

SOUTH AUSTRALIAN GOVERNMENT SUPPLEMENTARY SUBMISSION TO THE PRODUCTIVITY COMMISSION'S INQUIRY INTO ENERGY EFFICIENCY

EXECUTIVE SUMMARY.....	2
1. Capturing Untapped Benefits	3
2. General Comments on the Inquiry.....	4
3. Key Drivers for Further Energy Efficiency.....	5
4. The National Framework for Energy Efficiency	6
5. Incentives for Energy Efficiency.....	7
6. Energy Efficiency and Peak Demand Management	8
7. Social Dimensions.....	10
8. Experience Implementing Energy Efficiency	11
9. Transport Issues.....	13

EXECUTIVE SUMMARY

The South Australian Government's initial submission to the Inquiry into Energy Efficiency provided a stock take of energy efficiency programs, case studies of South Australian Government initiatives and an annotated bibliography of material relevant to each of the inquiry's terms of reference. This supplementary submission provides the South Australian Government's position on a number of specific matters that relate to the inquiry.

The South Australian Government is a strong supporter of energy efficiency and demand management, as these are cost-effective methods of reducing greenhouse gas emissions, while deferring the need for considerable investments in new generation and network capacity, and ensuring a sustainable future.

The South Australian Government believes there is a strong case for government intervention to encourage energy efficiency. In a competitive market, the most efficient outcomes are generally delivered through private decision-making. With regard to energy consumption, however, barriers within the market do not deliver the best outcomes for the overall community. Key barriers to energy efficiency include the high risk premiums businesses often apply when evaluating energy-efficiency investments, information asymmetries, split incentives, barriers to entry for energy services companies and high transaction costs.

In developing energy efficiency policies and programs, the Government seeks to deliver net public benefits including consideration of greenhouse gas emissions and the potential for lower energy prices through better demand management and more efficient use of resources. For example, the Government uses energy efficiency as a cost-effective method to reduce carbon emissions. The Issues Paper's narrow focus on private direct benefits may lead the Commission to overlook a significant amount of worthy potential energy efficiency.

The South Australian Government believes energy efficiency has an important role to play in providing financial relief to small energy consumers and reducing peak summer demand.

There is a need to target energy efficiency to small consumers as they face the greatest barriers. In South Australia, energy efficiency offers a means of providing financial relief to increases in energy bills that have resulted from privatisation.

There is merit in greater co-ordination between energy efficiency and peak demand management, particularly where they can be of great benefit to the community (eg. minimum standards for air conditioners reduces consumption and demand).

The South Australian Government supports the National Framework for Energy Efficiency as a means of unlocking energy efficiency benefits through greater national coordination of policies and programs. The inquiry offers an opportunity to comment on delivery mechanisms for Stage 1 NFEE measures and key factors to consider in Stage 2 investigations into incentive schemes. From a South Australian perspective, the design of any national incentive scheme needs to consider specific provisions for small consumers and peak demand reduction.

The Government, in working towards its own energy efficiency goals, has direct experience with the barriers to energy efficiency. The Government's Energy Efficiency Action Plan has proved to be an important tool to overcome these barriers within government operations.

In progressing energy efficiency in the transport sector there is a need to address (i) efficiency of individual vehicles, (ii) network efficiency and (iii) land-use efficiency.

1. CAPTURING UNTAPPED BENEFITS

The South Australian Government welcomes the opportunity to contribute to the Commissions inquiry into the economic and environmental potential offered by energy efficiency.

The South Australian Government is a strong supporter of energy efficiency. It recognises that there are many opportunities for energy users to derive private benefits through energy efficiency and/or conservation, yet for a range of well-documented reasons these benefits remain untapped. Greater uptake of energy efficiency can also result in significant public benefits such as reduced greenhouse gas emissions.

The failure of the market to deliver these benefits in South Australia is well documented. The Electricity Demand Side Measures Task Force¹ in its final report² stated:

“In a fully functional market environment, cost effective energy efficiency investments and demand responses to high market prices should occur without further incentives, but it is clear that this is not, in fact, the case in South Australia.”

Also from the same report:

“In summary, energy users do not seek to optimise the economic efficiency with which they use energy. In a complex world, people have many concerns and most have a higher priority than energy efficiency. So projects that are primarily about energy efficiency are often not even considered. And in investment decisions and purchases that involve energy use, energy efficiency is usually a minor consideration.”

Additionally from a discussion paper issues as part of the National Framework for Energy Efficiency (NFEE)³:

“None the less, the gap between the actual economic potential and the market delivered energy efficiency outcomes represents a significant amount of untapped market potential – there are significant economic benefits available that are not exploited by the market.”

The Australian Government’s June 2004 Energy Statement⁴ states the following regarding the role of energy efficiency:

“Energy efficiency is, and will remain, a central element of a cost-effective greenhouse abatement strategy, delivering about 40 per cent of expected energy sector abatement in 2010.”

As noted in the South Australian Government’s initial submission to the Inquiry, the SA Electricity Demand-Side Measures Task Force and the National Framework for Energy Efficiency have been two forums in which the barriers to energy efficiency have been investigated. Key barriers identified through these forums include the high risk premiums businesses often apply when evaluating energy-efficiency investments; information asymmetries, split incentives, barriers to entry for energy services companies and high transaction costs.

¹The Task Force was established by the South Australian Government in October 2001 to report on the measures that will assist in reducing electricity demands and lessen the impact of the electricity costs on industry, business and the community.

² Electricity Demand Side Measures Task Force, “Final Report”, June 2002

³ Energy Efficiency and Greenhouse Working Group, “Towards a National Framework for Energy Efficiency – Issues and challenges”, November 2003.

