General facilities management

Many options for improving your facilities efficiency will not only save you money, but do much to improve comfort, by improving quality of light, reducing draughts, and keeping temperatures more stable and uniform.

KEY TO SUCCESS

Whether you do it yourself, get an auditor, or sign up for EECA's Emprove program, the actions you take for your facilities should follow a logical order, such as that recommended in the US Energy Star 5 step program

Stage 1: Lighting – usually a big cost: improvements pay for themselves quickly and are simple, and it impacts your heating and cooling needs, so needs to be done first.

Stage 2: Building tune up – easy, no- or low-cost actions are where you start: clean equipment, replace filters, adjust settings, and repair obvious leaks.

Stage 3: Reduce consumption and unnecessary losses – next, focus on reducing the energy losses of your building, by blocking up the cracks and poor insulation that let hot or cold air escape, and take simple steps to reduce in-house energy use, by buying energy efficient equipment, appropriate controls and changing habits to turn off things you don't use.

Stage 4: Heating and cooling distribution system: optimise your HVAC fans, pumps, and ducts

Stage 5: Heating and Cooling plant – buy the right size – efficient heating and air conditioning units are the biggest capital investment.

TOOLS YOU CAN USE

- **Business Energy Check-up :** A comprehensive calculator and advisor on building actions allows you to calculate the benefits and costs of energy efficiency measures in each element of your building, outlining improvements you can make. (From Alliance to Save Energy, in the US, based on the US Environmental Protection Agency's Building

POWER PAYBACK!

St Margarets Hospital is saving $37K (64%) or their annual energy bill through general energy management.

Note to renters:

If you don't own the building, but are considering renting it, make sure you consider these aspects before you sign a lease. If you'll be paying for power separately, it's worth asking to see records of past energy bills.

Guide. Note: much of the information on the following pages is drawn from this web site.) See: www.ase.org/checkup/business/main.html

- **Energy Auditing :** A guide for building managers (EECA) gives you a good sense of what's involved in an energy audit, including a sample report of what recommendations you might expect. See www.emprove.org.nz/50to500/grant.html

- Energy-wise tips for efficient building operation (EECA). This is a simple overview of the various no- and low-cost things you can do across your building. Many are echoed in the following pages. See: www.emprove.org.nz/knowledgecentre/processes.html

FACILITIES MANAGEMENT SUCCESS STORY

St Margaret's Hospital is a 40-bed continuing care hospital on the Te Atatu Peninsula, Auckland. At the time they began their energy savings project, there was no reticulated gas supply on the peninsula and their only source of energy was electricity. The cost of St Margaret hospital's energy bill before energy management actions were undertaken was $58,000. The project was finished in October 2002 and was undertaken in stages over the course of 2 years. The savings calculated assumed a cost of 6 cents/unit with a usage of 500,000kWh/year.

THE ACTIONS

An audit identified that substantial savings were achievable and proposed the solution which was then implemented. This involved managing the type and demand of lighting and heating.

- **Lights:** Lighting in office and treatment areas with surface mounted lights, were replaced with high efficiency surface mounted lights incorporating low loss electronic technology and high efficiency reflectors. Bedrooms with surface mounted incandescent luminaries were re-lamped with long life self-ballasting compact fluorescent lamps. All lighting designs met the requirements of the NZS6703 for office and treatment areas.

- **Heaters:** Efficiencies were achieved by installing a building management system to control loads from electrical heaters, ie. to manage heaters so that only a percentage of the 71 heaters operated at peak load times with heaters in use alternating so that no perceived heat loss occurred. Electric water heater elements are controlled to avoid unnecessary usage at peak times. Inefficient wall mounted fan heaters were replaced with more energy efficient heaters and solar hot water panels were installed.

THE SAVINGS AND PAYBACK PERIOD

Before all the electrical loads acted independently of each other and capacity charge for the site was based on there being a dedicated 300kVA transformer. Energy efficiency was targeted to reduce the capacity charge to 160Amps/phase.

Previous annual electricity bill:	$58,000
New energy bill	$21,000
Annual Savings	$37,000
Capital Cost of project	$75,000

Payback: 2 years approx

Notes on the experience

- The energy auditor used was Noel Mason from Energy Management ph: 09 414 4952 fax: 09 414 4951

- The Solar Hot Water Systems was Reid Technology. Contact Bob Riley; Tel: 09 489 8100; Email: bob.riley@reidtechnology.co.nz

- Experience stressed the importance of getting advice from a consultant who understands your industry and the particular requirements that may place constraints on the design (eg. St Margaret Hospital's concerns about ensuring resident safety).

For more info, contact: Max Robins;
Phone: +64 9 522 4585;
Email: mrobins@cht.co.nz

Managing your lighting

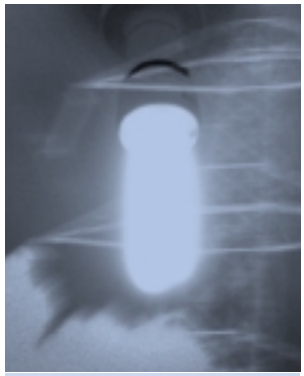
Lighting measures are the easiest and most cost-effective ways to save energy in commercial buildings. Lighting can account for up to 50% of a building's electricity usage, so it's a good place to start.

No Cost Options

- Switch lights OFF when you leave the room!
- Remove or disconnect unnecessary lights
- Lower light levels where appropriate, such as around computer monitors
- Use daylight, by arranging your desks near windows
- Remove objects that are blocking windows
- Educate occupants on use of natural vs. artificial light.

Low Cost Options

- Replace incandescent light bulbs with compact fluorescent lamps (CFL's) – they use less and last longer.
- Upgrade fluorescent fixtures with triphosphor lamps (fewer necessary)
- Use daylight, by arranging your desks near windows
- Remove objects that are blocking windows
- Educate occupants on use of natural vs. artificial light.
- Install high efficiency reflectors, in conjunction with bulb/tube upgrades
- Fit occupancy detectors in areas such as toilets
- Consider the colour of your walls – lighter colours will reflect the light better.
- In a partitioned office space, consider height of partitions – higher partitions may block effective lighting.
- Use high-pressure sodium or metal halide lighting outside.
- Convert exit signs to LED
- Fit timers or photocells on outside lights



POWER PAYBACK!

Installing efficient lighting equipment (eg. CFL's) can save 10% of your energy costs with a payback period of less than a year (for commercial operations) and 2–4 years (for small industrial operations).

KEYS TO SUCCESS

- Replacing the luminaries (housing) is often as important as the bulb/tubes.
- Remember to re-size when you replace. You'll only need a 27W compact fluorescent to give the light of a 100W standard incandescent bulb.
- When you consider the higher up-front cost, remember that the high efficiency bulbs also last much longer, as well as use less electricity than incandescent ones. (See example below).
- Be sure to choose compact fluorescent light colours that fit your needs.

An example Compact Fluorescent Light bulb replacing a fitting that formerly held an incandescent.

Photo: Sarah Burke

FURTHER INFO AND TOOLS

- For more guidance on prioritising, see EECA's "Lighting Guide" on www.emprove.org.nz/knowledgecentre/pdf/techguide3.pdf
- For guidance on how to calculate savings and choose the appropriate Compact Fluorescent, see: www.eere.energy.gov/consumerinfo/refbriefs/ef2.html

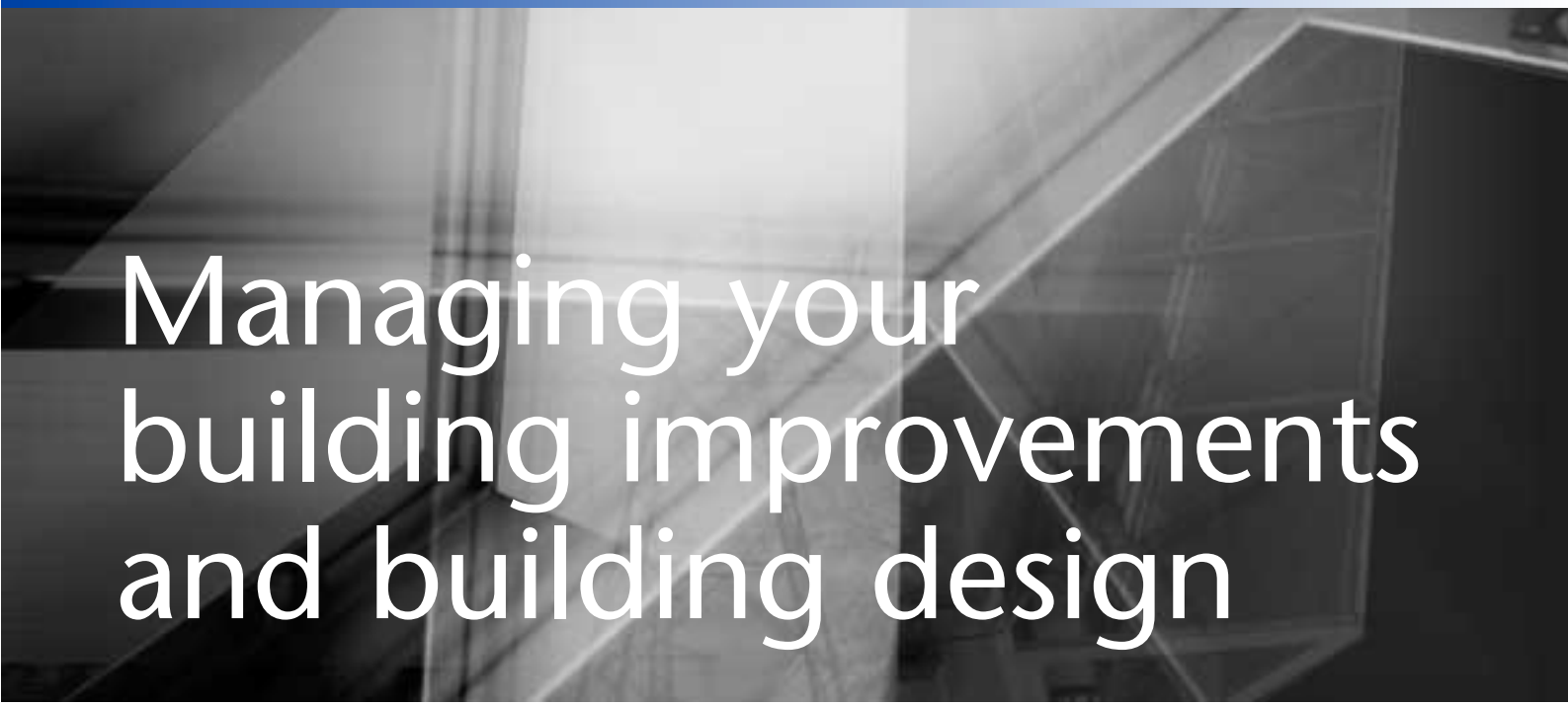
SAMPLE $$ SAVINGS

Replace your 100 incandescent light bulbs with Compact Fluorescent Lamps (CFLs).

– Pay back in 4 months.
Save 70% on your lighting costs from then on!
Replace bulbs less often.

