



Australian Government

Department of the Environment and Heritage

**SUBMISSION TO THE PRODUCTIVITY
COMMISSION INQUIRY INTO ENERGY
EFFICIENCY**

November 2004

Department of the Environment and Heritage Submission to the Productivity Commission Inquiry into Energy Efficiency

Key Points

- There are significant economic and environmental benefits that can accrue by improving energy efficiency. Most importantly, improving energy efficiency has proved to be the most cost effective of Australia's responses to reduce greenhouse gas emissions.
- However, international comparisons, including with other low energy price economies indicate that Australia's historic energy efficiency performance leaves room for improvement, due largely to significant impediments and barriers inhibiting the uptake of energy efficiency measures. These impediments include information asymmetries, organisational/cultural barriers and lack of accurate pricing signals.
- These issues have been recognised in the Energy White Paper, *Securing Australia's Energy Future* and the *National Framework for Energy Efficiency* (NFEE), recently announced by the Ministerial Council on Energy.
- Through the process of developing the NFEE, a GDP improvement of almost \$1 billion per year has been identified from improved energy efficiency. Existing and recently agreed energy efficiency measures will capture some of this potential. However further measures are likely to be required to fully realise these savings.
- The Department of the Environment and Heritage considers it important that the Productivity Commission (PC) Inquiry into energy efficiency examines the costs and benefits of further measures, which could include broad-based incentives.
- Within this context, the Department of the Environment and Heritage considers the Terms of Reference for the PC's inquiry should be interpreted broadly to examine the benefits of energy efficiency from a whole of economy perspective, and not only as a subset of energy efficiency improvements that are privately cost effective.
- There is a clear role for government in improving Australia's energy efficiency performance due to the lack of accurate pricing signals provided by current energy market arrangements and the potential for energy efficiency opportunities to deliver a more productive economy, as well as in ensuring that its greenhouse gas obligations are met cost-effectively.
- The Department of the Environment and Heritage considers that, whilst stationary energy should be the primary focus of the inquiry, the PC should also examine issues in the transport sector, including consideration of consistency of coverage and policy approaches among sectors, and identification of major market distortions or perverse incentives mitigating against energy efficiency improvements.

Introduction

The Department of the Environment and Heritage (DEH) has a responsibility to provide leadership in the protection of Australia's environment and the sustainable use of our natural resources in a broader social and economic context. In particular, DEH develops and implements policies and programmes to reduce Australia's greenhouse gas emissions and contribute to an effective global response to climate change. DEH has responsibility for protecting and improving urban air quality through national action to reduce emissions of major air pollutants.

Economically efficient resource use delivers economic and environmental benefits to all Australians. More efficient energy production and use therefore presents a major opportunity to improve the productivity of the Australian economy with a consequential benefit of a significant reduction in greenhouse gas emissions. The Prime Minister's Energy Statement, *Securing Australia's Energy Future* (the Energy White Paper) of June 2004, identifies the importance of meeting this challenge and the significant role energy efficiency must play in doing so. The energy sector is the single largest contributor to emissions of greenhouse gases, comprising 68 per cent of Australia's emissions in 2001. Transport emissions are the fastest growing source of greenhouse gas emissions and a significant source of urban air pollution. Demand for energy in Australia is projected to increase by 50% by 2020, requiring an investment of at least \$37 billion.¹ Improvements to Australia's energy efficiency have been identified as the most cost effective way of reducing our greenhouse gas emissions.

This submission addresses the scope and terms of reference for the Inquiry in general terms and indicates where, in the DEH's view, the Productivity Commission can add optimal value to the existing state of knowledge of the environmental and economic costs and benefits for Australia of improving energy efficiency, including assessment of policy options to achieve significant gains in energy efficiency. In doing so, DEH takes as a starting point the existing energy efficiency initiatives, including those in the Energy White Paper and the recently announced measures under Stage One of the *National Framework for Energy Efficiency* (NFEE).

Context for the Inquiry

The Energy White Paper

The Energy White Paper forms the foundation of the Australian Government's energy policy. The Energy White Paper states as its objective 'that Australians have reliable access to competitively priced energy, the value of energy is optimised, and environmental issues are well managed.'

The White Paper sets out the Government's commitment to improving Australia's energy efficiency, stating that energy efficiency is and will remain, a central element of a cost-effective greenhouse abatement strategy.

¹ Australian Government 2004, *Securing Australia's Energy Future*, Canberra, p. 2.

The energy efficiency measures announced in the Energy White Paper include:

- Improving price signals for demand side management as part of reforming Australia's energy markets;
- Demonstrating the potential benefits of energy efficiency and market reform through major Solar Cities trials;
- Expanding the range and stringency of minimum energy performance standards for appliance, equipment and buildings;
- Continuing to improve the energy efficiency of Australian Government agencies;
- Increasing the availability of information on the energy performance of appliances, buildings and vehicles;
- Requiring large energy users to regularly identify and publicly report on energy efficiency opportunities; and
- Streamlining energy reporting requirements and participation in energy efficiency and greenhouse programmes using the Greenhouse Challenge programme as a single point of entry.

The White Paper identifies the need to move beyond previous measures, which focused largely on the residential and commercial sectors, to target the industrial sector, which is the most significant energy user.

The White Paper also states the Australian Government's continuing commitment to working cooperatively with the states and territories through the NFEE process.

The National Framework for Energy Efficiency

The NFEE, recently announced by the Ministerial Council on Energy (MCE), has identified economic benefits of approximately \$975 million per year and 10 Mt of greenhouse gas abatement from improved energy efficiency across the residential, commercial and industrial sectors. This potential assumes the implementation of only half of all energy efficiency measures with an average payback period of 2.3 years (and none with a payback of more than 4 years) up to 2015.

Under Stage One of the NFEE, MCE agreed to measures that largely build on existing initiatives for residential and commercial buildings, appliances and equipment, while increasing the focus on realising gains from the commercial and industrial sectors (Attachment A refers). These 'foundation' measures are cost-effective approaches that address a range of barriers to energy efficiency uptake, with an enhanced focus on ensuring better information on available opportunities. It is estimated that Stage One measures have the potential to deliver less than half of the potential energy savings identified through the NFEE process.

MCE also agreed to continue development of a possible Stage Two of NFEE. If agreed by government, Stage Two NFEE measures would move beyond existing approaches to broad-based incentives designed to capture the bulk of the potential energy-efficiency gains. The proposed measures require further analysis to identify their costs and benefits.

