SOUTHERN METROPOLITAN REGIONAL COUNCIL

climatewise
SMRC response to climate change

FINAL REPORT

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

GREENHOUSE GAS ABATEMENT IN LOCAL CENTRES

Final Report by SMRC to
The Department of Environment, Water, Heritage and the Arts

July 2008

Prepared by the Southern Metropolitan Regional Council (SMRC), July 2008

On the ClimateActions Project (February 2007 to May 2008) implemented in collaboration with the Cities of Canning, Cockburn, Fremantle and Rockingham and the Towns of Kwinana and East Fremantle

Version 2, July 2008

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SMRC acknowledges

The Department of the Environment, Water, Heritage and the Arts for the funding of this project.

The participating councils – the Cities of Canning, Cockburn, Fremantle and Rockingham and the Towns of Kwinana and East Fremantle for their financial and logistic support for this project.

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All the businesses and residents who participated in this project.

The commercial organisations who offered special services/products for the ClimateActions participants.

Words from the participants…

It was fantastic to have someone knowledgeable to guide us with more efficient use of our resource.	*Community Midwifery*
Raising our awareness of energy use has been the standout area of the program. A lot of people are interested in the program, and have taken brochures home.	*Lighthouse Corner Store*
The last electricity bill has come down considerably. We are now using our air-conditioning more efficiently.	*George's Deli*
We put timers on 7 of our drinks fridges, and put in an evaporative A/C because it's more energy efficient than our old units.	*Star Deli*
Reminded me to get on and do something *"Thankyou, please keep on offering these types of programme. We all need all the help we can get."*	*Fremantle residents*
"Good work and very practical." *"A good service."*	*Canning residents*
"Thanks – Great initiative"	*Cockburn resident*
"Informative and interesting" *"Liked the use of recycled paper for brochures"*	*Kwinana residents*
"I liked the goal card system as I can choose the action that applies to me." *" It was just enough information for the householder."*	*Rockingham residents*

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ABBREVIATIONS

A/C	Air Conditioner
CBSM	Community based Social Marketing
CCP	Cities for Climate Protection
EF	Enterprise Facilitation
F & V	Fruit and Vegetable
GEF	Green Enterprise Facilitator
GHG	Greenhouse Gas
HWS	Hot Water System
HVAC	Heating Ventilation and Air Conditioning
IRC	Infrared Coating
RAC	Refrigerative/Reverse Cycle Air Conditioner
SHW	Solar Hot Water
SME	Small and Medium Enterprise
SMRC	Southern Metropolitan Regional Council
tCO_2e	Tonnes of Carbon Dioxide equivalent
UCO	Used Cooking Oil

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EXECUTIVE SUMMARY

The ClimateActions project was implemented by the Southern Metropolitan Regional Council (SMRC) in collaboration with the Cities of Canning, Cockburn, Fremantle and Rockingham and Towns of East Fremantle and Kwinana with the funding support from the Australian Government's Department of the Environment, Water, Heritage and the Arts. The project commenced in February 2007 and was completed in May 2008, with final evaluation carried by July 31, 2008.

The project engaged 91 small to medium-sized businesses from local centres in six council areas. These businesses were provided with a free and confidential service to improve energy efficiency. Businesses in this sector are often time and resource poor. They also lack the knowledge and expertise to implement energy efficiency measures without assistance.

The project's approach is based on the Enterprise Facilitation™ model. The **business participation rate of 93% and actions response rate of 76%** are testament to the effectiveness of the approach. The role of Green Enterprise Facilitator (GEF) is central to the implementation of the project. As the single point of contact for advice and support, the GEF was able to foster a good relationship with the shop owner through frequent communication via site visits and telephone calls. By doing the legwork, such as making available energy efficient products and arranging site visits and quotations from service providers, the GEF provided the opportunities for the owners to take immediate actions.

Participating businesses took actions to improve energy efficiency in many areas:

- **Refrigeration (35%)**
- **Lighting (15%)**
- **Recycling (12%)**
- **HWS (12%)**
- **Tariff change (10%)**
- **HVAC (6%)**
- Others (6%)

As a result of the actions taken, the following **savings achieved by businesses were**:

- Estimated **annual saving of almost 540,000 kWh of electricity**
- Estimated **annual saving of GHG emission of 500 tCO_2e**
- Estimated **total annual financial savings of around $93,700**
- **Average annual savings of over 6000 kWh in electricity and 5.7 tCO_2e in GHG emissions per business**

Refrigeration was the area where the most savings in electricity (63%) and GHG emissions (67%) were made, reflecting the disproportionately high consumption by refrigeration appliances in this sector. **Switching from electric to gas fryers also makes a substantial contribution to electricity (26%) and GHG (22%) savings.** Although many actions were taken in lighting and hot water systems (HWS), the

corresponding savings in electricity and GHG abatement were comparatively small.

Eighteen businesses with outstanding achievements were invited to an award ceremony in June 2008 where they were presented with a framed Certificate of Excellence and other prizes.

The project also engaged over 830 residents through an indirect approach of postal invitations. Residents were selected from the streets around the participating businesses. This was to enable these businesses to act as information hub for the households as well as inspiring residents toward energy efficiency and waste recycling.

The Information Service for residents began with a service sheet mailed to them to select information on specific greenhouse actions of interest. SMRC researched and produced on flyers on these key greenhouse actions grouped under Energy, Waste and Water. Residents then received the flyers they selected over three mailout rounds plus a newsletter with stories on the participating businesses in their Council and a goal setting card for planning actions.

The resident response rate was 7%, which is less than the 10% rate achieved using the same approach in a SMRC project in 2005. This indicates the postal method is becoming less effective and a more interactive element is needed like a phonecall or face-to-face conversation. The information service was also offered to Council staff and two local primary schools, but this also brought unexpectedly low responses.

For those participating households 427 tCO_2e in GHG emissions are estimated to be abated per year, using previous SMRC project monitoring as utility data was not available for this project. Participating households reported through feedback forms a high satisfaction (84%) with the information service and actions and goal setting were self-reported. The business newsletters were received well, with feedback that they showed shared commitment to action.

In conclusion, the project achieved great success in abating greenhouse emissions in small businesses. The experiences from the business engagement indicate that face-to-face contact, building good relationship, helping the businesses with sourcing of products and services, regular follow-up and recognition of their good work are effective in bringing significant actions to abate greenhouse gas emissions.

1. INTRODUCTION

1.1. Background

The 'Greenhouse Gas Abatement in Local Centres' project titled as '*ClimateActions*' was based on SMRC's earlier experience in delivering 'Local Centre' project where the small shops in neighbourhood 'local centres' were identified to be a sector keen for energy and waste advices and need a support. These businesses pay their own energy bills and so have some financial savings as incentive to act. At the same time, the small business owners are time and resource poor, so any approach had to work within these constraints.

In 2005-06 a successful pilot program was run engaging 36 small businesses in local centres[1]. The methodology trialled in pilot project was one of building a positive, non-sales relationship with the business owner, inspired by the *Enterprise Facilitator*™ approach, and identifying easy and longer-term opportunities to achieve better energy efficiency.

In 2003-4 SMRC entered into a project partnership commenced with Murdoch University to develop effective greenhouse programs for residents. Through a project branded *GreenHouses*, an engagement approach and new behaviour change model was tested. *GreenHouses* had success in engaging 10% of residents through a postal method and affecting significant measurable energy reduction over several months compared to control household groups[2]. The behaviour change model combined goal setting tools with local relevant information. In 2006-7 further research was undertaken at SMRC using Community-based Social Marketing techniques to build information for key greenhouse actions in the home. An individualised social marketing pilot project, *EnergyActions*[3] was also run in 2007 in partnership with Socialdata Australia where a service sheet together with phone conversations supported residents with behaviour change.

The *ClimateActions* project was launched in March 2007 as part of the Regional Greenhouse Gas Abatement Program and building on the lessons learnt from these previous streams of work in the residential and business sectors. The ClimateActions project was supported by funding from the Australian Government and implemented by the Southern Metropolitan Regional Council (SMRC) through a regional partnership with six member councils.

This report outlines the service and its response from residents and businesses as part of the ClimateActions project in the Cities of Canning, Cockburn, Fremantle and Rockingham, and the Towns of East Fremantle and Kwinana over a 14 month period. This report provides a quantification of actions taken and greenhouse gas emissions reduction, as well as qualitative feedback of the participants.

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[1] The Pilot project of Local Centres Business Program was carried out in the Cities of Canning, Cockburn and Rockingham between November 2005 and May 2006.
[2] The results of the GreenHouses pilot project are presented in full in the final project report to be found at http://www.climatewise.net.au/publications.htm
[3] The final report on the EnergyActions pilot project can be obtained by contacting SMRC.

1.2. Objectives

The overall aim of the project was to reduce greenhouse gas emissions in neighbourhood communities consisting of households and small-to-medium retail businesses. The project's principal objectives were to:

- Engage 80-100 local centre businesses and provide individualised support businesses to identify and implement actions in energy and waste-to-landfill reduction
- Engage 1,500 surrounding households in energy, water and waste reduction
- Support the cross-pollination of greenhouse gas abatement ideas and lessons learnt among participants to motivate businesses and residents in taking actions
- Assess the effectiveness of the project model with participating businesses and households through verbal and written feedback and measurement where possible.

1.3. Project activities

The project activities were segmented into the following rounds:

Round 1 for businesses (March – May 2007)

- Identify the businesses suitable for participation in the Climate Actions project;
- Engage the businesses in the project through Enterprise Facilitator Model (see Section 2.1);
- Identify the areas of energy efficiency improvement of the participating businesses;
- Assist the businesses taking actions to improve energy efficiency ;
- Follow up and monitor the actions;
- Distribute brochure holders for energy efficiency brochures and newsletters to participating businesses .

Invitation Round for Households (May – September 2007)

- Identify surrounding residents of participating businesses to target for participation in the project;
- Develop a service sheet addressing key actions for greenhouse abatement associated with energy, water and waste reduction ;
- Send service sheets to target residents and collate responses.

Round 2 for Businesses (October – December 2007)

- Select businesses who have taken positive actions as role models and publicize them, through media release and newsletters, to motivate other businesses and surrounding residents in taking actions;
- Identify and engage suitable businesses;
- Assist, follow up and monitor actions;
- Select Round 2 business role models and publicize them through newsletters;
- Develop information flyers for water efficiency for residential mail out;
- Distribute brochure holders for brochures, information flyers and newsletters to Round 2 businesses;
- Monitor and top up brochure holders and distribute service sheets to (Rounds 1 & 2) businesses for customers (neighbouring households) to collect;
- Send requested information flyers and Round 2 business newsletters to residents by email and post.

Service Rounds for Households (October 2007 to April 2008)

- Create information flyers for the energy, waste and water flyers;
- Send requested information flyers and business newsletters to residents by email (if requested) or post in 3 rounds starting with energy and finishing with water in March 2008.

Assessment and Awards round (April – June 2008)

- Final visits and phone calls to participating businesses to gather data on actions taken;
- Collect feedback from businesses and residents on the effectiveness of the program;
- Assess actions taken by businesses;
- Develop Certificate of Appreciation for business participants who have taken positive actions;
- Select outstanding businesses for ClimateActions Awards;
- Select motivated residents for ClimateActions prizes;
- Organise award ceremony and send invitation to business award winners;
- Present Certificates and Awards to businesses and send out prizes for residents.

2. Engagement Methods and Change Models

The Enterprise Facilitation approach was used successfully with businesses in the pilot project so was again applied in ClimateActions. The residential engagement approach was built on effective models tested in the past for engagement and change. Brief descriptions of each model are given in the following sections.

2.1. Adopting the Enterprise Facilitation™ model to engage businesses

This model has been developed by Ernesto Sirolli, a noted authority in the field of sustainable economic development. Sirolli believes that transfer of new technology and practices are unlikely to succeed if undesired or not requested by the business. Instead Sirolli espouses a bottom-up approach to economic development, and aims at improving the climate for entrepreneurship in a community.

This approach targets motivated businesses and supports them through free confidential advices to transform their good ideas into viable and sustainable business practices. These champions then spur on others in the sector to seek advice and make changes.

The model operates via an Enterprise Facilitator, whose key roles are to:

- Identify and understand ideas and motivation of business owners / entrepreneurs,
- Support businesses through free and confidential advice to materialise their ideas by:
    - Testing the personal motivation and skills of the business owner / entrepreneur and assist them to assess their own management strengths and weaknesses,
    - Linking them with experts / trainers / mentors in the concerned field,
    - Guiding them into effective partnerships, and
    - Encouraging them to learn from each other and build networks.

The role of the Enterprise Facilitator adapted for the purpose of this program to facilitate small to medium-sized enterprises (SMEs) with ideas that relate to energy and waste, and hence achieve greenhouse gas abatement.

2.2. Community-Based Social Marketing Model for targeting greenhouse abatement actions

The concept behind this model has been pioneered by Doug McKenzie-Mohr, a leader in the field of community-based social marketing (CBSM).

Traditionally, programs intending to promote sustainable behaviour have relied heavily or solely on media advertising, information campaigns or financial rebates. Although they may be effective in creating public awareness, they are limited in their ability to foster long-term behaviour change.

Instead, CBSM emphasises the importance of directly targeting the individual actions and identifying barriers and benefits of these actions as perceived by the target group through focus groups and/or surveys,

This model was applied in previous SMRC pilot projects for residents and local centre businesses. Materials were developed for common energy efficiency actions once their perceived barriers were identified. The same approach was used in ClimateActions.

2.3. Engaging residents with a postal approach and service sheet

SMRC achieved a 10% engagement rate with residents in 2004-6 across many suburbs under the GreenHouses project using a postal approach. Then in 2007 the EnergyActions project showed a higher response rate can be achieved through an individualised and more direct approach with a series of phone call conversations. The cost of such an approach however was not within the budget of this program, so a postal approach had to be used in Climate Actions.

The residents received a personalised letter on Council letterhead signed by an elected member of their Council. In addition, a 'service sheet' (and reply paid envelope were provided), listing a series of brochures they could select from covering a range of greenhouse gas abating actions in the home (see further discussion in 4).
The 'service sheet' works effectively in individualised marketing programs developed by Socialdata Australia with phonecall support over the project term, however had not been tested in a purely postal approach.

2.4. Goal setting for behaviour change

Goal setting model was based on the fact that by setting a goal, a person feels more committed to making a change (McKenzie-Mohr and Smith, 1999). Simply by writing a goal down, a person becomes focused and motivated to perform certain changes, but even more importantly, goal setting helps people identify how they are actually going to make that change (Kolb & Boyatzis, 1971). Figure 1 shows the goal setting concept developed by Murdoch University researchers and used .

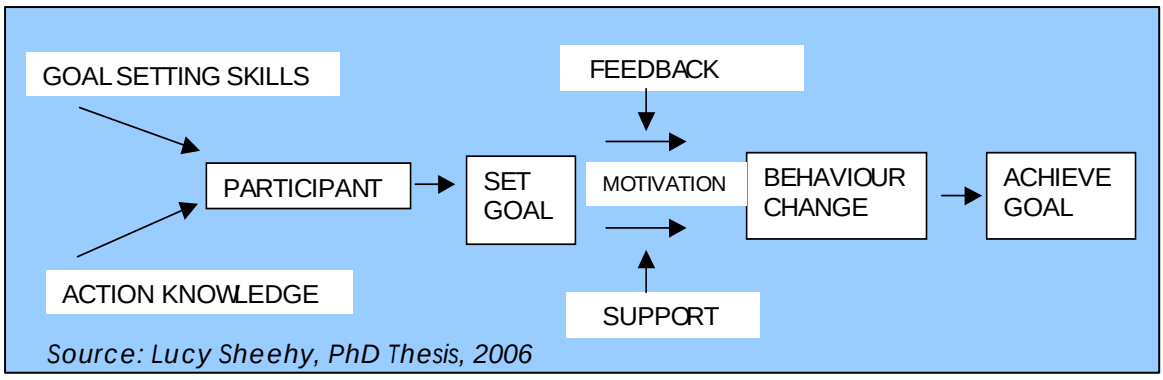

Figure 1: Goal setting concept developed by Lucy Sheehy, Murdoch University

The goal setting model[4] combines relevant local information with goal setting to support action planning and commitment. See further discussion in 4 of the goal cards used in this project.

[4] The model was based on the GreenHouses project for behaviour change developed by the Murdoch University environmental science researchers, Dr Peter Dingle and Dr Lucy Sheehy. This model was tested and shown to be effective in the GreenHouses project with 300 residents in East Fremantle and Kwinana. The same model also used in the Living Smart courses (see www.livingsmart.org.au).

3. PARTICIPANTS

3.1. Local Neighbourhood Centres

The selection of small businesses to approach in Round 1 determined the neighbourhood of residents to be invited to participate. The maps in Figure 2 show the local shops hubs and nearby suburban streets, where residents are within walking distance of the shops and form part of the customer base of these businesses.

3.2. Business participants selection

Small to medium sized businesses in six member council areas were invited to participate in the ClimateActions Project. Local shopping centres accommodate a wide range of businesses including delis, bakeries, butchers, mini-marts and hairdressers. The key features of these businesses in local centres include:

- Separately metered – hence have a financial driver that large shopping malls/centres do not have
- Opportunities for greenhouse gas abatement through energy efficient hot water, lighting, refrigeration and air conditioning practices and technology, plus reducing waste to landfill volume
- Common across the region – so can be expanded across the region
- Approachable for council staff as many have an existing relationship or knowledge of their local council – helpful for a business program
- Interested in reducing energy use and the majority surveyed indicated they valued an environmental image for their business, and
- Local centres provide a point of access to the local community in raising greenhouse awareness and publicising education programs

The Round 1 businesses were selected from an initial list of potential businesses compiled by council staff and reviewed together with SMRC staff. A list of 'food premises' from council databases was also used to identify potential participants.

A total of sixty-five potential businesses were selected for Round 1 of the project. They were sent a project flyer offering free confidential service to help reduce their electricity costs, accompanied by a council 'With Compliments' inviting them to participate. Within one week of the mailout, the SMRC Green Enterprise Facilitator (GEF) and the council CCP officer paid their initial visit to the potential business to explain the project and formally invite them to participate. The response rate was very high, with sixty businesses agreeing to be part of the project.

Round 2 participants were a combination of businesses which were interested when approached in Round 1, but did not participate due to other commitments, and other businesses identified by the Southern Metropolitan Regional Council (SMRC) and/or Cities for Climate Protection (CCP) officer during previous visits.

These Round 2 businesses were approached by the Facilitator, sometimes accompanied by the CCP officer, walking into the shop and presenting the project flyer, and offering the free and confidential service to the business owner. Thirty-two businesses were approached in this manner, with thirty-one giving a positive response.

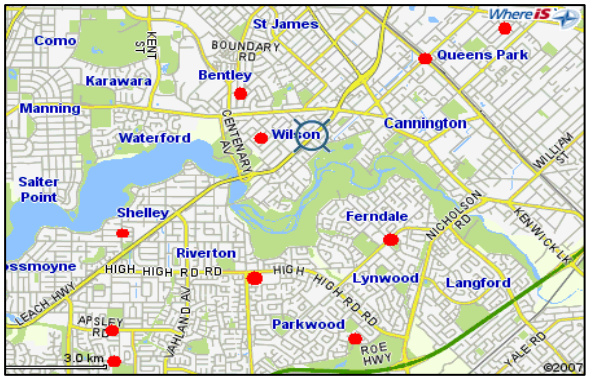

Figure 2a: Canning business hubs

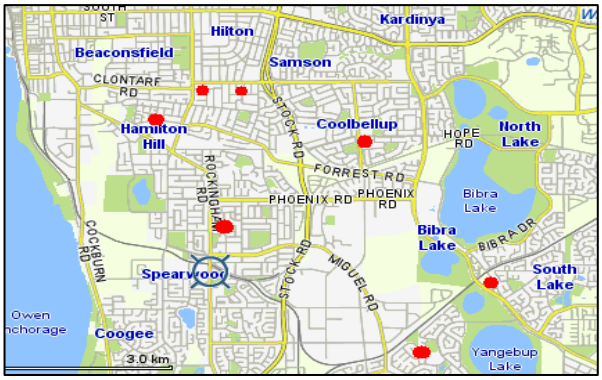

Figure 2b: Cockburn business hubs

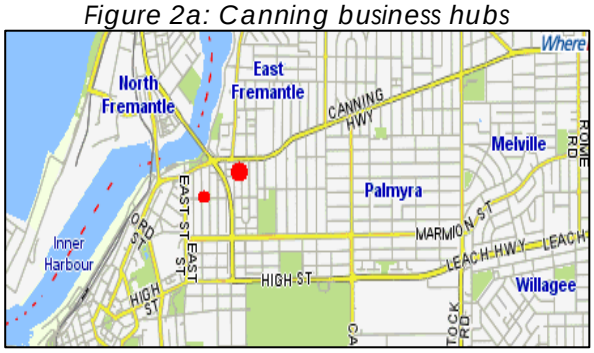

Figure 2c: East Fremantle business hubs

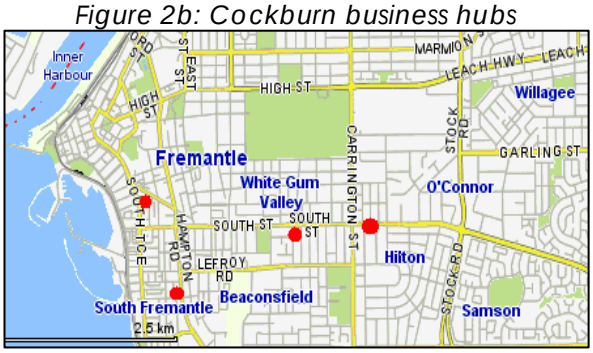

Figure 2d: Fremantle business hubs

Figure 2e: Kwinana business hubs

Figure 2f: Rockingham business hubs

Figure 2: Target areas for businesses to invite in different councils

3.3. Business Response and Participation

Ninety-one (91) businesses agreed to participate in the project, out of 97 initially invited. This corresponds to a response rate of over 93%. Figure 3 shows the distribution of participating business in the six member council areas. Of the participating businesses, 88 were successfully engaged in energy efficiency measures/ideas. Three businesses decided to drop out part way through the project.

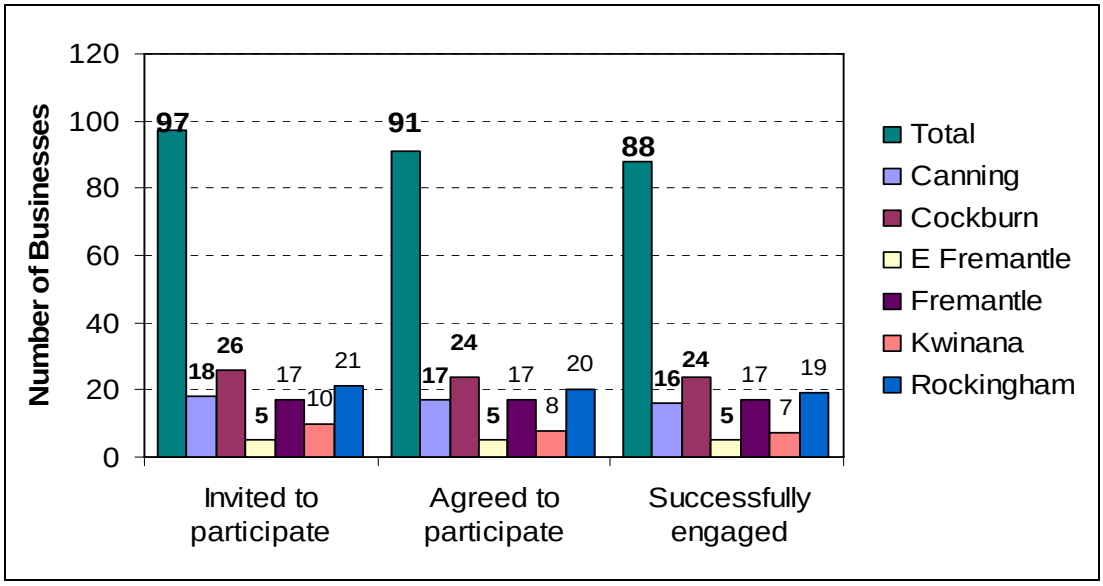

Figure 3: ClimateActions business participants in six SMRC member council areas

A broad range of small to medium sized businesses participated in the project, a breakdown of the business type is shown in Table 1. Many of the businesses are food premises with major refrigeration requirements. Other opportunities for better energy efficiency arise in the areas of lighting, hot water, HVAC and waste reduction.

Table 1 Summary of participating businesses

	Canning	Cockburn	E Fremantle	Fremantle	Kwinana	Rockingham	Total
Medium size Supermarket	2	2	0	1	0	3	**8**
Small Supermarket	2	3	0	2	1	1	**9**
Café	1	3	2	3	0	1	**10**
Deli/Lunch Bar	6	9	1	4	4	5	**29**
Butcher	2	0	1	1	1	3	**8**
F&V Store	0	2	0	0	1	1	**4**
Bakery	0	1	0	0	1	2	**4**
Liquor Store	2	0	1	1	0	0	**4**
Other[5]	1	3	1	5	1	4	**15**
Total	**16**	**23**	**6**	**17**	**9**	**20**	**91**

3.4. Selection of Residents to Invite

The residents were selected randomly but from the streets around the neighbouring local centres. This was so done to create the local centres as hubs for information dissemination for the participating households. In addition, the energy efficiency actions by the businesses would encourage the households taking actions in their homes. The addresses of the households were randomly generated from those selected streets. Figure 4 shows an example of network of the businesses and households where the businesses are information hubs for the neighbouring households.

[5] The other business types include shoe shop, hairdresser, midwifery, newsagent, laundromat, pharmacy, bicycle shop and service station.

