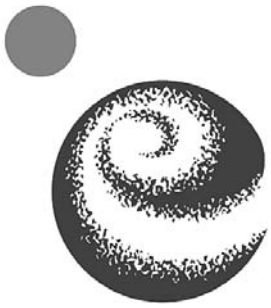


Moreland
Energy
Foundation

Submission to the Productivity Commission
Inquiry into Energy Efficiency
November 2004

Section 1 - Context

1.1 Introduction

Moreland City Council established the Moreland Energy Foundation Ltd (MEFL) to reduce greenhouse emissions (with a focus on energy) from the Moreland community. Since 2002 we have been working on a range of projects to address the community's needs in reducing energy consumption. Our key program areas are households, businesses and community entities (such as schools and libraries).

Moreland has a proud history of focusing on greenhouse emission reduction. Before the privatisation of the electricity industry, the City of Brunswick's Electricity Supply Department provided high profile programs to promote energy efficiency in the community. Project Aurora, initiated by the Electricity Supply Department, was the first urban wind/solar generation system linked into the electricity supply network. The Department's Home Energy Advisory Service carried out extensive programs in the area during the 1980's.

Privatisation of the electricity industry resulted in the sale of the Brunswick Electricity Supply Department, Coburg Electricity Supply Department and the State Electricity Commission. These sales, together with other changes in State Government energy policy, have led to a reduced focus on energy efficiency by most energy providers. To rectify this deficiency, Moreland City set aside $52 million received for the sale of the assets of the electricity supply departments to provide a base for the creation of the Moreland Energy Foundation. MEFL is funded from the interest on the investment of $5.5 million.

MEFL's unique role as the only community based organization focused on reducing local emissions in Australia gives us a special insight into how the community uses energy and what is required to reduce emissions. We welcome this opportunity to provide input to the Productivity Commission Inquiry into Energy Efficiency.

1.2 Background

1.2.1 Reversing the decline towards inefficiency

Moreland Energy Foundation's key focus is to pursue energy efficiency for small customers, including businesses, schools and the residential sector. The work we do with householders and small businesses in Moreland reinforces the fact that there is much investment in energy *inefficiency*, and not much in energy efficiency.

Take lighting as an example. In the residential sector, lighting has traditionally been viewed as one of the smaller energy use components within a household, with the proportion of energy for lighting being around 4%[1]. Not so long ago, an average Moreland house may have had around ten incandescent globes, of around 60 watts powering their whole house. If every light in the house was on they would be using 600 watts of energy. Now many houses we enter have low voltage halogen lights in their main living rooms. As they need multiple lamps to light an open space, one living room can easily accommodate 20 lamps. Each lamp uses 60 watts of energy, including 10 watts for the transformer. That means that this living room would be using 1200 watts of energy – twice as much as the whole house in the former example.

[1] Australian Greenhouse Office, Global Warming Cool It, page 3.

The same applies to small business. Traditionally halogen lights have been popular with jewelers as the nature of the lighting emphasizes features and makes shiny things sparkle. Now we are seeing them being installed in all nature of businesses – butchers shops, fruit shops, even shoe shops. In each example we see a whole wall or ceiling of halogen lights and speak to shop keepers who are experiencing dramatic increases in their bills, as well as increased need to air condition because of the heat loss from the lights.

So now we not only have the job of encouraging people to invest in energy efficiency, we need to get them to write off the investment they have recently made in energy inefficiency. From a local perspective, our job of encouraging uptake of energy efficiency would be much more straightforward if we were operating in a policy environment where all the right signals were in place across the board.

The thing that makes energy efficiency unattractive from a policy makers perspective is the complexity involved with addressing it. No one single solution will bring about emission reductions overall as there are multiple drivers of energy consumption. According to Greene and Pears,

"Most energy users, manufacturers of energy-using equipment, builder, energy suppliers or government policy makers, do not see end use energy efficiency as a major issue. Under these circumstances, policy makers are not willing or able to implement the far reaching efforts that would meet users' preconditions for improving their energy efficiency. Energy prices exclude the cost of the environmental damage associated with energy use. Manufacturers and builders assume that features other than energy efficiency provide the most powerful motivators for buyers to select their products. And energy suppliers have little incentive to reduce the amount of energy they produce and/or sell".[2]

We see the Ministerial Council for Energy's support for the National Framework for Energy Efficiency as very positive step forwards in recognizing the importance of energy efficiency as an issue and coming up with a range of measures to pursue energy efficiency. We would hope that the Productivity Commission Inquiry complements this work, and drives on into energy markets and beyond.

1.2.2 Climate Change Policies

We understand that this review is not a review of Australia's climate change policies. However, we believe that ignoring the issue of climate change is not in Australia's long term economic interests and therefore the Productivity Commission should see energy efficiency as playing a role in that response. The costs of climate change to the Australian economy are potentially very large, in terms of the impact on rainfall and the increase of major weather events. Losing environmental assets such as the Great Barrier Reef to coral bleaching will have enormous impacts on local economies. Energy efficiency has the potential to play an important role in Australia's climate change response and therefore the costs of climate change should be married into the equation when looking at the costs of implementing energy efficiency.

We also understand that the issue of targets is part of the review (which will be addressed in more detail later in the submission). A sensible approach would be to set a national emission reduction target of at least 60% below 1990 levels by 2050 and then to set targets for energy efficiency (and other sectors) which links back to this target.

[2] Deni Greene and Alan Pears, Policy Options for Energy Efficiency in Australia, January 2003, The Australian CRC for Renewable Energy, page 5

1.2.3 National Framework for Energy Efficiency

MEFL is aware that the MCE has signed off on a package of measures as part of the NFEE. We support the policy package as a significant positive step towards overcoming the barriers to energy efficiency and unlocking the potential benefits. We are keen to see the roll out of the policy package commence as soon as possible, with a view to having made significant progress by the end of twelve months and to having a second tranche of measures agreed to and commenced within three years. Up to date the non government sector has had some involvement with the NFEE process and we are keen to see that continue. However, our role and resources to support that role need to be clarified.

1.2.4 Energy Efficiency vs. Conservation

While we understand that the Productivity Commission's focus is on energy efficiency, we believe that in practical terms it is very difficult to draw a line between energy efficiency and energy conservation. Certainly from a community perspective, there is little difference and MEFL recommends actions which best suit the circumstances and they may be efficiency or conservation. Therefore the case studies which will be presented throughout the submission will have both examples.

We are also concerned about the possibility that limiting the Inquiry Terms of Reference to energy efficiency could prevent the recommendations from the Inquiry covering conservation options even when there are clear economic benefits. Given that much energy is wasted in our economy (simply look at how many commercial buildings in the CBD are fully lit throughout the night when no one is working there), taking pressure off the distribution networks by switching off power which is playing absolutely no useful purpose should be compatible with a healthy economy.

Section 2 - addressing the questions in the issues paper

2.1 Energy Efficiency

To what extent can the energy efficiency gap be explained by rational behaviour?

There is no doubt that a significant gap exists between what is possible to achieve with energy efficiency and what is actually being taken up within the majority of society. In terms of whether this can be explained as being for rational behaviour, (taken as meaning that players in an economy know the options and then go through a process of weighing up the pros and cons before making the decision which will be of most benefit to them), it must be understood that decision making around energy is very complex. One of the key findings in the Community EmPOWERment research paper attached is that householders "expectations around electricity use and their understanding of comfort, convenience, security and other values can be understood as socially and culturally constructed."[3]

In terms of the major players in the energy market such as the retailers and distributors, the way the market has been structured has created the situation where pursuing demand management and energy efficiency is not in the interests of these players and therefore their lack of interest could be said to be rational behaviour. This is described in more detail later in the submission.

To outline some of the reasons why energy efficiency has not been implemented even when it is in the interest of the player, some of our experiences working within the community in Moreland have given rise to the following:

- Lack of knowledge about a specific product or service – you can't implement something if you don't know it exists
- Not wanting to take a risk – for instance, people will very often replace a broken hot water service with the same product
- Lack of time or resources to look at all the options prior to making a decision – renovators often complain about choices they made under stress that they have become unhappy with; sole business operators rarely have the time to look at non-core business issues, even if it would be to their advantage
- Being given poor advice by market intermediaries – this is a key issue which will be addressed in more detail later
- High upfront costs – this is a big barrier for small businesses who lack the cash flow to make investments which will reap savings for them in the long term
- Conflict with other issues that the decision will impact upon

[3] Institute for Sustainable Futures, Community EmPOWERment Final Research Report, 2004, page xv

What is the scope for cost-effective energy efficiency improvements in specific firms or households? In sectors or industries? What are the economic benefits and costs to specific firms or households of cost effective energy efficiency improvements? To sectors or industries?

2.2 Households

Scope

All households have scope to reduce their energy usage and increase their efficiency. The degree of the scope depends upon whether they are designing and building a new home (where major improvements to current standards can be made), renovating an existing home (where many of their decisions will have an impact on energy efficiency), purchasing appliances or increasing comfort levels of a rented home. The examples below outline some of the projects MEFL has designed to capture the scope and case studies which illustrate the impact of our work.

2.2.1 Home Energy Action

Home Energy Action is aimed at building capacity within the community to deliver simple retrofitting and behavioural change techniques for energy and greenhouse reduction. The initial pilot commenced with 44 volunteers receiving training in domestic energy reduction techniques within their own homes. The project then provided resources and support for those people to provide the Home Energy Action service to their friends, family or neighbours, outreaching to 180 households across the 6 municipalities. The participating councils of Hume, Moreland, Banyule, Nillumbik, Whittlesea and Darebin make up the Northern Alliance for Greenhouse Action

Home Energy Action achieved 17% reduction of greenhouse gas emissions across participating households, after aiming to achieve 10 to 15%[4]. This totaled just under 200 tonnes CO_2. A total of 180 households have been part of the program, taking action within their own homes or helping their friends, family or neighbours to do so.

Some of the challenges this project has faced have often been related to supporting trained volunteers in the extension of Home Energy Action to other peoples' homes. Although in some cases this was a simple and straightforward process, other volunteers experienced difficulties in providing the Home Energy Action service to others. For this reason where MEFL has been involved with similar projects with other partners (Sustainability Streets, Community Power, Manningham City Council, Toyota Australia, AGL) we have focused these capacity building projects at supporting residents to implement changes in their own homes only.

2.2.2 Home Energy Star

Community leaders are crucial to sparking any change within a community. To identify and foster leaders for energy reduction, MEFL developed the highly innovative Home Energy Star project. We recruit households who are interested in making reductions to their energy usage. We audit their current energy usage and provide them with a detailed report outlining how to make cuts. The Stars commit to making changes they see as being viable and we support them in making the changes. Over the following year, we track their energy usage to see what savings they have made.