Inquiry Terms of Reference

The DEH notes that the terms of reference of the Inquiry focus on those energy efficiency improvements that are ‘cost-effective for individual producers and consumers’ (ie those with a private net benefit) and the view expressed by the Commission in the Issues Paper that improvements that might be justified on the grounds of net social benefit are not specifically called up by the terms of reference. Further, the department notes the Commission’s view that commenting on Australia’s policy response to climate change is beyond the scope of the Inquiry, even though decreasing Australia’s greenhouse signature is mentioned in the terms of reference, and is one of the major environmental and economic challenges for Australia as recognised in the draft PC paper on National Competition Policy Reforms.

In order to ensure that the outcome of the Inquiry provides useful advice to government regarding the most appropriate approach to addressing energy efficiency into the future, the DEH considers the scope of the terms of reference should be interpreted broadly, and examine the benefits of energy efficiency from a whole of economy perspective, and not only as a subset of energy efficiency improvements that are privately cost effective. The interpretation of the terms of reference needs to be mindful that the Inquiry originated out of the Energy White Paper, which has clearly identified energy efficiency as an area where gains can be made. In addition, the NFEE is looking to the Productivity Commission to examine the costs and benefits of possible measures under a Stage Two NFEE to capture the full economic potential from improved energy efficiency, which could include broad-based incentives.

Without this wider perspective, there is a danger that that the Inquiry will not significantly progress the understanding of the contribution of energy efficiency improvements to the Australian economy as a whole and thus underplay the significant role that energy efficiency improvements can make to reducing greenhouse gas emissions.

Further, the DEH considers that Australia’s response to climate change is a central issue for this Inquiry, given the important role of energy efficiency improvements as a cost-effective means to reduce emissions in the medium to longer term.

While DEH notes that the terms of reference require the Commission to consider existing and recent government energy efficiency programmes, it considers that the major focus of this Inquiry should be an analysis of the economy-wide costs and benefits of possible measures to more fully realise the energy efficiency potential identified by the NFEE.

While the stationary energy sector offers the greatest potential gains, the DEH notes that the terms of reference do require the Productivity Commission to examine opportunities for energy efficiency gains in the transport sector, which accounts for 41% of total final energy consumption in Australia. The DEH considers that the Productivity Commission should explore options for energy efficiency gains in the transport sector and the consistency in approach between and stationary energy and transport sectors.

The economic and environmental importance of energy efficiency

Increased take-up of cost effective energy efficiency opportunities can make an important contribution to economic growth, enhanced wealth and low cost greenhouse gas abatement.

From 1973-74 to 2000-01, Australia's total energy consumption almost doubled (98 per cent), at an average rate of 2.5 per cent per annum. The Australian Bureau of Agricultural and Resource Economics (ABARE), estimates that Australia's long-term primary energy consumption will increase by 48 per cent by 2019-20, growing at approximately 2.2 per cent per annum. Strong growth in energy consumption is expected over the medium term (2001-02 to 2008-09) of 2.5 per cent per annum. To meet this demand, ABARE estimates that by 2019-20, \$11 billion investment in new electricity generation capacity will be required. Across the energy sector more broadly, this figure is estimated to be \$30-35 billion.

As mentioned above, NFREE analysis indicates that capturing 50 per cent of all energy efficiency opportunities with an average payback period of 2.3 years would, once fully implemented:

- reduce greenhouse gas emissions by approximately 10 Mt of CO₂ per annum;
- reduce the rate of growth of energy consumption thereby reducing/delaying the need for future expansion of energy supply and distribution infrastructure;
- reduce peak load demand;
- increase GDP by \$975 million; and
- create up to 2600 jobs.

The production and use of energy is Australia's largest source of greenhouse gas emissions, accounting for 68 per cent in 2002. Of this, 48 per cent (or 262 Mt) was from stationary energy and 14 per cent (79 Mt) was from transport. The energy sector's share of total emissions is expected to increase over time. Energy efficiency is a significant component of meeting Australia's greenhouse gas emission reduction obligation, comprising approximately 25 per cent of Australia's total projected emissions abatement and around 50 per cent of the greenhouse abatement expected from the energy sector by 2010.

As indicated in the Energy White Paper, any significant reduction in Australia's long-term greenhouse gas emissions signature must involve changing the way energy is produced and used. Improving energy efficiency has consistently proved to be the most cost-effective of Australia's responses to reducing greenhouse gas emissions. Energy efficiency initiatives can deliver greenhouse gas abatement at a net *saving* of up to \$30 per tonne CO₂. In comparison, based on the 2003 projections of abatement between 2008-2010 and Australian Government expenditure on programmes to end of June 2003, the *cost* per tonne of all abatement measures averaged \$3.40 per tonne for those programmes where the primary objective was to deliver abatement. Studies in the US

(eg. Resources For the Future²) confirm that energy efficiency is a highly cost-effective form of abatement, delivering net economic and environmental benefits.

All regulatory energy efficiency measures are subject to regulatory impact assessment processes, and have generally demonstrated net benefit:cost ratios of 2:1 or more. For the Greenhouse Gas Abatement Programme, which funds the marginal cost of delivering an abatement project, Australian Government expenditure per tonne of projected abatement in 2008-12 was calculated at \$5.50 per tonne.

Air quality

In general, increased energy efficiency can also lead to improvements in air quality. The combustion of fossil fuels, whether directly for heating, cooling or transport, or indirectly in electricity generation, is accompanied by pollutant emissions. The key pollutants from fossil fuel combustion are particulate matter, volatile organic compounds (VOCs), nitrogen dioxide (NO₂), sulphur dioxide and carbon monoxide. VOCs and oxides of nitrogen (NO_x) are the constituents of a secondary pollutant, ozone, which is a proxy for photochemical smog.

Electricity generation and motor vehicle exhaust are key sources of these air pollutants. Electricity generation is the leading source in Australia of oxides of nitrogen (mostly NO₂) at 480,000 tonnes, followed by motor vehicles at 320,000 tonnes. Sulphur dioxide pollution also comes mainly from electricity supply (590,000 tonnes). Both electricity generation and motor vehicles are also significant sources of particulate matter.³

Existing measures to improve energy efficiency

Australia's energy efficiency performance has not been strong by world standards. The International Energy Agency has found that Australia's energy efficiency has improved at less than half the rate of other countries. Recent analysis by ABARE indicates that since the early 1990s, the real trend in energy intensity (a proxy for energy efficiency) shows little or no improvement in a number of sectors.⁴ While Australia's relatively low cost of energy is one influencing factor, other low energy cost countries such as the United States and Canada have performed better than Australia.