⁴ Australian Government, “Securing Australia’s Energy Future”, June 2004.

Given the market's failure to deliver these benefits and the barriers that exist for private consumers and producers, the South Australian Government takes an active role in energy efficiency. It does this by developing and implementing policies and programs that help the South Australian community tap into the wealth of economic, social and environmental benefits available through energy efficiency.

The National Appliance and Equipment Energy Efficiency Program (NAEEEP) is an excellent example of a government program, delivering energy efficiency benefits that would otherwise have gone untapped by the market. Experts have suggested that the additional purchase cost to consumers due to increased energy efficiency standards will be recouped on average within one to two years in the form of savings on energy costs and that the program will save purchasers over \$4 billion by 2018. The highly cost effective nature of the NAEEEP "suggests there is a case for much stronger action in this area"⁵.

Key Points:

- The South Australian Government strongly supports energy efficiency as a means to deliver economic, social and environmental benefits.
- Programs such as NAEEEP assist in overcoming barriers such as information asymmetry and demonstrate there is untapped potential to achieve significant benefits.
- Government intervention can and does deliver net benefits to the community.

2. GENERAL COMMENTS ON THE INQUIRY

The following points are conveyed in relation to the definition of energy efficiency used in the Productivity Commission's inquiry and how it relates to the drivers behind South Australian Government energy policy and programs.

The South Australian Government seeks to put in place policies and programs that produce a socially optimal outcome for South Australia and its future generations. In developing energy efficiency initiatives, the Government gives consideration to public benefits as well as private benefits. Public benefits include the value of avoided negative externalities such as greenhouse gas emissions.

Whilst the Commission's issues paper distinguishes between energy efficiency and energy conservation, the South Australian Government's policies and programs seek to achieve net public benefits through a combination of both. Policies and programs do not explicitly seek to promote one strategy over another.

Accordingly, the South Australian Government does not see particular merit in focussing exclusively on energy efficiency and would encourage the Productivity Commission to note energy conservation as a legitimate policy objective when formulating its recommendations.

A concern with only focusing on measures that deliver private benefits to end-users is that this may only capture the "low-hanging fruit" of energy efficiency and/or conservation. Additional measures, that could still deliver net public benefit, especially when considered as a package with the "low-hanging fruit" may remain untapped.

⁵ "Switched On" Issue 11, March 2004, <http://www.energyrating.gov.au/pubs/switchedon-11.pdf>
Supplementary submission to Inquiry into energy Efficiency South Australian Government

Consideration of benefits, either private or public, should not be constrained to direct energy benefits. Often energy efficiency and/or conservation can deliver indirect benefits that need to be taken into account in assessing cost-effectiveness⁶.

Key Points:

- The South Australian Government's policies and programs seek to achieve net public benefits and do not necessarily distinguish between energy efficiency and energy conservation.
- The Issues Paper's narrow focus on private direct benefits may lead the Commission to overlook a significant amount of worthy potential energy efficiency.

3. KEY DRIVERS FOR FURTHER ENERGY EFFICIENCY

There are a number of key drivers for further energy efficiency in South Australia:

South Australia's Strategic Plan is a plan developed by the Rann Government that looks forward and marks out the path for South Australia for the next decade. Under Objective 3, Attaining Sustainability, two of the targets relate to energy efficiency:

- Reducing energy consumption in government buildings by 25% within 10 years
- Increasing the energy efficiency of dwellings by 10% within 10 years

Energy efficiency is expected to also contribute to other targets.

Previously the **National Greenhouse Strategy** has been a driver in implementing and delivering energy efficiency policies and programs in order to reduce greenhouse gas emissions. This is to be superseded by a South Australian Strategy for Climate Change and Greenhouse, currently being developed, and will exceed current National Greenhouse Strategy commitments.

The **South Australian Government's response to the Electricity Demand Side Measures Task Force** establishes a number of actions to be taken by the Government in order to address the 24 recommendations of the Task Force. The full Task Force report and the South Australian Government's Response can be found on the Energy SA website at www.energy.sa.gov.au.

Stage one of the **National Framework for Energy Efficiency** has established implementation plans for eight integrated energy efficiency measures. These plans will build on existing programs such as the South Australian Government's Energy Efficiency Action Plan and the National Appliance and Equipment Energy Efficiency Program.

Greening of Government Operations encourages and supports good environmentally sustainable and eco-efficient practice in the operations in government. Under this framework, priority area 1 is energy management, which uses the existing Government Energy Efficiency Action Plan as the foundation program.

South Australian households have faced large electricity price rises as a result of **privatisation**. The Government is concerned about the impact of price rises on the community. Programs like the Energy Efficiency Program for Low Income Households, which offer energy services and incentives to low-income households, are important in this regard.

⁶ For example, efficient showerheads not only produce energy efficiency benefit, but also water efficiency. Better use of daylight in commercial buildings can also result in improved worker productivity.

At an **emergency meeting of State Ministers for Energy on the 26 June 2004** a number of actions were agreed to in order to address issues relating to the Australian Government's Energy Statement, *Securing Australia's Energy Future*. In regards to energy efficiency it was felt that the Statement offers no real incentives to promote energy efficiency or demand management. In order to continue to drive the uptake of energy efficiency the Ministers agreed:

"To demand immediate action by the Federal Government to offer incentives to promote energy efficiency and demand management"

Key Points:

The South Australian Government regards energy efficiency as a key means of responding to a number of state and national social, environmental and economic policy drivers. Government energy efficiency initiatives are able to help overcome the barriers to energy efficiency and deliver end-user private benefits.

