VICTORIAN GOVERNMENT

RESPONSE TO THE PRODUCTIVITY COMMISSION

DRAFT REPORT ON ENERGY EFFICIENCY

May 2005

Contents

Key Points

- **The Victorian Government pursues energy efficiency policies and programs largely to achieve net environmental benefits, recognising that these will also contribute to broader social and economic benefits.**

- **Energy is intrinsically different from most other commodities or services since it is an essential service that the whole community depends on and energy has a pervasive role in economic activities of the State.**

- **The Victorian Government pursues energy efficiency through a mix of policy tools and as part of a broad-based package of measures to achieve greenhouse abatement and a secure and affordable energy supply.**

- **Government intervention is required to address market failures that result in various market barriers and impediments to energy efficiency.**

- **Analysis by the Victorian Government as part of the *Greenhouse Challenge for Energy* shows that a package of measures to drive greenhouse gas emissions abatement – including national emissions trading complemented by action to drive energy efficiency – would deliver net economic benefits to Australia under a wide range of future scenarios.**

- **The Victorian Government acknowledges the value of evaluating energy efficiency policy and program outcomes against defined objectives as a basis for informing future policy development.**

- **In addition to achieving broader environmental, societal and economic objectives, the Victorian Government assesses the impact of energy efficiency policies and programs on consumers and, where possible, supports those that deliver net private benefits.**

- **The Commission's assessments of the potential benefits of individual energy efficiency programs and the rationale for government policy interventions are all underpinned by the limited test of net private benefit to individual producers or consumers. It is the Victorian Government's view that this confined scope has significantly diminished the value of the Inquiry as an input to government policy-making.**

Introduction

The Victorian Government welcomes the opportunity to provide a response to the Productivity Commission's (Commission) Draft Report on its Inquiry into *Energy Efficiency*.

This response has three key elements:

- The policy context for the Victorian Government's energy efficiency policy and programs.

- A detailed discussion of the scope of the Inquiry and the limitations inherent in its terms of reference that constrain the potential contribution of the Draft Report to public policy formation.

- Responses to the Draft Report's findings and recommendations relating to specific energy efficiency policies and programs, with particular reference to the Victorian Government's commitments and ongoing program of action in this area.

The Sustainable Energy Authority of Victoria (SEAV), at the Commission's request, has previously completed and submitted the Energy Efficiency Program Template, to provide background information on Victoria's recent and current energy efficiency policies and programs. As chair of the National Framework for Energy Efficiency (NFEE) Steering Committee, SEAV also provided the Commission with background briefings on the technical and economic modelling undertaken as part of the NFEE development process and with details of the policy packages that the Ministerial Council on Energy has agreed for implementation under NFEE Stage One.

1. The policy context for energy efficiency in Victoria

The Draft Report identifies some 11 Key Points (page XX), which define the analytical approach adopted by the Commission and the assumptions that underpin the comments, conclusions and recommendations contained in the body of the Report. In a number of key areas, the Victorian Government brings a different analytical perspective to the issue of energy efficiency policy and therefore draws different conclusions about the value and relative merits of various policies and programs.

The broad directions/principles underpinning Victorian Government policies and programs relating to energy efficiency are outlined below.

The Victorian Government pursues energy efficiency policies and programs largely to achieve net environmental benefits, recognising that these will also contribute to broader social and economic benefits.

The Commission notes the environmental objectives of energy efficiency in its Key Points section of the Draft Report, as follows:

> " Many governments see energy efficiency improvements as a low-cost means of reducing emissions of greenhouse gases, and thereby slowing global climate change." (page XX)
>
> " Some energy efficiency measures may not be privately cost effective, and yet may generate net public benefits because of their environmental outcomes. Those measures may prove to be sound public policy, but they should also

be considered against other means of achieving the environmental benefits more directly." (page XX)

The Victorian Government agrees with the Commission that Government intervention may be warranted for its pollution abatement benefits (page XLIV). It is important that the relative cost-benefits of energy efficiency policies and programs in pursuit of greenhouse gas abatement are assessed against other abatement measures, including sequestration, reduced greenhouse gas intensity (GHGI) of existing generators, alternative generation sources and switches to less GHGI fuels (renewables, gas) in the end-use energy mix.

