utilizes composting (food waste), while kerb side rubbish, recycling, and green waste (large grass, plants, or tree clippings) collection are also offered. Organized bins are provided by the Moreland City Council and a wide variety of recyclables are accepted. In November 2010, the Council ran a "Zero Waste for a Week Challenge" where 154 residents registered online and attempted to produce no waste for a week by using the variety of recycling options. Afterwards, evaluation surveys were completed by participants. The grand prize was a "Waste-Wise Kit" that included reusable bags, containers, and a coffee cup to encourage the continuation of waste-wise behaviour (Moreland City Council, 2010b).

The Council itself is also environmentally conscious and uses mostly products that have been made from recycled materials. To help businesses and residents limit their own environmental impact, the Moreland City Council provides a list of places to buy unpackaged bulk items and organic whole foods inside and outside of Moreland. Less packaging reduces waste output and the carbon emissions involved in production, and organic food has a smaller carbon footprint (see section 2.2). There is also a walking school bus program organized through Council where parents and supervisors walk a route to pick children up and drop them off to and from school, as shown in Figure 2. This saves on the use of school buses and reduces the pollution that they cause (Moreland City Council, 2010b).

FIGURE 2: CHILDREN WAITING FOR THE WALKING SCHOOL BUS (MORELAND CITY COUNCIL, 2010B)

Public transportation systems and a multitude of safe trails for bikers or walkers are also available around Moreland, and there are links to a car-pooling website through the MEFL and City Council websites. To promote sustainable travel even more, MEFL's current campaign on Sustainable Transport commenced in February 2011. It is running through April with a focus on one main topic per month: public transport, active transport, and air travel. To generate activity with this campaign, they are running social nights, film nights, bike workshops, and a competition to develop innovative ideas about transportation (Moreland Energy Foundation, 2010g).

The Moreland Energy Foundation also has many other programs to offer to the whole Moreland community. Zero Carbon Moreland (ZCM) is the main initiative with which our project is involved. It started in 2008 as part of the Moreland Solar Cities project, a government funded environmental program, with a goal of recruiting 5,000 households, 500 businesses, and 50 community organizations to reduce their carbon emissions by 20%. There is no set date for MEFL to reach these goals, but they hope to complete this by June 2011. Our project is focused on the household-based ZCM programs; specifically the Draught Proofing Blitz, Solar Hot Water bulk buy, and Summer Savers offer (see Appendix A for details). Another program promoted by ZCM is Warm Home Cool Home. This program is also an initiative of Moreland Solar City in collaboration with the Brotherhood Green, a social enterprise of the Brotherhood of St. Lawrence national charity. This program works to reduce energy usage and make homes more comfortable by providing energy advice and installing some free products at no charge for underprivileged households within Moreland (Moreland Energy Foundation, 2010g). All these programs and sustainable strategies help contribute towards achieving the Foundation's environmental goals (see Appendix A). A chart of the programs under Moreland Solar City was given to us by our liaison Elle and can be seen in Figure 3.

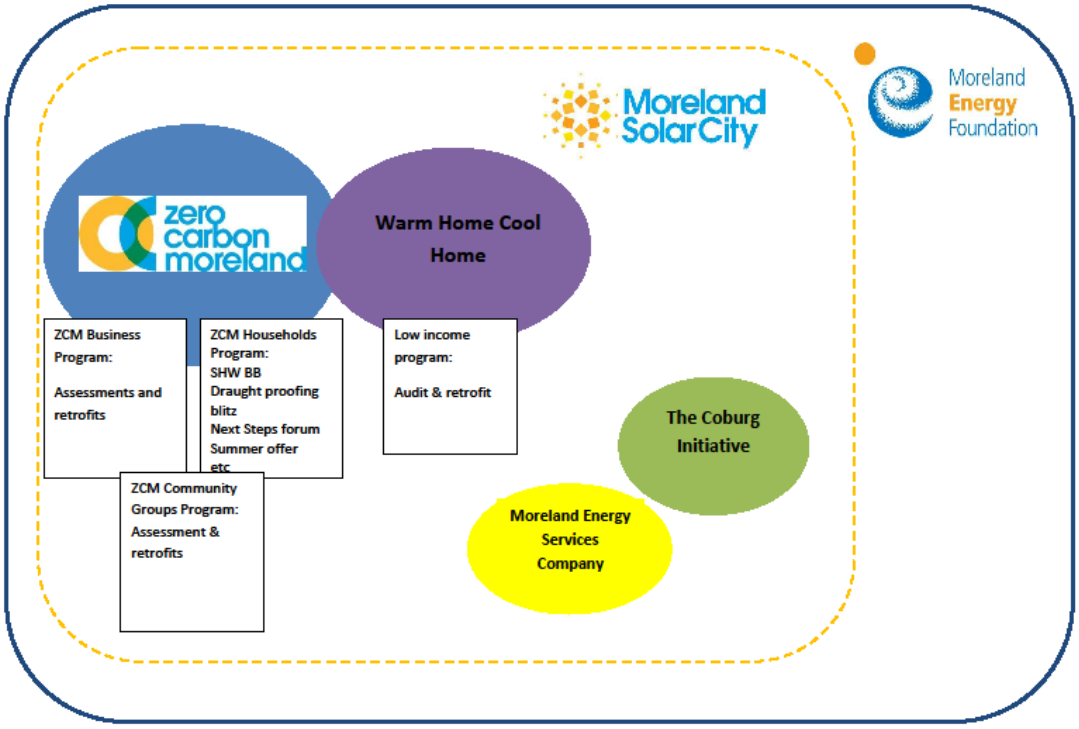

FIGURE 3: DIAGRAM OF MEFL'S PROJECTS AND PROGRAMS AND THEIR RELATIONSHIPS

2.2 SUSTAINABILITY

We view sustainability as the ability of a natural, human, or mixed system to withstand or adapt to changes perceived as threatening to the environment over some indefinite time period. We consider sustainable development to be the improvements made to address these changes while answering the needs of the present population (Victoria DSE, 2005). The environment is not only important to the well-being of the people of Victoria, but it is also vital to Victoria's economy. Many jobs in Victoria depend on tourism and food industries, both of which can suffer dramatically from adverse environmental conditions (Victoria DSE, 2005). This is why it is important for agencies such as the Moreland Energy Foundation to develop strategies that can be implemented to motivate people within their communities to adopt more sustainable practices to reduce carbon emissions. To better

understand the implications of sustainability, we investigated both Australian and global policies on sustainability, carbon footprints, renewable energy, and a case study.

2.2.1 AUSTRALIA'S SUSTAINABILITY OBJECTIVES

The EPA Victoria has set forth several objectives that they would like to achieve in their efforts in making Victoria a more sustainable state. Each year, they strive to make Victoria carbon neutral, meaning that the state's sustainable implementations are able to offset their carbon footprint. Victoria's EPA promises to implement any sustainable measures that have a payback time of four years or less. They also promise to invest in green power for electricity, meaning the use of more sustainable energy such as solar or wind instead of fossil fuels. EPA Victoria provides means and standards to help both large companies and individuals become more sustainable (Bourke, 2007).

In April 2005, Victoria's Department of Sustainability and Environment created a framework for future policies geared towards the mitigation of greenhouse gases. They have acknowledged the fact that Australia, both in 2006 and currently, has among the highest greenhouse gas emissions per person and that emissions are predicted to rise in the future. To counter their emission issues, the Department outlined three strategic directives for Victorian people, businesses, and government to implement. The first directive is to maintain and restore the state's natural assets by using renewable resources in ways that do not irreversibly damage the environment and by carefully managing non-renewable resources (Victoria DSE, 2005). The second directive is to use resources more efficiently by looking at how natural resources are used in industries, homes, and work places and outlining the need for greater efficiencies to reduce consumption of resources. The third directive focuses on what Victorians need to do in their everyday lives to reduce their environmental impacts. This involves making it easier for people to do the right thing for the environment and harder to be destructive (Victoria DSE, 2005). The Department of Sustainability and Environment believe

that by working together, the Victorian community can make the right choices to improve their environment.

2.2.2 REDUCING CARBON FOOTPRINT

A carbon footprint is a measure of the impact our activities have on the environment, and in particular, on climate change. It refers to the cumulative mass of carbon dioxide emitted either directly or indirectly from the actions of individuals and groups of people (Hertwich and Peters, 2009). Direct emissions stem from some type of supply chain or system of technology involved in delivering a need to a consumer, such as domestic energy production or transportation. Indirect emissions come from the carbon dioxide emitted in the life-cycle of a product, in particular their manufacturing and eventual breakdown (Carbon Footprint Ltd., 2010).

One of the goals of any person or business aspiring to be more sustainable is to avoid or reduce greenhouse gas emissions in order to decrease their carbon footprint, control energy costs, and reduce the need for energy production (Bourke, 2007). The EPA Victoria outlines several ways to accomplish this goal. Their advice covers a range of common household strategies. For example, they suggest that appliances and equipment should not be constantly running, whether they remain idle or on stand-by, and to also maintain a high efficiency rating for all new products. This includes replacing outdated appliances such as refrigerators that are nearing the end of their life-cycles. Simple and often practical means of decreasing a carbon footprint include walking, riding a bicycle, or taking public transportation instead of driving, along with monitoring the heating and cooling settings in a home or office. The EPA Victoria has been leading efforts to educate residents on simple and feasible measures they can take to reduce their personal carbon footprint (Bourke, 2007).

Businesses often contribute towards the carbon emission output as part of their means of making profit. Companies interested in mitigating their carbon production can invest in

carbon offsets. A carbon offset is any project a company can invest in to counter their own greenhouse gas emissions (Carbon Offset Guide Australia, 2010). Typical projects are centred on clean energy production, reduced energy consumption, and carbon dioxide absorption. While carbon offsets do not necessarily make a company more sustainable, they are an exhibition of proactive measures taken by a business to show that they care about the environment.

Carbon footprints are often calculated using life-cycle assessment or input–output analysis (Hertwich and Peters, 2009). There are many different ways of calculating a carbon footprint, ranging from quick estimates to audits done by qualified experts. Most calculators take into account the energy consumed by homes, including the use of electricity, natural gas, oil, and coal. The calculations also factor in the amount of driving, flying, and other transportation a person uses. However, the calculators lack consistency, especially for estimates of carbon dioxide emissions from household electricity consumption. Emissions from the production and delivery of food are often overlooked or tend to be very inaccurate due to the many factors involved in calculating these carbon emissions. A good calculator must take in to account every step of the process, including growing, raising, processing, shipping, and storage (Greenwood, 2006). Overall, carbon footprint calculators are a good measure of simple environmental impact, but the inconsistencies between calculators lead to discrepancies over which factors are most important. In addition, most calculators lack information about their methods and estimates, which may cause one to question their credibility (Vandenbergh, 2007). Until there are official standards put in place on how a carbon footprint is calculated, these discrepancies will continue.

The food production processes can have negative effects on the climate, causing the production and emission of carbon dioxide, methane, and nitrous oxide from agricultural practices. The largest contributing factors include carbon dioxide from net deforestation,

methane from rice cultivation and enteric fermentation of cattle, and nitrous oxide from fertilizer application (Intergovernmental Panel on Climate Change, 2000). Enteric fermentation refers to the livestock digestive process, in which microorganisms in the animal's digestive system break down food into simple molecules that can be absorbed by the bloodstream (Gibbs, 2003). The contribution of agricultural land-use emissions to the total global amount of carbon dioxide is 23%, while its contribution to the total methane and nitrous oxide amounts is about 75% for each (Intergovernmental Panel on Climate Change, 2000). The contribution of agricultural land-use emissions to carbon emissions is significant, and because of this, their future trends are relevant to climate change and how it can be mitigated.

Along with the use of land, livestock and how they are raised can be detrimental to the environment. Livestock now inhabit about 30% of the earth's entire land surface. People are consuming more meat and dairy products every year, and global meat production is projected to more than double from 229 million tonnes in 2000 to 465 million tonnes in 2050, while milk output is expected to increase from 580 to 1043 million tonnes (Matthews, 2006). The livestock sector accounts for 9% of carbon dioxide produced from human-related activities, 65% of the nitrous oxide produced, and 37% of the methane. Most of this comes from manure and digestive activities, though other emissions also stem from the actual production of food, including the grinding, slaughtering, freezing, and storing of meat. Each of these preparation activities requires an energy source, usually from diesel gas or electric power (Cascio, 2000). The preparation process can also be factored into determining carbon emissions from other food like fruits, vegetables, dairy products, and breads. This relationship between food and climate change is important to the future of this planet as they continue to impose adverse effects on one another.

Australia's livestock, being one of the largest livestock industries in the world, contribute to about 11% of the country's total greenhouse gas emissions (Pala, 2010). With more cattle than people, nearly 60% of the Australia's land mass is used for the production of livestock (Commonwealth of Australia, 2009). Methane reduction efforts in Australia are countered by the growth of cattle in the country. In Australia, a conservative family eating only 4 kg of beef per week will emit well over 200 kg of CO_2-e, or carbon dioxide equivalent, the normalized unit which measures all greenhouse gas emissions. That same family could drive over 600 km that week without emitting that much carbon (Brook & Russell, 2007). It is evident that the production of greenhouse gases from livestock is an even larger problem in Australia due to its large cattle population.

Food miles are a rough estimate of how far food travels between its production and the final consumer. A study conducted by two Carnegie Mellon University researchers compared the life-cycle greenhouse gas emissions associated with food production against the long distance travel associated with food miles. Although many environmentalists advocate buying local food products to effectively reduce carbon emissions, in reality, transportation of food only accounts for about 11% of their total greenhouse gas emissions (Matthews & Weber, 2008). The actual production of the food accounts for 83% of total emissions. Switching from red meat or dairy consumption to other protein sources or a vegetable-based diet just one day per week would have the same climate impact as buying all household food from local providers (Matthews & Weber, 2008). While food miles are a source of carbon emissions, the vast majority of food's carbon footprint that people should be most concerned with is the production of the food.

Experts in Australia have pondered ways to reduce the greenhouse gas emissions being produced by the agricultural sector. With a rising world population, meat production is projected to have to increase 80% to meet the demands of the population by 2030 (Williams

& Fisher, 2008). This will result in higher greenhouse gas emissions from agriculture unless there are radical changes in food production methods. Tony McMichael from Australian National University suggests a switch in meat preferences. In Australia, an obviously choice would be kangaroo meat. As a whole, kangaroo meat is healthier, containing less saturated fat and more fish oils than meat from cattle or sheep (Williams & Fisher, 2008). Furthermore, kangaroos are not ruminant animals, meaning that they do not ferment their food like cattle and sheep do. As a result, kangaroos produce much less methane gas. Such ideas are necessary to both develop and implement in order to combat greenhouse gas production and climate change.

2.2.3 RENEWABLE ENERGY AND SUSTAINABILITY

Renewable energy is derived from natural processes that are replenished constantly, converting energy into heat and electricity (International Energy Agency, 2002). Some companies and households in Victoria, like the household shown in Figure 4, have installed solar panels, which harvest the energy emitted from the sun. This energy is converted into electricity or heat that is useful in powering a home or business.

FIGURE 4: SOLAR PANELS IN MORELAND (MORELAND ENERGY FOUNDATION, 2010A)

Wind power also has become increasingly popular around the world, with applications ranging from wind turbines to make electricity to wind mills for mechanical power. Other forms of renewable energy for homes or businesses include hydroelectric, geothermal, and biomass energy. Renewable energy is seen by many as sustainable, environmentally friendly energy for a polluted industrialized world with rapidly developing new technologies (ABS Energy Research, 2010). It is a partial answer to the depletion of fossil fuel reserves. However, renewable energy is not without problems and limitations. Its drawbacks include its high cost, social impacts, and some, like windmills, can cause noise pollution.

Victoria's Green Power Scheme is a convenient alternative to the direct, onsite installation of renewable energy sources. Through the Green Power Scheme, electricity created by renewable resources can be purchased for a home or business. The scheme requires the payment of a premium by the user to their electricity supply company to offset the increased cost of generating electricity from renewable energy resources, which is currently higher than that of electricity produced from fossil fuels (Bradbrook, 2002). In return, the electric company purchases electricity from a local producer of renewable energy. Every unit of accredited Green Power energy purchased will ensure that renewable energy is supplied to the grid, thus reducing the amount of energy supplied by non-renewable resources (Bourke, 2007).

2.2.4 THE KYOTO PROTOCOL

The Kyoto Protocol is an international agreement created by the United Nations Framework Convention on Climate Change (UNFCCC) that sets binding targets for 37 of the world's industrialized countries for reducing greenhouse gas emissions. The Protocol was adopted in Kyoto, Japan on December 11, 1997 and was put into effect on February 16, 2005 (UNFCCC, 2010). The primary goal of the Protocol is to reduce the overall 2012 average greenhouse emissions by 5.2% compared to the total calculated emissions in 1990. To aid in

accomplishing this goal, the Protocol calls for more emissions trading, clean development, and joint implementation between countries. These features were intended to stimulate more sustainable investments and help members meet their emission targets in a cost-effective way (UNFCCC, 2010).

The Australian government did not agree to ratify the Protocol until December 12, 2007 and enforced the Protocol three months later. Australia was one of three countries under the Protocol granted an increase of its emission levels on its 1990 base, claiming that their target needed to be adjusted based on their own economic circumstance (Commonwealth of Australia, 2002). In November 1997, Australian Prime Minister John Howard released a policy statement, *Safeguarding the Future: Australia's Response to Climate Change.* The statement included a package of measures that the Australian government committed their country to regardless of the outcome of negotiations within the UNFCCC. In June 2002, Prime Minister Howard argued to the Australian Parliament that based on the settings in the Protocol at the time, it was not in Australia's best interest to ratify the Kyoto Protocol. He explained that the arrangements made under the Protocol excluded the United States along with several developing countries. He also claimed that ratifying the protocol would cost Australia jobs and damage their industry (Commonwealth of Australia, 2002). Nevertheless, the Government maintained that their target was on par with the targets taken by other industrialized countries under Kyoto.

Prime Minister Kevin Rudd changed Australia’s Kyoto stance in 2007 by signing ratification of the Kyoto Protocol as his first act after being sworn into office. He said the Federal Government would do everything in its power to help Australia meet its Kyoto obligations, including setting a target to reduce emissions by 60 per cent of 2000 levels by 2050 (Sydney Morning Herald, 2007). However, in December 2009, the Senate voted against

new carbon emission legislation which aimed to cut carbon pollution by between 5% and 25% of 2000 levels by 2020 using a cap-and-trade scheme (Barrowclough, 2009).

When projecting the trend of the last five years to 2010, the emission reduction in 2010 of industrialized countries will be close to 11% (Netherlands Environmental Assessment Agency, 2010). However, in developing countries, as a result of economic recovery efforts, greenhouse gas emissions have started to increase again at an average rate of 1% per year. Australia's Kyoto target is to limit greenhouse gas emissions from 2008-2012 to 108% of 1990 emissions (Commonwealth of Australia, 2010a). According to the National Greenhouse Accounts, Australia is on track to reach their 2012 Kyoto target. The Accounts show Australia's emissions fell between 2008 and 2009 by around 13 million tonnes (Commonwealth of Australia, 2010a). For 2010, The National Inventory shows an 0.3% increase in Australia's emissions in the June quarter, down from 0.6% in the March quarter, indicating a slowing of emissions growth (Commonwealth of Australia, 2010b). The reduced trend in emissions in the June quarter is mainly a result of reduced emissions from electricity generation due to switching fuel from coal to hydroelectricity and natural gas. Work on developing a new and perhaps more ambitious agreement on emissions targets is set to begin in 2012 when the current Protocol expires.

2.2.5 INDUSTRY CASE STUDY: MURRAY GOULBURN COOPERATIVE

The success of Murray Goulburn Co-operative in lowering their greenhouse gas emissions illustrates the benefits of following sustainability protocols. Murray Goulburn Co-operative is an organization which makes and distributes over 35% of Australia's dairy products (Murray Goulburn Co-operative Co. Limited, 2010). The company followed the EPA's Industry Greenhouse Program, a program launched in 2002 to improve energy efficiency and reduce the associated greenhouse gas emissions; all while improving the management of greenhouse gases that are not associated with energy use (EPA Victoria,

2008). Under the EPA's Industry Greenhouse Program, Murray Goulburn experienced significant savings on energy consumption in each of its six major plants. The company installed variable speed drives on its equipment, recovered the heat generated from their waste product, and improved their insulation. With these new implementations, the dairy suppliers saw a 55,000 tonne reduction in greenhouse gas emissions per year. This is the equivalent of permanently removing 13,000 cars from the streets (Bourke, 2007). The cost for their green implementations was AUD$5.5 million. As for the cost of their efforts, the company made back its money spent on energy savings after only 11 months, and now save an average of over AUD$6 million each year on energy bills (Bourke, 2007). In short, we see Murray Goulburn Cooperative as a viable model for the implementation of sustainable programs, as it can result in major savings which is a great motivation factor.

2.3 COMMUNITY ENGAGEMENT

Community engagement is one of the main tools that can be utilized to implement behaviour changes. When a community becomes invested in a project, the outcomes are more likely to be successful.

2.3.1 ASPECTS OF COMMUNITY ENGAGEMENT

Community or public engagement, also known as public participation, is defined as the way in which a community gets involved in local initiatives and programs (Commission on Children and Families, 2010). Since community engagement is one of the main goals proposed by the Moreland Energy Foundation, there are many aspects of public engagement that must be understood and executed to achieve these goals that they have set for themselves (see Appendix A: Sponsor Description). While there are many strategies for programming, communication, and other activities that can be done to create community engagement, the principles behind public participation must be recognized in an effort to successfully achieve

goals. These principles are applicable to situations that extend beyond environmental sustainability, but are especially important to an issue that requires many behaviour changes in order to be successful.

The basis of community engagement is developing an understanding for the profile of the population, in this case the Moreland community. Understanding the makeup of this community will allow the message to be delivered in a way that is relatable and understandable for the audience. With a complete understanding of the diversity within the community, it is possible to connect and effectively engage the maximum number of people (Nisbet & Scheufele, 2007). Understanding the community profile also allows for a community-specific plan to be identified. Another aspect of understanding the community profile is recognizing the people within that group that have a great influence over their community. Those who have the potential to be powerful should especially be targeted (Ling, Hanna, & Dale, 2009).

The community should be involved as early as possible in any process. Engagement should be an action forward, not a result of something that is already occurring (Ling et al., 2009). This type of early engagement is especially true when it is applied to sustainable living. Since one of the main goals of the Moreland Energy Foundation is to have zero carbon emissions by 2030, major lifestyle changes will have to be made by everyone in the community. It is important for any organisation to convey the desired message, but it is also important that the community has a voice in what the preferred outcome of the programs will be. This will help to further participation because when the voice of the people is heard and listened to, it creates room to collaborate and cooperate between the parties (Ling et al., 2009). When the community feels a sense of ownership they are more likely to stay engaged.

Once a community is engaged in the project, the Foundation must make a plan for the community to implement what the residents have learned. This plan will lay out the visions of

the community and the steps that they must take to achieve the goals of the program. Each community should set realistic, short term goals that will hold them accountable to achieve what has been set out in the plan (Ling et al., 2009).

2.3.2 COMMUNICATION VS. ENGAGEMENT

Moreland uses community engagement to implement major behaviour changes to decrease the amount of carbon emissions. In order to do this, the residents of Moreland must fully understand what MEFL is teaching and why. The programs that the Foundation puts on are one of the most effective ways of engaging their community, but these programs cannot be successful without effectively communicating with the community. Communication and engagement in this context will be defined to indicate two different things. Engagement is when MEFL will give necessary information to the community to absorb and use it to change their practices. Engagement is an active, dynamic way to involve a community in a project. We view communication as MEFL simply telling the residents information without looking for a response in exchange (Rowe & Frewer, 2005). Communication is still a very important aspect of public engagement, but it is a one way message with no response expected.

2.3.3 SOCIAL CAPITAL THEORY

When looking into community engagement, social capital theory must be considered. Social capital theory has been used for thousands of years throughout the world to engage communities and groups of people in different initiatives. The theory provides insight on how personal relationships affect individuals and their actions. All relationships create a social network; the main aspect of the theory is that the social network in a person's life holds value to that person (Strauss, 2010). People find value in these relationships and networks because they believe that they can benefit from them (Appalachian State University, 2006). The

theory looks at how these relationships build social capital; it works similarly to how financial strength builds economic capital in a company (Investopedia, 2010).

Social networks depend on different factors; trust, volunteerism, neighbourhood connections, everyday sociability, togetherness, generalized norms, and group characteristics (Appalachian State University, 2006). Capital will not materialize without these factors present. In a neighbourhood, simply knowing everyone that lives on the block is not enough. They must trust each other, be willing to help one another, communicate on a regular basis, look to each other as examples on how to live life, and value the opinions of everyone in the network. When strength is built in these characteristics it allows for social norms to develop and for people to believe that they can benefit from being a part of the network. It is this benefit that makes social capital theory a prominent factor in generating behaviour change in a community (Appalachian State University, 2006). When individuals feel strength in a network, they act as a unit and follow the actions of each other (Coleman, 1988).

Community organizations also have the capability to impact the strength of a social network. The organization should have regular contact with residents and promote something that will bring the community together and better the quality of life. Through meetings with the public, an organization can also help to build and strengthen individual relationships. But, when an organization takes part in building social capital, they should focus on strengthening an existing network without trying to create benefits for themselves. Communities tend to be most responsive when they believe an organization will make them, as a whole, a stronger unit (Strauss, 2009; Darnton, 2004).

Social capital theory can be applied when engaging a community in an initiative. Often, if a movement is going to strengthen the network that a person is a part of, he or she will become a part of that movement (Darnton, 2004). This is specifically applicable to sustainable practices. Sustainable practices offer a better quality of life for human beings as

well as the environment; as stated before, this is often one of the motivating factors within communities to act. If certain members of the community begin to integrate sustainable practices into their daily lives, others will follow and this will create a social norm. If a social norm is created within a community, it becomes natural for all members to act in a similar manner. Not only will sustainable practices create a norm, but if these practices are highly visible, like recycling every week or starting a garden, it develops into a social pressure to do the "right" thing. Within a network, this pressure will cause others to act.

2.4 SOCIAL EQUITY

Social equity is defined as being when all members of a community are seen as equals. Each member has the same access to all resources within the community, as well as full participation in government issues and the culture of the community (Reliable Prosperity, 2010). In Moreland, we specifically looked at people who are in fuel poverty, as this contributes to social inequity. Fuel poverty is defined as a household that is not capable of adequately heating or cooling the home due to a combination of insufficient funds and poor household insulation (Healy & Clinch, 2002). It is often described even more specifically to say that if more than 10% of a household income is spent on energy, they are in fuel poverty (National Energy Action, 2008). Since we have already detailed community engagement of an entire population, we wanted to find how to engage fuel poverty citizens in climate change initiatives. We first looked into this specific topic, but then geared our research towards the general engagement of low income residents. Looking at this general topic complemented our previous research on broad community engagement, but also allowed us to make more specific recommendations for the Moreland community.

2.4.1 FUEL POVERTY AROUND THE WORLD

Fuel poverty did not become a prominent issue in the world until the 1970s. In the 1970s, the Organization of Arab Petroleum Export Countries (OAPEC) put in place an oil embargo on all countries that were showing support for Israel in the Yom Kippur War. In 1973 the price of oil was around 3 AUD per barrel and by the end of 1974 the price of oil had almost reached 13 AUD per barrel. Oil prices increased in the years from 1978 – 1982 from 14 AUD per barrel to 35 AUD per barrel. An Iranian revolution and an Iran-Iraq war forced these prices to increase (WRTG, 2011). Since these oil crises, if 2009 US dollars are used as a basis, the price of oil decreased for a few years, but currently sits back where it was when it was at an all-time high. In the late 1970s and early 1980s, it was around US$95 per barrel and currently it fluctuates between US$85 and US$90 per barrel (Supply Chain Digest, 2010; Oil Prices, 2011).

Fuel poverty has become a major issue in many areas of the world, especially in the state of Victoria. An article was published in the Melbourne Herald Sun in November of 2010 that expressed the extent of this problem. It stated that electricity bills in Victoria had increased by 20% since the previous year according to the Australian Bureau of Statistics. This put about 30,000 more residents into fuel poverty; adding to the 211,000 that were already in fuel poverty (Collier, 2010). This is very concerning because cooling a home during the summer months is a necessity of life in Victoria; 374 deaths were associated with heat in this state in 2009 (Rolfe, 2010). Since this concept of fuel poverty is relatively new to Australia and has not been greatly acted upon, we looked to other parts of the world to see what they are doing to counteract this severe problem.

Fuel poverty has been critical for the United Kingdom ever since the oil crisis in the 1970s. The government has taken many actions to alleviate fuel poverty as well as making homes more energy efficient. In turn, the improved energy efficiency of the homes will

reduce carbon emissions. The UK has created a program called Home Energy Efficiency Scheme (HEES). It is aimed at families with a pregnant mother, families with children under 16, single parents with a child under 16, citizens over 60, and people with a severe sickness or a disability. With this program they offer different grants to allow people to retrofit their homes to be more energy efficient. They offer £2000 GBP (3200 AUD) to the first two categories mentioned and up to £5000 GBP (8000 AUD) to those who meet any of the other qualifications. The money can go towards anything from more efficient light globes to electric storage heaters (UK Energy Saving, 2010). From 1996 to 2008, the number of people in fuel poverty in the UK has decreased from 6.5 million to 4.5 million (DECC, 2010).

After looking into fuel poverty specifically and how other countries are dealing with it, we looked into more general ways to engage a low income community. We found that Participatory Action Research has been successfully used throughout the world on many occasions.

2.4.2 PARTICIPATORY ACTION RESEARCH

Participatory Action Research is a form of active research that includes the involvement of the people within a community. This research involves many of the key points that were presented previously on general community engagement. Researchers work with the members of the community to identify problems and needs within the community, and then proceed to find solutions and make an action plan based on those solutions. The basis of PAR is that the outside organization simply acts as a facilitator in solving the problems and they do not impose anything upon the people (Higgins & Toness, 2010).

There are many reasons for the success of Participatory Action Research with low income communities. PAR is a way for the community to work together and come to a solution on its own. When the researchers involve the members of the community in every step they are more likely to participate and become leaders in the movement because it is

something they will believe in. Often times it focuses on what resources the community can use that it already has and the successes it has had in the past in order to motivate them for the future (Higgins & Toness, 2010). They then create an action plan that is based on fulfilling the needs of the community while implementing the solutions they have identified. When an action plan is put in place with this process, it is often a sustainable plan. The plan is created by the community, utilizing the resources that are available to them as well as outside resources that they are willing to take advantage of. Because the members of the community have the most power in the creation of the plan, they design a plan that they know they can maintain. By using PAR along with the other community engagement methods mentioned before, causing behaviour change in all sectors of the Moreland population is achievable for MEFL.

2.4.3 PAR CASE STUDY: BHUTANESE COMMUNITY IN WORCESTER, MA

An example of Participatory Action Research can be seen in a case study done with a Bhutanese community in Worcester, Massachusetts in December of 2010. The people of the Bhutanese community are recent immigrants trying to adjust to a very different culture in the U.S.A. Some staff members and graduate students from Clark University held a two day, intensive workshop to determine what needs and problems the community had in order to create an action plan to help better their lives in the U.S.A.

They began by having three different groups, men, women, and children, rank the needs within the community that they thought were most important. With this list, each group came together and negotiated as to which ones should go on the top of the list. The focus here was that the researcher was only the facilitator in this workshop and the opinions of all members of the community were being heard and respected. At the end, they had a point based chart that reflected what they determined to be the most important, as well as a complementary list that explained why each was important. For example, the community

decided that language was the most crucial issue. It was important to these people because it aids at the Registry of Motor Vehicles, obtaining food stamps, gaining citizenship, parent-teacher conferences, advancing in employment, and it assists in communicating at hospitals and with police officers. Based on their needs list, they then created an action plan (IDCE, 2010).