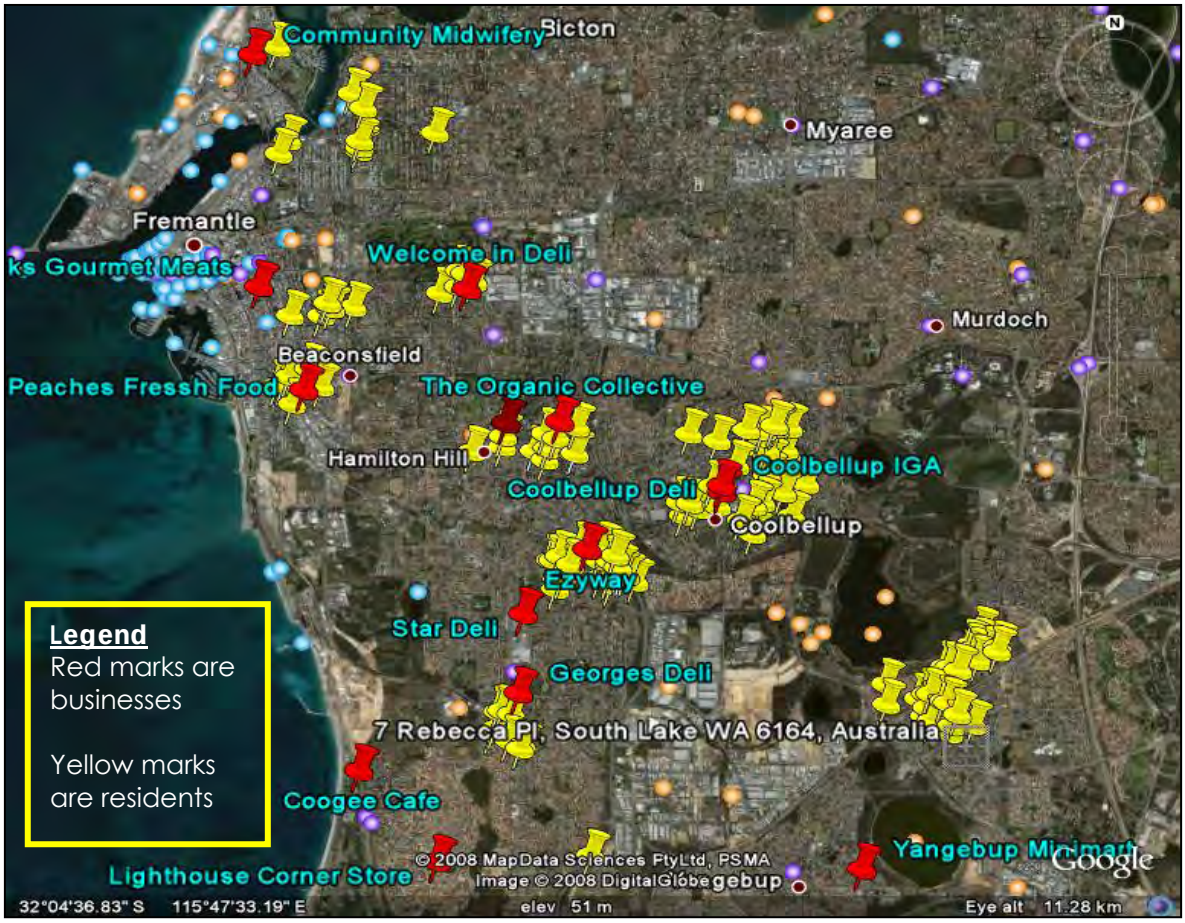

Figure 4: An example of local centres and residents network

3.5. Acceptance of Residents to participate

With the chosen postal approach, the anticipated response rate for residents to participate was 10% or higher. SMRC community surveys in late 2006 showed a remarkable increase in community concerns about taking actions on greenhouse emissions, hence a good response was expected.

In ClimateActions the objective was to engage 1,500 households across the selected neighbourhoods. To avoid an over-request of materials, the project team decided to initially invite 6,000 households in a first round and then followup in a second round, if necessary. Instead, surprisingly, the response rates were generally lower than expected (just over 7%). Table 2 shows the response rates achieved. Between 65% and 85% of households requested paper copies of the brochures. The remainder requested emailed brochures.

Second postal rounds were undertaken in all councils to boost participant numbers, with the exception of Rockingham where two different approaches were used as large postal mailouts were difficult to undertake with their mailing setup.

The postal invitation phase had to be completed by November 2007 in order for information to be effectively delivered. The project had not met the target of engaging 1,500 households by this time and alternative approaches were trialled in the City of Rockingham in November 2007 and February 2008 to engage more participants.

In November 2007 Rockingham environmental staff approached two local primary schools, within the target residential area, where enthusiastic principals agreed to make service

sheets available to all school students' households with an accompanying note from the school. Based on feedback from teaching staff, it was anticipated that this would give a good response rate.

In February 2008, all City of Rockingham staff were mailed service sheets by their Environment Officer with a cover letter. Both of these alternative methods brought lower results than their postal approach, even with follow-up reminders to staff and a presentation to the school.

During the project, Living Smart courses (see www.livingsmart.org.au) were being delivered by SMRC concurrently in the region. These courses cover all greenhouse abatement topics with local residents. The materials developed by ClimateActions were distributed in these residents during class time. Business energy actions were also presented and discussed as part of the class.

Table 2: Response rates achieved through different approaches of household engagement

Councils	Mode of invitations	Invitation #	Acceptance	% response
Canning	Postal	3400	202	6%
Cockburn	Postal	3040	232	8%
	Living Smart course	20	20	
	Business counters	20	-	
East Fremantle	Postal	100	15	15%
	Living Smart course	15	15	
Fremantle	Postal	1620	126	8%
	Living Smart course	20	20	
	phone inquiries		2	
	Business counters	20	1	
Kwinana	Postal	900	52	6%
	Living Smart course	18	18	
	Business counters	10	1	
Rockingham	postal	1320	127	10%
	2 Primary Schools	600	2	
	All Council Staff	380	11	
	Business counters	20	1	
Total		**11,509**	**831**	

4. THE CLIMATEACTIONS SERVICE TO RESIDENTS

For those residents choosing to participate their first step was to fill in the service sheet posted out to them in the introductory mailout. The service sheet listed the following key actions grouped under energy, waste and water:

- Choose clean, renewable energy
- Lower the hot water thermostat in Spring
- Be Prepared: Solar hot water systems
- Getting ready for summer - Shading east and west windows
- How effective is my ceiling insulation
- Selecting high efficiency lighting
- Switch off standby

- What goes in my yellow bin and green bin
- Shopping with climate change in mind
- Composting
- Ways to reduce the volume
- What to do with hazardous waste

- How effective is a water-efficient showerhead
- Choosing a rainwater tank
- Choosing a greywater unit
- Switch from Sprinklers to waterwise drip irrigation
- Establishing an attractive waterwise garden zone

The final list actions were derived from SMRC work in:

- **Energy Actions** project and an earlier **Targeted Actions** research project which investigated perceived barriers to key energy saving actions amongst residents in SMRC councils. These research findings can be found at http://www.climatewise.net.au/downloads.htm
- **Living Smart** course in August 2007 where a short survey was developed to get resident feedback on knowledge and perceived barriers on some water-saving and additional energy-saving actions in the home.

See the Figure 5 showing the Service Sheet for residents. A copy of the service sheet has also been enclosed in Appendix A.

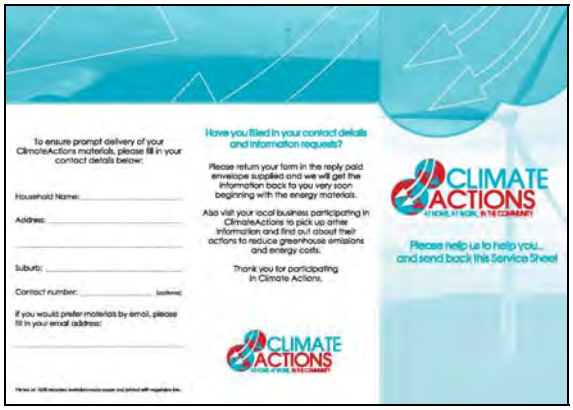

Figure 5a: Front page of Service Sheet

Figure 5b: Back page of Service Sheet

The returned service sheets were collated into a database to coordinate mailouts. To avoid information overload, it was decided to send out requested Energy flyers first pre-summer, then Waste flyers around Christmastime and finishing with Water flyers in the summer period. These action flyers can be found in Appendix D.

Over the course of the project, four Living Smart courses took place in SMRC and flyers were made available at these courses which were also covering greenhouse abatement through energy, water and waste reduction.

With the provision of these action brochures, goal setting cards (see Figure 6) were also provided. A copy of the goal setting card is also enclosed in Appendix A. On the back of the goal card simple instructions explained how and why to goal set.

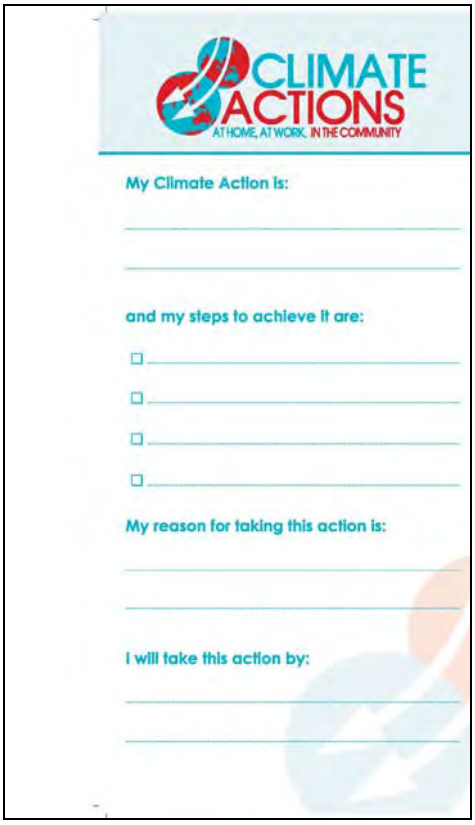

Figure 6a: Front page of Goal Card

Figure 6b: Back page of Goal Card

In the Energy and Waste mailout rounds, business newsletter were prepared for each council (see Appendix E), showcasing some of the local business participants who were taking energy and waste actions. The newsletters also encouraged residents to walk to their local shop and find out more. The residential component commenced midway through the Climate Actions project so that business stories would be available to report on for the first mailout. See further in 5.1.

A mix of energy brochures were also available on business counters. These included the Australian Government's Cool It book, WA Government SEDO Energy brochures and, to a lesser extent, Climate Action brochures. Refill rates indicated the Cool It to be particularly popular to customers.

5. THE CLIMATEACTIONS SERVICE TO BUSINESSES

5.1. Engaging Businesses with the Enterprise Facilitator model

The council CCP officer sends out a project flyer to invite the business owner to participate in the project a week before the site visit. On the first visit, the Green Enterprise Facilitator (GEF) from SMRC, sometimes accompanied by the CCP officer, approaches the business owner with the offer of a free confidential service to help them reduce their electricity bills. Through explaining the project aim to improve energy efficiency in the workplace and asking the owner if they have any ideas of their own the GEF can help to realise, a constructive dialogue is started. In cases where the owners do not have the knowledge in energy efficiency measures, the GEF offers on-the-spot advice and assistance.

With the business owner's permission, the business is supplied with a brochure holder and information brochures to display on the counter. The customers are encouraged to have the information brochures. This supports residents with additional information whether they are project participants or not.

Each participating business is given a specially designed project poster (see sample in Figure 7) with their business name to display. The business is also promoted in a letter, accompanying the information sheet, to nearby residents as being a leader in reducing greenhouse gas emissions.

Figure 7: Sample project poster

The businesses who are actively implementing energy efficiency measures are further promoted through a ClimateActions newsletter as well as council newsletters. Three businesses from each council area are showcased in the ClimateActions newsletter (see Figure 8) in each round of business engagement. The newsletters are circulated via the information mailout to the residents and also placed in the brochure holders at participating businesses.

5.2. Walk-through audit

During the initial visit, apart from ascertaining the owner's willingness to be part of the community project, the GEF carries out a quick walkthrough audit to identify energy saving opportunities. This entails a short survey (see Appendix B for a sample survey questionnaire) to gather information from the owner as to the operation, energy usage and waste practices at the shop. Due to the time-poor nature of these businesses, the survey is designed to be completed verbally with the owner in about 15 minutes. The GEF also makes a list of the major electrical appliances on-site. The GEF gives immediate feedback to the owner and puts forward suggestion of energy efficiency improvement during the first visit. Where possible, the information and/or energy efficient products/service are also made available to the owner at the same time.

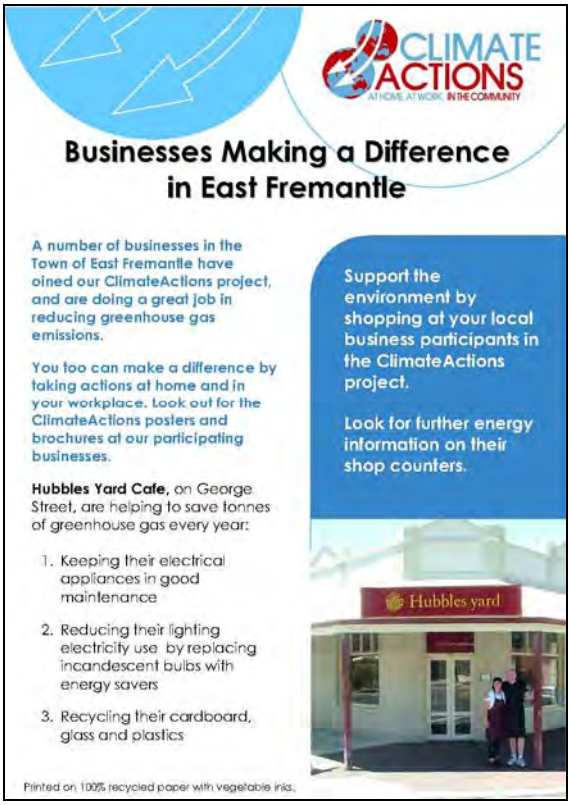

Figure 8a: Sample ClimateActions business newsletter (front page)

Figure 8b: Sample ClimateActions business newsletter (Back page)

5.3. On-Site assistance

In addition to identifying and informing the owners of the energy efficiency opportunities at their business, the GEF also offers on-site assistance in implementing energy saving measures, where possible. A common service provided is the insulation of the first two metres of exposed hot water pipe from a storage hot water system[6]. The GEF arrives equipped with rubber insulation material and gaff tape, and installs the insulation in the space of 5 minutes. Although the energy savings from this action may not be the most significant for the business, the owner tends to be more receptive to ideas and assistance after this goodwill service is received.

5.4. Research and information assimilation

As seen in Section 3.3, a wide range of businesses participated in the ClimateActions project. Common issues tended to arise in businesses of the same category. However, there were some issues which were unique in a particular shop and needed further research and investigation. In cases where further research and legwork is required, the GEF makes a note of the issues, carries out the investigation back at the office, and supplies the information and/or assistance at a later stage via follow-up phone calls or site visits.

Some of the issues can be quite involved, and the GEF may spend considerable time and effort in finding the solutions for the business. In this way, an excellent working relationship is also built up between the GEF and the owner.

[6] See SEDO website: http://www.sedo.energy.wa.gov.au/pages/insthw.asp

5.5. Liaison with product and service providers

Many of the business owners are keen to "do the right thing" for the environment. However, they often lack the time and knowledge to implement energy efficient measures, or where to look for products and services. With this in mind, the GEF supplies the contact details of product and service providers (see Table 3), and a description of their services (and charges if known), to the owner. The GEF also offers to make the call to the provider to set up a site visit and/or organise a quotation.

Table 3 Examples of Product and Service Providers

Provider	***Product and/or Services***
Allied Mechanical Engineering	Installation of coolrooms
Amcor	Cardboard and shrink wrap plastics recycling
Betta Boxes Recycling	Cardboard carton recycling
Bioworks	Used cooking oil recycling (for biodiesel production)
Carton Traders	Cardboard carton & pallet recycling
Claw Environmental	Plastics and expanded polystyrene recycling
Chillsavers	Chiller strips, plastic curtains, night blinds, freezer blankets, high impact swing doors, etc
Cleanaway	Toner & inkjet cartridge/bottle recycling
Coolroom Makers	Installation of coolrooms
DGC Recycling	Glass, plastics and restaurant waste recycling
Maxilights	Energy efficient lighting (retrofit or new)
Lamp Replacements	Energy efficient lighting (CFLs, 35W downlights, etc)

5.6. Readily available energy efficient products

While the responses from many businesses have been positive toward energy saving ideas, it was found that not many businesses actually put them into practice. With many of the businesses being open for long hours 7 days a week, the owners have neither the time nor the inclination to go shopping for energy efficient products.

At the end of the first round of the project, the Climate Actions Team decided to trial the sourcing of low cost energy efficient products from the suppliers and making them available to the businesses. The success of this strategy seems to be backed up by the uptake rate of the two items provided in this manner. Some suppliers also offered energy efficient products at a discounted price for the ClimateActions participants.

- **35W Energy Saving Downlights**

  Many businesses, such as cafes, use a large number of 12V 50W downlights for general lighting. An energy efficient 35W downlight (that incorporates the IRC[7] technology) has equivalent light output to the standard 50W lamps, and so can make electricity savings of up to 30%. Lamp Replacements (O'Connor) generously

[7] Infrared coating (IRC) is a technology developed by Osram. The infrared coating on the globe reflects heat, which would otherwise be lost, back to the filament, increasing the overall efficiency of the lamp.

offered these 35W energy savers at a significantly discounted price for the project participants. One of the medium sized supermarkets also took up an offer from Lamp Replacements to retail the 35W lamps at the discounted price.

- **Timers for drinks fridges**

  Electricity usage in delis and corner stores can be drastically reduced (by up to 30%) if fridges with non-perishable goods were switched off overnight. Common timers from hardware stores can be installed easily at the power outlet to turn off the fridges after hours and automatically turn them on again two hours prior to the commencement of morning trade. The GEF makes available these timers, and offers to set them up for the business owners according to their opening hours.

There is anecdotal evidence that the Round 2 businesses who were offered these energy efficiency products during the first visit were more likely to install them. In addition, they were more receptive to other energy efficiency ideas. The Round 2 actions response rate was significantly higher than Round 1 in nearly all council areas (see Figure 9).

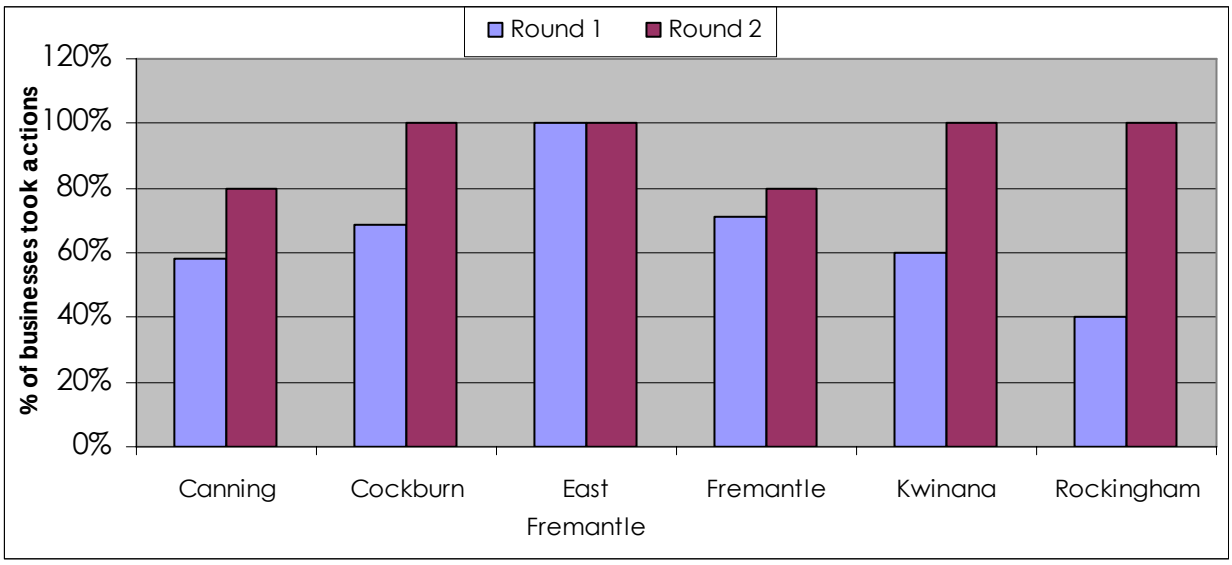

Figure 9: Rounds 1 & 2 actions response rates by Council

5.7. Electricity Tariff

As part of the electricity market reform by the WA Government, all business customers with an annual consumption of over 50MWh (average daily consumption of 137 kWh) became contestable from 1 January 2005. This means that they are free to choose to buy electricity from any approved retailers, including Alinta and Perth Energy. Synergy customers who are over the threshold are offered regulated time-of-use tariffs[8], with on-peak (Monday to Friday daytime) and off-peak rates.

A majority of ClimateActions businesses use well over 137 units of electricity per day, and are therefore contestable. With significant requirements in refrigeration, and appliances running 7 days a week, a sizeable proportion of their electricity is consumed in the off-peak period. However, these businesses are not aware of the choices now on offer. By shopping

[8] Details of Synergy's R1 and R3 tariffs can be found on their website: http://www.synergy.net.au/Business_Segment/Electricity/Buying_Electricity.html

around and choosing the appropriate tariff, a business can free up their finances to invest in energy efficient products.

In the course of the initial visit, the GEF asks the owner's permission to inspect their electricity bill. The owner is also asked to estimate their annual electricity costs to check that the bill is representative of their consumption. Should the business be contestable, the GEF would suggest that the owner perform meter monitoring for a typical week to check their load profile for suitability to switch from 'fixed' to 'time-of-use' tariff. The GEF also offers to liaise with alternative electricity retailers to organise a quotation if the business shows interest in comparing prices. 26% of engaged businesses took up the offer to review their electricity tariff.

Although tariff change itself has no impact on energy consumption, it serves as an opener to a good working relationship with the business. With frequent communication between the GEF and the owner during the negotiation of the contestable market, the owner begins to believe that the GEF is working with them to achieve economic benefits. Some business owners who seemed initially reluctant to be engaged showed more interest in having a dialogue after a tariff review was proposed. In many cases, the owners did not relate their energy use to their electricity bill, but once the time-of-use tariff structure has been explained to them, they began to find ways to reduce use or shift some of the load off-peak on their own accord.

5.8. Waste audits

There is a lack of uniformity in commercial recycling provided by councils in the Southern Metropolitan Region. Some councils provide recycling bins to businesses by request, others do not support commercial recycling.

Many of the ClimateActions businesses have large amounts of materials suitable for recycling. Some of the businesses already have recycling practice in place, using either private contractors or council service. Those who do not recycle at present have raised a number of issues:

- Lack of council recycling service
- Lack of space on the premises to store recyclable materials
- Lack of space for recycling bin (especially the larger ones provided by private contractors)
- Cannot afford recycling services
- Recyclables and general waste are picked up by the same truck therefore, they are not being recycled anyway

These sentiments were relayed back to the council's CCP officers during the bi-monthly project meetings. After discussions with some council Waste Managers and the SMRC's Engineering Services Manager, it was proposed that a small-scale recycling trial could be launched within the scope of the ClimateActions project. However, the idea did not have support across all councils.

Instead of a recycling trial, the SMRC offered to conduct fact-finding waste audits to ClimateActions participants. The SMRC waste auditor and GEF visited businesses in the Cities of Cockburn and Fremantle, and the Town of Kwinana, and conducted a total of 60 waste audits. An interesting outcome of the waste audits was that many of the businesses who were interviewed became interested in services provided by private contractors and a few improved their recycling practice. An extract of the waste audit report is enclosed in Appendix C.

6. Identification of Greenhouse Abatement Opportunities across Business Participants

6.1. General observations about business engagement

As seen in Table 1 (Section 3.3), there is great diversity in the business participants in business activities. There are also big differences in the size of the business, both in terms of number of employees and premises size. The commonly identified issues are therefore, sorted according to the size of the business into two main categories: small businesses with up to 3 full-time employees and medium sized businesses with more employees. A typical small business can be a small deli, corner store, lunch bar or cafe. A typical medium sized business can be a small supermarket such as a local IGA.

Tables 3 and 4 summarise the issues identified from the participating businesses during the initial visit. They show some minor differences in the common issues identified. However, opportunities to reduce energy use and waste volume are abound in all the businesses.

Table 4: Summary of the issues identified in small businesses

Issues	***Commonly identified***
Ownership of the businesses	Renting
Number of employees	2-3
Lighting	Mix of incandescent, CFLs, fluorescent tubes, metal halides and downlight
Lights left ON overnight	Fridge and security lighting
Number of operating fridges	On average 5
Number of operating freezers	On average 4
Type of air cooler	Split systems and evaporative
Hot water system	Electric instantaneous
Waste recycling	No
Reason for not recycling	No council service/Not aware of cost benefits
Major reason for participation	Concerns about electricity bill
Wanted to measure the performance of the appliances	Yes
Electricity tariff type	Synergy fixed rate
Main door type	Single/double leafed, Kept open
Reason for not closing the door	Inconvenience/deter customers
Have thought about applying EE before	No

Table 5: Summary of the issues identified in the medium sized businesses	
Issues	***Commonly identified***
Ownership of the businesses	Renting
Number of employees	Varies, >20 in cases, full-time/part-time
Lighting	Mix of fluorescent tubes, metal halides and downlight
Lights left ON overnight	Fridge and security lighting
Number of operating fridges	Banks of open chillers
Number of operating freezers	Banks of freezers with doors/rows of open chest freezers
Type of air cooler	Evaporative
Hot water system	Electric instantaneous
Waste recycling	Private contractors
Reason for not recycling	Not aware of cost benefits
Major reason for participation	Concerns about electricity bill
Wanted to measure the performance of the appliances	No
Electricity tariff type	Synergy time-of-use
Main door type	Automatic doors
Reason for not closing the door	No door inside metal roller door
Have thought about applying EE before	No

6.2. Specific Energy Efficiency and Waste Reduction Opportunities in the Businesses

Opportunities to reduce electricity use and waste-to-landfill volume vary from business to business. In general, there are many opportunities for businesses to take actions to reduce their impact on the environment. At the same time, they can reap economic benefits from the cost savings.