Over ninety-five households have been recruited so far and independent research by Strahan Research indicates that most of them are working to reduce their energy use.

[4] A 10% reduction in greenhouse gas emissions is a conservative target. Many households who have received similar energy-based recommendations have achieved reductions of between 20-30% with very simple structural or operational changes to their energy usage.

Telephone interviews of forty-five participants (of a total at that time of fifty-four) involved in the program was undertaken in July 2003. Respondents included thirty-one participants involved up to 30 December 2002 and a further twenty-three who were involved in January to May 2003.

The results of the Strahan research showed that nearly one third (31.1%) had made small structural changes to their home or appliances to reduce energy use, and 17.8% had made major changes.

Changes people had made included;

- Correct insulation, design of house, lighting, new energy efficient appliances, shading and double glazing of windows
- New ceiling insulation, new washing machine
- Changed roof, external shutters on windows
- Insulate walls & ceilings.
- Increase north facing glazing to capture winter sun.
- Zoning for heating system.
- Sealing bathroom exhaust fans
- Install ceiling fan - for winter and summer
- Better light fittings
- New car
- Altered roof line to install north-facing clerestory windows
- Replacing incandescent lamps with compact fluorescent globes
- Filled holes, cracks and gaps, sealed windows, sealed skylight.
- Replaced old electric with a new gas hot water
- Insulation on hot water pipe outlet
- Closable damper for fireplace
- Installed solar hot water system
- External canvas blinds
- Reducing standby power with better switching controls
- Winter window (temporary double glazing film)

A total of 57.8% of the sample said that they experienced barriers in making structural changes, and majority of these households (92%) identified financial costs as the key barrier to implementing changes.

Eighty percent of participants said they had a long-term plan for implementing changes, often involving several large structural changes. These long-term features included; better house design as part of an extension/renovation, improved insulation, use of solar hot water, better heating (through integrated systems), better appliances, and use of shading system for heat control during summer.

One of the key ideas behind the Home Energy Star project was to recruit renovators, as they are in the process of making changes to their homes, therefore have an interest and motivation. We have been successful in shaping the decisions of households which self select prior to locking plans in place. However, we have also experienced numerous households which have already committed themselves to changes which lock in increased energy use.

Collection of the household energy bill data twelve months after the audit date has also given us a valuable insight into the many varied and changing circumstances, as well as giving us data for the quantification of energy savings.

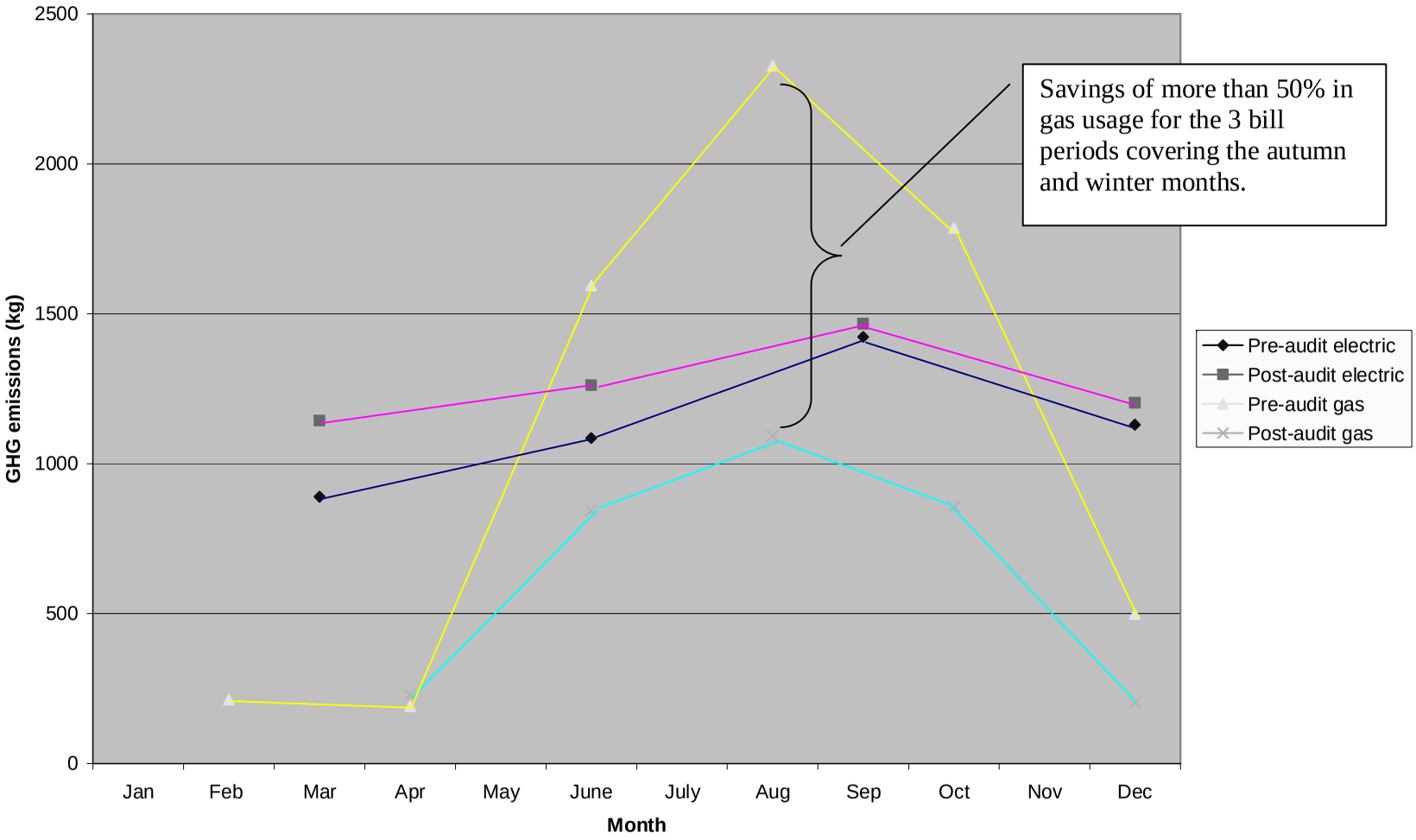
2.2.3 *Home Energy Star Case Studies*

Home Energy Star #49 had been planning to renovate their draughty under-insulated Victorian weatherboard home, and were keen to be comfortable and warm throughout their home and were considering numerous central heating options. Through participating in Home Energy Star they included several energy efficient features in their renovation, including; maximising the north facing glazing, thorough insulating and draught-sealing, choice of a 5 star rating central heating system and a new 5 star hot water service, and several other small structural features like AAA rating tapware and light fittings. After renovating this household not only were enjoying a more comfortable home, but had reduced their energy consumption by 23%, comparing to a full year of energy bill data prior to their involvement in the program. Their gas consumption in particular had reduced by over 50% across the 3 heating bill periods. See attached graph.

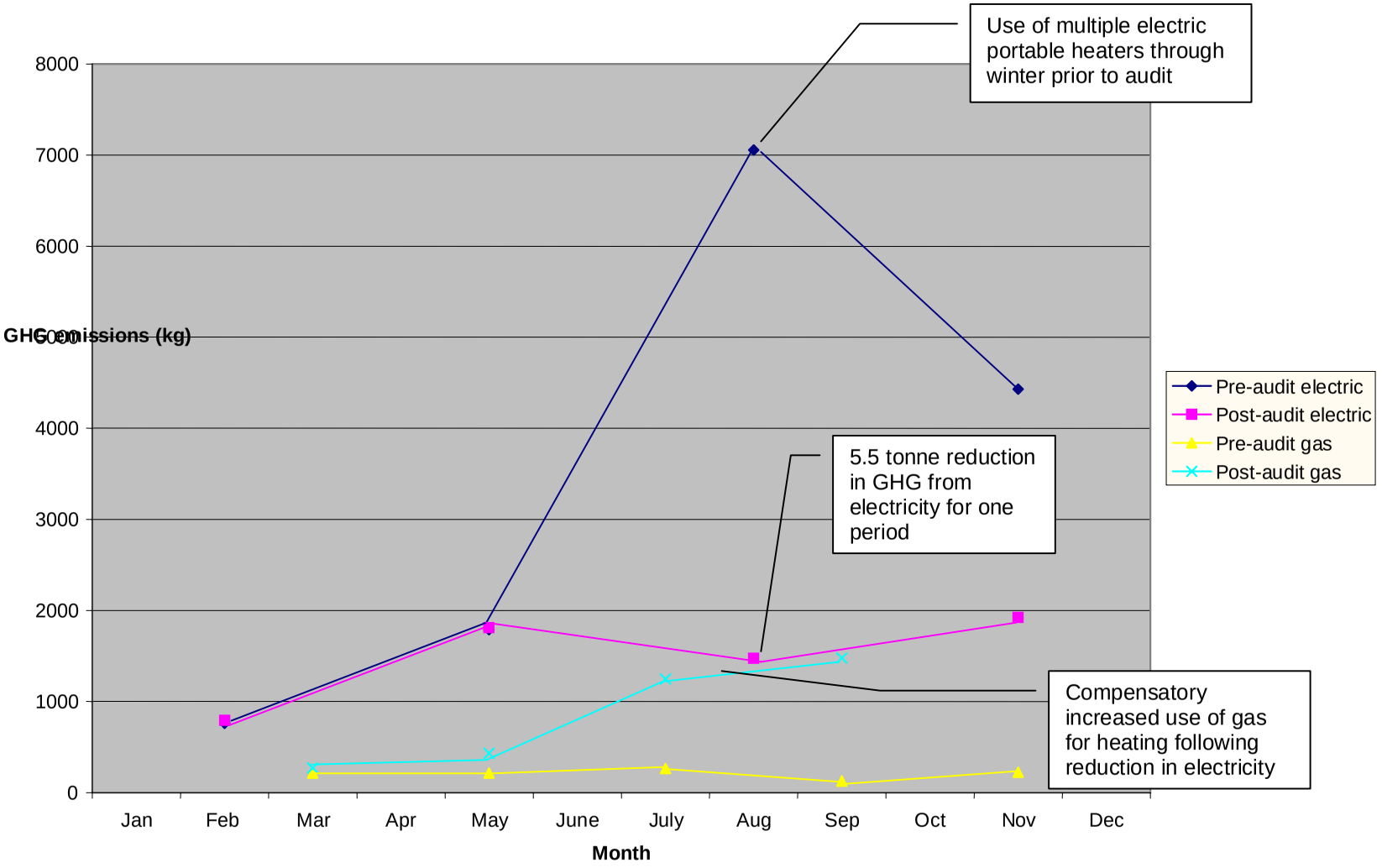
Home Energy Star #37 were unsure about whether their gas space heater was working or not, and subsequently were running several portable electric heaters to stay comfortable in winter. After receiving their Home Energy Star household audit and follow up report they serviced the gas heater, found that it was in good working order and began to use it instead of the portable electric heating. Their overall energy consumption decreased by 36% compared to the previous year's energy usage through this minor operational change and several small structural changes including; installing a AAA rated showerhead, using compact fluorescent lamps and installing better curtains on windows in their living area. It is interesting to note on the attached graph the increase in gas usage which is overcompensated by the enormous reduction in winter electricity usage.