	100 x 27W CFLs	100 x 100W Incandescent
First-time cost	**$700**	**$100**
Annual replacement costs	$154 (22% replaced each yr)	$200 (All replaced twice year)
Annual Energy Cost	$768	$2,847
Total Annual Cost	**$922**	**$3,047**
Annual Savings	**$2,125**	

Assumes: 6hrs/day @ 13c/kWh.



Managing your building improvements and building design

IMPROVEMENT OPTIONS

- **Isolate unused spaces** by putting up doors (or closing existing ones!) and only heat rooms that are being used.
- **Roof Insulation:** For commercial buildings less than about 1,000 square metres, or long, low buildings of two stories or less, or those in cold climates, insulating the roof can be a cost-effective measure. It can provide paybacks from as short as one-and-a-half years.
- **Windows:** Windows can have a major effect on energy costs. Some improvement in window efficiency can be achieved with minor retrofits, but for significant gains, especially if the existing windows are single-pane, have no solar control coating, and are metal frame, replacement may be worthwhile.
  - Add solar-control window film
  - Consider adding exterior or interior double glazing if heating costs are high.
  - Replace windows with double-glazed units and frames with a "thermal break"
  - Close curtains overnight – this helps retain the heat collected during the day.
- **Doors:** replace all-glass doors with insulated doors, and keep them closed! Ensure doors can be easily and quickly opened and closed.
- **Air Leakage:** Seal doors, windows, framing joints, pipe and wiring penetrations with caulking, weather-stripping, or foam sealants.
- **Garage Separations:** Many buildings locate garages under heated/cooled space. Insulating this surface can reduce energy losses.
- **Block off any chimneys** not in use.

POWER PAYBACK!

Insulating your building can save 5% of your energy costs with a 4 year payback period for commercial and small industrial operations

DESIGN TIPS:

Many possibilities for energy efficiency during a building's life are created at the design stage. Here are some factors to consider:

- Provide a high level of insulation above code requirements.
- Orient building towards north.
- Use heavy materials to regulate temperature.
- Design shading to avoid overheating.
- Specify solar-assisted hot water heating.
- Design hot water cylinder to be close to amenities and insulate pipes
- Consider alternative energy generation (wind, solar, etc).

FOR FURTHER INFORMATION AND TOOLS

For more detailed information about energy efficiency in the context of sustainable building design (sometimes called 'eco-design'):

- Waitakere City Council – *The Better Building Code*: www.waitakere.govt.nz/AbtCit/ec/bldsus/betterbuilding.asp or contact ph: 09 839 0400
- The Building Research Association of New Zealand (BRANZ) aims to promote sustainable building by accrediting participating architects and assessing house designs for a range of environmental, health and safety issues. You can find the names of participating architects in this area by contacting BRANZ 04 237 1170.
- *The Easy Guide to Eco Building* prepared by Auckland Regional Council, the Hamilton City Council, and BRANZ. This document can be found at www.branz.org.nz (under 'resources')
- EECA Building Design Guides at www.emprove.org.nz/knowledgecentre/buildings.html

MERITEC – COMBINING ENERGY EFFICIENCY WITH ARCHITECTURE

Meritec's head office in Newmarket, Auckland is staffed by about 200 people. In 2000, their team of consultants carried out an office refurbishment, involving interior design, architecture, building services and structural design – all undertaken in-house.

One of the key processes was to provide a lighting system that was flexible and had the ability to be easily changed to suit the frequently changing office environment. It was important that this lighting system created a pleasant spatial environment and was energy efficient.

THE ACTION

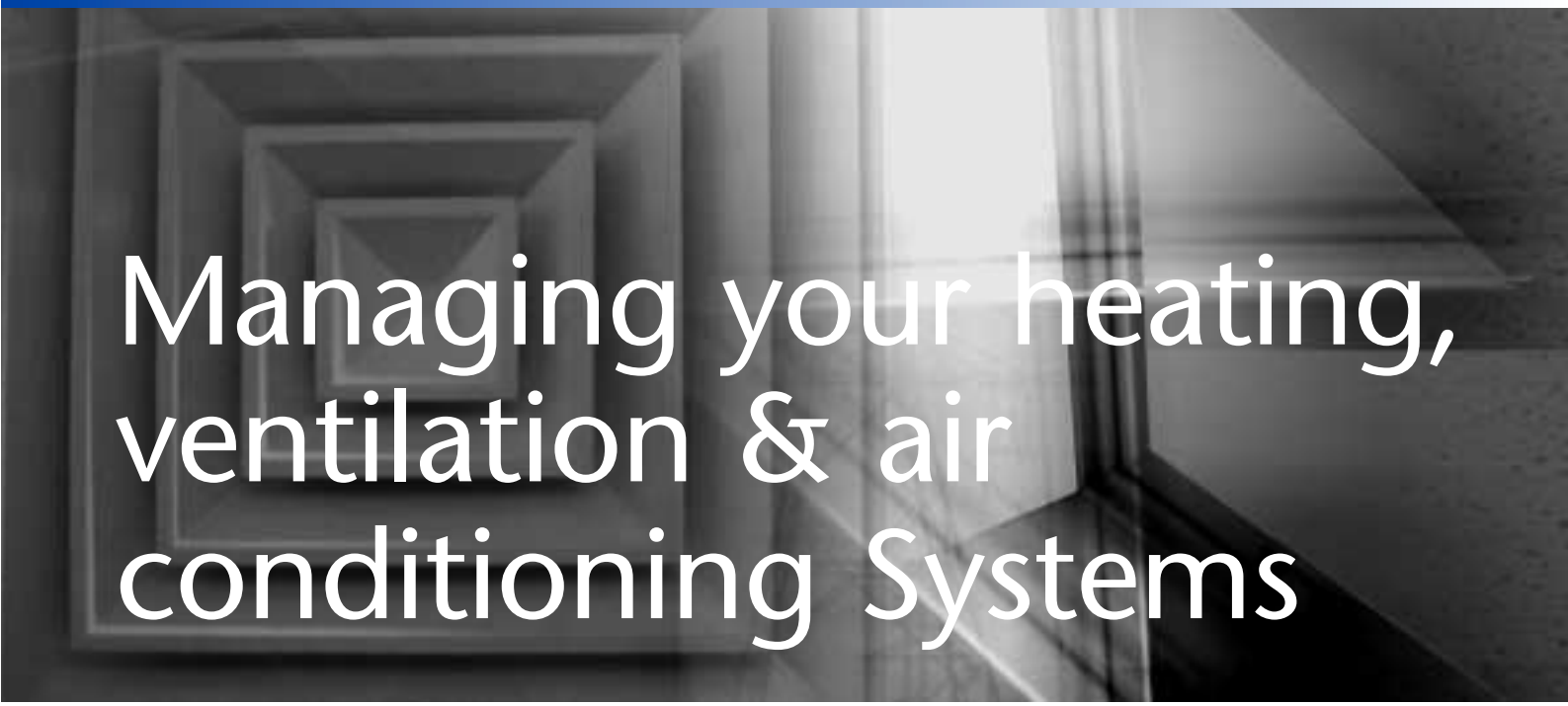
Category 2 louvres were used in the open plan office owing to the high usage of visual display units. Lighting placed special emphasis on "Lighting the Verticals First". This was achieved through the placement of vertical fluorescent down-lights on the walls. In the upmarket areas such as the Reception and Boardroom, architectural fittings were installed. The lighting design and lighting controls are flexible to permit different ambient settings and electronic ballasts were used to improve lamp life and reduce energy losses. The previous installation had

an installed load of approx. 28W/m^2 and the new installation had an installed load of approx. 12W/m^2, providing 57% energy savings.

THE SAVINGS

The existing 311 fittings with standard ballasts were replaced with 327 fittings with electronic ballasts. Lights run for an average of 10 hours per day. At a rate of 6cents/kwhr, the savings calculated work out at $306 per month. Meritec's total energy bill was reduced around 8.7% as a result of this lighting refit. The internal rate of return on the upgrade investment was around 12%.

For further information about this project, please contact Gina Morris at Meritec ph: +64 9 379 1208.



Managing your heating, ventilation & air conditioning Systems

Simple steps to clean and adjust the settings of your Heating, Ventilation and Air Conditioning (HVAC) can reduce your costs substantially, as can buying energy efficient equipment when you replace a component. However for more complex equipment upgrades and system design, professional help is usually necessary. The capital costs can be larger, though the payback and savings are still attractive.

If you are considering system-wide changes, be sure to complete your other energy efficiency steps first, as this will impact your HVAC needs and allow you to 'Right-Size' the new system correctly.

Low/No Cost Options

- **Turn off or close vents** where there is unnecessary cooling or heating.
- **Adjust temperature** and humidity settings according to the season
- **Set thermostats** back when the building is unoccupied, and set fans to "auto" rather than "on."
- **Clean and replace** filters regularly.
- **Repair leaks** in system components such as pipes, steam traps, and couplings.
- **Remove obstruction:** Make sure radiators, convectors, air intakes, air diffusers, thermostats are not obstructed so that air can flow freely.
- **Tune and check your boiler** before winter
- **Install awnings** and blinds to control how much sunlight enters depending on the heating/cooling needs of the season
- **Have plant regularly serviced** in line with the manufacturer's recommendations to ensure it is running efficiently.

POWER PAYBACK!

Getting efficient cooling equipment (eg. paddle fans instead of air conditioners) can save 2% of your energy costs with a payback period of 1–2 years for small industrial operations. For commercial operations, targeting the space cooling temperature control can save 2% of your energy costs with a payback period of less than a year

Other options

- **Right-Sizing** your system is critical, but may require technical help.
- **Programmable thermostats.** These simple microprocessor-based products offer as much as a 50% rate of return on energy dollars. In addition, these devices will maintain system start-up and set-back schedules for optimum comfort. They can also eliminate unnecessary HVAC use during unoccupied hours.
- **Solar heating systems** are available to supplement the HVAC systems. Supplemental space heating is efficiently provided by the transpired solar collector, a type of solar collector that heats air for the building.
- **Hot water heat recycling** – (mainly for industry) – pipe your hot water back into your building and it can be utilised as a source of space heating. This may also enable lower running costs by carrying out water cooling which would ordinarily need to be done.

TOOLS AND INFORMATION

- Contact Energy Management Association www.ema.org.nz or contact ph: 04 473 9444

POWER PAYBACK!

Getting the right heating equipment for your space can save 5% of your energy costs with a 2–4 year payback period for commercial and small industrial operations. Gas heaters and heat pumps are worthwhile where there's enough load.

Managing your hot water supply

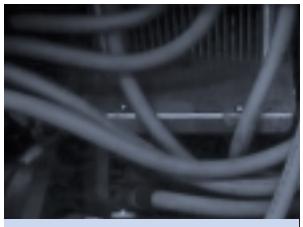
There are several very low cost and effective options to reduce your hot water needs, which focus on reducing the temperature of the water, the amount of water used and lost, and the heat waste.