Small businesses have many opportunities to take actions, and can implement changes quickly. The owner is fully autonomous (except in making structural changes to the building) and can make an informed decision on the spot to improve energy efficiency or implement waste reduction.

Medium sized businesses also have many opportunities to take actions. However, as many of the businesses, such as IGA Supermarkets, have to abide by certain corporate rules (e.g. lighting levels), it is more difficult to instigate immediate changes. In addition, the capital investment in implementing some of the energy saving measures, such as night blinds and

chiller strips on open chillers, can be quite significant due to the large number of chillers in the store.

Energy efficiency opportunities fall into four main categories:

- Refrigeration
- Lighting
- Heating, Ventilation and Air Conditioning (HVAC)
- Hot Water

Other opportunities exist in reducing energy use in cooking and other energy consuming appliances. As most of the recyclable materials originate from packaging, waste-to-landfill reduction can generally be achieved through reuse and recycling. Table 6 summarises the major energy efficiency and waste reduction opportunities which were identified in the Climate Actions businesses.

Table 6: Energy efficiency and waste reduction opportunities identified

	Energy consumption area	***Energy efficiency opportunities***
Refrigeration	Drinks Fridges	√ Reduction in the number of appliances √ Turn off fridges with non-perishables overnight with timers
	Open Chillers	√ Replacement with coolroom with display √ Chiller strips √ Night blinds
	Open Chest Freezers	√ Night covers
	Coolroom/Walk-in Freezer	√ Plastic curtain for entrance √ Self-closing device √ Shading for outdoor units √ Defrosting freezers regularly
	General issues	√ Regular maintenance √ Replacing old seals √ Replacement of old units with energy efficient appliances
Lighting	Fluorescent tubes	√ Delamping and/or lighting retrofit to more energy efficient models
	12V 50W down lights	√ 35W energy saving down lights
	Incandescent globes	√ Replacement by CFLs
	General Operation	√ Turning off lights when not required
HVAC	Reverse Cycle / refrigerative	√ Set appropriate thermostat temperature for the season
	Evaporative	√ Switching to evaporative cooling from refrigerative A/C
	Other issues	√ Keep doors closed during operation/plastic curtain √ Regular maintenance √ Shading for condenser (west and north facing units) Reduce door opening during operation √ Reduce heat generation inside the shop e.g. turn off fridges overnight √ More efficient use √ Reduce hours of operation by utilizing natural ventilation (sea breeze) √ Roof insulation √ Coating the roof with heat reflective paint

Table 6 continued		
Hot Water	Electric/gas Storage	√ Insulate hot water pipe
	Electric instantaneous	√ Switch to instantaneous gas or solar HW
	General Operation	√ Replace old units with instantaneous gas or solar HW √ Lower thermostat setting √ Turn off HWS if not required
General	Fryers	√ Switch from electric to gas fryers
	Other Appliances	√ Turn off when no in use √ Turn off standby power √ Purchase energy efficient appliances
Waste	Cardboard/paper	√ Reuse and recycle
	Glass & plastics	√ Reuse and recycle
	Organic waste	√ Recycle/compost

6.2.1.Refrigeration

Refrigeration is often the single largest source of energy consumption for businesses such as delis, liquor shops, butchers, supermarkets and cafés/restaurants. Improving energy efficiency in this area is therefore a top priority. Typical appliances found in these shops are standalone drinks fridges (many are vendor supplied), chest freezers (e.g. vendor supplied ice cream freezers, bait freezers), coolrooms and walk-in freezer rooms. Energy efficiency measures taken or anticipated to be taken by ClimateActions businesses are as follows:

Reduction in the number of appliances

A common sight in most delis and corner stores is wall-to-wall drinks fridges, packed full of soft drinks, fruit juice and dairy products. In addition, there are a number of freezers for ice cream, bait and other frozen products.

Installation of timers on drinks fridges / turning off overnight

Some product suppliers provide "free" fridges or freezers to retail outlets to promote their brand. Tests using a watt-hour meter over 48 hour periods were carried out on some of the vendor-supplied units showed that annual energy costs is between $1,000 and $1,500 for a single two-door unit.

Figure 11: Timer on the drink fridge

In cases where the fridges were used only for soft drinks and other non-perishable products, the GEF recommended the use of timers (see Figure 11) or to simply turn the fridges off overnight. The fridges can be turned on two hours prior to morning trading without comprising their coolness. This action is expected to save up to 35% of the energy consumed by these fridges, yielding annual savings of more than $500 per fridge.

In Round 2 of the project, the GEF made available analogue timers and offered to set them up for the business on the spot. This was readily taken up by 80% of the businesses who were offered the service.

Replacement of individual fridges with a coolroom with display

A case study[9] in Melbourne showed that energy efficiency of up to 50% can be made by replacing four separate fridges with a coolroom with display doors. Energy is saved from the use of a more energy efficient compressor on top of the roof and reduced air-conditioning use (built-in compressors in standalone fridges are a heat source raising the temperature inside the shop which contributes to the A/C load).

Equipment upgrade / replacement

Aging inefficient appliances were commonly found in businesses. When these were identified during visits to businesses it was pointed out to the owners that replacing old appliances with newer and more efficient ones could be an expense with a relatively short payback period due to the lower running costs. Old refrigeration appliances were replaced in at least two of the businesses. Some upgrades were also made, such as moving a large compressor from an area inside the shop to the roof. This action significantly reduced the air conditioning load of the shop.

Chiller strips and night blinds on open chiller display

An estimated savings of over 50% in energy consumption can be made by the installation of plastic chiller strips (see Figure 12)on open chiller display[10]. There is much resistance to chiller strips installation by business owners who perceive this action as a physical barrier which deters shoppers. A Cockburn business owner who installed chiller strips on his fruit and vegetable display reported little difference in sales, but was happy with the reduction in running cost.

Figure 12: Chiller strip installed in a shop in Cockburn

Insulated night blinds can be pulled down to cover the front of the chiller overnight to reduce cool air loss. The amount of energy savings depends on the number of hours the blinds are in use and the effectiveness of the blinds.

Many of the businesses already have night blinds (most modern chillers have built-in night blinds) and were already using them at the initial visit.

Night covers on chest freezers

The open chest freezers in supermarkets are large consumers of energy, as they maintain below-zero temperatures for products that are in direct contact with ambient air. Freezer blankets or fitted covers can be used overnight on these units to reduce the refrigeration load.

The GEF also researched the possibility of retrofitting glass covers for these units by request from one business. The manager already put night covers on the two banks of open freezers in his supermarket but felt that more could be done. Unfortunately, after an extensive search, the GEF could not find any local service provider. The dealer for the freezers believed that they could not be retrofitted with glass covers.

[9] For more details, see Moreland Energy Foundation Limited's case study of Dairy Queen in Melbourne's northern suburb of Glenroy at http://www.mefl.com.au/business/project/39/.

[10] The findings were made in a 1994 study - Monitoring of the Performance of Chillstrip 24 Hour Screens at Cheap Foods Store in Applecross by the Murdoch University Energy Research Institute.

Plastic curtain / self-closing device for coolroom and walk-in freezer door
Energy consumption by coolrooms and walk-in freezers can be substantial in a business. In many cases, particularly in the supermarkets, there is considerable traffic in and out of coolrooms and walk-in freezers. With each opening of the door, which is sometimes left open for a period of time, cold air rushes out due to the temperature differential. High grade plastic curtains can be installed across the entrance or a self-closing mechanism on the door can be used to stop the loss of coolness and improve energy efficiency.

Shading for outdoor units
Some coolrooms and walk-in freezers are located outside the building. In some cases, the units are in full sun or facing north or west. Although generally insulated, the heat gained from the hot summer sun increases the refrigeration load nonetheless. Shading with shade cloth or a purpose-built structure of these outdoor units reduces the energy consumption.

General issues
Other actions which have been taken by the businesses include regular maintainence of the appliances by removing dust around the compressor and checking for good condition. Freezers are defrosted on a regular basis, old ineffective seals are replaced, and old appliances are replaced with more energy efficient ones.

6.2.2.Lighting

Lighting in businesses presents a large potential for energy reduction. In many cases, lighting was found to be inefficient and lighting levels were excessive. Supermarkets and pharmacies tend to be over lit, but small premises such as delis often do not have excessive lighting. In some cases, inappropriate technology, such as large numbers of downlights, is used for general lighting. A lux meter was used to check illuminance levels in some businesses. The following energy efficiency measures for lighting were taken or anticipated:

Delamping and/or lighting retrofit of fluorescent tubes
The most common general lighting found in the businesses is double fittings of fluorescent tubes. In many cases, the lighting level is excessive so the opportunity exists to delamp some of the tubes to save electricity without compromising visibility. One Fremantle business delamped 42 tubes out of 96 in double fittings. This contributed to savings of 2.7 tCO_2e emissions per year. In two businesses, the owners were planning renovations and took the opportunity to retrofit single high efficiency fluorescent lights with reflectors. This action can save up to 50%[11] of electricity use without loss of luminance.

Replacement of 50W halogen downlights with 35W energy savers
This action is applicable to many businesses including cafés/restaurants, beauty salons, and pharmacies. The saving per lamp is estimated to be 0.15 kWh per 10 hour day of operation, giving a shop with 20 downlights savings of up to $200 per year. The 35 W lamps are not easy to source, so a flyer was produced with details on locating them and savings for different scenarios. Discussions were held with Osram who then offered a reduced lamp price for businesses participating in the project.

Replacement of incandescent bulbs with Compact Fluorescent Lamps (CFLs)
In most businesses, the general lighting is provided by fluorescent tubes. However, there were a small number of businesses still using incandescent light bulbs. Although public awareness of the CFL technology reasonably good, there is still resistance from some quarters to embrace it. Some owners are progressively replacing incandescent bulbs with more energy efficient CFLs. It is estimated that 80% of energy savings can be made by replacing a standard light bulb with a CFL of equivalent luminance.

[11] Energy efficiency data provided by Richard Greene at Maxilight Industries (WA) Pty Ltd, Osborne Park, WA.

Turning off lights when not required

Most businesses do not leave any lights overnight, except for outdoor security lights and lights inside drinks fridges. A majority of the security lights are activated by motion sensors. If this was not the case, the GEF suggested the installation of motion sensors to improve energy efficiency. Fluorescent lighting inside drinks fridges increases energy consumption and running costs as the lights are on all night when there is no requirement for display. In addition, the refrigeration load of the fridge is increased to combat the heat produced from the lamp. After the GEF pointed out that most drinks fridges have separate light switches, a number of businesses started to turn off fridge lights overnight.

6.2.3.Heating, Ventilation and Air Conditioning (HVAC)

Energy consumption in most businesses in the summer months can be 20% higher than the winter months, with air-conditioning accounting for much of this increase. Therefore, energy efficiency in this area can make a big difference in terms of energy savings and reducing the overall electricity bill. There is a variety of air-conditioning systems, the most common is the (ducted) evaporative air-cooler, but there are also a number of split-system reverse cycle units and a few old room air-conditioners (RACs) found in small-size businesses. The energy efficiency measures which can be taken depend on the type of air-conditioning system in place. The measures taken or anticipated are categorised as follows:

Refrigerative/Reverse Cycle Air-Conditioners (A/C)

Appropriate thermostat temperature for the season

Whereas temperature control on the RACs is manually operated, more modern reverse cycle A/Cs are thermostatically controlled. Energy efficiency for the latter can be maximised by setting the appropriate thermostat temperatures: between 24ºC and 26ºC for summer cooling, and 19ºC and 21 ºC for heating in the winter. There is widespread misconception among business owners that the thermostat needs to be set low (around 20ºC to 22 ºC) for summer cooling to be effective. After careful explanation from the GEF, a number of businesses improved energy efficiency by adjusting their thermostat settings.

Switching to evaporative cooling from refrigerative A/C

Evaporative cooling is up to 80% more energy efficient than refrigerative air-conditioning[12]. One business in Cockburn followed the GEF's advice and replaced two old RACs with a ducted evaporative cooler and made substantial savings on their electricity bill.

Keeping doors closed during operation/plastic curtain across entrance

Refrigerative air-conditioning load is drastically increased if the owner left the door open during its operation as the cooled air is constantly in contact with the much warmer air outside. The GEF explained the rationale to the many owners who keep their doors open. A common perception is that the shop "looks closed" with the door shut and therefore "puts off" potential customers. The GEF suggested placing a large 'OPEN' sign outside and encouraged them to install high-grade plastic curtain across the entrance. The ideas were taken up by a few businesses and actions taken include closing doors, activating their automatic doors and installing plastic curtain.

Shading for the condenser (west and north facing units)

[12] For more details, see the report at:
http://www.energyrating.gov.au/library/pubs/tech-evapac2001.pdf.

A condenser situated in full sun or hot afternoon sun increases energy consumption. Energy savings of up to 10% can be made by shading the A/C condenser[13]. Shading can be provided from sails or a custom-built structure. A small number of businesses have taken or are anticipated to take this action to improve energy efficiency.

Evaporative Coolers

Reduce door opening during operation

Although evaporative coolers need a certain amount of airflow to operate, a wide open doorway can increase the load of the unit. Owners with evaporative coolers are advised to reduce the size of the doorway during the operation of the A/C. A café in Fremantle has an 8m wide frontage with folding glass doors. The owner has since cut down the size of the opening by partially closing the glass doors.

General issues

Regular cleaning of the filters, condensers and fins on an A/C unit and periodic checks to sure good working condition will ensure that the A/C is running to its maximum efficiency. A Cockburn owner complained that the ducted evaporative cooler in his shop was ineffective and wanted to replace it with two reverse cycle split systems. The GEF suggested the cleaning and maintenance of an existing unit to see if it was performing efficiently. This advice was backed up by an air-conditioning/ventilation specialist, whose visit was organised by the GEF.

A common complaint from business owners at the initial visit was that the shop is uncomfortably warm in the morning when they arrive for work. These businesses tend to have large numbers of standalone drinks fridges and freezers in a small space. Heat generated by the many the motors/compressors is trapped in the shop as all doors and windows are kept closed for security. As a consequence, the air-conditioner has to operate at higher load and for longer periods to compensate for the heat gained overnight. Daytime operations of the fridges and freezers, and cooking appliances also contribute to the cooling load, therefore reducing the number of appliances and turning them off (e.g. grills and bain maries) also helps to reduce energy use.

Where possible, the GEF makes suggestions to turn off fridges (without perishables) overnight with timers, and looks for ways to improve ventilation without comprising security. A number of businesses who installed timers on their fridges reported not only lower electricity bills but a cooler shop when they arrive in the morning. Owners are also urged to the number of appliances and train staff to turn them off when not in use.

Businesses can use their air-conditioners more efficiently by turning them on earlier in the morning and pre-cooling the space, and setting the thermostat at slightly warmer temperatures during the day. Research[14] shows that this can save up to 30% in running cost and at the same time reduce load at peak times. A Cockburn deli owner, who used to have high electricity bills, tried this method, in combination with turning off drinks fridges overnight with timers, and found that her summer electricity bill substantially decreased. A number of businesses at coastal or near-coastal locations can reduce their hours of A/C operations by utilizing natural ventilation. Some businesses are proactive at opening windows and doors as soon as the outside temperature falls below the shop temperature and when the sea breeze comes in.

Air conditioning load can be greatly reduced by installation of roof installation and, if appropriate, coating the roof with a heat reflective paint, as they decrease heat gain through the roof. Two businesses are anticipated to take these actions.

[13] See: http://www.foxservice.com/kb/article-5.html

[14] Research by Purdue University, USA, found that pre-cooling in the morning at slightly lower temperature setting and cooling in the afternoon at slightly warmer temperatures can reduce A/C demand by up to 30%. For more information, see http://www.azobuild.com/news.asp?newsID=1904.

6.2.4. Hot Water

The typical hot water system (HWS) found in the businesses are: electric or gas storage, electric instantaneous, and gas instantaneous. One business in Kwinana has a solar HWS and they are able to meet their hot water needs without turning on the electric booster. The hot water measures taken or anticipated are as follows:

Lowering thermostat on electric/gas HWS
Energy savings can be made by lowering the thermostat setting[15] for any business with a water heater. However, many owners of food premises, particularly the ones serving cooked food, are reluctant to lower the thermostat for hygiene reasons. Some businesses have taken this action to improve energy efficiency.

Insulating hot water pipes
Energy savings by reducing standing loss can be achieved by insulating the hot water outlet pipes of an electric or gas hot water system. The Sustainable Energy Development Office (SEDO) recommends the insulation of the first 2 metres of hot water pipe from the tank for this purpose.

Replace old units with instantaneous gas or solar HW
Instantaneous gas or solar HW are far more efficient than electric or gas storage systems. Replacing old storage or electric instantaneous units with these HWS saves not only energy but running costs. Switching from a 100L electric storage system to a solar HWS with gas booster can save an estimated $500 per year in running cost[16].

One business in Ferndale replaced their large gas storage HWS with a 5-star rated gas instantaneous system after advice given by the GEF during one of the visits.

Turn off HWS if not required
This action can make huge savings if the HWS is rarely used. One electrical shop in Rockingham decided to turn off their electric storage HWS as it is never used, making an estimated savings of $350 a year. Other businesses chose to leave the HWS off until an hour before they require hot water at the end of the trading day, then turn it off again.

6.2.5. General Electricity Use

Switch from electric to gas fryers
A majority of commercial fryers found in shops are electric rather than gas fuelled. Although the initial capital outlay is much lower, electric fryers have up to 50% higher running costs compared to gas fryers. For a café in Coogee, an estimated savings of 3.5 tonnes of greenhouse gas emissions can be made each year by switching from electric to gas fryers in his fish and chips kiosk.

Turn off when not in use
Appliances such as grills and bain maries are often left ON even when not in use. Staff training can greatly help addressing this issue. The GEF provided one business in Rockingham with written prompts to encourage staffs to turn off certain appliances.

Turn off standby power
An estimated 10% of energy use in many appliances can be attributed to standby power. The GEF found that the awareness of this issue was very low during the initial visit. However, many business owners were keen to reduce standby usage and have commenced the practice of turning off appliances at the mains.

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[15] See SEDO website for more details: http://www.sedo.energy.wa.gov.au/pages/insthw.asp.
[16] Based on information brochure by SEDO Energy Smart: Solar hot water systems.

Purchase energy efficient appliances

There is a wide variation in the energy efficiency of electrical appliances in the market. GEF was able to advise a number of businesses on which energy efficient appliances to purchase. The Energy Rating website[17] was used extensively for this purpose.

A few examples of the appliances purchased on the GEF's advice include: an energy efficient reverse cycle air-conditioner, an evaporative A/C (replacing 2 RACs) and a five-star rated gas instantaneous HWS (replacing a gas storage system).

6.2.6. Waste Reduction

Large volumes of recyclable waste are generated at SMEs on a daily basis. A large proportion of the recyclables is in packaging cardboard, glass and plastics. Green waste is found in businesses retailing fresh fruit and vegetables or preparing food on site (e.g. lunch bars). Other organic waste produced includes used cooking oil and animal offal and fats.

Recycling practice in businesses was found to be extremely variable, depending on the availability of council service and owner's awareness of the cost benefits of recycling. There is no uniformity in the provision of commercial recycling in the six council areas involved in the project. Some councils provide yellow-top bins, small skips or a pick-up service for some businesses, while other councils do not provide commercial recycling. 60 out of the 88 engaged businesses reported that they were recycling at the beginning of the project. A variety of recycling practice was identified as follows:

- service from private contractors
- council provided service
- shared skip provided by Centre Management
- reuse the materials
- return the materials (cardboard cartons) to the suppliers
- take the materials home to put in the residential recycling bin

Many of the businesses who do not currently recycle would like to do so, if the council were to provide the service. The GEF compiled a list of services and prices provided by private contractors and distributed this to ClimateActions businesses who were interested in improving their recycling practices. The businesses are made aware of the cost benefits of recycling and the GEF also arranges a site visit from sales representative from the relevant private contractors.

Cardboard/paper

The bulk of recyclables found at the businesses was packaging cardboard. Paper is generated from food packaging and from the office, particularly at medium-sized businesses or at pharmacies.

At least one business sends the cardboard cartons back to the supplier via the deliverer. Medium-sized businesses, such as IGA supermarkets, have a baler which compresses the flattened cardboard and straps them up, ready for collection by a private contractor. Two small businesses use council collection service (one has a small skip and the other leaves the cardboard in a pile in the back lane). Other small businesses may have 240L yellow-top bins or a shared skip provided by Centre Management.

In general, businesses report that they have more cardboard than can be fitted into a 240L bin collected fortnightly. Owners have inquired as to whether it would be possible to have more frequent collection by the council. Where the business has sufficient storage space, the GEF advises them to look into getting a private contractor as they provide much bigger bins at reasonable prices.

[17] See http://www.energyrating.gov.au/ for details.

Glass & plastics

Some recyclable glass and plastics (drinks bottles and cartons) were found at the businesses although most businesses, with the exception of cafes, did not have significant volumes as their customers tend to consume their purchases elsewhere. During the course of the project, it was identified that (clean) shrink wrap plastics can be recycled at low cost to businesses. At least one business has taken up shrink wrap plastics recycling after the GEF informed them of the available service.

Organic waste

Organic waste was found at a number of supermarkets, fruit and vegetable (F&V) retailers and lunch bars. One F&V retailer in Cockburn delivers their organic waste to the Environmental Technology Centre at Murdoch University for recycling. Another retailer in Rockingham has a farmer pick up their green waste for animal feed. One business in North Fremantle would like to purchase two compost tumblers to supply their local community with free compost. The GEF has made the council's Sustainability Officer aware of their intentions so they may be supported in realising their dream.

Animal offal and fats generated at butchers are usually collected by a private contractor for recycling. Used cooking oil (UCO) from delis, lunch bars and cafes are often disposed of, although some businesses have a collection service by private contractors. The team became aware of a new UCO recycling service[18] which provides all the equipment, collects and pays the business for their used oil. As well as reducing waste-to-landfill and potential soil contamination, there is additional GHG abatement benefit as the company produces biodiesel from the UCO for transport fuel.

[18] Bioworks in O'Connor is a start-up business who pays to collect used cooking oil from businesses and produces biodiesel for transport fuel. For more information, see http://www.bioworks.com.au.

7. PROJECT EVALUATION

This section presents the qualitative and quantitative outcomes of the project based on the overall observation and participant feedback.

7.1. Evaluation of Business Engagement

The business engagement of the project was very successful, with over 93% of businesses approached responding positively the invitation to participate (see also Figure 5). Eighty-eight businesses were engaged for the duration of the project. The GEFs visited the businesses 3.5 times on average, and organised 60 site visits and quotations from service and product providers. A good working relationship was built up with the businesses, via a combination of visits and telephone correspondence. This led to a good uptake of the GEF's advice and many of the services and products, such as chiller strips, plastic curtains and recycling, taken up by businesses to improve energy efficiency at their workplace.

Table 7 below gives a summary of the Climate Actions service statistics:

Table 7: Climate Actions Statistics

Services provided by the GEF	***Number***
Business visits	309
Businesses showcased in newsletters	35
Businesses supplied with brochure holders to display energy and water efficiency flyers and business newsletters	70
Site visits/quotations from service and product providers organised	60
Businesses provided with on-site technical assistance	29
Businesses provided with Used Cooking Oil collection flyer	22
Businesses provided with SMRC waste audits	40

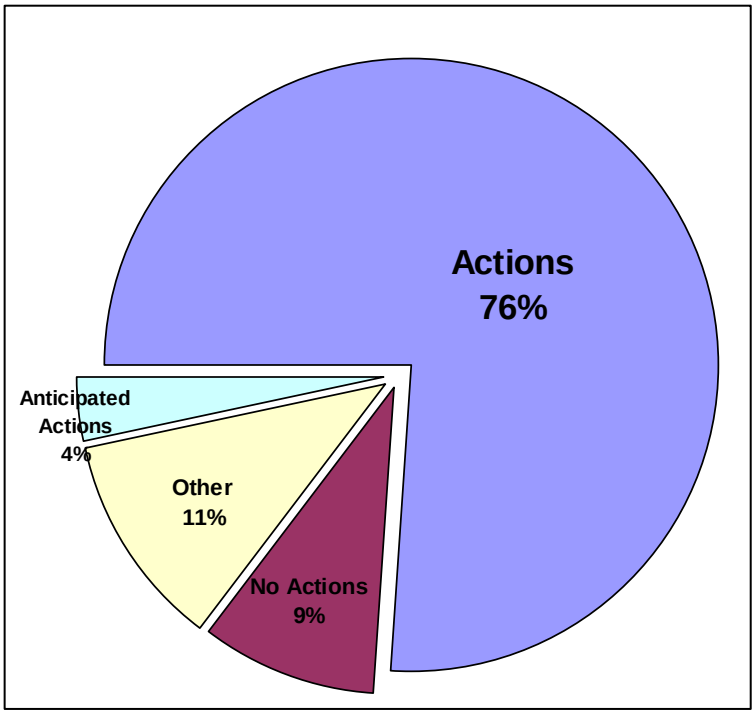
7.1.1. Actions taken by Climate Actions Businesses

Many participating businesses were very motivated in improving energy efficiency in their shop. Some of them became motivated after the GEF explained the cost benefits of using less energy, such as lower electricity bill and environmental benefits. Around 9 percent of businesses could not be persuaded to take actions as they were too busy or were deterred by the initial outlay of the energy efficient measures.

As some of the actions have relatively long payback periods, such as lighting retrofit or installing automatic doors, businesses tend to delay those decisions or choose not to take action despite the potential long-term benefits. Nevertheless some businesses took on this challenge and incorporated these retrofits or upgrades into their business plans. One deli owner in Cockburn decided to replace all his individual drinks fridges with an energy efficient coolroom with display. The owner also plans to upgrade his triple tube fluorescent light fittings with more energy efficient single high efficiency tube with reflector. He is currently awaiting council approval to make the structural changes to his shop.