In this case study, the action plan was not completed due to time constraints but they made very good steps towards completing one. They created a chart for each problem that stated the problem, previous attempts, if any, to solve the problem, and possible future solutions. An example of one of these charts can be seen below in Table 1; this example is not based on the actual data from this case study.

TABLE 1: PROBLEM ANALYSIS CHART

Problem Analysis: Language		
Causes of Problem	**Previous Attempts to Solve**	**Possible Future Solutions**
Immigrant	English Classes	Tutor

The goal in creating these action plans with items such as the chart above is to create a plan that can be implemented by the people with the help of outsiders, but maintained without any help. This will allow for a sustainable plan to be created and the solutions to be ongoing; it will hopefully prevent the reoccurrence of problems.

While this case study does not directly relate to fuel poverty or environmental issues, it reveals many important things about PAR. It shows the strength of collaboration. PAR allowed these Bhutanese people to come to a consensus about their main issue and begin creating a solution. In Moreland, this type of intensive workshop could help MEFL understand what is most important to the community and use that to make effective changes within the community.

2.5 BEHAVIOUR CHANGE AND MOTIVATION

In order to achieve a sustainable community, people need to change their behaviour to adopt more sustainable practices. In many cases, people will not change their behaviour of their own volition; rather they require some sort of incentive or motivation to do so. In the case of sustainability, despite rising concerns about the environment, many people remain unwilling to change existing lifestyles or are even apathetic to the condition of the environment (Vining & Ebreo, 2002). However, if entire communities are targeted and multiple antecedents to change are identified, positive and lasting change can be achieved.

2.5.1 GENERAL BACKGROUND FOR BEHAVIOR CHANGE

The study of behaviour change involves many forms of motivational techniques which can be divided into two categories: antecedent intervention and consequence intervention. Antecedents are anything that precede actual action or behaviour change but could influence a person to change his or her behaviour. Consequences are either positive or negative and can be used to enforce or dissuade existing behaviours (Abrahamse et al., 2005).

Much can be learned about the nature of people with respect to behaviour change from the medical field. In medicine, certain health conditions force an individual to change his or her behaviour, providing insight into stages of behaviour change, or the "process of identifiable stages through which patients pass" (Olsen & Bosworth, 2000). Olsen identifies five key stages for patient behaviour change: pre-contemplation, contemplation, preparation, action, and relapse prevention. Pre-contemplation and contemplation involve the patient's separation from the problem and initial assessment of what needs to be done to change. Preparation and action involve an actual effort to change (Olsen & Bosworth, 2000). Finally, relapse prevention focuses on keeping the change active. Such terminology could be used to qualify where individuals stand with respect to their behaviour change about the environment and what actions would be best suited to changing their behaviour.

2.5.2 SOCIAL SCIENCE BASIS FOR MOTIVATION

Social scientists have come up with various frameworks for changing peoples' behaviours toward the environment, which mix antecedent and consequence actions. One such framework further categorizes behaviour change techniques into information techniques, positive motivational techniques, and coercive motivational techniques (De Young, 1993).

Information techniques are largely antecedent actions which aim to "promote an internally driven search for knowledge and a subsequent change in conservation behaviour" (De Young, 1993). These techniques focus on educating the target audience about the issues and offering actions an individual can feasibly do to improve the state of the environment. Strictly, informative techniques lay out the facts and rely on the individual to do something based on their own volition. Antecedent actions can include audits and tailoring programs to the explicit needs of the individual in order to promote an identity with the sustainability movement to increase participation and foster positive behaviour change (Abrahamse et al., 2005).

Motivational techniques, both positive and coercive, are encompassed by more consequence based actions. Positive motivational techniques offer a promised reward if behaviour is changed, whereas coercive techniques focus on providing disincentives or barriers to non-sustainable behaviour. These techniques require more of an external influence to make the incentives or disincentives happen, but have a more direct impact on the individuals' lives which works toward actions for change rather than implying change as educational techniques do (De Young, 1993). Motivation is an important supplement to education because there is a "disconnect between people's expressed concern for the environment [as facilitated through education] and their own energy use" (McMakin, Malone, & Lundgren, 2002). Consequence actions include feedback to show how the participants' actions are affecting themselves and the world around them. The frequency of

feedback is shown to have a correlation with the effectiveness of behaviour change as it keeps the community engaged in positive change (Abrahamse et al., 2005).

Many motivational techniques stress action to be originated from the individual rather than being forced upon them by external factors. If people identify with a new behaviour, they will be more likely to continue such practices than if some sort of positive or coercive motivational technique, with a reward or disincentive, were fully relied on, forming the basis of a self-determination theory. Once the motivation for change has expired, participants might no longer see a benefit to continued action unless they were additionally motivated by some sort of internal causality (Osbaldiston, 2003). This is not to say that external influence should be entirely absent, but it should be tailored toward the participating individuals. Humans are structured by their attitude and environment; they are limited in what they can do as an individual, and they are generally locked into a particular daily routine. If all of these limiting factors are taken into account to create personalized and convenient programs, an internal causality could be fostered (Stern, 2000).

The motivation and knowledge an individual has affects both the effectiveness and significance of the behaviour change. Effectiveness measures how well the behaviour has been adopted and understood by the individual, while significance looks into the environmental impact of the change. In terms of effectiveness, an individual might have the best intentions, but misunderstand what is best for the environment and continue practicing harmful behaviours. Positive environmental intent does not always translate into a positive environmental change, which means that programs and goals need to be well developed and communicated. According to Stern, motivation to adopt or maintain environmental behaviour change is heavily influenced by the relationship between individuals' values, beliefs, and personal norms. If a human value is appealed to, it can have an impact on what the person believes, which could change his or her daily routine to potentially include more

environmentally friendly practices. So, without targeting the intended outcome directly, an internal drive can be created by understanding the individuals' values (Stern, 2000). Behaviour change takes place over an extended period of time. As such, without constant reinforcement, relapses are almost inevitable. Despite positive effects from motivational techniques, people can still relapse because they are attempting to adopt a lifestyle different from what they are accustomed to. Consequently, the mixture of antecedent and consequence actions is necessary to provide constant reinforcement and evaluation for the participants to maintain motivation and prevent relapses. Feedback should be tailored to the problem issues and target audience to promote a good environment for positive change (Abrahamse et al., 2005; Olsen & Bosworth, 2000).

2.5.3 MOST SIGNIFICANT CHANGE

Most Significant Change provides a means of monitoring and evaluating a population's social changes in particular domains. Field research is conducted, whether by observation, interviews, discussions, or surveys, to find stories relating to significant changes in a predefined context. These stories include a description of the event in question, personal significance to the story teller, and the data collector's name to provide context and potential for follow-up. Ultimately the goal is to aggregate these stories to develop a profile of the participants' domains of change, important expressed values, unexpected changes, and reasons validating why a particular event is significant (Davies & Dart, 2005).

By collecting Most Significant Change stories, an organization can focus its efforts on programs to which their intended audience will respond well. By categorizing stories into domains of change, an organization can recognize which domains are received well, which they can then use to stimulate related programs. These stories can also be used to motivate the group of people being observed. Feedback can be provided based on the most significant stories to show that the organization is taking the community's thoughts into account and is

using this knowledge for positive change. This two-way interaction can increase motivation for both parties. The organization will have beneficial information about the community profile to make changes that will be accepted, and the community will recognize that changes are being made based on their input (Davies & Dart, 2005).

2.5.4 MOTIVATION TOWARD THE ENVIRONMENT SCALE

A 1998 study surveyed various groups to determine their motivation toward environmental change with respect to a self-determination model. The goal was to measure levels of intrinsic and extrinsic attitudes toward environmental behaviour by asking questions relating to the perceived state of the environment and what the individual has done or feels about it. The study found positive psychological indicators such as self-control and self-esteem to be correlated with intrinsic and self-deterministic environmental motivation, while negative psychological indicators expressed the inverse environmental reaction. This seems to imply that those who actively pursue positive environmental changes do so for intrinsic reasons. However, when questioned for the motivation to engage in environmentally conscious behaviours, responses were split between intrinsic and extrinsic reasons. Those who had more internal drive to see positive changes in the environment largely had a negative attitude toward the current state of the environment, which makes sense in the context of attitude serving as an antecedent to self-determined or intrinsic motivation.

The findings in this study argue that lasting change is best generated by instilling self-motivated feelings in the target audience. This can be developed by encouraging independence of adopting changes in behaviour, and encouraging higher levels of involvement. The study also introduces the importance of understanding the target audience's contextual environment as was stressed by Stern (Pelletier, 1998).

2.6 SUMMARY

Our background gave us the proper information to help the Moreland Energy Foundation engage their community and achieve their goals to reduce the carbon footprint of their community. We learned the fundamentals of behaviour change and community engagement in order to involve the entire community in their initiatives.

CHAPTER 3: METHODOLOGY

In order to accomplish what we have set out to do in our project, we used multiple methodological approaches. We established two main goals to achieve through our work. The first was to gather and analyse data to measure how successful the Moreland Energy Foundation has been in its efforts with the Zero Carbon Moreland (ZCM) project since its beginning in 2006. Our second goal was to make recommendations to the Moreland Energy Foundation on how to engage more members of the community, as well as how they can improve their carbon footprint calculator. To accomplish these goals, we set forth the following objectives:

1. Evaluate how well MEFL has engaged the community in the past and how effective their programs have been in causing behaviour change.
2. Recommend sustainability practices and strategies which are best suited for the Moreland community.
3. Expand the scope of the community's carbon footprint calculator to more accurately capture the magnitude of each footprint.

We created a plan to accomplish each of these objectives through the use of data analysis, interviews, a focus group, and action research. We began by analysing information that MEFL provided from their database as well as data from utility companies to quantitatively determine the effect and success that the ZCM programs had in the community. We conducted interviews and a focus group to qualitatively evaluate the results of these programs. We also researched multiple topics to make recommendations on how the Foundation can improve in the future. Measuring the success of past programs and conducting further research helped us to determine what will work best in the Moreland community and make suitable recommendations.

3.1 EVALUATING EFFECTIVENESS OF MEFL'S PROGRAMS

An important aspect of our study was to gather information on how effective the sustainability programs that MEFL have implemented in their community have been. In

particular, we wanted to find data to show what effect their past programs have had on the overall reduction of carbon emissions due to energy consumption. We gathered and analysed qualitative and quantitative data with the help of MEFL to determine this. We conducted Most Significant Change interviews and a focus group in order to evaluate if MEFL was filling a need within the community and if they were causing any behaviour changes. We also contacted participants of the ZCM project and utility companies to gather billing data to determine if there were decreases in the energy consumption of those who participated in MEFL's programs. MEFL also gave us access to their in-house database. This allowed us to analyse the data that they already possessed, permitting us to answer research questions about how well MEFL has engaged the community.

3.1.1 MOST SIGNIFICANT CHANGE INTERVIEWS

As part of MEFL's Most Significant Change stories, we conducted interviews to gather personal reflections on participants' motivations and experiences. We carried out 11 individual interviews with adult members of the community who actively participated in MEFL's programs. We looked to understand their perspective of the most significant changes in their lives as a result of ZCM. To gather our sample population, we asked for participants in an MEFL e-bulletin and on their website. As an incentive, MEFL provided free movie tickets for participants. When we did not obtain enough volunteers through these two methods, we worked with Emma, the coordinator of ZCM household programs, and contacted specific individuals. We looked for a diverse population; those who participated in a range of programs, those from different suburbs, but we also focused on those who were likely to respond.

In conducting the interviews, we listened and used an audio recorder to document the interviews in teams of two. One member of the group interviewed and held the tape recorder, while the other took notes in the event that the audio recorder did not work. We used a tape

recorder only with the permission of each individual participant. We also asked them to sign a consent form in the case that MEFL wants to use their interview for promotional reasons in the future. If they wanted their personal information to remain confidential, they had the option to do so. Each interview was about 20 minutes long, and was directly transcribed from the audio recording afterwards (see Appendices D-N). We transformed information from several of these interviews into stories written up in a more creative narrative format (see Appendices O-Q).

These interviews were necessary to gather more specific, personal information that couldn't be found in any published work and was at a deeper level unreachable by a simple survey (Doyle, 2006). Stories where participants asked to remain confidential or that were not selected for public use were kept on file to maintain full background information for a complete follow-up analysis. We also helped MEFL determine what they will do with these stories; there is a great benefit in making these stories public because they detail the positive impacts that sustainability practices have caused in the participants' lives.

3.1.2 MEFL PARTICIPANT FOCUS GROUP

To gain specific insight from community members involved in the ZCM program, we held a focus group amongst 5 active participants. Elle Morrell, our liaison at MEFL, acted as the facilitator of the focus group. The focus group discussion covered three issues of high importance to MEFL regarding their efforts in engaging the Moreland community in sustainable practices. We asked questions to determine how effective MEFL has been in their engagement of the community. We then asked our focus group how active they had been in participating in MEFL's programs, along with their thoughts on their carbon footprint calculations. Further questioning was used to measure the extent to which these sustainability programs impacted the everyday lives of participants; specifically, if and how the programs caused permanent change in environmental behaviour.

Presenting such questions in a focus group allowed for open ended responses which led to conversation amongst the participants (Casey and Krueger, 2000). Our topics of interest sparked ideas between people on what MEFL can do to improve their programs' effectiveness and increase participation within the community (Berg, 2007). From the responses in the conversation amongst our participants, we were able to make recommendations on how to proceed in the future. We also compared the results of this focus group to a similar focus group conducted by MEFL staff in 2009. In this comparison, we were able to determine the extent to which ZCM members have changed their opinions and attitudes towards MEFL's programs over the past two years.

3.1.3 ANALYSIS OF UTILITY COMPANY DATA

To determine if members of the ZCM program were actually reducing their energy use, we collected billing data from utility companies. The first step of this process was to obtain the billing information and consent from the participants because the companies needed consent forms in order to allow us access to personal data. MEFL's goal was about 400 participants who had taken part in programs such as Warm Home Cool Home, Draught Proofing Blitz, or Summer Savers (see program descriptions in Appendix A). These programs are directly related to decreasing energy use within a home. MEFL acquired about 200 households' information and consent from the Warm Home Cool Home program before our arrival; we organized those and sent them to their respective utility companies with a request for data. We received copies of electric and gas bills for 29 households from Lumo Energy in return and an extensive document containing 37 households' billing data from Origin, but unfortunately did not receive information from the other companies in time and had to hand over those negotiations to MEFL upon our departure. After obtaining this billing data for 66 total households, we organized it and extracted the information we needed. The data from Lumo were unfortunately too inconsistent due to discrepancies with the bills, and we were

unable to perform any further analysis. Fortunately, we were able to use the information from Origin to compare current and past data, and look for trends. For households that completed the Warm Home Cool Home project over a year ago, we looked at data from the heating seasons before and after the program took place, but for households that completed it within the past year, we could only use the information to establish a baseline for MEFL to use in the future.

MEFL also wanted to collect household billing information and consent from the participants of the Draught Proofing Blitz program and Summer Savers offer. We mailed forms to these 106 households and followed up by contacting them directly through phone calls. As the forms were returned to us, we scanned them into the MEFL database and prepared them to be sent to the utility companies with a second request for data. While the return rate was high overall, we did not receive them all in a timely manner and this task was also turned over to MEFL to finish following the completion of our project.

3.1.4 IN-HOUSE RESEARCH AND ANALYSIS OF DATA

One way we determined the effectiveness of MEFL's community engagement was by querying their in-house database to benchmark Zero Carbon Moreland participants with respect to interaction that MEFL and the participants have had with each other. This involved collecting data about ZCM member participation, and looking for trends with respect to the demographics of the ZCM participants to highlight potential areas of improvement for MEFL's community outreach efforts.

Each person who has an affiliation with MEFL, whether by explicitly signing up or by participating in a MEFL run program, is entered into the organisation's database. This database logs important identifying and demographic information including a unique identifying integer, a full name, creation date, date and location of signing up with MEFL, what MEFL subscriptions the user is signed up for, important contact information including a

mailing address and telephone numbers, a date and method for calculating his or her carbon footprint and action plan, and a list of projects the participant was involved in and events the participant has attended.

Our data analysis helped to determine how many people within the community are involved and to what extent they are involved. We looked at the number of people that participated in programs and how many programs they participated in overall. We used this information to determine how effectively MEFL engaged the community and whether or not they were successfully satisfying a need within the community.

We also looked into how many ZCM members calculated their carbon footprint and those who created action plans. As part of Zero Carbon Moreland, MEFL requests participants to fill out a carbon footprint report annually, indicate an action plan for what they will strive to do to reduce their own emissions, and everyone is encouraged to attend any of MEFL's events. Both the footprint and the action plan can be completed in a variety of different ways from online to mail to on-site at MEFL's office so that everyone can have the opportunity to fill one out. We used these two pieces of information in conjunction with the program participation to determine the level of engagement by participants.

Another piece of data we analysed was the way in which each member signed up. We indentified events that had strong and weak sign-ups and involvement. This will help MEFL in future years to target those events or areas of the community that have the most success with sign-ups for ZCM. We also looked at demographics of those involved in ZCM in comparison to the Moreland census data to determine how well MEFL reached every segment of the Moreland community. Along with looking for ways in which MEFL had been successful in the past, we looked for areas in which they could improve by focusing on socioeconomic factors and underrepresented suburbs or populations within Moreland.

3.2 IDENTIFYING BEST SUSTAINABILITY PRACTICES AND STRATEGIES

The next step in our methodological process was to determine best sustainability practices and strategies for obtaining public participation and behaviour change. We continued our research into case studies in order to look for best practices for community engagement from other communities. We conducted social equity research on low income households to find international programs that engage these populations in social initiatives. Finally, we analysed the data collected from the focus group and interviews and used the results to help identify and recommend best strategies for obtaining the most behaviour change in the Moreland community.

3.2.1 COMMUNITY CASE STUDY RESEARCH

Case study research allowed us to extract strategies that other communities use to engage their residents and cause behaviour change. The community case studies presented in the Literature Review were a small representation of the multitude of communities throughout the world that are currently undergoing sustainability movements. The continuation of our research allowed us to evaluate successful communities throughout the world and provide innovative approaches for engaging the public. MEFL is also looking for low cost, portable methods of increasing their ability to get people interested during their community outreach efforts on the streets and at fairs or markets. We found and pulled out these aspects of each case study that will specifically apply to MEFL and the Moreland community.

3.2.2 SOCIAL EQUITY RESEARCH

Our social equity research looked further into communities with a large population of low income residents, specifically those who are in fuel poverty. We wanted to find practical ways of engaging people with low incomes in climate change initiatives. Since many case

studies involved communities in developing countries, finding more comparable, specific cases with fuel poverty residents in a developed country was very difficult. Because of this we had to look at more general case studies. In addition to our own research, we contacted WPI Professors Peet, Juisto, and Krueger. Each of these professors provided different insight, but Professor Peet gave us two contact names at Clark University in Worcester, MA. Professor Richard Ford aided us greatly by providing his own case studies that involve engaging low income communities. In conjunction with our community case studies, this research allowed us to make recommendations to MEFL on engagement practices that will best suit their community.

3.3 RECOMMENDING IMPROVEMENTS TO CARBON FOOTPRINT CALCULATOR

There are many factors that can be considered in calculating a carbon footprint. In order to increase the accuracy of MEFL's carbon footprint calculator, the carbon emissions from food must be taken into account.

3.3.1 FOOD AND CLIMATE CHANGE RESEARCH

All carbon footprints are different, as there is not a single standard way of calculating it throughout the world. Currently, MEFL's carbon footprint calculator does not include the carbon footprint of food production and consumption. To address this issue, we determined the impact of food on greenhouse gas emissions, particularly carbon dioxide emissions. We also looked at other calculators which do include food carbon footprints and how they are being calculated. Furthermore, we researched work done by several experts in the area of food carbon emissions, including the creators of the Cool Climate calculator from the University of California Berkeley, in order to help us fully understand the process behind calculating the footprint of food products (Jones, 2010b). Using this research, we made

informative suggestions and recommendations about how to best implement carbon emissions from food into MEFL's carbon footprint calculator.

3.4 SAFEGUARDING DATA

The data that we collected included notes from the focus group and interviews. We obtained permission from each participant if we used a specific quote from them in our final report. We also asked all subjects for the Most Significant Change stories and focus group participants for their permission to be audio-recorded with the possibility of making it public. For the utility data, after receiving the consent form we scanned it into one of our computers and saved it on the MEFL server. We also handed each hard copy of the consent forms to a MEFL staff member to be kept on file. All data were backed up on our computers or MEFL's servers and was stored securely by MEFL or destroyed following completion of the project.

CHAPTER 4: RESULTS & ANALYSIS

Our two main goals were to evaluate the effectiveness of MEFL's engagement in their programs and to make recommendations on how MEFL can improve their engagement in the future. We also investigated methods to expand the scope of their carbon calculator. In order to accomplish these goals, we set out to collect both qualitative and quantitative data. This chapter presents the data gathered through research, interviews, a focus group, and the analysis of the MEFL database and archival research. We first discuss the effectiveness of past and current MEFL programs. Then, we present the information that demonstrates how MEFL can engage a larger portion of their community in the future. Finally, we show how MEFL can include food in their carbon calculator.

4. 1 MEFL COMMUNITY ENGAGEMENT

Our first objective was to evaluate how well MEFL has engaged the community in the past. This included establishing a typical profile of a ZCM program participant, identifying where and how MEFL has recruited the most participants, and determining how much each member has been involved in programs. We also gathered more qualitative information through our interviews and focus group to help us better understand the relationships between MEFL and its members.

4.1.1 ZCM MEMBER PROFILE

Since starting Zero Carbon Moreland in 2008, the Moreland Energy Foundation has recruited 2,503 household participants with a target of 5000 by late 2011 in order to reach their goal of zero carbon emissions by 2030 (Moreland Energy Foundation, 2010f). To create a ZCM member profile, we looked at a sample of 517 ZCM members taken from the MEFL database, the majority of whom had given their information while calculating their carbon footprint. This was the only sample of demographic data available to MEFL but it helped

establish a general basis for the profile, including age, income, primary language, and postcode. We also compared this information to data are taken from the Australian Bureau of Statistics 2006 Census (Australian Bureau of Statistics, 2010).

AGE

Using the demographic data from MEFL, we were able to study how old all the residents are in each ZCM household. These data are based on households and not individual ZCM members (individual data were not available), but we were able to use this information to create an age distribution graph of that can be seen in Figure 5.

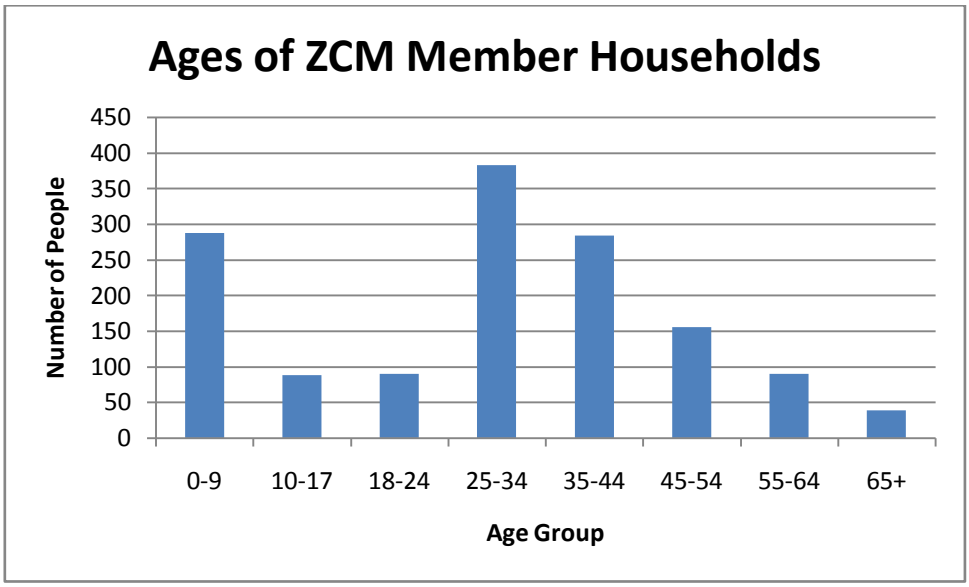

FIGURE 5: AGES OF ZCM PARTICIPANTS AND THEIR HOUSEHOLDS

As seen in Figure 5, the mode of these data is 25-34 years old with a large representation of 0-9 year olds as well. We can conclude that there are a significant number of families with young children involved in ZCM. To look at these data more closely, we compared it to the overall Moreland population based on the 2006 census data (Australian Bureau of Statistics, 2010), as seen in Figure 6.

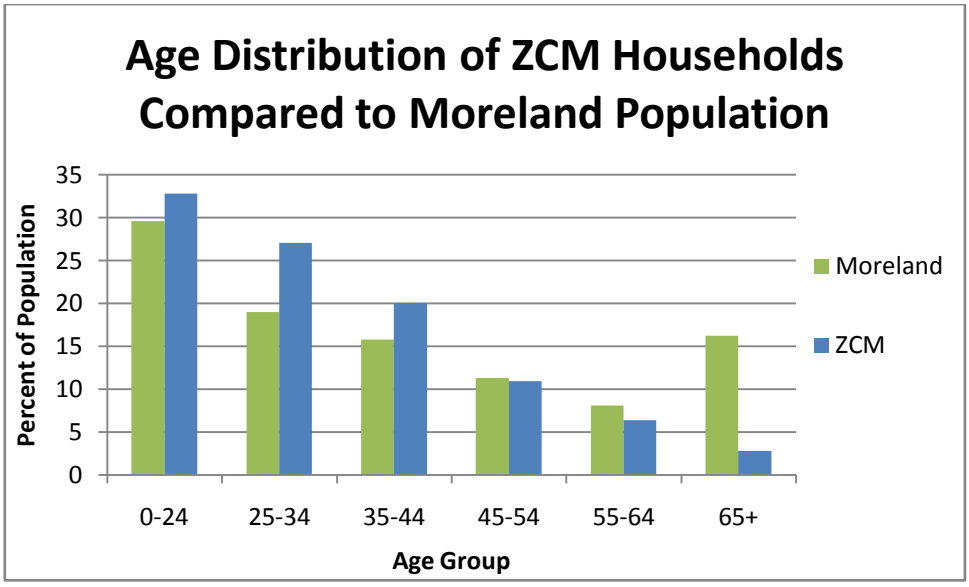

FIGURE 6: AGE DISTRIBUTION OF ZCM PARTICIPANT HOUSEHOLDS COMPARED TO THE AGE DISTRIBUTION OF THE TOTAL MORELAND POPULATION (DATA FROM AUSTRALIAN BUREAU OF STATISTICS, 2010)

As seen in Figure 6, the ZCM sample is representative of the general Moreland population for middle-aged adults. Ages 44 and below are slightly overrepresented and the 65+ category is severely underrepresented. About 16% of the Moreland population is elderly but only 3% of ZCM participants are in that age group. From these data, we can see that MEFL has been more successful recruiting young adults and middle-aged participants, as well as families with young children; however, they are lacking in senior participation.

Some of our interviews with older residents gave us feedback on the positive aspects of MEFL's current approach. In particular, they liked the programs where MEFL came to them and procedures like audits and free installations were done for them with no physical effort on their part. Liz Morrigan (see Appendix K) stated that she loved how the contractor came in and did all the work for her in the Draught Proofing Blitz program. She also commented on the troubles of trying to insulate her house herself; "I'm going to be hammering in my house and I might break something and my arm might not be strong enough." In order to reach out to the elderly community, these points should be taken into consideration.

INCOME

We attempted to compare the household income of ZCM members to that of the general population of Moreland. However, the ABS data were reported as average weekly income, whereas the ZCM database listed annual income. After converting the weekly data ranges to annual incomes, we grouped the ABS data to approximately match ZCM's ranges, as shown in Table 2.

TABLE 2: CHART OF THE ANNUAL HOUSEHOLD INCOME DISTRIBUTIONS OF ZCM MEMBERS AND MORELAND RESIDENTS (DATA FROM AUSTRALIAN BUREAU OF STATISTICS, 2010)

ZCM		Moreland	
Income range ($)	% Population	% Population	Income range ($)
0-20,000	6.0	16.6	0-18,200
20,001-50,000	14.7	30.3	18,200-52,000
50,001-100,000	34.6	28.2	52,000-104,000
100,001-150,000	23.4	10.4	10,4000-156,000
150,001+	6.2	3.3	156,000+
Unknown	15.1	11	Not stated

As seen above, almost half of the total Moreland household population makes under $52,000 a year, whereas only one-fifth of the ZCM members fall in a similar category. The majority (64.2%) of ZCM households make over $50,000 a year. While the ranges don't match up exactly, the difference in data very clearly shows that MEFL has recruited mainly from the middle-class group of residents and that the low-income side of the spectrum is not well represented.

PRIMARY LANGUAGE

Language plays a large role in communication, which is fundamental to MEFL's success. Since Moreland is a diverse neighbourhood with a large immigrant population (see

section 2.1.1), we analysed the primary languages of ZCM participants compared to the primary languages of the total Moreland population based on the statistics from the 2006 census.