Low/No Cost Options

- **Reduce the temperature setting on your heaters** to between 60-65ºC. Any more is wasting electricity, any less risks breeding bacteria.
- **Install flow restrictors and self-closing taps**. Changing to low flow shower heads can save 500 kWh/yr for every 15 minutes/day used.
- **Replace conventional taps with tempered spray taps**. This can save 60% of the energy used by a conventional tap for warm water.
- **Install time-of-use controller** to turn off your water heater when not needed.
- **Install an insulating blanket** on your heater, and insulation around the immediate pipes. This is one of the most effective measures you can use if you don't already have a grade A water heater. These jackets are easily found at large convenience, building, and hardware supply stores.
- **Check for leaks** on your entire system and repair them.

Other options

- **Install instantaneous heaters** in kitchens, and reduce bathroom tap temperature to 40°C for hand washing.
- **Solar Hot Water Systems.** Solar thermal hot water systems have been available for years, and can in many cases supply most of a building's hot water needs, or supplement for many small businesses with large water-heating needs (for example, restaurants, bars, and dry cleaners).



POWER PAYBACK!

Installing cylinder insulation and shower flow restrictions can save 1–2% of your energy costs with a payback period of less than a year (for commercial operations) and 2–3 years (for small industrial operations).

FURTHER INFORMATION

- Improving work-place hot water (EECA) – gives further detail of the measures listed above. See www.emprove.org.nz/knowledgecentre/pdf/techguide2.pdf
- Solar Industries Association: The Solar Industries Association represents the collective interests of manufacturers, importers and installers of solar water heating systems, and provides a single point of contact to the industry. www.solarindustries.org.nz/

SAMPLE SAVINGS

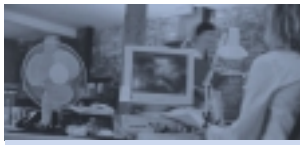
	Cost ($) incl materials/labour	**Savings** ($/yr @13c/kWh)	**Simple Payback**
Hot Water cylinder wrap[1]	70–120	$22–$80	1–5 yrs
Hot water pipe wrap[1]	5–20	$16	4–18 months
Low flow shower[2]	45–90	$115	5–9 months

[1] source: EECA

[2] Based on a total shower usage of 30 minutes per day.

Managing your office equipment

Some of the gains available in the office are extremely easy to do right away and just require changing a software setting or habit. Others are just relevant when purchasing equipment. In all cases, consider that improving the office energy efficiency will also decrease excess heat, noise and make the equipment last longer.



POWER PAYBACK!
Shutting off your office equipment completely can save 2% of your energy costs with a payback period of less than a year for commercial operations.

No Cost Options

- **Switch off equipment** at night and on weekends
- **Don't replace** if you can consider sharing printers and copiers instead
- **Activate the power-down features**, or sleep options on all the equipment where it is available.

Other Options

- **Buy energy efficient equipment,** (eg. by choosing Energy Star rated computers, monitors, photocopiers, printers, fax machines and power supplies. When choosing printers, consider high-efficiency Energy Star printers, which are ink-jet printers with internal power-down devices.

TOOLS YOU CAN USE

Calculate Energy Star Savings. This simple calculator allows you to enter the number of PCs, printers, faxes and photocopiers you have and see how much you would save. See www.energystar.gov.au/escalc.html

– Example: 10 PCs, 3 printers, 1 fax and 1 large copier saves $930 per year, with an energy cost of 13c/KwH. You can see that large copiers are big culprits.

IAG – SIMPLE ACTIONS, BIG SAVINGS

New Zealand's largest insurer, IAG NZ Ltd (owners of State & New Zealand Insurance) decided to find out how much they would save if they switched off the 2000 computers in their offices over the Easter and Anzac weekend 2003.

THE ACTION

A regular PC takes around 120W to run (laptops and flat screen monitors are more efficient than this however). This equates to around 2.88kWh used in a 24-hour day. IAG NZ Ltd's 2000 strong PC's use 5,760kWh if they are left on all day.

THE SAVINGS

Using an energy cost of 14 cents per kWh the savings are as follows:

14 cents x 5,760kWh = $806.40 saved per day

$806.40 x 7 days = $5644.80

Therefore, IAG NZ Ltd saved a total of **$5644.80** over this short period by simply turning off their PC's!

They are now looking into other energy efficient actions such as turning off their main building signage at night.

For further information contact Anthea Ogilvie at IAG NZ Ltd: Anthea.Ogilvie@iag.co.nz

Managing your motors, pumps, fans & compressors

MOTORS

Efficiency gains from improving your motors and the associated systems are substantial. Since motors consume up to 100 times their capital cost over 10 years, correct sizing and small efficiency gains can result in big savings. The solutions are not obvious however, as they vary depending on the entire system the motor is a part of.

In general, savings come from either using a more suitable motor for a given task, or a more efficient one. Changing the system overall may also be the best way to reduce the need for the motor. (See pump section ahead).

Low cost options below are worthwhile for all. Beyond that, get professional help.

POWER PAYBACK!
Savings from the redesign of motor systems are typically 20%.

Low/No Cost Options

- **Use an on/off control system** so the motor is only on when needed.
- **Check for appropriate drive belt tensions**, and good alignment of pulleys. Very hot belts are a sign that something is wrong.
- **Maintain them**. The energy savings from good maintenance are significant and the motors will be more reliable, trouble-free and last longer.
- **Think outside the box.** Can you get rid of it, or just run it off-peak?

Other Options

- **Install efficient motors**. Energy-efficient motors typically cost 10% to 30% more than standard models up front, but when deciding which to buy, remember also that these motors tend to be more reliable, produce less waste heat, and run more quietly than standard models.

- **Downsize oversized motors**: Because motors are inefficient when running at less than 50% of rated load, oversized and under-loaded motors can waste energy and money. This problem is extensive.
- **Install variable-speed drives:** Where loads fluctuate, replace single-speed motors with variable-speed drives. This can reduce motor energy use by 10% to 70%!

POWER PAYBACK!
Getting and maintaining efficient pumps and motors can save 2% of your energy costs with a payback period of 4 years or more.

POTENTIAL SAVINGS

Motor-related savings are hard to calculate yourself, but to see if the possible savings sound attractive, do the following simple calculation after looking at the ratings listed on your motors. The listing shows what a reasonable 20% saving translates to if you use three 30kW motors running constantly during the work week.

TOOLS YOU CAN USE

Motor Drive Guide (EECA) How to reduce your motor drive energy costs. Gives a good overview of possible savings while emphasizing the complexity and need for a systems approach. See www.emprove.org.nz/knowledgecentre/pdf/techguide4.pdf

Industry Guide to Motors (US EREN) – A good technical guide on controllers, motor types and how to select a motor. See www.eere.energy.gov/EE/industry_motors.html

3 x 30 kW		40 x 52		$0.13 /kWh		$4,867
Motor energy rating (kW)	x	Time used (hr/yr)	x	Cost of electricity ($/kWh)	x 0.2 =	Potential Savings / yr

PUMPS AND FANS

For most industrial equipment, you should focus on fixing leaks and maintaining your equipment, which is often the most important. Beyond that, for sizing, equipment upgrades, and retrofit, professional help is recommended. Below are listings of some of the things that can be done, taken largely from the Emprove 'Tips for Industrial Processes', found on www.emprove.org.nz/knowledgecentre/processes.html

Like motors, pumps and fans need to be viewed as part of a system, but can offer significant savings.

Low/No Cost Options

- Install controls – many systems don't need the pump to run continuously
- Change pump location
- Trim the impellers to improve efficiency
- Maintain the pumps regularly.

Other Options

- Sizing: Most efficiency measures relate to appropriate sizing of the pipes and pumps, especially relevant if other parts of your system have been modified. As with motors, professional help is recommended to look at pump size, fans size, ducts and piping.

COMPRESSORS

Optimising compressed air systems can provide energy-efficiency improvements of 20-50%.

Low/No Cost Options

- Fix all air leaks
- Install controls if the compressor doesn't need to be on at all times
- Reduce air pressure to the minimum
- Maintain the compressors regularly.

Other Options

- Size your compressors appropriately, when replacing, or use small compressors during off-hour loads
- Install energy recovery units to capture excess heat.

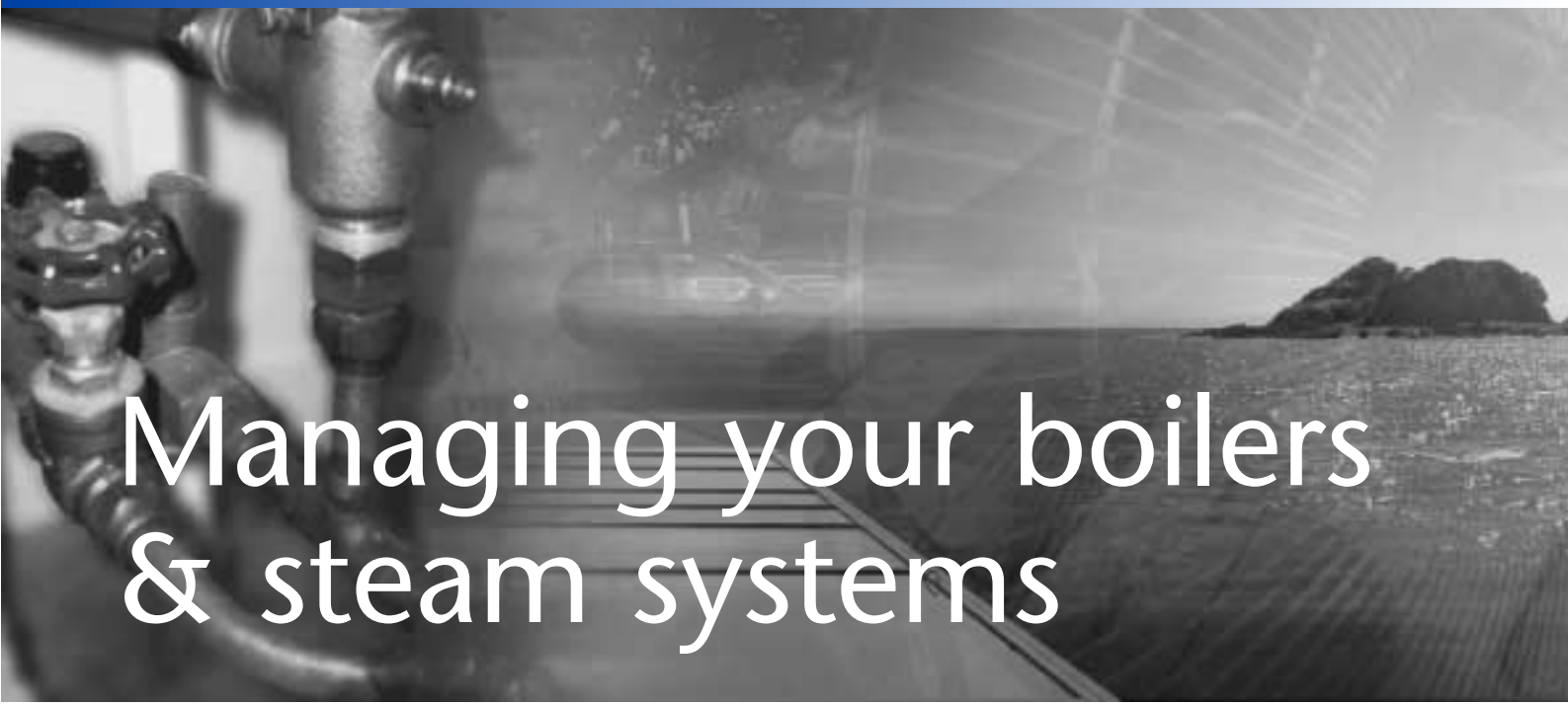
TOOLS YOU CAN USE

- Calculate savings from repairing compressed air leaks. SEDA website. See www.energysmart.com.au/wes/DisplayPage.asp?PageID=53

Example: A 500 kPa compressed air system operating at 1500 hrs per year has a single hole of between 1-3mm in size. Repairing this leak will save around $272 per year, and 1 tonne of CO^2.