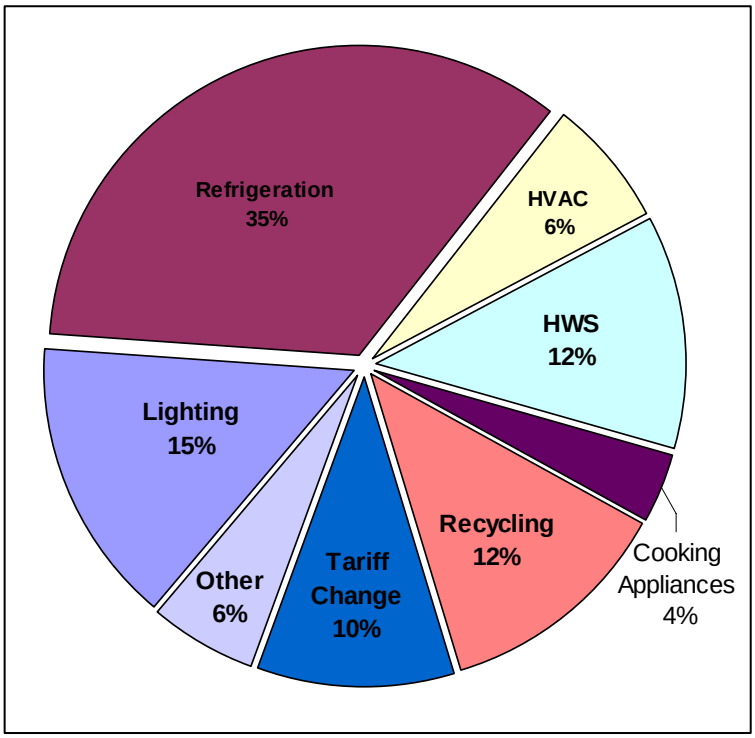
Of the 88 successfully engaged businesses, 76% took actions during the project, while 4% are anticipated to take actions to improve energy efficiency in the near future (see Figure 12). Another 11% have already taken actions on their own initiative to be energy efficient even before our first visit.

Figure 12: Business actions distribution



The types of actions taken reflect the areas of high electricity consumption in the businesses. As shown in Figure 13, **35% of actions were taken to improve energy efficiency in the area of refrigeration.** These actions include the installing of chiller strips, night blinds, timers on drinks fridges, reducing the number of appliances. One particular business in Canning had 10 fridges and 6 freezers and the owner was concerned about his big electricity bill. The owner heeded the GEF's advice to consolidate his products into fewer appliances and decommission 7 fridges and 4 freezers. He proudly informed the GEF at a subsequent visit that his (60 day) bill had reduced from $2,200 to $1,400. This translates to an annual greenhouse gas emission savings of 25 tCO_2e.

Figure 13: Types of actions taken by the businesses



Lighting was another major area where the opportunities for energy efficiency were readily taken up, with 15% of businesses taking actions. The most common action was the replacement of 12V 50W downlights with a 35W energy saver which gives the same luminance (with energy savings of 30%). Two small businesses decided to retrofit their fluorescent lighting from double or triple recessed fittings to single fittings with reflectors. The Community Midwifery in Fremantle, who delamped their fluorescent lighting by almost 50%, are saving approximately 2.7 tonnes of greenhouse gas emissions a year.

Lighting retrofit or partial delamping was identified at a large number of premises as double tube fittings are very common in shops. However, most businesses are reluctant to carry out retrofit due to the relatively long payback period and/or they have recently renovated.

Energy efficiency improvements were made by 12% of businesses in their hot water systems. Energy savings were made by choosing energy efficient hot water systems, turning off the storage system (and turning on an hour before hot water is required), lowering the thermostat and insulating the hot water pipe. The latter option was particularly popular as the GEF offered to insulate the pipe on the spot at no cost to the business.

Six percent (6%) of the actions were taken in the HVAC area, mainly for cooling in the summer with air-conditioners. Some of the businesses reduced electricity use by purchasing better energy rated A/Cs, using their existing systems more efficiently and reducing heat production inside the shop or heat gain from radiant heat. More details of the actions taken are described in Section 6.2.3.

Improved recycling practices help reduce greenhouse gas emissions by diverting waste from landfill. **Twelve percent (12%) of businesses commenced or improved their existing recycling practices.** The GEF liaised with the local council for the availability of recycling bins where the councils supported commercial recycling. In cases where the business was producing too much or too bulky recyclable materials to fit into 240L yellow top bins, the GEF arranged for site visits and quotations from private contractors. One business owner in Fremantle, who is already recycling aluminium, cardboard and glass, began recycling shrink wrap plastics after the GEF informed him of the specialist service.

Other areas of actions taken include turning off appliances overnight, switching from electric to gas fryers and purchasing high energy-star rated appliances when replacing old ones (see Section 6.2.5).

7.1.2. Electricity and GHG emissions reduction

As a result of the actions taken by the businesses, estimated savings of 540,000 kWh of electricity are achieved per year, with accompanying GHG emission saving of 500 tCO2e. This equates to savings of over 6000 kWh in electricity and 5.7 tCO2e in GHG emissions per business per year on average.

Table 8 summarises the quantifiable savings in electricity and GHG emission resulting from the business actions. The GHG savings are calculated by applying an emissions factor of 0.98 to the electricity savings, except in the case of replacement of electric by gas appliances. This accounts for the difference in percentages of savings in electricity and GHG emissions, as seen in figures 14 and 15. The calculations and assumptions for the estimates of energy savings and greenhouse gas emission reduction can be found in Appendix F.

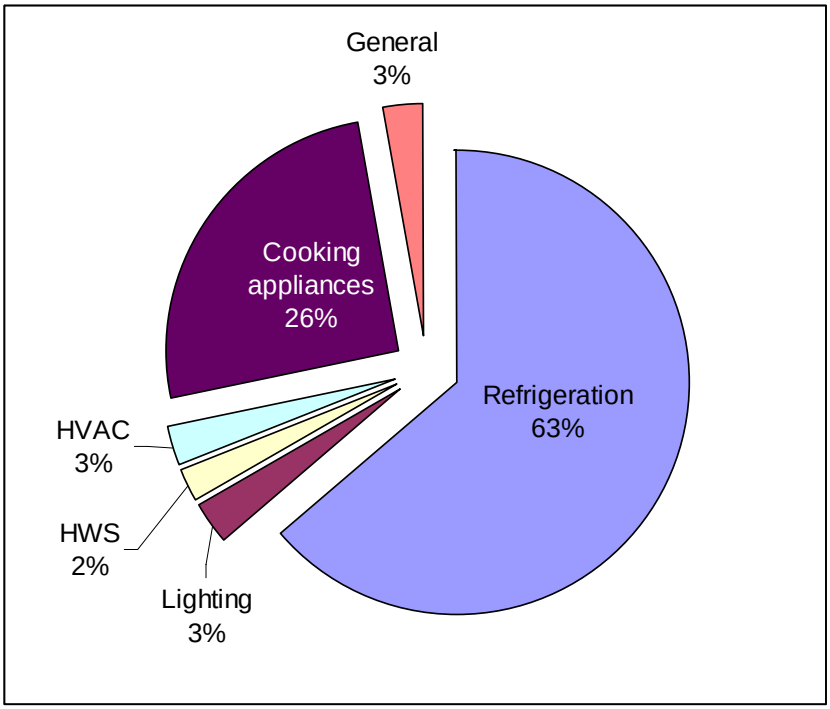


Figure 14: Electricity savings by businesses

The biggest electricity savings are made in the area of refrigeration (63%), as shown in Figure 14. The significant savings from more efficient refrigeration is not surprising as these appliances consume large amounts of electricity in their normal operation. Many of the refrigerators and freezers found in small retail businesses are supplied by soft drink and ice-cream vendors. Energy monitoring of some of these appliances showed that their efficiency vary considerably. Although business owners are given financial incentives, such as discounted products, to have these appliances in their shops, they are

generally not aware of the onus of having to pay higher electricity bills. The electricity and GHG savings in refrigeration was mainly achieved through installation of 70 timers on drinks fridges with non-perishable contents. Decommissioning and replacement of individual drinks fridges with an energy efficient coolroom with display also contributed to the savings. Other actions taken in this area include the installation of chillerstrips/night blinds for open display, plastic curtains for coolrooms/walk-in freezers, and the replacement of old seals.

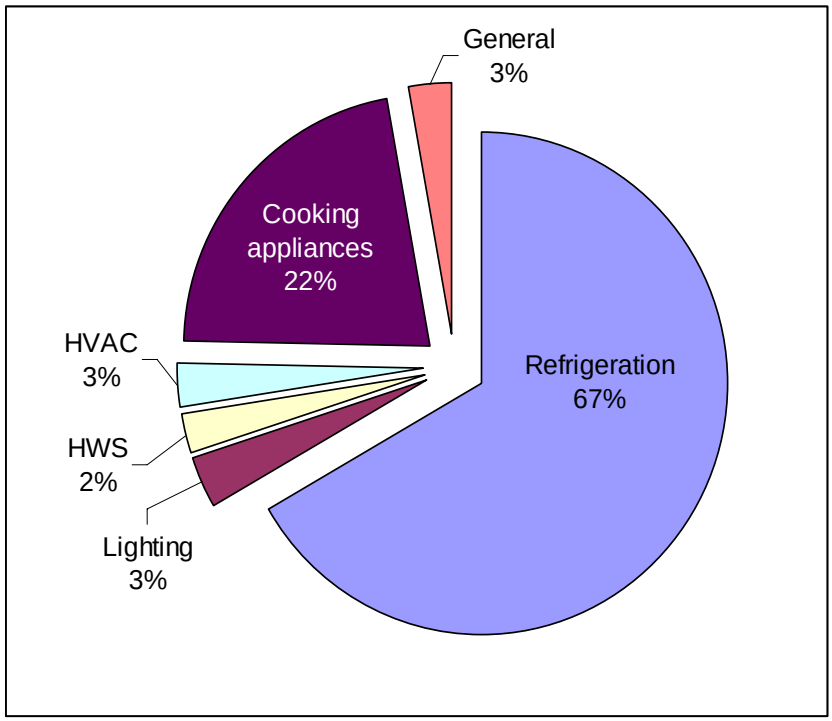


Figure 15: GHG emission savings by businesses

Significant electricity savings are also made in choosing energy efficient cooking appliances (26%), particularly in switching from electric to gas deep fryers. Gas fryers use less source energy for cooking compared to electric fryers. The heat is produced from direct combustion of gas at the point of use, rather than being converted from electricity produced at a centralised power station. In the latter case, energy is lost through power production (fuel to electricity), transmission, distribution and energy conversion (electricity to heat) along the supply chain. Businesses using efficient gas fryers also report quicker response times and "crispier" products.

Although many actions were taken in other areas, the electricity and GHG savings were relatively small. **Better energy efficiency in lighting (3%), HVAC (3%), turning off unused appliances (3%), and HWS (2%) contributed to the overall savings.** Savings in lighting resulted from the replacement of two hundred and twenty-two (222) 12V 50W halogen spotlights with 35W energy savers, delamping and retrofitting. Better efficiency in HVAC was achieved mainly through equipment upgrade, more efficient use of air-conditioners and installation of automatic doors or plastic curtains on shop entrances. In the area of HWS, the savings are made from lowering thermostat settings, insulating hot water pipe and switching from electric to gas hot water systems.

Savings from other actions are not easily quantified. For example, energy saved from the diversion of used cooking oil (UCO) from landfill to biofuel production is difficult to quantify without detailed analyses of the volumes and processes involved. Twenty-two businesses were provided with information on the free UCO collection service provided by Bioworks[19], with many of them expressing an interest in the service. Improved recycling practices save energy and GHG emissions, through diversion from landfill, and ensure more sustainable use of our resources. Sixty (60) shops were already recycling before the initial visit, thirteen (13) shops began or improved existing recycling practices. However, the energy savings are not quantifiable without a series of waste audits, performed before and after the improvement in recycling, and lifecycle analyses of the recycled materials.

[19] Bioworks is a local biofuel manufacturer who provides a free collection service to businesses for their used cooking oil for the production of biodiesel. For more information, see www.bioworks.com.au.

Table 8: Energy and greenhouse reduction estimates								
	Actions	***Quantity***	***Unit***	***Estimated Energy Savings kWh/unit/day***	***Actual Energy Reduction kWh per year***	***Anticipated Energy Reduction kWh per year***	***Actual + Anticipated Energy Reduction kWh per year***	***Actual + Anticipated GHG Abatement kg CO_2-e***
Refrigeration	Timer on fridges	70	timers	4	102200		102200	100156
	Decommission fridges	14	fridges	12	61320		61320	60094
	Decommission freezers	11	freezer	4	16060		16060	15739
	Replace fridge/freezer seals	4	units	1.3	1423.5	474.5	1898	1860
	Energy Efficient Upgrade	4	shops	25	27375	9125	36500	35770
	Chiller strips/Night blinds	5	units	12	17520	4380	21900	21462
	Plastic curtain for cool room/freezer	5	curtain	6	6570	4380	10950	10731
	Coolroom in place of vendor fridges	4	shops	60	21900	65700	87600	85848
	Shading for outdoor freezer/condenser	2	shops	7	2555	2555	5110	5008
Lighting	Energy Savers (35W downlights)	222	globes	0.15	12155		12155	11911
	Delamping	1	shop	10.58	2762		2762	2707
	Lighting retrofit	2	shops	2.98	1088	1051	2139	2096
Hot Water	Lower thermostat	2	shops	1.87	1368		1368	1341
	Decommission electric storage HWS	1	shops	12	4304		4304	4218
	Switch to gas instantaneous HWS	2	shops	8.39	6122		6122	6000
HVAC	More efficient usage	4	shops	3	1440		1440	1411
	Plastic curtain for shop entrance	2	shops	2	450		450	441
	Upgrade to EE air conditioning unit	1	shops	3	540		540	529
	Old RAC to evaporative ducted	1	shops	12	1440		1440	1411
	Install/repair automatic doors	3	shops	15	1800	3600	5400	5292
	Roof insulation/reflective paint on roof	1	shops	11		1320	1320	1294
Cooking	Switch from electric to gas fryers	4	shops	95	34675	104025	138700	110128
	Turn off appliances overnight	4	shops	10	14600		14600	14308
	Total			**318**	**339668**	**196611**	**536278**	**499755**

7.1.3. Financial Savings by the Businesses

The total financial savings made by the businesses who have taken actions are estimated to be around $93,700 per year (see Figure 16 for a breakdown by category)**.** This figure was calculated using Synergy's L1 tariff charges of 17.47 cents (including GST) and the total kWh savings per year.

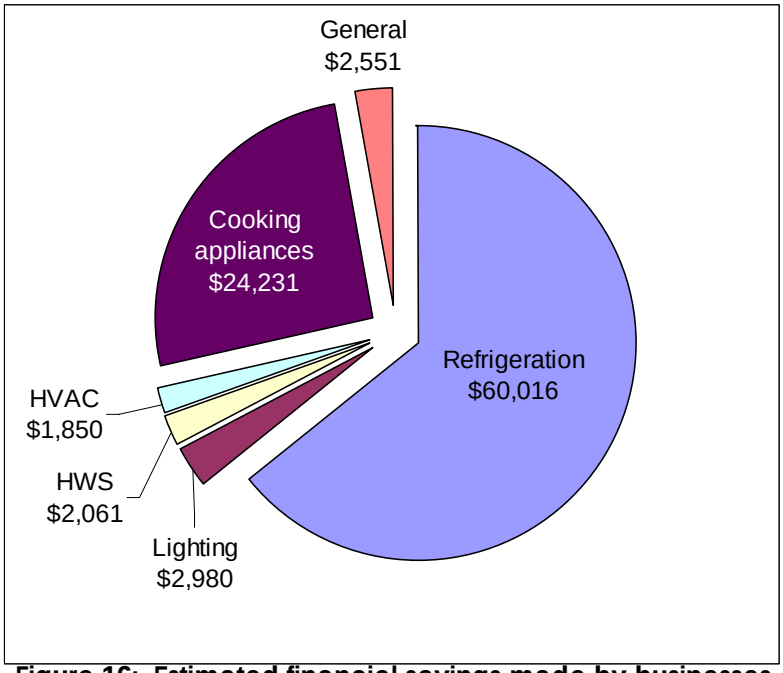


Figure 16: Estimated financial savings made by businesses

In reality, the businesses can be on Synergy's fixed (L1) or time-of-use (R1 or R3) tariffs, or under Alinta individual contracts with various charge rates. In addition, there are constant changes in the businesses energy use patterns, such as adding or replacing appliances. It should also be noted that some of the higher cost energy efficient products such as chillerstrips, plastic curtains, coolrooms with display, lighting retrofit, etc, can have payback periods of up to a few years. Therefore, it is not feasible to try and accurately quantify the financial savings made by the businesses.

Individual businesses have reported savings per 60 day bill ranging from tens to hundreds of dollars. One particular business in Canning has reported financial savings of around 40% on his electricity bill after removing 7 drinks fridges and 4 freezers from his shop. **Financial savings have also been made by 12 businesses who chose to change to a more appropriate tariff** (such as from fixed to time-of-use for those businesses who use more than 30% of their energy in the off-peak period), or switching to another electricity retailer offering a better rate.

7.1.4. Climate Actions Award Ceremony

Eighteen businesses were selected to receive an award for their achievements in improving energy efficiency at their shop (see Table 9). Some of these businesses had already put in place measures on their own initiative prior to the first visit. Others have been very proactive in putting in the measures once they have been shown where energy savings could be made. The winners were invited to an Award Ceremony at the close of the SMRegional Council Meeting on June 26th, 2008, where they were presented with a Certificate of Achievement and a small gift.

Figure 17: Award Ceremony in June 2008

Table 9: Climate Actions Award Winners		
	Business Name	***Energy Efficiency Achievements***
Canning	Ferndale Chicken Spot	√ High efficiency lighting retrofit √ Replace old HWS instantaneous gas or solar HW
	Queens Continental Deli & Lunch Bar	√ Drastically reduced number of refrigerators and freezers √ 40% electricity savings √ Estimated 25 tCO_2e savings per year
	Parkwood Convenience Store	√ Turns off drinks fridges after hours √ Installation of thick plastic curtain on shop entrance to reduce A/C load √ Anticipated installation of chillerstrips on open F&V chiller
Cockburn	Coogee Café	√ Replacement of 12V 50W downlights with 35W energy savers √ Anticipated replacement of electric fryers with gas fryers
	Duck's Deli & Lunch Bar	√ Replacement of drinks fridges with coolroom with display √ Anticipated lighting retrofit
	Eziway Food Store	√ Installation of chillerstrips on open F&V display √ Consolidated products into fewer freezers √ Installation of think plastic curtain on shop entrance to reduce A/C load
	Lighthouse Corner Store	√ Installation of chillerstrips on open F&V display √ Consolidated products into fewer refrigerators √ Ensures automatic doors are operating while A/C is on
	Star Deli	√ Replacement of old RACs with ducted evaporative A/C √ Timers on 7 drinks fridges to turn them off after hours
East Fremantle	Hubbles Yard Café	√ Regular maintenance of appliances √ Use of energy efficiency lighting √ Minimal use of A/C by utilizing the sea breeze
	Quarterdeck Deli	√ Timers on drinks fridges to turn them off after hours √ Insulation on hot water pipe for HWS √ New efficient motor for refrigerated display
Fremantle	Community Midwifery	√ 50% energy savings on lighting through delamping √ Placement of prompts to turn appliances off when not in use
	Old Bridge Cellars	√ Timers on drinks fridges to turn them off after hours √ Recycles glass, aluminium and cardboard √ Anticipated recycling of shrink wrap plastics √ Good use of natural lighting and ventilation √ Improved ventilation for coolroom compressor
	Tonic café	√ Reduced refrigeration by serving more fresh juices instead of bottled drinks √ Improved efficiency through less energy intensive cooking techniques
Kwinana	Burton's Bulk Buy	√ Installation of plastic curtains for walk-in freezer √ Uses paper bags made from Australian plantation timber √ Uses biodegradable meat trays
	Kattlers Deli & Lunch Bar	√ Replacement of electric storage with gas instantaneous HWS √ Timers on drinks fridges to turn them off after hours
	Wick's Bakery	√ Solar HWS provide all the shop's hot water needs √ Timers on drinks fridges to turn them off after hours √ Commenced recycling at the shop
Rockingham	Harro's Lunch Bar	√ Timers on drinks fridges to turn them off after hours √ Placement of prompts to turn appliances off when not in use
	Ocean View Seafood	√ Timers on drinks fridges to turn them off after hours √ Uses natural ventilation and ceiling fans for summer cooling √ Uses gas instantaneous HWS and cooking appliances √ Keeps refrigeration in good maintenance and well ventilated

7.1.5. Qualitative Feedback from the Businesses

Feedback from the businesses was collected by the GEF at the final visit in some instances, or as in most cases, feedback forms were mailed to the businesses with a reply-paid envelope (see Appendix G for a copy of this feedback form). Feedback was received from 14 respondents out of the 88 businesses.

The following findings were made from the business feedback:

- **87% found that the Climate Actions service to their business useful or very useful**
- **80% found that the program was effective in helping reduce their energy consumption**
- Awareness in energy use, lighting efficiency, recycling and impact on the environment were some of the issues the businesses found particularly useful
- **Businesses would like the council to assist them** with energy reduction and environmental management by:
  - **regular information update** of products and services for energy efficiency
  - **monetary assistance**, particularly toward the purchasing of energy efficient products
  - **providing recycling bin for business** (as some councils in the region do not currently support commercial recycling)
  - **providing recycling bin for office paper**
  - **designating a drop off point for bicycle recyclable parts** e.g. aluminium alloy, rubber tyres and tubes
- **93% self-reported that they have taken actions** as a result of the information/assistance provided by the program. These actions include:
  - lighting retrofit
  - installation of gas instantaneous HWS
  - turning off unnecessary lights
  - using A/C more efficiently
  - adjusting A/C summer cooling temperature to 24°C
  - plastic curtain on front entrance
  - using automatic doors
  - timers
  - lighting changes
  - improved refrigeration and
  - signing on for Green Power
  - tariff change
- **Some businesses self-reported having lower electricity bills** after taking actions to improve energy efficiency

Other comments made by the respondents include:

- "Other businesses should be given the same assistance to help reduce energy use."
- "The brochure holders for energy and water efficiency flyers were a good idea and their customers were interested in the information."
- "Some of the suggested actions were too difficult to implement due to large capital outlay."
- "The visit was great to keep the owner thinking about ways to reduce his business' impact on the environment."

7.2. Evaluation of participating residents

7.2.1. Response Rates from residents

As mentioned earlier, 831 household participated with a 7.2% response rate to the mailout.

The requests for information on specific actions listed on the Service Sheet are shown in Table 7. The most highly requested flyers in order were:

1. Choosing a greywater unit
2. Choosing a rainwater tank
3. Establishing an attractive waterwise garden zone
4. Selecting high efficiency lighting
4. Composting
4. What to do with hazardous waste

These actions are not high greenhouse abatement measures, but indicate the level of concern and awareness around water and climate change in WA.

Table 7: Information flyers requested by the residents	
Energy	
Selecting high efficiency lighting	**54%**
Choosing clean, renewable energy	43%
Switching off Standby	43%
How effective is a water efficient showerhead	42%
Solar hot water systems	41%
Shading east and west windows	38%
Effectiveness is my ceiling insulation	33%
Lowering hot water thermostat	31%
Water	
Choosing a greywater unit	**64%**
Choosing a rainwater tank	**61%**
Establishing an attractive waterwise garden zone	**58%**
Switch from sprinklers to waterwise drip irrigation	49%
Waste	
Composting	**54%**
What to do with hazardous waste	**54%**
Ways to reduce the volume	51%
Shopping with climate change in mind	47%
What goes in my yellow bin and green bin	44%

The specific actions taken as a result of this information service are only known via self-reporting through the feedback forms discussed in the next section.

7.2.2. Qualitative Feedback from participating residents

Feedback forms (with a reply-paid envelope) were sent to all participating households in their final postal mailout. See Appendix C for a copy of this feedback form.

To encourage responses, prizes were offered. Forty responses were received from the 560 postal participants.

For those receiving emailed brochures, feedback was requested by email on their actions taken and thoughts on the information service. A few scattered responses of appreciation were emailed back.

Feedback Forms

The results from feedback forms showed the following:

- **84% satisfaction rating**
- Respondents commented on the information provided both in terms on content and readability.
    - In regards to content, some commented that the information was sufficient and very practical, while others said they needed more detail with supplier contact information, cost estimates and more local content.

    - In terms of readability, comments were general positive such as "Smaller paper with colour info, easy to read". Multi-lingual information was requested.
- **65% self-reported that they took action as a result of the program**, such as
    - "Changed shower head, native plants, cold water washing"
    - "Replaced light globes with fluorescent globes, fixed gas leak, installed water saving washing machine and water saving toilet water tank."
    - "Reducing use of standby on appliances, less lighting, reduced watering of natives"
- For others, they stated longer-term technology actions, like installing solar photovoltaics or rainwater units, they plan to do in the future or a general raised awareness, as expressed by one resident "Continue to be aware and teach my children".
- For those that took action, they reported that they took action as a result of receiving information of a practical nature, indicating information elements to be of particular use such as "I refer to the rubbish/recycle sheets constantly", "Steps to take and list of nurseries" and "Information on rainwater tanks". Others said just receiving the local information in the post helped get them taking actions.
- **35% set actions using the goal card enclosed in the first and second round of mailouts**.
- **75% were interested to read the business newsletters with stories about their local businesses participating**, particularly as it showed a shared commitment to action, as expressed by one resident "Good to see the local shops doing their part."

Some additional comments were made on the nature of the service, including

- **support for a staged information service** : "Liked action info coming in increments-didn't overwhelm." But the wait between mailouts were too long (over Dec-Jan)for some: "Received some requested information many months later(too long)"
- **General appreciation for information**: "Thankyou, please keep on offering these types of programmes, we all need all the help we can get" and "Good work. Very practical."
- While some underlined the volume of paper in their homes, even though the brochures were self-selected.
- Some wanted information to have a more persuasive, urgent tone: "Stress the urgency more for climate actions"
- While other like the style of service: "It was free with no strings attached." And "Clear, precise with no sales gimmicks attached."