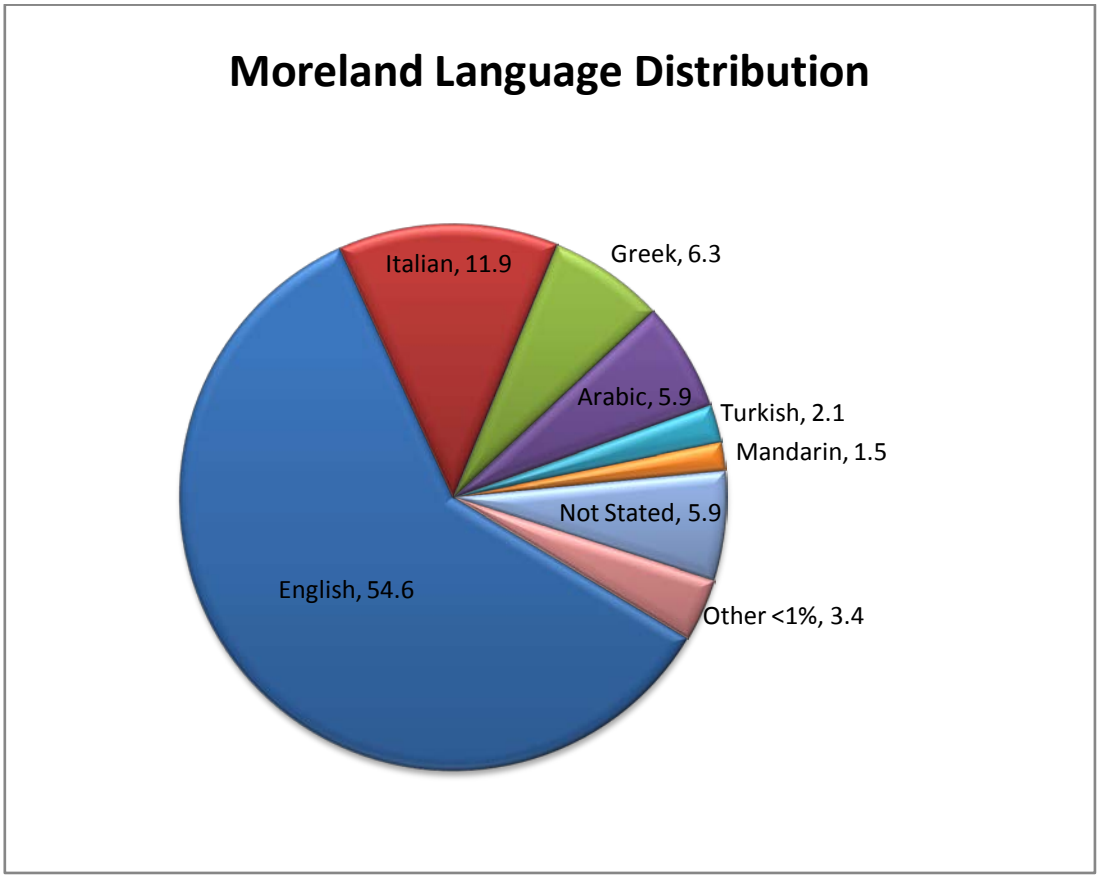

FIGURE 7: PRIMARY LANGUAGE DISTRIBUTION OF TOTAL MORELAND POPULATION (DATA FROM AUSTRALIAN BUREAU OF STATISTICS, 2010)

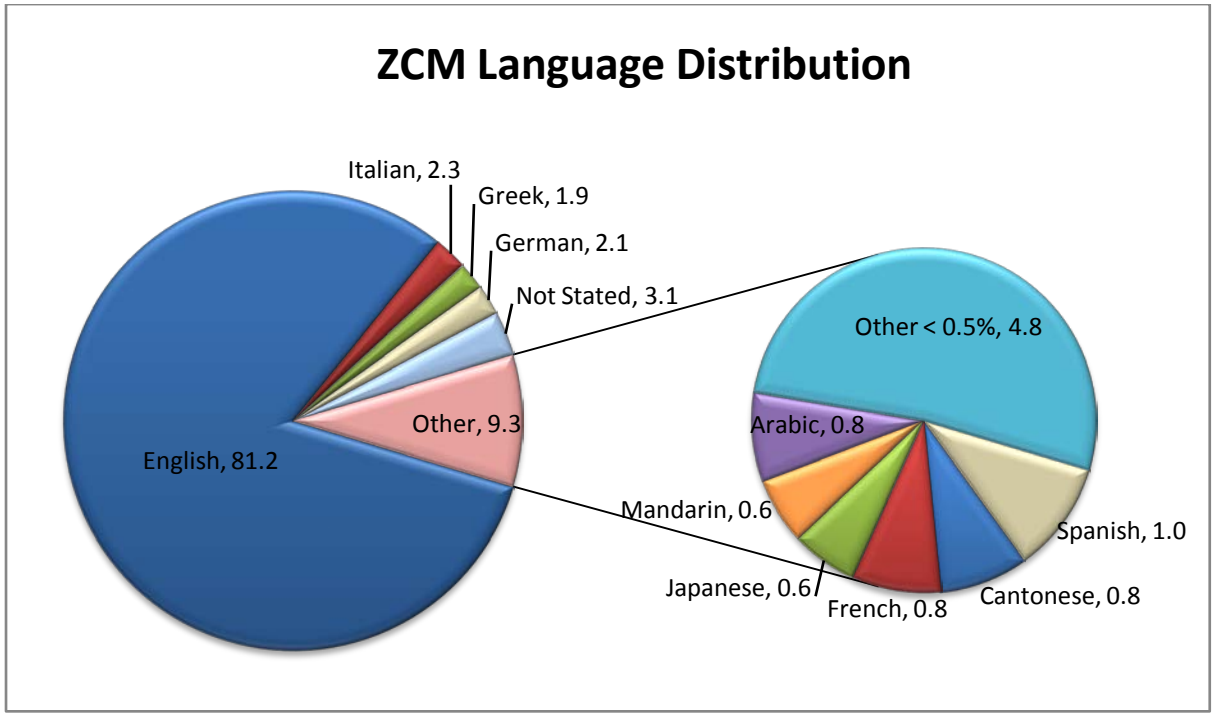

FIGURE 8: PRIMARY LANGUAGE DISTRIBUTION OF ZCM PARTICIPANTS

As shown in Figure 7, English is the dominant language but the other languages shown also make up over one-third of Moreland's population. Figure 8 shows that a much greater majority of ZCM members speak English as their primary language as compared to the general population of Moreland. While most of the other languages seen in Figure 7 are also represented within ZCM, they are not nearly as substantial. There is also a surprising percentage of other languages that are not as common in Moreland but are in fact represented by a few individuals within ZCM; for instance German. For the most part though, we can see that ZCM is not very ethnically diverse and these data demonstrate that they have not reached out to these non-English communities very well.

POSTCODE

Moreland is divided into 12 different suburbs with 8 postcodes. We analysed how well MEFL has extended into each region as shown in Table 3 and Figure 9. The numbers in Table 2 compare the overall Moreland population distribution with the ZCM population. We also calculated the percentage of ZCM members in each postcode to better compare the data.

TABLE 3: NUMBER OF RESIDENTS AND ZCM MEMBERS IN EACH POSTCODE OF MORELAND (DATA FROM AUSTRALIAN BUREAU OF STATISTICS, 2010)

	Participants		
Postcode	ABS 2006 #	ZCM#	%
3056 (Brunswick)	19,865	580	2.92
3057 (Brunswick East)	8,729	219	2.51
3058 (Coburg & Coburg North)	29412	687	2.34
3055 (Brunswick West)	12,594	244	1.94
3043 (Gowanbrae)	1,993	33	1.66
3060 (Fawkner)	11,877	128	1.08
3046 (Glenroy & Hadfield & Oak Park)	28,862	273	0.95
3044 (Pascoe Vale & Pascoe Vale South)	22,423	168	0.75
Total	135755	2332	1.72

Figure 9 shows the distribution of MEFL's outreach within Moreland including the number of ZCM households from each postcode and the percentage representation of that postcode, as well as the number of stalls or festivals MEFL has attended in each suburb.

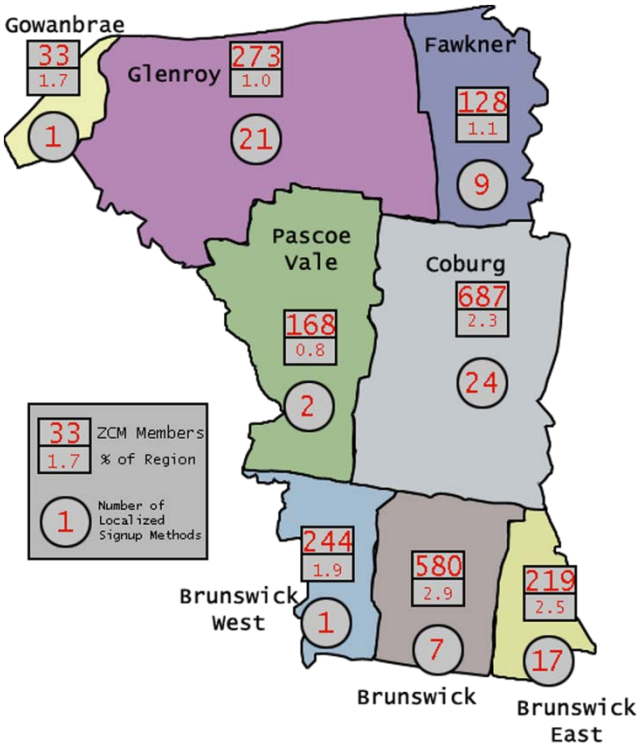

FIGURE 9: MAP OF MORELAND DISPLAYING ZCM MEMBER STATISTICS BY POSTCODE REGION

From these data, it can be determined which suburbs are most active in Zero Carbon Moreland, as well as which suburbs MEFL most actively engages. MEFL is located in

Brunswick, which may explain why Brunswick has the greatest percentage of ZCM members. The surrounding suburbs of Brunswick East, Brunswick West, Coburg, and Coburg North all have high participation rates as well, probably due to their proximity to MEFL in Brunswick. The farther postcodes have less representation, though the Pascoe Vales are directly west of the Coburgs yet have the lowest representation.

MEFL has used a greater number of localized recruitment methods in suburbs with higher populations, namely Brunswick & Brunswick East, Coburg, and Glenroy. Not surprisingly, we see a comparably greater number of represented households in most of these suburbs; however, there is a lower percentage of representation in the northern suburbs. To examine factors that might influence or serve as additional indicators of participation rates, we looked further into the recruitment and involvement of MEFL members.

4.1.2 RECRUITMENT & INVOLVEMENT

To achieve their target of 5000 households, MEFL has been actively recruiting members with a variety of recruitment methods. These methods include staffing stalls to provide information about MEFL and the importance of reducing emissions to people passing by, as well as attending various festivals which attract people who have similar interests or backgrounds.

The recruitment data presented previously in Figure 9 are further analysed in Figure 10 below, where the signups are broken down into years and normalized by calculating the percent of the respective household populations in each region.

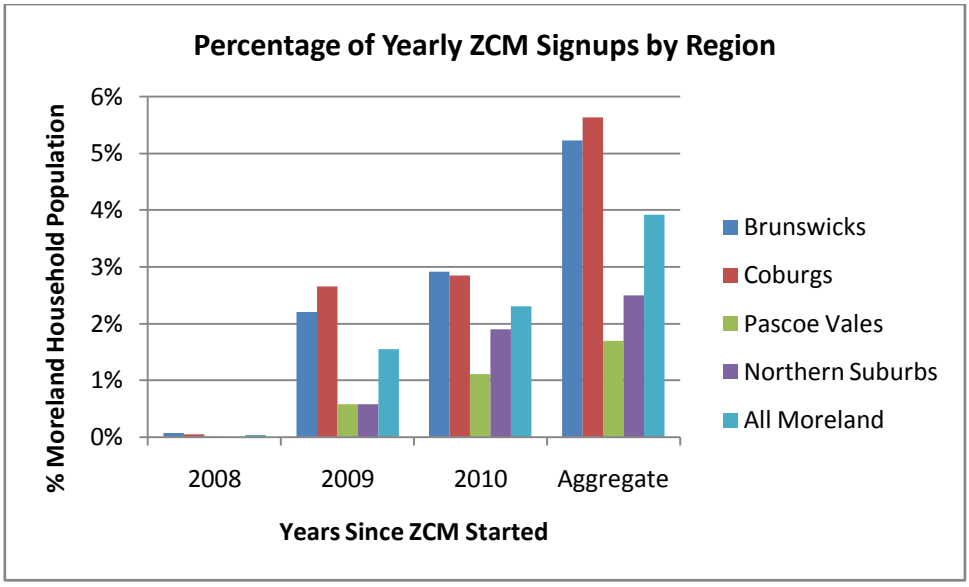

FIGURE 10: PERCENTAGE OF MORELAND HOUSEHOLDS THAT SIGNED UP FOR ZCM EACH YEAR BY REGION

The low number of sign ups in 2008 can be attributed to the fact that ZCM began in December of 2008, leaving only one month in 2008 available to obtain participants. Increased recruitment rates from 2008-2010 can be explained by the type of recruitment methods popular in each region as shown in the aggregate distribution in Figure 11 and regional distributions in Figure 12.

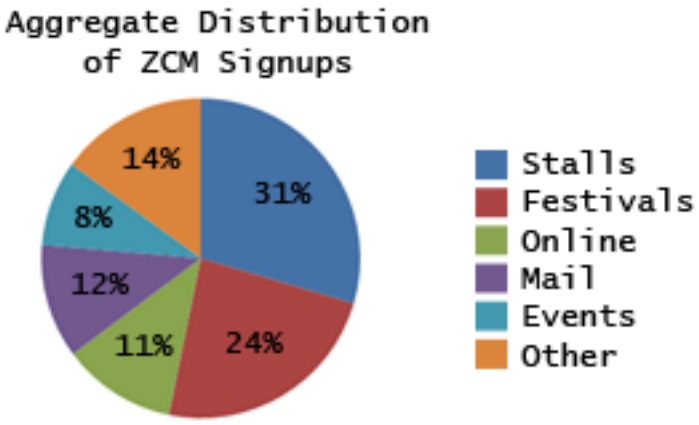

FIGURE 11: AGGREGATE DISTRIBUTION OF HOUSEHOLD SIGNUP METHODS IN MORELAND

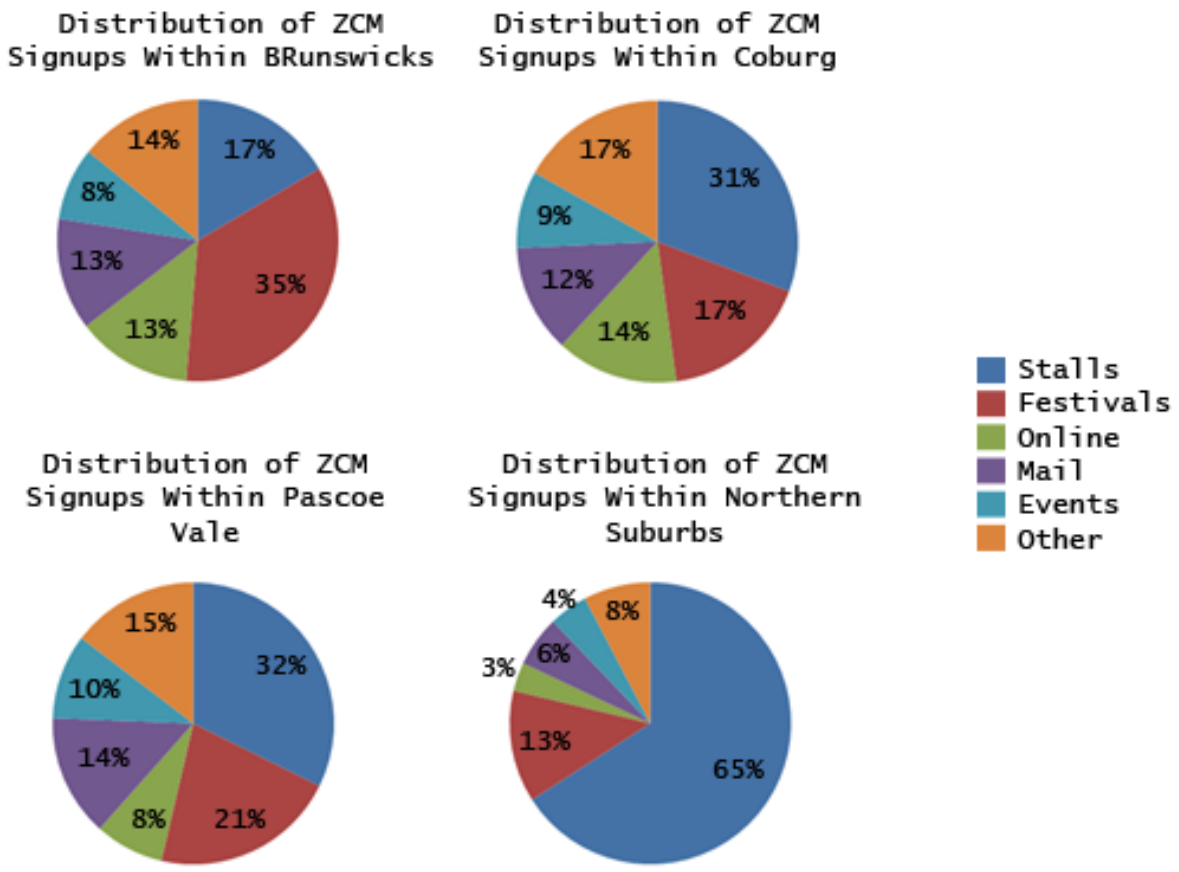

FIGURE 12: DISTRIBUTION OF HOUSEHOLD SIGNUP METHODS BY REGION

Stalls are the most popular sign up method overall, but as seen in Figure 12 this is not the case in every region. The Sydney Road Festival takes place in Brunswick and attracts many participants to Zero Carbon Moreland each year from the immediately surrounding regions. Coburg is the site of the Coburg Mall which also brings in many signups from MEFL's stall there. Households from the northern suburbs (Glenroy, Gowanbrae, and Fawkner) joined Zero Carbon Moreland largely through stalls and a few festivals, though the smaller festivals in Glenroy and Fawkner generally attract much less attention than the huge Sydney Road Festival. Many of MEFL's efforts in Glenroy are also targeted towards community groups, like schools, instead of individuals, which could explain why it has the second highest number of recruitment methods, but the second lowest representations (as seen before in Figure 9). Though the Sydney Road Festival is the most successful ZCM sign

up event in terms of numbers, the northern suburbs are underrepresented at this festival as well, with only 7 signups from Fawkner, so it would be important for MEFL to find a comparably popular program for the northern suburbs.

ENGAGING ENVIRONMENTALLY MINDED RESIDENTS

From our interviews and focus group, we found that another typical characteristic of ZCM members is that they were environmentally minded before they joined ZCM. This commonality was found with every participant in the focus group and each interviewee. MEFL is effectively engaging this group of people in sustainable practices.

ZCM is at the beginning stages of its development. The program is attracting environmentally conscious people who have joined ZCM because they are interested in helping the environment. The people in the focus group, as well as a majority of the people we interviewed were motivated because they felt that it was a personal or moral responsibility for them to make these changes. One interviewee said that her motivation is, "...some sort of deep seated interest in improving the planet and knowing it's in a bad way and we need to do things better" (See Appendix I). Many said that their main motivation was the environment and that the economic benefits of the changes they made were secondary. ZCM must begin targeting residents who aren't motivated by bettering the environment. They could target people who are motivated by the economic benefits of making change. They could do this by making stories like Mairi's public (See Appendix P); she has not received an electric bill in two years and that is likely to initiate interest for many people.

4.1.3 NEW METHODS OF REACHING OUT TO THE PUBLIC

In order to reach more residents, especially the ones that ZCM has had trouble recruiting thus far, ZCM should consider looking into new and different methods of reaching out to the public. We brainstormed methods that had effectively engaged us in the past and presented them to Emma from MEFL, the coordinator of ZCM Household programs. One of

the things that we suggested was that they find the "Jared Fogle" of carbon footprint reduction; Jared has been the spokesperson for Subway since 2000. Jared lost 245 pounds in a little less than a year by eating Subway sandwiches for lunch and dinner every day. Subway used his story in their marketing campaign to attract more people to Subway and portray the franchise as healthy fast food. In 2001, one year after the launch of the first Jared commercial, sales for Subway increased by 16% and by the end of 2008, Subway's revenue had doubled (Entrepreneur, 2011; York, 2008). Jared's success helped to provide success for Subway. If MEFL could find a member of the community who has taken many actions, successfully reduced their carbon footprint, saved money because of their actions, and others in the community can connect with they could potentially connect with many more people in Moreland.

Another suggestion that we gave was making informational posters. These posters could include a variety of facts. It could be general information on climate change or facts on contributors to a carbon footprint. We suggested the use of facts from Mike Berner-Lee's book, *How Bad Are Bananas?: The carbon footprint of everything.* He presents facts about carbon footprints in a very dynamic and interesting way. He addresses very ordinary things such as a unit of electricity or gas, but he also discusses the carbon footprint of text messages, emails, and the use of toilet paper (Berner-Lee, 2010). Posters with these facts would intrigue people because they are out of the ordinary and very relatable. Along with this, we suggested that they distribute copies of the book, or other environmental advocacy books and magazines around the community in waiting rooms, cafes, or any place that people sit and wait.

Other suggestions we made included using public wall space in the community to hang posters more frequently to advertise upcoming events. Also, with upcoming events we suggested that they write in chalk on some of the main sidewalks in Moreland. They could write something like "ZCM Social Night at the Edinburgh Castle tonight at 7 PM! Come

learn about sustainability!" Both of these ideas would increase publicity and could increase turnout for their events.

For their outreach stalls, we made the suggestion of developing a small scale sustainable home. This home could have solar panels on it, drapes or shades on the windows, and a garden with a composting and water tank systems in the back yard. Having a tangible example would not only be informative, but interesting for people to look at and get ideas from. ZCM could present pictures from member's homes to show that others have put in solar panels and have taken advantage of the land they own, even if it is small, to create gardens and utilize rain water tanks. We also suggested having two different hand-crank flash lights at the table: one with an incandescent light bulb and the other with a LED or fluorescent light bulb. By cranking the flashlights, it would be obvious that more effort is needed to light up the incandescent light bulb than the LED. This could also be a good activity to give a child to do while speaking to the parent about ZCM because it would be a hands-on activity that would communicate with the child, but also sends a message to the adult.

4.1.4 ENGAGING CHILDREN

Another age group that MEFL could work to actively engage in their initiative is young children. MEFL has not worked greatly in the past with engaging children because this is an area that another local organization, Centre for Education and Research in Environmental Strategies (CERES), is heavily involved in. MEFL should collaborate more with CERES and the local primary schools to begin involving this age level resident in ZCM. Primary schools are a good resource to utilize as a means of communication. The effectiveness of engagement of children is demonstrated in Ashton Hayes, England.

'Ashton Hayes Going Carbon Neutral' is a project in Ashton Hayes, England with a goal of net carbon emissions for their village of 1,000 people. The project leaders have made

a specific effort to connect with the community's children. In the Ashton Hayes Primary School, the children are taught by their school teachers about the 'Going Carbon Neutral Project' and what they can do to help the effort (Edwards, 2007). This curriculum develops sustainability practices at a very young age. To show what they had learned, the children gave a presentation on their view of sustainability at the 5th Anniversary event of the start of the project (Ashton Hayes, 2010g). In the video *Our Footprint, Our Journey,* one parent in Ashton Hayes speaks about the knowledge and motivation her child receives at school. In the video, she expresses that their enthusiasm can easily be passed on to parents (Ashton Hayes Parish Council, 2007). In an article, the author calls the knowledge of the children "pester power." This means that when children go home they continuously talk and bother their parents about what they've learned in school. The constant talking and disturbing educates the parents and can often lead to changes (Green Building Press, 2009). Using the power of children in Ashton Hayes as an example, children have the capability to bring extensive knowledge to a household as well as excitement about a program.

4.1.5 INVOLVEMENT WITH OTHER NON-PROFIT ORGANISATIONS

Another area that we believe MEFL can improve is their outreach to other non-profit organisations. Some of the MSC interviewees were involved with other non-profit organisations that were not concerned with environmental issues. Judith Cook spoke about an organisation in Moreland that deals with emergency housing for homeless children. She suggested that MEFL could provide energy saving advice for them to help save money (See Appendix G). This would create a positive connection with volunteers with the organisation; it would also provide the opportunity for the organisation to become a ZCM business. These are businesses in Moreland that have committed to the carbon neutral commitment. MEFL is already involved with similar organisations like CERES and the Alternative Technology Association (ATA). They have also collaborated with the Brotherhood of St. Lawrence for

the Warm Home Cool Home project; the Brotherhood is a local organisation that helps low-income residents (See Appendix A). Getting involved with any other local organisations that are providing beneficial services to residents in Moreland could expand their outreach in the community. As suggested by Judith, one option could be performing energy audits on buildings that are owned or occupied by these organizations to help them save money.

4.2 EFFECTIVENESS OF MEFL'S ZERO CARBON MORELAND

Another aspect of our investigation was to determine how effective Zero Carbon Moreland has been at engaging members after recruitment and decreasing the amount of energy used in a home. To determine the actual impact of the program on members of the community, we extracted information from the in-house data analysis, the Most Significant change interviews, the focus group, and utility billing data. We used these four methods to help us establish how successful MEFL has been in the community.

4.2.1 IN-HOUSE DATA ANALYSIS

One way we determined the effectiveness of MEFL's community engagement was by querying their in-house database to benchmark Zero Carbon Moreland participants with respect to the interaction MEFL and the participants have had with each other. We collected and analysed data from a sample of the MEFL database containing all the ZCM households and looked at participation and trends to highlight potential areas of increasing community involvement.

BENCHMARKING PARTICIPANTS

The effectiveness of ZCM is based on the level of participation members express. To benchmark the level of involvement of a ZCM member, a few indicators of involvement have to be established. These include completing an action plan and a footprint, attending informational events, and becoming a member of MEFL's various projects. A side by side

comparison of all these indicators is presented in Figure 13 which shows the percentages of recruits from each signup event that have completed further actions. Each signup event does have a different percentage of ZCM members recruited through it, as shown previously in the aggregate distribution of signup events in Figure 11.

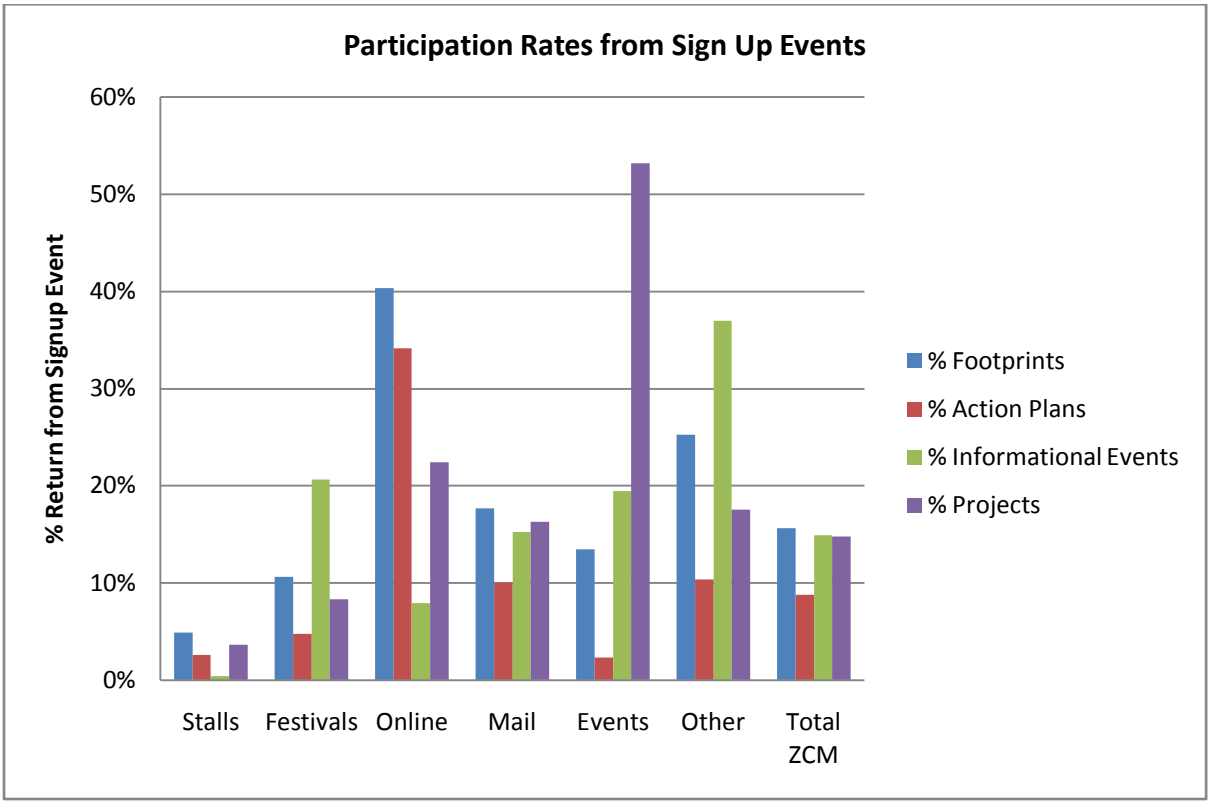

FIGURE 13: COMPARISON OF INVOLVEMENT INDICATORS BY SIGNUP METHOD

As determined previously in Figure 11, stalls were the most popular sign up method overall. However, with less than 5% of those recruited through a stall completing a further action, stalls have a lower return on involvement than other methods. So, while stalls bolster the total number of members, they appear to need improvement fostering involved members of the ZCM community.

We can also see from Figure 13 that events appear to have an extremely high return rate with programs. However, this anomaly is due to the fact that many people signed up for the program through the event, thus doing both simultaneously. Almost 50% of members that

signed up through an event actually came to sign up for the Solar Hot Water Bulk Buy program and consequently joined ZCM.

Festivals, the internet, and mail signups have a high level of involvement as well. Interaction at a festival can be tailored to the purpose of the festival, which could result in the audience identifying more with MEFL. Festivals targeting sustainability also ensure that attendees are environmentally conscious and likely to participate more actively in MEFL's programs. People can use the website or return mail at their own discretion, so someone who has taken the time to sign up by these methods could be more connected to the cause and more likely to take an additional step, such as an action plan or footprint, which are also easily available to them online or through mail.

ACTION PLANS AND FOOTPRINTS

A footprint is used to track the participant's annual emissions while an action plan indicates what the member will do to reduce his or her household's emissions. These actions are important for identifying Moreland's progress toward carbon neutrality. However, of all the ZCM participants, only 16% have completed footprints and only 9% have done an action plan as indicated in Table 4.

TABLE 4: DISTRIBUTION OF FOOTPRINTS AND ACTION PLANS

	# ZCM Members	% ZCM Members
footprints	390	15.6%
action plans	219	8.7%
only footprints	199	8.0%
only action plans	28	1.1%
both	191	7.6%

Only 7.6% of ZCM members have opted to complete a footprint and action plan simultaneously, with 8% completing only a footprint, and 1.1% only an action plan. From our focus group, we found that there are a few barriers to completing a footprint, including

the time commitment or difficulty finding old utility bills. This could explain the low return rate, but the process is so important that MEFL needs to convey that these barriers can be overcome. MEFL should push for more action plans which can be completed faster and more easily to give members a goal to work toward and provide incentive for them to follow through and complete a footprint.

INFORMATIONAL EVENTS

Because of the relatively low return on footprints and action plans, it is important to also note the timeline of involvement in ZCM. Figure 14 shows the distribution of informational events attended with respect to the date the participants signed up. From this it can be seen that earlier recruits of ZCM have a higher involvement than newer members. Being based on the number of events attended, this figure is not as surprising for recent recruits, but there is a falloff toward the end of 2009 and 2010, periods where members have had time to attend events during the past year.

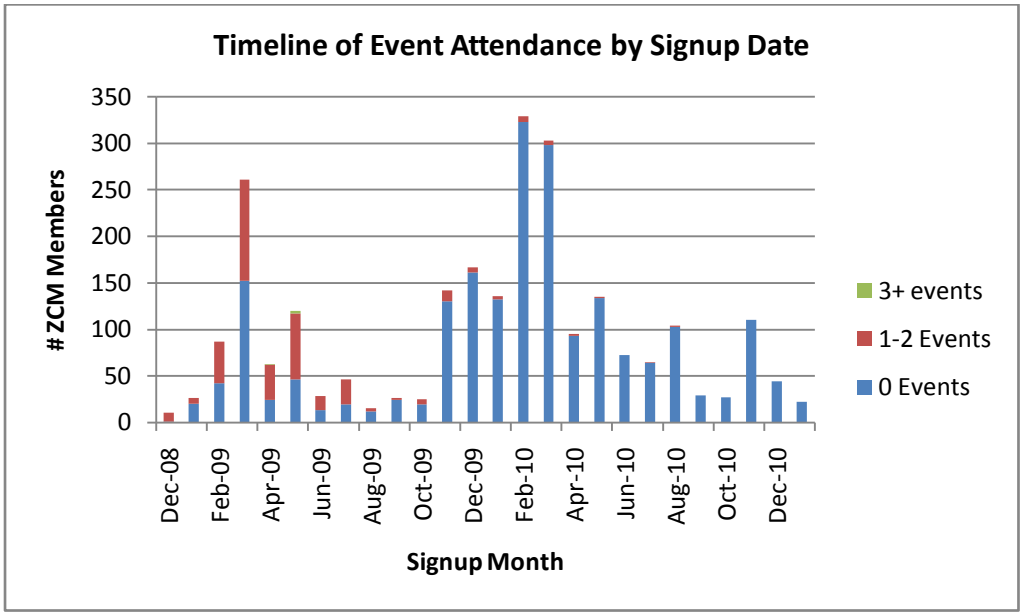

FIGURE 14: TIMELINE OF THE NUMBER OF ATTENDED EVENTS BY ZCM MEMBER SIGNUP DATE

Although 2010 did have much higher recruitment numbers than 2009, the majority of new members are not attending events. From the representative members in our focus group

we found that people might not be as actively involved because they do not want to spend the time out of their daily lives to attend an event. This is clarified by Table 5 showing the date and attendance of MEFL's events.