As discussed further below, analytical work commissioned by the Victorian Government[1], has indicated that, over a large range of greenhouse gas abatement opportunities, energy efficiency improvement costs are lower than other abatement options.

In addition to achieving broader environmental, societal and economic objectives, the Victorian Government assesses the impact of energy efficiency policies and programs on consumers and, where possible, supports those that deliver net private benefits.

In formulating energy efficiency measures, the Victorian Government considers an array of factors, such as economic analysis, estimated and perceived social and environmental benefits and costs, and community policy expectations. It also evaluates the effectiveness of various policy approaches ranging from the provision of information to the introduction of mandatory requirements for achieving specific outcomes.

The Victorian Government also considers net private benefit when developing policy to improve energy efficiency. In these evaluations, net private benefits are defined in terms of cost estimation, which include any distortions to private investment decisions, and energy savings benefits (at current and expected prices) to the private sector (households/businesses). However, these net private benefits are considered within the context of broader objectives. Therefore, it is necessary that the public benefit outweighs any private costs.

In the Commission's view, the net private benefit test should consider the diverse preference of individual homebuyers when economic decisions are made (Draft Recommendation 7.3). For example, in the case of new Victorian homes that are mandated to conform to a 5-star rating for the building shell, application of the Commission's criterion would trade-off lower thermal performance ratings in exchange for other new home features (increased size, exterior features etc.).

The Victorian Government and other governments, here and overseas, has decided to constrain consumer and producer sovereignty in the construction and purchase of new homes, on the basis of broader environmental, social and economic criteria, including: reduced greenhouse gas emissions; increased health and well-being; reduced private energy expenditure; and deferral of energy infrastructure investment. Similarly, minimum energy performance standards (MEPS) for appliances and equipment constrain consumer and producer sovereignty for similar reasons, as well as trade imperatives.

[1] Allen Consulting Group, *The Greenhouse Challenge for Energy*, Report to the Victorian Department of Infrastructure and Department of Sustainability and Environment, September 2004, page 80

The Commission has suggested that mandatory measures, such as MEPS, override consumer and producer sovereignty (pages XX and XLII). However, the Commission has not defined how it views producer and consumer sovereignty, nor were alternative definitions and implications for energy efficiency explored. A broader interpretation of consumer sovereignty would encompass group as well as individual choices about the economic, social environmental and ethical dimensions of consumption and production. Given that government action to address energy efficiency is usually predicated on the net benefits to the community, a broader view of consumer and producer sovereignty is justified.

The Victorian Government pursues energy efficiency through a mix of policy tools and as part of a broad-based package of measures, to achieve greenhouse abatement and secure and affordable energy supply.

The Commission notes the need for evaluations of the effectiveness of energy efficiency alongside other greenhouse gas abatement policy approaches with a view to determining the relative merits of energy efficiency in the greenhouse and overall energy policy mix. While this analysis did not fall within the scope of the Inquiry, the Victorian Government considers this would have been a useful and informative exercise.

The Victorian Government is committed to pursuing greenhouse gas abatement through a package of policy measures with national emissions trading at the core, supported by complementary measures including a strong focus on energy efficiency. The Government acknowledges the Commission's view (page XLIV) that 'a coherent, soundly-based national response is required' to address greenhouse gas externalities.

The Victorian Government's position is supported by extensive analysis undertaken as part of the development of *The Greenhouse Challenge for Energy* position paper (December 2004)[2], on how the Government could best achieve its commitments to reduce greenhouse gas emissions from the energy sector while maintaining a secure, efficient and affordable supply of energy.

This analysis showed that a package of measures including national emissions trading complemented by action to drive energy efficiency would deliver net economic benefits to Australia under a wide range of future scenarios.