POWER PAYBACK!

Fixing leaks in your compressed air systems can save 2% of your energy costs with a payback period of less than a year.



Managing your boilers & steam systems

A typical industrial facility can realize steam savings of 20% by improving its steam system. Simple approaches to improving energy performance include:

Low/No Cost Options

- Repair all steam leaks
- Insulate 'hot spots' and install insulation blankets on valves
- Tune your boilers regularly
- Install a gauge to detect high temperature variations, the sign of inefficiency
- Reduce steam pressure to the minimum you need.

Other Options

- Size boilers appropriately
- Install heat recovery systems.

POWER PAYBACK!
Keeping your boiler and steam systems regularly tuned can save 1% of your energy costs with a payback period of less than a year for commercial and small industrial operations

SUCCESSFUL EXAMPLES

- Health South Canterbury Ltd. automated one of their boilers at Timaru Hospital. The investment was repaid within the financial year and included fuel savings of 20% as well as operational improvements (EECA).
- A boiler control upgrade at Palmerston North Hospital has achieved savings in energy costs of about $55,000 per year, for a simple payback of under three years (EECA).

TOOLS AND INFO

- Steam leaks make big holes in company profits: more details on the boiler options listed above, and sample of costs associated with leaks.
- Contact Energy Management Association www.ema.org.nz or contact ph: 04 473 9444

Managing your refrigeration & freezers

Many small convenience shops can benefit greatly from simple measures on their fridges.

Low/No Cost Options

- Ensure all doors swing shut, and the door seals are good
- Check temperature setting is not excessively low
- Load the fridge appropriately. Too much prevents cooling; too little is a waste
- Locate them well, away from heat sources, strong lights and sunlight, and
- Clean the cooling coils.

Other Options

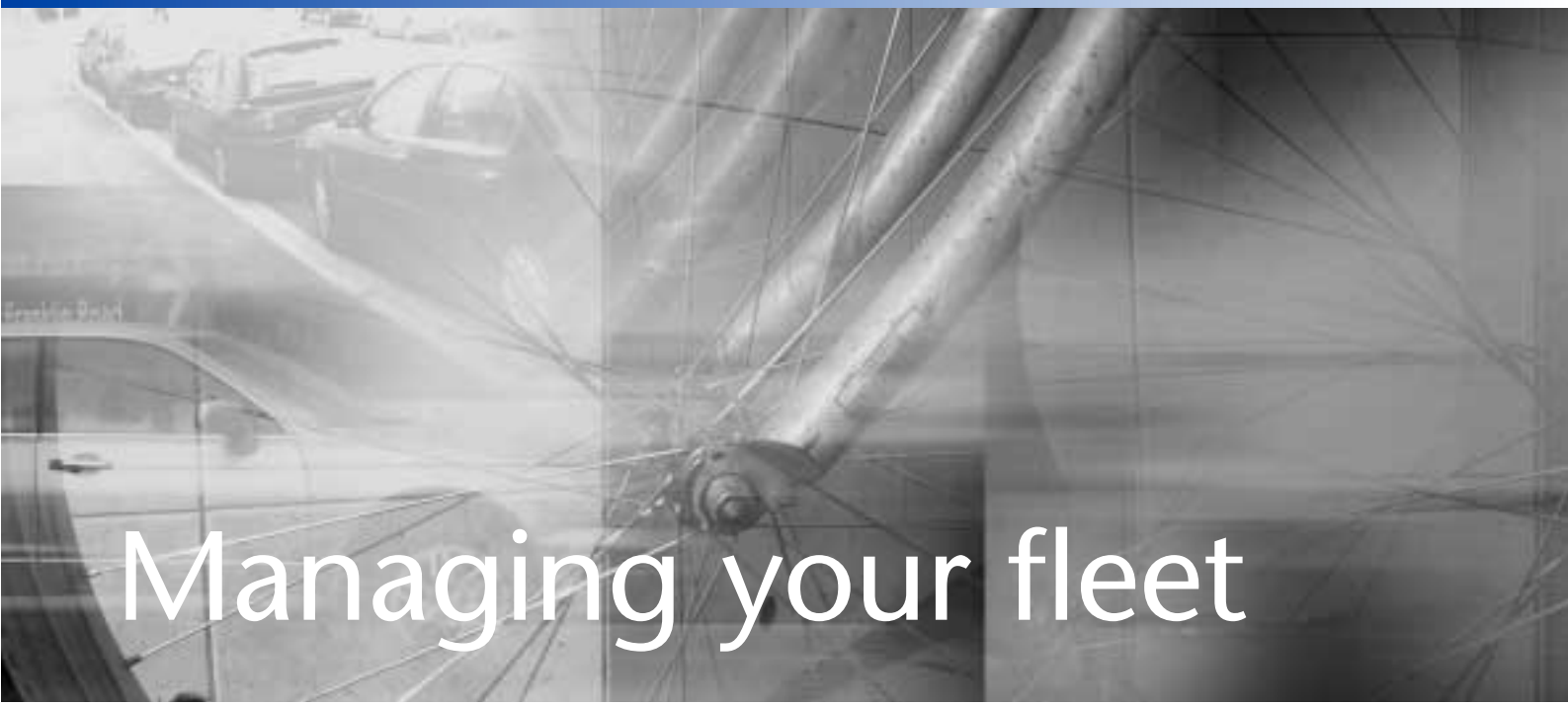
- Replace with more efficient equipment, or upgrade to one with heat recovery included.

TOOLS AND INFORMATION

- Contact Energy Management Association www.ema.org.nz or contact ph: 04 473 9444
- The Institute of Refrigeration Heating and Air Conditioning Engineers (IRHACE) contact: 09 262 1405 email: admin@irhace.org.nz

POWER PAYBACK!

Tuning up and adjusting refrigerant charge to factory specs can save 2% of your energy costs with a payback period of 1–2 years for small industrial operations. For commercial operations, this action can save 1% of energy costs with a payback period of less than a year



Managing your fleet

Whether you operate a fleet as part of your business, have a few company-owned cars available for your employees, or if your employees use their cars for business use, or if they simply commute, there are many things that you can do to reduce your fuel bill, or that of your workers. Generally speaking, the options to reduce fuel use are:

AVOID USING THE VEHICLE

- Walk, bike, or use public transport whenever possible.
- Car pool whenever possible, and give car-poolers priority parking (a handy site may be www.carpooltogether.co.nz)
- Encourage teleworking (see Sheet 11)
- Decide if the trip needs to be made at all.

DRIVE A DIFFERENT TYPE OF VEHICLE

- If you are a high mileage traveller, you should investigate LPG or CNG as lower cost substitutes for petrol, or consider an efficient diesel or hybrid vehicle when replacing your car. A number of energy efficient vehicles are being introduced to the New Zealand car market including; gas/electric hybrids (the second generation Toyota Prius and the Honda Insight); and fuel-efficient diesel engines (Volkswagen Golf 1.9TDI, and Peugeot 406 HDI). The environmental friendliness of these diesel-powered vehicles depends upon a supply of low sulphur diesel. Supplies of lower sulphur content diesel are available at selected stations. However, by 2010, New Zealand standards will be a lot tighter, meaning that all diesel supplied around the country will meet current European standards.

REDUCE THE LENGTH OF YOUR TRIPS

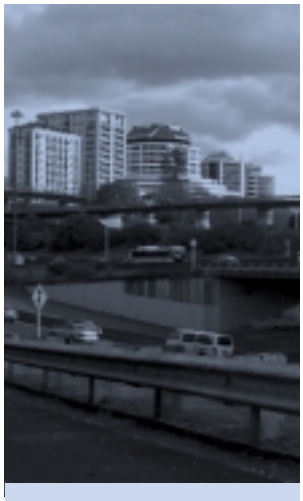
- When considering a new facility for your business, include the transport costs, including time wasted, into the calculation. Keep in mind your employees' and customers' access and where public transport is located.

DRIVE MORE EFFICIENTLY

- Accelerate and drive smoothly and avoid heavy use of brakes. Studies show that individual driving habits can influence fuel consumption by as much as 25 per cent.
- Encourage your drivers to undertake a driver training program (eg. defensive or advanced driving), and make information available to them.

REDUCE THE FREQUENCY & DURATION OF YOUR TRIPS

- Plan ahead to combine trips
- Manage the timing of trips to avoid traffic congestion



POWER PAYBACK!
Driver behaviour and vehicle tuning can have a 25% impact on fuel efficiency.

MAKE YOUR VEHICLE MORE EFFICIENT

- Don't use car boots for storage.
- Have the car engines tuned at least once a year.
- Choose alternative fuels. LPG is a more environmentally friendly alternative fuel, producing 15–20% less CO_2 emissions than petrol, has 20% lower ozone (smog) forming potential and up to 80% less harmful toxic emissions compared to petrol. Conversion can even result in instant payback (see Urgent Courier Case Study).
- Use the maximum recommended tyre pressure (usually around 30psi or 200 kPa).
- Install efficiency-improving devices. Drive a more appropriately-sized vehicle.
- Choose the most efficient vehicle that suits that task. Fuel accounts for up to 25% of the operating cost of a light vehicle, so choosing the wrong vehicle can be costly.
- Use explicit criteria when building or replacing your fleet. Balance the advantages of a single solution with those of a diverse, task-matched fleet.