The Australian government has implemented a range of energy efficiency initiatives to date. These have largely focussed on the residential and commercial sectors, and through a mix of voluntary and regulatory means have aimed to increase the amount of information available to consumers. These have included labelling and minimum energy performance standards (MEPS) for appliances and equipment, minimum energy performance requirements for residential buildings and energy efficiency targets for government. As well, the Energy Efficiency Best Practice Programme has aimed to encourage energy efficiency activities in the industrial sector.

The Australian Government has in place a range of measures related to energy efficiency and consumption in the transport sector. DEH notes that a holistic approach to the transport sector necessarily addresses both aspects. Existing measures include:

² Resources For the Future 2004, *The Effectiveness and Cost of Energy Efficiency Programmes*

³ Australian Government 2003, *National Pollutant Inventory, 2002-03*, Canberra.

⁴ ABARE, 2003, *Trends in Australian Energy Intensity 1973/74 to 2000/01*, Report 03.9, Canberra.

- The National Average Fuel Consumption Target, which will deliver an 18% improvement in fuel efficiency of new vehicles between 2002 and 2010;
- Fuel consumption labelling and the *Green Vehicle Guide*;
- Influencing travel choices through the Travel Smart programme and through cooperation with the Australian Bicycle Council; and
- Developing intelligent transport systems.

Further detail on existing energy efficiency measures is provided in [Attachment B](#).

Barriers to energy efficiency

There are a number of impediments to the uptake of energy efficiency opportunities that have been identified (each of these have been examined in detail as part of the NFEE):

- Negative externalities – a lack of accurate pricing signals act as a disincentive to investing in demand management measures such as energy efficiency and alternative technologies.
- Evaluation of investments – investors tend to apply a disproportionately higher risk premium to investments that change current practices or technology, including energy efficiency.
- Split incentives – the investor is often not the beneficiary, such as in the case of a building owner and tenant.
- Information asymmetries, including:
 - lack of awareness – energy users often do not know how much energy they use and thus cannot quantify energy savings. Whilst a common perception is that metering is expensive, in recent years the cost of both meters and monitoring has dropped considerably;
 - transaction costs – energy efficiency solutions are often only available at a high price because they are typically individually designed and expertise in the technical and commercial aspects of energy productivity is limited and highly specialised; and
 - barriers to entry – existing players in the energy sector can obtain and analyse information on energy use but the cost of obtaining this information can be very high for new entrants.
- Organisational/cultural barriers, including:
 - poor understanding in senior management of the potential for improved energy efficiency to increase productivity;
 - companies, particularly small manufacturers, often see any change to working processes and practices as a significant risk; and
 - finite resources within companies, both staff and financial, to focus on a limited number of issues. This means that energy efficiency often falls off the priority list.

Taken together, these barriers mean that firms invest less in energy efficiency than is optimal. Experience with a range of government programmes has shown that there is a range of cost-effective opportunities with very short paybacks that firms forego without direct intervention to support their uptake.

This leads to the question of whether government has an appropriate role in encouraging companies to undertake activities that are in their own interest. For at least three reasons, the answer to this is clearly yes:

1. Current energy market arrangements do not deliver appropriate signals for efficient use of energy. As a result, total investment in the energy system is larger than should be required, and pricing does not deliver efficient investment and operation signals. While there is considerable work underway to address some of these issues, resolution appears some way off;
2. The level of currently unused energy efficiency opportunities is large enough to constitute an important opportunity for microeconomic reform to deliver a more productive economy generally. This would have benefits for Australia more broadly than just for individual firms; and
3. As Australia is investing in greenhouse gas abatement, and has a commitment to an ongoing effective response to greenhouse, it is important that the most cost-effective opportunities are pursued as a priority. Experience with existing programmes shows that energy efficiency can deliver abatement with a net economic *benefit* while other abatement options (even including many economic incentives) tend to have economic *costs*. Therefore, energy efficiency should be pursued as a fundamental element of a cost-effective greenhouse response.

Energy efficiency and economic performance of firms

It is sometimes argued that government intervention to mandate energy efficiency can lead to firms foregoing better investment opportunities. While this is theoretically valid and suggests the need for careful programme design, there appears little evidence to support this view.

There is an increasing correlation between energy efficient companies and their economic performance. Effective energy and environmental management in a company is a strong indicator of overall management quality and market potential. A number of international studies have shown that companies that are leaders in energy efficiency within their sectors also demonstrate above average share price performance, price-to-earnings ratio, return on assets, return on equity and return on invested capital.⁵

The finance and investment sectors are also taking an increasing interest in “non-financial” performance and governance of companies. The Carbon Disclosure Project has undertaken two recent international surveys of the FT500 Global Index companies seeking information on measurement and management of greenhouse gas emissions,

⁵ Innovest Strategic Value Advisors 2002, *Energy Efficiency and Investor returns: The Real Estate Sector; Energy Efficiency and Investor returns: The Retail Food Sector*

including carbon dioxide, as part of their assessment of risks and opportunities presented by climate change. The second survey, reported in May 2004, was supported by ninety-five international institutional investors representing assets totalling US\$10 trillion.⁶ Four of Australia's largest institutional investors, AMP Henderson Global, ComSuper, VicSuper and the Catholic Superannuation Fund supported the second round of the Carbon Disclosure Project. A third survey is planned for 2005.

Financial incentives

Economic analysis done for the NFEE has shown that incentive-based mechanisms would deliver significant net economic benefits. Financial mechanisms provide the incentive for capital investment, improved energy efficiency of processes, equipment, buildings and potentially transport. These incentives could operate primarily in the industrial and commercial sectors, but could also have influence in the residential and government sectors.

Specific forms of financial incentives referred to in the terms of reference and the Commission's Issues Paper are an energy levy, grants or rebates and market-based instruments such as a National Energy Efficiency Target (NEET). This should not limit the Commission to consideration of these mechanisms only.

A market mechanism like a NEET could deliver measurable energy savings through the uptake of eligible energy efficiency activities and would be independent of the level of economic activity. Options for a NEET range from a voluntary scheme with voluntary agreements between the government and the business, to a hybrid regulatory/market-based scheme where liable parties are required to source energy saving to meet targets, but the market determines which eligible energy efficiency activities were undertaken.