Phonecalls to Participants

In addition, followup phonecalls were made to 26 households randomly selected from the 40 feedback forms. The purpose of this was to gain further verbal feedback on the service, their response to a phonecall and gauge interest and information needs on specific actions, particularly solar photovoltaics, GreenPower and solar hot water.

All the householders responded positively to being phoned which a typical response from a resident being "it's a great initiative to ring people" as, like herself, they are too busy to look for the information themselves.

A small number of respondents had already installed rooftop photovoltaic power system or about to do so. The others were all interested in installing it, especially after they were told that installation prices have come down substantially. Many were still eligible for the rebate under the income cap. The renters were either already on NaturalPower or interested in finding out more about it.

A majority accepted the offer to receive more information and/or supplier list for rooftop PV and government rebate. Many sought information and supplier list for grey water recycling.

7.2.3. Quantification of energy and GHG reduction from residents engagement

Energy data was sought from power utilities to quantify change in greenhouse emissions amongst participant household. Unfortunately Synergy and Alinta were unable to supply us with electricity and gas data for the households within this project. Data had previously been supplied in an earlier SMRC project in a similar manner respecting the confidentiality of household data. However a combination of the WA gas crisis requiring urgent work from staff and a recent crackdown on data confidentiality, led to a negative response this time. Synergy indicated only electricity data could be supplied on a per-suburb basis, though due to the gas crisis they were unable to supply this by close of report writing. Alinta staff however indicated this data was difficult and time-consuming to extract from these databases.

The release of the water action flyers in March 2008, close to the arrival of early winter rains, meant that water reduction from the key garden-related actions would not be apparent until next summer, rather than the billing period ending in July 2008.

Given these difficulties, the greenhouse abatement can only be estimated using previously quantified results from the GreenHouses project that used the same method – information on actions and goal cards posted to residents. In this project households were measured to achieve an 8% reduction on energy and 10% reduction in water consumption. Using 2005 average energy and water consumption figures for Perth, the Table 8 below shows the estimated annual savings of 427 tonnes of CO_2-e from the 831 participating households.

Table 8: Estimated Greenhouse Abatement by participating residents		
Number of participating households	831	
Energy	**Electricity**	**Gas**
Average annual energy consumption per household (kWh)[20,21]	5,689	5110
Quantified annual reduction per household measured in the 2004 *GreenHouses* project	8.4%	
Estimated annual energy consumption reduction per household (kWh)	478	429
Full-Lifecycle Greenhouse Factor [22, 23] (kg/ kWh)	0.98	0.21
Estimated annual greenhouse gas abatement per household (tCO_2-e)	0.47	0.090
Water		
Average annual water consumption per household (kL)[24]	298	
Quantified annual reduction per household measured in the 2005 *GreenHouses* project	10%	
Estimated annual water reduction per household (kL)	30	
Greenhouse Factor for water ($kgCO_2$-e/kL)[25]	1.16	
Estimated annual Greenhouse Gas abatement per household (tCO_2-e)	0.035	
Waste		
Abatement unknown		
Total Greenhouse Abatement		
Estimated annual Greenhouse Gas abatement per household (tCO2-e)	0.60	
Estimated annual Greenhouse Gas abatement from the participating residents (tCO_2-e)	499	

[20] Average from Synergy 2005-6 electricity data for residential addresses in SMRC suburbs
[21] Average use from Gas meter readings from the 300-household GreenHouses project in 2004.
[22] Department of Climate Change provisional estimates for 2007 based on NEMMCO data as reported in the National Greenhouse Accounts (NGA) Factors January 2008 with conversion factor
[23] Department of Climate Change provisional estimates for 2007 based on NEMMCO data as reported in the National Greenhouse Accounts (NGA) Factors January 2008 with conversion factor
[24] See Water Corporation figure in WA's Department of Planning and Infrastructure Report for the Living Smart program see http://www.dpi.wa.gov.au/mediaFiles/ls_dpi_report.pdf page 40
[25] Calculated by SMEC for WA's Department of Planning and Infrastructure for the Living Smart program see http://www.dpi.wa.gov.au/mediaFiles/ls_dpi_report.pdf page 5

8. LESSONS LEARNT AND OBSERVATIONS

The ClimateActions team has carefully observed and recorded the issues that would be useful for future implementation of similar projects. This section presents the observations and lessons learnt from the project for both the business and resident engagement approaches.

8.1. Lessons learnt from the business engagement

The diversity of business and personality types in the ClimateActions project means that the GEF had to employ many different strategies when engaging them. Their diverse backgrounds also reflect the region's cultural mix, with some of them having a language barrier. Below are some of the successful strategies employed and lessons learnt during the business engagement:

Successful strategies

- Using a combination of EF (see 2.1) and CBSM (see 2.2) methodologies, the GEF engages the business owner on a peer to peer basis. The owner's own efforts and initiatives are applauded and publicized in newsletters to help motivate others to improve their energy efficiency.
- A friendly facilitating approach, rather than an official advisory or sales one – appreciating and acknowledging the fact that the owner knows how best to run his/her business, the GEF is to assist them in making changes not enforcing them
- Appreciation (and congratulating them) of their efforts and ideas in energy efficiency and/or waste reduction, then they are more likely to take further actions
- Accommodating their needs to be contacted only at certain times of the day, e.g. not during lunch time for a café or lunch bar
- Making every effort not to impede the running of the business while on the premises
- Ensuring that the owner does not have to spend too much time filling in the questionnaire by offering to fill it in with them
- Building a good working relationship with the business owner via frequent communication, that is, site visits as well as telephone calls
- Making sure they understand the cost benefits (economic and environmental) in being more energy efficient and/or increasing recycling
- Making energy efficient products available during a visit – this worked very well with the timers and 35W energy saving downlights
- Doing the legwork for them as the owner is often too busy to pursue ideas or find the right product or supplier
- Quick response time – need to get back to the business with the information or arrange a quote as soon as possible, otherwise they feel less valued and may lose interest
- Providing a free service at the first visit, such as insulating the hot water pipe, tends to make the business owner feel good about the project
- Helping them perform a tariff change worked well with some of the businesses who were initially reluctant to engage

Lessons learnt during engagement

- Leaving too long a time gap between the initial visit and getting back to the business with the information or assistance in some instances resulted in the owner losing interest
- Leaving information flyers for energy efficient products, such as timers and energy efficient lights so the owners could make their own trip to the shop to purchase them meant that the uptake rate was virtually zero. When these products were made available during the visits, the uptake rate increased dramatically. The flyers can still be left with the owner for future reference
- A telephone conversation was less effective form of trying to put information across than face-to-face conversation with visual demonstrations, particularly with someone who has a language barrier

8.2. Lessons learnt from the residents engagement

The principal means of assessing the service were via household responses to the invitation, service sheet, the feedback forms and materials on business counters. The responses were generally favourable and encouraging a wider release of materials to the community. However as there was no direct interaction with residents and quantification of change proved to be difficult, it was harder to gauge how effective the materials were.

Engagement Process

- ✓ *Involving local council in the engagement*. Residents immediately understand that this is not a sales or marketing initiative giving a higher return rate compared to advertising material.
- × *Postal approach alone gathers a small pool.* A 7% response rate was below the rates of earlier residential projects indicating this method is becoming less effective, perhaps as people use the postal system less. In business component of this project the response rate was very high principally due to the face-to-face contact.
- × *Postage through council services proved to be difficult at some councils* where mail-folding services did not exist and outsourcing was costly.
- × *Engagement of households through school students and council staffs proved to be difficult* and less successful. Different approaches for these sectors are needed to be researched.

Service Sheet

- ✓ *The provision of a service sheet with options for different information for the residents to select*. This helped residents to select the information they need most opposed to generally sending all the information.
- × *Self-selecting resulted in lower greenhouse action flyers being chosen.* Water and waste action brochures were very popular choices by participating residents. This though is not ideal, as these actions do not carry high greenhouse abatement where energy actions do. The energy actions may need to be stated in different ways to attract residents to them, for example in terms of their greenhouse abatement and monetary saving.

Goal Cards

- ✓ *Inclusion of goal cards.* This ensured that they note their goals and try to reach there. Goal cards were used by over a third of participants and raised their commitment to take actions.

Action Flyers

- ✓ *Short flyers designed specifically on different actions with enough information on it.* Short brochures gave the residents the interest to read them.
- ✓ *Decision to cover energy, water and waste*. It appeared that most of the residents need information on all of these actions. Also separating them in different stages was a good idea as not all the residents want the same information.

Evaluation

- ✓ *Option to give prizes to the residents who return the feedback form* in a given time. This helped to meet the timeframe for this activity.
- ✓ *Phonecalls to residents were also a good means to get supplementary qualitative feedback.*
- × *Obtaining energy data from energy utilities is now proving difficult when using an address list of participant households.* Their preferred method of account numbers and individual signed permission slips would involve additional resources to phone residents and encourage them to return forms to avoid a further drop off in participants and return mail.

9. CONCLUSIONS

The ClimateActions project achieved a great success in its business engagement part. A participation response rate of over 90% indicates that the mode of delivery used in this case was very much appropriate. The project was also very successful in encouraging the participants to take actions, which is illustrated by 76% actions taking rate. The experiences from the business engagement indicate the following are crucial for success of a similar project:

- One-on-one facilitation by the GEF to help the business owner take actions
- Building a good relationship with the businesses via frequent communication throughout the duration of the project is a vital element
- Researching products and services for them and making these available to the businesses as this sector is very time and resource poor
- Providing technical assistance is important in helping businesses take actions due to a significant lack of knowledge in terms of energy efficiency and waste reduction
- Appreciation and recognition of their efforts in taking actions provides motivation for taking further actions

The high participation and actions response rates are testament to the facilitation approach for business engagement. Business owners are generally interested in being energy efficient and environmentally responsible, but they lack the time and knowledge to take positive actions. Many are not aware of the products and services available nor where to procure them, as some of the products such as chillerstrips are specially made by very few providers. The role of the GEF in arranging for site visits and quotations, and making some of the products available during the visits cannot be understated.

The residents engagement part of this project did not work as expected as the response rate was only 7%. This indicates that a postal approach is becoming less effective and a more direct and interactive engagement is needed like phone calls with the target group. Alternative engagement approaches through primary school students and council staff also proved to be difficult.

For participating residents, satisfaction rates were high for the information service and the self-selected information flyers focussed on specific action were well-received. Quantification of change through this service provided to be difficult as utility data was not available.

10. REFERENCES

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Appendix A

Sample Service Sheet
Sample Goal card

To ensure prompt delivery of your ClimateActions materials, please fill in your contact details below:

Household Name:.....

Address: .....

.....

Suburb:.....

Contact number:..... (optional)

Have you filled in your contact details and information requests?

Please return your form in the reply paid envelope supplied and we will get the information back to you very soon.

Also visit your local business participating in ClimateActions to pick up other information and find out about their actions to reduce greenhouse emissions and energy costs.

Thank you for participating in Climate Actions.

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Please help us to help you... and send back this Service Sheet

SOUTHERN METROPOLITAN REGIONAL COUNCIL

This service was delivered by the Southern Metropolitan Regional Council in a regional greenhouse abatement partnership with six member councils:

- City of Canning
- City of Cockburn
- Town of East Fremantle
- City of Fremantle
- Town of Kwinana
- City of Rockingham

This program is funded in-part by the Australian Greenhouse Office, Department for the Environment and Water Resources.

Australian Government
Department of the Environment and Water Resources
Australian Greenhouse Office

How can we help you? Please tick the actions you would like information on ...

WATER

- [ ] How effective is a water efficient showerhead and how to install one
- [ ] Choosing a rainwater tank for my home
- [ ] Choosing a greywater unit and steps to install one
- [ ] Switch from Sprinklers to Drip Irrigation
- [ ] Replacing lawn with a waterwise garden bed

ENERGY

- [ ] Choose clean, renewable electricity
- [ ] Lower the hot water thermostat
- [ ] Switch of standby power on appliances
- [ ] Getting ready for summer – shading east and west-facing windows
- [ ] How effective is my insulation
- [ ] Choosing attractive high efficiency lighting

WASTE

- [ ] What goes in my yellow bin?
- [ ] What goes in my green bin?
- [ ] Shopping with greenhouse in mind
- [ ] Composting my home organic waste
- [ ] Ways to reduce the volume of my recyclable waste
- [ ] What to do with hazardous waste like batteries?

CLIMATE ACTIONS

AT HOME, AT WORK, IN THE COMMUNITY

My Climate Action is:

.....

.....

and my steps to achieve it are:

☐ .....

☐ .....

☐ .....

☐ .....

My reason for taking this action is:

.....

.....

I will take this action by:

.....

.....

Want to take action but feel like you never get around to it?

Use this card to write down your chosen action and then stick it on the fridge to remind yourself.

Murdoch University research in 2004 showed writing it down makes a real difference in actually achieving environmental action in the home.

Some tips on writing up your action:

✓ Keep it positive (don't criticise your self)

✓ Make it specific (be clear on what you'll be doing)

✓ Choose a challenging yet achievable action.

CLIMATE ACTIONS

AT HOME, AT WORK, IN THE COMMUNITY

Printed on recycled card using vegetable inks without bleaches or chemicals.

Appendix B

Business Survey Questionnaire- A sample

REGIONAL GREENHOUSE GAS ABATEMENT - ClimateActions PROJECT

Survey Questionnaire for Initial Visit to Businesses

Confidentiality Statement:

Individual responses are kept confidential. Your responses will be used to establish a pattern of energy consumption and volumes of waste produced in your business to help the project team identify areas where savings can be achieved. Your responses will also help us design a more effective and successful program.

Introductory notes:

This project is delivered by the Southern Metropolitan Regional Council (SMRC) as part of a regional partnership with the Cities of Canning, Cockburn, Fremantle and Rockingham and Towns of East Fremantle and Kwinana. The program was developed as an initiative to both, tackle climate change (global warming) and support independent small-to-medium businesses in reducing energy costs. It was successfully trialled with 35 local centre businesses in the Cities of Canning, Cockburn and Rockingham over a 7-month period in 2005/06. The ClimateActions project will also involve residents surrounding the participating businesses, allowing businesses to showcase their actions to their local customer base and to act as an information hub for residents. You can now benefit from this new service by achieving substantial savings and contributing to reduce greenhouse gas emissions at the same time!

The **purpose of this visit** is to:

- Identify interest and opportunities in reducing energy consumption and waste in local enterprises.
- To offer a free confidential service where you (business owners / managers) are provided with support in energy and waste reduction initiatives, such as providing information as requested, arranging meetings with third parties, and following up of any ideas you may have.
- Identify some common energy efficient practices that could be improved in your business and others in the region.
- Review waste streams and volumes, especially recyclables, and current collection method and costs.

Survey Questionnaire

General Questions

1. Business Name: _____

2. Business Type: _____

3. Name (& Position) of the person interviewed: _____

4. Current form of workplace ownership:
   - Renting ☐
   - Mortgage ☐
   - Outright ownership ☐

5. How long has the business been in operation? _____

6. Number of employees:
   - Full-time permanent _____
   - Part-time permanent _____
   - Casual _____

Questions relating to Lighting, Air-Con, Hot Water and Refrigeration

7a. Lighting characteristics (Type, No. of fittings & wattage – Own Observation)

7b. Usage pattern? (hours/day, days/week)

7c. Any lights left on overnight?
(number of lights left on, wattage, hours left on)

7d. Have you considered changing the lighting to a more energy efficient type? Yes ☐ No ☐

7e. What have been the reasons for not implementing more efficient lighting?
(e.g. lack of time, lack of information, initial costs)

8a. What type of AC system do you operate?
(i.e. evaporative, refrigerative, reverse cycle; make, model, size)

8b. On what basis does it operate?
(Prompts: Automatic thermostat, manual)

8c. Do you keep the door open (or ventilation fans ON) while running the a/c or heater? Yes ☐ No ☐

8d. If Yes, what are the reasons for not closing the door or benefits of having it open?

9a. What type of hot water system do you currently use? (i.e. electric/gas, instantaneous/ storage, size).

9b. What is the current thermostat setting? (check and, if possible, lower)

9c. If storage system used, are pipes insulated?

9d. Do you have any boiling water urns or coffee machines? Yes ☐ No ☐

9e. If Yes, are they kept ON overnight? Yes ☐ No ☐

9f. If Yes, what prevents you from turning them off overnight?

10a. List all commercial refrigeration appliances on the premises.
Include brand, model, rated power/current, refrigeration technician contact details (if available).

10b. List any measures you have implemented to reduce energy used for refrigeration?
i.e. plastic strips to cover chillers and/or cool room doors, night blinds, freezer blankets, turning drink fridges off overnight, or any other.

11a. Do you have any concerns about the energy consumption (or running costs) of any specific appliance(s)?

11b. Have you taken any actions to address these concerns?

Questions relating to Waste

12a. Do you currently separate your waste into organic/general and recyclables? Yes ☐ No ☐

12b. How do you dispose of general waste?

12c. What is the approximate volume of it?

12d. How do you currently dispose of recyclables? (Cardboard, Packaging, Plastic)

12e. What is the approximate volume of it?

12f. Do you currently have to pay for your waste disposal? If YES – How much?

12g. Name of current waste collection service: (if other than Council)

12h. Do you know where your waste goes?

12i. Any other comments on waste?

Enterprise Facilitation Questions:

13a. Do you have any ideas of your own to take your business on a more environmentally friendly path?
(by saving energy and/or reducing waste)

13b. Have you put them into practice? Yes ☐ No ☐

13c. Would you want us to assist you by following up some of your own ideas?

For example:
- Provide information and technical advice
- Link you with experts from the required field.
- Help organise a meeting or seminar
- Liaise with reps from dairy and soft-drink companies

Other Questions

14a. This project is strongly related to other programs on sustainable living taking place in local communities involving hundreds of participants. Would you like more information about these programs? Yes ☐ No ☐
(i.e. Living Smart, Greenhouses)

14b. Is there a place in your business where we can leave some brochures about these programs? If Yes, where?

14c. Type of Electricity Tariff:
Fixed Rate ☐ _____
Time-of-Use ☐ _____

15. Would you allow us to look at your electricity and gas bills for the sake of providing a complete service and evaluating the project outcomes?

16. Would you agree on a follow-up visit to take place during July/August 2007? Yes ☐ No ☐

17. Would you like to add anything else?

Leave your business card.

THANK YOU

This questionnaire will help us carry out a better and more effective greenhouse gas abatement program

Appendix C

Extract of the Waste Audit Report of participating businesses of

City of Fremantle

City of Cockburn

Town of Kwinana

Commercial Recycling Audit – City of Fremantle

Executive Summary

Background

The audit was to gain an understanding of the material composition of the Commercial Business Recycling and how better practices could be incorporated into a non – formal industry. The audit conducted will be able to demonstrate how much can be recycled from commercial businesses and reduce recyclable materials going to landfill.

Objectives

- Identify the recycling yields and other waste compositions in commercial businesses
- Analyse the collection containers used, frequency and volume

Approach to the Project

The sample selection was conducted by selecting the businesses involved in the Climate Actions Project. The sample material was assessed based on material collected through an average day's work to minimise any negative influences on the samples being audited.

Data Sources

From the City of Fremantle, areas were identified where both waste and recyclables was to be set out on the scheduled day. From these areas, Beaconsfield, Fremantle, North Fremantle, South Fremantle, and White Gum Valley twelve businesses were identified, from the Climate Action Project.

Data results

MSW		Recycling		Onsite	
Paper	17.6%	Paper	0.3%	Paper	36.9%
Cardboard	12.4%	Cardboard	71.6%	Cardboard	8.6%
Plastics	29.2%	Plastics	9.9%	Plastics	18.3%
Textiles	0.0%	Textiles	0.0%	Textiles	0.1%
Non-Ferrous	0.6%	Non-Ferrous	7.3%	Non-Ferrous	0.8%
Ferrous	0.0%	Ferrous	0.0%	Ferrous	0.9%
Organic	37.0%	Organic	0.0%	Organic	28.5
Earth	0.7%	Earth	0.0%	Earth	0.3%
Glass	0.9%	Glass	11.0%	Glass	0.3%
Special	0.0%	Special	0.0%	Special	5.2%
Miscellaneous	1.5%	Miscellaneous	0.0%	Miscellaneous	0.2%

Based on the percentage of total volume/bin space available at the day of audit.

Conclusion

All twelve businesses audited displayed positive attitudes towards recycling, and reducing their waste. Where owners were able to bring in recycling it was their own initiative. This meant that most of the other materials that could be recycled went in the MSW waste stream in either the businesses bins, or were taken home and put in the domestic bin just to remove the waste from the businesses premises. The majority of businesses agreed that there should be a council recycling service made available to commercial businesses, because of the amount of recyclables created.

Commercial Recycling Audit – City of Cockburn

Executive Summary

Background

The audit was to gain an understanding of the material composition of the Commercial Business Recycling and how better practices could be incorporated into a non – formal industry. The audit conducted will be able to demonstrate how much can be recycled from commercial businesses and reduce recyclable materials going to landfill.

Objectives

- Identify the recycling yields and other waste compositions in commercial businesses
- Analyse the collection containers used, frequency and volume

Approach to the Project

The sample selection was conducted by selecting the businesses involved in the Climate Actions Project. The sample material was assessed on two days, seven weeks apart to give a true representation of an "average day by day waste" to minimise any negative influences on the samples being audited.

Data Sources

From the City of Cockburn, areas were identified where both waste and recyclables were to be set out on the scheduled day. From these areas, Coogee, Coolbellup, Hamilton Hill, Spearwood, South Lake and Yangebup twenty-one businesses were identified, from the Climate Action Project.

Data Results

MSW		Recycling		Onsite	
Paper	13%	Paper	7%	Paper	36%
Cardboard	24%	Cardboard	73%	Cardboard	11%
Plastics	27%	Plastics	14%	Plastics	21%
Textiles	0%	Textiles	0%	Textiles	0%
Non-Ferrous	2%	Non-Ferrous	2%	Non-Ferrous	2%
Ferrous	1%	Ferrous	0%	Ferrous	0%
Organic	22%	Organic	2%	Organic	29%
Earth	1%	Earth	0%	Earth	0%
Glass	1%	Glass	2%	Glass	1%
Special	0%	Special	0%	Special	0%
Miscellaneous	9%	Miscellaneous	0%	Miscellaneous	0%

Tbl.1 Data Results

Conclusion

A few businesses displayed positive attitudes towards recycling and reducing their waste but most were frustrated by not being able to recycle their bulk waste through the council services, and having to turn to alternative waste collectors. Some crammed these materials into the MSW bins, or centre management mixed waste bins. The majority of businesses agreed that there should be a council recycling service made available to commercial businesses, with larger recycling bins because of the amount of recyclables created.

Commercial Recycling Audit – Town of Kwinana

Summary of audit

Background
The audit was to gain an understanding of the material composition of the Commercial Business Recycling and how better practices could be incorporated into a non – formal industry. The audit conducted will be able to demonstrate how much can be recycled from commercial businesses and reduce recyclable materials going to landfill.

Objectives
- Identify the recycling yields and other waste compositions in commercial businesses
- Analyse the collection containers used, frequency and volume

Approach to the Project
The sample selection was conducted by selecting the businesses involved in the Climate Actions Project. The sample material was assessed based on material collected through an average day's work to minimise any negative influences on the samples being audited.

Data Sources
The data was to be collected for a sample of six Commercial Businesses in the Town of Kwinana localities of Medina, Orelia and the Kwinana Hub to be audited into the following categories; Cardboard, Paper, Textiles, Wood & Ceramic, Organic, Metal, Plastics.

Data results
The waste audit was split into 3 categories, MSW (Green), Recyclables (Yellow) and On site (Bins within the premises). Through the 3 categories, it was shown consistently that plastics and cardboard were the most discarded materials from the premises. Analysed On site data displayed a high number in food waste.

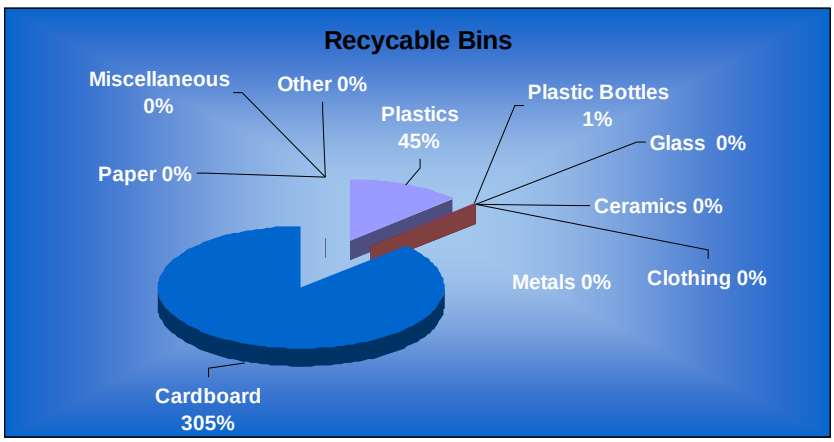
On the day the waste audit was conducted, it was found in the 240Ltr bins the waste consisted of mostly Cardboard and Plastics.

Green Volume 5 bins = 1200Ltrs only 29.25% was used

Yellow Volume 7 bins = 1680Ltrs only 19.34% was used

Onsite Volume 12bins = 465ltr 78.7% was used

Recyclables (Yellow Top Bin)



Conclusion

Most of the businesses were recycling already, and using their Yellow top bins or allocating a bin for recycled material. The other percent did not have a recycle bin or did not believe it mattered. They classed mostly cardboard and plastics as their recyclables items. Through discussions with the business owners, it was found they did not have adequate recycling bins. The majority of businesses agreed that the recycling service should be increased to a weekly service, because of the amount of recyclables created. They did not know of any other business that recycled. Two out of the six businesses displayed negative attitude towards recycling. The other four were for recycling and were already implicating recycling initiatives into their business, some have been for many years.

Appendix D

Resident Information

Action Flyers developed under the project

Choosing Clean, Renewable Electricity

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

You can get renewable electricity for your home by either

Option 1. **installing a rooftop solar (photovoltaic) system or**

Option 2. **signing up for GreenPower electricity from Synergy or another accredited supplier.**

Either way you will take a huge greenhouse step for your home by choosing renewable electricity instead of the standard residential electricity generated from coal and gas power stations.