Home Energy Star #44 had been relying on an electric heater in a poorly designed, draughty and under-insulated house. In preparation for the birth of their first child the household was planning for major renovations in which the home was extended and refurbished. After participating in the Home Energy Star program they included several energy efficiency choices including installing ceiling insulation, general draught sealing and choosing a 5 star rated hydronic heating system. Despite these energy efficient choices, the increase in the size of the members of the family, the increase in square meters of the structure of the house, and the relative increase in the comfort resulted in a net increase in annual energy consumption of 13%. See attached graph.

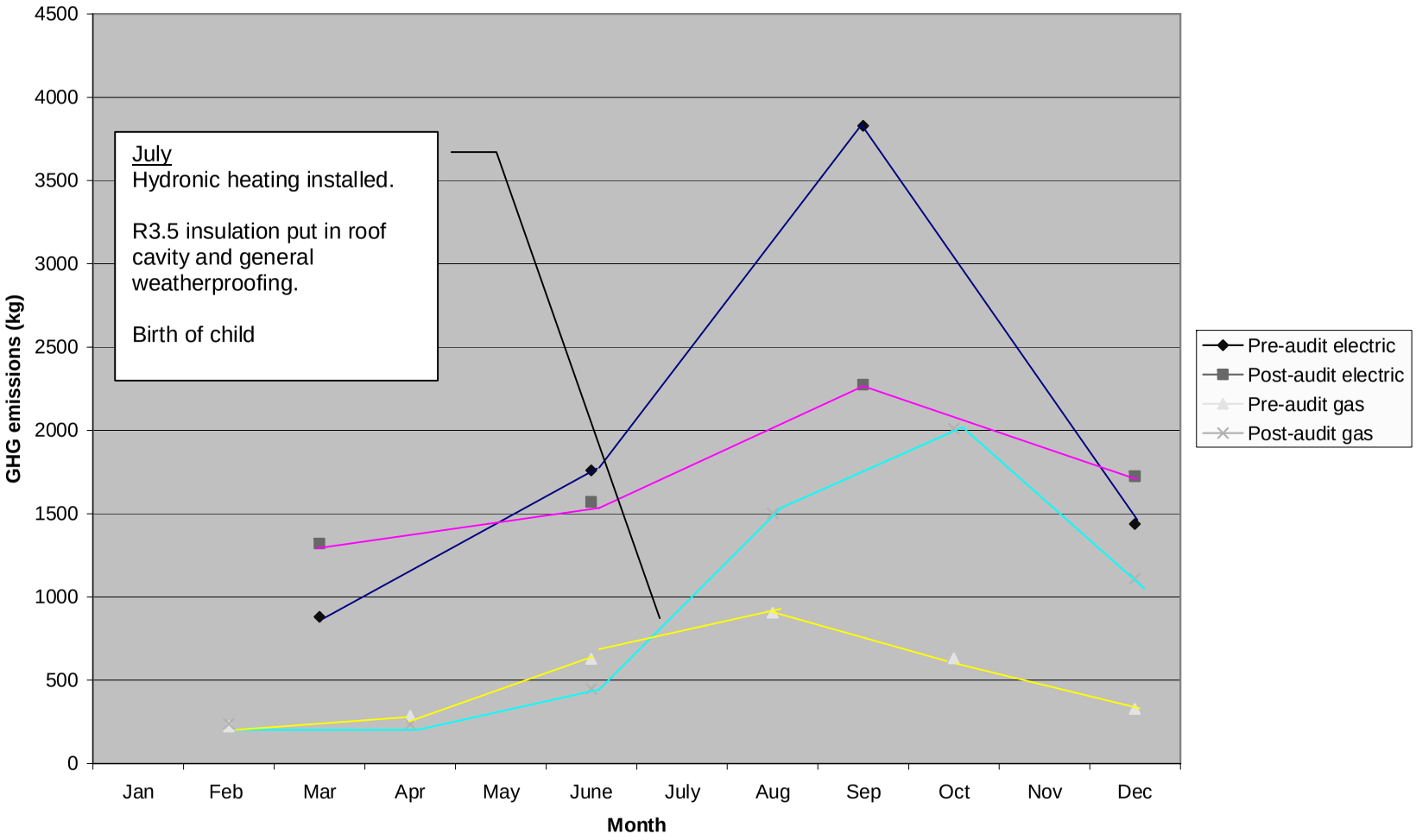
Home Energy Star 049: Gas and Electricity Usage Pre and Post Audit



Home Energy Star 037: Gas and Electricity Usage Pre and Post Audit



Home Energy Star 044: Gas and Electricity Usage Pre and Post Audit



2.3 Small & Medium Sized Enterprises

Scope

The impact of Small and Medium Sized Enterprises (SMEs) adopting environmentally sustainable practices should not be underestimated. In 2000 – 01 there were 1,233,200 private sector small businesses (employing less than 20 people) in Australia. These small businesses employed 3.6 million people, 49% of all private sector employment. While individual SME energy use is low when compared to large industrial sites their combined consumption is significant. In addition the increase in SMEs, especially within the commercial sector, presents a significant projected growth in energy consumption.

There is significant scope for cost-effective energy efficiency improvements for SMEs. Energy consumption within SMEs is primarily driven by equipment selection and routine / operating practices. Energy has not traditionally been a key driver within SMEs due to the low price of supply resulting in low utility overheads relative to other costs. However technology advances and developments in design and operating practices over the past decade provide significant scope to advance energy efficiency. These measures combined can deliver over 50% savings across a range of business types.

A considered approach to energy efficiency can provide significant economic benefits to SMEs. Adopting simple measures and changes to operating practices can deliver immediate results without cost. While initial capital costs are often required to achieve substantial savings the investment has an inherent return. Payback periods can be further offset through consideration during initial design and equipment acquisition and life cycle replacement.

2.3.1 Key Opportunities:

Building Design
The building design stage presents significant scope for energy efficiency to be embedded in business operations. Commercial buildings especially provide opportunity to design building shells incorporating passive lighting, insulation and control of air flow. Structural design and use of appropriate building materials allow for efficient Heating Ventilation and Air conditioning (HVAC) and lighting, each significant areas of energy consumption within this sector. Additional costs to incorporate energy efficiency at the design stage can be effectively absorbed and can have dramatic effect on operating costs given long building lifecycles.

Tenant Fit Out
Installation of HVAC and lighting systems presents significant opportunities for energy efficiency. Careful design can reduce capital cost while providing for required performance or amenity. Efficiency measures when incorporated at initial installation stage can deliver over 50% savings in operating costs.

Equipment Acquisition / Replacement
Equipment acquisition presents an important opportunity to invest in energy efficiency. Understanding type, sizing and alternative approaches present a range of options when considering equipment acquisition. Technology improvements across common commercial and plant equipment provide effective efficiency increases with marginal cost increase. Understanding and incorporating operating costs into equipment acquisition will benefit energy efficiency. For example an average electric motor uses 50 times its purchase price in the cost of electrical energy over a 10–15 year life.

Replacement of equipment due to age or failure creates an opportunity to reassess type, sizing and alternative methods of delivering requirements. Over sizing is a common occurrence in plant equipment where 'rule of thumb' and 'fudge factor' dominate 'design for purpose'. SMEs in certain situations have greater flexibility to change equipment than larger companies due to the size and lifecycle of their capital investment.

Retrofit Existing equipment
Where new equipment acquisition is not feasible various retrofit techniques can deliver energy efficiency improvements on existing capital. For example voltage controllers deliver 20% savings on lighting costs for common fluorescent fittings, with a pay back of 1 year in standard business operations. Skilled retrofits have saved 70-90% of office and retail lighting energy while achieving more attractive and effective lighting of workstations[5]. A host of simple measures are readily available and applicable to a range of equipment with minimal disruption to business activity.

Operating Practices
Assessment of business process and operating routines can reveal potential efficiency improvements. Focussing on operating practices can reveal further cost savings opportunities due to materials wastage, idle equipment etc. Employee awareness and engagement on energy efficiency tends to identify further measures to be identified.

2.3.2 MEFL Programs

Given the diversity of small business and the range of issues they face MEFL has developed a series of approaches to assist with energy efficiency. Some examples are:

Business Energy Action
The Business Energy Action project was a groundbreaking approach to working with small and medium sized enterprises (SME) to reduce greenhouse gas emissions. The project directly engaged businesses across Melbourne's northern metropolitan region to increase understanding of their emissions and provide capacity to take practical action. The project involved delivering a series of training programs for business and local government representatives, conducting over 35 business energy audits and working with over 15 businesses to implement retrofit measures.

The project identified an average 15% savings potential which had paybacks under 3 years. 10% savings were implemented across 15 businesses resulting in over 80 Tonnes CO_2 reduction per annum. Business participation was increased due to the availability of 'dollar for dollar' funding, technical and project management assistance. The program has developed a series of training modules and common recommendations that aim to be replicable across other municipalities.

The projects were coordinated by the Moreland Energy Foundation and involve the municipalities of City of Darebin City of Whittlesea, Nillumbik Shire, Moreland City Council, Hume City Council and City of Banyule which form the Northern Alliance for Greenhouse Action (NAGA).

Foundry Project
Moreland has a considerable number of foundries, which are intensive energy users. MEFL provided the foundries with a series of workshops and onsite assistance to develop energy action plans. One of the foundries has already implemented measures which will result in savings of 36 tonnes of CO_2

[5] Lovins, A.B. & Hunter Lovins, L. (1997), Climate: Making Sense *and* Making Money, Rocky Mountain Institute

annually and they have committed to additional measures totaling between 88-120 tonnes $CO_2$of further emission reduction.

Bakery Program
Moreland is home to more than 80 bakeries and cake shops. Bakeries use a range of energy-intensive equipment to produce and display their goods, including ovens, provers, mixing equipment and refrigeration. The Commonwealth Government's Energy Efficiency Best Practice Program has completed a lot of work in this area and has identified that there are significant opportunities for energy savings within the baking industry. MEFL adopted this work and delivered it to bakeries in the region.