Analysis done for the NFEE showed that a one per cent NEET (annual energy savings of one per cent beyond 'business as usual') would deliver an increase in consumption of approximately 0.18% by 2014, while reducing greenhouse gas emissions by 16.5 Mt CO₂-e and reducing electricity prices to end users. The total net present value of increased consumption over the life of the investments initiated by a one per cent NEET is \$8.4 billion.

Conclusion

As noted above, DEH recognises that the terms of reference require the Productivity Commission to consider existing programmes and that a strict interpretation of the terms of reference would restrict the Inquiry to the perspective of the individual firm or household. However, DEH considers that a narrow interpretation of the terms of reference will not deliver a report that provides useful advice to government on the most appropriate approach to capturing energy efficiency gains. DEH urges the Productivity Commission to interpret the terms of reference broadly, to ensure that both the economic and environmental benefits of energy efficiency are considered, and the benefits to the wider economy are considered.

⁶ *Climate Change and Shareholder Value in 2004* Carbon Disclosure Project, 2004

In DEH's view, the role of the Inquiry is to examine the possible measures that can deliver the bulk of energy efficiency gains, beyond NFEE Stage One. There are broadly three categories of possible measures – information disclosure; regulation; and incentives. The Productivity Commission should consider the various measures available and provide options on the best mix of measures to deliver a quantum gain in energy efficiency benefits.

Whilst energy efficiency may not always be cost effective for individual firms, DEH believes that the significant economy-wide benefits of improved energy efficiency should be captured. The role of the Productivity Commission should be to examine the impacts of energy efficiency measures on individual firms and make recommendations on how these could be addressed. DEH notes that firms are required or encouraged to behave in ways that benefit society or the environment as a whole, for example, occupational health and safety. It is also worth noting that firms that have invested in energy efficiency are relatively high performers in the market.

In the context of the need for significant new investment in energy generation, DEH considers that the Productivity Commission should provide some guidance on the technology choices that will deliver cost effective energy efficiency gains.

While DEH agrees that the focus of the Inquiry should be stationary energy, the Productivity Commission should also give consideration to energy efficiency opportunities in the transport sector. In this context, the Productivity Commission should examine market distortions and perverse incentives mitigating against energy efficiency improvements and explore options such as congestion pricing, road user charge reform and appropriate incentives for low-emission, fuel-efficient vehicles.

Attachment A: Measures agreed under Stage One of the National Framework for Energy Efficiency

At its meeting of 27 August 2004, MCE agreed to the implementation of nine policy packages constituting the first stage of NFEE within three years, and to the investigation of broad-based incentive measures that could be considered for inclusion in the second stage of NFEE in the context of the Productivity Commission inquiry into energy efficiency in 2005. The NFEE is a comprehensive package of measures covering the residential, commercial and industrial sectors. “Foundation” measures agreed under Stage One of the NFEE are:

Residential buildings

To improve the energy performance of the residential building stock over time and to inform consumer decision making, the package encompasses:

- Nationally consistent minimum energy efficiency design standards for new homes, units and apartments;
- Minimum energy efficiency design standards for major renovations; and
- Mandatory disclosure of the energy performance of homes, units and apartments at the time of sale or lease.

Commercial buildings

To improve the energy performance of the commercial building stock over time and to inform owner and tenant decision-making, the package will introduce:

- Nationally consistent minimum energy efficiency design standards for new and refurbished buildings; and
- Mandatory disclosure of building energy performance at time of sale or lease.

Commercial/industrial energy efficiency

To raise the awareness of senior management and motivate action, and to improve the skill base to identify energy efficiency opportunities, this package includes:

- The requirement for large energy consumers to undertake mandatory energy assessments and report on the energy efficiency opportunities that these identify, as announced in the Australian Government's Energy White paper; and
- Nationally coordinated training and accreditation for energy auditors and energy performance contractors in conjunction with programmes and protocols already in place.

Government energy efficiency

To demonstrate leadership to the business sector and wider community, governments will:

- Develop nationally consistent standards for measuring and reporting on government energy efficiency programmes;
- Introduce public annual reporting by all jurisdictions on energy use and progress towards achieving the targets set for government agencies;
- Establish minimum energy performance standards for government buildings; and
- Develop best practice models for government departments to implement energy efficiency programmes.

Appliance & equipment energy efficiency

To improve the energy efficiency of major energy using appliances and equipment, the National Appliance & Equipment Energy Efficiency Programme (NAEEEP) for electrical

products will be:

- Broadened in scope to include mandatory minimum energy performance standards (MEPS) and labelling for gas products; and
- Expanded through the introduction of new or more stringent MEPS for residential, commercial and industrial products, with a key focus on increasing the number of commercial and industrial products regulated.

Trade and professional training & accreditation

To develop the capacity of the relevant professions and trades to identify opportunities and implement energy efficient solutions, the package will:

- Undertake a nationally coordinated effort to integrate energy efficiency concepts into the courses for the key trades and professions that influence energy efficiency outcomes; and
- Develop training and accreditation courses for practicing tradespersons.

Commercial / industrial sector capacity building

To demonstrate the benefits of energy efficiency, build industry capacity to deliver energy efficient solutions, and reduce energy efficiency investment risks, the package will:

- Develop a nationally coordinated programme to generate highly visible examples of energy efficient equipment or processes in key industrial sectors and new or refurbished commercial buildings;
- Link industry and government to key centres for leading edge energy efficiency research and development; and
- Establish nationally coordinated energy efficiency best practice networks.

General consumer awareness

To raise the awareness of general consumers (householders and small business) and motivate energy saving actions, the package comprises:

- The requirement for energy retailers to provide benchmark data on energy bills;
- Development of a nationally coordinated network to facilitate easy and timely access to high quality and relevant information;
- Targeted promotional campaigns for specific energy efficiency issues; and
- The integration of energy efficiency concepts into the school curriculum.

Finance sector awareness

To increase the type and availability of finance products for energy efficiency, government agencies will work with the finance sector to:

- Raise awareness of the opportunities for, and benefits of, energy efficiency investments; and
- Provide tools for the valuation and risk assessment of proposals.