CUSTOM SOLUTIONS

There is no one-size-fits-all solution to managing your fleets. Some examples are:

Source: Econodrive

- **Sizing:** An organisation with 430 cars decided to replace 1.5/1.6 litre cars with 1.0/1.3 litre cars. Within a year, the small car proportion went from 13 to 60 of the total, with a resulting $73,000 savings per year.
- **Reducing:** a company with 60 'pool' cars didn't replace 18 of its cars when it sold them, raising utilisation from 49% to 81%. They got $135,000 in cash from the sale, avoided $351,000 spending on new cars and reduced annual operating costs by $53,000. The taxi cost to meet the shortfalls is only $10,000 per year.
- **Simplifying:** A diverse fleet of 120 cars, made up of sedans and wagons from different manufacturers was replaced with a single model. Total operating costs, including the resulting reduced accident rate, dropped by $1,200 per year per vehicle, and the up-front costs were reduced by $2,000 per unit!
- **Learning:** Driving techniques have a major impact. The winner of the EnergyWise Rally got 66.9 mpg in a diesel engined Peugeot 406, driving from Auckland to Wellington and back.
- **Outsourcing:** A health organisation outsourced the management of its 400+ cars to a leasing company. The result: Parts and labour costs fell 20%, administration costs 35%, accident repair 60%, and there were fuel savings.
- **Reporting:** An organisation who started recording, and reporting its accident rates by employee, lowered the rate of major accidents from 1 every 12 days to 1 every 112, medium accidents from 1 every 18 to 1 every 98 days, and minor accidents from 1 every 7 to 1 every 63 days.
- **Replacing.** Can email, phone and video-conferencing reduce your travel needs? The 'Walking Schoolbus' movement is a good example of the impact of creative solutions in transport. Each walking school bus saves around 1,200 litres of fuel. EECA offers partnership opportunities for businesses wanting to support this initiative.
- **Auditing.** For companies with large fleets (>100 vehicles), EECA is developing an auditing 'health check' program (FleetCheck). It provides the fleet manager with a snapshot of the company's fleet practices as they are today along with a clear action plan on how to improve performance. Hamilton City Council has been among the first to pilot this program. Check the Emprove website for developments www.emprove.org.nz/knowledgecentre/vehicles.html

POWER PAYBACK!
Phoenix Organics lowered transport costs by 10% throught fleet management (see case study on next page).

Can email, phone and video-conferencing reduce your travel/delivery needs?

- **Travel Demand Management.** A program established in Australia called TravelSmart has enabled schools, households and workplaces to find the most efficient means to travel, prioritising alternative transport to cars www.travelsmart.gov.au. EECA and others are beginning to develop such a program in New Zealand. Contact Donna Goodwin at EECA office (Auckland) phone 09 374 3802.
- **Route Optimisation.** Can you optimise delivery notes etc. to reduce your mileage, fuel use and vehicle maintenance needs?

TOOLS AND FURTHER INFORMATION

- Econodrive – A very comprehensive guide on how to take all the above listed steps. Includes detailed advice on purchasing criteria, monitoring techniques and many useful checklists to help you get started. You can view it on: www.emprove.org.nz/knowledgecentre/vehicles.html
- Ten Ways to beat the fuel gauge (EECA) – some good driving tips available on www.energywise.org.nz/ontheroad/ontheroad-fueleconomy-drivetips.asp
- GreenFleet – sustainable transport program offering a comprehensive set of practical tools for managing small to medium sized fleets. Sign up with the Sustainable Business Network. Contact Sarah Burke 09 920 2403. www.sustainable.org.nz
- Rideshare. Software to enable carpooling. Ideal for a large organisation with one or two central locations. Available from EECA.
- www.carpooltogether.co.nz website that allows you to match ride needs and offers.

PHOENIX ORGANICS – MANAGING TRAVEL BEHAVIOUR

Phoenix Organics is an Auckland based, New Zealand owned and operated company making and distributing some of the finest organic food and drinks in this country. They are focused on sustainability, aiming to maintain a business that is both good for the planet and the health of its people. One of the initiatives that they have undertaken is to manage the travel demand of their fleet of delivery trucks and to encourage alternative travel to work options for staff.

THE ACTIONS

Although it may not be feasible to purchase new technology vehicles, there are a number of actions that can be undertaken to allow energy efficiencies in transport. Phoenix Organics undertook the following actions to manage their delivery fleet of 3 trucks:

- Managed the timing of their trips to avoid traffic congestion where possible.
- Undertook combined trips – by strategically planning their routes in advance.
- Chose appropriate engine size for the load to optimise delivery efficiency
- Regularly service the vehicle fleet
- Joined GreenFleet, a sustainable transport program, where trees were planted to offset the carbon emissions produced by the vehicle fleet.

In addition, Phoenix Organics also encourage the following travel behaviours within their workplace:

- Car pooling
- Cycling / walking
- Use of local public transport.

THE SAVINGS

Through the various fleet management activities, ***Phoenix Organics was able to reduce the size of their delivery fleet from 4 vehicles to 3 and achieve a 10% reduction in their overall transport costs.*** This has reduced the carbon emissions being produced.

Encouraging alternative travel behaviours for staff has facilitated team building and is in keeping with the sustainable work ethic Phoenix Organics endeavours to follow.

For further information, please contact Chris Morrison: chris@phoenixorganics.co.nz

URGENT COURIERS–STRATEGY, TREES AND LPG

Auckland based courier company Urgent Couriers contracts a fleet of around 75 owner-drivers. Since establishing an environmental management policy in 1996, Urgent Couriers has made a significant commitment to utilising sustainable procedures in every area of the business. It is a bold step for a business operating in an industry that burns fossil fuels as the foundation of its operation! Included in the company's Triple Bottom Line approach are a number of initiatives undertaken to reduce the impact of their fleet on the environment.

THE ACTIONS

One of the more recent steps Urgent Couriers is undertaking is to encourage their contractors to convert to LPG. Since mid May 2003, 11 of their fleet (representing 15%) have been running on LPG. The company's preferred fuel supplier, Shell, provides a $3000 interest free loan to assist drivers to convert, a $150 credit on the driver's fuel card and 150 Fly Buys points. In addition, Urgent Couriers provides a $200 incentive to drivers who change to LPG and meets the cost of a hire car while the driver's vehicle is being converted.

Some other initiatives that the company has taken involve the company cycle courier fleet. In the last 18 months Urgent Couriers has doubled the area that the cycle couriers cover, this has meant doubling the cycle fleet from 4-8. This effectively means that Urgent Couriers has continued to grow its business without increasing the number of vehicles used proportionately. Cycle couriers not only provide a zero emissions alternative they also increase Urgent Couriers' overall efficiency. A further initiative involves Urgent Couriers employing an extra cyclist on Fridays to pick up and deliver for vehicle couriers in the CBD. This allows these couriers to bypass the CBD which is generally very congested.

Urgent Couriers is also a member of GreenFleet, and in addition, has an active commitment to planting trees on a regular basis with tree-planting group, Trees for Survival.

THE SAVINGS

Results so far from the LPG conversions have indicated that even with paying back the $3,000 loan, drivers are still able to save $100 per month. These are savings that go directly back into the driver's pocket – part of Urgent Couriers' socially responsible commitment to their team. Since converting to LPG, drivers have been able to cut back their fuel bills considerably – from $800/month to $480/month. That's a 40% saving!

There are also a number of savings that have resulted from cyclists, rather than drivers making deliveries in the CBD, as well as the Greenhouse gas emissions saved due to employing cyclists and converting to LPG. Both of these, however, are yet to be calculated.

THE TOOLS

LPG conversion technician – contact Grant Miller, Gogas – 09 838 7940

Trees for survival – contact Nicky Elmore – 09 520 4347

GreenFleet – contact Sarah Burke, Sustainable Business Network 09 920 2403

Notes from the Experience

If you are thinking about converting to LPG and travel around the country regularly, be sure to check out the locations of LPG suppliers so that you can buy a fuel card that covers all the areas you need to get to.

For further information, please contact Sandy McInnes or Sue Bonnici-Carter 09 307 3555, or email sandym@urgent.co.nz, sueb@urgent.co.nz

Managing your work off-site: Teleworking

Teleworking is simply working from a distance – using home offices or other locations nearer to an employee's home. Telework is rarely implemented for energy and emission reductions alone – it not only reduces the energy consumption and emissions associated with commuting, it can also reduce business costs and increase productivity, and make your company a more attractive place to work.

No Cost Options

- Allow (and encourage) staff to work from home on a few days each month
- Offer to help set up a home office instead of providing a company car
- Find out more about the real business benefits telework can offer
- Ensure performance management systems work regardless of where staff are located.

Low Cost Options

- Make notebook and portable computing options part of your next office technology upgrade
- Prepare a detailed cost-benefit analysis to see whether your company could make tangible gains from telework
- Establish a formal telework policy for all staff
- Set up a telecentre (a place where telework happens) for your staff, if many travel from the same part of town.

POWER PAYBACK!

Telework benefits include:

- **Reduced emissions: if 5% of Auckland's drivers didn't use their cars on two days a week, we'd stop 29,700 tonnes of greenhouse gases and pollutants entering the atmosphere**
- **Reduced congestion: Auckland Regional Council research suggests a 5% reduction in vehicle usage, region-wide is feasible.**
- **Employer benefits: space and cost savings, retention and recruitment benefits, and productivity improvements worth up to $300,000 per annum per 100 employees.**

KEYS TO SUCCESS

- Where telework arrangements succeed, they are treated just like any other change in your business: planning, and sound assessments of benefits and costs are important.
- Plan for the long term and move towards the goal gradually.
- There should probably be an internal 'champion' and a commitment to consultation with all staff.
- The telework arrangement should be a voluntary arrangement for all staff, within a set of clear guidelines.
- Telework arrangements should be established to meet specific objectives. Although telework is almost always beneficial, it is important to know what particular benefits you wish to maximise, and what you intend to measure.
- Try to establish your telework arrangements so that it becomes a normal work option – part of the corporate culture.
- Be prepared to establish your own telework programme: every company is different and there is no 'one size fits all' solution.

FURTHER INFO AND TOOLS

- For more information on telework and its possible advantages for your business, visit www.telework.co.nz or www.gilgordon.com. Both these sites provide links to a wide variety of resources and organisations that might be able to help.

SAMPLE $$ SAVINGS

- For a company with 100 staff and 20 teleworkers working from home 2.5 days a week, productivity improvements, space savings, staff retention and recruitment benefits and reductions in absenteeism can be worth over $100,000 per annum. International case studies suggest that teleworkers benefit the company by between $15,000 and $30,000 each. Such a company could also reduce its office power bill by 10% or more.

HESKETH HENRY – A TELEWORK SUCCESS STORY

During 1999, Auckland based law firm Hesketh Henry trialled teleworking with five of their staff in order to determine whether or not the action would be suitable for their company.

THE ACTION

The idea to telework was initiated by the proprietors of Hesketh Henry. An external consultant, Bevis England, from Telework NZ, was contracted to design a plan and the General Manager and HR Manager implemented this within the company. Home offices were established for each of the five staff and an IT Manager implemented the necessary technology to use remote access to Hesketh Henry's information systems. Teleworking from home for staff ranged between 1–5 days per week and occurred for part of the day when traffic was most congested.

THE SAVINGS

Person	Travel route	Savings resulting from teleworking during thick of traffic	
A	Takapuna to City	45 minutes / day	(3 times per week)
B	Milford to City	30 minutes / day	(1 time per week)
C	St Johns to City	1 hour / day	(2 times per week)
D	St Heliers to City	30 minutes / day	(3 times per week)
E	Glenfield to city	1 hour / day	(5 times per week)
TOTAL SAVINGS (all staff)		11 hours 15 minutes per week	

...assuming a 40 hour week...

Hesketh Henry saved 13.5 weeks worth of time in a year through teleworking, or 13.5 weeks worth of time in a year staff would have spent in traffic!