Traders Associations
Trader and Commerce Associations: In order to make contact with small businesses, MEFL has partnered with the associations in Moreland which represent these interests. These relationships have been essential to inform our understanding of the needs of small businesses when designing programs and services for this sector; it has also been critical to the successful promotion of what we have available.

2.3.4 Case Studies

Dairy Queen
The Dairy Queen ice-creamery and take-away café is successfully saving $1600 a year after taking action on energy consumption. Last year Moreland Energy Foundation worked with the Glenroy business to identify cost-effective ways of reducing a $12,000 a year power bill. MEFL found that 22% of the electricity bill was spent on running 4 separate drinks fridges, a kitchen fridge and a cool-room. A grant of $1,600 was made available under the NAGA-supported Business Energy Action program toward replacing these appliances with a new energy-efficient display fridge and cool-room. The measures more than halved the refrigeration consumption. A further $3000 savings can be made at Dairy Queen by converting their electric fryers (using up to 50% of their energy) to gas.

Sahara Pizza
An initial energy assessment found that nearly 40% of the Sahara restaurant's electricity use was in lighting, with 60% of this from halogen down lights. MEFL recommended changes to improve the quality of lighting in the café and reduce overall energy use from lighting.

The 50W halogen down lights throughout the café were replaced with new 35W OSRAM halogen down lights which output the same amount of light but provide 25% energy savings (including transformer costs). The fluorescent tubes were replaced with efficient 'quadphosphor' tubes which output around 20% more light than a standard fluorescent tube. The resulting extra illumination meant that the number of tubes in the café could be halved. The new tubes were also a different colour tone so they more closely matched the warm yellow tone of the halogen down lights.

As well as the changes to lighting, MEFL recommended switching some refrigeration units off overnight. As Sahara is on a peak only tariff, the savings from turning off just one soft drink fridge overnight add up to over $80 per year. This has been achieved by fitting an inexpensive timer switch which turns the fridge off at 11pm and back on again at 7am to ensure that drinks are cold in time for opening. Total expected savings from the changes are over 7 tonnes of CO_2 and over $630 per year which represents an 8% reduction in greenhouse gas emissions for Sahara Pizza.

2.4 Community organizations / entities

Scope

MEFL sees community organizations as being critical to any energy efficiency strategy as community entities such as schools, libraries and kindergartens are both reasonably large energy users and places where the community congregates. The educational process involved in transforming our society to a more energy efficient one places community entities in a unique position. They are often not well endowed financially, which means that savings on energy bills can provide real benefit to them.

2.4.1 Case studies

Greenhouse Countdown
Four primary schools in the Moreland municipality are currently competing for $1,500 worth of prizes in the *Greenhouse Countdown*, a program providing resources and inspiration to reduce their energy consumption and greenhouse gas emissions.

A pilot program and joint initiative of MEFL, North Coburg Football Club and Pacific Hydro, the first stage of the project is underway, with MEFL running energy assessments within the schools to identify where savings can be made.

By implementing simple changes all the schools in the *Greenhouse Countdown* will be able to save money and greenhouse emissions whilst students learn about energy use and conservation. The program is supported by a range of materials integrated into the curriculum for the remainder of the year.

The audits which MEFL has undertaken have revealed a disturbing trend – the poorest schools have the worst facilities with the highest costs. In general the schools emissions come from the following key sources:

* Refrigerated air-conditioning cooling systems are responsible for high summer electricity loads.
* Heating thermostats are often set too high and cooling settings (for both evaporative and air-conditioning) are set too low.
* Draughts are a considerable source of heat loss in winter and heat gain in summer.
* Many schools have superfluous hot water systems which are constantly on (even during holiday time) but rarely used.
* Many schools have refrigerators or freezers which are run constantly and under-utilised.
* Lights and heating are often on when not needed, such as on bright days or in unused spaces.

Kinda Cooling
The Kinda Cooling Project was shortlisted for a United Nations Association World Environment Day Award 2003. MEFL responded to a request from the Brunswick Kindergarten to find solutions to a summer heat problem, without the use of air conditioning. We provided them with expert advice and a passive cooling plan, and then assisted them to raise the funds to implement the plan. The fundraising initiative itself worked towards emission reduction, through selling compact fluorescent globes in a “chocolate drive” fashion.

The fundraising drive successfully raised the required funds and the passive cooling measures have been implemented. Staff and parents report that the building is now very comfortable in hot weather. Not only has the project resulted in improved amenity for the children, it is also raising awareness of passive cooling solutions amongst the families whose children attend.

MEFL is now extending this project to other kindergartens in Moreland.

\What effect would cost effective energy efficiency improvements have on greenhouse gas emissions? What other environmental benefits would result from cost effective energy efficiency improvements? What is the likely impact of the "rebound effect" on these benefits? What would be the private and social costs of achieving these benefits?

2.5 Environmental effects of energy efficiency

2.5.1 Effect on Greenhouse Gas Emissions

Australia has adopted a short-term target of modest real emission increases by 2008-12 over 1990 levels equivalent to that agreed in the Kyoto Protocol. It is acknowledged that in the long term major global emissions reductions of 50-60% by 2050 are needed.[6] Australia has been able to meet the 108% Kyoto target via reduction in land clearing however projected emissions from the energy sector are set to increase some 40% over 1990 levels. Beyond Kyoto most emission reductions will have to come from fossil fuel use.

Energy efficiency has a key role to play in reducing emissions from the energy sector, with the stationary energy sector responsible for around 50% of total emissions. In a business as usual scenario energy demand is projected to grow by 57% between 2001 and 2040[7]. Economic modeling under the National Framework for Energy Efficiency has shown that 50% uptake of low energy efficiency improvements over a 12 year period can deliver 9% reduction in emissions from stationary energy sector equivalent to 32 MT CO_2. Medium energy efficiency scenario achieved through the widespread implementation of cost effective energy efficiency demonstrates that energy demand can be contained to 25% increase between 2001 - 2040[8]. Energy efficiency is fundamental component to the effective transition to a clean energy sources.

2.5.2 Other Environmental Benefits

Air Pollution
Energy efficiency measures that impact fossil fuel use will directly reduce or offset other associated pollution created by their combustion. Increased fuel efficiency in both transport and stationary energy use will mitigate particulate, NO_x, SO_x and other forms of pollution.

Resource Conservation
Energy efficiency has direct and indirect effects on efficiency of resources use. Reduction of energy wastage for example in processing industries is commonly interlinked with reduction in materials wastage. Resource efficiency conserves limited resources and avoids waste management and landfill issues associated with disposal.

CFC / HFC Emissions
Refrigeration has a twofold impact on global warming; energy consumption and emissions arising from CFC and HFC refrigerant and insulation. The international response to the impacts of CFCs on the Ozone Layer has seen an effective transition away from CFC use in refrigeration through policy and regulation. However the main replacement refrigerant promoted, Hydro fluorocarbons (HFCs) remains a significant global warming agent. 1 kg of HFC has a global warming potential (GWP) equivalent to

[6] Media Release, Minister for the Environment and Heritage, Senator the Hon. Ian Campbell, 2 September 2004, http://www.deh.gov.au/minister/env/2004/mr02sep204.html
[7] Energy Strategies Pty Ltd, A Clean Energy Future for Australia prepared for the Clean Energy Future Group
[8] ibid

1300 kg of CO_2. HFCs are used extensively with the average household fridge containing 200g as a refrigerant and a further 500g contained internally in foam insulation. Existing CFC and HFC content present serious issues from leakage arising from operation and disposal.

Natural refrigerants are an emerging alternative to traditional use of CFC and HFC refrigerants in closed cycle domestic and commercial cabinet applications. In addition to avoiding emissions impacts, natural refrigerants have a very low greenhouse potential and higher heat transfer properties that provide significant energy efficiency improvements of between 10 – 30%.

The Phoenix Fridge Program initiated by MEFL aims to collect under used fridges and retrofit them to provide an affordable and energy efficient product to low income households. The program is being developed in partnership with the Brotherhood of St Laurence, St Vincent de Paul, the Electrical Trades Union and RMIT TAFE. A pilot scheme is presently trialling hydrocarbon refrigerant as a 'drop in' replacement for CFC and HFC based refrigerants. There is significant potential to apply natural refrigerants to domestic and commercial refrigeration and air conditioning in both the production of new units and the retrofitting existing units.

Saving Water Saves Energy
Installing flow restrictors in household showers has a significant impact on both water and energy consumption. A flow restrictor installed in an house with gas water heating saves 50,000 Litres of water per year and 0.5 Tonnes of CO_2; installed in a house with off peak electric water heating saves 2.3 Tonnes of CO_2.

2.5.3 Rebound Effect

Our experience working with the Moreland community tells us that, whilst the rebound effect exists, it is not a major issue. A key component of minimising rebound is education, so that people see energy efficiency in the context of the need to reduce energy use overall. This issue is discussed in more detail later in the submission.

2.5.4 Private & Social Costs

Energy efficiency fundamentally provides the same function or service while reducing or substituting energy consumed. Where cost effective measures are applied there are minimal private or social costs. Energy efficiency broadly brings direct personal benefit through lower economic costs. Domestic and commercial buildings designed for energy efficiency are a common example of provide greater amenity and comfort for occupants while reducing operating costs.

Energy efficiency has direct private and social benefits through reduction of greenhouse gas emissions and conservation of finite resources. The social cost of not taking action on climate change is considerable due to a variety of impacts such as increased drought and extreme weather events. Energy efficiency can in turn mitigate the impact of rising fuel costs, especially oil, on private spending and macroeconomic activity.

3. Are there barriers and impediments to improving energy efficiency?

What are the barriers and impediments to energy efficiency in the market for energy? What impact do these barriers and impediments have on energy efficiency?

3.1 Key issues and barriers to households practicing energy conservation and efficiency

Poor household design
It is our experience that a key issue leading to high (and growing) levels of household energy use is poor design, leading to uncomfortable homes. The average Victorian home built prior to July 2004 has an energy efficiency rating of 2.2 stars under the current rating system (Pears, 2003; SEAV, 2002). The Victorian Government has started to address design issues through the implementation of mandatory energy ratings for new houses from July 2004. This has been picked up in the NFEE, which also proposes to extend to major renovations. As most houses are here already, a major challenge is stimulating the community to retrofit.

