

Environmental Business Assessments in Marysville and Yea Districts

Technical Report

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1. The Report Summary

1.1 Introduction

After the February 2009 bushfires, the Murrindindi Climate Network (MCN) was approached by the Economic Leadership Group (ELG) of Marysville and district, asking for help with establishing a Voluntary Green Code of Practice for the local business community. ELG's idea was to establish a voluntary guideline for businesses to achieve a certain level of environmental standards. This should help to establish an image as an eco-tourism area. To make the project attractive for businesses, MCN suggested conducting this project with an interactive component including free assessor trainings of local volunteers and free business assessments. Following a successful tender process, grant funding was received for this project from the Victorian Environment Protection Agency. A large part of this project went into the setting up of training modules, the training of a local group of volunteers who already have a background in building/energy/environmental education and the conduct of free environmental audits in the test areas of Marysville and Yea districts.

This report summarises the findings of the Murrindindi Climate Network Green Business Auditing team. Over a 18-month period forty businesses from an array of different situations were assessed. They included the following business sectors: Hospitality (11), Retail food (7), Retail non-food (7), Primary industries (2), Service providers health / banking / real estate etc. (4), Public buildings and schools (9). Whilst most audits involved one site visit and the editing of a report, some of the locations were so big and/or complex that they needed several visits.

1.2 The scope of the audit

The scope for these audits was to cover two areas of environmental impact within each of the businesses and to identify effective measures to reduce these impacts. The following problem areas and corresponding problem types were included in the assessment:

Problem Area I: Energy use and energy efficiency, namely

- Building orientation and design
- Building envelope
 - Air tightness of building,
 - Insulation levels,
 - Windows & doors
- Lighting
- Appliances:
 - Refrigeration, cooking appliances
 - Hot water
 - Heating / cooling

Problem Area II: Cleaning chemicals & processes

- Identifying chemicals used for different cleaning tasks
- checking for "chemicals of concern" that are harmful to human health and the environment
- Identifying non-toxic alternative products and processes for different cleaning tasks and simple methods with renewable resources

1.3 A brief summary of key findings

Based on the forty assessments a database was set up, collating the findings by problem area and type. The comparison across the all businesses showed that the most frequent problems were:

- At 88% of locations it was found that an excessive amount of hot water was provided. In many cases no assessment of actual hot water requirement had been done. This problem can be solved by accurately assessing the hot water requirements of the business. In many cases an instantaneous hot water tap or a very small storage system would be more appropriate than the current systems in place. With these changes the average savings would be approximately 4.5 Kilowatt/hours per day.
- The second most common problem was found to be the use of T8 fluorescent tubes and was recorded at 83% of the locations. To fix the problem, it is recommended to substitute the T8 tubes by T5 tubes, which saves an average of 19% of lighting costs.
- The third most common issue was excessive lighting. It was found that 78% of sites could function satisfactorily with considerably lower lighting levels. This can be solved by reducing the number of light fittings or by de-lamping some of the existing fittings which on average would achieve a reduction of 35% of lighting cost.

As a common denominator to all sites, it was found that decisions are often biased by myths and dis-information – preventing business owners from achieving optimum outcomes.

Many businesses are miss-informed about energy conservation, the effectiveness of simple energy efficiency measures and the harmful effects of cleaning chemicals. A lot of the proprietors receive information through media and personal contacts rather than through scientific research results. This results in several re-occurring myths being re-iterated and many undesirable actions being taken in response.

For example, a very common confusion concerned downlights. Many people wrongly believed that low voltage is the same as low energy. It is a tribute to some poor marketing initiatives that they have managed to perpetuate this myth for so long. The clients were often amazed when they were presented with the potential savings of converting the dichroic halogen downlights to the LED equivalents.

The most common myth in the use of cleaning products seemed to be the belief that if a product had been approved for sale in Australia then it must be reasonably safe to the environment and to human health. Often the fine print on the product labels gets overlooked along with the fact that many commercially available cleaning products contain “chemicals of concern” to the environment and human health.

2. The Audit Process

2.1 Initial Contact

All of the businesses that participated in the audits were initially contacted by telephone. They were given an explanation about the purpose of the free environmental audits and the level of involvement we would need from them. Many of the participants were very enthusiastic about the whole process.

2.2 Initial Site inspection

On the agreed date we would arrive on site to inspect each of the three main areas of interest. When possible, one auditor would focus on energy conservation while another would focus on chemical use or waste management. This allowed for quite detailed notes to be recorded and we covered a greater range of subjects in the allotted time.

2.3 Report writing

To prepare the reports each auditor collated his or her notes and forwarded them on to the nominated author for the particular site. Once the report was initially compiled it was sent back to all auditors for proof-reading and editing.