The Greenhouse Gas Savings

One of the other less obvious benefits of teleworking is the amount of greenhouse gas emissions that don't get emitted as a result of avoiding travelling in congested traffic, or avoiding travelling at all! In the case of Hesketh Henry, the emissions savings are based on an assumption about the additional kilometres that could have been travelled had the individual travelled at rush hour. The assumption is that time saved would have been spent travelling at 10km per hour in peak traffic flow. Given this, the total reduction in CO_2 emissions for all 5 teleworkers at Hesketh Henry across 12 months amounts to 1792.9kg. Similarly, the reduction in toxic emissions 100.8kg over 12 months.

Notes from the experience

The costs of setting up teleworking are mostly related to setting up home offices, but there are many other benefits associated with teleworking as well, such as staff wellbeing – the reduction in stress related to dealing with traffic congestion may have a significant impact on an individual's mood. The teleworking policy needs to be robust and it is important to define how you will measure employee performance at the outset. It is also vital to ensure employees understand the purpose and benefits of using teleworking.

TOOLS

Teleworking consultant –
Bevis England, Telework NZ,
09 811 8024, bevis@telework.co.nz

For further information about Hesketh Henry, contact:
Mark O'Connell, 09 375 8700, mark.o'connell@hesketthenry.co.nz

Managing your long distance travel: videoconferencing

Air travel consumes large quantities of energy, and therefore greenhouse gases. When the carbon charge begins, air fares will begin to incorporate this environmental cost.

OPTIONS

- Consider using videoconferencing or phone conferencing instead. Ideal for short meetings where you already know the people, you will save money, lots of travel time and limit your pollution to whatever it takes to get to the nearest videoconferencing centre. See the case study for a sample comparison.
- Compensate for the environmental impact of your travel by buying carbon offsets.

TOOLS

- **Air Travel Calculator.** This calculates your emissions of greenhouse gases in CO_2 equivalents for a given air trip, and gives the option of paying to offset those emissions through renewable energy, efficiency, and carbon sink programs.
  See www.nzbcsd.org.nz/Climatechange/content.asp?id=17
  Example. A round trip flight from Auckland to Sydney results in 0.54 tonnes of CO_2 equivalent greenhouse gases.
- **Hire videoconferencing facilities** already set up at other agencies such as:
  Institute of Chartered Accountants in New Zealand (ICANZ).
  They have facilities based in Auckland, Hamilton, Wellington, and Christchurch.
  Contact: registry@icanz.co.nz

  Communication Partners in Wellington
  See www.cpnz.net.nz/index.cfm/Video_Conferencing

  Business Centre at The Open Polytechnic of NZ in Auckland, Wellington and Christchurch
  see www.topnz.ac.nz/businessandindustry/servicesoffered/venuehire/index.html

POWER PAYBACK!
Video-conferencing from Wellington to Auckland for a 30-minute meeting is around $500 cheaper than flying (see case study)

CASE STUDY – PARTICIPATE IN A MEETING VIA VIDEOCONFERENCING

At an Auckland NZBCSD workshop the guest speaker (Roger Sutton) remained in Wellington and effectively presented and led discussion for 1 hour via video-conference. The cost, time and greenhouse gas savings, resulting from Roger not flying to Auckland, are summarised below:

	Physical Travel	**Videoconference**
Direct Costs (tickets, taxis etc)	$680	$174 ($150/hr plus line charge)
Travel Time: Air/airport/road	4 hrs	30 minutes
Total cost	**$680**	**$174**

$ Savings	**$506**
Greenhouse Gas Savings	**172 kg**

Aside from the big financial benefits of videoconferencing, the action also has a positive impact on our environment by reducing harmful carbon emissions that result from air and vehicle travel.

Energy efficiency & renewable energy

Products from New Zealand Ltd

LOOKING AT THE BIG PICTURE – A CASE EXAMPLE OF A COMPREHENSIVE APPROACH TO ENERGY MANAGEMENT

Some businesses take a comprehensive approach to addressing their energy usage. The following demonstrates the broad range of actions and creativity you can put into reducing your energy impact.

SUCCESS STORY: PRODUCTS FROM NEW ZEALAND

Simon and Kristina Cope from **Products from New Zealand** have covered many of the actions listed in this guide, as well as made a commitment to using renewable energy sources for their power.

- **The Building**
  SIMPLE, passive solar building design techniques were used in the building of the premises. The design of the building allows plenty of sun and natural light in during the day and wind ventilation. Therefore, no additional heating is used over the winter, and no air conditioning is required. In addition, all internal walls, ceilings and floors are well insulated to the highest R value.

  LIGHTING: compact fluorescent lights

  HOT WATER is provided from a solar hot water system on the roof

  TOILET water is provided by rainwater collected from the roof.

- **Equipment:** an energy-efficient fridge, and 'green' monitors. Behavioural changes included turning off computers, monitors and lights when not in use.
- **Telework:** Employed two additional staff, who telework from their homes.
- **Renewable Power:** The office is powered 100% by solar energy, with 1kW solar electric photo-voltaic modules on the roof.

THE SAVINGS

A building of similar size to Products from New Zealand would expect to pay $100 per month for their electricity bill. Since installation of the solar energy generators 2 years ago, Simon and Kristina have paid $10 per month, a total saving of $2160. In addition, they have saved around $100 per annum on their water bill through using rainwater in their toilet.

The payback periods:

Insulation: 2 years

Rainwater tank and pump: 2 years

Solar Hot Water: 7 years

Solar electricity generation is 10+ years

TOOLS THEY USED

- Photovoltaic solar electricity modules (Siemens and UniSolar)
- Solar hot water system (Solahart)
- Lighting (Phillips and Osram)
- Fridge (Gram)

Notes from the experience:

For further information about the facilities management actions Products from New Zealand took, please contact Simon Cope: Simon.Cope@ProductsFromNZ.com. Phone: +64 9 627 2089. Simon is a renewable energy consultant.

Sustainability Framework:

The Natural Step – *Hot Pyjama Productions*

LOOKING AT THE BIG PICTURE – A CASE EXAMPLE OF A COMPREHENSIVE APPROACH TO ENERGY MANAGEMENT

The Natural Step Framework is an approach that encompasses much more than energy efficiency, but incorporates many of the actions described in this guide. Anyone interested in making changes to their business to incorporate a wider environmental and social impact, should consider this an option.

HOT PYJAMA PRODUCTIONS – USING THE NATURAL STEP FRAMEWORK

Hot Pyjama Productions is a small graphic design, print and web production firm located in Christchurch with a staff of four. Winners of the 2002 Environment Canterbury Resource Management Award, as well as the Landcare Special Award for Sustainable Management of Land Resources, Hot Pyjama Productions have achieved energy efficiencies through adoption of the sustainability framework – The Natural Step.

THE ACTION

The Natural Step uses a science-based framework to help individuals and organisations understand sustainability and build sound programs, tools and metrics. The Framework assists companies and organisations to develop strategic sustainability initiatives. These initiatives have helped them achieve greater effectiveness, competitive advantage, bottom line results, security, employee satisfaction and public acceptance.

Hot Pyjama Production's adoption of The Natural Step has helped significantly reduce their use of resources; notably energy, paper and fuel. Simple exercises like switching off the hot water cylinder and boiling the jug for hot water have saved the company an estimated $500 per year. Within The Natural Step framework, other sustainability initiatives taken by Hot Pyjama Productions included cleaning and changing the lighting fittings following a lighting assessment, re-cycling office paper, emailing proofs and artwork, rather than posting hard copies, voluntary car-less days, organic waste disposal, and a 'Tree Reward' program to offset the paper used in printing jobs for their clients. This program involves calculating how much of a tree has been used in printing jobs, then each quarter, purchasing the equivalent number of seedlings from Trees for Canterbury which are then donated to community planting initiatives.

THE SAVINGS AND PAYBACK PERIOD

Although Hot Pyjama Productions have not calculated the exact amount of savings resulting from all their energy efficiency initiatives, they are still significant. As The Natural Step Program was subsidized by Christchurch City Council and Target Zero at the time, the

cost of initial investment was $600. This was good value for the amount of time Hot Pyjama Productions received from The Natural Step team and consultants on an individual basis, and so the action quickly paid for itself. In addition, the adoption of The Natural Step Framework has not only developed a positive work ethic within the organisation, but achieved national recognition as a leader in sustainable business.

THE TOOLS

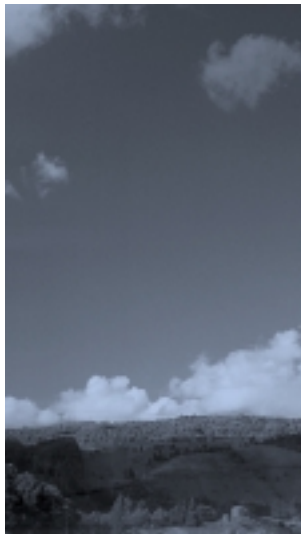
- The Natural Step
  email: natstep@naturalstep.org.nz
- Lighting audit – Target Zero –
  call Karyn Durham 03 941 8991

Contact: Wendy Riley;
Phone: +64 3 374 9929;
Email: wendy@hotpj.co.nz

Sustainability Framework:

Triple Bottom Line – *Interface Agencies*

LOOKING AT THE BIG PICTURE – A CASE EXAMPLE OF A COMPREHENSIVE APPROACH TO ENERGY MANAGEMENT



Triple Bottom Line reporting is the method of reporting on the three components of sustainable development – social, environmental and economic – not just reporting on the traditional financial outcomes of an organisation. This enables a business to find better ways of measuring and reporting on progress towards sustainability at several levels, ranging from national to local organisations.

Interface Agencies Ltd is a privately owned company with eight personnel specialising in the supply of floor covering solutions to commercial premises and public buildings throughout New Zealand. The main product is high quality carpet tiles which provide a lower total cost of ownership than alternatives. Interface Agencies is focused, not just on providing great products and services, but also on looking after our environment and giving back to the New Zealand community. In 2001, Interface Agencies adopted the Triple Bottom Line sustainability framework in order to meet this objective.

INTERFACE AGENCIES – TRIPLE BOTTOM LINE REPORTING

THE ACTION

Undertaking the Triple Bottom Line (TBL) approach enabled Interface Agencies to track their performance and help set goals for continual improvement. TBL reporting (also referred to as sustainable development reporting) required them to define their vision, and describe their economic, environmental, and social performance. Interface Agencies also identified and assessed potential risks, and proposed their future direction in this TBL report.

The information gathered as a result of TBL reporting has helped Interface Agencies to run their business better. It has enabled them to assess ways to transport their products more efficiently and to cut back on waste. They are making a significant contribution in relation to their size to improving society and are working at emulating nature's examples in the design of their products. Interface Agencies are planning to do another TBL report in 2003.

THE TOOLS

- Business Guide to Sustainable Development Reporting – see www.nzbcsd.org.nz/sdr/ or phone 09 488 7404 for a copy.
- Triple Bottom Line Reporting – contact Sustainable Business Network: phone 09 920 2400 email office@sustainable.org.nz For SME's – See www.sustainable.org.nz/attachments/triplebottomline-final.pdf

Notes from the experience

In nature, waste equals food. Following that simple principle can revolutionise a business. In short, we remain profitable in a very difficult market.