Attachment B: Existing Energy Efficiency Programmes

Labelling and Minimum Energy Performance Standards

The labelling and Minimum Energy Performance Standards (MEPS) programmes have been in place since 1986 and are estimated to be Australia's most cost-effective method of reducing greenhouse gas emissions. The Prime Minister's Energy Statement – *Securing Australia's Energy Future* and Stage One of the NFEE have included new measures including an expanded MEPS programme.

Labelling and MEPS measures are aimed at driving products with higher levels of energy efficiency into the Australian market place, and bringing about more rapid improvements in product energy-efficiency than would occur otherwise. This takes place primarily through setting standards for industry and providing more information to consumers about the energy efficiency of products that they purchase. In some cases the improvement in product energy efficiency would not occur at all without the intervention of MEPS (eg storage water heaters, where all products were at the same low level of efficiency before MEPS were introduced, so labelling would have had no effect).

The labelling scheme for electrical equipment and appliances requires refrigerators, freezers, clothes washers, clothes dryers, dishwashers and air-conditioners (single phase only) to carry a label that indicates their energy performance when they are offered for sale. Gas water heaters and most forms of gas heaters also carry a Gas Energy Rating label. There is evidence from overseas and Australian studies to suggest that many consumers use energy efficiency as a tool to differentiate between the final two or three products that meet their other selection criteria (eg. appearance, colour, size etc).

Labels are based on a star rating scheme. The star rating of an appliance is determined from the energy consumption and size of the product. These values are measured under Australian Standards, which define test procedures for measuring energy consumption and minimum energy performance criteria. The labelling scheme in Australia is operated through the National Appliances and Equipment Energy Efficiency Committee (NAEEEC).

Labelling can accelerate the rate of increase in energy efficiency, even before consumers become aware of the label. In the lead up to the implementation of energy labelling for refrigerators in 1986, suppliers removed the least efficient models from the market to avoid having to label them. Therefore even non-users of the label benefited from a more energy-efficient product range.

Once consumers became aware of and familiar with the refrigerator label they could gain further benefit by identifying the more energy efficient models (or the ones with the optimum balance of capital cost and running cost). In addition to the labelling scheme, the ENERGY STAR programme covers office equipment like computers, printers, photocopiers, home electronics like TVs, VCRs, audio products or DVD players, and is a joint initiative of the Australian, state and territory governments.

Through the MEPS programme, government works with industry to set standards for a minimum level of energy performance for individual appliances, for example refrigerators. MEPS programmes are made mandatory in Australia by state government legislation and regulations that give force to the relevant Australian Standards. Products covered by MEPS include refrigerators and freezers, mains pressure electric storage water heaters, small mains pressure electric storage water heaters and low pressure and heat exchanger types, three phase

electric motors, single phase air conditioners, three phase air conditioners up to 65kW cooling capacity, ballasts for linear fluorescent lamps, linear fluorescent lamps, distribution transformers – 11kV and 22kV with a rating from 10kA to 2.5MVA, and commercial refrigeration. Table 1 below indicates those products covered by MEPS and/or labelling schemes.

Sector / Product	MEPS and/or Labelling	
Residential sector		
Air conditioners, single-phase*	MEPS - 2004	ML - 1992
Clothes washers		ML - 1992
Clothes dryers		ML - 1992
Dishwashers		ML - 1992
Electric water heaters*	MEPS – 1999	
Refrigerators and Freezers*	MEPS - 1999	ML - 1992
Gas water heaters	MEPS – 1983	ML – 1988
Gas room heaters	MEPS – 1983	ML – 1993
Gas ducted heaters	MEPS - 1983	ML - 1994
Commercial sector		
Packaged air conditioners, three-phase*	MEPS - 2001	VL - 2001
Linear fluorescent lamp ballasts	MEPS - 2003	VL – 2003
Linear fluorescent lamps*	MEPS - 2004	VL - 2004
Commercial refrigeration – remote / self contained	MEPS - 2004	VL - 2004
Industrial sector		
Three phase electric motors*	MEPS - 2001	VL - 2001
Distribution transformers	MEPS - 2004	VL -2004

ML = mandatory labelling; VL = voluntary labelling, usually based on a defined high efficiency level.

* Upgrades to existing MEPS levels currently scheduled to take place between 2005 and 2007.

Costs and benefits of labelling and MEPS programme:

In May 2003, NAEEEC released *When You Can Measure It, You Know Something About It* (Projected Impacts 2000-2020), which assessed some of the costs and benefits of the NAEEEP. The report indicated that NAEEEP is projected to deliver almost \$4.2 billion dollars to the community over the next 15 years (after the projected \$2.6 billion costs are deducted from the \$6.8 billion energy savings NPV at 10 % discount rate by 2018. This analysis does not include any estimate of the benefits in terms of GHG abated, or peak load reductions.

In a 2000 evaluation of the NAEEEP, it was estimated that the programme would result in a community benefit of \$31 net present value per tonne CO₂-e avoided, and a combined benefit/cost ratio of 2.4 (at a 10% discount rate). Using the same criteria, more recent projections estimate a slightly lower benefit per tonne CO₂-e avoided, of \$28 per tonne – though the combined benefit/cost ratio remains constant at 2.4. This is to be expected as the NAEEEP matures and extends its coverage to products where the benefits are not as easy to achieve.

The main monetary benefits of labelling and MEPS programmes are the value of the energy saved through consumer preference for, and supplier introduction of, more efficient products than would be the case without these programmes. Labelling and MEPS programmes also have benefits for the individual producer as they are selling a higher quality product. This also enhances the export potential and assists in recouping development costs.

In terms of environmental benefits, Figure 1 illustrates the expected greenhouse gas abatement from products regulated through the NAEEEP.