2.4 Report delivery

The final edited report was sent to the business proprietors in electronic and printed form. Later they were contacted to see if they had read and understood the report and also to answer any questions that had risen as a result. Occasionally, this process triggered a further site visit, to help answer questions or further discuss solutions to a problem.

3. Detailed Findings of the Energy Audits

In the wake of the fires many businesses (especially in the Marysville district) were forced to re-build their premises and a lot of them seized the opportunity to re-build using an environmentally friendly and energy efficient design. The owners of these businesses proudly showed us the improvements they were enjoying as a result of their proactive stance during the design phase.

Unfortunately the well-designed premises were in the minority. Over the course of the auditing period an array of recurring issues were found in different problem areas. The following sections provide a description of the principal problems along with the solutions. These improvements that can be added as a retro-fit or incorporated into a new design will lead to increased energy efficiency and reduced costs.

3.1 Lighting

Problems:

Inappropriate positioning of lights and old technologies are the main problems found with lighting.

Recommendations:

- Task-based assessments should be made of the actual lighting requirement for the intended use.
- Studies have shown that a combination of task lighting over work areas and lower intensity lighting over general passageways is preferable for workers and far more efficient than saturation lighting over the whole building.
- Quartz halogen and dichroic down lights are very inefficient. They produce large amounts of heat which place an additional burden on air-conditioning systems. A variety of LED lights are now available to suit different light fittings and colour temperature requirements.

3.2 Appliances

3.2.1 Refrigeration

Problems:

Many people underestimate the amount of energy consumed by refrigerators. Inefficient use of refrigerators and poor maintenance are the main problems.

Recommendations:

- Refrigeration is often the single largest consumer on any site. It is recommended that only the minimum required amount of refrigeration be used at any time
- Refrigerators require frequent maintenance to ensure the condenser coil works efficiently. All condenser coils should be cleaned regularly. Adequate ventilation is vitally important. All air inlets and outlets must be free of obstruction and the recommended clearance from other appliances should be maintained.
- Many retail stores offer refrigerated drinks. Considerable energy savings can be achieved by controlling these refrigerators on a timer. The refrigerator only needs to run for 2 to 3 hours before sales begin and it can go off at closing.

- To increase the efficiency of a refrigerator it is best to keep it packed tight with product at all times. This will reduce the volume of air changes each time the door is opened and tend to stabilise the temperature within the cabinet.

3.2.2 Cooking appliances

Problems:

Inefficient use and poor maintenance of cooking appliances are the main problems.

Recommendations:

- Cooking appliances should not be turned on hours before they are required. Heat up times can easily be measured and marked on the appliance so that staff are aware of the required lead times.
- If possible, use an electric frying pan, pressure cooker or microwave oven as an alternative to traditional electric ovens—they use a lot less energy. Cooking with gas is far more efficient.
- Check the oven door seals with a piece of paper. If the paper slips out from between the seal and the door, you could be losing a lot of heat. Replace the seals to prevent wasted energy and money.
- If possible, cook several things at once in the oven.
- Don't open the oven door unnecessarily while cooking. Keep oven windows clean so you can look through to check progress.
- Consider cooking in bulk and freezing.
- Reheat food in the microwave to cut greenhouse gas emissions and save time.

3.2.3 Hot water

Problems:

Overestimated hot water needs and inappropriate hot water systems and storage are the main problems.

Recommendations:

- In all situations an accurate measure should be done of the hot water requirements. Electric hot water units must be 125 Litres or larger to qualify for off peak storage. Most commercial installations are smaller than 125 Litres so they do not qualify. This means that most businesses are paying peak rate at all times for their hot water. Many of these businesses are heating much more hot water than they require. A typical under bench 60 litre service can lose around 3 Kilowatt/hours per day through escaped heat.
- When heated water is only required for hand washing, an instantaneous gas or electric service will save a lot of energy every day.
- It is preferable to mount storage style hot water services in a warm dry location protected from wind and weather. Externally mounted hot water services have approximately twice the losses compared to internal units.

3.2.4 Heating / cooling

Problems:

Inappropriate use of heating/cooling systems and insufficient air tightness are the main problems.

Recommendations:

- Staff training and education can be the biggest savings in heating and cooling costs. When a building is to be artificially heated or cooled, air tightness is the most important factor. Often doors and windows are left open un-necessarily. This puts an enormous burden on the heating or cooling system. If the system is thermostatically controlled it will run for longer to compensate.
- Temperature settings are often affected by the psychological impact of the weather. People often heat a building to over 25 degrees in winter and yet they want to cool it to less than 20 degrees in summer. This has a significant impact on the energy requirement of the system. More moderate settings can save enormous amounts of energy.