TABLE 5: DATES AND ATTENDANCE OF MEFL'S INFORMATIVE EVENTS

Informative Event	Date	Attendance
BikeMWS_Mar09	Mar-09	6
FootprintWS_May09	May-09	4
GrHomeWS	May-09	16
GrPurchWS	Jun-09	11
GrRentWS	Jun-09	20
FtprintWestwiyckWS	Jul-09	7
FtPrint_M3mailout	Aug-09	154
FtprintM4_MailPhone	Aug-09	97
FootprintWSNeighbourAttend	Sep-09	11
FtprintFriendsWS	Sep-09	7
FtprintWSNeighboursContact	Sep-09	47
Next Steps Forum	Mar-10	58
Shining Lights	Apr-10	2

The table shows that events, which are mainly workshops, were offered regularly in 2009 and had constant attendance. The mail-outs and follow-up phone calls reached a large number of people as well. However, there were significant gaps in event dates in 2010, giving participants fewer opportunities to get involved. There also haven't been any events run for the past several months. Unfortunately, the event records in the database have some limitations and only larger events are recorded, so attendance at the monthly social nights is not uploaded.

Events are important for educating ZCM members about sustainability in a more personal manner than the web or email. This education is a critical part in changing members' behaviours, so the drop in event offerings in 2010 until now should be addressed. Events should be run regularly, be well advertised to the community, and present relevant content that participants want to or need to learn about.

Another means of tracking participation includes looking at the projects ZCM members have participated in. Participants can be in involved in any of MEFL's projects, and involvement in a greater number of projects implies that the participant is more proactive about reducing emissions. Figure 15 shows a timeline of ZCM members' project involvement with respect to their signup date.

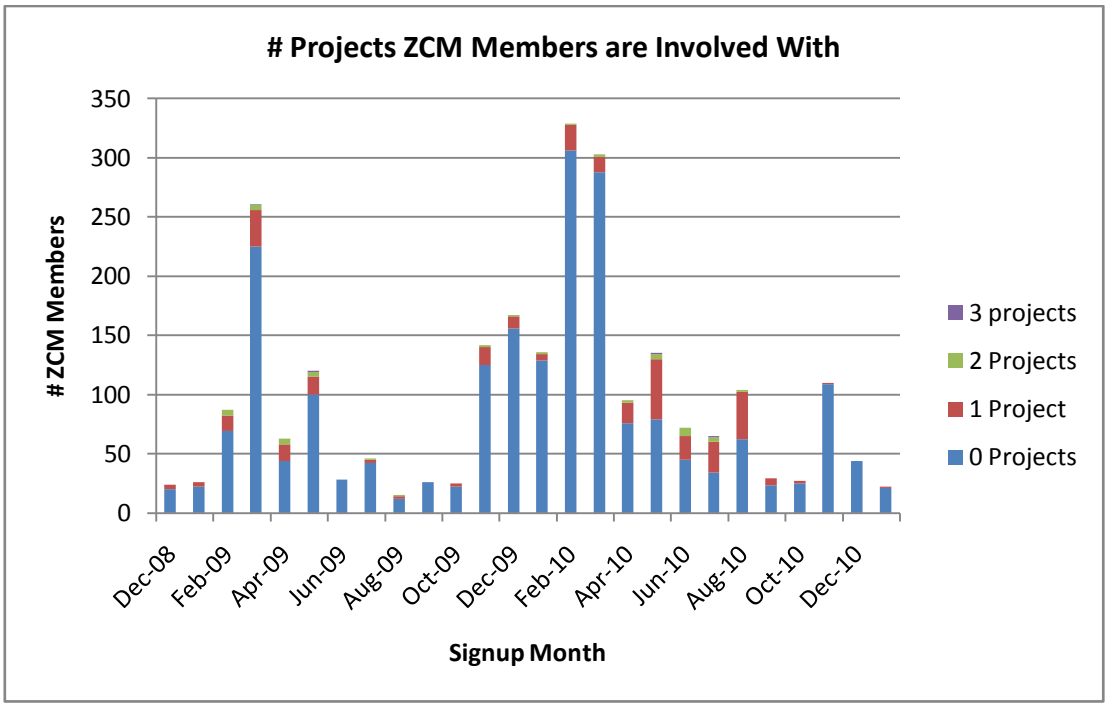

FIGURE 15: TIMELINE OF PROJECT PARTICIPATION BY SIGNUP MONTH

The majority of members are only involved with ZCM, 15% have participated beyond just ZCM, and 51 members, 2 % of ZCM participants, are involved in 2 or 3 projects. Although a low percentage of ZCM members have participated in projects, the distribution of project involvement in Figure 16 shows which projects have been popular.

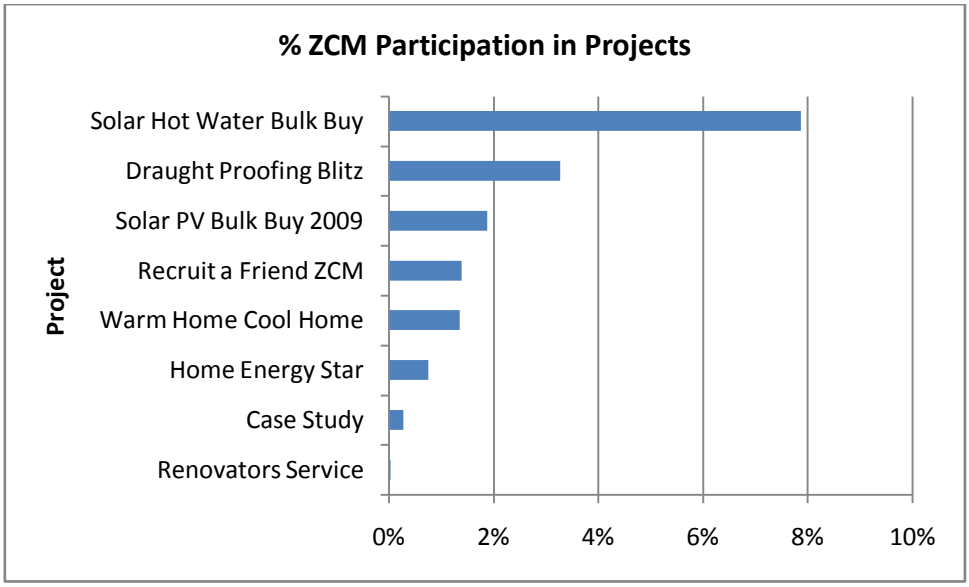

FIGURE 16: DISTRIBUTION OF PROJECT INVOLVEMENT FROM ZCM MEMBERS

This figure shows that active participants were most interested in the bulk buys and draught proofing. Our focus group confirmed that participants would like to see more bulk buys as they allow members to purchase relevant articles both at a lower price and without worrying about ordering the wrong thing. The solar hot water bulk buy and draught proofing were also more recent projects, so higher participation on those corresponds to the greater number of ZCM members and potentially could indicate a similar trends for future projects. .

PARTICIPATION SUMMARY

The more active members of MEFL show that participation is possible, but 85% are not involved in any projects, 85% have not attended any informative events, 84% have not completed a footprint, and 91% have not completed an action plan. This large percentage of ZCM participants has taken the important first step by joining the program, but in order to change their behaviour and help reach a carbon neutral Moreland, these members need to be encouraged to take additional steps.

4.2.2 UTILITY BILLING DATA

To look beyond participation and into the success of actual ZCM programs, we requested billing data from the local energy suppliers and received information from 2 utility companies and a total of 66 households. After examining and organizing the first set of data, we unfortunately could not utilise it for any further analysis due to discrepancies with the billing. The second data set was more useful and we were able to extract the information we needed. First, we looked at the gas data as shown in Figure 17. Since energy usage is affected by numerous factors, such as differences in the number of residents in a household, we took the averages of these households instead of looking at individuals to view the overall trend.

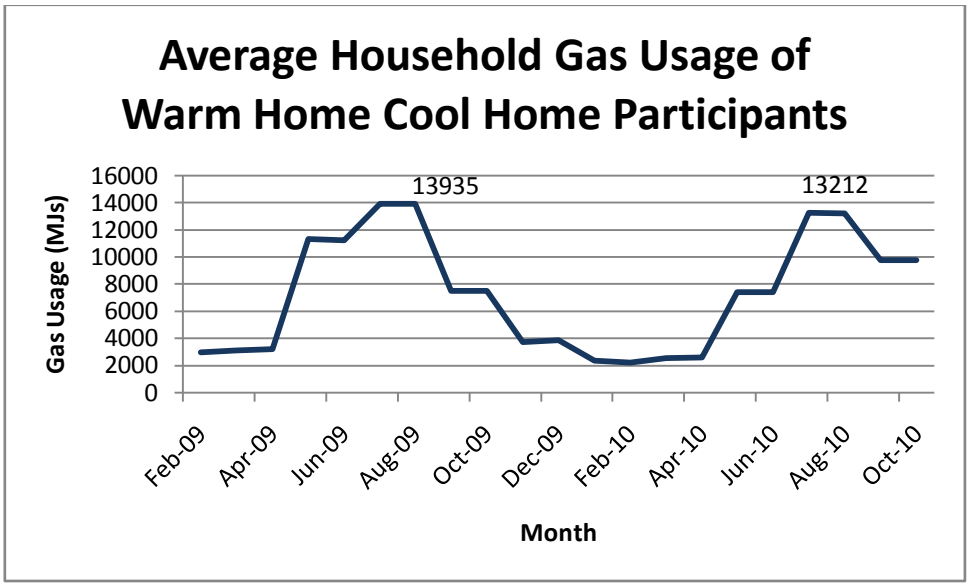

FIGURE 17: AVERAGE GAS USAGE OF 8 WARM HOME COOL HOME PARTICIPANTS

This analysis was based on the 8 households that completed the Warm Home Cool Home program between October 2009 and June 2010, with gas bills encompassing 2 full winter seasons (one before and one after the program). From looking at Figure 17, we can see that the average gas usage for these households appears to go down the winter after the

program. The average combined 2009 June-October usage was 54,107MJs and the 2010 June-October usage was 53,441 MJs.

Weather is a huge factor on gas usage though, so to take that into consideration we looked at the heating degree days. Heating degree days are the number of days in a month where the average temperature is below the normal temperature. As shown and described in Appendix T, 2010 had more heating degree days from June-October than those same months in 2009. We used these numbers to calculate a predicted usage for 2010 based on the 2009 data and adjusted to compensate for the weather. We found that on average each of these households saved a total of 3,771MJs or 6.6% in the winter season after participating in the Warm Home Cool Home program, when adjusted for weather variations.

We also looked at the electricity bills and did a similar comparison as shown in Figure 18.

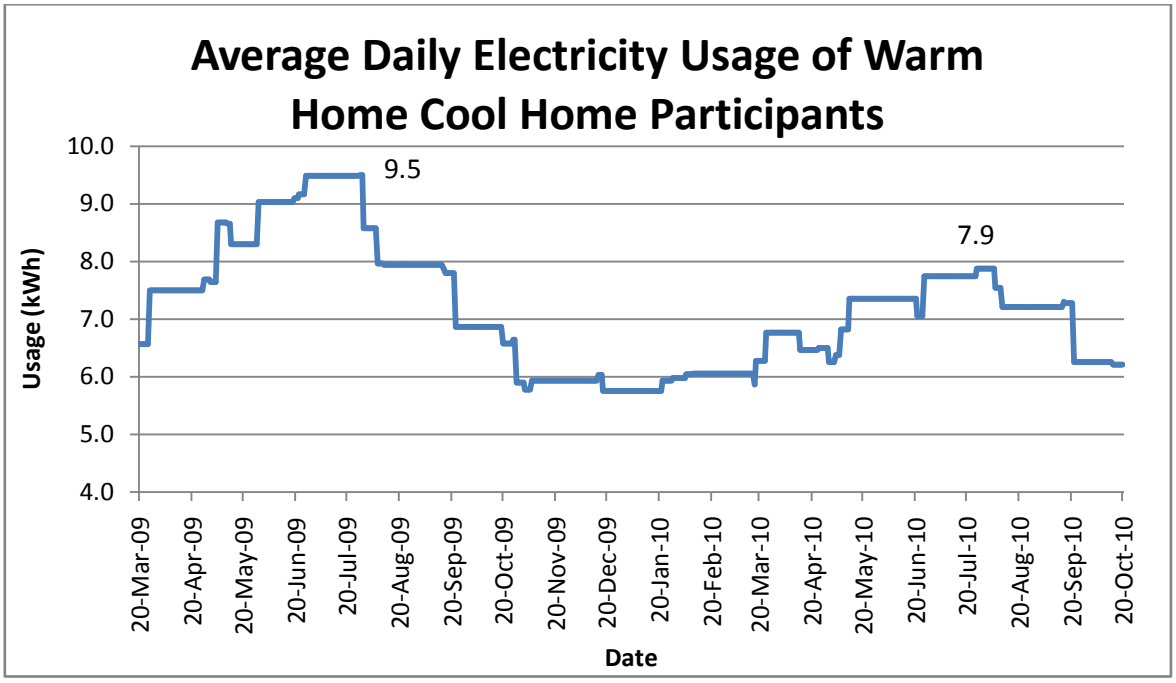

FIGURE 18: AVERAGE DAILY ELECTRICITY USAGE OF 11 WARM HOME COOL HOME PARTICIPANTS

This analysis was based on the 11 households that completed the Warm Home Cool Home program between October 2009 and June 2010, with electricity bills encompassing 2

full winter seasons (one before and one after the program). As we can see in Figure 18, the average daily electricity usage for these households goes down the winter after the program. The average combined 2009 June-October usage was 1250.6 kWh and the 2010 June-October usage was 1091.2 kWh.

By applying the heating degree calculations as shown in Appendix W, we were able to predict the 2010 usage average adjusted for the weather. We found that the average overall savings for the winter 2010 season was 198 kWh or 15.3% per household. Since this program was free for low-income households (see Appendix A for more details), these gas and electricity savings convert into a direct monetary payoff for the participants.

We also looked at what changes had been made to these household through the Warm Home Cool Home program. By examining MEFL's in-house records, we determined that almost all these households had put in some sort of door seal or draught-stopper. Switching to energy efficient light globes was also popular. These common improvements in the households along with the billing data we analysed suggest that this program was effective in reducing energy usage.

While these results indicate that the Warm Home Cool Home program has been successful, we must also recognize this is only based on a very small selection of households and should not be applied to all the households that have participated in ZCM programs without further investigation. The data we could not use for this before-and-after comparison was used to establish a baseline, so in the future MEFL can continue conducting similar analyses. Not all of the ZCM members participate in these specific programs though, so it is necessary to examine the other roles that MEFL plays in this community.

4.2.3 RESOURCE FOR THE COMMUNITY

When evaluating the effectiveness of ZCM, there were many different aspects of the qualitative data to consider. For the people that they have engaged, we have observed that

MEFL is acting mainly as a source of information. Those involved use MEFL to help them achieve the things that they always wanted to do, but they didn't know where to start. Also, many people recognized the convenience of many of ZCM's programs. This shows that ZCM is acting more as a communicator rather than an engager at this point in time.

For programs such as Draught Proofing Blitz, a contractor chosen by MEFL would come directly to the member's house to give a quote. Based on that quote, the member could choose to proceed or not in making the necessary changes. This saves time for the participants because the planning stages of implementing a change in the home were taken care of by the ZCM team. This support allows members to continue making the changes that they want to make. One of the interview participants said that, "The significant change has been being more active in being able to do the things I want to do and knowing that there is support and stimulus to actually keep going with them." Being a resource and a help in implementing changes is a good place to start to get people involved and will allow for a reliable relationship to form between MEFL and the participant.

In order for ZCM to build reliable relationships and a good reputation, they must provide quality services to please their members. One of the ZCM members that we interviewed said that her most significant change was the draught proofing that she had installed. She recognized that it was good and it has eliminated draught in her house, but the other reason that it was the most significant change was because the draught proofing at the front door was hanging down and she noticed it every day. She was pleased with some of the work, but not all of it. ZCM could aid with problems like these by having a follow up survey. The follow up survey would allow them to get feedback on the program and if any problem occurred, they could help to fix that problem. This would allow for a positive experience for the participant and it would show the extra effort that MEFL is willing to put out to help their participants.

Other feedback that we received from those who are already involved in ZCM was that they needed more in depth information. Participants from the focus group felt like they had already done a lot at home and were looking for information on how they could bring sustainability practices to work. They wanted to know the best ways to go about influencing others at work as well as what practices are feasible to implement in the workplace.

4. 3 COMMUNITY ENGAGEMENT IN CLIMATE CHANGE INITIATIVES

Our second objective was to find the best sustainability practices throughout the world and identify engagement strategies that will work best in the Moreland community. We began by looking into other communities that have successfully engaged their members in climate change initiatives. Stockholm, Sweden was the first city that we studied. It is a large city of 800,000 people with heavy government involvement. Since 1990, the citizens of Stockholm have reduced their carbon emissions by 25%. Stockholm received an award as the European Union's Green Capital of 2010 by the European Commission (European Commission, 2010a). The first city in the United States to make a plan to reduce carbon emissions, Portland, Oregon, also benefits from many government climate change programs. They have reduced their carbon footprint by 12% since 1993 (American Public Works Association, 2010). Ashton Hayes is a small village in England with a climate change initiative to become carbon neutral. Garry Charnock, a leader and active member in the community, devised the plan to go carbon neutral in 2005. Through this project, the community has reduced their carbon footprint by 23% (Edwards, 2007). Finally, there is Samsø, Denmark; an island thought by many to be the first carbon neutral place on Earth. Their quest to achieve carbon neutrality began with a government competition that challenged the island to be powered by solely renewable energy sources. One man took control of the project at its inception and now the island is very close to reaching their goal. Each of these case studies is fully presented in Appendices S – V.

After looking at other communities, we then looked into how to engage low-income residents, as this is a large part of the Moreland population. As discussed in the background chapter, social influences are very important as a form of motivation for behaviour change. Theories such as the social capital theory explain why social influences are very important in causing change within a community. Our findings support the information presented in the background section. Mainly, our findings show that with government support and social capital, climate change initiatives have the potential to be very successful.

4.3.1 GOVERNMENT ACTION

Through research and personal conversations with members of MEFL, one of the main differences between other parts of the world and Moreland are the cultural perceptions of environmental actions. In places such as Stockholm and Portland, the government has made environmental issues a priority. While Melbourne and all of Australia do have regulations and programs in place to encourage behaviours that would decrease the carbon footprint of residents, these government programs are not as ambitious as the actions that governments in other places have taken.

ENCOURAGEMENT THROUGH LEGISLATION AND FUNDING

Governments have the ability to encourage environmental behaviour change through funding that they can provide, as well as incentives and disincentives that they can implement. In Stockholm, the government has provided both disincentives and incentives. In 2007, the government implemented a congestion tax for those travelling in and out of the city between 6:30 A.M. and 6:29 P.M. Each license plate is scanned and a bill is sent to the resident based on their plate number. This has been effective, as traffic in and out of the city has decreased by 10-15% since the implementation (European Commission, 2010a). But, with the disincentive the government provided an incentive to travel using cars powered by green energy; these cars are exempt from the tax. Also, reduced insurance rates and free

parking in Stockholm are provided for those who drive green energy vehicles (Kroh, 2008). Now, 20% of cars in Stockholm run on partially alternative fuels (Johansen, 2007).

In Portland, the state government passed legislation in 1999 that created steady funding to help residents invest in more efficient and renewable sources of energy. This legislation caused the creation for the Energy Trust of Oregon in 2002. It is a non-profit organisation that is based in Portland, but helps citizens across the state save money and reduce their carbon footprint by conserving energy and investing in renewable, clean energy (Energy Trust of Oregon, Inc., 2010). The organisation hosts programming and training for residents to participate in the help them learn how to reduce their footprint. They also provide cash incentive offers for their residents to encourage them to participate. The Energy Trust has helped participants to save about USD $600 Million and reduce carbon emissions that are equivalent to the use of 750,000 cars in 8 years (Energy Trust of Oregon, Inc., 2010).

The Portland government established the Bureau of Planning and Sustainability in 2000 (American Public Works Association, 2010). The government provides funding for the Bureau to inform Portland residents about sustainable practice and put on different interactive programs for them to participate in. It is the first government organisation of its kind in the U.S.A. (American Public Works Association, 2010).

AUSTRALIAN GOVERNMENT

The Australian government has also implemented incentives to encourage residents to change their behaviour. The government has implemented many programs and rebates as encouragement for the Australian people to begin sustainable practices. Zero Carbon Moreland is an example of action that they have taken, as it is a program funded by the national government (See Appendix A). Despite these programs, the government is still not providing motivation for residents to live more sustainably. A study done on the Australian attitude towards environmental issues found that one of the barriers in making behaviour

changes was difficulty in accessing government rebates (Fielding, 2010). In 2009, the Australian government discontinued a solar panel rebate program unexpectedly. It was a sudden cut, unexpected by people in the solar panel industry as well as residents (News, 2009). In one MSC interview, we heard a personal statement from a woman who wanted to take advantage of the rebate, but the program was discontinued before they had a chance to get the panels. She and her husband then chose to purchase the panels through a utility company program instead (See Appendix H). If our interviewee had not been environmentally minded before deciding to invest, the outcome of this cut could have been different. If a citizen makes plans to invest because of the rebate, when the rebate is taken away, discouragement can occur. This may cause a change in plans.

Recent actions by the Australian government demonstrate another instance where they found it necessary to cut climate change programs. Due to recent floods in Queensland, the environment has taken a back seat in governmental funding. The government cut programs such as the Green Car Innovation Fund, which was meant to provide incentive for the Australian automobile industry to produce low carbon emission vehicles (Carr, 2008). The government also cut the Cleaner Car Rebate which provided a $2,000 rebate for residents who traded in an old car made before 1995 for a lower emission car (Australian Industry, 2011). The government deferred programs such as the Solar Flagships Scheme and Carbon Capture and Storage Flagship Program. Along with these changes, the Australian government has decided to cap rebate programs for solar hot water and global capture and storage (ABC News, 2011). It is puzzling to most experts that the government would make such substantial cuts to climate change programs because the extreme weather conditions that caused the floods are thought to be a result of climate change (ATA, 2011).

These actions set an example for the people of Australia, discouraging the development of sustainable practices as social norms. From talking with Elle, our liaison,

environmental consciousness is not yet a social norm in Australia. In the Moreland community, it is still a common perception that a sustainable lifestyle is a privilege. This attitude was also seen in our MSC interview with Mairi. She said that the most significant change that she experienced because of ZCM was her change in mindset. They helped her to realize that in order to live sustainably, it is not necessary to be rich (See Appendix L).

IMPLEMENTATION OF SUSTAINABLE SYSTEMS

Governments have the power to provide funding to build and maintain sustainable energy systems for communities. In Stockholm, the government has invested in district heating plants that provide combined heat and power; they also have district cooling systems. The district heating is powered mostly by renewable energy, lowering the carbon footprint of the residents (City of Stockholm, 2010).

Ashton Hayes has received many government grants to help the residents install solar panels and a wind turbine. They also recently received a grant to look at the possibility of taking the village off of the main electric grid and create a microgrid, only used by the town and completely run off renewable energy (Ashton Hayes, 2010d). This has allowed the village to take the next step to being carbon neutral. In both Ashton Hayes and Stockholm, the government provided the means for these communities to be powered more sustainably.

Samsø provides an example of a community that was not provided with sufficient funding from the government to implement renewable energy systems. After winning the competition to become completely powered by renewable energy, they were given virtually no funding to support the project and had to find the funding from within the island's population (Kolbert, 2008). The local government, businesses, and residents invested in solar panels, wind turbines, and district heating. In this instance, the national government provided the motivation for the residents of the island to change the way they lived, but not the

funding. All of these examples display the ability the government has to cause change and be a great influence over a group of people to act more sustainably.

ACTION ON CLIMATE CHANGE

In order for the government to recognize the action that needs to be taken on climate change issues, programs such as ZCM need strength in numbers. This point was brought up in our MSC interview with Julie Francis. She felt that the most significant thing as a result of her joining was that she can "give power to ZCM..." By becoming a part of ZCM, she has added her support and increased the number of participants. The main goal of ZCM is to aid in preventing further climate change, but ZCM is also a movement. For a movement to hold substance it needs members, and more members will help create the attention MEFL needs to ultimately succeed. Liz, another participant in our MSC interviews stated, "If you want Council to change its policies, you have to be a group (See Appendix M)." When a large enough following is present, the government should take notice that there is a need within the country that they are not fulfilling.

4.3.2 BUILDING SOCIAL CAPITAL

Ashton Hayes and Samsø have successfully implemented climate change initiatives with the utilization of social capital. Both projects built social capital through the process of bringing the community together. Using this technique as motivation allowed the residents to see value in the project. As introduced before, Charnock began the movement to go carbon neutral in the village of 1,000 people. Charnock advertised the project as something the community could be proud of and it has worked to successfully engage over 75% of the community (Ashton Hayes, 2010b).

Charnock built social capital at the beginning of the project by enlisting the help of as many organisations as possible. This allowed him to contact many people and gain support for the project from many people. A list of the supporting organisations can be seen in

Appendix C. Leaders of the movement in Ashton Hayes have also reached out to people through media outreach and communication on the website. Communication is an area that MEFL is currently working hard to improve. They recently re-vamped their website so that it is much easier to navigate than before, and recently created a facebook page, social media website, twitter account, as well as two different blogs about ZCM and advocacy. They are continuously improving their internet resources to reach more people. Also, one of the staff members writes a column every three weeks in the local newspaper, the Moreland Leader, about sustainability advice. Increasing their modes of communication will allow them to reach more people and help to build social capital.

Ged Edwards, a Master's student, receiving his degree in Climate Change and Sustainable Development, completed a study to determine what motivates the people in Ashton Hayes. He found that one of the main motivators behind implementing environmentally friendly behaviours and participating in the 'Going Carbon Neutral' project was pride in the village, among others. He also found that many people felt that being a part of this project made them more involved in the community, which motivated them and engaged them further in the project (Edwards, 2007).

As a part of the study, students from the University of Chester surveyed many non-participants to determine what prevented them from being actively engaged in the project. Even though they do not actively participate in the project, most of the non-participants practice environmentally sustainable behaviours. Of the non-participants, 33% of them began practices to decrease their footprint because of a friend or neighbour. Also, to support the presence of social capital in this initiative, 81.8% of the non-participants thought that approaching a climate change initiative was best achieved by using a community approach. This meant that they believe that strengthening the community is the best way to go about motivating participation. Most importantly, Edwards found that these non-participants are

attempting to decrease their carbon emissions; they do not fit the typical profile of a non-participant. Edwards revealed the importance of social capital in his findings.

Another community that successfully used social capital to implement a climate change initiative was Samsø, Denmark. Samsø won a competition that required the island to be completely dependent on renewable energy in 10 years. One man, Søren Hermansen, took control of the project and gained support throughout the island. The residents of the island were hesitant to get involved in the beginning; Hermansen describes each person as "waiting for the neighbour to do the move." Hermansen took advantage of this quality in the community. He knew once people got involved, it would become contagious. He began promoting the project as one that everyone on the island could have a hand in and be proud of, as well as a project that could have economic benefits (Kolbert, 2008).

It took a couple of years, but the community became engaged and now, Samsø is thought by some to be the first carbon neutral place on Earth (EDIN, 2010). By building social capital around the project, the community wanted to participate knowing that it would strengthen the ties in their community and better the quality of life for everyone.

Another important thing that can be learned from Samsø is that the development of a project takes time. When analysing the ZCM programs, we have taken into consideration the progress MEFL has made and recognize that ZCM is a young project. It took Hermansen about 3 years to get his community engaged and he only had 4,200 people to reach out to. At this stage of development, MEFL has reached a significant number of people, but they must work to reach a broader segment of the community.

Ashton Hayes and Samsø demonstrate the effectiveness of social capital in climate change initiatives. It is because of their success that we strongly advise pushing community leaders to be more active in influencing the members of their community. Because Moreland is a much larger community than both Ashton Hayes and Samsø, MEFL has recruited

multiple community leaders; one leader will not have enough reach in an area the size of Moreland. MEFL does work with their leaders already; each community leader had an average drop of 20% in their carbon footprint in the first year, with the largest drop of 39%. These statistics display that they are making changes in their own lifestyles, but MEFL should encourage their community leaders to become more active and spread their experience with ZCM in their communities. If the message is spread through community leaders, it will initiate a community driven movement, the way the initiatives in Ashton Hayes and Samsø began. One way to help the leaders influence others would be to host a workshop specifically for community leaders. An instructional workshop could help the leaders to learn strategies on how to approach others and motivate them.

4.3.3 CREATING SOCIAL NORMS

Providing training for leaders would also help ZCM create social norms in the Moreland community. Social norms are often created because of pressures that are created by other people. From the qualitative data that we received through the focus group and interviews it seems that ZCM has not yet created social norms within the community. Those who are involved in ZCM have implemented many environmental practices into their life, but they are not using their positive experiences to influence others. Community leaders could act as liaisons for MEFL and spread the messages of ZCM.

4.4 ENGAGING LOW INCOME AND DIVERSE RESIDENTS

Our research on reaching every member of a community continued by looking at how to engage the low income and diverse segments of a population, specifically people who are in fuel poverty. Searching for a case study specific to fuel poverty stricken people being engaged in climate change initiatives proved difficult. We then looked to general engagement

of a low income population. This more general research allowed us to find very good information on Participatory Action Research, or PAR, and other engagement methods.

4.4.1. IMPLEMENTING PAR

Through the background research, it can be seen that PAR can be implemented successfully in low income and diverse communities. MEFL has recently received funding to work with the CALD, Culturally and Linguistically Diverse, communities in Moreland. They plan to produce brochures in four languages: Turkish, Mandarin, Arabic, and Vietnamese. The brochures will present information about ZCM, climate change, and different actions the CALD communities can take. MEFL plans to produce a video that will display how to make simple retrofits on a house. They also plan to hold workshops with the members of the four communities to teach them more about climate change and how they can start acting in their communities to reduce carbon emissions.

If given the opportunity again, funding similar to this could be put towards implementing PAR workshops. PAR workshops can be utilized in low-income communities as well as communities with a large migrant population. In the case study from Worcester, MA that was presented in Chapter 2 of this report, the facilitators and the community began the two day workshop by participating in a social night put on by the Bhutanese people. They allowed the Bhutanese people to immerse the facilitators in their culture through dance, art, and food. This helped to develop a certain level of trust between the facilitators and the participants. MEFL could do the same with the CALD communities because they have cultural art, music, and customs from their home countries that they most likely would be thrilled to share.

MEFL could then host a workshop with these communities to help them understand climate change. However, since the point of PAR is for the facilitators not to impose anything upon the community, MEFL could give the chance for the members of that sector to decide

what it is they need the most help with and what they need more information about. This will allow collaboration between MEFL and the community to determine what they want to learn. This strategy has the potential to engage a significant number of people that ZCM has not reached yet.