4. THE NATIONAL FRAMEWORK FOR ENERGY EFFICIENCY

The South Australian Government, through the Ministerial Council on Energy (MCE), is currently participating in the development of the National Framework for Energy Efficiency (NFEE). On 27 August 2004, the MCE agreed to nine (subsequently revised to 8) national policy packages forming Stage 1 of the NFEE and to investigate incentives that could form a Stage 2 NFEE. In December 2004, MCE agreed to an implementation plan for the Stage 1 measures.

The South Australian Government regards the NFEE as an important vehicle to achieve significant improvements in the efficient use of energy and the economic and environmental benefits that would flow from this. Existing initiatives such as the National Appliance and Equipment Energy Efficiency Program (NAEEEP) and the energy efficiency work of the Australian Building Codes Board demonstrate the benefits that national coordination can provide.

The NFEE has provided a forum for the most comprehensive investigation in Australia into:

- Quantification of the energy efficiency gap
- Estimates of the broader economic and environmental benefits from capturing this energy efficiency potential (closing the gap)
- The barriers that prevent these benefits being realised
- Policy measures to capture this energy efficiency potential - and hence deliver the untapped economic and environmental benefits

These investigations together with stakeholder consultations have presented a compelling call-to-action for Australian governments. The Stage 1 policy measures agreed by energy ministers on 27 August 2004 offer the potential to deliver increased GDP of around \$400 million per year. The ministers also recognised the potential to deliver even greater benefits through well-targeted incentive mechanisms. The South Australian Government supports the NFEE Stage 2 investigation into incentive mechanisms for energy efficiency, such as a National Energy Efficiency Target (NEET).

For Stage 1 measures, the Productivity Commission's inquiry presents an opportunity for comment on the most effective means of delivering the measures so as to capture the maximum benefits.

Potential Stage 2 measures are yet to be developed by the NFEE Steering Committee. In light of this the Commission's inquiry presents an opportunity for identifying key factors that the NFEE Steering Committee could consider when investigating Stage 2 measures.

Key Points:

- The South Australian Government strongly supports the NFEE.
- As the NFEE Stage 1 is entering implementation phase the Commission's inquiry presents an opportunity for comment on the most effective means of delivering the policy measures so as to capture maximum benefits.
- As investigations into NFEE Stage 2 are yet to commence the Commission's inquiry presents an opportunity for identifying key factors that the NFEE Steering Committee could consider when investigating Stage 2 measures.

5. INCENTIVES FOR ENERGY EFFICIENCY

The Commission's Issues Paper notes that it has been asked to consider the policy option of a national energy efficiency target (NEET). The South Australian Government notes modelling undertaken through the Sustainable Energy Authority of Victoria (SEAV) has suggested that a 1 per cent National Energy Efficiency Target would result in \$1.57 billion increase in GDP after 10 years⁷.

The South Australian Government supports investigation into a NEET. There are, however, two key issues - specific provisions for small consumers and peak demand reduction - are important from a South Australian perspective and should be given significant consideration during the investigation into such a measure.

In its purest form, a scheme such as a NEET is likely to deliver benefits to those with low cost energy efficiency and low transaction costs, typically larger businesses. This tends to exclude those with the greatest barriers such as small consumers, especially those households with low incomes. Another important consideration from a South Australian perspective is to what extent such a scheme contributes to peak demand management.

At a State level, the Electricity Demand Side Measures Task Force in its Final Report raised the issue of incentives. The Task Force's final report found that:

"In particular, affluent householders with large refrigerative air-conditioners, which are a significant contributor towards higher summer market prices, are being subsidised by poorer households who are less likely to have such systems. For every \$1,000 of refrigerative air conditioning installed by an individual consumer, approximately \$1,000 of additional generation and distribution infrastructure is required, the cost of which is spread over all consumers.

With commercial interests now driving relationships and an increasing need for demand side action, due to the increased peakiness of demand and heightened environmental concerns, the Task Force stresses the need for the Government to help the customer, in real financial terms, in respect of demand-side measures."

The Task Force believed that there was a need for measures to ensure a balance between the best interests of energy retailers and those of small consumers and the environment. The Task Force investigated a number of measures introduced, both nationally and internationally, which aim to provide balance between the interests of consumers and energy retailers.

⁷ To put this in context, the Stage 1 NFEE has the potential to deliver increased GDP of around \$400 million per year.

The Task Force noted that using an intermediary, such as an energy retailer, provides access to a much larger residential market than could be reached by a single government agency.

Energy efficiency has unique properties that warrant consideration of a dedicated incentive measure. It is able to address a number of Government objectives relating to energy use and the environment and also provide private net benefits to consumers through reduced costs.

Key Points:

That the South Australian Government supports investigations into a NEET and believes that the design of any national incentive scheme needs to consider specific provisions:

- To target those with the greatest barriers to energy efficiency, especially small energy consumers and low-income households.
- To encourage energy efficiency measures that also deliver peak demand reduction benefits.

6. ENERGY EFFICIENCY AND PEAK DEMAND MANAGEMENT

South Australia's electricity profile is the peakiest of all the Australian states. Approximately one third of the State's existing generation capacity operates for 5% of the year or less.

The Electricity Demand Side Measures Task Force, in its Final Report, noted that:

“the need to supply large quantities of electricity for short periods of time, largely to meet summer air-conditioning requirements, is leading to an unsustainable investment in peaking generation that will lead to increasingly higher costs for South Australian consumers.”

Peak energy demand continues to grow at a faster rate than electricity sales.