Interface Agencies believes strongly that even small enterprises like itself should adopt this type of undertaking.

ENERGY EFFICIENCY TIPS FOR RESIDENTIAL LANDLORDS

(Statistics taken from ECCA, and Statistics NZ)

BACKGROUND

New Zealand landlords can make an important contribution to increasing our country's energy efficiency. About 25% of New Zealand's homes are owned as rentals by private investors. These properties account for approximately 9% of New Zealand's total electricity consumption, at a cost of around $390 million dollars.
Electricity is by far the most widely used energy source for New Zealand houses. This electricity is used for the following activities: hot water (45%), space heating (20%), appliances (15%), lighting (10%), and refrigeration (10%). The best energy efficiency measures are incorporated in a house at the design and build stage, however easy retrofit options are also available. It is estimated that around 8% of residential rental property electricity could be saved, along with $31 million dollars, by simple low cost measures.
The top three measures are described below:

1. HOT WATER CYLINDER INSULATION

Quick paybacks are available by paying just a little bit of attention to your houses' hot water cylinders. Up to 40% of the energy used to heat water could be wasted through poor insulation.

- If your cylinder is not labelled 'A Grade', then wrapping it with an insulating blanket will be beneficial.
- It's also a good idea to insulate the first metre of the pipe carrying the hot water from the cylinder.
- Check that the temperature at your hot water tap is about 60°C. If it is hotter then this it could be a burn hazard as well as wasting energy. Adjust the cylinders thermostat to suit.

	Cost ($)	Savings ($/yr)	Payback
Hot Water Cylinder Wrap	70–120	22–80	1–5 years
Hot Water Pipe, 1m lag	5–20	16	4–18 months
Adjust Thermostat	Free		

Based on electricity cost of 13c/kWh

2. LOW FLOW SHOWER HEAD

Installing a low flow showerhead can reduce hot water usage during a shower by 30-40%, which also saves the energy that is used to heat the water. Fixing dripping hot water taps saves energy too.

	Cost ($)	Savings ($/yr)	Payback
Low Flow Showerhead	45–90	115	5–9 months

Based on electricity cost of 13c/kWh, and a total shower usage of 30 minutes per day

3. COMPACT FLUORESCENT LIGHTING

Compact fluorescent light bulbs use 1/5 of the energy and last 8 times longer than the standard light bulb that most people are familiar with. Although they are more expensive, they are good value in places where the lights are used for several hours at a time, resulting in energy savings of between 60-80%.

	Cost ($)	Savings ($/yr)	Payback
Compact Fluorescent Bulbs	12–28	15	10 months – 2 years

Based on electricity cost of 13c/kWh, and bulb use of 5 hours a day

INDEX OF WEB SITES & TOOLS

GENERAL ENERGY MANAGEMENT Comprehensive Program & Managment Tools

Resource & Type	Organisation & Web link	Description
Emprove (program)	Emprove **www.emprove.org.nz**	Emprove is an Energy Management Programme brought to you by the Energy Efficiency and Conservation Authority and capable of delivering energy cost savings of up to 30%.The program includes grants to cover energy audits.
EnergySmart (program)	SEDA (Aus) **www.energysmart.com.au**	Australian NSW energy efficiency program, with a separate business focus. Signs on partners with bills over $200K. The 'toolbox' includes an Energy Smart Savings Manual: 60 pages long, covers all the key areas you can get efficiency gains. A little dense, but has good technical guidance, and good examples of calculations. The site also has several good live calculators.
Energy Star for Small Businesses (Program)	US EPA **www.energystar.com**	The US energy efficiency program, developed by the EPA. Tons of useful info, from management strategies down to shopping checklists. The web site has general and technical advice, sector-specific recommendations, and detailed descriptions on what actions and products you can use. A 30-page guide called *Hands on Solutions to Increase your Profits and Productivity* is probably the simplest comprehensive guide to prioritising and taking simple steps. (Note: A 100-page guide is available for US companies that sign up, called *Putting Energy into Profits. Energy Star Guide for Small Business*).
EBEX21 (Footprinter emissions management tool)	Landcare **www.ebex21.co.nz**	Comprehensive emissions management program. Start by signing up (for a small fee) and recording energy consumption, which generates a CO_2 emissions report and gives guidance on emissions management.
Triple Bottom Line reporting (Program and tool)	Sustainable Business Network Email: **Rachel@sustainable.org.nz**	Triple Bottom Line reporting is the method of reporting on the three components of sustainable development – social, environmental and economic – not just reporting on the traditional financial outcomes of an organisation.

GENERAL SERVICE PROVIDERS & PRODUCTS

Energy Auditors	**www.ema.org.nz**	List of approved auditors, by region who you can call on for help.
Energy Service Directory	**www.emprove.org.nz**	EECA database of energy service professionals. Search by region for consultants, contractors and products.
BusinessCare	**www.businesscare.org.nz**	BusinessCare provides training courses to individuals and Council members to enable them to provide assistance in cleaner production techniques.
Renewable Energy Database	**www.eeca.govt.nz**	EECA database of renewable energy products and services. Search by region and energy type.

INFORMATION & ADVICE

Climate Change Business Opportunities NZBCSD	**www.nzbcsd.org.nz/climatechange**	Potential NZ business opportunities associated with the increased need to reduce greenhouse gas emissions.
NZBCSD Emissions Accounting and Reporting	NZBCSD **www.nzbcsd.org.nz/climatechange**	The why and how to emissions accounting and reporting in NZ. Based on the GHG Protocol – an international protocol for emissions accounting and reporting, includes an easy-to-use emissions calculator.
Energy Info for your Business	US Dept of Energy **www.eere.energy.gov/**	Links to guides and resources specific to business. Organized alphabetically covering sector, actions, planning and more. Lots of good info, but you have to dig for it!
Climate Friendly Kiwi Guide	BRANZ **www.branz.co.nz**	'Easy Guide' to energy efficiency at home and in the office. Gives scientific background to climate change, calculating your greenhouse gas emission, and taking steps to reduce it.
	Centre for Advanced Engineering **www.caenz.com**	A guide to Energy Efficiency Technologies. A very comprehensive, technically oriented guide in two volumes, on technologies and their application.
	www.ccc.govt.nz	Christchurch City Council's Target Zero programme has many resources, including this brochure which covers all the waste-related things you can do, including energy efficiency.

TOOLS & CALCULATORS

NZBCSD Emissions Calculator	NZBCSD **www.nzbcsd.org.nz/climate change/content.asp?id=17**	Simple website calculator for emissions from fuel use, electricity, air travel etc.
EBEX21®	www.ebex21.co.nz	An integrated service that assists organisations to Measure, Manage and Mitigate CO_2 emissions.

ProForm (Calculator)	**www.greenbiz.com**	Spreadsheet for assessing financial and environmental aspects of renewable energy and energy efficiency projects. Comprehensive 'back of the envelope' calculator. NPV, IRR, emissions savings. Source: US EPA, Lawrence Berkeley Nat. Lab. [is not simple]
Tools Directory	US Dept of Energy **www.eren.doe.gov**	US DOE website. Described here are 251 energy-related software tools for buildings, with an emphasis on using renewable energy and achieving energy efficiency and sustainability in buildings. Some are free.

FACILITIES & BUILDINGS

Energy Saving Tips for Small Businesses (Guide)	US Department of Energy **www.eere.energy.gov**	An excellent 30-page guide from the US Department of Energy. Many of the facilities-oriented suggestions in this booklet are drawn directly from this source, which goes over how to prioritise your energy saving steps
Business Energy Check-up: (Calculate + info)	Alliance to Save Energy (US) **www.ase.org**	Calculate the benefits and costs of energy efficiency measures in your building. Gives detailed advice also, based on the US Environmental Protection Agency's Building Guide
e-Bench	**www.energyts.com**.	Database for recording facility energy use. Can be used to benchmark against similar facilities in New Zealand. Allows for facility types, building materials, and location. Has an associated cost.
EnergySmart Calculators	EnergySmart **www.energysmart.com.au**	See EnergySmart toolbox, which has calculator for Lighting and compressed air.
Emprove Tip Sheets (Advice)	**www.emprove.org.nz**	Emprove tip sheets for auditing, monitoring and operating for building and energy managers. Includes a guide on steam efficiency.
NZSEA (advice)	New Zealand Solar Energies Association **www.solarindustries.org.nz**	The Solar Energies Association represents the collective interests of manufacturers, importers and installers of solar water heating systems, and provides a single point of contact to the industry.
Wind technology	New Zealand Wind Energy Association **www.windenergy.org.nz**	A point of contact for advice on wind technologies and options available in New Zealand.

EQUIPMENT

Best Practices for Industrial Systems	US Department of Energy **www.oit.doe.gov**	Indepth info and efficiency tips for Compressed Air, Motors, Process Heat and Steam.
PC Monitor Power Management (Tools & Advice)	**www.energystar.gov**	US Energy Star programme website provides free downloadable software, and advice for enabling monitor sleep mode for MS Windows based PCs. Different options for small, medium, and large organisations. Easy to use.
Energy Star Office Equipment (Tool)	Australian Energy Star **www.energystar.gov.au**	Calculate dollar and GHG savings from using Energy Star office equipment.
Air Compressor Leak Cost (Tool)	SEDA (Aus) **www.energysmart.com.au**	Calculate dollar savings for repairing leaking compressed air systems.
Tip Sheets and Technologies	Emprove **www.emprove.org.nz**	Industrial guides on improving efficiency and saving money for: Motor Drives, Lighting & Water Heating.

FLEET & TRANSPORT

Rideshare (Tool)	**www.energywise.org.nz**	Web based software developed by EECA to facilitate carpooling for large physical locations. See 'On the Road' section. Lincoln University's version: http://minaret.lincoln.ac.nz/rideshare/
TeleworkNZ (Advice)	**www.telework.co.nz**	Website offering statistics and guidance on establishing teleworking in NZ. A link to an emissions calculator will shortly be added to this site.
Econodrive (Tool and Advice)	Emprove **www.emprove.org.nz**	Emprove guide and software developed for fleet management. Covers vehicle selection, maintenance, monitoring and management.
Fleetwise (Fleet Management Service)	**www.fleetwise.co.nz**	Fleetwise provides complete fleet management services (if you want to outsource your fleet management).
GreenFleet (Program)	Sustainable Business Network **www.sustainable.org.nz**	GreenFleet is a sustainable transport program offering a comprehensive set of practical tools for managing small- to medium-sized fleets.
Esanda Fleet Partners	**www.esandafleet.co.nz**	Esanda are one of the largest and most successful vehicle leasers in Australasia.
Custom Fleet NZ	**www.customfleet.co.nz**	Custom Fleet provides an extensive range of Fleet Leasing Services to suit all business applications.
Car pooling	**www.carpooltogether.co.nz**	Helps commuters find each other, so they can carpool.

OTHER

Transport Supplier Questionnaire (Tool)	**www.getf.org**	Questionnaire for potential transport suppliers. Information gives a picture of how well the company manages its environmental performance.