Ashton Hayes proved that PAR is not limited to low-income and diverse communities. The project in Ashton Hayes used grant money from DECC, in conjunction with a grant received in 2009 from Carbon Connections UK Ltd for GBP £86,000 (AUD 137, 500) to look into putting Ashton Hayes on its own rural microgrid (Ashton Hayes, 2010d). A microgrid will allow the village to run entirely off of renewable energy. First, they are completing a feasibility study to ensure that this will work for the entire village. Throughout the study, they are conducting focus groups and communicating with the residents to guarantee that this is a change they are willing to make and that it will be accepted throughout the community. To further engage the community in the project, they asked volunteers to help set up the weather stations that were used to measure wind speed and determine how much solar energy is inputted in the village. The study looked solely for volunteers, it did not impose the project on anyone, and this allowed further engagement for those who wanted more.

4.4.2 ENGAGEMENT THROUGH SOCIAL FAMILIARITY

A study done by the International Reading Association in Philadelphia, Pennsylvania examined the access to reading materials in four different neighbourhoods of Philadelphia. This study did not study community engagement directly, but it revealed an important fact about engaging members of a low-income, diverse community. One of the points that it made was that children often associate tasks with practices in their day-to-day life that are familiar to them. For example, Muslim children often memorize and write out sections of the Qur'an. Similarly, members of certain African tribes weave regularly. These are examples of skills

that they use on a regular basis; when other tasks are presented that use similar skills, they can identify with that task immediately (Neuman & Celano, 2001). Because of this, learning is partially dependent on the social situation.

This idea of social familiarity is an important thing for MEFL to recognize because there is a large population of migrants in their community. There are populations of Italian, Greek, and Lebanese people that have been in this area for a very long time that have produced second generation citizens, but there are also many different refugees and migrants that have recently come and are not accustomed to the culture in Moreland. It is these refugees and first generation migrants that MEFL can target. These populations are mainly Chinese-Mandarin, Vietnamese, Northern African, and Turkish. Their presence can be seen in Figure 1: Primary Language Distribution of Total Moreland Population; a small percentage of each of these languages has become present in the census data. Social familiarity can be used to target these populations because there are many things that they did in their home country that are normal in social situations, but are not a normal practice in Australia. Focusing on what these are and really learning what social situations the migrants will connect with could be critical to engaging them in a social initiative.

Engagement through social familiarity can effectively implemented with adults from CALD communities. For adults from these CALD communities, ZCM could host workshops for women to teach them how to make their own drapes, using fabric that is best for keeping the cool air in the room and the hot air out of the home. An activity like this would tap into the hands-on sewing and craft work that women do to sell material at the open air markets in Northern African countries. Gardening classes could be offered as well because it is very common in Vietnamese and Chinese women to work on farms. These are activities that the women would most likely enjoy and ZCM could use the workshops to communicate their message and engage members of these communities.

4.5 EXPANDING THE SCOPE OF CARBON FOOTPRINT CALCULATOR

Often overlooked when examining greenhouse gas emissions, the methods by which food is produced, processed, and transferred can have a detrimental environmental impact. Agriculture, coupled with livestock production, accounts for close to 25% of the world's total greenhouse gas emissions (Butler et al., 2007). However, calculating one's food-related carbon footprint is not easy due to the various means of production that exist. A few food carbon footprint calculators do exist, detailing the correlation between diet and carbon emissions.

4.5.1 CALCULATING EMISSIONS FROM FOOD PRODUCTION

A popular method for calculating the environmental impact of food is Economic Input-Output Life Cycle Assessment, or EIO-LCA. It was created by the Green Design Institute at Carnegie Mellon University to calculate emissions from food, goods and services. Life cycle assessment, or LCA, is a way to investigate, estimate, and evaluate the environmental burdens caused by a material, product, process, or service throughout its life span (Green Design Institute, 2006a). Results from an LCA can serve three purposes. It can help differentiate the impact of two comparable products. It can also determine the best design options for the same product. Finally, it helps identify where in the life cycle an impact should be targeted for reduction. A product life cycle can be defined using a six-stage linear progression, ranging from the extraction of raw materials to the management of the waste product (Green Design Institute, 2006a). EIO models are usually presented in matrix form where each row and each column represent a single industry sector. Using some basic linear algebra techniques, EIO models identify the direct, indirect, and total effects of changes to the economy (Green Design Institute, 2006b). Examining the entire life cycle can help consumers avoid making decisions that in the end cause greater environmental damage (Green Design Institute, 2006a).

The United Kingdom environment consultancy ADAS led a project to develop, test, and apply a more consistent approach for measuring food-related greenhouse gas emissions (Washington, 2008). The project is still ongoing and final reports have not been made available to the public. However, a study on ready meal cottage pie details the major sources of carbon emissions in its production process. The results show that the production of the ingredients of the pie contribute about 65% of the life-cycle greenhouse gas emissions, making it the "emissions hot spot" (DEFRA, 2008). Manufacturing, retail, and consumer use contributed to 10-12% of emissions each. The disposal of the pie was found to be a very small factor with only a 2% overall contribution. ADAS worked with farmers and growers to evaluate the impact of the agricultural stage of the food production process and compared emissions from each raw material in cottage pie. Their findings showed that beef in the pie contributed almost 70% of the total carbon emissions from the production stage (DEFRA, 2008). Further studies noticed another interesting observation. When prepared using an electric fan oven, the carbon emissions from the pie preparation make up 9% of the total greenhouse emissions. However, when prepared in a microwave, the carbon emissions drop to 2% of the total (DEFRA, 2008). From this, it can be concluded that microwaving small portions instead of using an oven will reduce the carbon footprint of food. Studies like this are helpful in determining how best to reduce food's carbon footprint and indicating what areas of the food production process need to be addressed.

4.5.2 CARBON FOOTPRINT CALCULATORS

The Cool Climate Calculator, developed by a team at the University of California Berkeley's Renewable and Appropriate Energy Lab and led by PhD student Chris Jones, features a section addressing food consumption. The food section is divided into five categories. The first category includes meat, fish, and eggs, but this group can be broken down even further to measure individual meat proteins instead of just looking at the total

meat consumption (Jones, 2010b). The options include beef, pork, lamb, veal, poultry, eggs, fish, seafood, and others like processed meat or nuts. This is done because the amount of carbon emitted from the production of meat varies; red meat is about 150% more greenhouse gas-intensive than chicken or fish (Matthews & Weber, 2008). The four remaining sections are dairy, fruits & vegetables, grains & baked goods, and a section labelled "other" which includes snacks, drinks, and other similar products.

The scale used to approximate the consumption of each category ranges from zero, meaning no consumption in that category at all, to three times the average American household (Jones, 2010b). The amount consumed by the average American household is listed, making it easier for the user to approximate their food intake based on these averages. Using the inputted data, including how many adults and children occupy the household, the calculator can estimate in metric tons how much carbon dioxide is emitted per year due to the food consumption of the household. Out of the five categories, consumption of other foods like snacks and drinks has the largest impact on carbon dioxide emissions. This is mainly due to the vast array of products that fall into this category. Second in climate impact is meat, followed by dairy, grains, and lastly, with the smallest impact, are fruits & vegetables. The total amount of carbon dioxide emissions per year is then added, along with emissions from food goods and services, and compared both to similar U.S. households and the average United States household emissions. According to this calculator, the average amount of carbon dioxide emissions of a U.S. household from food, goods, and services is 20.7 metric tons per year (Jones, 2010b).

The results from the Cool Climate calculator are generated from Economic Input-Output Life-Cycle Assessment. To make it more applicable to food products, EIO-LCA emission factors are modified to account for inflation, differences between consumer and producer prices, and emissions from transportation and trade (Jones, 2010a). The 280

consumer product categories in EIO-LCA are then aggregated into six categories of food, along with three categories of goods and a category for services. Each category is aggregated using averages weighted by consumer spending from products in each sector (Jones, 2010a). The carbon emissions of a single category are calculated by multiplying the amount spent on the category in a month by the grams of carbon dioxide emitted per dollar spent. This product is multiplied by 12 to convert the total from a monthly amount to a yearly amount. Adding together the results from each category will result in one's total grams of carbon dioxide emitted in one year from food consumption (Jones, 2010a). The equation below describes the calculation process in mathematical form:

Total Food emissions [gCO_2/yr] = Sum of food categories (Dollars spent on each category [$/mo] * Emissions for each category [gCO2/$]*12 [mo/yr])

The Nature Conservancy has also developed a carbon footprint calculator which includes the impact of food consumption. It features a food and diet section consisting of two questions regarding the food consumption of a household. The first question asks how often meat is consumed. The more meat is consumed, the higher the total carbon dioxide emissions rise (The Nature Conservancy, 2011). The second questions asks how often organic foods are included in the diets of the household. The more organic food purchased, the lower the total carbon dioxide emissions are (The Nature Conservancy, 2011). The results of the two questions are combined to give an estimate of how many tons of carbon dioxide are emitted from the food consumption of a household. The methods used in the Nature Conservancy calculator suggest that one should avoid meat products and buy organic foods in order to lower their carbon footprint.

Members of our focus group had mentioned some difficulties using MEFL's carbon footprint calculator. Some participants found it hard for them to gather their bills together, which they need in order to accurately input their energy usage. They all found the calculating process to be more time consuming than they first thought. These complaints were taken into consideration when making a recommendation on implementing food emissions into the calculator.

The two methods we found for calculating food emissions were by inputting the amount of food consumed or inputting the amount of money spent on food. Both methods have their advantages and disadvantages. For other areas of emissions, such as energy usage and transportation, MEFL's calculator currently asks users to input the amount consumed rather than the amount of money spent (Moreland Energy Foundation, 2010k). People can usually estimate how much food they eat each week more accurately than how much money they spent on food, and calculating based on consumption would be less time consuming. However, estimates based on amount of food consumed tend to be less accurate than calculating based on food costs. This is because there are currently statistics available providing the amount of carbon dioxide emissions per dollar spent on each food category in the United States. These statistics were determined using EIO-LCA methods, and are implemented into the Cool Climate calculator (Jones, 2010a). If MEFL were to choose to calculate food emissions this way, the statistics would need to be adjusted based on Australia's economy. This calculation method must also be adjusted as food prices fluctuate, which is quite common. As mentioned in the focus group, it can be difficult to keep track of bills. With money as the input value, users would need to keep track of their food receipts for more accurate results. With all advantages and disadvantages considered, our recommendation should ultimately be user friendly while yielding accurate results.

CHAPTER 5: CONCLUSIONS & RECOMMENDATIONS

From our results and analysis, we were able to successfully evaluate how well MEFL has engaged their community in the past and how effective their programs have been in causing behaviour change. Using these findings, we drew conclusions and made recommendations about the best sustainability practices and strategies for Moreland. From our research, we were also able to make suggestions on how to expand the scope of MEFL's carbon footprint calculator to incorporate food.

5.1 COMMUNITY ENGAGEMENT AND BEST SUSTAINABILITY PRACTICES

MEFL's membership is increasing and they are on their way to achieving their goal of 5000 participants; however, it is important to monitor the demographic and level of involvement these participants express.

Based on the demographic ZCM data, we can conclude that the typical profile of a ZCM participant is 25-44 years old, English speaking, has an annual income of $50,000 - $150,000, and is likely to live in one of the Brunswick or Coburg suburbs, in the South of Moreland. Comparing these data to the ABS data for the general population of Moreland, we can see that MEFL has done a great job recruiting young families, but they are severely lacking in elderly participation. To focus their efforts on residents 65+, we recommend giving special options like door to door services, deliveries, and free installations to help the older people that may not be capable of doing these things on their own.

From examining primary language data, we can conclude that ZCM has some diversity but really has not made much progress with recruiting the non-English speaking residents. We suggest that they try to make their information more accessible for these non-English residents, possibly by offering different language options or translations. They can also explore the concept of engagement through social familiarity to engage adults who have

recently migrated to Australia and may have communication issues. This would involve creating activities that are similar to practices from the migrant's home country so that they can more easily relate to what MEFL is trying to inform the community about. The funding MEFL has recently received for their project 'In Common Language' will be a great opportunity for MEFL to reach out to these people and put into effect our recommendations.

The household income levels of the ZCM participants indicate that the majority are middle-class. However, ABS data show that almost 50% of Moreland residents earn under $50,000 a year. Consequently, MEFL does try to target low-income people with their money-saving strategies and programs like Warm Home Cool Home, but our interviews and focus group support the fact that they are actually reaching people whose economic concerns are secondary to environmental concern. To engage low income and diverse individuals, we recommend Participatory Action Research, or PAR. PAR has been used successfully throughout the world with low-income residents, but we believe it can successfully be used with diverse residents as well. If given the opportunity through funding, MEFL should conduct a PAR workshop in the CALD communities that exist in Moreland. It will help build a positive relationship between MEFL and both low income and diverse residents. It will allow for connections to be made with sectors of people that ZCM has not yet reached.

Geographic divisions are another concern. While membership has risen steadily since ZCM's inception, two post codes are severely underrepresented. One post code includes the suburbs of Pascoe Vale and Pascoe Vale South, while the other includes Glenroy, Hadfield, and Oak Park. These sections have the second and third highest populations of all postcodes in Moreland and the two lowest percentages of ZCM members. The bulk of ZCM membership is concentrated around MEFL's headquarters in Brunswick and neighbouring regions, with a significant drop in household participation towards the northern suburbs. We recommend further outreach to members in these underrepresented communities.

To find the best outreach methods to recommend, we looked at the analysis of signup methods and levels of involvement. From these data we can conclude that stalls generally attract the largest number of new recruits. However, stalls have a lower return on the number of people who have taken the next step in involvement. To counter this trend, we recommend personally following up with members who have been recruited through a stall to remind them of the importance of calculating footprints, completing action plans, and participating in programs. Based on our behaviour change research, another recommendation would be to provide more incentives for increased participatory behaviours. We found that many members joined because of a bulk buy, which simultaneously increased both ZCM membership and average involvement. MEFL should look into other signup opportunities like this, where new members see an instant benefit. Also, based on our behaviour change research MEFL could push for more people to complete an action plan, which can be done faster than a footprint, in an effort to get people to realize what they can do and provide an incentive to take action. This could even be something done quickly while signing up for ZCM. MEFL should also be sure to hold regular events to keep reiterating the values of the organisation and potentially obtain more footprints.

Another theme we observed through our analysis was that MEFL has recruited mainly residents who were aware of environmental issues before joining Zero Carbon Moreland. In order for ZCM to recruit those who are not environmentally conscious, they must use new and different ways to reach out to the public. This includes more publicity around events, more innovative ways to bring people to stalls, and placing environmental reminders throughout the community. Along with this, ZCM can gain more members by reaching out to new sectors of people such as children and non-profit organizations. To reach out to children, they can look to collaborate with primary schools or get more involved with programs that CERES does with local children. To reach out to other non-profit organisations

in the community, if feasible, MEFL could offer energy audits and advice on how these organisations can save money and energy. With these recommendations, we suggest that MEFL continuously look at other similar organisations and movements around the world to find new engagement methods and programs that are used to get residents involved.

MEFL can also use their environmentally-minded members to their advantage in order to create social norms in the community. So far, they have succeeded in creating permanent changes within their participants' lives, but have not yet created them throughout the community. Social norms will be created in the community when sustainable behaviours become more obvious; this will create pressures on others to act in a similar manner. We recommend that the community leaders in ZCM should be utilised more to spread ZCM's impact. MEFL could host workshops to train these leaders on the best way to influence and motivate others. Utilising these community leaders to send the ZCM message will also initiate a movement that has been started within the population and not by MEFL. This approach will allow for greater social capital to build. This is vital because we have found social capital to be a powerful tool for engagement in climate change initiatives. Social capital takes time; as the project ages, their capital will build and more members of the community will be influenced to join.

Another factor influencing the engagement of Australia as a whole is government action. Recent action by the Australian government has demonstrated that climate change programs are not their first priority. In order for MEFL to help change this, they must continue to advocate for change and recruit as many people as possible to their cause. The government will take notice when they realize how many people are behind the zero carbon initiative. MEFL can do this and increase their membership by implementing many of the ideas that have been presented throughout this section.

Looking past community involvement and instead at the success of the actual ZCM programs, we also recommend that MEFL continues to study the billing data they receive and carry on collecting more in the coming years. The initial data we analysed suggests that the Warm Home Cool Home program was successful, and we advise that they use the other baseline data we established as a comparison in the future to see if this trend is validated by additional data.

5.2 FOOD CARBON FOOTPRINT RECOMMENDATIONS

From our research into carbon emissions from food consumption, we can make some suggestions to MEFL on how to effectively implement the carbon footprint of food into their calculator. First of all, no matter which solution MEFL decides to implement, the food calculation portion of their calculator should follow the same format as the rest of the calculator. This will make it easier for both the calculator's programmer and the users. Based on our research, we feel that the best food calculator for MEFL to model would be the Cool Climate calculator. Food cannot be treated as one category; doing this will result in an unacceptable level of inaccuracy. We have found that carbon emissions vary amongst different food types. We suggest splitting food up into six different categories: red meat, white meat, dairy, fruits and vegetables, grains, and snack foods. We think these six categories will give enough variety without being too much of a burden for the user to calculate. Using statistics describing the amount of carbon emissions from each category, a carbon footprint can be calculated based on how much food the household consumes weekly in each of the six food categories.

Our food consumption research also allowed us to draw some conclusions on how to reduce the carbon footprint of food. The consensus among most experts in the food consumption field is to simply eat less meat. We have found that decreasing meat consumption in favour of a vegetable-based diet will result in a large drop in household's

carbon emissions. An alternative suggestion, which is much more feasible for Australians, is to switch to kangaroo meat, which emits less carbon than meats from cattle and sheep. Another common recommendation promoted by environmental groups is to buy local products, decreasing the emissions from food miles. However, we have concluded from our findings that an actual diet change will have a much larger impact in lowering a carbon footprint. These are some measures we recommend for MEFL to help their members lower their carbon footprint from food.

5.3 OVERVIEW

We set out to evaluate the effectiveness of Zero Carbon Moreland and make recommendations for MEFL for the future regarding further engagement and improvement of the accuracy of their carbon footprint calculator. We have found that MEFL has reached a significant number of people and is effectively engaging those residents, but they have reached a crucial phase in their project where they must involve new segments of the population. To do this, we have identified the sectors of the population that they have not reached and made recommendations on how they can connect with these non-participants. We have also made recommendations based upon our research on adding food emissions to the carbon footprint calculator. Our evaluation of the Zero Carbon Moreland program will help MEFL reapply for funding from the government this coming March. Our recommendations based on this evaluation will then allow them to continue engaging new residents throughout Moreland to help achieve the goal of carbon neutrality.

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GLOSSARY OF TERMS

ABS – Australian Bureau of Statistics

AUD – Australian Dollars

CALD – Culturally and Linguistically Diverse

CERES - Centre for Education and Research in Environmental Strategies

CO_2-e – Carbon Dioxide Equivalent

DECC – Department of Environment and Climate Change

EIO-LCA – Economic Input Output Lifecycle Analysis

GBP – Great Britain Pounds

MEFL – Moreland Energy Foundation Ltd.

MSC – Most Significant Change

PAR – Participatory Action Research

USD – United States Dollars

ZCM – Zero Carbon Moreland

APPENDIX A: SPONSOR DESCRIPTION

The Moreland Energy Foundation is a non-profit independent organization located in Brunswick, a suburb of Melbourne. It is run by a Board of Directors headed by Mike Hill, who helped establish the organization. The Board is also in charge of appointing a CEO, a position currently held by Paul Murfitt. The Foundation was established in the 1980s by the Moreland City Council to promote the protection of the environment by reducing the "carbon-footprint" of the community. As stated in their Constitution, the Moreland Energy Foundation actively helps the reduction of greenhouse gas emissions by promoting community awareness and energy efficient appliances, increasing the number of audits they perform to monitor efficiency improvements within homes and businesses, holding programs to encourage greenhouse friendly technologies, and developing and analysing data to facilitate research into new energy efficient technologies (Moreland Energy Foundation, 2004).

The Moreland community has made some improvements to reduce their "carbon footprint" in recent years by taking advantage of sustainable technologies. The Moreland Energy Foundation has aided this effort by providing many different services and education for the residents, as well as for businesses and other organizations. For example, the 5-Star Home Renovator Service offers a free 1-hour consultation to Moreland residents to help them develop more sustainable homes (Moreland Energy Foundation, 2010a). For business leaders, a list of workshops and training sessions on energy management can be accessed on the MEFL website. To tailor these programs for a community that is continuously changing and developing, the Moreland Energy Foundation is continuously gathering and analysing data to stay on the cutting edge of sustainability. For example, they are currently collaborating with the Sustainability Victoria agency on a research project to evaluate the state of Victorian homes and how to improve them to meet their energy efficiency potential.

This research will be used to inform the community on how to make their homes more energy efficient (Moreland Energy Foundation, 2010c).

The current project of the Moreland Energy Foundation is Moreland Solar City, which began in late 2008 and will receive up to $4.9 million in funding from the Australian Government. A major initiative of this project right now is Zero Carbon Moreland – a program to get 10% of Moreland households and businesses to reduce their greenhouse gas pollution by 20% by the end of this year. The overall goal is to then get a net zero carbon emission from the entire community by 2030 (Moreland Energy Foundation, 2010g). An organisational chart of the programs under Moreland Solar City was given to us by Elle and can be seen in Figure 1 of the report.

Under Zero Carbon Moreland, MEFL runs many programs to help accomplish this goal. For instance, the Draught Proofing Blitz was run in collaboration with Ecovantage, a sustainable technologies provider similar to MEFL, during the winter of 2010. Through this program, 86 Moreland households paid $50 for the materials needed to seal off gaps in their homes which were installed free of charge to help reduce draughts. The Summer Savers program is another ZCM - Ecovantage collaboration this summer. With this offer, residents can get $75 off the installation of any energy-saving household product. The Solar Hot Water bulk buy was an additional program MEFL did this past year from May to November. With this program, members were able to purchase discounted solar water heaters and receive a free assessment and quote from Servco, MEFL's chosen supplier. MEFL also runs the Warm Home Cool Home program in collaboration with the Brotherhood Green, a social enterprise of the Brotherhood of St. Lawrence national charity. This program offers sustainability advice as well as free products installed at no charge to make homes more energy efficient for low-income healthcare or concession card residents (Moreland Energy Foundation, 2010g).

To further help participants in Zero Carbon Moreland, MEFL has begun implementing the Zero Carbon Moreland carbon footprint calculator to measure their progress. The scope of the ZCM carbon footprint calculator covers emissions related to energy use, transport and waste. Several other sources of emissions, like those related to food production, are not included in the scope of the ZCM footprint calculator (Moreland Energy Foundation, 2010k).While net zero emissions is a very ambitious goal, it is one that the Foundation truly believes in and is providing resources to help the community achieve this goal.

APPENDIX B: COMPLETED CARBON FOOTPRINT SURVEY

TABLE 6: EXAMPLE OF COMPLETED CARBON FOOTPRINT SURVEY FROM ASHTON HAYES (ASHTON HAYES, 2010C)

Home Energy

1 What is your main heating system?

Central heating (boiler / radiators)	X
Electric storage heaters	
Room heaters or fires	
Other (please specify)	

_____

2 What is your main fuel for heating?

Mains gas	X
Electricity	
Solid fuel	
Bottled gas	
Oil	
Wood	

3 What heating controls do you have?

Room thermostat	X
Programmer (timer)	X
Thermostatic radiator valves	
Storage heater dials	
None	

4 How is your hot water provided?

From main heating system	X
Electric instantaneous	
Electric immersion	
Gas instantaneous	
Back boiler	
Combi boiler	
Range	
Other (please specify)	

_____

5 If you have a hot water tank, is it insulated?

No tank	X
Yes	
No	

6 How much loft insulation do you have?

No loft/access	
None	
1 inch/25mm	
2 inches/50mm	
3 inches/75mm	
4 inches/100mm	
5 inches/125mm	X
6 inches/150mm	
8 inches/200mm	
10 inches/250mm	
Don't know	

7 How much of the property has insulated walls?

None	X
Partial	
Full	
Don't know	

8 How many low energy light bulbs do you have in your home?

None	
One	
Some	
Most	X
All	
Don't know	

9 How much of the property is double / secondary glazed?

None	
Some (25%)	
About half	
Most (75%)	
All	X

Don't know ☐

10 How much of the property has insulated floors?

None ☐
Partial ☐
Full ☐
Don't know ☐

11 How many of the openings in your property have draught proofing?

None ☐
Some ☐
Most ☐
All ☐

12 Are your hot water pipes insulated?

No ☐
Yes ☐
Don't know ☐

13 Are you on a green electricity tariff with your electricity supplier?

Yes ☐
No ☒
Don't know ☐

14 Any other energy efficiency / renewable energy measures?

N/A_____

15 From your last bill, what was your fuel consumption?

Fuel Gas_____
Units kWh 34766_____
Time Period Annual_____

Fuel Electricity_____
Units kWh 7814_____
Time Period Annual_____

Fuel _____
Units kWh _____

Time Period _____

APPENDIX C: SUPPORTING ORGANISATIONS FOR ASHTON HAYES

TABLE 7: GROUPS IN SUPPORT OF 'ASHTON HAYES GOING CARBON NEUTRAL' (ASHTON HAYES, 2010F)

Businesses	**Local Organisations**
Andy Foster Architects	Ashton Hayes Parish Council
Ashton Hayes Post Office	Ashton Hayes Primary School
New Community Shop	Ashton Hayes Scout Group
Busy Bus	Ashton Hayes Women's Institute
Chester Chronide	Ashton Hayes St. John the Evangelist Church
Country Electrics Solar Systems	Ash-worth Timebank
County Cuisines - local ready meals	Ashton Hayes Gardening Club
Delamere Forest Touring Park	Ashton Hayes Scouts and Brownies
EA Technology Eurotree Service	Sylive Milne's Village Website
Fifth Pictures	Drs. Gleek, Griffin, and Adey
Golden Lion Pub	
Gunnery Store and Restaurant	**Government Related Organisations**
Green Fuels	Carbon Connections UK Ltd
Green-car-guide.com	Cheshire West and Chester
John Tweed, Architect	Cheshire Community Action
Inglenook Self Catering Cottage	DEFRA
Kidderton Morris Men	Energy Projects Plus
Legat Owen	Energy Saving Trust
Lovelula.com	North West Development Agency
M&M Communications	Ofgem
Okell's Nursery	
RSK Group	**Non-Government Organisations**
Solarwin	Business in the Community (BITC)
Scottish Power Energy Networks	CPRE
Technical Editing Services	The Carbon Leapfrog Charity
United Utilities	Oxfam
Wattson	Forum for the Future
	Zerofootprint (not for profit)
Academic Institutions	Energy Institute
University of Chester	
University of East Anglia	
De Montfort University	
Glasgow University, Crichton Carbon Centre	
Liverpool John Moores University	
University of Central Lancashire	

APPENDIX D: MSC INTERVIEW 1

For the transcriptions of all MSC Interviews, E will stand for Emily Pearce and K will represent Kathryne Kulzer; the other initials are that of our interviewee.

Name: Enrico Mussolino

Enrico has been in Australia for 61 years and in his house for 50.

Age: 84

Gender: M

Suburb: Hadfield

E: What projects have you participated in with MEFL and ZCM?

N: Solar Panels, globes changed, water tanks, stoppers under the doors. Whatever we could do without incurring too much expenses because somebody came and they say you can put cover on top of the window but it won't make much difference and it will cost money. Pension try not to go out and spend left and right but if it is something that will make a difference like solar panel and water tank (as a present) I don't know if there is much more we can do.

E: Seems like you've done a lot already.

N: Yea well we done what we could ya know?

E: Thinking back, what's been the msc as a result of MEFL's programs?

N: Well I don't know really because the electricity bill is coming more or less like before because we're using less, but the price gone up so we haven't seen much advantage but maybe it will help environment but it hasn't helped me much. The rest I don't know. We haven't made any drastic change in our life we just carry on ya know? We are not a very heavy user because we don't go out much. We don't use much electricity or heating. When it's cold we don't put central heating on, we sit here in front of the heater. Only when its extreme heat we put the whole house, otherwise ya know the main thing we're doing is so we don't incur unnecessary expenses. That's the main thing for us. We probably won't be around when the carbon will make much difference in the world; we are not young like you. For us we take it day by day and that's all.

E: What influenced you to start making these changes?

N: Well I don't know. If we make any influence. We do our share, but we try to put things in the compost and now we have to try and get minimum waste as possible. We are talking about reducing these, but the post box is full everyday with advertisement things that we don't even read we just put them in the rubbish. Now, that's where you people have to concentrate your efforts. Why put so much waste around? Ya know they send here for computer or internet. We don't have the internet; we never want to have it. See we have letters from everywhere. We save in case maybe they come handy, but for us it doesn't make much difference. Even from you people I told Emma the other day we got a letter for me and one for my wife, such waste ya know? And the extra paper and the extra thing, the world to

today is filled with wastage, a lot of wastage ya know? There is nothing you can do really. I'm doing some volunteering at the health centre and even there you see so much waste, but what can we do? You say too much and you upset somebody so you keep quiet and go along with it.

E: So, you use composting here, do you recycle as well?

N: Yeah we got the compost and the wastage we try to put nothing in the ground. We haven't got a full garbage bin. It's never full; the most we fill is half. So I have to fill up the questionnaire about how much electricity we use and how much gas how much paper and about 18 or 19 litres per week and the electricity was less than last year but the price has gone up so it doesn't really make any difference to me. And the wastage is below average and that's about all I can tell you, the rest I don't know.

E: Obviously for you cost is a big motivator, what else influences you to be more carbon neutral? Why did you start the program?

N: I know the catastrophes around the world they are caused by global warming and I don't know I'm not a scientist but I believe the atomic bomb have a lot to do with this happening because when you explode this bomb the world shift thousands of kilometres in the air probably. So it is not in the proper place in relation to the sun and the moon and now the seasons are not there now summer you get cold winter you get hot so volcanoes are erupting because they explode bomb in the pacific I believe a little bit or some of it is caused by global warming but a big share of that is caused by these bombs and these things. When big explosion happen, it is not where it's supposed to be and I believe nothing is like meant to be now have tsunami and floods and they are caused by the atmosphere obviously so if I can do something to reduce that I do it but as I said I can't do much about it.

E: And you mentioned before that you have children, is that correct?

N: Yes

E: Do they do a lot of sustainable things as well; do you try to encourage them?

N: We I don't try to influence them because they are not kids, they are grown up and I think they are doing the same thing as we do. They try, my son is adopted so he knows what is going on and I suppose they also will see the meaning and try not to be extravagant. The older one is a safety officer for the union and she is 54 so I'm not going to tell her to do this do that. The other one is a school teacher so they are well educated and they are aware of what is going on. Now, unfortunately I believe all the people that are more conscious of what is going on aren't the young people. Maybe they know, but they say okay and we live in an uncertain world. They do drugs and get drunk and they know it is not good for them. They do it. They don't expect much. When I was their age, it was a better world. You know today it is full of crime, drugs, corruption, and we see what's happening in Egypt and Indonesia and all over the world. It is not the world I used to know. Sometimes when I speak with my children they say dad you get depressed over something you cannot control I say yeah but that's the way I am I see things that are definitely wrong and what can you do about them.

E: Do you think that what you're trying to do is going to help you in the future and help the world?

N: If everyone in the world does it then yeah, if I'm the only one doing it then it doesn't make much difference

E: Has it been hard for you making these changes or has it been pretty simple?

N: No, not really because I always had the life of discipline. I'm Italian. I was born under the Fascism. I believe discipline is good because you know if everyone wants to be the boss it is chaos, even in the family. That's anarchy. People always say dictatorship is really bad, well if he is a bad dictator it is. But if he's a good dictator at least you got some discipline and you know where you stand, otherwise its corruption. Unfortunately I know the world is so confused and you don't know if I'm wrong or they're wrong. So what you do is you live your own life and try your best not to harm anybody or do anything wrong. See the world has old people walking around getting attacked, raped. What the government is doing? They must fix it or otherwise you lose control.