Lack of regulation for major alteration market
MEFL has been advocating for an extension of the mandatory energy ratings scheme to major alterations, which is by far the biggest area of building work for Victoria and particularly for Moreland. Major alterations (which in Moreland are typically the demolition of the lean-to kitchen / bathroom and replacement with an over-glazed, un-insulated box requiring significant heating and cooling to be comfortable) cost householders hundreds of thousands of dollars. This investment is currently being wasted in measures which increase energy use; with better design and reductions on glazing levels householders will enjoy significant benefits. However, the market does not direct them this way and we will continue to receive calls from householders distressed by how uncomfortable their very expensive extension is until this is addressed through regulation.

Expectations of comfort and how it is achieved
Coupled with poor house design, meaning the house is cold in winter and hot in summer, the community has higher expectations about what sort of comfort levels is “the norm”. With a low level of understanding of how buildings can achieve comfort through passive means (mainly because there are few examples and passive measures are often not easily identifiable anyway) and a high level of understanding that appliances can heat and cool, we see more appliance installation. For instance, 86% of new homes have central heating (Plumbing Industry Commission), a trend that would have been unthinkable a couple of decades ago. Jeff Washusen has undertaken a number of research projects which have uncovered the growth of domestic air conditioning and also that more energy intensive air conditioners are being installed.

Fashion and intermediaries
Another key issue for households is the impetus from third parties and / or fashion to implement measures which lock in high energy use. The “glass box extension” described above is part of a current fashion in architecture, where indoor and outdoor spaces blend in. People like the way it looks and don’t know how uncomfortable and impractical it is until the construction is complete. The difficulty of retrofitting (in terms of putting in curtains when windows extend to the ceiling and double glazing existing timber frames) makes big appliance installation necessary.

The rapid growth in halogen downlights is partly a fashion issue and partly an intermediary issue. People tell us they “like the look”, but they have no idea about their energy consumption, nor the negative impact they have on insulation and summer heat, until they are in place. Electrical contractors

are in favour of their use as they ensure a higher number of hours worked per job. People who are not sure what sort of lighting they should install are often encouraged to go for halogen downlights.

Lack of accreditation and standards

Households are frequently talked into high energy consumption appliances by companies and individuals which supply and fit them. For instance, MEFL has heard many stories from households which have been talked into fitting a much larger air conditioning unit than required. Further, the way heating and cooling appliances are installed leaves much to be desired. With so many houses getting central heating it is a real concern that there are no standards in place for installing systems and the companies which do the installation do not need any particular accreditation or training. Hence the high number of complaints we receive from households who are paying big energy bills but are still cold – only to find they are heating the side laneway or that the location of the thermostat is throwing their system into disarray.

The problem of insufficient Government controlled accreditation and standards is becoming more enhanced as interest in energy efficiency increases. While certain products (such as insulation and windows) make claims about their ratings, they are not required to advertise a rating made by an independent body. As new products come onto the market it is even more difficult for consumers to know whether they are getting a good energy deal or are buying something which will not live up to its promises.

Private rental market

Tenants in the private rental market experience a number of unique barriers. For instance, there are many rental properties where no heating is provided. For these tenants the only option is to run costly portable electric heaters, which are far less environmentally friendly than gas space heating. MEFL encourages tenants to make low cost measures, such as draught blocking and window coverings, to bring down their energy bills. However, measures such as installation or replacement of a heater or hot water service are out of the tenants reach and few incentives are provided to landlords to do these measures.

MEFL welcomes the NFEE initiative of mandatory disclosure of energy ratings on lease or sale of properties as a means of educating the community about the strong link between the building and the energy it consumes. However, to be effective for tenants (who are not going to make major changes to heating, cooling and lighting systems), it is critical that the energy rating program include wired in appliances. Further, that the tenants be provided with the detailed report which outlines how the energy rating was achieved, to prevent landlords fitting out temporary measures for the purpose of achieving a better rating.

3.2 Key issues and barriers to small and medium sized business

General neglect of sector

Small businesses have long been neglected in energy efficiency programs at the State and Commonwealth government levels for a number of reasons. These reasons include difficulties in accessing small business owners, communication with small businesses is resource-intensive, they have many competing priorities, limited resources (financial and human) and energy is often not a very significant component of their costs compared to labour, rent etc.

Similarly at the local government level, programs for small business have mainly focused on improving business profitability through such things as marketing, export development or e-commerce; or on environmental programs covering waste and water rather than energy efficiency.

The impact of SME's adopting environmentally sustainable practices should not be underestimated. In 2000 – 01 there were 1,233,200 private sector small businesses (employing less than 20- people). These small businesses employed 3.6 million people, 49% of all private sector employment (ABS – 2002). Therefore a genuine approach to business sustainability must involve small business.

Financial commitment

Upfront Costs

The initial investment in energy saving capital can be prohibitive. While common retrofit measures can have reasonable payback periods of less than 3 years small business are subject to cash flow issues surrounding initial outlay.

For example: Retrofitting fluorescent lighting in a newsagency can reduce their energy use by 20% and provide a payback within 2 years. However the upfront cost of over $2,000 can be prohibitive to the business.

Low Cost Low Return

Measures which are cost effective do not generally deliver significant energy reductions. Our experience with the application of various measures has shown that up to 10% increase in efficiency can be achieved with a return less than 2 years. However to get beyond 10% reductions requires significantly longer return which is prohibitive especially to small business. As a result measures regularly presented to business fall below measures required for targets set by local and state governments.

High Cost Low Return

Certain measures such as upgrading or replacement of refrigeration and air-conditioning systems can deliver energy efficiency increases though incur significant costs. The payback period for these items, often over 10 years, is prohibitive and meaning action can only be taken when equipment needs to be replaced for other reasons.

Cost of Electricity

For some small businesses electricity is a small percentage of overall business costs hence the incentive to adopt energy efficiency is considered low. A higher electricity supply price in the future will increase costs to small business though can be directly offset by adopting energy efficiency measures.

Equipment Issues

Significant barriers arise with certain types of equipment used by small business. While lighting presents good potential retrofitting, other equipment such as refrigeration, air-conditioning and heating can prove hard to retrofit existing equipment. The only solution in some instances is to replace, raising financial issues raised above.

Building Issues

Building issues vary significantly depending on business size, type and occupancy situation.

Rental Lease
There are natural restrictions on the ability of tenants to make significant adjustments their rented space. Further potential barriers to efficiency occur when the cost of infrastructure eg. Heating / cooling may be covered by the land lord / lady while the operating cost eg. Electricity and gas is incurred by the tenant.

New Buildings and Planning Permit Applications
Present planning processes do not compel new businesses to invest in energy efficient equipment, lighting for retail and office etc.

Time / Routine
Small businesses usually have significant constraints upon time. To implement energy efficiency measures often requires staff to commit time outside of routine tasks. In many cases this presents a significant impediment to business involvement. Some behaviour / operational changes require extra time or a change in routine and are not adopted unless the business is highly motivated. An example is changing the time of day when a cool room is restocked.

Awareness
Public awareness of energy use and its impacts remains a barrier to change. Research of business attitudes undertaken by MEFL showed that 97% had an awareness of global warming. However even amongst the businesses who rated environment as important, almost half did not know what they could do to reduce their greenhouse gas emissions (Strahan, 2002).

Motivation
Motivation to take action on energy use remains a difficult area to measure. However businesses are generally interested in reducing overheads. 60% of businesses surveyed in 2003 in Moreland had attempted to cut down their energy use in the previous 6 months. Nine out of ten business people said that if they were aware of ideas to reduce energy consumption they would try to implement them.

Information
There is generally a lack of information available for small to medium sized businesses on this topic. Indeed the information sheets and training programs which MEFL has developed are the only ones of their kind which we are aware of.

3.3 Key issues and barriers to community entities practicing energy conservation and efficiency

Funding shortages
A key barrier to community entities practicing energy efficiency is a shortage of funding available for them to implement retrofits and replace inefficient equipment. Currently the only funding we are aware of is the Solar Innovations funding through SEAV. This is supposed to be for innovation, not for the multitude of measures which are old technology but still very worthwhile implementing. Further, it requires a 50% contribution of funding from the entity making the application. Therefore it is a program which will be well suited to some areas but not broad enough to provide for all needs.

Given that many are reliant upon chasing grant funding and raising additional funds through their own supporters, providing cash incentives is an important way of getting them to turn their minds to the issue. For instance, MEFL is currently running a number of projects with community entities. We

were successful in recruiting four schools to our Greenhouse Countdown competition in a very short time period, due to our ability to offer cash prizes for the schools which made the most progress in reducing their emissions.

Time shortages
Community organizations often have a large workload, covered partially or wholly by volunteers. They may recognize the need to take action but simply do not have the capacity to do so themselves. Where they have conflicting priorities, they can be difficult to engage on sustainability issues (unless there are incentives and support available).

Perceptions of safety
Where children are concerned, there is an increasing view within the community that it is unsafe or unhealthy to experience excessive heat or cold. As a result, schools, kindergartens and child care centres are under pressure from parents to install air conditioning. There are now an increasing number of air conditioners in place in Victorian schools, putting school budgets under pressure and emitting high levels of greenhouse emissions.

Lack of coordinated approach
One feedback MEFL receives from schools is their confusion at the number of different approaches and initiatives underway which relate to sustainability. While innovation is good and different approaches are needed for different situations, it would be much easier for schools if all the sustainability initiatives came under one Government umbrella, linked to a State level strategy and policy. While there are lots of programs available for schools, there isn't much available which focuses on energy and there are no resources available to help schools drive energy efficiency on the ground.

Lack of standards for new buildings
There are currently a number of schools and community buildings about to be constructed in Moreland which do not meet the same energy standards which households have to meet. This is a wasted opportunity to provide comfortable, low running cost buildings for the community. We would hope that this policy gap will be addressed through the NFEE Government energy efficiency package, although we note that standards for new buildings are not mentioned.

Split incentive for energy efficiency retrofits
The ownership and management arrangements of community buildings are very diverse and often complex. However, it is frequently the case that community organizations are housed in buildings which they do not own. Therefore they suffer from a lack of incentive for the building owner to make energy efficiency retrofits, as the community organization will get the financial benefit from savings on the bills while the upfront costs are borne by the owner.

To what extent do market failures create barriers and impediments to energy efficiency improvements? Do these barriers and impediments warrant government intervention? What are the costs and benefits of government intervention to address market failures?

3.4 Market structure

Rather than seeing natural monopolies as being the cause of barriers to energy efficiency, MEFL would contend that the break up of the electricity industry has led to a shift away from demand management approaches which were part of the brief of the SEC and Local Government based energy retailers such

as the Brunswick Electricity Supply Department. Market failure with regards to energy efficiency occurs at a number of levels within the electricity market.