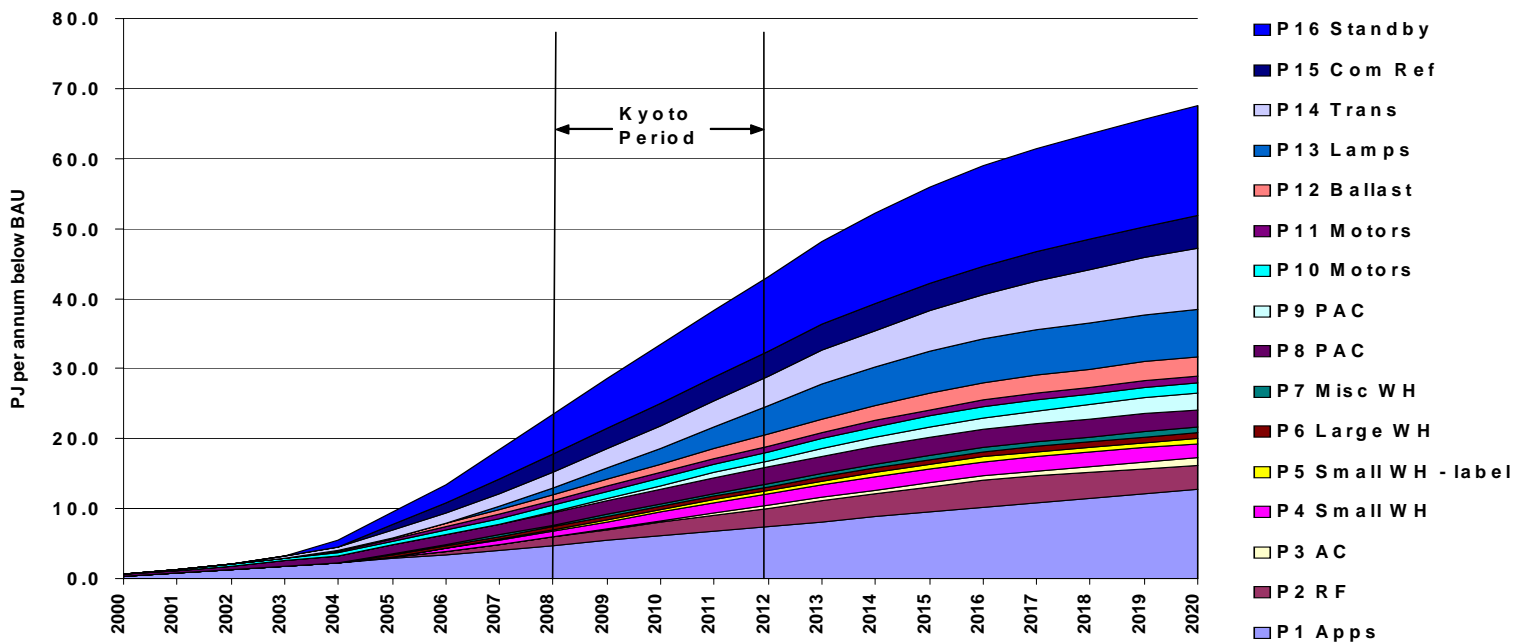


Figure 1: Projected greenhouse gas abatement from NAEEEP measures to 2020

The projected benefits and costs of adopting a proposed MEPS level for individual products is closely evaluated. When appliances are regulated under the MEPS programme, the Australian Greenhouse Office (on behalf of all jurisdictions) undertakes a stringent process of assessing the costs and benefits associated with regulating that particular product type. Every MEPS proposal is subject to a Regulation Impact Statement and cost-benefit analysis carried out to COAG Guidelines. The Office Of Regulation Review oversees the process and certifies that the RIS meets COAG guidelines. Individual regulatory impact statements are published modelling the precise impact of the regulatory measure and demonstrating why it is in the community's best interest. Used to regulate 16 product types nationally to October 2004, these RISs show community benefits outweigh costs by an average of more than 2 to 1 when measured over the next 15 years.

The MEPS approach is not unique to Australia. The United States, Japan, Korea, Canada, Mexico, Taiwan, China, Russia and the European Union all have MEPS programmes of one kind or another. The level of minimum standards can be set using different approaches for a variety of circumstances.

It has been estimated that the Australian approach to MEPS is one of the most cost-effective in the world. In the United States, the cost to government agencies to regulate just one product is between US\$2-5 million, more than the entire Australian programme budget for MEPS that currently regulates 16 products. This is because the Australian approach is to match, for each appliance regulated, best practice levels imposed by Australia's major trading partners. This approach overcomes arguments regarding the technical feasibility of meeting the proposed MEPS levels and avoids elaborate and expensive testing procedures being conducted locally.

The main costs of labelling and MEPS schemes include:

- The costs to government of programme development and administration. These costs are usually borne by the taxpayer, with limited cost recovery from suppliers for specific services, such as registration. For MEPS, additional costs are marginal if the MEPS programme covers a product already subject to labelling.
- The costs to product suppliers of any additional product testing (beyond what they would normally undertake during product development), registration, production and fixing of labels, and their internal administration. These costs are usually passed on to consumers via increase in product price. Again additional costs for MEPS are marginal if the MEPS programme covers a product already subject to labelling.
- The costs to consumers of any increases in average product price due to greater consumer preference for the more efficient models on the market. In most cases this element represents 90% or more of the total cost of a labelling programme.

The main differences between MEPS and labelling costs and benefits are:

- The administrative costs of MEPS are substantially lower, since there is no need for a physical label, for checking that the label is correctly fixed, or for publicising the label.
- The benefits of MEPS are more likely to be realised and easier to predict, since they do not rely on the mechanisms of consumer awareness and choice and supplier response to consumer preference, which are all highly variable.
- In labelling, a high proportion of the costs and benefits are borne voluntarily by those consumers who use the label to select more efficient products. In MEPS, the costs of increased appliance prices are borne by all consumers, even those – usually very few – who do not stand to benefit (because their energy prices or energy usage is so low). Conversely, the benefits also flow to additional classes of consumers who would not benefit from labelling – those who do not purchase their own appliances (eg tenants) or who are not label-aware.
- MEPS can have a greater cost for suppliers than labelling, since suppliers must adjust their model ranges to meet the MEPS levels by the given date (which is why the lead times for MEPS implementation is often 2 to 3 years).
- The costs to government of ensuring the quality of initial product tests and undertaking random check tests are the same for MEPS and energy labelling.

Impact of minimum standards on competition and economic efficiency

The adoption of MEPS magnifies rather than dampens competitive advantage, although the effect appears to be minor.

It confers some competitive advantage on those suppliers who have a more energy-efficient product range to start with (and so do not need to eliminate or substitute as many models) and those who are better able to engineer their products to be more energy efficient at lower cost.

The increasing harmonisation of international MEPS levels reduces any negative impacts on trade of differences in national MEPS regimes. This advantages efficient producers and exporters, whose economies of production may be increased by harmonising local with international MEPS, and disadvantages inefficient ones, who are more exposed to imports.

On the other hand, some of the disadvantaged firms may be driven out of the market if they cannot adjust to MEPS. However, there is no known instance of this happening in Australia. This could reduce market competition, and lead to upward pressure on consumer prices.