3.3 Building orientation and design

Problems:

Many commercial buildings are constrained by the layout of the site and the need to display products toward the street or entrance. This often results in overheating in summer and large heat losses in winter.

Recommendations:

Recommendations include the orientation of new buildings, the positioning of windows and eaves and the use of shade trees.

3.3.1 Building orientation for new buildings

The direction that a location faces will influence the layout of the building and its positioning on the site. When selecting a site for your new building, the orientation of in relation to north needs be a top priority. Rooms with an orientation to the north will benefit from warming winter sunshine and the rooms will be brighter and have a friendlier feel to them.

In this context, the selection of a building site and the selection of a design and layout should not be treated as two separate items.

There are now a range of subdivisional guidelines covering aspects including the recommendation for the long axes of sites to be within a range of N20W to N30E or E20N to E30S to enable better outcomes in regards to building heating and cooling costs.

A minimum level of energy efficiency for new buildings is now mandatory across Australia. In some locations with existing subdivisions, various generic designs cannot be economically placed on the sites due to their layouts, and window placement etc. As an example, in Victoria where a level of 5 star energy efficiency is required, an off the shelf design, depending upon its window placement etc. on a north south orientated site may not only be uneconomical to build but may possibly not be able to achieve the requirements. This situation may instead require a customised design to suit the site.

3.3.2 Positioning of windows

The largest areas of glass should be oriented toward the north. Where it is not possible to provide verandas or eaves, glass should be treated with low emissivity tinting or external sun blinds.

3.3.3 Positioning of eaves

North facing windows are most effective when combined with large eaves or verandas. The ideal over-hang is produced when the shade angle from the outside edge of the veranda to the base of the window is at least the same as the latitude at the site. In the Murrindindi Shire Council area this is 37 degrees.

East and west-oriented windows are best protected by sun blinds, as these are more effective than curtains.

3.3.4 Strategic placing of shade trees

Deciduous trees (trees that lose all of their leaves each autumn) save energy in summer by shading houses, paved areas, and air conditioners. Small deciduous trees and shrubs, and especially those with low, dense branches, also can serve as effective wind barriers.

Large and small evergreen trees and shrubs save energy by slowing cold winds in the winter. They also provide shade, but since they often have branches near the ground, their shade is most effective when the sun is not directly overhead. Shade from trees reduces air conditioning needs and makes non-air conditioned homes more comfortable. Plant deciduous trees so they will shade from 3pm to 7pm during December, January and February. Trees with mature heights of at least 7 metres should be planted 5 metres east and west of the house. Planting of smaller deciduous or evergreen trees with lower limbs northwest and northeast of the building, to provide late afternoon and early morning shade. East-facing walls and windows from 7am to 11am and west-facing surfaces from 3pm to 7pm should be in the shade zone of prevailing trees.

Trees planted to the northeast, north, or northwest will only shade a building in the summer if they extend out over the roof. In the winter, when maximum sun is desired, such trees will provide too much shade. Even deciduous trees that have dropped their leaves cast quite a bit of shade in the winter.

To avoid winter shading, locate trees no closer than 2-1/2 times their mature height to the north of a building. Trees planted to the northeast or northwest should be about four times their mature height from the building.

3.4 Building envelope

3.4.1 Air tightness of building

Problems:

Low air tightness, that is, excessive air leakage resulting in increased energy consumption and a draughty, cold building.

Air tightness is the resistance of the building envelope to inward or outward air leakage. Air leakage is driven by differential pressures across the building envelope. The mechanisms that create these differences in pressure are the combined effects of – stack (internal warm air rises), external wind (inducing positive and negative pressures on the envelope) and mechanical ventilation systems.

Recommendations:

The leakage sites to be found in dwellings and other buildings can be subdivided into two types:

Structural leakage sites occur at joints in the building fabric and around window and door openings. Hatches and access openings (usually non-domestic) also fall within this category. There may also be leakage through cracks in masonry walls, poor perpends in block-work inner leafs being the most common cause, and some diffusion through materials. These are the hardest to retro-fix. Caulking of weather seal joints and the installation of draft stop foam can reduce heating and cooling costs quite significantly.

Service penetrations occur where pipes and cables pass into the building. These can be sewerage pipes, water pipes and heating pipes. As well as electricity cables there may also be television aerials and cable television connections. The worst problems tend to occur when these two types of leakage problems interact. Often door seals (Particularly sliding door seals) cause the greatest amount of air leakage.

A range of retro-fit door seals are available in a variety of thicknesses to repair these leaks.

3.4.2 Insulation levels

Problems:

The general use patterns of a building is an important factor in determining insulation levels needed, i.e. storage areas versus living areas, day use only, e.g. shop, versus day & night use e.g. B&B).