Generators key interest is seeing constant sales of electricity in base load, and for those generators which have been installed to meet peak demands, their ability to generate revenue is entirely dependant upon hot summer days where air conditioning use peaks. Since the peak shortages of a few years ago, electricity retailers have increasingly become involved in generation as a means of hedging their risk. This again complicates the market structure and, for retailers who have made investment in generation, reduces the potential for energy efficiency.

Distributors generate profit through developing their infrastructure and therefore have had a direct interest in seeing electricity sales increase, particularly at peak times. While least cost planning should occur through the requirement for distribution businesses to go to tender for demand side management when considering network augmentation, the reality is that there has never been a successful demand side bid put forward and implemented. A specific requirement in the Electricity Distribution Codes would underline the importance of least cost planning, but it does appear that the issue is more complex than this and needs more specific investigation.[9]

Electricity retailers generate profits through selling more electricity and as businesses, have focused their attention on generating electricity sales over and above the provision of *energy services* (which includes energy efficiency and demand management). Retailers participated in the creation of the summer peak shortages through the provision of interest free loans for air conditioning.

3.5 Information failures

A critical issue to understanding the level of information failure with regard to energy is the multitude of decisions market participants make every day which impact upon the nature of their consumption. Just over breakfast everyone makes numerous energy related decisions – whether to have toast or cereal, whether to boil the water in the electric jug or on the stove top, whether to listen to the radio or read the paper, whether to put the heater on or a dressing gown – the list goes on and on. Since energy use is predominantly linked to achieving an outcome – to be fed, to be warm etc – addressing the information needs of people in relation to energy means communicating with them about these outcomes.

Given that energy decisions are many and around a multitude of issues, one needs to look at the "big ticket items" or the best opportunities to provide information. Some of these are reviewed below.

3.5.1 Information to influence buyer behaviour.

Purchasing decisions provide a good opportunity to make energy efficient decisions. The type of information and where it should come from is dependant upon the nature of the decision. An example of a successful information approach is the star energy rating labels on major electrical appliances, because it is consistent and in full view of people choosing appliances. The main disadvantage of this program is that it does not apply to all appliances and there is a definite need to expand it, as well as to explore what the participants of the Community EmPOWERment project recommended which involves providing information on the running costs.[10]

Given the poor state in energy efficiency terms of our existing housing and commercial building stock, providing information to build energy into building purchasing decisions is a positive initiative. This is

[9] Institute for Sustainable Futures, Community EmPOWERment Final Research Report, 2004, p 108

[10] ibid, p 106

a key aspect of the NFEE measures. To make this work effectively, it is important that the implementation is robust through providing reports which outline for the purchaser how the energy rating has been achieved, as well as including major appliances in the energy rating.

One area where there is a complete lack of energy related information to guide purchasing decisions is for commercial equipment. There is a strong need to enforce better energy operating standards for equipment through MEPS, as well as to provide information on key industrial and commercial products such as refrigerators, motors and compressed air. Design and sizing of industrial and commercial equipment relies heavily on industry 'rules of thumb' that fails to employ lifecycle costing. Equipment acquisition decisions are generally made without awareness of operating costs. Information, standards and labeling can greatly influence buyer behaviour.

3.5.2 Information to influence overall household and business management

For most households and business the key source of information on their energy consumption comes from their bill, which means they get feedback on past actions up to three months since the action occurred. The bill also lacks information linking energy used with the source of its use, unless the household has an off peak electric water heater (where this is the only item clearly singled out on the bill). This makes bill feedback a insufficient tool to achieve a demand management response. The Community EmPOWERment project found that households would welcome more instantaneous feedback from their meter [11], which would be one of the benefits of interval metering if the meter installed was accessible and had an easy to understand display. Better metering would enable an active management approach to energy consumption.

Interval metering roll out is expensive but is more cost effective when done in a concerted jurisdiction based approach. The benefits are potentially large, including the capacity to change cost structures for energy and to open up the capacity for implementation of other technical approaches, such as remote control of air conditioning.

3.5.3 Rectifying the impact of poor information

A key concern of MEFL is the amount of wrong and flawed information which consumers use to make energy inefficient decisions. Some examples of this include:

- Halogen downlights are energy efficient
- A bigger air conditioning or central heating system will use less energy because it doesn't have to work as hard
- Electricity is a more efficient cooking source than gas

This type of information failure is best overcome by putting in place standards for installation of major appliances (such as heating and air conditioning systems) and driving market transformation through implementing programs such as a Green Electricians post trade training for electrical contractors. The role of Government should be to set and administer the standards and provide accreditation programs and there are obviously costs attached to this. However, we believe these roles are critical in a market based economy to support the consumer and the benefits attached to ensuring better outcomes for the individual as well as reducing the stress on our energy systems would well outweigh the cost.

[11] ibid, p 97

3.5.4 Targeted information

A survey of business in 1999 suggests that small business prefer practical assistance measures ahead of newsletters and web information. While expansion of information available to business should continue it should be directly applicable and in combination with an implementation strategy. Resources need to be made available to assist organizations which work with businesses (such as Traders Associations), and Local Government and community organisations to coordinate business energy programs on the ground.

Similarly households value information which is specific to their needs and homogenous information is often limited in use to anyone, given how individualized the consumption of energy is. A successful strategy which MEFL has implemented is compiling information kits for the following groups:

- Renovators
- Renters / people on low incomes
- Families with new babies

These kits are well sought after as they provide information relevant to the reader and are written in a way that makes contact with the reader.

To what extent do organizational structures create barriers and impediments to cost-effective energy efficiency improvements? Do these barriers and impediments warrant government intervention? What are the costs and benefits of government intervention to address organizational structures?

See sections 3.2 and 4.4

To what extent do behavioural norms create barriers and impediments to cost effective energy efficiency improvements? Do these barriers and impediments warrant government intervention? What are the costs and benefits of government intervention to address behavioural norms?

3.6 Behavioural norms

Behavioural norms do create barriers and impediments to cost effective energy efficiency improvements; however they are not the only barriers and impediments. As noted above, some of the behavioural norms experienced by small business include their time and routine. The Community EmPOWERment research describes in detail the social, cultural and economic factors which shape electricity use (see page 91 – 93), some of which are behavioural.

Behavioural norms can be impacted upon by Government intervention, and depending upon the behaviour a different form of intervention will be required. In general terms however, it is useful to look at the area of water and the dramatic changes which have occurred in behavioural norms due to the drought and the clear messages sent from Government that there is a problem which we all need to participate in resolving.

Energy needs a similar approach – Government statements about the need to reduce consumption and increase efficiency, the banning of unsustainable practices (such as hosing down concrete and watering lawns in the winter example), incentives in place to increase the uptake of more sustainable practices.

Regarding incentives for energy efficiency, one of the key advantages MEFL sees in incentives such as rebates is to provide people with an extra reason to make an energy efficiency purchase over another purchase. By providing encouragement to people to make energy efficient purchasing decisions, or to undertake energy efficient retrofits, we are both more likely to see those actions undertaken and create more awareness of energy efficient options. This is essential in an environment where energy is simply not 'top of mind' for most people.

4. Policy options for cost-effective energy efficiency improvements

4.1 Coordination

What are the costs and benefits of national coordination? What degree of national uniformity in energy efficiency programs is desirable? Does it differ for different programs?

Importantly, there must be a commitment to a broad based national energy efficiency policy as part of a climate response strategy. The following areas would be best coordinated at a national level:

- National Building Standards – energy efficiency ratings for the building shell for domestic and commercial buildings. These should benchmark the best state standards available, providing a timeframe within which other states need to reach that standard. It is probably not essential however for all states to use the same software to analyse ratings, so long as the approaches were all able to effectively perform the rating task.
- National Major Appliance Standards – energy efficiency ratings for domestic heating, cooling and hot water systems for new homes
- Mandatory Energy Performance Standards – for all domestic appliances and industrial and commercial equipment
- National accreditation standards for providers of energy efficient goods and services
- National standards for lighting, establishing a maximum wattage per square meter for all installations (including energy used by the ballast and globe)
- Require disclosure of energy performance of housing and commercial buildings on rent and sale of property. The approach should be nationally consistent in terms of requiring the building envelope and wired in appliances to be included in the rating. Inconsistency will be required to deal with climatic issues.
- Mandatory requirement for identified large energy users in the manufacturing sector to regularly audit their energy consumption, report on performance and undertake measures.
- National regulation of energy markets to prevent failure which impacts upon the environment. This includes providing real imperatives to exercise demand management in parts of the system which are nearing capacity.
- Fuel poverty elimination commitment, with alignment of a range of programs and implementation of specific policies to meet this goal.
- Energy intermediary / energy service market development. Commitment to a new program which provides resources towards and develops policies for the development of the Australian economy to encompass the services and products which are required to ensure take up of energy efficiency on the ground.
- Testing and labeling products available on the market in terms of their energy consumption, including their standby energy consumption. This includes new products which are emerging all the time in response to consumer demand or innovation.
- Taxation reform to impact upon landlords and their retrofitting of rental accommodation.

In terms of the degree of national uniformity, many of the above would be successfully implemented in a uniform manner. Where local differentiation would be of benefit is around climatically impacted measures (for instance, the priorities to achieve an energy efficient home in a tropical climate are different from the Tasmanian climate). Ultimately, moving away from a uniform approach would need to be justified on the basis that it is necessary to improve energy efficiency.

What should be the NFEE's role? What institutional and administrative arrangements should underpin the NFEE?

The NFEE has been very important in driving an acknowledgement of the potential for energy efficiency and coming up with a broad package of measures which MEFL supports as being a good first step. Currently we would support the NFEE continuing to operate broadly as it has done so. However, it is now at the point of implementation of a multitude of measures and this is where it could stall or fall apart. To keep up the momentum and to ensure information flows out of the process, we believe the MCE should engage the jurisdictions to prioritise the roll out of this first stage, with a view to having made significant progress by the end of twelve months. The second tranche of the NFEE should be agreed to by the end of three years.

It is also important that the NFEE process be proactive in engaging with the community in terms of the detail of how things are to be implemented, as well as maintaining an information flow on the overall works program. Community organizations will be integral in ensuring that the process does not go off the rails and can also strengthen the package by ensuring well considered approaches. There should be resources available to support this input.

4.2 International comparisons

What factors should be taken into account in comparing Australian and international energy efficiency programs? What criteria should be used to compare the effectiveness and efficiency of international energy efficiency programs? How do Australian energy efficiency programs compare with specific overseas programs? What characteristics make specific programs more efficient and effective?

While it is important to understand the contextual history which has lead to different countries excelling in different areas of energy efficiency, we believe the view should be taken that Australia looks to international best practice in all elements of energy efficiency and then seeks to understand how well approaches would suit the Australian context.