E: What motivated you to join Zero Carbon Moreland?

N: Well I joined because as I said before because I believe we're heading for disaster. The people in power are more headed in politics than a real thing. We all talk about the world is not fair. How you going to take speeding? The person that goes 62 gets fined, but the person who goes 100 kills someone and gets out with a tap on the hand or with a good behaviour bond so what can we do about it? Nothing.

K: You've done a lot of good around here.

N: I'm trying but I don't know if it makes much difference.

K: If you do as much as you can it's all you can do.

N: That's it, see the world has come to the point where everybody has to be responsible for themselves and do what is conscious and say look, it is not what I can get from it's what I can give. But I mean to a certain extent because our pension is always there. We get 2 or 3 % a year and the rest increase 20 % electricity 50%, the water, so it is getting harder and harder. I wrote to the Prime Minister, I wrote to Kevin Thompson, I wrote to Christine Campbell. They all agree with what I say. Our rates increased so she gives me an interview to explain how they do the rates. She say we sit down, we determine how much we need to run the city and divide it. She said to me prepare to come at the meeting. Because I tell them they have to subsidize the pension. We get rebates for electricity and water. She said if they give some to me, they take from someone else, but that is democracy. I keep all the correspondence. Now I have these solar panel because I said in one way it helps the environment and in one way it helps me to reduce my bill. But I reduce the use of electricity, but not the bill. One counsellor told me that it doesn't matter what you do because the council needs so much and that's what you have to get. They waste it. They take money from the people and waste it. It's not fair. Maybe you can suggest what else we do. Obviously, it has to be something that doesn't put extra cost on us. WE can't put 20 panels instead of 6 because it costs too much. I used to go around driving, but lately we don't. We only go where we have to. Doctors or swimming. Visit sister in hospital. We don't go out just to go out. It helps environment, but it also helps us not to spend. Can't spend what you haven't got.

E: That was definitely very helpful

N: I hope so, but I don’t know.

E: That will help us with our research.

N: Whatever they need, I will help if I can.

APPENDIX E: MSC INTERVIEW 2

Name: Confidential

Age: 34

Gender: F

Location: Brunswick

Projects: Draught Proofing Blitz, Quote for Solar Hot Water

K: What has been the msc as a result of these programs?

C: For me personally in my life, it's definitely been the draught proofing. It's the only action change that's happened as a result of the program. I didn't even do like a calculator at the beginning or anything so that's kind of the only change so far.

K: But what makes it the most significant? How's it affected you?

C: I don't actually know that it has to be honest with you. It's good that there is no draught and stuff so that's been good. Also at the same time I feel like the people who did the draught proofing didn't take a lot of care. I can show you heaps of examples where it's kind of hanging. It's been the msc because I've noticed it every day. I walk out of the front door and notice it hanging every day. I don't know what else has made a significant change.

K: I can tell you have gardens and stuff. What has motivated you to make these changes?

C: I'm definitely into environmental sustainability. I only joined because I was at the Sydney Rd festival and a friend of mine was at the stall and I went over to stay hi, but he was talking to someone else. I started talking to someone else entirely and they told me it didn't cost anything to join and I was kind of like "I'm not really going to do anything because I can't afford anything and I don't really have the time or head space." But they told me it was fine so I joined just because I was waiting to talk with a friend pretty much. I'm kind of glad that I did even though I haven't done the calculator or anything just because the times that they've organised group stuff, I can be a part of that if I want to be. The flip side of it, like why didn't I do the solar hot water thing when that happened. It was because they never sent me the quote. They did an on the spot quote thing, but because I don't have gas connected to this property. Even though I told them that when I booked it, they sent the guy who has expertise when there is no gas in the house. When he came, he was kind of surprised that I didn't have gas. And so then they didn't really have the numbers to give me a quote and the system that they were pushing, I had talked to others about it, they said that that system didn't have very good components and there was this other system that everyone says is like absolutely the best hot water system you should use if you're not using gas boosted. And so I said I'd like that brand and he said he would look up a quote including that as well and he never sent. They never called me so I didn't pursue it. That's both sides.

K: Do you foresee yourself continuing involvement? Did that experience affect whether or not you participated again?

C: It didn't, but I have to say when the draught proofers came, some of what they did is great and some of what they did is mediocre. If it was a rented property, I wouldn't mind too much, but when it's your own house it's always in the back of your mind that you might have to sell it so you have to keep the value up. And it's those little things that people will notice. I kind of feel like now if there is another project I would check that it was with a different provider.

K: Do you foresee yourself continuing participating?

C: If you call what I do participating, then yes. We have 100% green energy, that's all we use. I don't know if they still have it, but they used to have community power and households' sign up to kind of bulk buy green energy. At that time, I didn't sign up because 20% was from landfill kind of taking out the gases from that and I felt like that's great that they're trying to reach out to any old person in the community, but really, I pay extra to get 100% green.

K: Do you have recycling?

C: Yeah.

K: One of the main things that has kept you from making a lot of changes is money, is there anything that would motivate you? What makes it more appealing to you?

C: I think to be honest the biggest thing is the time. When they said it was half an hour and they do it all for you, it was sweet. I didn't have to figure out what I needed. I didn't have to go to the hardware store and figure it. The expertise was great. I think another thing that might be ZCM to do, even if it was like the phone call and have a one on one chat and say here's a whole bunch of different things and which ones appeal to you. If they try to make it more one on one and gear it more towards me because it's hard to know what would be best for me in my house. Like, should I change the water system if I already buy 100% green energy? I think the rebate for the solar panels is coming out in the middle of the year and I'd really like help knowing should I really buy it now because this is never going to happen again and the technology has just improved or if there is new technology coming very soon. I would like to know those sorts of things that I don't know and I'm sure they have their heads wrapped around it. It kind of feels like they're real experts but I don't feel like I'm getting the benefit of their expertise. I know they don't have the opportunity to go around individually like that. Maybe if they sent out an email that said you tick the box of the things you would consider for your home and from that they then look at who to contact about programs. I also really like feeling like I'm a part of something and feeling like everyone else is doing their thing to. But, I have to say when they feature people and you look at everything they've done and I go I'm never going to manage that and for me personally I think it's disempowering. I'd prefer to see average, who made one change and this is what it's led to. Maybe that's just me being wussy and pathetic, but I do wonder if others who are less environmentally inclined than me and they are setting the bar so high.

K: I'm sure you're not the only one.

C: I do do lots of environmental stuff. I don't have a car and I cycle heaps. So if I'm feeling like that, so how does someone with a crappy, environmental lifestyle feel? I do think that motivation, the psychology of that is very difficult to figure out.

K: How often is ZCM in contact with you?

C: I get the e-bulletin, but it's good but I don't always get around to reading it. In general, it's pretty good. It's always clear, not too busy, but busy enough for me.

K: Maybe more emails?

C: No, that wouldn't help because I would think there were too many. I think the frequency that they send it is very good, but even then sometimes I don't have the time to read it. Maybe a separate email would be warranted if it was one of those were getting a group together to do bulk buy of solar or whatever. I think they are doing a bulk buy of solar at the moment.

K: I know you said you have house mates; do they live the kind of same environmental lifestyle as you?

C: Yeah pretty much, like she has a car but she still cycles heaps. She's the gardener; she's really good at that.

K: Do you talk to others about it? Do a lot of people in your life live environmentally? Do you try to influence them or is it just the way they are?

C: Most of my friends are environmentally minded and it sort of becomes this norm that it's the way you're supposed to live and it's nice to have that sort of support around you and you're creating an understanding of what your life should be like. I work very closely with two people and one of them is very into fashion and the other is very into technology and different gadgets and computer games. They know that I have these values and without saying anything they already know what they're doing is wrong, sometimes, not all the time, but they know it's not what you should be doing. So it's like I'm their conscience. I don't push it though.

E: What about your family?

C: Most of my family lives in Queensland and also my parents divorced. I've got an older brother and he's even more out there environmentally than me. It's kind of good, but he's so out there that it's not always so good. Our mom actually learned quite a bit from us, she's very much into gardening because of my brother. She grows heaps of the food her and her husband eat. She has a few of the water tanks so she can keep her garden going. She's also got the cost minded thing. She's put solar minded, I think that was more getting energy for free rather than environmentally motivated. My dad is totally the opposite, latest car and doesn't care about energy conservation. Flies all the time, everywhere. And he also keeps telling me about the latest something or other that puts doubt on climate change. He's so much in his lifestyle so he finds anything that supports him.

E: What about cost for you, is that a huge factor?

C: It is a bit of a factor, but at the same time I would consider doing the solar panels on. I guess it's very difficult for the MEFL to kind of get an indication of everybody and the payback period and stuff for that. That's quite an expensive thing. The other thing about solar panels is that you have to sign away the renewable energy certificates and I would prefer not to do that because they can sell it on to someone else. That allows someone else to pollute but

use the certificate to make up for it. I would prefer to not do that so they have to do more work. They sell certificates for the lifetime of the solar panels. That's a big consideration for me because I want to do well. When I think back, being a renter it's hard to think what you can and can't do. You feel like you can't do anything because the house is not your house. I think renters would be helpful to interview because of the situation they're in.

E: How long have you been living in this house?

C: Under a year.

APPENDIX F: MSC INTERVIEW 3

Name: Doug Myers

Age: 87

Gender: M

Projects: Solar panels – through stimulus that Kevin Rudd put out

D: Solar panels were recommended by you people because I couldn't get TRU energy. The water was not through Moreland Energy.

E: Basically the main point of this interview is to figure out your story. We want to hear what your perspective is on what you think the most significant change in your life has been as a result of Moreland Energy.

D: The most significant would be the solar panels. And secondly, the hot water service. At that expo that I went to, I was very interested in this method of heating water. Now, the gas hot water service was put in 19 years ago and after about 10 years some plumbers arrived off the street and we've got a gas hot water service here and you've got a sacrificial rod and we can fix in for 90 dollars. The life of your hot water service is only meant to be 10 years, but if we fix the sacrificial rod. I put the new sacrificial rod in and of course when it got 10 years, there was always this thing about solar hot water generated by Moreland. I said to the plumber that I thought it was a good time to change over. He said okay and he came and did it. I got a small grant from the council for about 1000 dollars and I paid for the rest of it. That's the second most significant thing. One of course as well is the light in our kitchen from the outside that saves us electricity. And another thing that I haven't done yet is the switch off boards. I've got it, but I haven't done it.

E: Let's go back to the solar panels, why do you think that's the most significant?

D: It saves electricity and gas. How important that (gas) is I'm not sure because it doesn't have the same publicity as electricity in regard to the carbon.

E: What kind of difference has it made in your life?

D: Well I don't know. Beginning of last year we eventually came up to the point after waiting months for the solar panel. There was a short period where they put a smarter meter, not a smart meter, a smarter meter I was told. Just before they put the panels in they said, you can have a free month's electricity after 12 months. This happened, so I'm waiting for a bill and I'm waiting, waiting, no bill, no bill for about 7 months. I rang them up and they didn't know what to do with my account they said. Then I got a bill for 598 dollars. 200 of which were from the meter going in, so 398 which was really low for that time. We had a little bit of buy back during that period. The energy was feeding back into the grid and it made the meter go backwards. I figured it out that about 1/3 of my energy was from the roof. I want to make more.

E: Okay, so you definitely want to continue making improvements?

D: Yeah, the improvements that I want to make are to generate more electricity. I can't do much more with saving water, and I'm not sure about gas. When I put that on, the solar panels, I told Origin to put me on to 100% green electricity. It's an extra 5 dollars/kWh.

E: Have the solar panels encouraged any other changes?

D: No.

E: Have you talked to neighbours or any of your friends about the solar panels?

D: Oh yes. I tell you what, I live right across from the doctors and sometimes they see us in the front. One time, they see and go ahh what's that? Because I have a sign for green energy in my lawn that I'll get 30$ for if I leave it up for 12 months. It was about 8000$ and I had to pay a deposit of 2900$, most of which I was to get back, except for the extra support they had to put under because we have a tile roof. But, that got squashed at parliament. I'll tell you a story about water. Our tank was in and overflowing and it was raining. Now, the garden was extraordinary dry and the tanks running over. What do I do? I was in shorts because it was hot. I flipped the tank and started hosing the garden. Nancy gets a phone call from the doctors. The persons are very worried about your husband watering the garden in the rain. Nancy said don't worry; it's all coming out of the tank. Oh, oh that's alright! That goes down in history as this crazy man watering with an umbrella. You never know what you'll learn in interviews. I've done it since too. IF it's coming out of the tank it doesn't matter.

E: Why did you join ZCM?

D: Just because it's a good thing for the planet. I've always been a do it yourself man. Many years on the farm, if you didn't do it yourself, it didn't get done.

K: Is that what motivates you? Decreasing carbon emissions is good for the environment?

D: Yes, I'm keen to help that.

K: Is there anything else?

D: Mainly the environment. And secondary, I don't mind saving money on my poor pension. I've managed my money very well actually because I thought about it before now to save and invest. So I'm not desperate, more about the environment

K: How much has the energy foundation helped you?

D: Not much by money. The only grant I got for the tank was 150$ and when I put the second tank in I did it myself. I didn't need a plumber so I didn't have to apply. I didn't apply for any of the small things, even mulch. I always felt they could have help a little more with the tanks and that, but I didn't put myself out to go for it.

E: Do you get the e-bulletin?

D: Yes, I read it.

E: What do you think of those? Are they helpful?

D: Yes, but I don't intend to do much more. I'm more keen to generate electricity than save it. With water I can't do much more. I do have a problem; I have to get a timer switch

because I'll tell ya what happened. One tank was pretty low and the other one was full. I turned it on and thought I would turn it off pretty soon. I started doing other things and got distracted. I got into bed that night and realized I hadn't turned the tanks off. Most of the tank went down the drain. So, I believe that I need a timer switch. I need to get that.

APPENDIX G: MSC INTERVIEW 4

Name: Judith Cook

Age: 57

Gender: F

Projects: Solar hot water

K: What has been the MSC associated with your participation?

J: I suppose I've been more aware of the energy issues. I always was aware but I suppose I'm more consciously aware now. Participating in the solar hot water project was interesting because the outcome was that my house wasn't suited to it because of the way the gutter runs on the roof. It would be too difficult for them to get the tubes up on the roof, so we didn't get it. So that was significant because I've wanted solar hot water for ages. It was actually going to be too difficult, well not too difficult but very difficult for them to do it. But, I suppose I'm a little more conscious in terms of growing veggies and using compost and I've got a worm farm now. I never had that before. No really big thing. I want solar panels for power, but I haven't looked into that yet.

K: So there are changes that you want to continue to make?

J: Yep. I'm in the process of getting a big water tank. I've got a little one, but I'm going to get a bigger one as well.

K: What motivated you to join ZCM?

J: I've always been involved in community groups that are consistent with what I'm interested in. I think I got an email or at the Sydney rd party I got a brochure. I signed up for the newsletter there.

K: Do you foresee your changes as permanent in your life?

J: Yes yes.

K: You have recycling as well?

J: Yes. I collected seeds from my poppies and gave them to people as Christmas presents. I've got all sorts of veggies and a couple of citrus trees.

K: Are your family and friends involved in ZCM? Do you tell them about it and try to influence them at all?

J: My daughter is a Moreland City Council counsellor, but I don't think she's involved with MEFL as a counsellor. It's good because it keeps me connected with everything around the place. And my partner I think he's a member of ZCM as well. I didn't influence them to do it.

K: Is the e-bulletin enough communication? Do you need more personal?

J: I like the e-bulletin. If there is anything in there that I'm interested in I can take the initiative and follow it up. I did that with a couple things like the solar hot water. You get like so much stuff in your email; it's nice to get that one thing.

K: Is it at the right frequency?

J: Yeah I think so.

K: Is there anything else that would help you to be more involved? Any changes that would suck you in more?

J: I suppose it would be good if more people knew about it but I don't know. If the marketing could increase in some way.

K: Are there any ways in particular that would work especially in this area?

J: One of the things I do is I work on a committee of management for a youth refuge in West Brunswick and its emergency accommodation for kids who are homeless. And we can hold up to 10 kids at different times and they can stay for 6 weeks. We run on such little money its ridiculous and I don't know what capacity MEFL has to get involved with organizations like that, but if we could have energy saving support or initiatives in an environment like that it would be fantastic. I don't know because its a little community group with not much money providing a very important service and there are lots of those groups around similar. Things like kindergartens and primary schools are good for that. I'm not saying that MEFL's got heaps of money, but MEFL could be like a catalyst with working with those groups to get grants and put projects in place that would help to save energy over time. Or even just the energy audits for those organizations to tell them how they could save money.

K: Personally, do you respond best to email or flyer or something else?

J: Email and it's not paper which is a good thing.

E: How much do you think MEFL has helped you with your personal goals?

J: I suppose it's a source of encouragement as well as a source of information and education. I've learned things just through reading the newsletters. There is different information in there about things you can do or the impact of something so I've really enjoyed that in terms of the educational content. Apart from that it's just part of the support. You know that you're getting support to do it the right way. Where to find things is very useful help. I've just picked up that renovators guide out front, not that I'm renovating, but there is always useful information that you can pick up.

E: Is there any one thing specific thing that got you involved or got you looking into the solar hot water? What initiated that?

J: I suppose the information came through that a deal had been done and it was a cheaper way of doing it, so it was a price motivator because they negotiated a bulk buying thing. The other part was they were running an information session down at CERES and so there was the opportunity to go and find out about it and ask questions from someone who wasn't trying to sell you something so you had confidence that the information was unbiased and that was really important for me.

E: Have you always been environmentally conscious?

J: Yes

K: That's usually a pretty big factor in getting involved is that you're already aware.

J: Yeah and the organization has a great role in terms of advocacy. That's probably the thing that I was most attracted to was the information advocacy. And the fact that it's locally based. I like Brunswick based organizations.

APPENDIX H: MSC INTERVIEW 5

Name: Confidential

Age: 33

Gender: F

Suburb: North Coburg

Projects: Draught Proofing Blitz, multiple phone calls for advice, solar panels but done individually, investigated solar hot water but didn't work out.

E: What's been the most significant change for you as a part of your participation in any of the Moreland programs?

S: The most significant thing we've done recently is the solar panels. Since we've had the place we've had plans to do up different things so we've progressively done things over our 5 years.

E: Do you foresee yourself making more changes in the future?

S: Yeah we'd like to. Some of the things have been prevented by the way our house is built. We'd like to get water tanks under the house, but the house really needs paint before we can do that and that's really expensive so we're doing things as we can afford them.

E: What motivated you to get the solar panels?

S: We've always wanted to and it's been a matter of when we could afford to. We almost got them when the government had the rebate but we missed it. Origin offered a deal where you could pay it off month by month over 2 years and it was 3000 dollars and we just thought it was a good time. It was always something we wanted to do.

E: Why do you think that this is a significant change? Do you foresee it making a huge difference in your life?

S: I guess it won't because we were purchasing 100% green energy anyways. I suppose in that sense our carbon hasn't decrease that much. It's more cost effective long term to have the solar panels. It's an investment.

E: Have you talked to any neighbours or friends and encouraged them to join?

S: Yeah actually, especially because it's easy to see our solar panels because they face the street. A number of people have been past and they didn't know it was so cost effective.

E: Why did you join ZCM?

S: We want a green house and we thought it would help us to have access to that information. And maybe a bit of motivation for us to continue making changes.

E: Have you always been environmentally conscious?

S: Yeah I guess so. It wasn't until we bought a house that we started making all the improvements because when you rent it's a bit more difficult. We waited till we decided to settle somewhere.

E: What is your main motivation?

S: I think it's a personal responsibility. Cost is a benefit, but it's mainly that it's a responsibility.

E: How much would you say MEFL has helped you?

S: I don't know. I think it's great to know that the resource is there and it has helped because I've called a few time just to talk for advice. The draught proofing was good and it provided a way to get something off our list checked off that we wanted to do.

E: Is there anything that would help you to be more involved?

S: I think it's really good to just have someone you can ask for advice. We have ideas of what we want to do but we don't necessarily know the best way to do it.

E: So, a more personal touch?

S: Yes, having more people who are experts to talk to would be helpful.

E: Do you get the e-bulletin?

S: Yes I read it and I think the events are great but I never have time to go. I always want to though.

E: Are they at a good frequency?

S: Yeah, I think if I was at a different life stage I would be more likely to go to more.

APPENDIX I: MSC INTERVIEW 6

Name: Julie Francis

Age: 34

Gender: F

Suburb: Brunswick

Programs: Carbon footprint, tried $60 offer but it didn't work, and social nights.

K: Over the time of your participation, what has been the most significant change that you've seen?

J: Okay, I think that this is where I might have changed what you were hoping for. I was thinking about it this morning and I don't think participation in ZCM has made me do more green things than I would have otherwise been doing. I think the importance that I see is being a part of ZCM. That sounds strange, but for me the only way they'll get leaders and the government to take notice of individuals doing greener things is by being in groups. I don't think that anybody cares that individually we're putting solar panels on, but for me the important thing is to be part of a group so that ZCM can say that we've got this many thousands members and we know because they're joining. I've encouraged friends as well to become a part of it. I was really thinking about this this morning because I can't say that I've done these things because of ZCM but I want to give power to ZCM by signing up and being a part of it. TO me, that's the importance because I want to be a part of it.

K: Have you always had an environmental mind set?

J: Yes, since before ZCM. I really was on that track and if anything, I've actually recalculated my footprint and I'm a thousand times worse than I was last year. That's because I used to have this theory that I wasn't going to travel by plane anymore because it was so horrible. I fell in love with someone from Sweden so last year I flew to Sweden. If this guy starts living with me, if it's based on the household our carbon footprint will go through the roof.

K: Were the solar panels through ZCM or was it individual?

J: Individual.

K: We've heard from a lot of people that MEFL is a good resource that is always there even if there isn't a huge change from the programs.

J: Yeah, I noticed that they advertise things like food swaps in the e-bulletin, but I'm already going. I hope one day there is something different. But it is an interesting question isn't it? I was just having this discussion with my friend because I work with an asylum seeker charity and we've been talking about that we have an information night coming up about how to talk to people who are asylum seekers but I'm starting to wonder if we're just preaching to the converted. I think that it will be interesting to see the results of your research because will it be that ZCM members are already converted, in which case, is there a value in sending out that newsletter? Because people who are interested in these sorts of topics flock to the thing

and that's what we were talking about in relation to the refugee thing. Are we just talking to those who are already committed? Marketing is a very difficult topic. I do remember reading one interesting article from the ZCM newsletter which did talk about how they are working with people from some sort of background that perhaps weren't the traditional target of enviro concepts and they aid they've done some good work with them which is more interesting because how do we get to them? I think they said the tap flow restrictor that they gave out to people when they joined helped heaps because there were a lot of little old Greek and Italian ladies just washing vegetables under the tap and let it flow and flow and flow and it reduced their flow significantly. It's of particular interest to me when ZCM gets out and cracks into a new market and such. There might be some that they've reached out to and really made a change but there might be a split also with people like me, Brunswick greenies that are in the 20 and 30's age group, professionals who've already committed to green things.

K: Is that the main motivator of why you joined ZCM to be a part of the movement?

J: To actually join I was excited by freebees because they gave out a tap flow thing, thermometer, and I think I got a bag. So, I guess there is a lot environmental things that go on and I don't need to join them all because I'm already doing so many things, but when they stand there and say here's a thermometer. I use mine heaps. So actually joining was the free stuff that got me across the line. Then I decided it's actually important to be a part of the group. That's why I do my carbon footprint as a part of the same logic because if ZCM presents that to leaders that we've got thousands of members that have decreased their footprint by this much. That's why I did more than just take my thermometer and do nothing else. I support the cause, but I feel that I like to support to cause and I don't feel as much that I'm getting something wonderful back but I don't want something wonderful from ZCM. I just want to be there to help so they can end up a more efficient and better organization so they can go and talk to the Turkish people and the old and young people that isn't the typical Greenie Brunswick.

K: Is there anything they could do to help you to be more involved?

J: I don't think so. There is nothing I'm particularly looking for or wanting and I'll continue to do things. I think if they go out and get more people I'll be happy to just be a number in their books.

E: Why are you environmentally friendly in the first place? Is it the way you were brought up or something you believe in?

J: Yeah I guess it's probably a number of factors. When I finished school and went to university I wanted to study environmental science and I had a childhood of doing lots of environmental things. Once I got to university I heard lots of things of what was going on and people talking about the environment. I can't say there was one thing that changed and I suddenly realized I wanted to be environmental, it's always been a part of me and how I grew up.

E: Is money a huge factor?

J: Not really. It's a benefit, but it doesn't motivate me. It's just some sort of deep seated interest in improving the planet and knowing that it is in a bad way and we need to do things

better. I guess I'm fortunate enough to get an education in environmental science and I know the kinds of terrible things and it made me want to commit to doing things right. That's the way I am, if I'm interested in an issue I'm committed to it. That's why I had my big plan not to fly around. I'm not flying around Australia anymore because it's not logical but I have to fly to Sweden.

E: What would you say the biggest change has been, like has it been the solar panels?

J: For my footprint, it probably is the solar panels, well I don't know. It's the biggest thing I've done in terms of I put big things on my roof and everyone can see it. But I was already a green power user so in that respect I was always supporting sustainable energy. I've always biked but I think I ride it more and more these days. For my own change, that is probably a bigger personal change. My roof wasn't hard because the government made it virtually free so I didn't actually have to change anything I was doing on a personal basis. Then what I've done recently is I've built a green roof in my back yard. I just wanted to try one because I figured that buses and trams could have green roofs on them so I thought I would do a prototype in my back yard. I made it my veranda so it's pretty standard and not attached to my house. I put plants on it so I could prove it would work. It's not going well; it was going great until NYE when it was 40 degrees and everything died pretty much so I'm trying different things. That's my biggest, funnest thing that I've done recently. Have you heard of the 350 campaign? 350. org? It's a big climate change initiative throughout the world because it's about the parts that are in the air. We're at 390 right now and it should be at 350.

K: Does living in Brunswick influence you?

J: Yeah, I think there are a lot of like minded people here, but I probably would be doing these strange things no matter where I was because I'm interested in it.

APPENDIX J: MSC INTERVIEW 7

Name: Stuart Reeh

Age: 37

Gender: M

Suburb: Brunswick

Projects: Past Director of MEFL, Home Energy Assessment, ZCM, lots more

E: Thinking back, what has been the MSC as a result of MEFL and any of the projects you've done?

S: I'd say the biggest change would have to be that we have solar hot water now after many, many years of planning to do it. The fact that it was available through ZCM meant that a lot of the barriers to actually putting it in ourselves went away. For example, the time for research and getting quotes and stuff was taken care of. That made it a lot easier for us. It was a good thing for us.

E: What sort of impact has that had on your life overall?

S: Well it's not had a real impact and that's one of the great things like a capital project like that. It makes sure that our lifestyle doesn't actually have an impact on emissions. So we still continue to do the same with showers and how we use the washer machine, but we've got a better source of hot water to allow us to do that.

E: You see this as a permanent change?

S: Yes.

E: Has that gotten you more involved or about the same?

S: One of the good things about ZCM has been the yearly calculation of the house footprint and our house footprint is about 3.6 tonnes. Most of that is taken up in transport and the rest is energy. That's not bad at all and a lot of what we do around the house and have done for many years now have been all the small things that don't cost much money like making sure the doors and windows have good seals. We already had a lot of that in place, but it's these bigger, capital intensive changes that need to be made which were the harder things for us to do. It (their involvement) probably has been the same as it always has been for us because we are environmentally conscious people. The projects have just been a good way for us to access the technology that we have always wanted to use but have not had the time or inclination to do it.

E: Have you always been environmentally conscious or are there other motivators?

S: For me, it's not about saving money. I don't look forward to just getting the bills. Through ZCM it's quite a bit easier for us because we don't have to put all the time and effort in. My partner and I have made changes, but sometimes there are other barriers. Emily works in Hawthorne and so getting from Brunswick to Hawthorne, yeah she can take the train. The trains don't run all the time and sometimes she has to do something in the city or if she's

getting on and off the train here or in Hawthorne and she doesn't feel safe enough. Even trains at Flinders St can be quite an experience; so there are some things beyond the environmental good thing to do. So she tends to drive most the time. With that in mind, we have a little Honda Jazz that is about 6 litres per every 100 k.

E: Obviously MEFL has made it easy for you; is there anything else that you can recommend they do to get you more involved or others more involved?

S: It's paced about right because even though I've got the real interest, it's a time issue. I'm working a little more than 9-5 and trying to actually fit in all that stuff around it. Just being able to make it that little bit easier is really helpful. And I feel like I talk about it in economics because you've got all these different barriers for people. Lack of information and lack of resources are also barriers.

E: Do you think the e-bulletin is helpful?

S: Yeah it is, it's nice to actually know what's coming up in terms of projects and offers and opportunities. It's also nice to get MEFL's perspective on some of the broader things that are happening. It's nice information for changes to tariffs, what's happening with this carbon tax, and the price of carbon; having a viewpoint that's local and credible is very important.

E: Is there anything else you'd like to see them do with that?

S: Off the top of my head, no I think it's gone very well and I can see that the organization is testing things rather than just keeping things going. The blog for ZCM deactivated at the end of last year and now everything is done through the MEFL website. They found a better way of doing things and they changed accordingly so I'm pretty confident that there are smart people with the finger on the box.

E: Have you talked to neighbours or friends to encourage others to make changes?

S: I try not to do bible thumping, but if people ask then sure. Most of my circle of friends is pretty cluey about this already. Some of them actually got panels put on as a part of the Commonwealth rebate when it was actually working and have put in rainwater tanks and that sorts of stuff. If someone moves into somewhere new, we try to start talking about electric payments and changing the halogen lights. But, with my neighbours it's more of a gentle process because I don't want to come across as the green freak on the street, but little things like having the solar panels for the hot water system, they're not immediately visible from the street, but our neighbours can see them. We've had a few chats about where we got them from and how much they were.

APPENDIX K: MSC INTERVIEW 8

Name: Liz Morrigan

Age: 60

Gender: F

Suburb: Coburg

Projects: Solar Hot Water – couldn't afford and registered for next one, seminar on the easier methods of make a house less energy consuming, no waste for a month, draught proofing, and food swaps.

L: Well that's one of the things isn't it? Because it's a grass roots movement it points to the different roles that an organization or program has to have in relation to (didn't finish thought). Because it's a grass roots movement, people are doing a lot of things. When MEFL comes and offers something, the offer is often targeted at people who aren't doing much. There are many of us who are doing lots of things already so the stuff that MEFL is doing is really sort of simplistic. The action plan, for example, it's so simplistic. For me, my action plan is much more complicated. The MEFL website says for me replace light globes with the ones you're supposed to use. Now, I've already done that but because it's not complete I couldn't tick yes on the evaluation. I've already pay for the electrician to come and rewire some so I can actually put a new light globe in. So there is no room to account the effort people are putting in in the context of tick or don't tick. So there is a big difference between what fits. They give you 75 dollars and they'll replace your down lights. Now, I'm not the sort of person who has down lights because it just isn't relevant because I'm not worried what they look like. (Mimics people who do care) That's the context.

K: What is the most significant change that you've seen in your life because of MEFL and ZCM?