The Allen Consulting Group's analytical work[3] also identified the following key conclusions regarding the role of energy efficiency:

- the availability of 'no regrets' energy efficiency opportunities in the short term - "According to recent analysis, if industry took up only half the cost effective measures available to it, very substantial emissions abatement would be delivered

[2] Allen Consulting Group, *The Greenhouse Challenge for Energy*, Report to the Victorian Department of Infrastructure and Department of Sustainability and Environment, September 2004.

[3] In the *Greenhouse Challenge for Energy* modelling undertaken by COPS Monash for the Allen Consulting Group, the EEI imposed under the preferred package scenario (ETS at a permit price of $5/t CO2, exemptions for trade exposed industries plus EEI) was 80 per cent of the beyond BAU EEI estimated for investments with paybacks of up to four years as estimated by SEAV consultants for NFEE. The EEI in the package was applied over 2005-12. Compared with a BAU case (no ETS, no exemptions, no beyond BAU EEI), the package resulted in average Victorian electricity price increases of 3.5 per cent in 2012 and Victorian GSP declines by $45 million per annum over 2008-12. And over the period average emission levels are reduced by 7.55 Mt of CO2e per year. These results compare with, in the same period, average real electricity price increases of 7.7 per cent, and a GSP decline of $280 million and average emissions reductions of 3.23 Mt per year in the ETS plus exemptions but no EEI case. Notwithstanding the practical difficulties of implementing this level of EEI over 2005-12, the results clearly show the economic benefits of EEI. Note - the analysis takes rebound into account.

and the need for further investment in electricity generation would be delayed for a number of years." (page 177); and

- the ongoing role for energy efficiency measures over the longer term - "the modelling … suggests an emissions trading scheme over 2008 to 2012, packaged with … complementary policies to drive energy efficiency" (page 176).

These conclusions are consistent with the approaches pursued by the Victorian Government in action to date under the *Victorian Greenhouse Strategy* (VGS) 2002 and in the recently released *Victorian Greenhouse Strategy Action Plan Update* (April 2005). In particular, the Victorian package of measures aimed at energy efficiency improvements draws on a range of policy tools, including: regulation; incentives; best practice demonstration and benchmarking projects; and information and education.

The Victorian Government accepts the need for Government intervention to address market failures that result in various market barriers and impediments to energy efficiency.

The analytical work related to energy efficiency, conducted for the *Greenhouse Challenge for Energy*[4], highlighted complex market failures that prevent a series of economic, social and environmental benefits from being realised.

The Allen Consulting Group's report noted that: "the scope for achieving greater efficiency in energy use is the main remaining area where significant opportunities [for greenhouse abatement] exist." (page 176) However, energy efficiency opportunities providing environmental, social and economic benefits will remain untapped if left to voluntary individual or business actions to maximise net private benefit[5].

The Commission's discussion of barriers to energy efficiency focuses primarily on individual failure to take up opportunities with a net private benefit as defined by the Commission (see above discussion of the issue of definition). The Victorian Government agrees with the Commission's draft finding (8.1) that for the commercial and industrial sectors, market failures that may warrant Government intervention are: information and split incentives. However, the Victorian Government considers that:

- it has a role in addressing a much broader range of market failures (such as addressing externalities) that result in various market barriers and impediments to bring about greater uptake of energy efficiency improvements than if left to the market alone, and thereby achieve cost effective greenhouse gas abatement and lower overall energy system costs; and
- once the public benefit objectives of energy efficiency policy are taken into consideration, governments can justify a wider range of interventions than is acknowledged by the Commission, including regulatory interventions.

The Victorian Government acknowledges the value of evaluating energy efficiency policy and program outcomes against defined objectives as a basis for informing future policy development.