Some of the highlights of approaches overseas from our perspective include:

- The Sacromento Municipality Utilities District (SMUD) in the US. They are implementing a wide range of innovative programs to reduce demand for electricity.
- Demand management funds in the US, such as the New York State Energy Research and Development Authority.
- The UK Government Energy Efficiency Commitment

For a SMUD to set up in Australia under the current market structure, a State Government would need to re-enter the market with a view to transformation. This does not look politically viable at present, but there is no doubt that much can be learned from SMUD in terms of their initiatives to deal with peak demand and overall energy efficiency. We would like to see SMUD reviewed by the Productivity Commission.

The demand management funds and UK Energy Efficiency Commitment have one thing in common which could be implemented in Australia – the creation of hypothecated funds to achieve sustainable energy improvements. Given the low cost of energy in Australia, it should certainly be achievable to take a modest amount of money from energy users (with exceptions based on social equity) and invest these funds in demand management measures including energy efficiency.

4.3 Pricing and the influence of market reforms

MEFL is concerned that the view put forward in the Issues Paper that "other things being equal, an increase in the price of energy can be expected to lead to a decrease in consumption, particularly over the medium to long term" is too simplistic.

This is because it:

- Doesn't address the difference in price elasticity per customer class. For instance, households with higher levels of discretionary income may simply absorb a price increase.
- Doesn't take into account the barriers to demand management that need to be overcome to avoid paying higher prices. For instance, a business may not be able to afford the upfront costs of replacing a major energy-using piece of equipment.
- Doesn't take into account tariff structures, where energy consumed is only one part of a bill. Currently low consuming energy users are disadvantaged in the market place by high set charges which are not based on consumption levels, such as service to property charges.
- Doesn't take into account issues of social equity. Low-income households are typically locked into energy inefficient housing with limited control over their major appliances. They frequently respond to price by rationing of energy usage, leading to loss of lifestyle and poor health.

We support increasing the cost of energy by reasonable and fair amounts, when the additional revenue raised is directed to demand management, energy efficiency programs and to socially beneficial programs to reduce the costs of energy for low income and disadvantaged households. This could be done through the establishment of a demand management fund and the creation of a fuel poverty alleviation strategy.

To what extent do current prices for energy accurately reflect the costs of supply, including externalities? What is the course and magnitude of the distortions? Can they be cost-effectively overcome? What effect does price uncertainty have on investment in energy efficient technologies?

The current prices for energy do not accurately reflect the costs of supply and certainly do not reflect the cost of a key externality, the impact upon the environment and the resultant impacts upon our economy. This situation seems to be worsening rather than improving – under Victorian full retail contestability, some retailers have developed tariff structures where the kilowatt hour cost of energy decreases the more energy you consume. Declining block tariff should be disallowed in the electricity market and more work should be done to look at the best way to establish inclining block tariffs.

Participants in the Community EmPOWERment project pointed to the high set service to property charges as being biased against low energy consumers. Again, these set charges have increased in recent years and are not based on time of use or level of consumption. Tariff structures needs to be reviewed to identify and eradicate in built biases towards higher consumption, such as declining block tariffs as usages increases and high set service to property charges.

In terms of the effect price uncertainty has on investment in energy efficiency, the complexity of price issues outlined above makes it difficult to be clear. However, one wonders whether householders

would be as enthusiastic about central refrigerative air conditioning systems if they knew they would have to pay the full cost of running them in future!

How have market reforms in the electricity and gas industries influenced economic efficiency? How have reforms influenced energy efficiency? How has energy market regulation influenced investment in energy efficient technologies?

See response to market structure section 3.4. Re how regulation has influenced investment in energy efficient technologies, it is clear from the large energy efficiency gap that regulation has not assisted with take up in this area.

What are the costs and benefits of demand management and time of day pricing? What influence would time of day pricing have on economic efficiency and energy efficiency?

MEFL considers demand management and time of day pricing to be particularly useful in terms of responding to the growth of summer peak demand. NEMMCO released its Statement of Opportunities (SOO) in July 2003, providing an assessment of the need for electricity generation capacity and demand outlook over the next 10 years. The SOO predicts that a NEM-wide shortfall of energy supply will occur onward from the summer of 2005/06. This is based on current supply and demand characteristics, which also predicted that it will be 2011 before peak winter demand eclipses supply.

The SOO states that this deficit is as a result of increases in peak summer demand particularly in NSW and QLD and primarily due to the rising use of air conditioning. The Electricity Supply Association of Australia has estimated that some **$30 billion** of electricity network and generation infrastructure will be required to meet this deficit.

Redirecting even part of $30 billion towards reducing summer peak demand through energy efficiency would have significant benefits for Australian society. Not only could these funds be spent in many better ways than in poles and wires, it is also necessary to recognize that increasing infrastructure to enable more energy consumption at peak times provides an impetus to the energy market to sell more electricity at other times of the year. The way the market operates has and will continue to have a direct impact on the uptake of energy efficiency and other demand side approaches.

The design of the energy market within Victoria shapes the behaviour of energy retailers and distributors towards selling more energy to maximize their profits. In fact, the reason we have seen such a broadscale move towards air conditioning in the residential and commercial sectors (as opposed to increased take up of passive cooling measures) is that customers have been given incentives to invest their funds in air conditioning.

Further, customers do not pay the true running costs of appliances such as air conditioners, giving them no incentive to manage their own demand. While customers running air conditioning units consume significant electricity, at times when the electricity price in the spot market is the highest, the structure of tariffs ensures that true costs of their consumption are placed across the entire NEM.

The types of measures which should be implemented to deal with peak demand issues include:

- regulating the capacity of domestic air conditioners – some air conditioners should simply not be allowed to be installed into houses

- installation of remote control technology to enable customers to be switched off for a short period of time each hour at peak times
- programs to encourage the increased take up of passive cooling measures such as efficient building design and retrofits
- increasing the efficiency of air conditioning systems through Minimum Energy Performance measures
- interval metering with time of use tariffs
- programs which retrofit existing air conditioning units to increase their efficiency

In terms of load shifting, we support the principle of large energy users being required to drop load or load shift during peak times to reduce pressure on the grid. However, we do not support contracts which provide for lower energy prices as a means of getting the support of businesses could have an overall negative impact on energy efficiency. Providing support for increasing energy efficiency as opposed to reducing energy prices would be the better policy option.

Regarding time of day (or time of use) pricing, this is seen to be a mechanism to correct current market distortion, ensuring that users that operate energy intensive appliances at peak times are responsible for funding the infrastructure upgrades to meet the growing peak demand. It is recognised that focusing on peak demand reductions will have minimal effect on net greenhouse gas reductions, however given that it is detracting from implementing tougher more robust demand management measures, that will result in significant energy savings the issue should be addressed.

Distinctions need to made about whether pricing will increase just at peak times (several days) or accompany an entire season (several months). TOD pricing reduces market distortions by removing information asymmetries enabling users to make informed decisions on the true costs of their actions. Pricing as an action alone has limitations and TOD pricing could further disadvantage low income customers. Therefore TOD pricing should be incorporated as part of a package that encompasses information campaigns and mandatory building and appliance standards, and programs to increase energy efficiency for disadvantaged customers.

The success of TOD requires:

- A large roll out of metering technology to make it economically feasible
- Meters which enable householders and businesses to obtain information in a straightforward manner.
- Mandated time of use tariffs with appropriate information available to the end-user
- Social obligations must be put in place to ensure people who need to use lots of peak electricity due to health or who live in poor quality housing are not disadvantaged
- Remote control technology that enables loads to be reduced at high peak times
- Incentives in place for customers to allow their appliances to be controlled externally

What impediments are there to introducing cost reflective pricing for distribution and transmission networks? What would be the cost and benefits? How would a more cost reflective approach influence distributed generation and other demand management approaches? What effect would distributed generation have on energy efficiency?

A key impediment to introducing cost reflective pricing is how this would be perceived by opinion sensitive decision makers and the community, particularly those who use excessive amounts of energy. This is particularly an issue when the community is not being adequately informed by decision makers

of the links between energy use and climate change and therefore not understanding why changes are necessary. To use the water example again, the Victorian Government has managed to implement a program of major reform, including the potential of higher water bills for big water users, with no backlash experienced. It is well recognized that change needs to occur.

Another issue is the lack of willingness on the behalf of retailers to innovate along these lines. For instance, Powercorp is currently charging retailers for distribution based on a time of use tariff. Rather than passing these costs on directly to customers, the retailers are smearing the costs across all customers.

In terms of distributed generation, it does appear that renewable energy could become more viable under a cost reflective pricing regime, if it became in the interests of communities located distant from the major sources of generation to generate power closer to home. It would also appear that energy efficiency would be viable too if it was clear that energy costs could be avoided. However, it is not clear what other barriers would exist to this occurring and it may well be the case that just implementing cost reflective pricing would not provide the desired outcome.

4.4 Information provision

What is the rationale for government involvement in firms' internal and external capital markets? What influence would mandatory reporting of energy efficiency have on access to capital and managements' willingness to invest in energy efficiency?

Most of Australia's energy is used by a small number of corporations. It is obvious that targeting these players has great potential to reap results with a minimum amount of resources. With the interest from the community (an increasing proportion of which have become shareholders) in sustainable development, using annual reports as a means of keeping a check and balance on major companies seems to be a good approach. It can be assumed that management will be focused on not having an embarrassing result published at the end of the financial year! Of course more needs to occur – such a program needs to be implemented in such a way as to drive the enthusiasm for the companies targeted to maximize their efficiency and they need to be given top quality energy audits which push the envelope on identifying areas where improvements could occur.

Case Study on Energy Auditing

Whilst MEFL was engaged with a recent staff development project with a large industrial manufacturing firm, several unexplored energy efficiency opportunities became apparent. This was not an unusual situation, except that it became clear that the company had already engaged an energy consultant who had audited the operations and implemented some large energy efficiency initiatives.

The initiatives that were already in place were large scale. These were the sort of initiatives that would require some investment, but would streamline production processes and result in a large and profitable return on that investment. These are sort of efficiency processes energy efficiency practitioners refer to as 'low hanging fruit', being the easiest to harvest and typically having a pay back period of less than two years.

Despite these excellent initiatives there were other opportunities that had not yet been realised and yet would result in long term energy savings, with a pay back period of under two years;

Compressed Air: Leaks to the compressed air system are presently only repaired if a system pressure drop of over 30% occurred.

HVAC: Staff identified that the heating and cooling systems in administrative offices were operating concurrently. Ie the systems were on concurrently and competing against each other.

Lighting: Several thousand halogen downlights remain left on after office hours.