The Task Force made a number of recommendations regarding peak demand management, including:

- Develop better house rating tools and standards to tackle peak demand issues
- Extend energy rating of residential dwellings to include major fixed appliances
- Enforce disclosure of building energy performance at time of sale or lease
- Develop stringent new minimum performance standards for residential air conditioning systems

Managing the State's peak demand is a fundamental energy policy challenge made more complex by the fact that energy retailers and distributors often lack incentives to deliver energy efficiency as they receive revenue through energy sales, while their costs are largely driven by peak demand. Peak demand management can avoid consumer price increases by being cost effective alternatives to new generation and network infrastructure that is otherwise poorly utilised.

Not all peak demand management strategies deliver energy efficiency outcomes. Measures such as off-peak water heating - one of the most common forms of peak load shifting - result in energy inefficiency due to standing losses from storage water tanks.

Conversely, not all forms of energy efficiency deliver favourable peak demand management outcomes. National rating tools used to assess new home performance against the South Australian Government's 4-star standard give preference in South

Australia to winter performance over summer performance. From a greenhouse gas reduction perspective this makes sense as more energy is used in homes to heat than to cool. Such conflicts highlight the need for peak demand management and energy efficiency policies and programs to be complementary.

In delivering energy efficiency initiatives, such as the Stage 1 NFEE measures and those to be investigated as part of the Stage 2 NFEE, there is merit in considering means by which these can complement peak demand objectives.

The Commission's term of reference 4 makes reference to more efficient cost-reflective pricing. It is worth noting the Electricity Supply Industry Planning Council has recently analysed the effect on demand for electricity following tariff increases associated with the introduction of full retail contestability in South Australia⁸. This analysis demonstrated that small consumers have responded to increased tariffs through energy efficiency and energy conservation.

Small consumers in South Australia currently do not receive strong cost-reflective price signals. As a result, it is unlikely that the energy efficiency and energy conservation measures taken have flowed through to peak demand reductions. As a result, it is possible that these measures have resulted in a further deterioration of the load factor (ratio of average demand to peak demand).

Greater cost-reflective pricing would allow for energy efficiency and energy conservation to be aligned better to peak management objectives - though it is likely to be only one of a range of strategies that will be needed to effectively manage peak demand. The range of ETSA Utilities peak demand management trials⁹ proposed by the Essential Services Commission of South Australia will provide greater insight into the relative merit of various peak demand strategies.

The AGL SA standing contract price¹⁰ for electricity in South Australia incorporates the following cost-reflective pricing elements:

- A lower off-peak tariff for controlled loads (for households) or night (for small businesses).
- A higher summer tariff that applies from 1 January to 31 March

The lower off-peak tariff, which has been in place for many years, encourages the use of electric storage water heaters. As discussed above, this is a form of water heating that has significant inefficiencies due to standing losses. The South Australian Government's Solar Hot Water Rebate program seeks to encourage a greater uptake of solar water heating as a more efficient and less greenhouse-polluting alternative to electric storage.

The summer tariff applies to all electricity usage over January to March that is not covered by an off-peak tariff. Accordingly, it does not distinguish between specific times or days of high wholesale prices. The inefficient use of electricity at times of high wholesale prices

⁸ Report to the Essential Services Commission of SA, Sales forecasts by tariff category for South Australia's electricity distribution network for the period 2005-06 to 2009-10, 14 September 2004

⁹ The Draft 2005-2010 Electricity Distribution Price Determination, prepared by the Essential Services Commission of South Australia, makes specific provision for ETSA Utilities to commit \$20 Million over the five year regulatory period to trial a number of demand management initiatives which may result in less need for peak-driven network expansion.

¹⁰ The Essential Services Commission of South Australia has made a price determination to fix AGL SA's standing contract prices for small customers (those that consume less than 160 MWh per year) that have not entered into a market contract.

imposes additional costs that are largely met by all electricity consumers. Government programs such as Minimum Energy Performance Standards (MEPS) for refrigerators and air conditioners contribute to improving the efficiency of electricity use at such high wholesale prices times.

Key Points:

- Growth in peak demand is a significant issue in South Australia. Priority needs to be given to energy efficiency and peak demand management initiatives that are complimentary.
- While noting that consistent pricing is used for social equity reasons, non-cost reflective pricing is a barrier to the uptake of energy efficiency and demand management options.
- The ETSA Utilities peak demand management trials will provide greater insight into the relative merit of various peak demand strategies.

7. SOCIAL DIMENSIONS

Private individuals, particularly those who are poor, face a number of specific barriers to improved energy efficiency in relation to housing. Consistent evidence from welfare groups suggests that people in rental housing have limited opportunities to improve the efficiency with which they use fuel because they do not own the major appliances in the house, nor have a chance to alter the thermal properties of the house. Many such families also have relatively high needs for heating and cooling because they are at home during the day and may be ill or disabled.

A South Australian parliamentary inquiry into poverty¹¹ recommended a number of measures aimed at reducing electricity costs in low-income households, including:

- Education/information to help households reduce electricity consumption
- Low cost or free energy audits for low income households
- Free energy audits for all South Australian Housing Trust tenants in older housing stock
- Low interest loans for items to assist in reduction of energy use
- The development of strategies to promote energy efficiency in urban developments that include low cost housing, including analysis of the long term economic impact of energy efficient design

The South Australian Government regards energy efficiency as an important and low cost means of providing financial relief to low-income households. Through its Energy Efficiency Program for Low-Income Households, the South Australian Government uses energy efficiency services and incentives to help reduce energy costs to low-income households. This scheme aligns closely with a number of the Poverty Inquiry's recommendations.

Key Points:

There is a need to target energy efficiency programs towards small consumers as they face the greatest barriers. Within this sector energy efficiency can be a low cost means of delivering broad social benefits.