- Problems arise from insufficient insulation with respect to the purpose of the building.
- A common problem is the general underestimation of insulation needs.
- Using the thermal camera revealed a frequent problem: Holes in the insulation significantly impact on performance: A 5% gap in coverage results in a 50% decrease in insulation performance!
- Thermal bridging, where metal frames and beams are not insulated and conduct heat from the inside of the building to the outside.

Recommendations:

- Always opt for the highest possible level of insulation matching the usage pattern of a building.
- Research shows that improving the insulation level (even on a leased premises) will repay the initial outlay in 5 to 7 years.
- If metal parts of a building are exposed internally and externally (for example steel rafters, or aluminum window frames) they should be covered over with a timber or other insulating façade. This will reduce the rate of thermal bridging to the outside.

3.4.3 Windows & doors

Problems:

- Unsealed doors and windows, gaps in architraves
- Double glazed vs. single glazed windows
- Missing curtains, missing pelmets, missing shading (outdoor shade better than indoor shade sources)

Recommendations:

Thermal considerations for window frames include;

- A significant part of the thermal energy transmission can be through the frames. Another significant energy pathway is the porosity of the construction including sealing.
- Timber and PVC are approximately thermally equivalent and provide high level of energy efficiency compared to a standard aluminium frame.
- Standard aluminium frames can have a poor energy performance. To become more energy efficient aluminium frames need to be improved through performance enhancing design features or through the use of thermal breaks.

4. The Assessment of Cleaning Products

4.1 Assessment methods used

As part of the Murrindindi Climate Network's Green Business Assessment program, forty businesses from an array of different situations were assessed. They included the following business sectors: Hospitality (11), Retail food (7), Retail non-food (7), Primary industries (2), Service providers health / banking / real estate etc. (4), Public buildings and schools (9).

Out of these, 13 businesses/locations (32%) were also interested to receive an assessment of cleaning chemicals.

The chemical assessment of the Green Business Assessment program focuses on all products used for the daily cleaning tasks at the assessed location. Thus, during a site visit, the assessor recorded the name and brand of each product and took a photo of the labels. The assessor also asked the business owner to produce a hard copy of the Material Safety Data Sheet (MSDS) for each product.

The information recorded during the visit was then further used to conduct the assessment, following a method developed by Fresh Green Clean Ltd. (FGC). FGC is now established as Australia's leading independent green cleaning educator. Founded in 2001 by Bridget Gardner, the aim of this company is to provide simple, sustainable, toxin-free cleaning processes for a wide range of situations such as family homes, office environments, childcare centres, etc.

Using the FGC method, each product used for a specific cleaning task is analysed with **five specific objectives** in mind, namely

- Reduction of risk to human health and the environment
- Transparency of information about the product
- Reduction of specific impacts on the ambient air
- Sustainable purchase, with respect to bio-degradability, short transport distances (local production), etc.
- Reduction of waste, with respect to the packaging

For each of these objectives, a number of questions with a binary outcome (meets a criteria or not) are checked, from which an overall score is formed. A maximum score of 30 is achieved for the most environmentally sustainable products that meet all criteria in each of the five sustainability objectives.

The evaluation process for each product is based on the Material Safety Data Sheet (MSDS), a visual inspection of the product container and its labelling and information provided by the user.

Some products include "chemicals of concern" for which the symbol "x" marks a proven health risk to humans and the symbol "o" marks a suspected human health risk or proven risk to animal/fish. Health impacts are defined as follows (Table 1):

Table 1 Type of Health Impacts related to “Chemicals of Concern”

Health impacts	Code	Definition
Volatile Organic Compound	VOCs	Volatile Organic Compounds can cause health problems including: eye, nose, throat irritation, headaches, nausea
Skin & Eye irritant	SKIN/EYE	A substance able to cause severe irritation on contact with skin or eyes
Respiratory irritant	RESP	A substance able to cause severe irritation to the respiratory tract
Carcinogen	CARC	A substance able of causing cancer in humans
Reproductive Toxin	REPR	A substance capable of damaging the human reproductive system
Liver & Kidney Toxin	LIVER/KIDNEY	A substance capable of causing liver & kidney disease in humans
Neurotoxin	NEURO	A substance capable of damaging the central nervous system
Endocrine Disrupter	ENDO	A substance capable of damaging or disrupting the development of the endocrine system in a foetus of an organism
Mutagen	MUT	A substance capable of causing genetic damage in humans
Teratogen	TER	A substance capable of causing abnormalities to a human foetus
Aquatic Toxicity	AQUATOX	A substance capable of damaging or killing aquatic organisms

Source: Fresh Green Clean Ltd. (2011) Fresh, Green, Clean Tool Kit: The FGC Product Checklist

The detailed product scoring system established by Fresh Green Clean Ltd. is organised along the five objectives and is based on the following criteria, as presented in Table 2.