The Victorian Government considers that program evaluation has two facets, being:

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[4] Allen Consulting Group, *The Greenhouse Challenge for Energy*, Report to the Victorian Department of Infrastructure and Department of Sustainability and Environment, September 2004

[5] Individuals on their own are unlikely to make decisions that lead to this collective benefit either because: they are unaware of the potential benefits; they do not receive all of the benefits from their individual actions; they consider that they can maximise their returns through other activities that deliver a higher net private benefit; or they are simply not presented with accessible alternatives. Collective action, facilitated in part through Government intervention, is required to capture these benefits.

- evaluation to monitor the effectiveness of current energy efficiency programs - where relevant, the Victorian Government will pursue this issue through national processes. At the state level, processes underway to develop a Victorian Energy Efficiency Strategy will provide an opportunity to consider appropriate approaches (type and frequency of evaluation) with regard to such evaluations, both before and after measure implementation; and
- evaluation to inform energy efficiency policy development, for example, under NFEE there are a range of tasks (including research, program design, stakeholder consultation, and the completion of Regulatory Impact Statement (RIS) processes) which will be undertaken prior to the implementation of any energy efficiency program.

2. Scope of the Inquiry

The terms of reference of the Commission's Inquiry into *Energy Efficiency* specified that the Inquiry be limited to examining energy efficiency improvements that are "cost effective for individual producers and consumers". As noted in the Draft Report, this direction has "greatly influenced" (page.2) the scope of the Inquiry.

The Commission's assessments of the potential benefits of individual energy efficiency programs and the rationale for government policy interventions are all underpinned by the limited test of net private benefit to individual producers or consumers[6], applied by the Commission. It is the Victorian Government's view that this confined scope has significantly limited the value of the Inquiry.

The Inquiry terms of reference direct the Commission to consider the economic and environmental potential offered by energy efficiency improvements which are cost effective for individual consumers and producers". The Commission itself has noted the limitations of this prescribed scope, stating in the Draft Report that: private cost effectiveness "is a much narrower focus than the more commonly adopted public perspective that underpins the Commission's economy-wide charter" (page XXII).

The approach adopted in the Draft Report ignores the reality that governments, across Australia and internationally[7], chiefly predicate their interventions for energy efficiency on the negative economic, environmental and social impacts of inefficient energy use and the non-realisation of net public benefits that could be achieved by an improvement in energy efficiency. This has been the main rationale for the range of energy efficiency measures developed and implemented around the world for the past thirty years.

The Victorian Government, drawing on analysis of energy efficiency[8] including that commissioned as part of the development of the *Greenhouse Challenge for Energy* position paper (released in December 2004), considers that there are net environmental, social and economic benefits to be achieved from energy efficiency improvements. These benefits include:

- lowered greenhouse gas emissions;

[6] The Commission's definition of net private benefit is more constrained than that used in the development of energy efficiency measures, such as building and appliance performance standards

[7] International Energy Agency shared goals (http://www.iea.org/Textbase/about/sharedgoals.htm) highlight the broader public policy objectives of Governments when considering energy policy.

[8] The NFEE analyses on energy efficiency can be found at: http://www.nfee.gov.au/library_downloads/library_downloads.asp

- avoided energy infrastructure costs, through system-wide reductions in energy demand growth at costs lower than additional infrastructure costs;
- avoided energy production costs (economic, social, environmental through lower demand in peak and off-peak periods);
- greater energy system affordability and security;
- enhanced supply reliability; and
- lower net energy expenditure by households and business.

In addition there are a range of secondary benefits, including:

- reduced solid waste;
- reduced water consumption;
- improved urban air quality;
- improved overall business productivity (mainly from improvements in transport energy efficiency improvements); and
- improved community health through greater, affordable thermal comfort.

The Commission acknowledges that current energy efficiency policies and programs have been mainly developed to realise environmental benefits: "Reflecting their genesis in greenhouse abatement policies, the state and national administrative arrangements for energy efficiency policy have generally been part of the broader greenhouse agenda" (page 39).