#1 Rooftop Solar Electricity

You can generate solar electricity for your home from your own roof with a 1-kilowatt solar photovoltaic array and receive an $8,000 rebate from the Australian Government. After the rebate, the system's net cost would typically be $6,000 installed depending on local conditions.

#2 What is GreenPower?

By choosing accredited GreenPower, you can have 25% to 100% of your household's energy usage generated from renewable sources. The greenhouse pollution savings for one house are equivalent to taking between one and two cars off the road each year!

Printed on 100% recycled paper with vegetable inks

Where do I get more information on solar power systems?

For a suppliers list, look under '*solar energy equipment*' in the Yellow Pages or online under '*renewables*' on www.energysmartdirectory.com

To find out about the *photovoltaic rebate*, contact the national information line on 1300 138 122.

Rooftop solar photovoltaic array

Who Sells GreenPower to us?

WA residents can purchase GreenPower from Synergy or interstate providers. The accredited providers are:

- Synergy – NaturalPower phone 13 13 53
- ActewAGL – GreenChoice phone 13 14 93
- Climate Friendly – Climate Neutral Power phone 02 9356 3600
- Green Switch – Greenpower phone 03 9822 6335

How can a power source in Albany feed my home with green electricity?

A GreenPower supplier, like Synergy, purchases local or interstate renewable electricity produced from sun, wind or biomass to meet the total electricity consumption from households signed up for GreenPower. There is no change to your meter or electricity connection.

Signing up for GreenPower

To signup just any of the accredited electricity providers offering green electricity to WA households on Page 1.

At the time of signing up, make sure you have a recent electricity bill handy and a personal identification.

But how much would GreenPower cost me?

You can sign up to GreenPower for between $1.20 (25%) to $4.60 (100%) per week or **potentially nothing if you take up some energy efficiency measures in the home at the same time as signing up**. Consider the following to offset the cost:

- replacing 6 existing 75W globes with 18W energy saving lamps plus lowering your hot water system's thermostat, or
- installing a water saving showerhead.

Note: Savings will vary depending on the type of hot water system you have. See Climate Actions flyers to help you undertake these actions. These actions will save the average household around 4 units of electricity per day or more, which eliminates the extra cost for the same household signing up to 100% GreenPower.

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How to Lower my Hot Water Unit Thermostat

Often hot water units come out of the factory at a setting higher then needed. So an easy way to make a big difference in your energy bill is by turning down the hot water temperature control or thermostat.

Most, though not all, systems have a thermostat you can adjust.

So, what type of hot water system do I have?

Locate your hot water system and see what it is powered by: gas, electricity or solar? Most hot water systems in Perth are gas. You should be able to identify a gas system because it will have a gas connection. If you're unsure, call the manufacturer.

Storage systems

Storage systems are designed to hold the water after it has been heated. You can identify storage systems because they have a tank to hold the water.

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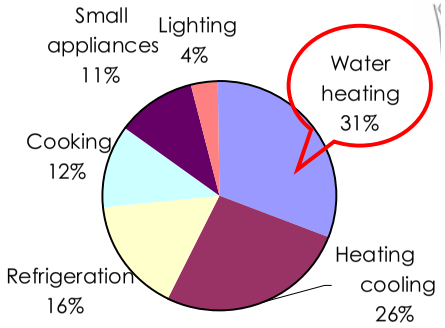
Hot Water is typically the largest energy user in a WA home.

Ref: Sustainable Energy Development Office



Concerned that you won't have steamy hot showers?

Lowering the hot water thermostat doesn't mean having lukewarm showers. Your shower water will still be at a temperature to have a hot shower, while saving energy, money and greenhouse gases.

Solar hot water units have the lowest greenhouse emissions for all hot water unit types for the Perth Home.

Solar hot water system

Solar hot water systems have storage tanks with either an electric or gas boost. The thermostat controlling the booster is not accessible and does not need adjusting.

Solar systems will have their thermostat preset around 60^{0}C, a necessary temperature for storage systems. Use a timer or switch to boost as needed in winter.

Instantaneous system

Instantaneous systems are designed to heat the water only as you use it. It is generally a box mounted on a wall inside or outside your house.

Note that **electric instantaneous** systems cannot be turned down. They are big users of energy when in use, so carefully manage your hot water use.

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HOW TO LOWER YOUR HOT WATER THERMOSTAT

For *Gas Storage* units

You can safely lower the thermostat on gas storage units. Look for the dial typically at the base of the tank. It may be behind a cover you can lift up.

Your water in the storage tank still needs to be hot (for health reasons must be set at 60 degrees Celsius*). To test this, hold a thermometer under the closest hot water tap half a day after making the adjustment. Check whether you need to adjust it up or can lower it further.

Note also Vacation Mode – turn down the dial to this setting when you leave for holidays and turn it back up when you return.

For *Electric Storage* units

It is only safe to lower the thermostat on your electric storage tank if it has a <u>visible control</u> as shown below. (It may be behind a small plastic cap)

Otherwise you will need to **call your local Electrician**, as it is not safe for you to access the control. These systems typically have red warning labels behind a fixed metal plate.

* Australian Standard 3500 Regulation – water in storage units needs to be maintained at 60°C or above to avoid Legionella bacteria growth.

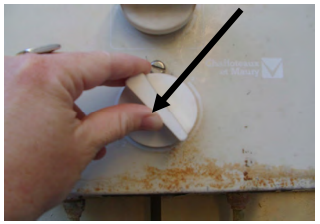
If you are at all uncertain, contact your local plumber or the unit manufacturer.

For Gas Instantaneous hot water systems

You can safely lower the thermostat on all gas instantaneous systems. The controls vary from system to system. In new systems you may have a remote control inside in your house. Older systems will have sliders or dials.

Thermostat slider

Thermostat dial



Systems with dials may have two controls– one for ignition and/or flow and one for temperature – you want to lower the one for temperature – typically the bottom control.

Your unit may have a cover that you can lift or unscrew to reach the thermostat.

For instantaneous units, lower the thermostat to a temperature you are comfortable with.

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

How effective is my insulation?

Over time, insulation material in your home deteriorates and becomes less effective in cooling in summer and warming in winter.

Older insulation material will need to be upgraded or replaced. It is estimated that a good insulation lasts for 20 years before it needs to be upgraded or replaced.

What is the standard for insulation?

The benefit of insulation is measured by its Thermal Resistance or '**R-value**'. Under the Building Code of Australia, all new homes in Perth, WA are required to have insulation with a minimum R-value of:

2.8 - 3.0 for ceiling depending on your ceiling pitch and roof material

0-1.5 for walls depending on your type of walls

Existing homes are encouraged to have a retrofit to meet these standards.

For more information on insulation and good house design, visit the Australian Government's Our Home Consumer Guide

http://www.greenhouse.gov.au/yourhome/consumer

Why insulate my home?

In a house without insulation, 35% of the heat loss takes place through the roof; 15-25% through the walls (ref: SEDO).

Insulation, when correctly installed, helps save money on your power bills from less heating and cooling.

Insulation or upgrading the insulation in an average house will cost from $600 but make your home a more pleasant temperature to live in and save on heating and cooling costs.

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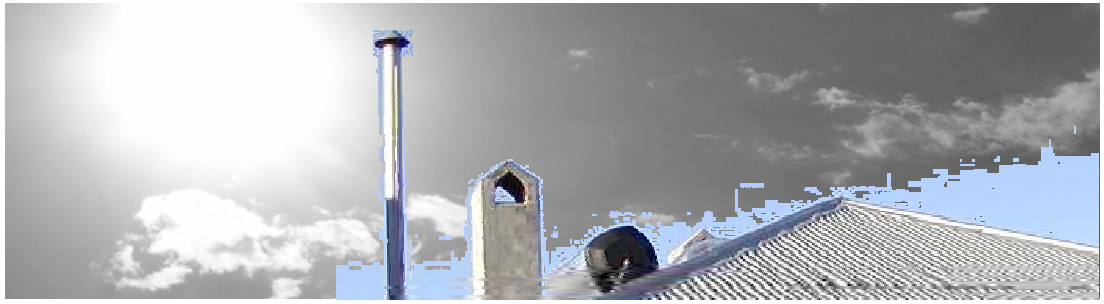

Tips for good insulation

Blown-in products settle over time, so you will need to measure thickness every 5 years to find out whether an upgrade is needed.

Batts are bonded strongly so will stay thick for a longer time. They are also easy to install. Also if work needs to be done in the ceiling later on, a batt can easily be removed and replaced in its original position.

What to remember when buying insulation?

1. **Choose insulation according to the R-value.**
   - Choose insulation that has a higher R-value.
   - Different insulation materials with the same R-value will perform just as effectively. For example, batts with an R–2.5, will perform exactly the same as loose fill with an R-2.5.
2. **Get multiple quotes from suppliers**
   - Get multiple quotes to ensure good value.
   - You can also ask for a relevant certification for the type of insulation that you are interested in.
   - The insulation should be certified in writing by the supplier as being to Australian Standard AS 3999.
3. **Keep in mind the hot box syndrome**
   - Shade east and west-facing windows with adjustable awnings or deciduous pergola and the north with eaves to block summer sun.
   - Unshaded windows build up heat inside the home and the insulation keeps the heat inside, resulting in an oven effect.
4. **Fire Protection**
   - Insulation materials should be either non combustible or fire proof.

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

High Efficiency Lighting Choices

Put aside your incandescent globes and consider some energy saving alternatives. What are they?

Downlights have become a popular choice but are to be avoided if you are looking for an energy efficient solution for space lighting.

New generation compact fluorescent lights (CFL) come in a wide range of sizes to fit into small lamps or ceiling recesses and provide a warm light colour.

AVOIDING DOWNLIGHTS

If you are considering downlights for a living space, think again as you could substantially increase your lighting costs. Your heating costs may also rise as downlights can cause gaps in ceiling insulation.

You also may have an unsatisfactory lighting pattern as halogen downlights provide bright pools of light rather than general illumination.

IF YOU ALREADY HAVE DOWNLIGHTS…

- ☼ Ask for 35W downlights by Osram or Phillips with the same light output as a standard 50W
- ☼ Use the dimmer
- ☼ Keep an eye out for LED and micro-CFL technology and consider rewiring

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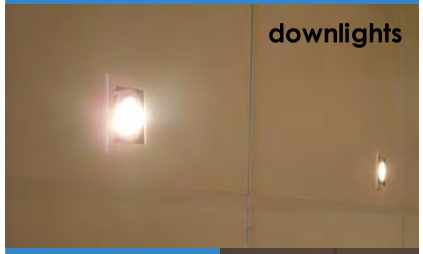
Low voltage does not mean low power use.

Downlights can now number up over 100 in a house and six in a room. This has led to lighting energy in homes increasing 3 to 4 times the traditional fluorescent tube or even incandescent globe. (DSC, Vic)



Compact fluorescents have a lifetime of up to 10,000 hours, while halogen downlights last for up to 2,000 hours and can be sensitive to voltage fluctuations.

Tips for choosing a good compact fluorescent light:

- ✓ **'Warm white' colour**
- ✓ **Curly style to get good light distribution**
- ✓ **Not the cheapest – pay a little more for quality**
- ✓ **Choose a slightly higher wattage than the incandescent equivalent**
- ✓ **Check the maximum size to fit your lamp before you go shopping**

The CFLamp should not 'buzz'. If it does, take it back.

INSTALLING FLUORESCENT TUBES AND LAMPS

All fluorescent lamps contain some mercury but this is being reduced all the time. Far more mercury (and other pollutants) are released into the atmosphere from burning coal to provide the power for inefficient incandescent lamps. (Australian Greenhouse Office website)

Nevertheless take care when handling these lamps. If one breaks, open a window and leave the room to ventilate for 15 minutes. With gloves and a moist disposable cloth, pick up the pieces. Do not use a vacuum cleaner. Wrap the pieces and cleaning tools and place in a sealable container (www.environment.gov.au/settlements/ waste/lamp-mercury.html) Place the container in your yellow-top bin (SMRC).

Turn off lights including compact fluorescents when leaving the room for more than 5 minutes.

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Getting Ready for Summer: Shading East and West Windows

East or West facing windows let in the summer sun. Each square metre of unshaded window heats your home by the same amount as a one bar radiator.

In a living room with west-facing windows with blinds but no external shade, the room can be 3 degrees hotter for several hours, than the same room with awnings or shade cloth over windows.

WHAT ARE MY OPTIONS FOR SHADING WINDOWS?

There are many to choose from:

- **Plant trees or tall shrubs**
  - very effective and low cost, but
  - needs space to grow away from house
- **Shaded pergola or sail structures**
  - very effective in summer and removable in winter,
  - provides an outdoor shaded living space, but
  - needs space to build out from house
- **Window tinting**
  - Can be applied to any window,
  - Moderate cost ($300-$400)*, but
  - Reduces light all year round

continued – please turn over

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DID YOU KNOW?

A curtain or blind on the inside will reduce this heat by around 35%. Shading the outside can reduce the heat by up to 80%.

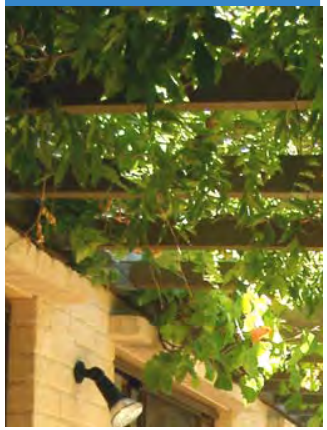
So choose *external* shading!

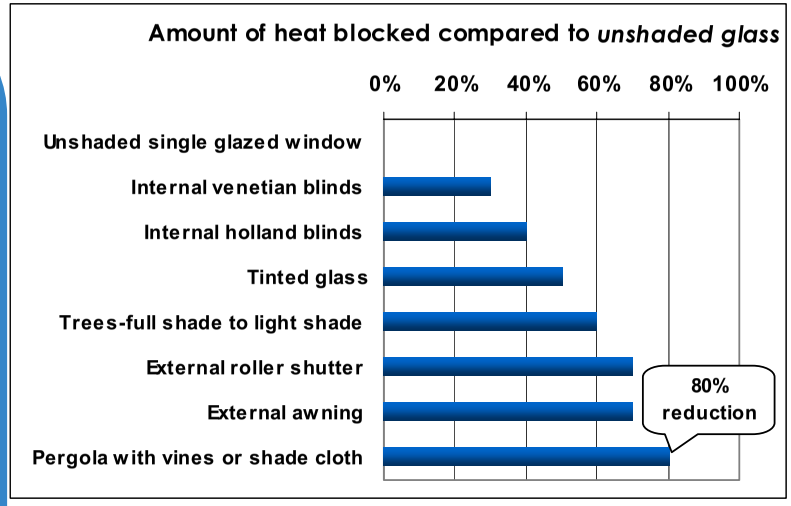
HOW THE GARDEN CAN HELP?

Avoid paving outside your north, east or west-facing windows. This paving soaks up heat during the day and radiates it at night. Try ground cover or shrubs alongside walls and windows instead.

HUNTING AROUND FOR PRODUCTS AND PRICES?

Look in the YellowPages under headings such as 'Awnings', 'Window Roller Shutters', 'Shade Structures & Sails' and 'Carport & Pergola'. You can buy shade cloth and sails from hardware stores too.





WHAT ARE MY OPTIONS FOR SHADING (continued)

- **Roller shutters**
  - Reduces heat loss in winter as well as heat gain in summer,
  - Adjustable any time of day and improves security and noise control, but
  - More costly (from $700 for manual and $950 for motor controlled), and
- **Awnings or external blinds**
  - Minimal space requirements,
  - Adjustable for the time of day and season, but
  - Costly for product and installation ($400-$700 depending on the material); and
  - May not fit all window types.

Or for a low cost solution, simply hang a roll of shade cloth from the eaves.

** indicative costs for a 2-3 square metre window in brick wall.*

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Understanding Solar Hot Water

Replacing your existing hot water system with a solar system will save hundreds of dollars off your energy bills each year. The ongoing savings will pay off your investment providing you with free hot water in around 10 years on average.

Subsidy Available from SEDO

The subsidy is for a two-panel solar hot water system with a gas boost. The table below shows the rebate for a two-panel unit, its annual energy savings and payback period (the time at which the savings exceed the initial purchase and install cost).

Type of Boost	Rebate Eligibility[1]	Annual savings compared to a storage unit	Estimated Payback time
Electric	×	$490	7
Natural Gas	✓ ($500)	$340	13

1. Rebate information is correct as of August 2007.
2. Savings/year under each fuel category have been estimated by comparing the running costs of a storage tank system run by that fuel alone and the solar water heater boosted by that fuel. Running costs of different hot water systems were sourced from SEDO website.

Notes on Claiming the Subsidy

There are some conditions on the SEDO rebate such as solar water heaters must be purchased and installed within the 12 months prior to a rebate application. For rebate enquiries call **SEDO** on **1300 658 158.**

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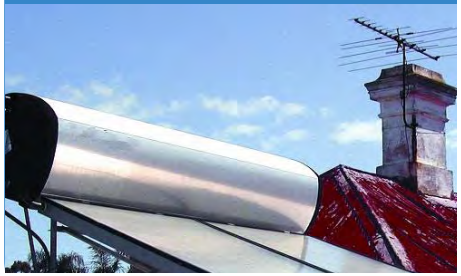
The Western Australian Government, through the Sustainable Energy Development Office (SEDO), has a subsidy to encourage Western Australians to install solar water heaters and help save on energy use, energy bills and the environment.

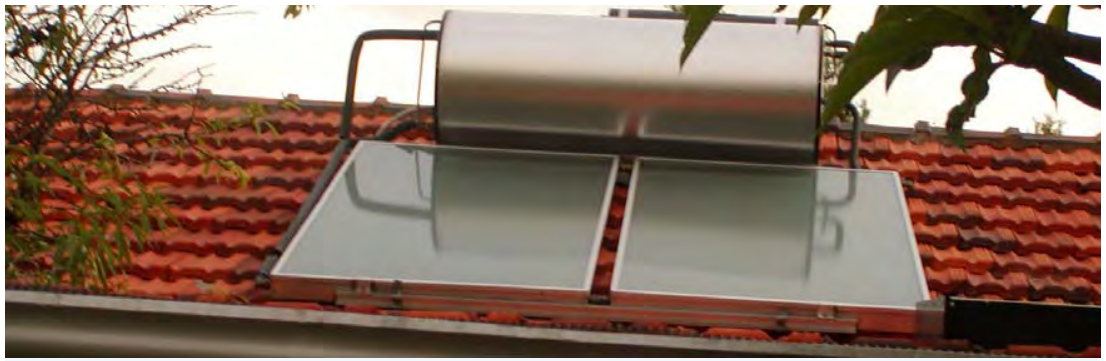
The cost of solar water heater depends on the system size and type of boost.

The typical purchase prices are:

Type of boost	2 panel system	1 panel system
Electric	$3,600	$2,800
Gas	$5,000	$4,200

Prices are indicative only and may vary. There is no subsidy for 1 panel system.





How a Solar Hot Water System Works

Water heats as it circulates through the collector panels on the roof. In some newer models, a special fluid is heated, rather than water, and then transferred its heat to water in the tank. The tank is well insulated to keep the water hot through the night.

In winter if there is insufficient sun, a gas or electric booster heats the water tank. You can manage the booster's energy use by installing a manual switch or putting in a timer to allow you to heat the water in winter just before you use it. You will not need the boost in the warmer month if your system is appropriately sized and positioned.

Like all hot water systems, locate the unit near your kitchen and bathroom to get hot water quickly. The collector needs to face north to maximize sunlight on the water coils in the collector.

In summer the water can be boiling if your household is a low water user. For improved safety and a longer life tank, consider shading one for the panels with shadecloth in mid-summer.

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

What to do with Hazardous Household Waste?

We often need to dispose of hazardous items from our homes. This brochure will help you to identify hazardous items and provide the information you need to dispose of them safely. To begin, here are answers to some common queries:

This brochure is designed to help you identify what is hazardous and how to dispose of it safely. To begin some common queries are answered.

What to do about batteries eg AAA, D cells?

Batteries are hazardous household waste. To dispose of them, find your nearest Battery World store for recycling OR take them to one of the three disposal sites listed on this page OR contact your local council as they may have a collection point at their council offices.

What to do with used motor oil and Auto batteries?

Motor oil and batteries need to be disposed with care to avoid pollution. Take them to one of the three disposal sites listed on this page OR contact your local council as they may have a closer collection point.

What to do about Fluorescent Tubes / bulbs?

These tubes contain a small amount of mercury. Residents are currently asked to place these tubes and bulbs in your yellow-top bin. We are currently investigating ways to recycle these tubes and recover the mercury.

Many familiar products you use to clean or improve your home, maintain your car or deal with pests can be hazardous. If disposed of incorrectly, these items can cause serious harm to the natural and residential environment.

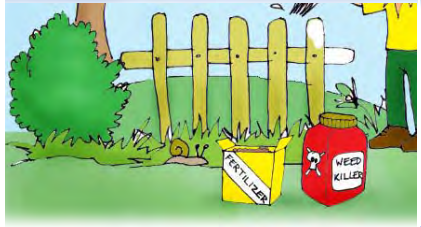
Residents can safely dispose of hazardous household waste at the following disposal sites*:

City of Rockingham
Miller Road West
Baldivis
Ph: 9528 8550

City of Cockburn
Rockingham Road
Henderson
Ph: 9411 3543

City of Canning
Ranford Road
Canning Vale
Ph: 9231 0670

***FEES PAYABLE FOR DISPOSAL**



What constitutes hazardous waste?

Below is a list of common household hazardous waste that can be taken to the disposal sites.

Categories	Waste materials
Acids	Brick cleaners, stain removers, pool chemicals.
Alkalis	Oven & drain cleaners, other cleaning chemicals.
Ammonia	Bath & tile cleaners, window cleaners, floor cleaners.
Pesticides & organic chemicals	Insecticides, herbicides, miticides, fungicides, fumigants and chemicals used for destroying weeds, insects & fungus, etc.
Photographic chemicals	Fixers, bleaches, neutralisers, and developers.
Miscellaneous chemicals	Garden products, fertilizer, cleaner.
Solvents	Brake fluid, thinners, mineral turpentine, white spirit, creosote, degreaser, decarboniser, solvent based paint, dry cleaning fluid, antifreeze, engine coolant, radiator inhibitor, catalyst.
Oxidisers	Pool chlorine & sanitiser, bleach, bleach based cleaners.

Other items

Before you throw out your household items, see if they can be reused.
For recycling of old and outdated **computer equipment** including desktop, notebooks, servers, monitors, printers and peripherals contact:

- Dell Recycling & Buy Back at 1800 465 890
- Sims E-Recycling: 9434 6899 (fees may apply)

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Shopping with *Global Warming* in mind

Minimising the greenhouse impact of your shopping basket involves understanding the lifecycle of your food and other goods.

Each product on a supermarket shelf has used energy and water and may have also created methane, thereby generating greenhouse gas emissions over its lifecycle from farm to shelf through the stages of production, processing, packaging, storage, transport and disposal.

As a shopper you can follow some general guidelines to reduce the greenhouse footprint of your shopping purchases.

HOW TO REDUCE THE GREENHOUSE EMISSIONS EMBODIED IN YOUR WEEKLY FOOD PURCHASES

- Buy more fresh wholefoods rather than refined and highly processed foods
- Check the label – where does the product come from?
- Look for organic and free-range foods with lower production footprints
- Buy in-season, unpackaged fresh fruit and vegetables and less meat
- Better still, grow your own. Try starting with herbs and salad greens.

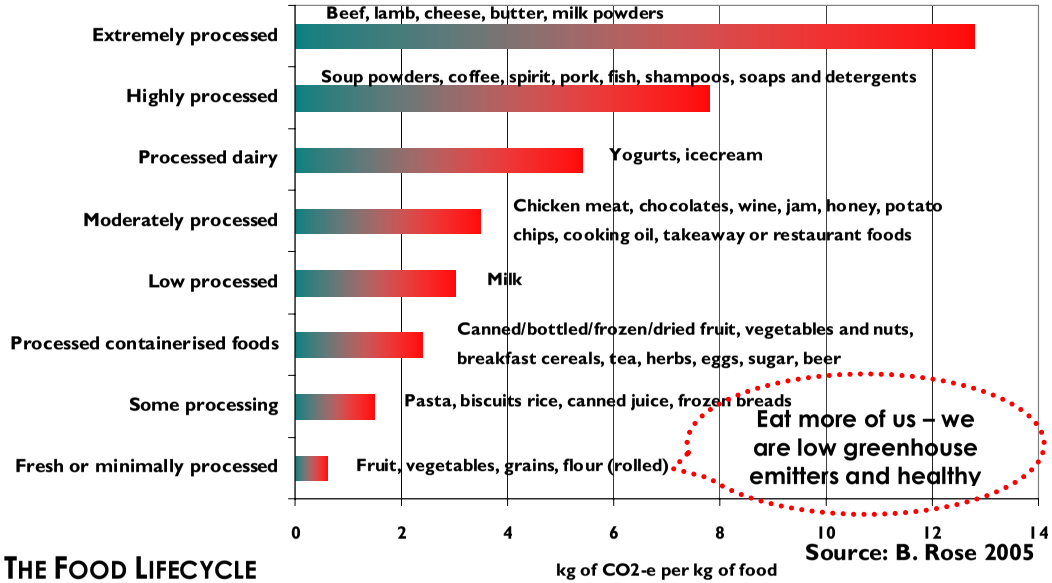
Greenhouse emissions from your weekly food purchases could be as high as emissions associated with your home electricity and gas use.

BUYING A WHITEGOOD, HOT WATER UNIT OR PLANNING TO BUILD?

Look for top energy and water star ratings models and designs AND get *free* independent advice from the State Government's Energy Smart Line on what to look for next time you are considering a new purchase

Phone: 1300 658 158

THE ESTIMATED GLOBAL WARMING IMPACT OF DIFFERENT FOOD CLASSES



THE FOOD LIFECYCLE

The ***production*** of food has many energy inputs that generate greenhouse gas emissions. These include the fuel for harvesters and irrigation, methane from livestock and the manufacturing energy associated with equipment, fertiliser and pesticide used on the farms. In 2007, *Curtin University* research found that emissions associated with fertiliser use comprised the highest proportion of greenhouse gas emissions in the production of a tonne of wheat in WA's wheatbelt (39% of total emissions).