L: It's actually finding that support. It's MEFL that helps, it means I can continue and develop the things I want to do. Even though I didn't get the hot water, but it's significant to actually get that close to getting solar hot water, and even now looking at solar hot water and solar panels it's still a huge leap financially. Just being the fact that MEFL does these sort of programs makes it a bit more possible. There is a whole range of things that makes it a bit more possible. So the draught proofing really wasn't that fantastic for me. When the guy did it to my front door, now my door won't lock properly. So I've got draught proofing but I haven't got security. Which did I choose? Draught proofing over security. I can't use my dead lock anymore, but I've got my draught proofing. Having the guy that came gave me a clearer idea on how to do the practical jobs so it's just a bit more possible. I've actually made particular steps for what I need to do. I've written down what I need to do in detail; for example, the quad to cover the gaps in the walls. You've got to measure the gaps and go to the hardware. I haven't done that yet, but it's actually not possible because I've had several people explain it to me. So the significant change has been being more active in being able to do the things I want to do and knowing that there is support and stimulus to actually keep going with them.

K: You touched on it a little bit in your response, but why is this the MSC? Is it because things are more possible or is there more to it than just that?

L: It's quite a significant change because before I would be beaving away or getting discouraged or going where do you find a trades person who can do this job and I can get information from? How do I prioritize all the things that need doing? It's significant because it opens up more possibilities. So, I don't find their plan good enough, but I can do my own. The significance is that it means that I've got support and there's a reference. In this town we've got all of these resources dedicated to reducing carbon, reducing waste, increasing sustainability. It's important.

K: So you would say that MEFL has helped you a lot in making the changes that you've made to this point in your house?

L: Yes.

K: Do you foresee these as permanent changes?

L: I've got half the light globes and I've still got the gaps and a gas stove that releases heat when I cook anything. I still go that so that's what comes to the energy thing. If you want to try and manage them you have to have the money to do those things. Then, you have to have the skills to do it. I need to get the quad and find the right nails and recover from my injury that slowed me down. And is that going to be alright? I'm going to be hammering in my house and I might break something and my arm might not be strong enough. There are some things that I've changed, but nothing major. I've done the insulation, but I want to do it on the back half of the house now. The point I'm trying to make is that it's not a simple thing of here's a house, uses this amount of energy, make these changes, see the amount of energy go down. It's not that simple. For some people with a really nice house and they've just got a few gaps, it might work. In my situation and ordinary peoples situation, got an old house and not much money. It's not going to be a simple measure.

K: But you do want to continue making changes in the future?

L: Yes

K: Why did you join ZCM?

L: Do you know when I joined? And how? I've just become a member of MEFL, but I must've registered for ZCM. October 2009.

K: But, why did you join?

L: Well it was really registering, I didn't "join."

K: Why did you register? What motivated you to do that?

L: I support the idea of what they do. I was quite interested in setting goals and achieving those goals.

K: Were you environmentally minded before you joined?
L: I was environmentally minded as a child. My father was the original environmentalist. He died this year at the age of 100 and when we were kids we weren't allowed to put anything in

the rubbish bin. We weren't allowed to generate any rubbish. My father would bring home cloth bags with some sort of moisture absorbent things. He would bring it home and we would clip it into a handkerchief. The rags that you put through the wash and use them again. I learned as a child to be aware of what I was using and how I was using it. I learned to darn. Darning is when you mend a jumper or something knitted and you get a darning needle and wool to re-weave that whole bit so it's fixed. We learned that as children. Our activities during the summer were preserving fruits, making jam and stuff along those lines.

K: Are the changes you make now rooted because you want to help the environment? What motivates you to make the changes that you do?

L: It's a whole philosophy of life for me. For a long time, I've thought about what my values are and where I come from and why I do what I'm doing. I try and fit my life with those values. Some of those are the value of the simple things and frugality in food and maintaining and mending and growing. So as far as MEFL and ZCM they support my values and what I'm trying to do in my life. So it didn't initiate it, but it certainly gave me a boost with more of a frame work and it's us doing it and not just me. If you want the Council to change its policies you have to be a group. And things like the bulk buy are done together because we have to.

K: Is there anything that MEFL could do to get you more involved, it sounds like you're very involved already, but is there anything more they could do to reach out to you from a personal perspective?

L: I don't think it's possible to make the plan more complicated, but the measures for the figures for the carbon footprint. The estimates for the measures for waste is not good enough for me because when you re-calculate you need a more accurate figure. What I want to do is find a way to measure it more accurately because now it's a guess. The other thing is the figures that I put stuff and I want to know from last time so I can compare. The information that I've got from that program didn't link with what I'm doing. There wasn't enough of a match. I think that the measures could be better so we can even put marks on the bin and monitor it for a month. And I think that the offers like the $75 off were not relevant to me and you can only get those particular things. I don't know what could be done about that though. It's good that they do that but I think there is a bit of a gap between what's offered and where some more can be done, financial and skill wise. Draught proofing was good because someone came in and gave me advice and assistance to do some of the things in your house. Maybe it's because that particular trades person was helpful. Everyone's house is different though so it was good. The information sessions I think are terrific because you get to learn in more detail about things. I went to a whole day forum and it was really good.

K: Do you get the e-bulletin?

L: Yes.

K: Do you read it? Do you find it helpful?

L: Yes

K: It comes at a good frequency?

L: Yes I think so

APPENDIX L: MSC INTERVIEW 9

Name: Mairi Rowan

Age: 66

Gender: F

Projects: Draught proofing blitz, Coburg redevelopment project through MEFL

M: We already had solar panels put in. I got into a community purchasing project. And I tried to get some of my neighbours involved, you know young people with young families that weren't quite ready for that. But it wasn't a huge investment about $1000 I think. Started out being $880 for the whole 1.05 kilowatts. But costs went up in the meantime and they had to get a different sort of panels and it ended up being a bit over 1000. But I joined up for something worth it so they thought that was close enough. By the time MEFL was doing it I already had done that.

E: And do you talk to your neighbours and friends a lot about making similar changes?

M: Yup

E: Have any of them listened to you?

M: Well, when I tell them that I haven't paid for electricity since I installed my solar panels, and their bills are going up and up and up, people, they stop and listen. One of my brothers has put on solar panels and I'll tell you my four brothers have been scoffing for years. They're all in the electricity industry aren't they? And they scoff. Except one now has solar panels and he's very happy with them. Once one gets them I think the other 3 will just topple off.

E: That's great that you're so active. Alright so the main question I'm going to be asking you is what's the most significant change you've seen in your life as a result of participation in MEFL's programs or any of MEFL's influence?

M: Okay. I don't think MEFL can claim the credit for everything, which is disappointing. But, everything has a context. And my context was, I was retiring from work. Which means that, I knew, because women my age have almost no superannuation, I was going to have to be living on state pension, which is not very much let me tell you. And, I was moving to a new area, here. And I met MEFL at around about the same time, through, um looking for, because I knew I needed to live on a lower income, I was looking at ways to reduce my footprint, because it costs me a lot less as well. So the two go together. So when I was looking for information about solar energy I tried MEFL, and there were dozens of local community programs so that's why I got into the other one. But I, you know all those things go together don't they. You want to improve the planet but it also makes a big difference to your quality of life. And MEFL is a great resource. So I look up things online, rather than actually participate in programs, I use, you know, the website. And occasionally, publicity I meet in the street. I think I first heard about it through a leaflet I picked up at council or somewhere. Anyway, but they're a great resource. So it all goes together, it's not just one thing or another. So, I'd go, whenever I'd come up with an energy problem, I would go to the MEFL website. So when I had trouble with my power supplier, over solar power, I was

with a company that was going to charge me a penny less for lovely clean electricity than they were charging me for their dirty electricity. And I thought that can't be right. So I ring MEFL and someone explains to me. And I say well can you suggest another company where I might get an honest deal? And I get a recommendation which I can follow up. So things like that are great. The other thing I did was change as much as possible from electricity to gas. So, I've got an instant gas hot water, so there's no, you know, electricity running keeping it hot when it's not being used it's only heated when it's used. And I got advice about that from MEFL, before I did the changeover. So, I don't know, it's tricky isn't it?

E: Yeah, it's definitely complex. What do you thinks' been the biggest change that you've made so far? Like what's had the most effect on your life?

M: I think the biggest thing, which is directly attributable to MEFL, is the head change. Or realizing how comprehensive it is, or can be, to actually be energy efficient. So, um, yeah that it can be really quite small things that make a big difference, but also big things as well. And that, you don't have to be rich. In fact, it's in my personal economic interests to be energy efficient. Not just I love everything I'm doing for the planet so my grandchildren have a place to live. You know, it's also that balance. It always gets portrayed as you're doing it for your grandchildren. But, sure, but I'm also doing it for myself.

E: So you think it's been mostly like how you think about it, that's your biggest change?

M: Yes, yes. I think MEFL's approach is really really good in that way. That, it's not just interested in big ticket items. Now most of my furniture is second-hand, so no one's out there making, spending energy making new stuff to please me. The paving in my garden is second-hand bricks, so it's using embedded energy rather than new energy. And all those things make a difference.

E: How was your mindset different before?

M: See I grew up in the Latrobe Valley where the power industry is everywhere. And um, I guess I just took it for granted. You know, you never got clean air, because the air down there was quite polluted when we were kids. But clean air, which affects you personally right now, in terms of pollution, is not the same thing as poisoning the whole planet with carbon dioxide so that actually life becomes less and less possible for all species. So, yeah, it's that change from being, um not prioritizing it. You know you go to work, you do your job, you deal with the day to day issues. Without, well, I won't say I didn't lift my eyes above the horizon because I did, but on social issues, because people matter. But you can elevate people and what we want and prefer, to some sort of, you know, religious status. So that denying a human being, um, the grass eaten by a few kangaroos suddenly becomes a crime and we kill the kangaroos? That's pathetic. So, you know, I think MEFL is part of that shift.

E: Was there anything else that caused that change of mind for you?

M: I think it's incremental. You know I grew up in a very different world from the one we're now in. And so, I think, I think the other part is having time to think about it. You know I'm not focused on earning money, doing the job, you know all of that stuff. Having energy left over is a great thing.

E: So, is that more due to retirement as well?

M: Partly that, yeah, yeah. And now I don't have little children, you know, they take up an enormous amount of time and effort. Um, and the other thing too, I think, is a sense of loss of some of the things I grew up with. Like the freedom we had as children to hop on our bikes and ride for miles, to go for a swim in a creek, and to be in the bush. To know where milk came from, to be sitting by the cow and have the milk squirted into your mouth straight from…You know you knew what real food tastes like. And food miles wasn't an issue because you grew it in your backyard. And so, I wanted to keep some of that for myself, so I grow food. Um, not everything obviously, growing wheat is ridiculous in Coburg, but my raspberries are great.

E: Yeah we saw your garden on the way up, it looks beautiful.

M: Yup. Yeah so partly it's trying to maintain some things that were a normal part of my childhood, which is clean food, clean water, and plenty of it which doesn't happen very much anymore. But you know it's a lifestyle thing as well isn't it. And to be, if you do it yourself, you're not just preaching at people, your demonstrating. This is a meaningful way of life in the middle of a very large city. And I think that matters. And MEFL does that. They try and make it meaningful on the ground in the middle of a very large city to grow your own veggies.

E: Okay so, this mindset is permanent right? You're going to keep making changes?

M: Yep.

E: Okay and you mentioned before that you're renovating your bathroom, is that also due to the fact that you want to keep making changes in your life?

M: Um, yes, it's partly because it's a bit of a wreck. Um, but the things I'm doing which are more about environment, like I put double glazing in the kitchen, which is um quite expensive, so then I put secondary glazing here, which is why we can sit here without traffic noise. Um, on the bedroom, heat and light and noise were a problem, so I put one of those aluminium roller blind things on the outside. Now they don't look great, but boy do they work? So there are very energy efficient ways of dealing with specific problems. The house is double insulated. I took weather boards off the back and put blue board and lots of, stuffed it with lots of insulation. Because the house is on the South side, of us if you're sitting on the south, heat is not usually a problem, but cold is. So, insulation and the draught stopping that I did through MEFL is really valuable.

E: And has that made a huge difference? Are you satisfied with the-

M: Yes. I um I use a small gas fire instead of central heating. The central heating sits in the roof and doesn't get used very much at all. Course there's no point in heating the whole house obviously. But, um, I use that a lot less since the draught stopping got put in, and I, I was amazed. I didn't expect such a small thing to make such a big difference. I really didn't. Otherwise I would have done it years ago. You just think, oh that's just a bit of insulation. But it's not. Um, what else? I put out very little garbage. And MEFL has, actually, my use of stuff is where MEFL's made a difference, because the website has some really good information about garbage. So, I changed to a smaller garbage bin, because I didn't put it out very often I thought it was ridiculous having a big bin. I rang council, I changed it over, and I saved a hundred dollars. Which, that was nice. So I've got a little bin, but I still only put it out

maybe once a month. Yeah, so, producing you know, stuff, bin-able stuff, not recyclables, I've actually reduced enormously.

E: Do you do compost here as well?

M: Yup, well I have a garden you see. I've got no lawn, everything is cultivated. With brick pathways and brick retaining walls. So, that's partly because being on a slope, every time it rained heavily, all the water just rushed from the top to the bottom. And now its tiers so the water stays there and actually is useful. And if there's a flood the pathways collect it and take it out. There's about that much topsoil in Australia, on average, over the whole country. Europeans are amazed when I tell them, because they have, you know, a meter and a half, two meters of topsoil, and they have no idea what it's like to cultivate such an eroded landscape as we live in. But to make a garden on that much is very difficult. Which tells you what survivors Australian plants are. Um, so it takes a little compost to build it up. And I mulch every year, sometimes twice a year, depending on what sort of mulch, so that that adds to the soil as well. And I've got a worm farm.

E: That's great. You've mentioned using the website a lot, have you looked at the new website? They recently revamped it.

M: No I haven't been there recently.

E: But the old one was helpful?

M: Yes, yup.

E: And do you also get the e-bulletin?

M: Yes.

E: Do you read that a lot? Do you think that's helpful as well?

M: Yup. I like um, it tells me about other people that are doing stuff. Because, that's a reminder that, yeah, you don't have to have a lot of money, um you can do it. You just need to focus a bit of attention. So sometimes it's quite inspiring. Other times it's just, useful information. But more and more it's just talking about things I've already done. So, um, you know I know now about double glazing and secondary glazing and stuff. And I know now about water conservation. And I've reduced my gas and electricity pretty much as low as I can. We can blame MEFL for the fact that I turn my switches off at the wall all the time. Um, that was a, a nice piece of research that I first saw on MEFL. And you don't realize do you. I didn't. So when I look at my bill, and its down, that's partly why my solar panels cover all my costs.

E: That's great.

M: Yeah. Um I think it's really important that MEFL lobbies the government because the input tariffs for solar power, it is a really valuable thing. It's a good motivator for people. I mean I would have done it anyway, but that's just really great. And some people would never put solar panels up without that incentive.

E: Right. Is there anything else that you think that MEFL should do, or any improvements you think that they should make?

M: It's really tricky because we've got CERES on one side and MEFL on the other and they're both great resources. We're very privileged here. Seems to me there's the individual and the systemic. And I still use my car more than I would like because I'm scared to ride my bike on the roads around here. So, you know, if you're a Lycra freak and you're on your bike a lot and you're hyper alert all the time, then you might do alright. But old ducks like me, who are just going out to do their shopping, I don't feel safe on my bike. Which means I use the car more. Or buses, which are filthy polluting things too. So, there are things like that which are systemic rather than individual, that I think deserve some work. And I don't know how you get Bell St. to be made safe for cyclists. But, to ride safely from here to my shopping centre in Coburg, I have to go down to the creek, ride around the creek, pop out somewhere near CERES, and wander up through the back streets. And I tell you my knees aren't up to those hills. So, that's one thing I think MEFL could take a look at as a way of getting better energy use in Moreland. I think they do the electricity thing very well, you know, from when they began with talking about light bulbs, um you know, it's grown and extended magnificently since then. And I think those things are well done. Public transport in Coburg is not well done. And, you know I reckon MEFL can stick a finger in that pot and do some stirring. It troubles me that Council does not have solar panels on the roof of every civic building. You know we've got a neighbourhood house and community centre over there with not a solar panel in sight. And it would be so easy because the roof is long, faces north. You know that kindergarten and community centre could be independent from electricity. So, you know I think they should be leaning on Council too. You know they've done the water tanks, which is good, in some places, but I think they should have solar panels everywhere. And, I think it would be good if they looked, at the idea of municipalities generating their own power again because, you know, when you have huge power generation at one end of the state and huge consumption at the other end, the loss in between is huge. That's one thing I do know, by growing up in the power industry, they produce an awful lot, that doesn't ever get here because of the losses in transit. So in the UK, and in the US, there um, there's a whole major city in the UK which produces its own power and is now off the grid. So, while I'm not necessarily suggesting that everyone should be off-grid, because there are problems with that as well, you can be very largely self-reliant. And you know, we've got places where you could stick up windmills without any problem. Why don't we? It'd be great. But also, instead of um, dumping waste, why not burn it? Or, you know, look at the other ways of actually generating energy locally. Which is what used to happen, in the late 1930 20th century.

E: Okay…any other questions?

K: What's your main motivation to make these changes in your house? Like what's the main thing: the environment, money, or…what is it?

M: I can't see them as separate. I really can't. I read in the newspapers about how much change is going to cost us to preserve the environment, and I can't see the point, if we can't have… You know, to use a biblical metaphor, we've got a Garden of Eden, and we're turning it into hell. That's tragic. Um, and even in my lifetime I can see a huge difference. It's not just that we've got floods and droughts, that's normal, um but so many things have changed that are not good for people. Um, the idea that Australians are being told that we should live in um mouse-hutches stacked one on top of each other, um is just insane. That's not healthy for people. You know, we're being told to ration sunlight, open air, green space, because it's economically better. For who? You know, developers make a lot of money but

what about those people living in the mouse-hutches? It's not good. Just because Europeans do it, they live in a totally different climate. You know if I lived in Montreal, I might be happy to live in a hive where the heat is kept in because it's intolerably cold outside. But we don't live there. You know, we actually have a climate which is healthy for human beings, um indoors and out, on the whole, most of the year. So, why would you choose to live like people who have to live differently? I don't want to go back to living in caves. And yet that's what we're being encouraged to do as a solution. And I think that's pathetic. It's about economics; it's not about what's good for human beings. So, I'm really concerned about climate change about environment actually, as a suitable continuing habitat for us and other species, because we're interdependent. It's not me or kangaroos, or me or grasslands. Without one the other is not going to survive. So, to me it's good to be able to demonstrate that by doing all of those things, it actually costs me less. And, that's very persuasive to the people I talk to. You know, that by growing my own food I save money rather than spend more. Well I spend a bit more time, and I've got water tanks so I can water them. But, in the long term it saves me financially, and the planet. And, my brother got solar panels, not because it's a good idea, he doesn't believe in climate change. But he got solar panels because I demonstrated that I saved quite a lot of money. You know, so, it matters to people. And, it might not be my primary motivation, but it certainly, on a low income, matters. Because I would do this, if I didn't have enough money, I couldn't buy secondary glazing. So if I save it off my electricity bill, and I put it into, um, renovating my bathroom; why are you interested in me renovating my bathroom?

E: You mentioned it on the phone when I was talking to you.

M: Really that's just about making the house more habitable, more convenient. So, my primary motivation is that I think we, I love the world I live in. I don't want it to die or degrade. And I can do something, and I can encourage other people to do things. Um, little things and big things. Often people sit in this room and say "gee it's quiet there's a main road out there" and I say yup, secondary glazing. It works. And then they think about it because it's practical. Not because they're saving the environment but because it make their environment work. But it will also contribute. So I find it hard to pick the strands out, because everything's connected to everything isn't it.

K: Just out of curiosity, how long has it been since you had to pay for electricity?

M: Um, I haven't paid for electricity since I put the solar panels on. Which should be almost 2 years? So, my electricity's been in profit ever since.

E: How long have you lived in this house?

M: Um, 1999. That's 10, 12, going on 12 years now. So, it's only a 1.05 kilowatt array, so the reason I'm in profit is I've also reduced consumption which is where MEFL comes in. They're very helpful at those things. Yeah, so probably thinking about it, apart from changing the way I think about things and appreciating that really everything is connected to everything, which you know they don't actually appreciate, I think I've changed my lifestyle. I think that's the biggest thing I would attribute to MEFL. And share it a bit with CERES. But mainly MEFL I think. They encourage that change of lifestyle, or change of thinking, the way you think and do things. My biggest crime against the environment to date is to fly overseas. All my life I've wanted to travel, and now I can, every now and then. I feel guilty. It's tragic.

K: We're guilty of that too so…

M: Well when I think of when everyone else was trekking off, you know backpacking everywhere, and I stayed home because I had a kid, and no husband, um and a job, you know they never had any guilt.

E: Well that's great that you get to finally do it now, even if it makes you feel a little guilty.

M: It is. I'm not going to stop doing it.

APPENDIX M: MSC INTERVIEW 10

Name: Colette Corr

Age: 32

Gender: F

Suburb: Glenroy

Projects participated: Helped with website as volunteer, e-bulletins

E: What has been the most significant change as a result of MEFL and ZCM and in regards to the environment and sustainability?

C: I started working in acid management about 1 and a half years ago. It's an area where people tend to be quite conservative and I work with mostly climate change deniers. I mean I never really worked with climate changed deniers, but I find it best not to have a lot of those discussions. I started renovating this property last April because when I moved in it was really uncomfortable. I started getting really emotionally involved and I started thinking making houses really comfortable to live in, for my tenants it's really important because they have the right to have a comfortable home to come home to. I've been trying to do a lot of sustainable project management and there are a lot of things in acid management that have taught me preventative maintenance and a lot of homeowners don't do that. I make sure it's a comfortable place to live in and I take care of problems straight away and if I can't take care of it straight away I save up so that I can. Some things are very expensive. I've always been very into the environment. I was a vegan for a while, for a while I was an animal liberationist, so it's not that I've never not been into the environment, I started recycling at a young age. My parents were minimalist so when I started working it was like how do I make money in an ethical way. I just got really excited, and I get really sad when I see a house that's horribly uncomfortable because I had to put up with those things as a student and it's not so common, but it's still around. There are places that are really badly built and maintained. With the place that I'm living in now, I'm really thinking about sustainable development because we have all of these terrible town houses getting built that don't have eves. The sun might just go right in and it'll be very uncomfortable to live in. I've had friends that have rented or bought town houses thinking, they're so cute or comfy because they have 3 bathrooms for 2 people or something crazy like that, and they were really really uncomfortable to live in. My friends rented townhouses in Brunswick west and it leaks and it's only a year old and where I moved in is 84 years old and its really really structurally sound and it's got units on top of that are built properly and now it's leaking and I can't live in it. It's just hard because there has to be regulations around it. And I know the government is moving into a less interventionalist way, but when you drive around what do you see? Tasteless town houses and mcmansions that are built on plots to small with windows right to the road and you know people don't want to live in that, but it's people who don't have a choice. It's disgusting and I know that the place where I'm moving and that's a really big thing in Brunswick west and there's a lot going on in Moreland and it's one of those city councils where things are really happening. And I don't know, people just don't realize things like if you don't have eves it won't be comfortable to live in. I guess that's what I've been thinking about a lot, trying to do my bit so someone who reads this article who's an investor can see that your tenants will stay longer and take good

care of the property because you invest in it. That's all I can do, like instead of air conditioning I use ceiling fans, which is smart from an economic perspective as well. I got a home sustainability assessment when I was living in Chelsea and that was the first property I bought about 2 and a half years ago and I was really wanting to try and find a way to make it more sustainable and a really comfortable place to live. And it actually already was quite sustainable and there wasn't much I could do to make it more sustainable. Here, there was so much I could do. It used to be really really cold when you walked in here, like 13 degrees and I know that because I used the thermometer that I got when I signed up for ZCM.

E: You said before that your parents were hippies, were you just raised with this mindset?

C: Yeah I grew up in Tasmania. We learned about recycling in primary school and I announced to my parents when I got home that we were recycling. I trained them on how to recycle and if they did it incorrectly, I went through the bins and corrected them. I've just always been like that. My mother is a very amazing gardener and I'm not much of a gardener, but my mom has done the garden here and it's lovely. There are beautiful herbs, and chillies, and tomatoes and a lime tree. I was really into it when I was younger then I had to go and get a job and be responsible. It never completely stopped, but when I see people who brush their teeth with the water on and it bothers me. It's hard to have those chats with tenants, but you have to. I don't think it's a part of the culture in other countries to save water and you just don't realize that people haven't been brought up to save things such as water. I learned it in primary school, so you would think that others had it drilled into their heads. Maybe it was just that I lived on Tasmania and Tasmania is this sort of a culture of really extreme hippies and really extreme red necks.

E: Do you talk to people a lot about becoming more environmentally conscious? Is it mostly housemates or neighbours, family?

C: I've got a little group of people at work who are like minded. The rest of the people in acid management kind of think we're tree huggers. But I do talk a lot about economic feasibility and being environmentally responsible. But yeah, we talk about it a lot at work. We talk about how to save lighting and things like that, I find it very inspiring. They give out plastic coffee cups now and kindles. We're trying to switch to kindles instead of using documents. That's actually my msc; I've done it in the last few months and gone electronic for reading. I had to send them about 50 pages and I just split it up into attachments instead of printing it. So that's the most significant thing that I've done that I'm going paperless. For me, it actually doesn't feel like an electronic device, it actually feels like a break from technology.

E: Have you noticed any other big changes in your lifestyle?

C: I talk about it quite a bit. I don't know because a lot of people, I'm into property obviously. The other thing that I am is intolerant to lots of chemicals, sulphites and in the last 2 years I've been switching to a more natural food diet. It made me realize that we eat all this stuff that we're not actually conditioned to, like thinking McDonalds a couple times a week is okay, or I haven't had any junk food today I've been healthy. There are some really good books I've read on that. The end of food, this whole idea of the clarification of food, it's quite uncomfortable to be gluten intolerant, lactate sensitive, it made me realize how much food affects your life. So I talk about that quite a bit with people. Because a lot of people have strange reactions to foods. I can't think of anything else.

E: Do you think the kindle was the most significant change so far?

C: Yeah Kindles! In terms of actual bulk saving for the environment yeah switching to paperless is really good. And you can search in it and they're parting of making packets for executive meetings and instead they're uploading it to kindles and that's going to change over time because people quite like the kindles. For executives it's all about finding something in the meeting so they can win the argument. Using yamma a lot at work to connect with other people. Our internet is down so it's strange.

E: Have changes like this caused you to think about making any other big changes in your life or is it mainly just small things?

C: Well, I'm going to start cycling to work. I catch public transport at the moment, I really love public transport but I've recently got really lazy and started driving to the station it's only 9 minutes walk. I'm going to bicycle to work because it's only 6 6.5 kilometres from my new place, perfect cycling distance and a really good way to stay fit. I'm thinking more about the distance of food from my home and I try to eat organics. Not all the time, sometimes I eat organics and sometimes I don't because it's expensive, though I've never really been very interested in money. That's something that people in acid management are much more interested in than I am. But I think you can be environmentally sustainable and economically responsible. It's quite hard to do an economic analysis. Because if you factor in the cost of cutting down a 400 year old tree, you can't replace it or it takes 400 years to replace, so it's those sorts of things that are valuable and have a high value attached to it. It won't grow back in a couple of weeks.

E: Is money a huge factor?

C: I think it's just a tool and you've got to use it; I never really thought of making money, I wanted to be completely non-materialistic. When my parents retired, they've really struggled and now they've got health issues and I don't want to be like that. I don't see why I can't be a good person and morally responsible and not struggle when I'm old. I'm just preparing for my future, but it's not something that I have a burning desire. I want to be able to go to the doctor when I'm ill and if I didn't save I wouldn't have that option. Part of my work is in strategic foresight and my prediction is that we are going to have to be far more funded in the future in terms of our retirement. I'm not as good as the experts but the experts tend to be saying the same thing anyways and maybe we'll still have a pension but I'm not going to rely on it.

E: Is there any other motivation besides the money factor in making changes?

C: No, no, no it's not really my motivation. I just use money as a tool. Investors care about money because they struggle. Every month I have to come up with 800 dollars out of my own money to pay the mortgage at my Chelsea place and it's hard for me. Investors have to try and manage their costs. For me, it's about the fact that if I own a property and I'm renting it out I have a responsibility to ensure that it's a clean and safe place to live, and that's in the legislation anyway, but as an investor I should be taking care of my property. For me, I think houses have personalities and souls and I feel very sad when I see one that's neglected and it gets to a certain point when it should just be pulled down. Like this one, I think "OH, I could convert it to this or this." I was looking at the possibilities to try and create places that are

comfortable to live in. Say, like urban planning, I've kind of fell into that area a little bit even though I don't have a background in it. Housing is moving towards high density and I heard this very interesting Italian, urban design professor speak last year and he was saying that if we're going to have high density options, we have to have better common areas, green areas. All these common areas are getting sucked up because we have critical shortage of space. This is going to be the same in the not too distant future. If you want people to be happy you have to have parks, community gardens, places for people to go. And that leads to cohesion and that reduces crime. I find it very interesting that if we create spaces you actually help the community connect. There's a property aspect to it and there's an emotional aspect to it.

E: You mentioned all these ways for making homes more comfortable for people, why do you specifically lean towards more sustainable options vs. the cheapest option?

C: Well that's because if you cost it, and the environment is a cost, so we have reduced fuel. If you go out and buy a fancy car then pay for it for the next 25 years because petrol has gone way high. It's like planning for the future, if you haven't made any modifications to a house, what's it going to look in 40 years time? It's going to be a world in which we have drastically different energy availability, needs and costs. I was talking about this with my brother about feeling paralysed with what's coming in the future and he was just really really sad that he couldn't do anything about it. Even if it's hopeless, if I just have my shower setting low and I haven't taken a shower longer than 3 or 4 minutes in months, except when I wash my hair once a week. If it's just me it won't make any difference, but if everyone does it, it could. If I just do what I can do, but yeah I feel very sad, like I see people doing things like not helping; one of my other housemates Jess was just in the shower full boat and it made me realize I have to replace the bath and the shower fitting at the same time so full boat isn't actually that full on because it's very high pressure at the moment. Of course it's luxurious, when I was in high school there was an excuse that I had to write in for why I was 40 minutes late and I just spent 40 minutes in the shower and I can't imagine doing that now, but I have the memory of the shower or under a hose. All that kind of stuff is gone and climate change is happening faster than anyone anticipated. It's here, like monsoon weather and this is a sign that climate change is here. One of the signs that it's occurring and it's more extreme than ever is all this kind of crazy stuff that's going on. I never expected it to happen this fast. We went from Melbourne weather, which when was a kid was much cooler than it is now, then we went to sort of a Mediterranean climate, and now were almost moving into a sub-tropical climate. It's quite obvious even to my climate change denying friends.

E: Why did you join the ZCM program?

C: I don't know, I thought it would be really really good. I had a really small budget for this place, but I wanted a sustainability assessment of my place in Chelsea and it was really interesting and I thought it would be nice to try and plan to make the house more comfortable.

E: How have they helped you to make these changes?

C: It was actually my boss, he's a big climate change denier, but he told me about window glazing. And what they told me about in the old place was that it would be better to have drapes. They told me that I should switch.

E: Is there anything else that MEFL can do to get you more involved?

C: No, I always want to do things and I get really interested but I'm busy. I enjoy reading the newsletter.

E: Do you find them helpful?

C: Yeah I liked the last one with the story about Charmane. She did quite complex things that I'm not quite up to yet, but I have a handy man who always helps me to fix my problems around here. I have one piece of advice for those renovating, do it slowly! It takes a really long time to solve problems sometimes. Also, don't always trust professionals. Do you want to see some stuff now?

E: Yeah that'd be great if you don't mind!