As noted above, the Commission recognises that some energy efficiency measures "may not be privately cost effective, and yet may generate net public benefits because of their environmental outcomes", and that this may constitute "sound public policy". However, existing policies and programs are reviewed and criticised by the Commission based on the much narrower test of its definition of private benefits (page XXII).

The Victorian Government notes that while policy initiatives aimed at delivering collective social and environmental benefits are deemed to be outside the scope of the Inquiry, Draft Recommendation 12.1 compares energy efficiency to other greenhouse abatement options.

The Victorian Government notes with concern the Commission's concluding comments that:

> "Energy efficiency opportunities are sometimes overlooked, but so too are other income or cost saving measures. There is nothing intrinsically different about energy in this regard, nor does failure to take-up such opportunities necessarily warrant policy intervention." (page XLIII)

The Victorian Government, and other governments around the world, consider that energy is intrinsically different from most other commodities or services for the following reasons:

- energy is an essential service[9] that the whole community depends on and government interventions are required to minimise hardship;

[9] Other essential services include water, and energy (electricity and gas). The Victorian Government has recently announced the establishment of Committee of Inquiry into Financial Hardship of Energy Consumers, (announced March 13, 2005 by Minister for Energy Industries) in recognition that the community relies on an affordable and secure energy supply.

- energy has a pervasive role in economic activities of the State;
- energy infrastructure, in its construction and operation, has significantly higher costs, which are imposed across the economy, than the economic cost of energy efficiency improvements[10];
- electricity is not easily or cheaply stored;
- energy networks have monopoly characteristics; and
- there are significant and potentially very long term, environmental costs arising from the production and use of energy, which are ultimately borne by the community.

For the above reasons, it is inappropriate to treat energy efficiency as just another productivity improvement measure to be left entirely to the discretion of individuals. This approach provides little insight into the broader public policy issues that governments must address. For example, a critical issue for governments is ensuring future security of supply while reducing the costs of future investment in electricity infrastructure and reducing net costs of supplying and using energy.

With regard to the assessment of the Victorian Government's energy efficiency programs, the Commission's terms of reference mean that the Inquiry into *Energy Efficiency* can only provide a limited perspective as it does not attempt to assess the effectiveness of programs against their stated policy objectives. As a consequence, the Draft Report provides a partial and incomplete assessment of these programs. For these reasons, the Inquiry is limited in its capacity to inform government policy-making. Specific responses to issues raised by the Commission with respect to individual policies and programs are outlined in the following section.

3. Response regarding specific energy efficiency policies and programs

Aside from the Victorian Government's reservations regarding the scope of the Inquiry, the Government is concerned that the Commission has not provided well-founded and accurate assessments of programs and policy directions. The Draft Report is critical of a range of current and proposed Victorian Government energy efficiency measures, including measures implemented in Victoria or as part of nationally-coordinated programs. By way of broad response, the Victorian Government considers that these programs achieve broader public policy objectives and deliver net private benefits, as discussed in the previous section. More specific details of program objectives and outcomes are provided in the following sections.

Further details of the Victorian Government's response with respect to the Commission's approach, draft findings and recommendations are provided below under the following key topic areas:

Victorian Policy and Programs
- Residential Building Standards
- Commercial Building Standards
- EPA Greenhouse Program

[10] Over the next 10 years at current demands trends over $5 billion will be required in Victorian energy infrastructure (electricity production, generation and networks) to meet growing demand. This amount could be reduced by energy efficiency improvements costing less than the power delivered by these investments.

National Policy and Programs

- National Framework for Energy Efficiency
- National Building Standards
- Building Rating Tools
- Appliance and Equipment MEPS & Labelling
- Energy Market Reform

Victorian Policy and Programs

Residential Building Standards

Victoria has been a leader in dwelling energy efficiency. The Victorian Government has introduced a mandatory 5 Star residential building standard to improve the energy efficiency of new homes from 1 July 2004. The standard uses a flexible performance-based approach to improve the energy efficiency of the building fabric. The adoption of a performance-based approach is consistent with the Victorian Competition & Efficiency Commission (VCEC) *Victorian Guide to Regulation 2005*. Performance based approaches provide for: flexibility in dealing with technical matters; innovative design solutions; and lower compliance and administrative costs.