Table 2 Objectives and Criteria of the Product Checklist

Objective	Checklist for daily-use products
Reduce the Risk	The MSDS states that the product is not classified HAZARDOUS to the criteria of NOHSC1 (SafeWork Australia)
	The MSDS is free of the classification: TOXIC (T) and VERY TOXIC (T+); and the risk phrases: R23, R24, R25, R26, R27, R28, R39, R45, R46, R48, R49, R60, R61
	The MSDS is not a Schedule Poison 5, 6 or 7.
	The MSDS states that that the product is between pH6 - pH8, when diluted ready for use
	The MSDS is free of the classification: CORROSIVE (C) and the risk phrases R34 / R35
	The MSDS is free of the warning phrase: SKIN / EYE IRRITANT or SKIN / EYE SENSITISER and the risk phrases: Xi (Irritant); R36, R37, R38, R41 or R43
	The MSDS is free of the classifications: EXPLOSIVE (E) or FLAMMABLE (F & F+) and the risk phrases: R1 - R12; R14 - R19; R30; R44
	The MSDS does not contain ingredients listed as 'chemicals of concern' as Hazardous substances
No data? No dollar!	The MSDS is dated within the last 5 years
	The MSDS contains 16 section headings
	The product is Certified Environmentally Preferred by GECA 2 or another international Ecolabel that complies with ISO14024
	The product provides 3rd party toxicity testing results conducted on the whole product
	There are no 'chemicals of concern' (pages 2 - 3) in this product, as determined by one of the following methods: <ul style="list-style-type: none"> ✓ The manufacturer lists 100% of the ingredients on the MSDS ✓ The manufacturer provides written declaration that the product is free of these chemicals of concern ✓ The product is Certified by an Ecolabel complying with ISO14024
	Health and safety warnings are printed clearly on the label and match the advise written in the MSDS
	Dilution / dosage rates are printed clearly on the label
Clear the Air	The MSDS is free of the warning phrase: RESPIRATORY IRRITANT and risk phrases: R29; R31; R32; R37; R42
	Volatile Organic Compounds (VOCs): <ul style="list-style-type: none"> ✓ The MSDS for daily cleaning products, states that it contains less than 4% w/w VOCs ✓ The MSDS periodical and air-freshening products, states that it contains less than 10% w/w VOCs ✓ The MSDS is free of Hazardous substances listed as VOCs on the 'Chemicals of concern' list
	The product does not emit strong fumes, fragrances or odours when the container is closed
	The product is not dispensed from an aerosol can
Purchase sustainably	The manufacturer provides written evidence that the product is Readily Biodegradable according to AS 4351 or [ISO 7827] or [OECD 301A – 301E]
	The manufacturer of detergents provides independent evidence that it contain no added phosphates
	The product is supported by 3rd party evidence of low aquatic toxicity (i.e. L50 Daphnia, fish & algae tests)
	The manufacturer states that the products is made from renewably sourced materials, and provides 3rd party supporting evidence such as Certification by GECA or an internationally recognized Ecolabel
	The product is manufactured in Australia (as local as possible)
	The product has multi-purpose function and/or is concentrated form to reduce the frequency of transportation
Be waste wise	The product is packaged in a form that minimises packaging waste (i.e. sachet)
	The product is in super concentrated form (at least 1:200)
	The packaging is able to be recycled (embossed number on base that is able to be recycled in your area)
	The supplier provides a controlled dose dispenser
	The product supplier collects empty containers for re-use

Source: Fresh Green Clean Ltd. (2011) Fresh, Green, Clean Tool Kit: The FGC Product Checklist

4.2 Key findings from the assessment of cleaning products

4.2.1 Missing Material Safety Data Sheets (MSDS)

It was found that the majority of business owners did not keep a hard copy of the Material Safety Data Sheets (MSDS) of their cleaning products on site. Prior to our visit, only 5% of the locations followed the OHS regulation and had a hardcopy of the MSDS for their cleaning products on site!

Many managers did not even know what an MSDS is and that it is a regulatory OHS obligation to keep a hard copy of an MSDS for each chemical product on site where they are stored.

Material Safety Data Sheets for cleaning products include essential information about a product and is organised in 16 separate sections. The information includes the manufacturer and distributor, the chemical composition of a product and its physical properties, if it is listed or not as a hazardous product, its flammability and explosiveness, toxicological information, first aid information in the case of a contamination, how best to store it and what to do in case of a chemical spill, information on potential environmental hazards, how to transport it, etc. It is crucial to have hard copies of MSDS available in a folder where the chemicals are stored, so that this information is at hand in an emergency.