¹¹ Social Development Committee of the South Australian Parliament, Seventeenth Report, Poverty Inquiry, May 2003

8. EXPERIENCE IMPLEMENTING ENERGY EFFICIENCY

The South Australian Government's Energy Efficiency Action Plan (EEAP) has been prepared in accordance with Measure 3.1 of the National Greenhouse Strategy (1998) for Governments to "develop and implement an action plan to reduce emissions". The Premier launched the EEAP in 2002. It is available at:

www.sustainable.energy.sa.gov.au/pages/programs/government/state/state.htm

Through the EEAP the South Australian Government has set a target of 15% reduction in energy use in government buildings by 2010 (based on 2000/01 levels). As part of the South Australian Strategic Plan, the Government has extended this target to a 25% reduction within 10 years. An Energy Efficiency Reference Group has been established to implement reporting processes for the EEAP targets.

Translating the EEAP into action

The experience gained within the South Australian Government building environment thus far, indicate that the EEAP Policy Statement was just the beginning of a significant range of measures put in place to support its implementation. Action taken by the Government since the introduction of the EEAP includes conducting briefings for key stakeholder groups accompanied by the development of guidelines, embedding the energy efficiency requirements in building project procurement processes, development of agency specific standards, the use of rating tools and the introduction of efficiency technologies. Together, these have produced an integrated implementation strategy necessary to successfully realise the policy objectives and overcome some of the barriers encountered.

Some of the specific actions taken to support implementation of the Energy Efficiency Action Policy Statement include:

- Formation of an Energy Efficiency Reference Group to implement reporting processes for the EEAP targets
- Establishment of energy consumption baseline against which agencies' consumption can be measured and monitored
- Translating the EEAP into process guidelines accompanied by briefing seminars and embedding the energy efficiency actions into the building life cycle process eg, existing major project capital investment procurement processes and facility management processes
- Working with agencies to improve preventive maintenance strategies including specific maintenance regimes and associated works schedules for various plant, equipment and engineering services
- Establishing lease arrangements that avoid passing uncontrolled central service costs to the tenant
- Investigations that have identified cost-effective energy efficiency improvements to school and pre-school air conditioning systems (new and retrofits) eg, application of commercially available energy recovery ventilator fans
- Securing Australian Procurement and Construction Council (APCC) agreement to the principle of a common and consistent approach to environmental rating tools for application by the Government Real Estate Group (GREG)
- Adoption of the Green Building Council of Australia's Green Star 'Office Design' tool for the design and construction of new office accommodation and a 5 star rating sought

Barriers and Impediments Encountered

The South Australian Government has encountered the following barriers in implementing the EEAP. The presence of such barriers further emphasise the need for the comprehensive, integrated implementation strategy described above to assist in their mitigation.

- Changing building operation and maintenance strategies from fix-when-fail to a preventive approach has had limited success because asset owners are **reluctant to increase preventive expenditure** in the hope that longer term benefits / paybacks will be realised from more efficiently operating engineering services.
- It is difficult to convince organisations to adopt energy saving or efficiency measures that involve some form of **initial capital investment** that is anticipated to yield longer term benefits. In some instances the decision to accept a longer-term strategy is often hampered by the organisational separation of management responsibility between capital and recurrent funds.
- Where new technologies are introduced it is critical that the building occupants and those responsible for engineering service operation are **adequately trained** in the operating procedures.
- For most organisations, building management is **not their core business**, resulting in core business investments receiving greater priority
- **Energy costs tend to be small in comparison** with the plethora of costs associated with sustaining buildings
- Many energy efficiency benefits tend to have **longer-term payback periods**
- The **complexity of the relationship between** the wide range of participants in the building and construction industry. What motivates building developers, owners and occupiers can differ considerably and this bears directly upon implementation of life cycle principles.
- Many staff within agencies have **limited awareness of energy efficiency products and services**, such as Energy Performance Contracts, provided by the energy services industry¹².
- **Ready access to accurate and timely data** is the essential element of a program to improve energy efficiency. Reducing energy consumption exemplifies the adage “You can’t manage what you can’t measure”. Ensuring that every government site (leased or owned) is accurately recorded on an up to date asset register and establishing a monitoring and reporting has been a key to performance improvement. Further, lack of knowledge about **how to measure and verify the performance of an energy efficiency initiative** leads to uncertainty over whether those making investments are getting value for money.
- As the **market becomes better informed** and insists on higher standards of energy performance to support building occupants, developers and owners will increasingly be required to respond to remain competitive in the real estate market. There are indications that this is already occurring as competition for environmental star ratings is evident among building suppliers in the office accommodation market.

Key Points:

¹² The Energy Services are broadly defined as the development and implementation of systems and processes that use energy efficiently, increase the reliability of supply, reduce peak demand and reduce greenhouse gas emissions associated with energy use.

- Like many large organisations the South Australian Government faces many barriers in implementing energy efficiency including high upfront costs, limited awareness of energy efficiency options, lack of available data and differing interests of participants in the building and construction industry.
- The South Australian Government's Energy Efficiency Action Plan Policy Statement has provided the catalyst to action and its successful implementation has involved a mix of activities including accompanying guidelines, briefing seminars and embedding the energy efficiency actions into existing procurement processes and maintenance practices.
- South Australian Government's experience indicates that ready access to accurate and timely data is an essential element of a program to improve energy efficiency.

9. TRANSPORT ISSUES

Transport System Complexity

Maximising transport sector energy efficiency is particularly demanding due to the sectors complex, multi faceted and competing interactions. The desire for improved transport energy efficiency must be balanced against the requirements of appropriate levels of safety, impact on the economy and environmental and social sustainability, to name a few.