In 2004 *Murdoch University* research into weekly food purchases of several Perth families showed that in a household's weekly food purchases, agricultural production often uses 50% or more of the energy consumed in the product lifecycle from farm to shopshelf. This research showed ***processing*** is the next largest energy consuming stage at between 20 and 35%. This relates to milling of grains, and mixing, refining and canning of products. ***Transport*** and ***packaging*** are around 10 to 15% each.

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Composting Organic Waste (Resource) at Home

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

There are many options for home composting and you can take up one or more. The option suitable for you depends on

- **what you want to use the compost for,**
- **how much time you have to spend on compost creation,**
- **how quickly you want the compost and**
- **how much garden space you have.**

So What Can You Compost?

- ✓ Kitchen waste, including tea bags and egg shells - avoid meat which attracts flies and rodents
- ✓ Grass clippings and sawdust - break these up to avoid clumping
- ✓ Weeds – avoid seeding weeds, especially in cold heaps
- ✓ Blood and bone and manures such as pigeon, cow or sheep.
- ✓ Newspaper, unbleached paper and cardboard – in small amounts as decomposition time is long
- ✓ Twigs and leaves – in small quantities noting that tough gum leaves take a long time to decompose

Some golden rules of garden composting:

- ☼ Break up the layers of kitchen scraps by alternating with dead leaves, sawdust or paper.
- ☼ For a hot compost heap, turning is the key to sweet-smelling compost. It keeps the compost aerobic, avoiding methane production (a potent greenhouse gas).
- ☼ For a cold (un-turned) compost heap, look at ways to get oxygen into the nutrient-rich kitchen scraps with PVC piping or similar.
- ☼ Set your bin up in a location shaded in summertime to avoid overheating and on well-draining sand to avoid waterlogging in winter.

Choices for Home Composting

There are many options for home composting and you can take up one or more. Consider what option is suitable for you in your home situation.

For kitchen scraps only

- Worm Farm – a relatively low maintenance option but requires constant feeding through the year, compact, needs care in summer to avoid baking worms, principally produces liquid fertiliser and mineralised castings, not compost.
- Bokashi bin in your kitchen that ferments food waste inside a sealed container – low maintenance, requires ongoing purchases of bokashi microbial mix for new monthly collection.

For one-off compost production

- Black cone unit – a slow producer of 'cold' compost after approximately 1 year, without use of turning devices, avoid meat scraps and grass weeds.
- Compost tumbler – a fast producer of compost in 6 weeks especially if turned daily, limited varieties available, does not benefit from worms entering and decomposing materials as in open-to-ground heaps.
- Single 'hot' compost heap – needs regular turning.

For ongoing large volumes of compost

- Three-bin heap – frequently produces large volumes of compost for a large-sized productive backyard garden

Go to your local bookshop, environment centre and ABC shop for books and articles on composting and organic gardening.

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

There are many options for home composting and you can take up one or more. The option suitable for you depends on

- **what you want to use the compost for,**
- **how much time you have to spend on compost creation,**
- **how quickly you want the compost and**
- **how much garden space you have.**

DID YOU KNOW that your Council composts the kitchen scraps you put into your green bin? So, if you don't need the compost for your garden, leave the composting to us.

From 150,000 households, your Regional Council produces tonnes of compost each week in a giant composting facility at the Regional Resource Recovery Centre in Canning Vale.

Organic waste from your green bin is filtered out and composted in slowly turning digester pipes, producing high quality compost (see right).

This ends up in numerous, innovative uses in the metropolitan area.

Turn over for a synopsis of the various options for garden composting and worm farms.

Some golden rules of garden composting:

- Break up the layers of kitchen scraps by alternating with dead leaves or similar.
- For a hot compost heap, turning is the key to sweet-smelling compost. It keeps the compost aerobic, avoiding methane production (a potent greenhouse gas).
- For a cold (un-turned) compost heap, look at ways to get oxygen into the nutrient-rich kitchen scraps with PVC piping or similar.

Mature compost at the Regional Composting Facility in Canning Vale

CHOICES FOR HOME COMPOSTING

There are many options for home composting and you can take up one or more. Consider what option is suitable for you in your home situation.

For kitchen scraps only

- Worm Farm – a relatively low maintenance option but requires constant feeding through the year, compact, needs care in summer to avoid baking worms, principally produces liquid fertiliser and mineralised castings, not compost.
- Bokashi bin in your kitchen that ferments food waste inside a sealed container – low maintenance, requires ongoing purchases of bokashi microbial mix for new monthly collection.

For one-off compost production

- Black cone unit – a slow producer of 'cold' compost after approximately 1 year, without use of turning devices, avoid meat scraps and grass weeds.
- Compost tumbler – a fast producer of compost in 6 weeks especially if turned daily, limited varieties available, does not benefit from worms entering and decomposing materials as in open-to-ground heaps.
- Single 'hot' compost heap – needs regular turning.

For ongoing large volumes of compost

- Three-bin heap – frequently produces large volumes of compost for a large-sized productive backyard garden

Go to your local bookshop, environment centre and ABC shop for books and articles on composting and organic gardening.

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This project is supported by the Australian Government and implemented by the Southern Metropolitan Regional Council (SMRC) through a regional partnership with the Cities of Canning, Cockburn, Fremantle and Rockingham, and the Towns of East Fremantle and Kwinana.

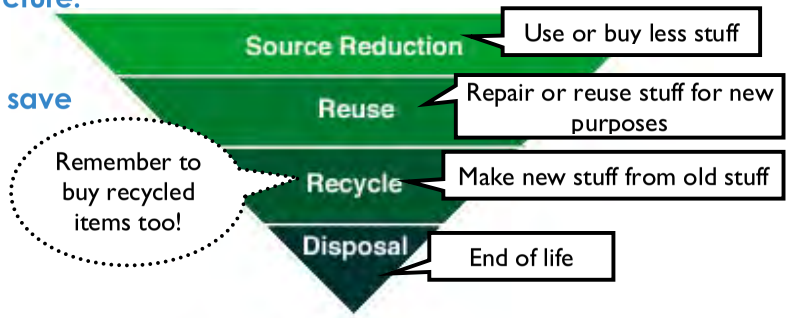
CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Reducing the Volume of my Yellow-top Bin

So you have recycling well in hand and you are ready to move up the *waste reduction hierarchy*.

Recycling does use energy to collect, process and re-manufacture. It provides savings on energy and resources compared to the raw material manufacture.

If you REUSE and REDUCE, we can save more resources, energy and greenhouse emissions.



First step – What are you putting in your yellow bin?

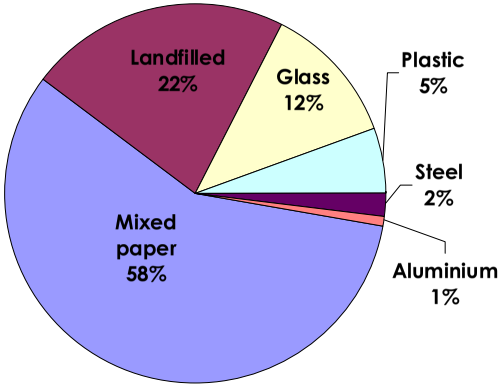
The typical make-up of our recycling bins

A 2005-6 SMRC waste audit showed our bins are mainly filled with:

- paper
- glass
- plastic
- items for disposal at landfill

What's in your yellow-top bin?

Is paper #1 on your list to Reduce and Reuse?



Pie Chart is using SMRC Survey Data for domestic collections over 2005-6. Percentages based on weight.

To reduce landfilling and greenhouse gas emissions.

Reduce By

- ✓ Buying grains, fruit and vegetables at bulk food shops, markets or home deliveries to avoid packaging
- ✓ Ask your grocer or butcher to provide goods with minimal packaging, or find another
- ✓ Buy yourself some handkerchiefs and reduce your use of tissues. It's better for your nose!
- ✓ Do you need your own newspaper? Why not share one at work or with neighbours.

Reuse By

- ✓ Create a scrap paper pile for reuse
- ✓ Retaining containers for other suitable purposes, such as jars for grains and nuts
- ✓ Reuse wrapping paper this Christmas and for birthdays in the New Year
- ✓ Your electrical appliance has 'died'. Is it repairable? Look under "Electrical Appliances – Repairs" in the Yellow Pages

Recycle AND Remember to Buy Recycled

"close the loop"

This ensures the recycling industry has a WA consumer market for recycled goods. Look out for

- ✓ recycled office paper
- ✓ recycled toilet tissue
- ✓ recycled plastic bottles for shampoos
- ✓ recycled cardboard

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

What goes in my Yellow and Green Bins?

The Southern Metropolitan Regional Council is working hard to reduce the volume of waste to landfill sites and greenhouse gas emissions.

Your Council and the SMRC are separating recyclable materials, mulching tree prunnings and, most importantly, composting organic waste, like kitchen scraps, and small garden clippings from green-top bins at the Regional Resource Recovery Centre (RRRC) at Canning Vale. Together this is diverting about 70% of 'waste' from landfill.

GREEN (Composting) Bin

Organic materials such as kitchen scraps, garden weeds or small tree prunnings, pet litter and tissues should be placed in the green bin. At the compost facility in Canning Vale, this waste is composted in an aerobic digester using state-of-the-art technology. Non-compostable materials are removed before going to the digester.

YELLOW (Recycling) Bin

Inorganic materials including all plastics, glass, metal, ceramics, cling wrap, plus recyclable organic materials like cardboard and paper can be placed in the yellow bin. Computers and printer cartridges can be recycled via many organisations. For example, Dell Recycling & Buy Back (1800 465 890), Cartridges 4 Planet Ark (1800 242 473).

WHICH BIN?

When choosing a bin for an item, ask yourself was it ever alive? If it was, choose the green bin, if not then put it in the yellow bin. Some items require special disposal.

Your council calendar has a detailed A-Z list of what to put where (see enclosed a summary of this).

Hazardous waste like batteries, paint, pesticides, used motor oil, and medicines should not be disposed of in either bin. Contact your Council to find out about the battery collection service. Other items can be dropped off at the hazardous waste facilities in Rockingham Rd, Henderson Rd, and Randford Rd.

What Happens to your Waste at the Regional Resource Recovery Centre (RRRC)?

a. Organic waste from your green bin is composted in an in-vessel digester and turned into high quality compost.
b. Recyclable waste from your yellow bin is separated and recovered for reprocessing.
c. Green Waste is shredded and ground to produce mulch and soil conditioner.

Organic waste from Rockingham and Kwinana are currently going to landfill.

RETHINKING THE PLASTIC BIN LINER

Plastic bin liners are not compostable, and are too contaminated for recycling.

Try lining your bin with newspaper. It is a compostable alternative to the plastic bin liner.

The key to successful waste separation – a 2 bin system in your kitchen

Recycling does not have to be time consuming. It is easiest to separate the compostable and recyclable waste at the time of disposal.

Have a 2-bin system in your kitchen which matches your yellow and green-top bins.

When the time comes to take out the rubbish, simply tip the contents of each bin into the appropriate council bins.

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Switching from Sprinklers to Waterwise Drip Irrigation

Why consider changing to drip irrigation for your garden beds?

The water savings are enormous and your plants will love it. After all, they receive the water near their roots right where they need it and you can reduce fungal diseases from wet leaves.

What does Drip Irrigation look like?

Drip irrigation delivers water to garden beds at or just below the surface through flexible plastic dripper lines.

The spacing of these lines and the spacing of the holes in these lines depends on the type of plants you are watering and the type of soil you have.

What are the Savings in Water and Greenhouse gas emissions?

Perth households typically use more water on our gardens than in our homes. Drip irrigation can save substantial volumes of garden water as you avoid:

- Wind drift, overspray of garden beds and runoff onto paths and roadways
- Water loss to weeds, mulch (drip lines sit below the mulch) and on foliage.

Each litre of water you save brings a saving in greenhouse gas emissions. Mains or bore water uses energy to reach your tap at pressure and this energy use produces greenhouse gases.

Go Manual!

Did You Know a Perth study found automatic reticulated gardens in Perth on average use *double* the garden water use of a manual setup.

WA Domestic Water Use Study 2003

Some Components in a Home Garden Drip System include poly pipe supply lines connecting to drip lines, a pressure regulator to lower water pressure for the drip lines, an air relief valve to reduce air pockets in the lines, a timer to manually or automatically set the length of watering time and a flush device or end stop to flush out sediments regularly.

http://portal.water.wa.gov.au/portal/page/portal/WiseWaterUse/WaterwiseRebates

Waterwise Rebate

A Waterwise rebate of $10 is available for 30m rolls of subsurface irrigation pipework endorsed under the Approved Watermark Scheme.

In addition there is a rebate of $300 or 50% of the installation cost (whichever is the lesser amount) for installing a new Waterwise Irrigation System by an endorsed Water Corporation Waterwise Garden Irrigation installer.

See more details and list on the website to the left.

Steps to Installing Drip Irrigation

The equipment you'll need is available from hardware stores and reticulation suppliers.

Before visiting your local store, measure up the garden area you are looking at and note down the plants you have or will plant.

You will need this information and your soil type to determine the type and amount of drip line for the job.

Then have a chat with a reticulation specialist at your local store and decide if you want to install it yourself with their advice, or get someone in to install it.

See further advice at ABC Gardening Australia's online factsheet :

www.abc.net.au/gardening/stories/s1183013.htm

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Choosing a Greywater Unit and Steps to Install

When deciding whether to install a greywater system, you need to consider:

- **whether you have any garden zones that can use greywater?**
- **what greywater your home produces?**
- **how accessible your plumbing is?**

Can you use greywater in your Garden?

Greywater is best suited to

- Fruit trees, where fruit is well above ground
- Nutrient and water-loving exotic plants that can handle alkaline water (eg. not azaleas, gardenias or camellias),
- Lawn.

Do you have a garden with these?
If your garden is basically native plants and/or vegetable patch, then greywater reuse is probably not for your garden.

Sources of Greywater in the Home

YES Washing machine

YES Shower and bath

YES Hand basins, though see note #1 below

Y/N Kitchen sink – see note #2 below

NO Toilet (blackwater not grey)

#1 Hand basins can carry high chemical loads from soaps and toothpaste.

#2 Kitchen water is generally polluted with cleaning products and detergents that may harm your soil, plants and local groundwater.

See also Code of Practice section 1.4

Speak to your Council's *Environmental Health Officer* for further information on greywater systems and locally applicable conditions.

Rebates for Greywater

A rebate is available from the WA Government for $500 or 50% of the purchase cost (including installation) for an approved system.

TURN OFF GREYWATER IN WINTER to flush out salts that may build up in the soils from the greywater.

Untreated greywater is dispersed through purple colour-coded pipes, which are required to be below 10cm of mulch.

DIY Bucket

For small basin loads

For laundry loads

Some systems allow you to add your own liquid fertilizers as needed through the greywater reticulation to the plant roots.

Greywater and your Health

Greywater will contain pathogens and households chemicals which could be harmful to your health. Avoid contact with fruit, vegetables and herbs you eat and keep reticulation subsurface away from your fence lines.

Laundry Water

Carefully choose your detergent to be both low in sodium and low in phosphorus. Don't reuse water from washing nappies.

Steps for Installing a Greywater Unit

1. What are your accessible greywater sources and where can it be used in your garden?
2. Get advice from suppliers on WA Department of Health approved systems and decide on the type of system suitable for your greywater load and garden. See list and Code of Practice at www.health.wa.gov.au/envirohealth/water/greywater.cfm
3. Get a quote. Prices can range considerably from $500 for a simple gravity-fed system to several thousand for pumped systems.
4. Contact your Council's Environmental Health Officer for an application form
5. Submit the form with drawings to your Council. It may also require a processing fee.
6. If approved, install the system with a licensed plumber connecting the system to house wastewater pipes.
7. Contact your Council to check your system is safe and get your 'Permit to Use Apparatus'. With your permit then claim your rebate.

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Choosing a Rainwater Tank suitable for my Home

You don't need the biggest rainwater tank on your block to save mains water. How much you can save depends on:

- how much water you use
- the area of roof you connect to
- how wet the Perth year is, and
- the size of your rainwater tank.

To work out what size tank is suitable, start with deciding what you want to use your rainwater for.

Step 1 Deciding What You Want To Use Rainwater For

Small quantities in the garden?

600 to 1,500 Litre tank may be sufficient.

For flushing the toilet?
(Is dual flush and 3 or 4 star?)

2000 Litres or more can be sufficient to make a difference.

Plus

etc...

For laundry washing, hand washing, the showers etc?
A 4,000 - 5,000 Litre tank will make a difference. If you can afford a larger system and have the space, plumbing your tank into the mains is a great idea.

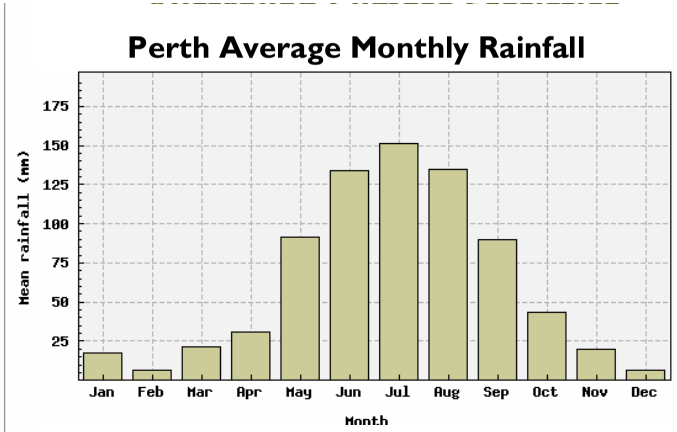
Rebates on Rainwater Tanks

For purchase and installation of a tank over 600 Litres $50 rebate

For plumbing a tank over 2000 Litres into your toilet and/or washing machine $600 rebate (capped at 50% of the purchase and plumbing costs)

Drinking Rainwater

Untreated rainwater is not reliably safe to drink. Chemical pollution or bacteria can enter the tank from bird droppings and vehicle and industrial air pollution. First-flush diverters and gutter guards help, but are not failsafe.



1993 – 2007 Data from the Bureau of Meteorology

Perth's Rainfall Pattern

80 % of Perth's rainfall arrives in 5 winter months so this makes it impossible to use rainwater all year round unless you have a *very* large tank. However you *can* easily eliminate all or most mains water use in winter with a moderate sized tank.

The Importance of the First-Flush Device

A screen plus first flush diverter reduce the amount of large debris entering your tank and collect the initial water volume likely to be more contaminated with pollutants and sediment.

Step 2. Where to Locate the Tank

Look for a gutter collecting rain from a significant proportion of your roof area, where the roof and gutter is in good condition. Look for physical space alongside the house up to 2.3 metres high and 1-2 metres wide depending on size and shape.

Check with your Council to see if approval is needed. This depends on factors like the tank's proximity to a boundary fence or its height or size.

Step 3. Find a Rainwater Tank Supplier and a Plumber

If your rainwater tank is to be plumbed into the mains, a licensed plumber must connect your tank.

Look for suppliers in *YellowPages* under "Tanks".

Step 4: Regularly Clean your Gutters and Filters and Desludge your Tank every 1-2 years

See www.health.wa.gov.au/envirohealth/water/rainwater.cfm

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Establishing an Attractive Waterwise Garden Zone

Perth households use more water on their gardens on average than they use in their homes.

You can address this by establishing no-water zones in your garden with attractive local native plants.

Step 1: Identify a zone to begin with

Start with a manageable area of your garden to turn off the tap. Is the zone weed and grass free? If not, you'll need to tackle this first. A layer of mulch won't stop them.

Step 2: Decide on the type of garden

Are you looking for low shrubs and ground covers, shade trees or 2m tall shrubs to hide your fence. Remember birds appreciate a mix of foliage and flowers and local native trees can offer food and nesting places.

Step 3: Find a suitable nursery

Go to a native plant specialist and tell them the suburb you live in. They will then be able to tell you your soil type and the species that grow on your soil type. For example coastal soils will not support most species that thrive in the clay soils of the Perth hills.

Specialist Native Nurseries in Southern Perth Region

APACE
1 Johannah St, North Fremantle **9336 1262**
(open weekdays only)

Carramar Coastal Nursery
1834 Mandurah Rd, Port Kennedy **9524 1227**

Lullfitz Nursery
1071 Thomas Rd, Oakford **9439 2555**

Men of the Trees
Elanora Drive (in Golf course) Rockingham **9527 3142**

Oakford Native Nursery
141 King Rd, Oakford **9525 1324**

Find more around Perth in the *YellowPages* under 'Nurseries'

For your Other Zones - Remember Water Efficient Drip Retic.

Look into drip irrigation for your vegetable garden and exotic garden zones and save substantial quantities of water.

Ask us for a flyer on this – phone the Climate Actions team on 9329 2700 – or speak to a reticulation supplier.

Step 4: Plant your garden at the onset of winter

Dig a wide planting well that can hold 3 to 4 litres of water. This will make watering in summer much easier. You could also mix in a small quantity of soil wetter and compost to the soil in the well to give your seedlings a strong start, but it is not essential.

Step 5: Watering regime for local native plants

For the first summer, water in the early morning 2 to 3 times a week until new leaves appear.

Then drop back watering to 2 litres 1 to 2 times a fortnight for the first 2 summers. Avoid light, frequent watering as this encourages seedlings to develop surface roots and be dependent on watering.

Resources to support and inspire you

- Visit the Wildflower Society website **http://members.ozemail.com.au/~wildflowers** to find out about their books and talks on native plants.
- Look out for the annual King's Park Wildflower Festival in September.

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Choosing and Installing a Water Saving Showerhead

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

The new generation of water saving showerhead means you can have a great shower while saving water and energy.

Can these showerheads be used with my hot water system?

YES, if you have a **solar, electric or gas storage/tank systems** with mains pressure.

NO, if your hot water is from an **instantaneous** system (these are attached to the inside or outside wall of your house). These units heat according to the flow rate.

NO, if you have a **low pressure solar** hot water system. You do not need a water efficient showerhead as your hot water system is already water efficient.

If uncertain, ring the manufacturer of your unit or phone the Energy Smart line on 1300 658 158.

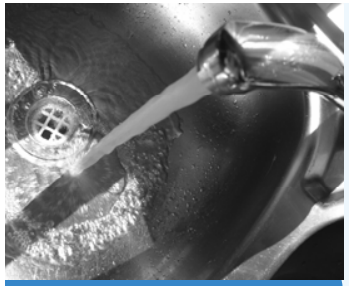
What to look for and where to find it?

Most hardware stores and bathroom suppliers have water saving showerheads for purchase. Expect to pay between $40-$100 for a good quality showerhead. Look for a showerhead with the type of spray pattern you like or choose one with multiple settings to give your family choice in the shower they want.

How much water and energy will you save?

Exactly how much you'll save depends on the number of people in your household, your hot water system type and how long your showers are, but on average, you could save:

- **Around one tonne of greenhouse gas emissions every year - that's around 10% of the greenhouse pollution from home activities.**
- **From $70 to over $100 on your gas or electricity bills every year, as you'll also use less hot water.**
- **From 15,000 to 25,000 litres of water per year – that's enough to fill a back yard swimming pool.**



Important installation considerations

- **If water leaks from the arm joints, loosen screws and run warm water through arm joints for 10-20 seconds. Turn water off and re-tighten the screws to rectify the problem.**
- **Never use abrasives to clean the showerhead. Clean with contaminant free soapy water or soft, damp cloth.**

Flow Regulators for Taps and Showers

Flow regulators take the place of regular tap washers and can be an alternative to purchasing a water saving showerhead. They save you money by allowing water through at lower flow rates.

Claim a Waterwise Rebate of $2 for each 3 'Stars' or better authorised flow regulators. The rebate is available to a maximum value of $20 per household.

How to Install your Water Saving Showerhead

You'll need: 1 water saving showerhead, plumbers tape, a wrench or adjustable spanner and a dry cloth

1. Unscrew your old showerhead anti-clockwise.
2. Clean and thoroughly dry pipe threads on the open end of the arm joint.
3. Apply 3-4 rotations of plumbing tape tightly over the threads of the arm joint in a clockwise direction.
4. Place the showerhead joint over the arm joint.
5. Install showerhead turning in a clockwise direction. Tighten firmly. Do not over tighten as this will restrict movement of the arm. Do not use the arm to tighten. Use a spanner with cloth so the showerhead joint does not get scratched.

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SOUTHERN METROPOLITAN REGIONAL COUNCIL

This brochure is largely based on materials from the EnergyActions project supported by the Sustainable Energy Development Office.

This project is supported by the Department of the Environment, Water, Heritage and the Arts, and implemented by the Southern Metropolitan Regional Council (SMRC) through a regional partnership with the Cities of Canning, Cockburn, Fremantle and Rockingham, and the Towns of East Fremantle and Kwinana.

Appendix E

Business Newsletters

developed under the project

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Rockingham

As part of the ClimateActions project, a number of businesses in your area have been making changes with the aim of reducing their "Environmental Footprint". Through their participation we have reduced overall greenhouse gas emissions in Rockingham while providing the local community with the ability to shop with a greener conscious.

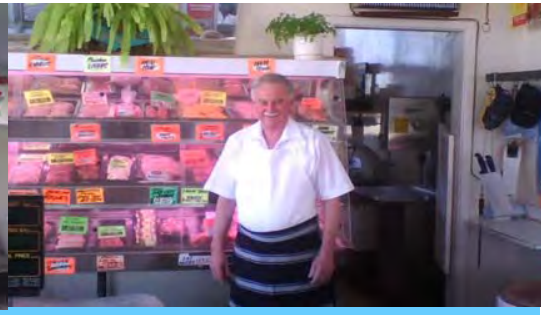
Look for participating shops in the Shoalwater Warnbro and Safety Bay area.

Somore Gourmet Food and Coffee House in Safety Bay has:

1. installed higher efficiency lighting with an estimated 1.3tonnes saving in greenhouse gas emissions per year.
2. They are also involved in the process of switching electric cooking appliances to gas with even greater greenhouse gas savings anticipated.