As part of the assessments, we therefore provided each location with a complete set of MSDS for all of their products. We also invited the business owners to get MSDS from the provider or the internet at each future purchase of new products.

4.2.2 Few products of high environmental quality

In the 13 businesses assessed for their cleaning chemicals, the overwhelming number of products (97 % of 136 products used) were not 'readily biodegradable' according to AS4351 standards, and at each location there was at least one product that even contained components toxic to humans and the environment.

Readily bio-degradable products were mild soaps and vinegar products.

According to the Scoring system applied in the assessment, a product is deemed biodegradable if the manufacturer provides written evidence (on the product label or in the MSDS) that the product is "readily biodegradable" according to one of the following Standards:

- AS 4351
- ISO 7827
- OECD 301A-301E

It is important to note that the words "readily biodegradable" without a reference to one of these standards is no guarantee for environmentally friendly biodegradability! The "Good Environmental Choice Australia" (GECA) provides and regularly updates a product list of biodegradable products according to the three standards. It is therefore recommended to get products with the GECA certification for different cleaning tasks.



GECA accredited products can be found on the GECA website at:

<http://www.geca.org.au/products/categories/>

See also the GECA standard for Cleaning Products, at:

http://www.geca.org.au/media/medialibrary/2013/11/CPv2.2-2012_Cleaning_Products_Standard_Final.pdf



GECA also collaborates with international eco-labels such as Green Seal (USA), Blue Angel (Germany) and Environmental Choice New Zealand.

4.2.3 Too many different cleaning products for the same task

Across the thirteen businesses that received an assessment of cleaning products, an total number of 136 products were recorded, translating into an average of 10 products per assessed site. A staggering maximum number of 18 products was scored at the business of a tourism operator, followed by 17 products in a bakery and 16 products in a social service institution and a school. The lowest number of five cleaning products was recorded at a Real Estate Agent.

In the business with the highest number of cleaning products, which happens to be a large tourism operator, out of the 18 items 5 products also contain a “chemical of concern”. These products are flagged with an asterix (*) in the table below, and are further discussed in Section 2.4 below.

Table 3 Top number of cleaning chemicals used by a tourism operator

Product Name	Manufacturer	Overall Product Score	Cleaning Task	Chemicals of concern
Radiant	Jasol Australia	15*	Glass/mirror	2-Butoxy Ethanol (111-76-2)
BC3 Degreaser	Jasol Australia	14	Gen surface	
Freshmint	Jasol Australia	21	Gen surface	
Commercial Bleach	Jasol	11*	Gen surf/laundry	Sodium hypochlorite (7681-52-9)
Toilet Care	Jasol	17	Toilet Bowl	
BC11 Toilet Bowl cleaner	Jasol	18	Toilet Bowl	
EC1 Cleaner Sanitiser	Jasol Australia	24	Sanit Food prep	
BC1 Cleaner Sanitiser	Jasol Australia	19	Sanit Food prep	
Superscent	Jasol Australia	23	Gen surface	
Excellent Spray & Wipe	Jasol	22	Gen surface	
Dishclor	Jasol	12*	Dishwashing	Sodium hypochlorite (7681-52-9)
Tecwash	Jasol	13	Dishwashing	
Spot Aid	Jasol Australia	19	Dishwashing	
Firedog	Jasol Australia	11	Oven/microwave	
Safehands	Jasol Australia	16*	Soap (handwash)	Triclosan (3380-34-5)
Palm Toilet Soap	Jasol Australia	21	Soap (handwash)	
Brightwash	Jasol	16	Laundry	
EC19 Laundry Powder	Jasol Australia	21*	Laundry	2-Butoxy Ethanol (111-76-2)

This particular operator chooses to use the products of a single manufacturer, who is Australia based. This manufacturer has recently established an environmentally friendly product line for many cleaning tasks. We therefore suggested to the tourism operator to progressively switch to these environmentally friendly products and to reduce the number of different cleaning products to one product for each cleaning task, or even better – a few environmentally friendly products that are suitable for many different cleaning tasks.

Also way above the average is the number of cleaning products used by a Social Services Provider. Here, the 16 cleaning chemicals stem from many different manufacturers, and often several products are used for the same cleaning task. This suggests, that in this institution different staff buy products off the shelf as they see fit, without there being a coordinated approach. Furthermore, as shown in Table 5, six out of a total of sixteen products or 37% include a “chemicals of concern”!