Transport energy efficiency can be evaluated on a number of levels including:

- Efficiency of individual vehicles;
- Network efficiency; and
- Land use efficiency.

Evaluation of each level identifies a number of contradictions and opportunities in the existing system with regard to improvements in energy efficiency and use. Arguably, any of the energy efficiency measures described below could be considered as energy conservation rather than improvements in energy efficiency.

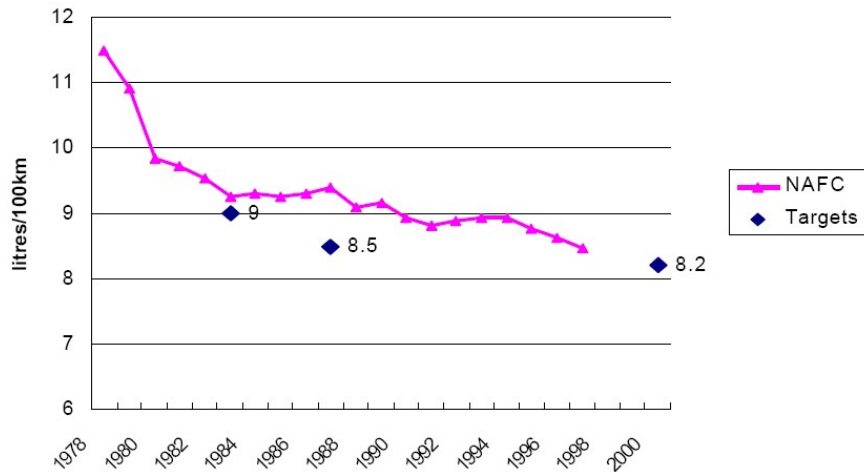
Efficiency of Individual vehicles

In simple terms individual vehicle efficiency can be defined as the amount of energy used per distance travelled (for passenger vehicles) or per tonne kilometre (for freight vehicles). In this context measures that reduce vehicle fuel consumption while still achieving identical outcome with similar attributes improve vehicle efficiency.

For instance, the Federal Chamber of Automotive Industries (FCAI) has previously agreed to voluntary code of practice for reducing fuel consumption levels. National Average Fuel Consumption (NAFC) targets were set for 1983, 1987 and 2000 and although the industry failed to achieve those, reductions were nonetheless achieved over this period (see graph below)¹³ for vehicles of similar classes. New voluntary targets have now been set for 2010 and whilst it is expected that further improvements will be made, the average fuel consumption levels will remain high (say in comparison to the European Union) as long as Australian manufacturers rely on the "upper medium"¹⁴ vehicle class to remain competitive.

¹³ "Study on Factors Impacting on Australia's National Average Fuel Consumption Levels to 2010", A report for the AGO by ACIL Consulting, June 1999.

¹⁴ "Upper medium" vehicle category is defined as a passenger car, hatch, sedan or wagon, 6 cyl or 8 cyl (37.2% market share in 1998).



Source: Australian Greenhouse Office and ACIL Consulting

The two strongest segments of the Australian car market include small and light vehicles (Hyundai Excel, Toyota Corolla etc) that are largely imported and “upper medium” vehicles (Mitsubishi Magna, Holden Commodore etc) that are produced locally. Most notably, 79.5% of “upper medium” category of vehicles in 1998 were sold to fleets and government fleets form a large proportion of this. Whilst decisions on the purchase of small vehicles are driven by a set of priorities such as value for money, reliability, fuel consumption and safety, decisions for purchasing “upper medium” class vehicles are driven by requirement for power, torque at low speed, passenger compartment size, affordability, safety and fuel consumption.

Fleet purchasing policies are typically aimed at buying Australian made vehicles and this results in a selection of “upper medium” category vehicles (given lack of smaller size vehicles produced in Australia). Furthermore, and probably more importantly, fringe benefits tax arrangements motivate use of larger, less efficient vehicles and greater car use given the additional impact on tax minimisation.

Introduction of smaller, more efficient vehicles into Australian vehicle production, whilst desirable from an energy efficiency perspective, would present a number of challenges such as the costs of conversion for the Australian automotive industry and likely competitive pressures from vehicle manufacturers abroad.

Providing New Vehicle Fuel Consumption and Emissions Information

The requirement under the Australian Design Rules for compulsory labelling of fuel consumption and CO₂ emissions of new vehicles and a recently launched Green Vehicles Guide is aimed at providing comparative fuel consumption information to consumers. Whilst this is critical to informing the public about the performance of the vehicles they may be about to purchase, a significant asymmetry exists in the Australian market in relation to fuel efficiency. By and large, local manufacturers focus their extensive marketing campaigns on power, passenger comfort and performance and little information is provided about fuel efficiency. The small amount of information provided on vehicle efficiency is unlikely to generate a huge impact given that it is competing with very large professional campaigns arguably aimed at the opposite.

Key Points:

There is a need to promote the use of clean and fuel efficient vehicles by educating the public about potential savings in operating costs and reduced environmental damage of more suitable vehicles for the task intended.

Considering Embodied Energy of Motor Vehicles

A weakness of setting NAFC targets is that it only considers fuel consumption values as a measure of improved energy efficiency. Embodied energy used in the vehicle's manufacturing process may form a significant part of the whole of life energy consumption. As such, the embodied energy requires consideration, as does the requirement to meet safety and performance standards. Producing super efficient motor vehicles that satisfy all of today's expectations of safety, comfort and performance is technologically possible however the use of very lightweight materials to produce these may require a significantly higher production energy input.

Key Points:

To give a complete picture, future efficiency targets for motor vehicles could incorporate embodied energy of vehicles.