RELEVANT NEW ZEALAND ORGANISATIONS

Energy Management Association (EMA)
www.ema.org.nz contact: 04 473 9444

Sector Specific

ACCOMMODATION, CAFES AND RESTAURANTS

- Restaurants & Pubs. See the Waitakere City Council Restaurant Guide, or contact Michelle Dawson on www.waitakere.govt.nz/AbtCit/ec/clnprod/pdf/restcafegde.pdf
- Auckland Regional Council EHOA project: Jocelyn Rennie, 09 366 2000 ext 8263; Jocelyn.rennie@arc.govt.nz; www.arc.govt.nz
- Small Motels and Hotels: Green Globe 21: Tourism Industry Association of NZ (TAINZ): Kirsty Quickfall, NZ Co-ordinator, 03 545 7706; kirsty@tainz.org.nz; www.tainz.org.nz or www.greenglobe.org for information on the Green Globe 21 system, which benchmarks and certifies tourism facilities based on their environmental sustainability.
- **Institute of Refridgeration Heating and Air Conditioning Engineers (IRHACE)**
  contact: 09 262 1405 email: admin@irhace.co.nz

AGRICULTURE, FORESTRY AND FISHING

- www.maf.govt.nz for information on climate change and the agriculture sector.
- AgNZ works with various agricultural sectors, including vegetable growers, pack houses & glasshouses, to identify energy efficiency solutions. They also conduct tractor efficiency sessions.
  Contact Andrew Barber, on 09 237 1273 for details.
- Hastings District Council: Nickie Jones, 06 845 2997; nickie.jones@xtra.co.nz; www.hastingsdc.govt.nz for information about fertilizer, fruit and vegetable processing, and meat processing.
- For information about Grape Growing and Marine Farming: Marlborough District Council:
  Annie MacDonald, 03 578 5249; amc@marlborough.govt.nz; www.marlborough.govt.nz
- EBEX21® provides information on the restoration of indigenous forest on pastoral land and the consequential sequestration of CO_2, and a verification service for non-harvest forest sink carbon credits. See www.ebex21.co.nz

CONSTRUCTION AND DESIGN

- REBRI Guide. The Resource Efficiency in the Building and Related Industries (REBRI) initiative between Auckland Regional Council and BRANZ developed some good targeted information including tips by trade, materials and construction type. Can be found online at www.rebri.org.nz/
- Better Building Code – A voluntary minimum environmental standard for commercial buildings – but also useful for domestic buildings – with appropriate tender clauses for each life stage. Can be found online at www.waitakere.govt.nz or contact the Waitakere City Council 09 836 8000.
- Listing of Green Architects and Designers. Either visit the EECA database www.eeca.govt.nz (click 'renewables' then 'energy wise renewable products and services database') or for a list of building professionals who are qualified to environmentally audit house designs, contact BRANZ Accredited 'Green Home Scheme' Assessors ph: 04 235 7600 or www.branz.org.nz (under 'resources').
- For information on boat building; EERST (Environmental Education for Resource Sustainability Trust): Paula Inglis, 07 552 4559; paulainglis@ihug.co.nz
- For information on Furniture Manufacturing: EERST (Environmental Education for Resource Sustainability Trust): Paula Inglis, 07 552 4559; paulainglis@ihug.co.nz

PLASTICS

- Plastics New Zealand: Carolyn Cox, 09 262 3773 ext 104; carolyn.c@plastics.org.nz; www.plastics.org.nz

PRINTING

- Christchurch City Council: Laine Phillips, 03 941 8991; laine.phillips@ccc.govt.nz; www.ccc.govt.nz/targetzero
- EERST (Environmental Education for Resource Sustainability Trust): Paula Inglis, 07 552 4559; paulainglis@ihug.co.nz
- Waitakere City Council: Michelle Dawson, 09 836 8000 ext 8539; michelle.dawson@waitakere.govt.nz; www.waitakere.govt.nz

EDUCATION

- Schools can apply for capital funding for energy efficiency projects under the Crown Energy Efficiency Loan Scheme. Call EECA for details 04 470 2230. Frans Plugge, from Wellington-based ECO-systems has also carried out energy programmes in many schools.

- A guide for schools: 'Saving Energy Dollars in Schools' Robert C Bishop, Trevor Murray. Energy Management, Ministry of Commerce. Sept 1990. (Copy available from Jo Hume, NZCSD ph: 09 488 7404).

HEALTH AND COMMUNITY SERVICES

- Hospitals. There is substantial experience on hospital energy efficiency measure. Contact EECA for help, or see the following comprehensive guide to hospital energy efficiency measures www.caddet-ee.org/mb_pdf/mb_05.pdf

PROPERTY AND BUSINESS SERVICES

- The Green Office Guide covers energy efficiency in your office, and much more. Download from www.greenoffice.org.nz/docs/greenoffice.doc

FOOD PRODUCTION

- EERST (Environmental Education for Resource Sustainability Trust): Paula Inglis, 07 552 4559; paulainglis@ihug.co.nz

PANEL BEATERS/SPRAY PAINTERS

- For information on Paint Manufacturers: Hutt City Council: Sandy Beath-Croft, 04 570 6666; sandy.beathcroft@huttcity.govt.nz; www.huttcity.govt.nz

SERVICE STATIONS

- EERST (Environmental Education for Resource Sustainability Trust): Paula Inglis, 07 552 4559; paulainglis@ihug.co.nz; www.eerst.co.nz
- Greater Wellington: Francie Pedersen, 04 384 5708; francie.pedersen@gw.govt.nz; www.gw.govt.nz
- Timaru District Council: Blue Forsythe, 03 684 8199; bluef@timdc.govt.nz; www.timaru.govt.nz

OTHER RELEVANT ORGANISATIONS

- **New Zealand Climate Change Office:** (www.climatechange.govt.nz)
- **New Zealand Business Council for Sustainable Development** (www.nzbcsd.org.nz)
  NZBCSD aims to provide business leadership as a catalyst for change toward sustainable development, and to promote eco-efficiency, innovation and responsible entrepreneurship.
- **Sustainable Business Network** (www.sustainable.org.nz)
  The Sustainable Business Network is a forum for businesses that are interested in sustainable development practice to get together and make it happen.
- **Sustainable Management Fund** (www.smf.govt.nz/)
  The purpose of the Sustainable Management Fund (SMF) is to support the community, industry, iwi, and local government in a wide range of practical environmental management initiatives.
- **New Zealand Trade and Enterpise** (www.nzte.govt.nz)
  New Zealand Trade and Enterprises is the New Zealand Government's agency charged with helping New Zealand businesses achieve success at home and in the global marketplace.
- **Energy Efficiency and Conservation Authority** (EECA – www.eeca.govt.nz)
  EECA works to bring about voluntary changes of behaviour to implement Government strategies for energy efficiency, conservation and renewable energy in both the private and public sectors.
- **Emprove** (www.emprove.org.nz)
  Emprove is an Energy Management Programme brought to you by the Energy Efficiency and Conservation Authority and capable of delivering energy cost savings of up to 30%.
- **Energy Info NZ** (www.energyinfonz.com)
  Energy Information New Zealand (EnergyInfoNZ) is a convenient single location site accessing an extensive range of information on energy (electricity, gas, oil, solid fuels etc.). It is also a forum for those involved and interested in the New Zealand energy industry.
- **City and Regional Councils.**
  See www.govt.nz/en/search/govt-agency-list/ OR www.yellowpages.co.nz/all-categories/community/government/local-authorities/ for contact details of your local city or regional council
- **Universities.**
  Both Massey University (www.massey.ac.nz) and the University of Otago (www.otago.ac.nz) run Energy Management courses, which train auditors, among other things.
- **Target Zero Association**
  Christchurch City Council's resource efficiency/waste minimisation initiative See www.ccc.govt.nz/TargetZero/ for more info, or call Karyn Durham 03 941 8991
- **Institute of Sustainability Accountants. Auckland** (ICANZ)
  The Institute has branches throughout New Zealand, and in Sydney, Melbourne, London and Fiji. Within this framework, volunteer committees and special interest groups (eg. sustainability special interest group) work together to share ideas and create opportunities for members to continually develop their skills. Phone: 09 443 0773.
  Info on the sustainability interest group: www.sustainabilitymatters.co.nz
- **Envirofunz**
  Database of environmental and conservation funding for New Zealand www.envirofunz.org.nz
- **Packaging Council**
  The Packaging Council represents manufacturers, fillers, wholesalers, retailers and consumers of packaging. www.packaging.org.nz or contact 09 262 4044.
- **New Zealand Society for Risk Management**
  The NZ Society for Risk Management was established in 2000 to improve the knowledge and practice of risk management in New Zealand www.risksociety.org.nz or contact: 04 567 7512
- **Anew New Zealand**
  Developing and implementing a new shared vision for building a new New Zealand. www.anewnz.org.nz

ENERGY EFFICIENCY QUICKLIST

Source: *Putting Energy into Profits. Energy Star Guide for Small Business*. EnergyStar, US EPA.

LIGHTING

- Replace incandescent light bulbs with compact fluorescent lamps.
- Convert exterior lighting to high-pressure sodium or metal halide lighting.
- Upgrade fluorescent fixtures with T-8 fluorescent lamps and electronic ballasts.
- Remove or disconnect unnecessary lights.
- Lower light levels where appropriate, such as around computer monitors.
- Install occupancy sensors in areas such as bathrooms that are frequently unoccupied.
- Install timers or photocells on outside lights.
- Keep light fittings clean.

WATER USE AND WATER HEATING

- Install an insulating wrap for the hot water cylinder and the first metre of outlet piping.
- Install tap aerators and efficient showerheads.
- Select native or low-water plants for landscaping.
- Find and fix leaks.
- Set thermostat for hot water cylinder to 60°C

REFRIGERATION

- Repair doors and seals so they close tightly.
- Make sure fans and equipment are not obstructed.
- Combine refrigerated goods and disconnect unneeded refrigerators.

BUILDING

- Install weather stripping, caulking, or seals on openings that create draughts.
- Add or repair insulation to create a continuous blanket around building.

HEATING AND COOLING SYSTEMS

- Clean and replace filters regularly.
- Set back your heating, ventilating, and air-conditioning (HVAC) systems when the building is unoccupied. This includes setting the fans to 'auto' rather than 'on'.
- Repair leaks in system components such as pipes, steam traps, and couplings.
- Make sure radiators, convectors, air intakes, and air diffusers are not obstructed so that air can flow freely.

TRANSPORT

- Is journeying by private vehicle necessary? Consider the alternatives first: public transport, walking, cycling, car pooling/rideshare.
- If you can only take your private vehicle try to: combine trips, keep acceleration smooth, keep to the speed limit, don't engine break, avoid travelling at congested times, switch off if idling >30 seconds.
- Keep your vehicle loads to a minimum (fill up with people instead).
- Maintain your vehicle – keep tyres inflated, regular servicing/tune-ups, check wheel alignment.
- Turn off the extras – air conditioning, use rear screen demister only when needed.
- Telework – either partially or completely if possible.
- Long term, choose the right vehicle to suit your needs – consider engine size (smaller is more efficient) and type (hybrid, fuel cell, LPG, diesel).