Table 4 Several products from many different manufacturers

Product Name	Manufacturer	Overall Product Score	Cleaning Task	Chemicals of concern
Methylated Spirits	Diggers Australia P/L	14	Glass/mirror	
Super SaF (former Swipe A Fly)	S&N Products P/L	16	Glass/mirror	
AJAX SPRAY N'WIPE 5 in 1	Colgate – Palmolive Pty Ltd	12*	Gen surface	Triethanolamine (102-71-6), Diethanolamine (111-42-2)
JIF CREAM	Unilever Australasia	16	Gen surface	
WHITE KING – Power Clean Bathroom Foam	Pental Products P/L	12*	Bathroom	Sodium hypochlorite (7681-52-9)
WHITE KING POWER CLEAN, Toilet Bleach Gel	Pental Products P/L	12*	Toilet Bowl	Sodium hypochlorite (7681-52-9)
AJAX BAKING SODA Floor Cleaner	Colgate Palmolive P/L	17*	Floor	Tetrasodium EDTA=Ethylene diamine tetra acetate (64-02-8) Formaldehyde (50-00-0)
DETTOL HEALTHY TOUCH, antibacterial hand wash	RECKITT BENCKISER	16*	Soap (handwash)	Lauric acid diethanolamine (120-40-1), Tetrasodium EDTA (64-02-8)
PALMOLIVE SOFTWASH antibacterial	Colgate Palmolive P/L	18	Soap (handwash)	
BLAST ULTRA PLUS dish wash concentrate	Natures Organics P/L	18	Dishwashing	
EARTH CHOICE DISHWASH TABLETS	Natures Organics P/L	19	Dishwashing	
HARPER'S POWDERED BORAX Stain remover	Ward McKenzie P/L	15	Stain remover	
REGULAR BLEACH	Black & Gold	11*	Gen surf/laundry	Sodium hypochlorite (7681-52-9)
LOW IRRITANT SURFACE SPRAY crawling insect killer	Aaron Laboratories P/L	15	Insect killer	
GLEN surface spray disinfectant aerosol	Reckitt Benckiser	16	Air freshener	
EUCALYPTUS OIL	Felton Grimwade & Bosisto's	21	Gen surface	

4.2.4 Cleaning products containing “Chemicals of Concern”

Throughout the Green Business Assessment program, we found that EVERY place where we did an assessment of cleaning chemicals, used at least one product for its daily cleaning tasks that contained one or more “Chemicals of Concern”.

As mentioned above, the FCG method differentiates between chemicals in cleaning products that are a known or proven health risk to humans and chemicals that are a suspected human health risk, or a proven risk to animals and fish.

X = known or proven health risk to humans

O = suspected human health risk, or proven risk to animals/fish

The list displayed in the tables below includes the most frequent “**Chemicals of Concern**”, their Chemical Abstracts Service (CAS) reference number of the American Chemical Society registering chemical compositions and the nature of their health / environmental effect (as per Table 1 reference list of codes).

Table 5 The most frequently encountered “Chemicals of Concern”

Sodium hypochlorite (7681-52-9) and chlorine (7782-50-5) in bleaches in toilet + bathroom cleaning products									
Chemical of concern	VOC	SKIN/ EYE	RESP	CARC/ REPR	LIVER/ KIDN	NEURO	ENDOC	MUT/ TERT	AQUA/ TOX
Sodium Hypochlorite		x	x						
Chlorine		x	x	O	O				X

Triethanolamine (102-71-6), sometimes in combination with Diethanolamine (111-42-2) in Spray n’ Wipe surface cleaners, disinfectant sprays, germ busters									
Chemical of concern	VOC	SKIN/ EYE	RESP	CARC/ REPR	LIVER/ KIDN	NEURO	ENDOC	MUT/ TERT	AQUA/ TOX
Triethanolamine		X	X						
Diethanol-amine		X	X	O	X	X			

2-Butoxy Ethanol (111-76-2) in window cleaning products, heavy duty degreasers, disinfectants and some laundry powders									
Chemical of concern	VOC	SKIN/ EYE	RESP	CARC/ REPR	LIVER/ KIDN	NEURO	ENDOC	MUT/ TERT	AQUA/ TOX
2-Butoxy Ethanol		X	X	O	X				

Tetrasodium EDTA=Ethylene diamine tetra acetate (64-02-8) and Formaldehyde (50-00-0) in floor / general surface cleaners such as “Ajax Baking Soda Floor Cleaner”, “Palmolive Dishwashing Liquid”									
Tetrasodium EDTA (64-02-8) alone in antibacterial hand wash products									
Chemical of concern	VOC	SKIN/ EYE	RESP	CARC/ REPR	LIVER/ KIDN	NEURO	ENDOC	MUT/ TERT	AQUA/ TOX
Tetrasodium EDTA		x							
Formaldehyde	X	X	X	X		X		x	

Triclosan (3380-34-5) in handwash products									
Chemical of concern	VOC	SKIN/ EYE	RESP	CARC/ REPR	LIVER/ KIDN	NEURO	ENDOC	MUT/ TERT	AQUA/ TOX
Triclosan		X					0		x

4.3 Cleaning the environmentally friendly way

4.3.1 Avoiding harsh chemicals with simple methods and renewable resources

We found, that there is a general unawareness or disbelief that there are simple and effective cleaning methods available working with renewable resources. Perhaps it is the exposure to aggressive product marketing over many decades that turned people away from these effective and cheap cleaning methods. And yet - hot water, hot steam, vinegar and baking soda can be used for many cleaning tasks and together with micro fibre cloths they do a very good job without harsh chemicals.