Providing information on costs of travel

The perceived cost of motoring influences the choices people make about the type of vehicle they use or the transport mode they select such as public transport, walking and cycling. At present, motorists do not accurately estimate the actual cost of motoring when they make their vehicle choices and travel decisions. This occurs in part because fixed charges such as registration and insurance fees do not vary with the amount of use and consumption. Provision of information about the actual cost of travel will assist the public in making more appropriate travel choices.

Using Alternative Fuels

Use of alternative fuels such as LPG, CNG and biodiesel may have beneficial consequences for individual vehicle energy efficiency. They also provide the additional benefit of reducing Australia's dependence on imported oil. Given the limited penetration of these fuels into the Australian market, compounded by limited refuelling infrastructure and availability of advanced alternative fuel vehicle technologies, the existing price differential between alternative and conventional fuels should be maintained if not increased. Conventional fuels have a significant market leaders advantage that almost guarantees a monopoly for these fuels.

Two decisions flagged in the Energy White Paper released by the Prime Minister earlier this year are likely to reduce the difference in effective prices of alternative and conventional fuels to the point where some alternative fuels are unlikely to be used in the future. Firstly, the Federal Government proposed to introduce partial excise relief for vehicles that are over 4.5 tonnes gross vehicle mass (GVM) and used to conduct business. Secondly, excise is to be introduced on alternative fuels from 2011. Reduction in the use of alternative fuels is undesirable. Furthermore, reduction in the actual cost of fuel is likely to make energy efficiency of heavy vehicles less of an issue and therefore likely to result in less efficient vehicles being purchased. Finally, depending on the level of road use charges it is possible that heavy vehicle operators will select a vehicle that is just above the 4.5 tonnes GVM limit even though a smaller, more energy efficient vehicle was suitable for the intended activity.

Stricter emissions standards are putting pressure on energy efficiency of individual vehicles. Use of alternative fuels has the potential to reduce emissions while at the same time improving energy efficiency and reducing greenhouse gas emissions. A

comprehensive CSIRO report¹⁵ on alternative transport fuels identified significant energy and environmental advantages of these fuels over conventional fuels.

Key Points:

Policies and strategies for pricing controls (excise and rebates) on motor vehicle fuels should not be used to increase the price of alternative fuels thereby decreasing the price differential between alternative and conventional fuels.

Making Road Freight Vehicles More Efficient

Road freight vehicles design has traditionally been limited by prescriptive standards to maximise safety, minimise damage to the environment and prevent damage to roads and infrastructure. Development of National Performance Based Standards for Heavy Vehicles is likely to result in industry innovation and improvements in vehicle efficiency. The trend for larger and heavier vehicles is likely to continue resulting in reduced fuel consumption per tonne kilometre of road freight task and therefore higher overall efficiency.

Key Points:

Continue work that encourages development of safer, cleaner and more efficient road freight vehicles.

Influencing Driver Behaviour

Another significant element of the energy efficiency of an individual vehicle is driver behaviour. Driver behaviour can make up to 30% difference in fuel consumption.

Vehicle maintenance also plays a part in improving energy efficiency. Targeted enforcement of gross polluters through smoky vehicle reporting programs and use of emissions testing facilities are likely to improve motor vehicle maintenance practices of in-service vehicles that result in reduced greenhouse gas emissions, pollution and improved fuel consumption and therefore individual vehicle efficiency.

Key Points:

Means of influencing driver behaviour include:

- Educating drivers about the impact of driver behaviour on vehicle efficiency
- Introducing programs that enforce environmental performance through targeted enforcement of in-service vehicles

Network Efficiency

Assuming that the most efficient individual vehicles are already operating on our roads, network efficiency presents the next opportunity for improving energy efficiency of the entire transport system. In this context network efficiency also extends to other transport modes such as rail, marine and air.

An energy efficient network could be defined as one that carries the most transport task (people per kilometre and freight tonnes per kilometre) in the minimum amount of time against the embodied energy used to create this network. So an intelligent transport system (ITS) equipped network of roads with well synchronised traffic signals and up to

¹⁵ "Life-cycle Analysis of Alternative Fuels for Heavy Vehicles", A report for the AGO by CSIRO, 2002. Supplementary submission to Inquiry into energy Efficiency South Australian Government

date driver information will have a better network energy efficiency than an identical network without these technologies because vehicles on the ITS network will have a smoother transition and use less fuel to travel to their destinations.

Making Informed Transport Mode Choices

The concept of an efficient network also implies that the choice of transport mode used is the most appropriate given the users expectations of time, comfort, performance etc. This requires provision of key information including cost-reflective pricing signals that accurately replicate incremental costs associated with the use of each mode. For instance, the choice of transporting freight on road or rail could be made on the basis of price that takes into account original investment in the infrastructure, maintenance requirement due to damage caused by moving the freight, any externality costs (environmental damage etc) and operational costs including energy used. Presuming that the infrastructure investment and maintenance costs broadly represent the embodied energy of the infrastructure, this type of arrangement would most likely result in the most energy efficient movement of freight. Whilst this is the general intention of the National Transport Commission, it is difficult to determine accurate mode specific pricing information especially given variability of the maintenance expenditure over time.

At the network level, there is a lot of debate over the impact of road charging has on the choice of land transport mode. The National Transport Commission argues that road transport pays the full cost of its impact on road infrastructure through its cost recovery process. Nationally consistent heavy-vehicle charges were first introduced to Australia by the National Road Transport Commission in 1995. The charge applies to all heavy vehicles over 4.5 tonne and is a two-part charge consisting of a vehicle registration component levied and collected by the state/territory governments, and a fuel (or road usage) charge raised and collected by the Commonwealth as part of fuel excise. The national heavy vehicle charge was designed to:

- Fully recover the costs of providing and maintaining the nation's road network;
- Stop "shopping around" by heavy vehicle owners for the cheapest registration charge; and
- Establish a more competitive playing field with respect to road transport options.