The notion that 'we've already done that energy efficiency stuff' was clear, despite profitable opportunities still being available.

What is the rationale for government involvement in education and awareness raising? What are the costs and benefits?

As discussed earlier, getting people focused on reducing their energy use requires clear messages from Government about the need to use energy in a sustainable way. These types of messages should be conveyed in broad based media campaigns. However, this should not be the extent of education approaches. The Community EmPOWERment project identified a raft of areas where community energy knowledge is low (see pages 96-97). Other education approaches include:

- Advertising around specific government initiatives – for instance, increasing awareness of how the star energy rating scheme works; explaining mandatory building energy rating schemes
- Focus on schools as a means of driving a new generation of people who use energy more sustainably, as well as showcasing to the community how energy efficiency works in practice. The money which could be invested in retrofits and curriculum development would be offset by decreases in school energy expenditure
- Post trade training for electrical contractors, with a view to expanding training throughout trade types and levels
- Innovative, community based education approaches, such as the work of MEFL and CERES. With our projects we can demonstrate that a modest level of funding brings in much more resource through the engagement of volunteers and partners.

What is the rationale for government involvement in labeling? What are the costs and benefits of voluntary and compulsory schemes?

As discussed above, labeling is a very important way of helping consumers understand the energy implications of their purchasing decisions. People do look at the star rating labels when choosing appliances covered by this program. Compulsory schemes are better than voluntary ones as they ensure all the competing products are covered in one program. Voluntary programs (particularly those set up by industry bodies) can also disappear once political pressure has been removed, instead of going through an evolutionary process where the labeling criteria becomes stronger over time.

What are the benefits and costs of minimum energy efficiency standards? How should the level of minimum standards be set? What impact do minimum standards have on energy efficiency? What impact do minimum standards have on competition and economic efficiency? What impact do minimum standards have on consumer choice and the prices of appliances? What is the rationale for government involvement in minimum energy efficiency standards?

MEPS are a generally well regarded tool in terms of driving energy efficiency. Given that it is very difficult to consumers to make well informed energy purchasing decisions at all times, simply taking the worst appliances off the shelves is important. Indeed, MEPS have played an important role in getting manufacturers to look to improving the energy efficiency of their products, rather than simply

churning out energy hogs. Removing the choice of purchasing appliances and equipment which do not meet community expectations of efficiency takes away the need to educate consumers to influence their choices.

A key area of concern identified by participants in the Community EmPOWERment project and well supported by our ongoing work with householders, is the lack of controls over portable electric heaters and it is a failing of the MEPS program that such a large household energy consuming appliance is not part of the program. The report explains this as being because electricity conversion efficiencies are close to 100% and space heating requirements differ. However, because of the proliferation of these heating devices in households, particularly low income households without access to gas heating, it is advanced that a MEPS should be developed along the lines of how efficient they are in heating a room.[12]

4.5 Incentives to develop and adopt new technologies

New technologies / R&D

When looking at the technological capacity of energy efficiency, it is true that new products and different versions of the same product are arriving onto the market. For instance, MEFL has been involved with trialing a number of new initiatives including:

- Reflective paint
- Shading devices
- Insulation
- Heating appliances

We have also successfully developed the Phoenix Fridge program, which takes old refrigerators and retrofits them to make them more energy efficient. This program is currently in a pilot phase and we expect it to be expanded under the auspices of the Brotherhood of St Laurence next year.

Some key issues to make around this topic are:

- The lack of an energy services industry is an impediment to the commercialization of energy efficiency R&D. People who put the time and resources into developing energy efficient products often find themselves alone with a product that needs to be marketed and that may suit a particular aspect of the market which they don't have the ability to reach.
- The lack of accreditation of products makes it difficult to assess whether new products meet the claims of the developers and where they are best applied. This has been a trying issue for MEFL, as we want to support innovation and have the capacity to increase take up on the ground, but are concerned about promoting products which do not live up to expectations.
- While there is a great focus on developing new things, the issue of retrofitting what we have currently is generally ignored. The Phoenix Fridge concept could be applied to other household and commercial products such as air conditioners.

Regarding the energy services sector, Mark Ellis and Associates (2002) have estimated that the Victorian sustainable energy industry directly employed over 5,200 full-time equivalent staff in 2001/02, and it is estimated to stimulate a total of between 11,900 and 18,300 jobs throughout the

[12] ibid, p 106

State. Approximately 90% of jobs are created by the energy efficiency sector in Victoria. The remaining 10% are created by the renewable energy industry. Government has provided some support for the development of the renewable energy industry and this is commendable. However, comparatively little emphasis has been placed on the development of the energy efficiency industry.

4.6 Financial incentives

What is the rationale for financial incentives to improve energy efficiency in the energy supply market and the market for energy efficiency products? What are the costs and benefits of financial incentives? How should such incentives be structured?

As noted above, financial incentives are an important component in the energy efficiency policy mix, serving to both increase the uptake of energy efficiency and spreading awareness of what good energy behaviour consists of. There are three key areas where MEFL has identified financial incentives should be applied:

4.6.1 Incentives and Rebates for Households

MEFL would support the implementation of rebates for energy efficiency, focusing on the wide range of measures which improve the thermal performance of homes. Such a rebate program would help educate households about the potential to improve comfort without increasing bills and demonstrate what the government believes is socially desirable behaviour. In a similar way to the rebates provided for water measures, rebates for energy efficiency would provide important psychological and practical support for taking these actions.

The types of measures where rebates would apply include:

- Insulation
- Double glazing
- Draught proofing
- Installing external blinds
- Replacing ceiling fans with self sealing ceiling fans

Insulating a home can save between 45 – 55% of heating and cooling energy (SEAV, 2002). Installation of double glazing can result in between a 45% (for heating) and 60 % (for cooling) improvement in performance in comparison to clear single glazed aluminium windows (SEAV, 2002)

External blinds are an energy free way of keeping houses cool in summer. With the concern that increasing use of energy hungry air conditioning is leading to potential energy shortages during summer, a focus by Government on increasing the uptake of external blinds is essential.

The type of rebate program recommended would provide the following social benefits:

- Increase the uptake of low cost measures – such as installation of draught blockers – in rental and low income households
- Encourage renovators to upgrade their dwellings along energy efficiency lines. For instance, a household installing new windows would be given more reason to choose double glazed and home owners in the process of re-stumping would be more likely to install floor installation.
- Greater uptake of energy efficiency measures would grow the industry providing these products and services.

It should be noted that the participants in the Community EmPOWERment project endorsed rebates and incentives as their most popular policy option (see page 99). The research did conclude however that more research was required to identify the optimal level of rebates and who should be eligible.

4.6.2 Incentives for Small Business

Costs of measures are the key barrier to uptake of energy efficiency in small business. At present there is a scarcity of financial schemes that encourage or assist practical retrofitting of businesses.

> 43.9% of Moreland business expressed interest in zero and low interest loans to finance
> 58.4% of Moreland business said they would apply for grants if available
> (Strahan Research 2003)

The Business Energy Action program as described above proved that where funding was available, businesses were more likely to engage in energy efficiency programs. The BEA demonstrated the viability of local government and community groups administering funding to small business made available on a dollar for dollar basis. State government funding of such a scheme could deliver significant practical uptake by small business.

4.6.3 Incentives for community organisations

MEFL would support the establishment of a fund for incentives for community entities and organizations to implement energy efficiency retrofits and equipment replacement. Ideally this fund would be accessed by community and local organizations to coordinate the efforts to get the money into the organizations and ensure that the measures being part funded were going to result in emission reduction.

Additionally, MEFL would support the establishment of a schools energy management policy and program. This would involve providing financial assistance to schools for the implementation of energy efficiency retrofits and equipment purchases. Savings on energy bills would be kept by the schools for the purposes of funding further energy efficiency measures and the purchase of Green Power. Schools would also be able to access support in identifying what measures they need to undertake to reduce energy, both behavioural and structural. This would either be provided by the State Government directly, or funded by the State Government and provided by community organizations and local government.

4.7 Levies

As noted above, MEFL supports the creation of a demand management fund or funds, through the application of a levy on energy consumers, linked to consumption levels but also making allowances for social equity. Hypothecating a fund in this way is positive as it:

- Sends a signal to energy users that demand management in its broadest sense is a priority for the community
- Creates a source of income to undertake much needed demand management work
- Is fair in that bigger energy consumers pay more than small energy consumers

It could also be possible to build in additional incentives for companies to act to reduce their energy consumption, by reducing the burden from those who have taken action under their own initiative.

The demand management funds in the US are capable of undertaking very ambitious energy efficiency and demand management work, because they have a real budget to work with.

MEFL would also be keen to see some of the funds allocated directly to the alleviation of fuel poverty through programs which target low income and disadvantaged households.

4.8 A national energy efficiency target

As outlined above, MEFL supports the setting of an energy efficiency target as part of an overall target for reducing greenhouse emissions. This would require developing targets for other greenhouse emitting sectors as well; however it is clear that using less energy would be a key component of a strategy to mitigate climate change and therefore one would expect the energy efficiency target to reasonably high.

In terms of the energy efficiency target, setting one at a Commonwealth level shows a clear political determination to make progress on this issue. It also provides Australian society with a means of tracking progress, and a goal which policies and programs should be aimed at meeting.

Some of the issues relating to the target are:

Limitation of the return on investment criteria as an indicator of economic potential. This reduces the scope of what is considered economic potential as it looks at it from an individual perspective rather than a social perspective. There are many energy efficiency and demand management initiatives which have longer pay back periods (such as cogeneration), but where the social benefit is very large. A longer pay back period can also be in the best interests of the individual where the measures taken result in lower life cycle costs. Finally, return on investment is often applied inappropriately to householders. Not only do householders tend not to consider pay back periods when making purchasing decisions, applying ROI to the increased cost of building an energy efficient home doesn't recognize that from a householder perspective their concern will be about their housekeeping. This means looking at their mortgage repayments and energy bills, not how many years of savings on the energy bills will be required to cover the additional up front costs.

Technological advancement – technical capacity has a tendency to increase in ways unknown at the time of setting targets (based on current technical capacity). Targets have to be able to adjust with advancement.

Difficulty of measuring efficiency. It is much easier to measure the amount of energy consumed and set a target for reducing consumption, with energy efficiency playing a major role within this.

In terms of the idea of White Certificate scheme, a key problem with being able to assess this idea is the difficulty of coming to grips with how it will operate in actuality and what the other options may be. Certainly there are issues with how you prove efficiency gains to get certificates and the transaction costs involved with this process.

5. Sectoral Issues

Please note that we have covered sectoral issues throughout the submission and therefore will not be responding to the questions in this section.