There are of course many tips and recipes available on the internet, how to use the environmentally friendly and cheap alternatives, for example:

Vinegar (acetic acid) as a cleaner

<http://www.greenlivingtips.com/articles/119/1/Versatile-vinegar-tips.html>

http://www.ehow.com/how-does_4597302_vinegar-work-as-cleaner.html

Baking Soda as a cleaner and other useful tips

<http://www.greenlivingtips.com/articles/articles/154/1/30-baking-soda-tips.html>

Recipe for All Purpose Green Cleaner

<http://www.greenlivingtips.com/articles/171/1/All-purpose-green-cleaner.html>

Homemade window cleaner made with vinegar

http://www.ehow.com/way_5554426_homemade-window-cleaner-made-vinegar.html

How to clean without using harsh chemicals for different cleaning tasks

<http://www.ehow.com/search.html?s=without+harsh+chemicals&skin=home&t=all>

How to clean a blocked drain

http://www.ehow.com/how_4679423_clean-blocked-drain.html

How to Kill Germs without using harsh chemicals

http://www.ehow.com/how_2128452_kill-germs-using-harsh-chemicals.html

How to clean your Oven using baking soda (sodium bicarbonate), citrus and tea tree oil

<http://www.greenlivingtips.com/articles/153/1/Earth-friendly-oven-cleaning.html>

Micro Fibre Cloths – pro and contra, and how to use them effectively

<http://www.greenlivingtips.com/articles/409/1/Are-microfiber-cloths-green.html>

4.3.2 Avoiding chlorine based household bleach

Of particular importance is the replacement of regular household bleach and products containing chlorine with Chlorine Free Bleach. Sodium hypochlorite in traditional household bleach is potentially dangerous to humans and animals, and runoff into the drainage system or the garden can damage vegetation and aquatic organisms.

In contrast, chlorine-free bleach uses oxidation to remove stains and does not have the same risks to human health and the environment. To disinfect and sanitize an area (e.g. in the kitchen or bathroom), instead of regular household bleach vinegar or environmentally friendly, bio-degradable products can be used (e.g. EC1Cleaner Sanitiser from Jasol).

For additional information on chlorine-free bleach visit:

http://www.ehow.com/info_8612214_chlorinefree-bleach.html

For chlorine free bleach (using Oxygen Bleaches such as hydrogen peroxide, sodium percarbonate and sodium perborate instead of chlorine) visit:

<http://oxygenbleach.homestead.com/files/>

<http://www.seventhgeneration.com/Chlorine-Free-Bleach>

As a general rule, before each purchase of a cleaning product, ask yourself if the cleaning task can be done by home-made environmentally friendly ways. If you need to buy a product, check the GECA website for an environmentally certified product (www.GECA.org.au/products/categories).

4.3.3 Summary of the assessment of cleaning chemicals

To summarise, the green business assessments have shown similar problems at all sites, namely:

- An overwhelming amount of cleaning products used by the assessed businesses are not certified as biodegradable (AS 4351, ISO7827, or similar). The procurement process should focus on products that are on the GECA list and that are “readily biodegradable” according to AS 4351 standards;
- In most places, too many different cleaning products were used for each of the cleaning tasks. Instead, businesses should choose 1-2 multi-purpose cleaning products that work for several tasks;
- Many cleaning products included “chemicals of concern” generating a significant risk to human/environmental health. Using the product check-list developed by Fresh Green Clean Ltd. businesses could avoid products with such harmful chemical ingredients.
- Material Safety Data Sheets were not kept on site where the cleaning products are stored. Business owners need to be reminded that it is a regulatory requirement to store a hardcopy of an MSDS for each product at the same location where products are stored.
- Simple methods with renewable resources were not known or were deemed inefficient. We refer businesses to our internet-based resource list and to GECA listed products.

Addressing these shortfalls with our recommended actions will result in:

- financial savings from cheaper and more natural cleaning methods;
- direct benefits from increased comfort for workers and for customers; and
- Indirect financial benefits stemming from increased endorsement by customers.