While "shopping around" has unequivocally been stopped, it is debatable as to whether the current charging system has achieved full cost recovery or has encouraged appropriate transport choices through a fair and competitive playing field.

Current charges are determined through a national averaging process that aggregates road costs for each heavy vehicle category (12 in all) and divides these costs by the number of vehicles in the national fleet. As road authorities do not consistently record whole-of-life-cycle costs for constructed roads, the national charging system uses annual expenditure data from road authorities as a surrogate for annualised road costs.

This methodology is known as PAYGO, or pay-as-you-go, system of charging. To eliminate the effects of annual peaks and troughs in road authority expenditure profiles, the charging system uses a rolling average of the previous three years expenditure data. Any increase in heavy vehicle charge is capped at the national inflation rate and has a floor of zero (i.e. charges cannot decrease).

Although in aggregate, the attributed costs of road infrastructure are collected from road transport, the approach to determining heavy vehicle charges has several weaknesses with respect to efficient transport choice.

The national averaging process means that local costs are overwhelmed by what happens across the whole of Australia. This means that any pricing signals that perhaps should influence mode choice in local situations are effectively blunted. For example, in many grain growing areas, rail is seen as vitally important for local grain transport and is more energy efficient than road transport. Most grain lines, however, are now privately owned and any private sector investment will need to be recovered through transport charges and these are felt immediately, directly and locally through rail transport rates. The alternative is to allow these railways to close and place significant investment in roads. Even though the investment may be greater than that for rail, because the pricing mechanism is averaged across Australia, local road charges remain effectively the same regardless of the investment required as a result of transport choice. Any pricing signal, if it is felt, only impacts many years after the choice of mode has been made. At the time the mode choice is made, it appears as if there is no price to pay for the choice of what might be a less efficient transport mode.

Technological advances are being made that might allow a more selective and immediate road pricing use charge that can reflect local impacts including congestion and cost of local transport facilities.

To motivate use of more efficient transport modes the SA Draft Transport Plan proposes improvements in inter-regional and interstate rail freight links and supports development of intermodal freight terminals.

In the area of passenger transport, travel behaviour change programs such as South Australia's TravelSmart SA aim to motivate greater use of less energy intensive and greenhouse friendly passenger transport modes such as public transport, cycling and walking. This is achieved by provision of appropriate information regarding transport options and their benefits. Analysis of this approach indicates a positive cost benefit ratio ranging from about 4:1 to 44:1. TravelSmart has demonstrated a significant shift from passenger vehicle use to public transport.

Investment in efficient systems for moving people such as public transport and cycling and walking infrastructure is critical to motivating use of these services over passenger vehicles. To this end South Australia's Draft Transport Plan recommends initiatives that achieve these objectives including, to name a few, creating fully connected cycle networks in partnership with Local Government, development of walking and cycling facilities, promoting Walking School Buses, Bike ED programs and special events.

Public transport infrastructure has also been identified for upgrade including replacement of critical transport assets, purchase of new buses and train refurbishment. Public transport will be made more attractive through upgrades to existing interchanges and the urban environment in the vicinity of public transport operations and through improvements in safety, security and accessibility. Public transport will be given priority on the road network through transitways, clearways and improved traffic signals.

Adoption of car parking levies, especially in areas where alternative forms of transport are readily available are further likely to motivate use of more efficient transport modes.

Importantly, a smarter approach to transport spending is being proposed that relies on a four-tiered priority framework – safety first, public transport, freight, and then selected improvements to address capacity needs.

Key Points:

- Transport investment decisions need to acknowledge the shortcomings of on-going road capacity improvements and recognise benefits of sustainable transport modes such as public transport, cycling and walking.
- Transport user charging systems and technologies are needed that allow accurate accounting of energy intensity, externality costs and infrastructure consumption and are sensitive to local conditions and therefore result in efficient transport mode selection.

Improving Network Efficiency Through ITS

Intelligent Transport Systems (ITS) provide some clear benefits for improving the efficiency of the transport network. Whilst ITS can improve energy efficiency of the network, in the long term this may have the unintended outcome of motivating further vehicle use resulting in traffic congestion, delays and increased fuel consumption and vehicle emissions. However, ITS has the capability to assist in the management of the need to travel by car through congestion and parking pricing and by encouraging alternative travel patterns such as use of public transport and higher vehicle occupancy.

Key Points:

The use of technologies that result in improved utilisation of existing infrastructure and motivate use of efficient and sustainable transport modes needs to be promoted.

Land Use Efficiency

Land use efficiency specifically relates to the strategic distribution of residences, workplaces and commerce precincts etc with the aim of minimising the requirement to travel. This also relates to co-locating alternative transport modes such as public transport interchanges in close proximity of trip generators. Higher density population centres result in fewer and shorter passenger trips and these typically result in higher public transport use due to its improved service performance in such locations.

Information provided to potential property purchasers and renters about the costs of travel is expected to provide balance in the decision about dwelling location with respect to the location of work, educational and shopping facilities and result in reduced need for travel especially by passenger car.

Key Points:

Improved land-use efficiency can be progressed through means such as:

- Educating the community about impacts of cost of travel to motivate more appropriate accommodation choices
- Promoting higher density population centres with improved public transport, cycling and walking services and facilities
- Integrating public transport infrastructure and urban development
- Evaluating and implementing measures that require assessment and regulation of the inherent travel demand of new developments with respect to efficient access to key facilities