APPENDIX N: MSC INTERVIEW 11

Name: Sandra Scott

Age: 60

Gender: F

Suburb: Hadfield

Projects participated: Attend one of the meetings at the public town hall when they discussed insulation, light globes and double glazing, e-bulletins and newsletters

K: Looking back at your participation with Zero Carbon Moreland and the Moreland Energy Foundation what has been the MSC for you?

S: Probably the big one's now that we're renovating the bathroom, we've insulated all of the walls with sound proofing as well. That was after we managed to do the toilet because that was the only part of the house that wasn't insulated; I did get that idea from MEFL.

K: Why is this the msc? How has it affected you?

S: Well it's not really that much of a significant change, but it's something I wouldn't have thought to do before I went to the meeting. We did insulate the water pipes with rubber hoses and my partner went up on the roof and did the air conditioner ones as well. We've changed over all the light bulbs and I installed the second blinds here because the verticals let too much sun through, to keep out the sun and it helps in the winter to keep the heat in. The other thing this winter and we decided not to open our shutters and keep the drapes closed to keep it warmer in here. We got the ducted heated gas as well. We installed a ceiling fan to use when we don't need the air conditioning on. Then, we decided to put the skylight in as well because we were using the light because it's dark in that middle wall.

K: You mentioned renovations to your bathroom, what are you doing besides the insulation?

S: We took the bath out and put a new shower in that's only going to run 7 litres/minute and we put a second toilet in here that's running on even less water than the one in here. We had one toilet, but we wanted a second one. We weren't using the bath so someone picked it off up the side of the street last night. We put it out and it was gone this morning.

K: What motivated you to start making these environmental changes? Were you already environmentally conscious before you joined MEFL and ZCM?

S: No, probably not. It's just that I was down in Coburg one day and we signed up.

K: What attracted you to it? Why did you end up signing up?

S: I really don't know, it's just one of those spur of the moment decisions and I just signed up.

K: Why did you start making these changes? For the environment, to save money?

S: To save money, do something good. It was a combination. Make the house comfortable is on the list.

K: Do you see these as permanent changes?

S: Yeah.

K: You mentioned a couple of other changes, but do you want to continue to make similar changes in the future?

S: Yeah, I had a guy come last year because I wanted to get some pelmets made to put on top of the windows to keep the draught away. I've seen that on television shows and I heard that at town hall as well. The guy never came back so I'll have to get my brother in law to do it. We have got some little ones blocking out the draught in some of the rooms. We got the idea in a hotel room.

K: Do you talk to others and try and influence them? Tell them how it's helped you?

S: No. I tried to talk to my brother and have him make a few changes.

K: How has MEFL helped you in making these changes?

S: In what way? They've only given me the idea. I've always done it myself, but they've given me the thought I've always just followed it through myself.

K: Do you think they're a good resource for you? And you feel that at any time you could call them?

S: I think that they would probably be the starting point.

K: Do you find the e-bulletin helpful and interesting?

S: Yes I always read through it.

K: What would help you to be more involved? Is there anything they could do to reach out more to you?

S: I don't think so because I think we've got everything covered now. The bathroom, the insulation, I've got my solar panels, 6 on the roof. I think we're using what we're making during the day so we have to buy less. We're supposed to be Gf5etting 68 cents/ every kilowatt but AGL's only giving us 15 cents so now they're going back through to recalculate what they should have given us. That was stressful and annoying.

K: Are there any other changes that you've made besides what you've told us so far?

S: We recycle, and we've got 4 composts bins behind our garden, a little over the top. No vegetables, they're not doing very well this year. Our neighbour pulled his shed down this year and now we've got the sun coming in through one of our side windows. I contacted the council, but they said it was alright. Before it was dark there, but I guess it's better now because it's light. We shut these in the morning because we get the morning sun then in the afternoon I fully shut the ones out front because the afternoon sun comes in. I made a blind on the front porch out of shade mesh to keep the sun from coming in. I couldn't find one so I just bought the shade mesh and put it up to stop the heat. It doesn't look very nice, but it does the job. We're going to fix up the pagoda out back. We're going to extend it further then put

up blinds so that we can get more use outside and hopefully the blinds will stop the sun a little too. There's always something to do, it's just the money.

E: With the solar panels, did you do all that before you heard about MEFL?

S: Um, this is the second summer they've been up so it's about the same time. If I ever need to change my hot water service, I'm considering getting solar hot water to replace the gas that's constantly heating now. So that'll be on the plan.

K: That's good you've got lots of plans to keep you busy.

MOST SIGNIFICANT CHANGE: DOUG & NANCY MYERS

Meet Doug and Nancy Myers. Living out in Glenroy, this sweet elderly couple joined the Zero Carbon Moreland program (ZCM) back in 2009. Doug describes himself as a "do it yourself man" and was very eager to sit down and talk with us during our interview. The most significant change he had made was installing solar panels. According to him, this was the most noteworthy because it helps to save electricity and gas. He's not entirely sure how much of a difference it has made so far, but according to his calculations about 1/3 of their energy usage has been taken from the roof. Encouraged by this, he wants to add more solar panels to generate more electricity in the future. In the meantime, Doug and Nancy pay the little extra to get 100% green electricity from their energy distributer.

The second most significant change this couple has made in their lives was to get solar hot water. Doug got the idea from MEFL at an expo and quickly became very interested in this method of heating water. His own gas hot water was 19 years old at the time and was about to need some fixing up. Instead, he talked to his plumber and got a $1000 grant from Council to help pay for the switch to solar hot water. Now anyone passing by can observe the heater and the solar panels on the roof and talk to Doug or Nancy about how they made these influential changes to their home.

Other changes the Myers have made include installing a skylight in the kitchen to help save electricity and using water tanks to help conserve water for their garden. The water tanks have proven very helpful in the past, though sometimes concerned callers will ring up and ask Nancy why her husband is watering the garden in the rain! She'll tell them not to worry; it's all coming out of the tank which is overflowing. They also plan to hook up their switch off board, to turn off everything using electricity instead of putting it on standby. Doug also wants to invest in a timer switch for the water tanks so if he pumps water from one to the other and accidentally forgets to turn it off, the water won't all run down the drain. Besides

these little things, Doug says “I don’t intend to do much more. I’m more keen to generate electricity than save it. With water I can’t do much more.”

What motivates this couple? Doug believes it’s a good thing for the planet and mainly wants to help the environment. Money isn’t a huge factor because they planned ahead, saved, and invested, but he says he doesn’t mind saving money on his meagre pension. Since Doug grew up on a farm, he believes that “if you didn’t do it yourself, it didn’t get done,” which is why he’s taken the initiative on these projects. MEFL has given him encouragement, advice, and the ideas to make that happen.

MOST SIGNIFICANT CHANGE: MAIRI ROWAN

Meet Mairi Rowan, a Moreland resident who hasn't had to pay her electricity bill for 2 years. Living out in North Coburg, this ambitious woman attributes her lack of electricity bills to her solar panels which she bought through a community purchasing project a couple years back. But that's not the only factor contributing to her energy usage; according to her, "we can blame MEFL for the fact that I turn my switches off at the wall all the time...that's partly why my solar panels cover all my costs."

MEFL's influence in Mairi's life began back when she was retiring from work and moving into her current home. She describes it as double sided: she needed to live on a lower income and at the same time knew that reducing her carbon footprint would cost her less overall. MEFL was a great resource for her to do both, and "whenever I'd come up with an energy problem, I would go to the MEFL website." They gave her recommendations for changing electricity companies when one company was overcharging her, as well as advice on changing over to instant gas hot water. Overall, though, the most significant change she attributes to MEFL is her mindset and lifestyle.

Mairi grew up in the Latrobe Valley deep in the power industry. As a child, she says she just took electricity for granted and never thought of the effects of "poisoning the whole planet with carbon dioxide so that actually life becomes less and less possible for all species." Incrementally, she began to realize that she needed to change her view and make the environment a priority. When she hit retirement and had more time on her hands, MEFL's influence helped her make that shift in her life.

Using MEFL as an information resource, Mairi has since put double and secondary glazing on her windows, an aluminium roller blind on the outside window to block heat and light, and double insulated her home. She also participated in MEFL Warm Home Cool Home program to draught-proof her house. Since having that done, she hardly has to use her central heating. "I was amazed. I didn't expect such a small thing to make such a big difference. I really didn't. Otherwise I would have done it years ago."

Mairi has also taken matters into her own hands and had Council switch her big waste bin with a smaller one to help her reduce her waste. She recycles and composts, and has cultivated her entire backyard into a garden. Her second-hand bricks pave little pathways through the veggies and form tiers to hold in the water when it rains. Most of her furniture is second-hand as well because she doesn't want anyone "out there making, spending energy making new stuff to please me."

Neighbours and family members have seen the monetary success Mairi's had with these changes, and have been influenced to do the same. "When I tell them that I haven't paid for electricity since I installed my solar panels, and their bills are going up and up and up, people, they stop and listen." She explains that it's actually in her personal economic interests to be energy efficient. What helped her most was realizing that small things can make a big difference towards a sustainable lifestyle too, "and that you don't have to be rich."

MOST SIGNIFICANT CHANGE: COLETTE CORR

Meet Colette Corr. Colette joined ZCM a year ago because she thought it would be a good thing and wanted to do her part to help the environment. Growing up in Tasmania, she was taught in school all about the environment and sustainability. She learned at a young age the importance of saving water and even taught her parents to recycle correctly. She's "always been very into the environment" and as an adult has continued to be proactive.

When she first moved into the house she owns and now rents out in Glenroy, the living space was very uncomfortable and she immediately began planning changes. She installed ceiling fans instead of using air conditioning, insulated the floor with rugs with rubber backing, and plans to put additional insulation under the house as soon as she can. By making the concrete house more comfortable, she says that "tenants will stay longer and take good care of the property because you invest in it," and that's why these changes are "smart from an economic perspective as well."

The most significant change Colette has made with her lifestyle has been going paperless. Besides just sending documents through email instead of printing hard copies, she also bought a kindle. She also notes that "for me, it actually doesn't feel like an electronic device, it actually feels like a break from technology." At her work, they've also been switching over instead of printing huge packets for executive meetings. She says that this change has been met with approval, though not just for the environmental benefits but also because, for the executives, it's all about finding the document they need quickly to win the argument. Nevertheless, Colette and her like-minded friends recognize the importance of saving paper. "You can't replace it [a tree] or it takes 400 years to replace, so it's those sorts of things that are valuable and have a high value attached to it. It won't grow back in a couple of weeks."

Colette plans to continue making changes in her life, such as riding her bicycle to work more and eating more organic and local foods. She's inspired by MEFL and the stories of other Moreland residents making the effort to implement similar changes in their lives. She hopes to pass on the same enthusiasm, and imparts some words of wisdom: "I have one piece of advice for those renovating, do it slowly! It takes a really long time to solve problems sometimes." Her own experience hasn't been a smooth ride, but no amount of hardship has prevented this determined woman from implementing her innovative sustainable ideas.

APPENDIX R: FOCUS GROUP SUMMARY

A focus group was held on February 17, 2011 at the MEFL offices amongst four Zero Carbon Moreland participants to discuss their experiences with the program thus far. From facilitated discussions, we wanted to evaluate how well MEFL has been doing in engaging the community into sustainable actions. We also wanted to know whether or not the ZCM programs were filling a need within the community. Furthermore, we were interested in seeing the extent to which the ZCM programs have contributed to social norms amongst members. The results of this focus group proved to be comparable to a similar focus group held in January 2010.

The first topics of discussion were the participants' motivation to join the ZCM campaign and what their preliminary expectations were. One member had mentioned her desire to join and support a local community group that had an interest in environmental issues. All of them were motivated primarily by their environmental values and concerns, not by the potential financial benefits of the programs. Through ZCM, they expected to learn and discover what more they could do to help preserve and protect their environment. They also expected MEFL to help educate the community about sustainability and promote sustainable lifestyles through Moreland. They each hoped that ZCM would not only reach out to the environmentally conscious members of the community, but also inspire those who have yet to help better the environment.

Each participant has found ZCM to be effective thus far in meeting their own expectations. Melinda installed solar panels with the help of MEFL. Another attended a workshop on reducing energy, finding it both informative and helpful. Others have taken the online surveys to voice their opinions or to evaluate their own levels of sustainability. However, each member remarked that they find themselves too busy to attend events and

workshops regularly, even ones which they have interest participating in. Still, they each expressed desires to be aware and informed of the happenings during each of MEFL's events.

Three of our four focus group participants said they had calculated their carbon footprint with MEFL, either online or on paper. Their motivations for calculating were to have an actual measurement to see if and by how much they have improved. They also see the calculator as a way to display to the community the difference ZCM has made, particularly in showing where they had started compare to where they are now in terms of sustainability. Overall, they found the calculations simple and straightforward, but there were some difficulties and suggestions for improvement expressed. Peter found it difficult to calculate because he buys green electricity but also has solar panels, which made it more difficult to import and export electricity data. When asked why she has not yet calculated her carbon footprint, Sharon said it has been difficult for her to gather energy bills. Peter mentioned that he would like to see emissions from food consumption as well as carbon offsets incorporated into the calculator. Despite being more time consuming as anticipated, the three who completed their carbon footprint calculations found it useful, and even completed an action plan to outline their goals to reduce their carbon footprint.

Next, the group discussed their benefits from being part of the ZCM campaign. The group likes how ZCM can break down their goals into measureable quantities, such as averages and targets for carbon emissions. The programs have helped each member save money, and they have found that they will make back the money they invest into a project saving electricity or gas rather quickly. The participants are all readers of the monthly e-bulletin distributed to ZCM members via e-mail. They find it to be the best and easiest way of getting information on what MEFL is doing. They also find it encouraging, even inspiring, to hear stories of what others have done to become more sustainable. Peter added that he finds it heartening to see someone has done something that he has been afraid of doing himself, and

it shows him that such a change is in fact possible. Furthermore, the e-bulletin can and has been used to recruit others as members show it to their friends. The participants find it nice to live in a community with something like ZCM and convenient to have someone to refer to for sustainability advice.

Participants were then asked to make recommendations on how to improve the ZCM campaign. Phil and Peter wanted more step by step instructions for projects which would also include the effect each change can have. The group wants ZCM to determine what businesses are doing to become more sustainable, and encourage members to inspire change at their work place. Peter mentioned the amount of energy wasted from leaving appliances such as computers running constantly, and feel that this is an issue MEFL should address. The group also would like to see more case studies of sustainable change successes from other parts of the world. It was suggested that as Moreland becomes a denser city, waste disposal will need to be further addressed. Something that each member wants to see happen in Moreland is a better transportations system, which will help reduce the amount of driving. The final and the most important recommendation was for MEFL to try avoiding "preaching to the converted", or those who are already environmentally conscious. They should instead be reaching out to those who do not concern themselves with the environment. Participants suggested trying to recruit more community members by promoting the potential cash savings involved with sustainable living while also showing how life changing ZCM could be. This discussion stimulated great ideas on how MEFL should proceed with ZCM in the future.

The focus group in 2010 was held to gather feedback after the first year of the ZCM campaign and ideas for the next year's activities to engage more of the community. The discussions yielded similar results to those from this year's focus group with a couple of interesting points. This group's expectations of ZCM were similar to this year's group, expecting the education and promotion of sustainable living throughout the Moreland

community. Most found the carbon footprint calculator simple enough to use and enjoyed being able to compare themselves with other Moreland households, even though some had difficulty collecting bills. This group also found the e-bulletin to be a good motivator and made them more aware of the services that MEFL can provide ZCM members. Many participants in this focus group want to take more actions in reducing their carbon footprint, but they need to support in order to install the necessary improvements. They all believed in the power of gathering people together, encouraging one another to lobby politicians for better environmental policies and drag friends to workshops and events.

The results helped us complete our three objectives for this focus group. We were able to determine that MEFL is doing well in engaging members of the community who are already environmentally conscious. However, in order to achieve a zero carbon Moreland by 2030 as they intent, it is imperative to recruit members who are not concerned with environmental issues and convert them to more sustainable lifestyles through the ZCM programs. Our focus group participants feel that ZCM is definitely filling a need within the community. They recognize the importance of sustainability and want the entire community to recognize it as well. On ZCM's efforts to contribute towards social norms, Peter remarked that when someone tries something new on a daily basis, after a while it becomes routine. It is easy to contribute to the social norms of those who care for the environment. The challenge lies in instilling environmental values into people who are not sustainable and causing them to permanently alter their environmental behaviours.

APPENDIX S: COMMUNITY CASE STUDY: STOCKHOLM, SWEDEN

Stockholm, Sweden is a growing city of 800,000 people. It received an award as the European Union's Green Capital of 2010 by the European Commission. They received this award based on a report that was created by the government that was based on many factors: air quality, land use, waste management, water consumption, and sustainable development (European Commission, 2010b). Since 1990, the residents of Stockholm have reduced their carbon emissions by 25 % (European Commission, 2010a).

The government has used many different methods to help their citizens reduce emissions. They have implemented disincentives like a congestion tax for those travelling in and out of Stockholm. Between 6:30 A.M. and 6:29 P.M., each car that drives in and out of the city has their license plate scanned and a bill is sent to their home based on the plate number. This disincentive has been effective, as traffic in and out of the city has decreased by 10-15% since 2007 when the tax was put in place (European Commission, 2010a). Along with this, the use of public transportation has increased in the time since the congestion tax was implemented. Also, cars that are utilize green energy such as hybrids and biogas are exempt from this tax, so now 20 % of cars in Stockholm are run off partially alternative fuels (Johansen, 2007). To encourage the use of fossil fuel free cars even further, reduced insurance rates and free parking in Stockholm are provided for those who drive green energy vehicles (Kroh, 2008).

The Stockholm city government has also taken action such as investing in district heating plants that provide combined heat and power; they also have district cooling systems. The district heating provides 80 % of the heat in Stockholm (City of Stockholm, 2010). A majority of the power for the district heating is created from renewable energy and incineration of waste, which emits significantly less carbon dioxide than using coal or oil for heat and power (Environment and Health Department, 2010). These are only two of many

examples of the actions the government has taken and the dedication that they have to reducing carbon emissions in Stockholm.

APPENDIX T: COMMUNITY CASE CTUDY: PORTLAND, OREGON

Portland, Oregon in the U.S.A is another city that demonstrates the successes of government-based initiatives to reduce carbon emissions. Portland was the first city in the United States to make a plan to reduce carbon emissions. Based on their 1993 levels, their plan is to reduce emissions by 50% by 2030, and by 80% by 2050 (Peterson, 2010). Since 1993, the city has reduced their carbon footprint by about 12% (American Public Works Association, 2010).

In 1999, Oregon legislation created steady funding to help residents invest in more efficient and renewable sources of energy. The Energy Trust of Oregon began in 2002 as a reaction to this legislation; it is based out of Portland, but helps residents outside of the city as well. The Energy Trust is a non-profit organisation that is dedicated to helping citizens save money and reduce their carbon footprint by conserving energy and investing in renewable, clean energy (Energy Trust of Oregon, Inc., 2010). The legislation that was put into place provides funding for the Energy Trust to give programming and training sessions for residents of Oregon to teach how to reduce carbon emission, as well as funding to provide numerous cash incentive offers. The Energy Trust communicates the benefits of renewable energy sources and encourages people in the community to invest in them through these cash incentives.

The residents of Portland who have participated in the programs put on by the Energy Trust have saved almost USD $600 Million since 2002 and have reduced carbon emissions that are equivalent to the use of 750,000 cars in its 8 years of existence (Energy Trust of Oregon, Inc., 2010). The Energy Trust sets yearly and long term goals. The short term goals work to keep citizens engaged and interested. They provide something reasonable to achieve each year rather than a long term goal that can seem unreachable and become discouraging.

The city government in Portland has also taken other actions such as providing a light rail system that is available for people to ride downtown for free, solar powered parking meters, and a plan to be a “20 Minute City”, where it is a 20 minute or less commute for all of its residents to travel between home and work (Public Works Association, 2010; Sustainable Circles Corp., 2008). The government has also established a USD $2.5 Million Green Investment Fund for any building project that is implementing green practices, which encourages sustainable development.

The government also took action to establish the Bureau of Planning and Sustainability in 2000. This organisation was the first of its kind in the U.S. to be dedicated to informing members of the Portland community about sustainable practices. They also put on many different lecture series, film showings, and workshops. These programs cover a large variety of topics to connect with as many people as possible within the city (American Public Works Association, 2010). The government has taken so many actions in the city that they have helped create social norms among the people. While the government has implemented many programs to help citizens, the residents’ behaviour change is what has really made these government efforts a success.

APPENDIX U: COMMUNITY CASE STUDY: ASHTON HAYES, ENGLAND

Ashton Hayes, England is a community of 1,000 people who have a climate change initiative to go carbon neutral. In 2005, Garry Charnock, a resident in the community presented the idea to go carbon neutral at a town meeting attended by over 75% of the adult population. As a result of this meeting, the Aston Hayes Parish council established 'Ashton Hayes Going Carbon Neutral', a foundation run by about 40 volunteers (Edwards, 2007).

Before 'Going Carbon Neutral' began, Charnock founded Technical Editing Services Ltd., a marketing and communications company with a specialty in working with oil, gas, and environmental companies and projects (Technical editing services, 2010). Charnock was inspired when he heard Sir David King speak about how each person must take responsibility for changing their behaviours in regards to the environment, and that it cannot be left up to the government to save the planet. After hearing that large corporations such as HSBC had gone carbon neutral, he realized his village could absolutely achieve carbon neutrality. He believed the people of Ashton Hayes would listen to him because of his background in civil engineering and journalism (Blackhurst, 2007). His movement has led to great success in his community and he has reached out to over 100 other communities to help them start similar programs (Pogge, 2008).

The Ashton Hayes community has stayed engaged in this initiative for over 5 years now and they have successfully reduced their carbon footprint by 23% since 2005 (Renewable Energy Focus, 2010). They have remained engaged through learning new information and being involved in many of the projects that are continuously developing in Ashton Hayes. Charnock stated that another thing that keeps people engaged is the use of media. They take any opportunity they can to feature families and members of the community in any media release, from local to international. It's exciting to be the subject of

an interview, but it's also interesting for members of the community to read about someone they know and the changes they've made.

Charnock and some of the volunteers created an action plan at the beginning of the project to ensure that the project would be an ongoing, permanent change for the community. In their action plan, they stated that they would enlist the support of businesses, the government, and universities (Charnock, 2005). Ashton Hayes has kept pace with their goals due to active participation of many groups and organisations throughout the community; a list of these organisations can be seen in Appendix C, as taken from the 'Going Carbon Neutral' website. Also, the students at the University of Chester are used to aid in the collection and analysis of data for the carbon footprints of residents. The list of supporters in Appendix C can be seen as the first place that social capital was utilized in the Ashton Hayes project. Enrolling help from all of these organisations immediately created a large pool of people that they had successfully reached.

A community shop that is mostly run by volunteers from the community was re-opened in the village and displays the dedication of the Ashton Hayes residents. 'Going Carbon Neutral' encouraged this effort because it saw the importance of having a local food store that was close by and provided foods that were locally grown and raised (Ashton Hayes, 2010b). Those who volunteer do so because they believe that the community shop is an important part of the community, and if it helps to decrease the carbon footprint that is an added bonus. One woman who volunteers said, "I think a village without a shop is a village without a heart" (Ashton Hayes, 2010h). A picture of the community shop can be seen in Figure 19.

FIGURE 19: COMMUNITY SHOP IN ASHTON HAYES (ASHTON HAYES PARISH COUNCIL, 2010)

They have made other efforts to reduce their footprint as a community, including the installation of solar panels and wind turbines on the local primary school and plans to build a cogeneration power plant for the school as well (Ashton Hayes, 2010e). They received a £500,000 GBP (AUD $800,000) grant from the Department of Energy and Climate Change to install different types of renewable energy sources in their town (Renewable energy focus, 2010).

They have also used their grant money from DECC, in conjunction with a grant received in 2009 from Carbon Connections UK Ltd for £86,000 (AUD 137, 500) to look into putting Ashton Hayes on its own rural microgrid and take themselves off of the general electric grid (Ashton Hayes, 2010d). A microgrid will allow the village to run entirely off of renewable energy. The idea is to put in a cluster of solar panels or wind turbines to generate power for the entire village instead of each individual home installing their own. First, they are completing a feasibility study to ensure that this will work for the entire village. They held a public meeting in the beginning of the study to inform everyone about the microgrid idea and the feasibility study to explain what it means. Throughout the process, they are conducting focus groups and communicating with the residents to guarantee that this is a

change they are willing to make and that it will be accepted throughout the community. To further engage the community in the project, they asked volunteers to help set up the weather stations that were used to measure wind speed and determine how much solar energy is inputted in the village. They will use these stations to determine how much energy they have the potential to create compared to how much the village usually consumes. (Ashton Hayes, 2010i). All of these factors will be analysed to determine if it will be possible to put Ashton Hayes on its own grid.

In Ashton Hayes, the programs and information that are provided by the volunteers who run the project are the main resource for the community. Another way they communicate is through the project's website. Their website provides the most recent statistics on how the community is doing in their progression towards having zero carbon emissions. The continuously updated information keeps people interested and constantly checking (Ashton Hayes, 2010a). They also utilize other means of communicating through the media. When they advertise an event or meeting, they use the radio, TV, newsletters, and newspapers to reach as many people as possible (Homes & Communities Agency, 2009).

One of the other main ways that Ashton Hayes communicates is through participation at town meetings. The meetings, referred to as Parish Council meetings, are a place where active members of the community can be contacted. These members are most likely to spread the message about the updates that they were given at the meetings (Ashton Hayes, 2010e).

APPENDIX V: COMMUNITY CASE STUDY: SAMSØ, DENMARK

Samsø, Denmark is a community that is very similar to Ashton Hayes in initiative and size. It is a small island off the coast of mainland Denmark. It has 4,300 residents and is arguably the first carbon neutral place on Earth (EDIN, 2010). In 1997, the Danish Ministry of Environment and Energy put out a competition for five Danish islands to submit a plan to be "Denmark's Renewable Energy Island." The competition asked for a 10 year plan to become an island that could be completely dependent on renewable energy sources and independent of fossil fuels (Kolbert, 2008). An engineer who did not leave on the island saw Samsø as the perfect island for this competition. He collaborated with the mayor of Samsø to create and submit a plan to the Danish government. His plan won and consequently the island had to begin working to achieve this ambitious goal (Tagliabue, 2009).

The competition offered no prize money or funding to support the plan. Along with a lack of funding, residents and businesses on the island were not on board immediately; in fact most residents of the island were surprised to hear Samsø had won (Kolbert, 2008). One man, Søren Hermansen, an island native and environmental studies teacher, took control of the project at the beginning after funding was made available by the Danish government to pay one person to work full time on the project. Hermansen describes the people on the island as hesitant to get involved; each person was "waiting for the neighbour to do the move." Instead of allowing this to be a barrier, Hermansen took advantage of it. He spoke wherever he could about the movement. He marketed it as a community project, something everyone could have a hand in and be proud of, as well as a project that had potential economic benefits (Kolbert, 2008). This was crucial to the residents because the economy on Samsø is completely dependent on tourism and agriculture. Before the project began, the island experienced a decrease in jobs in those crucial areas that kept their economy going; the prospect of new jobs and investments became attractive to the community (Slatcher, 2011). After a couple of

years, people began following and soon most of the island was engaged in the project. As one article put it, “community commitment provided the foundation for success...” (Dallas News Group, 2010). At this point, the people on the island worked together to follow through with the project.

Before the plan was put in place, Samsø received their electricity from mainland Denmark, produced mostly from coal and their oil was brought by boat (Slatcher, 2011; Höges, 2002). The community immediately looked for ways to take their island off the mainland electric grid. Their solution was wind turbines, solar panels, and district heating.

Every person on the island was offered an opportunity to invest in the wind turbines that were being built on and off shore: 11 onshore and 10 offshore. Most of the funding for the wind turbines came from the residents of Samsø. Nine of the 11 onshore wind turbines are owned by private investors or residents of the island (EDIN, 2010). The other two are owned by a windmill cooperative; this cooperative is comprised of hundreds of people on the island. For many, it has been a worthwhile investment. With the help of his bank, one man invested 2.5 million Euros (3,421,000 AUD) into the wind turbines. He claims that on a good day, the turbines will earn 3,000 Euros (Jones, 2009). Five of the offshore turbines are owned by the municipality of Samsø, three are owned by private investors from the island, and the last two were divided into shares and are partially owned by hundreds of people (Slatcher, 2011). These wind turbines tend to produce 10% more energy than the island uses; this energy is sold to mainland Denmark (Kolbert, 2008).

In order to reduce the carbon emissions from heating homes, the local municipalities built three new district heating plants, making a total of four on the island (EDIN, 2010). One of the plants is owned by a Danish energy company and is powered by solar panels; the other three are owned by resident shareholders (Slatcher, 2011). These power plants also create more economic benefit for the resident farmers because they are powered by burning straw

that is provided by the farmers. Only 75% of the heating for Samsø is provided by these plants; that's where the wind turbines come in to negate the carbon emissions from the fossil fuel that they still use for transportation purposes and all other heating (Tagliabue, 2009).

The community is taking action in other ways besides investing in renewable resources. Many participated in energy assessments to find ways to decrease their energy consumption. Members of the community who live on a pension could receive a grant from the federal government to have an energy audit completed and put some more sustainable products in their home (EDIN, 2010). Also, many farm owners are powering their tractors with alternative fuels such as canola oil. (Tagliabue, 2009).

This is another community, similar to Ashton Hayes, where the movement was fuelled by the people. In this case, it did begin with a government competition, but momentum for participation grew within the citizens and made the project as successful as it has been. Samsø is also a great example of how social capital can allow a movement like this one to begin and flourish.

In Samsø, Hermansen took advantage of the fact that if one person began to follow him, they would influence others on the island. In a small community like Samsø, when one person joins an initiative, a social force is created which influences those in contact with that person (Edwards, 2007). After the community joined, it became a part of the culture on the island to be engaged in the project. It is this behavioural change that allows Samsø to currently be considered a net zero carbon community by many people throughout the world.

APPENDIX W: UTILITY DATA - MEFL IN-HOUSE ANALYSIS SPREADSHEET

To follow the weather differences from year to year, MEFL keeps track of the number of heating degree days through the Melbourne Bureau of Meteorology. Using their in-house analysis spreadsheet[1], we were able to determine that in 2009, there were 783 heating degree days from June-October. The same months in 2010 had 898 heating degree days, which indicates that it was a colder winter. We also added up the total average gas and electricity usage of our ZCM household sample (see section 4.2.2). By plugging these numbers into the spreadsheet shown below in Table 8 and 9, we got a normalised usage based on 2009 which is a prediction of the 2010 usage adjusted for the number of heating degree days. We were then able to find the total average savings for each household, based on the 2009 baseline data.

TABLE 8: MEFL INTERNAL ANALYSIS HEATING DEGREE DAY SPREADSHEET (GAS)

Year	Gas use from June-October (MJ)	Heating Degree Days	Gas Use Normalised to 2009	MJ Savings
2009	54107	783	54107	
2010	53441	898	57212	3771
Difference:	666	-115		6.6%

TABLE 9: MEFL INTERNAL ANALYSIS HEATING DEGREE DAY SPREADSHEET (ELECTRICITY)

Year	Electricity use from June-October (kWh)	Heating Degree Days	Electricity Use Normalised to 2009	kWh Savings
2009	1250.6	783	1250.6	
2010	1091.2	898	1289	198
Difference:	159.4	-115		15.3%

[1] Conversion factors and formulas were provided using MEFL's spreadsheet created by Cory Jemison, Energy and Greenhouse Analyst.