Impact of minimum standards on consumer choice and the prices of appliances

MEPS removes less efficient appliances from the market – but in most cases (eg water heaters) the buyers of those products did not purchase them out of deliberate preference but because they were the cheapest, because they were unaware of the product's inefficiency and high operating cost (or did not care, in the case of 'landlord' purchases).

Although prior MEPS analyses almost always project an increase in product prices, post-introduction analyses have failed to detect any increases, or indeed any reduction in the number of models offered to the market.

Voluntary and mandatory labelling programmes

Generally speaking, mandatory labelling systems are more effective than voluntary ones, since suppliers cannot just choose to label their more efficient products – they are forced to label less efficient products as well, so enabling buyers to avoid them. A key limitation of the voluntary water labelling programme, which is to be replaced by the Commonwealth's mandatory programme, was that participation was so low because suppliers of inefficient products had no incentive to label.

There is a role for voluntary labelling as a supplement to a main mandatory programme. For example, suppliers of the most efficient products on the market can voluntarily use a 'Top Energy Saver Award Winner' in addition to the mandatory energy label.

There is also a role for 'optional mandatory' labelling, in which there is no obligation on suppliers to label, but if they do so they must use the prescribed format of label and are obliged to meet all compliance obligations. An example is three-phase air conditioners, which are subject to mandatory minimum energy efficiency standards, but for which labelling is optional.

Rationale for government intervention in labelling and MEPS programmes

There are a number of factors supporting the rationale for government involvement in labelling and MEPS initiatives. Government has a natural advantage in ensuring the factors necessary for the effectiveness of labelling – mandatory participation, quality assurance, compliance, publicity and communications and, increasingly – ensuring international consistency.

Labelling is only effective when all participants observe the rules. This is most likely to occur if the rules are enforced by a party without a commercial interest. In addition, no product supplier acting on its own can build a resource labelling regime, however sound, to the level of public acceptance that forces its competitors to adopt it. The investment required to build public trust in the label is very high (and much higher for a private sponsor than for government) and a private labelling regime is always subject to undermining by competitors, who can question the basis of the label, launch their own alternative labelling systems or simply refuse to participate.

All successful resource efficiency labelling programmes in Australia have been initiated by governments (NSW and Victoria in the case of energy labelling, which began with refrigerators) or by utilities at the time when they were also regulators and so effectively agents of government (gas labelling by the Gas and Fuel Corporation of Victoria, water labelling by Melbourne Water).

As the gas and water utilities have lost the regulatory ability to enforce labelling, the only way to ensure the continued effectiveness of their programmes has been to involve government in their management - the Australian Gas Association is working with NAEEEC to establish gas labelling as a regulated joint industry-government programme, and a mandatory water labelling programme is being legislated by the Commonwealth.

The reasons why no individual firm would unilaterally introduce MEPS are the same as for labelling but more so. The costs to the producer are higher than for labelling, since not only do product designs have to change physically, but the only conceivable competitive advantage to the supplier is from publicising its actions and convincing buyers that it is a reason to prefer its products - ie the same costs as for a 'private' labelling regime. On the other hand the risks of 'private' MEPS are also higher, since the first mover places itself at a product price disadvantage.

There is no recorded example of an effective MEPS regime (ie one that has an actual market impact) introduced *other than* through government involvement.

MEPS are currently implemented through state and territory regulations. A nationally consistent regulatory approach is vital to the effectiveness of national equipment and appliance (as well as building) MEPS. In some cases, not all states have implemented consistent approaches, which leads to management issues for industry.

Buildings energy efficiency measures

There are a number of market failures that exist in both the residential and commercial buildings sectors. These market failures influence both the nature of the current building stock and provision of new buildings in Australia. There is a relatively complex supply chain in building markets (designers, developers, builders, building owners, and tenants), and the lack of performance information available, the knowledge base of purchasers, as well as the longevity of buildings, all lead to a blurring of pricing signals.

In addition, existing markets do not fully reflect environmental and social benefits and costs. Energy and building material prices are largely based on the operational costs of supply, and do not include environmental costs such as greenhouse emissions. Such environmental costs are not generally included in calculations of the productivity of the building sector and the returns to building investment. Government involvement in regulation is essential to ensure the creation of open and competitive markets.

Research commissioned by the Australian Greenhouse Office has found that residential building energy performance before regulation averaged below 1 Star in the nation-wide House Energy Rating Scheme, yet economic research commissioned by the Victorian Government has demonstrated that a 5 Star energy performance level would benefit the local economy by \$566 million per annum, create over 1,000 jobs and reduce annual greenhouse gas emissions by 37,000 tonnes.

Estimates by the Australian Greenhouse Office show projected greenhouse gas emissions savings from minimum residential building energy performance standards to reach greenhouse savings of around 12 Mt CO₂-e and energy savings of around 60 PJ by 2020 against business as usual just from improved thermal comfort performance. A further 10 Mt CO₂-e and 50 PJ by 2020 is possible from improving hot water energy efficiency through minimum energy efficiency standards. The commercial building sector is projected to save over 19 Mt CO₂-e and nearly 90 PJ by 2020 by adopting minimum energy performance standards.

Other benefits expected from establishing minimum energy efficiency standards include reduced expenditure on heating and cooling conditioning plant and reduced infrastructure development, as discussed more generally above.

Regulation of minimum building energy performance standards can have positive and negative impacts on competition and economic efficiency. Localised regulation can reduce competition by establishing barriers to inter-regional trade and therefore inflate the cost of construction. Product manufacturing, building design and construction industries of the 21st century operate without consideration of state and territory borders. Artificial trade barriers caused by localised regulation can lead to a reduction in economic efficiencies. A nationally consistent approach to the development and enforcement of standards is important for reducing the cost of meeting regulation and to increase the level of competition in the market for both goods and services.

Government energy efficiency measures

The Australian government has for some years implemented energy performance targets and reported annually on energy use. As a result of these initiatives, the Australian Government has reported, since 1997/98, falls in energy consumption of 15.4%, reduction of greenhouse gas emissions by 12.7% and an estimated fall in annual energy costs of \$30 million. Most of the reported improvement is due to better energy efficiency.

The objectives of energy efficiency initiatives in the government sector are to lead by example and illustrate to others the economic and environmental benefits of improved energy efficiency. To complement the existing performance rating for commercial buildings and residential buildings, the government will work with the states and territories to require landlords and building owners to disclose energy performance information in leases and sales agreement.