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop. counters.



Local butchers including **Shoalwater Quality Meats** and **Bay View Butchers** have been practicing energy efficiency for a number of years.

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Another business participating in ClimateActions is the **Taste Of Britain** in Warnbro Fair Shopping Centre. Energy consumption has been dramatically reduced through:

- The installation of an energy efficient air conditioner
- Optimising shop floor lighting.

You too can make a difference at home and at work by:

- Turning off lights and appliances not in use
- Buying energy efficient appliances
- Reusing and recycling materials such as paper & cardboard

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Department of the Environment and Water Resources

Australian Greenhouse Office

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Fremantle

As part of the ClimateActions project, a number of businesses in your area have been making changes with the aim of reducing their *environmental footprint*.

Through their participation we are reducing greenhouse gas emissions in Fremantle and building up community knowledge on actions we can take in our workplace and home.

Look for participating shops at 195 Hampton Road and also numerous delis in the local area. One example is **Peaches** where owner Sergio has purchased more efficient 35 Watt downlights to replace standard 50Watt lights for part of the shop.

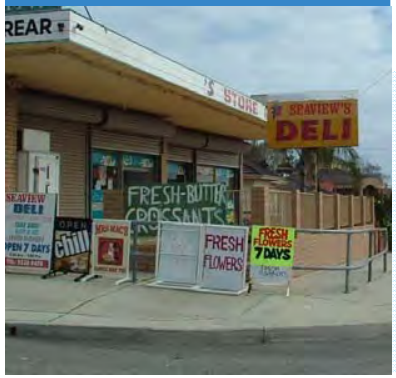
Once installed at **Peaches**, these more efficient downlights will save an estimated **1.3 tonnes** each year.

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop counters.

Did you know that "fresh" produce is often imported from the eastern states and in many cases from overseas? By sourcing the same produce locally greatly reduces transport requirements and greenhouse gas emissions.

Shop locally and walk instead of driving. Save money and the environment, while staying fit.



Another business participating in this project is the **Seaview Deli** on South Street, where they have dramatically reduced energy consumption through:

- Minimising the refrigeration units.
- Turning fridges containing non-perishable goods off overnight.
- Annual savings in greenhouse gas emissions is estimated at **8.7 tonnes**.

You too can make a difference at home and at work by:

- Turning off lights and appliances not in use
- Buying energy efficient appliances
- Reusing and recycling materials such as paper & cardboard

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Canning

A number of businesses in the City of Canning have joined our ClimateActions project, and are doing a great job in reducing greenhouse gas emissions. You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Ferndale Chicken Spot, on Metcalfe Road, Ferndale, are becoming more energy efficient by:

1. Replacing their existing lighting with more energy efficient lights and fittings
2. Installing a 4-star energy rated gas instantaneous hot water system to replace their old gas storage system

These actions are helping to save tonnes of greenhouse gases every year.

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop counters.

Ferndale Deli, on Metcalfe Road, Ferndale:

- Turn off their drinks fridges overnight using timers
- Set their air-conditioner thermostat at 25°C in the summer

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Queens Continental Deli & Lunch Bar, in Wharf Street, Queens Park, reduced the number of refrigeration appliances and made:

- 40% savings in their electricity use
- Thousands of dollars savings in their annual electricity bill
- An estimated savings of 25 tonnes of greenhouse gas emission a year

You too can make a difference at home and at work by:

- Turning off lights and appliances not in use
- Buying energy efficient appliances
- Reusing and recycling materials such as paper & cardboard

Australian Government

Department of the Environment and Water Resources

Australian Greenhouse Office

SOUTHERN METROPOLITAN REGIONAL COUNCIL

This project is supported by the Department of Environment and Water Resources, Australian Greenhouse Office, and implemented by the Southern Metropolitan Regional Council (SMRC) through a regional partnership with the Cities of Canning, Cockburn, Fremantle and Rockingham, and the Towns of East Fremantle and Kwinana.

CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Cockburn

A number of businesses in the City of Cockburn have joined our ClimateActions project, and are doing a great job in reducing greenhouse gas emissions. You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Eziway Food Store, in Southwell Crescent, Hamilton Hill, are helping the environment by:

1. Reducing electricity use by the installation of plastic strips on their fruit & vegetable display chiller
2. Consolidating their products into fewer fridges and freezers
3. Recycling their paper and cardboard

These actions are helping to save tonnes of greenhouse gases every year.

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop counters.

Organic Collective, on Greenslade Street, Hamilton Hill:

- Are Carbon Neutral and purchase Green Power
- Compost kitchen organic waste

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Duck's Deli & Lunch Bar, in Simms Road, Hamilton Hill, are making headways in energy efficiency by:

- Replacing their fridges with a cool room and display
- Retrofitting their lighting with new energy saving units

You too can make a difference at home and at work by:

- Purchasing Green Power
- Buying energy efficiency appliances
- Using energy savers in place of incandescent light bulbs

Australian Government
Department of the Environment and Water Resources
Australian Greenhouse Office

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in East Fremantle

A number of businesses in the Town of East Fremantle have joined our ClimateActions project, and are doing a great job in reducing greenhouse gas emissions. You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Ambience Café, at 147 Canning Highway, are helping to save tonnes of greenhouse gas every year:

1. Replacing the seals on their refrigerators to improve energy efficiency
2. Saving 30% of their lighting electricity use by replacing 50W downlight bulbs with 35W energy savers†

†Osram IRC Decostar 35W (12V) energy saving halogens are available from Lamp Replacements at 293 Stock Road in O'Connor.

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop. counters.

Meat Direct, on Canning Highway, are helping the environment by:

- Saving electricity through insulating the hot water pipe on their electric storage hot water system
- Recycling cardboard packaging

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Quarterdeck Deli, on East Street, have become more energy efficient by:

- Refitting their refrigerated display unit with an energy efficient compressor
- Recycling paper and cardboard

You too can make a difference at home and at work by:

- Replacing old seals on your fridges and freezers
- Using energy savers in place of standard downlight and incandescent bulbs
- Reusing and recycling packaging materials

Australian Government

Department of the Environment and Water Resources

Australian Greenhouse Office

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Kwinana

A number of businesses in the Town of Kwinana have joined our ClimateActions project, and are doing a great job in reducing greenhouse gas emissions. You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Wicks Bakery, at Oriela Shopping Centre, are helping the environment by:

1. having their hot water fully supplied from their rooftop ***solar hot water*** system
2. making big savings on their energy use
3. helping to save tones of greenhouse gases a year

Support the environment by supporting your local business participants in the ClimateActions project.

Look for further energy information on their shop. counters.

Medina Fruit & Veg, on Pace Road, Medina, are energy efficient by:

- Keeping their appliances well maintained
- Having plastic strips on their cool room entrance

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Burton' s Bulk Buy, on Pace Road, Medina, are helping to reduce the amount of waste going to landfill:

- Minimizing their organic waste
- Recycling paper and cardboard

You can make a difference at home and at work by:

- Installing a solar hot water system
- Reducing kitchen organic waste by composting or using or worm farm
- Reusing and recycling packaging materials

Australian Government

Department of the Environment and Water Resources

Australian Greenhouse Office

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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Businesses Making a Difference in Canning

A number of businesses in the City of Canning have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Parkwood Convenience Store, on Vellgrove Avenue, Parkwood, are becoming more energy efficient by:

1. Turning off their drinks fridges overnight
2. Installing a plastic curtain across their front entrance
3. Setting the air-conditioner's thermostat to 25˚C for summer cooling

These actions are helping to reduce the emissions of tonnes of greenhouse gases every year.

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

IGA, in Apsley Road, Willetton:

- Recycle their cardboard packaging
- Retails 35W downlight energy savers for a discounted price of $6.50

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Queens Park Deli, on Sevenoaks Street, Queens Park, are helping the environment by:

- Turning off drinks fridges overnight using timers
- Looking at replacing individual fridges with a coolroom with display to improve energy efficiency

You too can make a difference at home and at work by:

- Turning off lights and appliances not in use
- Using a ceiling fan instead of air conditioning for cooling
- Reusing and recycling packaging materials

Australian Government

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Cockburn

A number of businesses in the City of Cockburn have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Coogee Cafe, at Coogee Beach, are helping the environment by:

1. Saving water by having a rainwater tank which is plumbed into the toilet cisterns
2. Having a 5 star-rated gas instantaneous hot water system
3. Replacing 50W downlight bulbs with 35W energy savers†

†Osram IRC Decostar 35W (12V) energy saving halogens are available from Lamp Replacements at 293 Stock Road in O'Connor.

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

George's Deli, on Rockingham Road, Spearwood, save electricity by:

- Turning off drinks fridges overnight using timers
- Installing plastic insulation strips on their shop's entrance

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Lighthouse Corner Store, on Fairbairn Road, Coogee, are making headways in energy efficiency by:

- Putting plastic insulation strips on their fruit and vegetables chiller
- Activating their automatic doors when running their air conditioners

You too can make a difference at home and at work by:

- Buying energy efficiency appliances
- Using energy savers in place of incandescent light bulbs
- Using a ceiling fan instead of air conditioning for cooling

Australian Government

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in East Fremantle

A number of businesses in the Town of East Fremantle have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses.

Hubbles Yard Cafe, on George Street, are helping to reduce the emission of tonnes of greenhouse gas every year:

1. Keeping their electrical appliances in good maintenance
2. Reducing their lighting electricity use by replacing incandescent bulbs with energy savers
3. Recycling their cardboard, glass and plastics

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

The Wine Store, on George Street, are looking to achieve energy efficiency by:

- Conducting an energy audit and
- Upgrading to more energy efficient appliances where applicable

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Quarterdeck Deli, on East Street, have become more energy efficient by:

- Turning off fridges overnight using timers

You too can make a difference at home and at work by:

- Turning off lights & appliances not in use
- Using energy savers in place of incandescent light bulbs
- Buying more energy efficient appliances when replacing old units

Australian Government

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Fremantle

A number of businesses and organisations in the City of Fremantle have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses and organisations.

Old Bridge Cellars, in North Fremantle, are helping the environment by:

1. Installing timers on drinks fridges which automatically turn them off overnight, reducing energy consumption by as much as 30%.
2. Recycling all glass and cardboard generated by the business.

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

Tonic Cafe, on Queen Victoria Street, has reduced energy consumption by:

- Reducing the number of fridges used in the shop while improving the quality of produce and service.
- Improving the efficiency of gas use for cooking in the kitchen.

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

South Fremantle Laundry Services, on South Terrace, are making headways in reducing their "Carbon Footprint" by:

- Replacing 50W down-lights with 35W energy savers
- Purchasing carbon offsets for a number of washing machines.

You too can make a difference at home and at work by:

- Using energy saving light bulbs
- Using a ceiling fan instead of air conditioning for cooling

Australian Government

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Kwinana

A number of businesses in the Town of Kwinana have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters at our participating businesses.

Kattlers Deli & Lunch Bar, on Pace Road, are helping the environment by:

1. Switching from an electric storage hot water system to a gas instantaneous one
2. Turning off their drinks fridges overnight with the use of timers
3. Recycling their plastic and cardboard packaging

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

Parmelia Superdeli, on Parmelia Avenue, are saving greenhouse gas emissions by reducing electricity use through:

- Insulating the hot water pipe of the electric storage H/W system
- Turning off lights when not needed

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Kwinana Hub Deli, on Gilmore Avenue:

- Use timers to turn off drinks fridges overnight
- Cool off with a ceiling fan instead of the air conditioner on those not so hot days

You can make a difference at home and at work by:

- Using a ceiling fan instead of air conditioning for cooling
- Reusing and recycling packaging materials

Australian Government

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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CLIMATE ACTIONS
AT HOME, AT WORK, IN THE COMMUNITY

Businesses Making a Difference in Rockingham

A number of businesses and organisations in the City of Rockingham have joined the ClimateActions project, and are doing a great job in reducing greenhouse gas emissions.

You too can make a difference by taking actions at home and in your workplace. Look out for the ClimateActions posters and brochures at our participating businesses and organisations.

Harro's Lunch Bar, on Kent Street, are helping the environment by:

1. Installing timers on drinks fridges which automatically turn them off overnight, reducing energy consumption by as much as 30%.
2. Increasing staff awareness to turn off appliances when not in use.

Support the environment by shopping at your local business participants in the ClimateActions project.

Look for further energy saving information on their shop counters.

Rockingham IGA, are helping the environment by:

- Installing timers on drinks fridges.
- Investigating an energy efficient shop lighting system.
- Reducing heat gain into refrigerated display cabinets.

Shop locally and walk instead of driving. Save money and the environment, while staying fit.

Mercy Point Kiosk, in Waikiki, are making headways in reducing their greenhouse gas emissions by:

- Installing timers on drinks fridges.
- Recycling much of the shop's cardboard and glass.

You too can make a difference at home and at work by:

- Turning off lights and appliances not in use
- Using a ceiling fan instead of air conditioning for cooling
- Reusing and recycling packaging

Australian Government

SOUTHERN METROPOLITAN REGIONAL COUNCIL

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Appendix F

Calculations and Assumptions for Electricity & GHG Savings

Electricity and GHG Savings Calculations and Assumptions

The calculations for electricity savings are made by estimating the average daily savings using actual data collected within the Climate Actions and its pilot project, or based on research materials as referenced in this appendix. The GHG abatement is calculated by applying the National Greenhouse Accounts (NGA) emissions factor of 0.98 kg CO_2e per kWh[26] in most instances. In cases where the energy and GHG savings result from switching energy source (electricity to gas), the calculations and assumptions used are specified in the relevant subsections.

The following assumptions were made for the calculations of energy reduction and GHG abatement as shown in Table 8:

Refrigeration

Timers on drinks fridges
These calculations are based on actual monitoring of energy consumption by drinks fridges, with and without a timer installed, at a number of locations using a kWh meter. The monitoring was conducted over typically a 5 day period in two consecutive weeks. The average daily consumption data were then compared to calculate the percentage savings. Energy savings with the timer installed depends on the opening hours of the shop. The figure of 30% savings was used as being representative for most SMEs (see below for average daily consumption of drinks fridges).

Decommission fridges
Energy consumption of fridges vary considerably depends on the size, condition, situation and energy efficiency of the individual appliance. The majority of the decommissioned fridges in Climate Actions are vendor supplied two-door or three-door display fridges of various commercial brands. Average daily consumption of such fridges was calculated using actual consumption data collected for a number of fridges in different shops, both in the pilot and Climate Actions projects. The figure of 12kWh per day was chosen as being representative energy consumption for one of these fridges[27].

Decommission freezers
Energy consumption of freezers vary according to the size, condition, situation and energy efficiency of the individual appliance. An assortment of small ice-cream freezers, bait freezers and bigger commercial freezers were decommissioned by the businesses. No actual consumption data is available for these appliances. The average daily consumption figure of 4kWh for freezers used in the calculations is chosen from the high end of the consumption figures in a 2003 Australian case study[28] of ice cream freezers[1].

Replace fridge/freezer seals
Actual energy savings from replacement of old or faulty fridge or freezer seals are not available. An assumption of 11% loss in energy efficiency due to faulty seals[29] was used for these calculations. Using the average daily consumption of 12kWh above, the average savings of 1.3kWh per day was calculated.

---

[26] Indirect emission factors for consumption of purchased electricity from the grid for WA(SWIS) end users, as stated in the National Greenhouse Accounts (NGA) Factors published by the Department of Climate Change, last accessed at http://www.greenhouse.gov.au/workbook/pubs/workbook-feb2008.pdf

[27] See also www.energyrating.gov.au for generic energy consumption figures for commercial refrigeration and air conditioners

[28] Field test of 75 R404A and R290 ice cream freezers in Australia by CSIRO Energy Technology, last accessed at http://www.airah.org.au/downloads/2003-11-02.pdf

[29] As quoted on the website: http://www.whatcanonepersondo.com/blog/index.php?/archives/17-Increase-your-fridges-efficiency-by-up-to-25-With-one-simple-DIY-trick..html

Energy efficient upgrade

The energy efficient upgrades arose from replacing old motors or replacing entire refrigeration units in small to medium-sized supermarkets or liquor stores.
Actual energy savings from energy efficient upgrade of refrigeration are not readily available. The estimate for energy consumption from refrigeration for these premises was based on a monthly electricity bill, provided by a supermarket, of 26000kWh. Assuming that 50% of the electricity consumption is for refrigeration, an average daily consumption of 860kWh is calculated for refrigeration alone. Taking into account that some of the premises which had the upgrade were smaller, and some of the appliances had glass doors, the much lower figure of 250kWh per day was assumed in the calculations.

Energy efficiency can improve by as much as 25% with an upgrade, according to some refrigerated display manufacturers[30]. However, the actual savings may be lower, as the new unit may have larger display areas and therefore greater loss of cold air to the surrounding. Therefore, a lower figure of 10% savings was assumed in the calculations.

Chillerstrips/Night blinds

According to Murdoch University research[31], the installation of chillerstrips on open display chillers can save up to 50% of energy consumption. Insulated night blinds can save more than 50% of night-time consumption, according to manufacturer's product information[32]. As this category of actions cover mainly installation of chillerstrips, an assumption of 40% savings was used in the calculations. The average daily consumption of an open display chiller varies according to its size and situation (e.g. ambient temperature and proximity to open doors). A figure of 20kWh was assumed in the calculations as being representative of the daily energy consumption[26].

Plastic curtain for coolroom/freezer

Plastic curtains for coolrooms and walk-in freezers prevent the loss of cold air through open doorways. Electricity consumption of coolrooms and freezers vary with size, situation and the frequency and duration of the door being left open. The estimated daily consumption of 60kWh for a coolroom was based on a case study[33] by the Moreland Energy Foundation. The assumption of 10% savings was made for the calculations.

Coolroom in place of vendor fridges

The estimated 50% savings of 120kWh daily consumption was based on the same case study[30] as above.

Shading for outdoor freezer/condenser

Actual energy consumption data of these appliances is not available. However, energy consumption of an outdoor refrigeration unit situated in the sun is much higher than if the appliance were situated in a cool shaded place. These outdoor units are ice freezers and large condensers for A/C situated close to a north- or west-facing wall. An estimated energy consumption of 70kWh is assumed for the calculations. By shading these units, it is assumed that 10% savings[34] can be made.

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[30] Private conversation with Mr Peter Baker, at A J Baker & Sons P/L

[31] Monitoring of the Performance of Chillstrip 24 Hour Screens at Cheap Foods Store in Applecross by the Murdoch University Energy Research Institute, 1994

[32] Chillsaver Australia P/L, WA

[33] "Dairy Queen" case study by the Moreland Energy Foundation, last accessed at http://www.mefl.com.au/business/project/39/

[34] As quoted on the website: http://www.foxservice.com/kb/article-5.html

Lighting

Energy Savers (35W downlights)
The 35W energy savers replace 12V standard 50W downlights, making a 30% savings per light in energy consumption. The energy savings is calculated based on 10 hours usage per day, therefore an average of 150Wh savings is assumed per light per day.

Delamping
The removal of one fluorescent tube from each double fitting reduces energy use in lighting by 50%. The average daily energy saving was assumed to be the product of the sum of all the opening hours in a week and the wattage reduction, averaged over 7 days.

Lighting retrofit
Lighting retrofit refers to the replacement of standard (double or triple) fluorescent fittings with energy efficient single fittings with reflectors. The wattage reduction from the original to the energy efficient lighting and an assumption of 10 hour daily usage were assumed in the calculations for the average daily energy savings.

Hot Water

Lower thermostat
The average daily energy savings for lowering the thermostat setting of a storage hot water system was depends on the difference in temperatures between the original and final settings. The estimated savings was calculated based on the annual electricity consumption data documented in the Home Energy Diet[35].

Decommission electric storage HWS
The estimated daily electricity savings from the decommissioning of electric storage hot water systems was based on the annual running costs[36].

Switch to gas instantaneous HWS
The actual energy savings made from switching from an electric storage to a gas instantaneous HWS is difficult to quantify. The energy savings was calculated by converting the emissions from gas instantaneous HWS and electric storage HWS[33] to electricity savings by applying the inverse of the NGA emissions factor.

HVAC

More efficient usage
Energy savings from more efficient use of air-conditioning can be significant. One particular shop in Cockburn used to run their air-conditioner overnight throughout summer to prevent the chocolates from melting. Following the GEF's advice, the owners installed timers on a number of drinks fridges resulting in less heat gain inside the shop so much so that they no longer require air-conditioning overnight. They also started turning on the A/C in the earlier cooler hours of the morning and increased the A/C thermostat setting. As a result they have made big savings in their A/C electricity cost.

The assumptions of 40% savings on 10 hours of daily usage, for 4 months in a year, for a 750W system were made for the calculation of the annual energy reduction.

[35] The Home Energy Diet is accessible at:
http://books.google.com.au/books?id=pG7CIG31GSUC&pg=PA157&dq=energy+savings+from+insulating+hot+water+pipe&sig=p8FpTJoQq6lh6k5zdzwiTljw32A

[36] The information can be found at the Sustainable Energy Development Office website:
http://www.sedo.energy.wa.gov.au/pages/emissions.asp

Plastic curtain for shop entrance
An assumption of 25% savings on the A/C energy consumption was made for the calculations as the shops concerned have the A/C in close proximity to the entrance. It was also assumed that a 750W A/C was used for 10 hours a day for 4 months in a year.

Upgrade to energy efficient A/C
An assumption of 40% energy savings was made for the calculations. The shop concerned had replaced non-star rated A/C with one of good energy efficiency[26]. It was also assumed that a 750W A/C was used for 10 hours a day for 6 months in a year, for both winter heating and summer cooling.

Old RACs to evaporative ducted A/C
An assumption of 80% energy savings[37] was made for the calculations. The shop concerned replaced two old in-wall refrigerated air-conditioners with a ducted evaporative A/C. It was also assumed that the two RACs, each of 750W, were used for 10 hours a day for 4 months in a year.

Install/repair automatic doors
An assumption of 30% energy savings was made for the calculations. One of the shops concerned has banks of open display chillers (without chillerstrips) and wide entrances, increasing the load on the A/C (and refrigeration units) in the summer. It was also assumed that 5kW systems are used for 10 hours a day for 4 months in a year.

Roof insulation/reflective paint on roof
An assumption of 50% saving on the A/C energy consumption can be made for the calculations. The average daily consumption for A/C for the shop was estimated by comparing their summer and winter electricity bills. It was also assumed that the savings is made only for 4 months in a year.

Cooking Appliances

Switch from electric to gas fryers
The average daily consumption of the electric fryers was estimated from the self-reported increase in electricity bill by a café owner after the installation of his fryers. The GHG emissions from the electric fryers are obtained by applying the NGA emissions factor of 0.98 kg CO_2e per kWh. The GHG emissions from the gas fryers are obtained by applying the emissions factor for natural gas[38] to the estimated daily consumption (3 x hours of operation at 100MJ/hr gas consumption). The GHG abatement is therefore obtained by subtracting the emissions figure for gas fryers from the electric ones. It should be noted that pre-heating and standby usage for the gas fryers have not been accounted for in the calculations.

General

Turn off appliances overnight
The figure of 10 kWh was used for overnight energy consumption was made assuming that a typical cooking appliance such as a 1kW griller was left on for 10 hours.

[37] Energy savings information was obtained from the Australian Greenhouse Office report on evaporative air conditioners, last accessed at: http://www.energyrating.gov.au/library/pubs/tech-evapac2001.pdf

[38] Emissions factor for natural gas of 58.9 kg CO_2e per GJ as stated in the National Greenhouse Accounts (NGA) Factors published by the Department of Climate Change, last accessed at http://www.greenhouse.gov.au/workbook/pubs/workbook-feb2008.pdf

Appendix G

Feedback Form for Businesses

Feedback Form

This response form is designed to help the Greenhouse team at SMRC to measure the effectiveness of the trial and to improve the program with participant input.

Your Name/Business Name: _____ / _____

1) **How useful did you find the Climate Actions service to your business?**

2) **How effective was the program in helping you reduce the energy consumption of your business?**

3) **Did any part of the program stand out as either particularly useful or particularly unhelpful to you?**

4) **What would you, as a small business, want from the Council to help you with energy reduction and environmental management?**

5) **Will you be taking any actions as a result of the information provided to you?**
If so, what actions are you likely to take? (lighting changes, use of timers, improved refrigeration)

6) **Do you have any other comments you'd like to make about the Climate Actions program?**

Check quote - Permission to use quote?

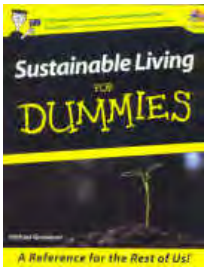
Thank you for your participation in this project. Your feedback is invaluable.

Appendix H

Feedback form for residents - A sample

Feedback Form

If you return your feedback by end of April 2008, you are in the running for a prize including a $30 *box of organic local fruit and veg, a $30 gift voucher to a local native nursery and selection of magazines and books.*



Magazines

Name: _____

Phone: _____

(Details used only for the prize. Any feedback you provide remains strictly confidential.)

The program began with a letter from your Council, a blue service sheet and a reply paid envelope.

1. Did you like the invitation to the information service or is there something we could have done differently?

_____

_____

2a. How satisfied have you been with ClimateActions materials you requested?

Very dissatisfied *Dissatisfied* *Unsure* *Satisfied* *Very satisfied*

2b. Do have any suggestions on improving the information materials?

_____

2c. Did you use the action cards for planning climate action goals?

YES **NO**

Action card →

3a Were you interested in reading about the actions by your shops in the 2 flyers of business stories sent to you? (Circle one) **YES** **NO** **SOMETIMES**

If YES, what did you like most?

_____

3b Did you see the information racks at local shops? **YES** **NO**

4. Did you take any actions to reduce greenhouse emissions as a result of the program?
Please list your energy, water and/or waste actions :

_____

_____

Are you considering some actions in the near term? Please list them:

_____

_____

5. If you took action, what in the program helped you most?

_____

_____

6. What did you like …

Best about the information service

_____

Least about the information service

_____

Any other comments: _____

Many thanks for completing this feedback form.

Please return it via the reply paid envelope and be in the running for a prize.

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