Further cost-effective energy efficiency improvements could result from improving metering, setting more specific energy efficiency targets, improving lease arrangements, introducing energy efficiency financial measures and changing the powers of the Parliamentary Standing Committee on Public Works and Lands Acquisition Act.

Adoption of 30-minute time-of-use metering would enable identification of energy efficiency opportunities. This should include separate meters for tenant light and power and base building services. The price of metering has been perceived as a barrier to uptake, but in recent years the price has fallen about 40% and technological features have been significantly enhanced. For example, the Intelligent Metering platform building on the standard National Electricity Code “Type 3, Tier 2” metering provides the opportunity to support a range of

“beyond the meter” monitoring and control products. The Australian Greenhouse Office has excellent examples of 30-minute time-of-use metering over 230 sites in the ACT that have identified cost effective energy efficiency opportunities. The AGO would welcome the opportunity to talk to the Productivity Commission about this data.

One of the significant barriers to introducing energy efficiency initiatives is in the area of leasing, as energy efficiency is often regarded as financially insignificant. For example, the annual energy costs for premium office accommodation are around \$22/m² for tenant light and power, whereas the rent is \$500/m². In addition, approximately 50% of Australian Government leases are net leases as opposed to the government-recommended gross leases. Gross leases reduce the split incentive between building owners and tenants by requiring the owner to run and manage the air-conditioning plant. In a net lease, the tenant operates the building and so the fixed term of the lease discourages investment in more efficient plant.

Presently, most leases do not bind the building owner and tenant to an agreed energy intensity level over the term of the lease. There are very few formal and agreed energy management plans between building owner and tenant and very few mechanisms are in place to bring the building owner and tenant together to review energy efficiency.

The Australian Greenhouse Office is currently developing the green lease schedule that will address energy performance of the tenant and building owner throughout the term of the lease. The development and enforcement of a green lease schedule for new leases and refurbishments that outlined the responsibilities of both tenant and landlord in relation to actual energy performance would:

- Ensure tenancy and base building meet the energy design and performance targets;
- Ensure that both the tenant and building owner agree and implement an energy management plan for the lease term; and
- Establish a building management committee to monitor and report energy efficiency usage.

Improved lease arrangements would need to be supported by education and training in the areas of energy efficiency and building performance targets for tenants, tenant advocates, building owners, property managers and facilities managers.

The cost of the green lease schedule would be embodied in the rent or incentives or at no cost depending on market conditions and size of the tenancy. The actual costs for specifying a building energy performance rating depend on the size of the building and frequency of the rating. The benefits of a green lease include significant costs savings and future-proofing of their buildings by adopting an energy performance rating.

Transport energy efficiency measures

The transport sector is the single largest contributor to urban ambient air pollution and is estimated to contribute up to 70% of total urban air pollution (NSW EPA 1999). Motor vehicle emissions include carbon monoxide, carbon dioxide, nitrogen oxides, photochemical smog (“ozone”) precursors and particles. High levels of air pollutants have been shown to result in a wide range of adverse health and visual impacts on society. In addition, the transport sector was responsible for over 14% of Australia’s greenhouse gas emissions in 2001.

Increased fuel efficiency could deliver significant environmental benefits through reduced urban air pollution and greenhouse gas emissions, as well as economic benefits from lower fuel costs. The Australian Government is working to improve fuel efficiency through the National Average Fuel Consumption (NAFC) target, which is based on the annual sales weighted average of all new vehicles. In 2003 the Australian Government reached agreement with the automotive industry on a voluntary target, which represents an 18% improvement in the fuel efficiency of new vehicles between 2002 and 2010.

However, the car industry is a world market, and technology driven efficiency improvements (following Europe) require a corresponding lock-step approach of more stringent emission standards (health benefits) and more stringent fuel standards (lower sulphur to allow more sophisticated catalytic reduction of toxic emissions).

In Australia, fleets are the major buyers of new vehicles, however, fleet buyers do not consider fuel efficiency to be a high priority. Stakeholders have identified a number of possible barriers to and perverse incentives for increased energy efficiency in the transport sector, including taxation arrangements (eg. Fringe Benefits Tax).

The Australian Government is working to provide consumers with information on comparative fuel efficiency. This is shown by the introduction of fuel efficiency labelling in 2001, the previous *Fuel Guide*, and the new *Green Vehicle Guide*. Over the years (dating from oil crises of the 1970s) there have been efforts to educate consumers on selection and operation of vehicles with respect to fuel efficiency. At times of high petrol prices there is always a focus on efficiency, but most evidence points to consumer preferences being driven by many other priorities. Once these priorities are satisfied, consideration is given to efficiency. The biggest factor relating to fuel use is vehicle weight, so the marketing attraction of large four-wheel-drives is quite counter-productive to efficiency. Over time, weight specific efficiency has improved, but increasing vehicle weight has worked against overall efficiency improvement. The NAFC figure has slowly improved over time.

In other areas of transport there is scope for increasing the energy efficiency of urban passenger travel by switching passengers from cars to buses and trains. There is also scope for increasing the energy efficiency of rail freight, but at high cost due to ancient railway systems. Policies in recent years have supported increased use of trucks – larger trucks are more economically and environmentally efficient.

Another method of addressing energy efficiency in the transport sector is travel demand management. Travel demand management is described by Engineers Australia as intervention (excluding the provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced. Approaches include challenging

traditional beliefs about travel by encouraging the use of cycling, walking and public transport, reducing single occupant vehicle use and reducing or removing the need to travel.

The Australian Government also manages the nationally branded TravelSmart™ programme now in place in many states and territories. TravelSmart™ aims to encourage individuals to make small travel behaviour changes by providing information, advice and incentives that impact on travel choices. It is estimated that in Fremantle, WA, the TravelSmart™ programme would result in annual savings of 11 million car kilometres, 3300 tonnes of greenhouse gas emissions and around \$500 per household in car running costs.

The Australian Government recently funded a coordinated National Travel Behaviour Change Programme as part of the Greenhouse Gas Abatement Programme. This National Travel Behaviour Change Programme will involve jurisdictional programme delivery and implementation of national initiatives to encourage Australians to rely less on their cars and more on alternatives. This initiative is expected to involve car users from 186,000 households and aims to reduce car kilometres travelled by 3.85 billion kilometres over a five-year period. It also aims to reduce greenhouse gas emissions by 1.23 million tonnes.