Improving energy efficiency in new houses and apartments is critical for managing growth in greenhouse gas emissions from the residential sector[11]. Ensuring that new homes incorporate energy efficiency improves the occupant comfort, lowers ongoing energy costs for the householder, and reduces the need for additional energy supplies.

The mandatory 5 Star standard improves the heating and cooling energy efficiency of the average new Victorian home by approximately 50%[12] compared with the average rating of new homes built before 2004. For a market in excess of 30,000 new homes a year, this will amount to initial energy savings of 600 GJ annually and greenhouse gas savings exceeding 600,000 tonnes within 5 years.

Victoria's 5 Star Standard was introduced on the basis of extensive cost benefit analysis demonstrating its economic, social and environmental benefits[13]. The cost-benefit study, conducted by the Allen Consulting Group, is cited in the Commission's Draft Report. That study found that Victoria would benefit from an additional $720 million of economic growth over 20 years, with up to 1,800 new jobs created. Subsequent analysis by the Australian Building Code Board (ABCB), as part of the national 5 Star (RIS) has validated the original economic analysis. Further comments in relation to the ABCB process are provided in the following section dealing with National Policies and Programs.

The RIS prepared by the Plumbing Industry Commission in 2004, quantified additional greenhouse gas and water savings accruing from the additional requirement of either a

[11] Residential heating and cooling contributes 58% of total residential energy use in Victoria and 26.1% of the residential sector's greenhouse gas emissions. This makes the thermal efficiency of the building shell a particularly important issue. As the average efficiency of the housing stock is progressively, and significantly, increased through the 5-star standard, this will result in a significant reduction in energy use for heating and cooling, compared to business as usual levels. (George Wilkenfeld and Associates, *Victoria's Greenhouse Gas Emissions, 1990, 1995 & 1999: End Use Allocation Emissions*, November 2002)

[12] Research undertaken by the ABCB has shown that the 5 Star standard will increase the energy efficiency of the building shell for the average Victorian new home from a rating of only 2.2 Stars up to 5 Stars.

[13] This analysis was peer reviewed at the time by Professor Roger Fay of the University of Tasmania and Adjunct Professor Alan Pears of RMIT, as well as being subjected to extensive community consultation.

solar hot water and rainwater tank from July 2005. Recent work for VENCorp[14] has indicated that the 5 Star standard will have a significant impact on reducing maximum summer peak demands.

The 5 Star Standard has been explicitly designed to deliver market transformation by facilitating:

- reductions in the cost of building more energy efficient houses and apartments;
- the building services sector to provide more sustainable products and services;
- building designers to deliver innovative energy efficient dwelling designs; and
- consumers to demand energy efficiency improvements beyond the 5-star standard.

Commercial Building Standards

As noted in the Victorian Greenhouse Strategy Action Plan Update (April 2005), the Victorian Government is fully committed to implementation of the Building Code of Australia's (BCA) energy efficiency program. The program includes energy measures for all classes of new and refurbished buildings in the BCA. In particular, the Victorian Government will be moving to introduce mandatory energy efficiency standards for new commercial buildings through the BCA from 1 May 2006.

The Commission recommends that energy efficiency standards for commercial buildings should not be introduced without a more thorough evaluation of the costs and benefits of such a policy and a comprehensive analysis of the other policy options. The Victorian Government considers that the proposed BCA provisions have been comprehensively analysed during their development[15].

The Draft RIS published by ABCB in April 2005 supporting the proposed BCA energy efficiency measures for non-residential buildings was signed off by the Commission through its Office of Regulation Review (ORR). In confirming the very significant economic and environmental benefits of these new building standards, the ABCB RIS further validates the findings of Victoria's 2002 cost benefit analysis in support of the 5 Star Standard. It also confirms that building energy standards can deliver highly positive economic and environmental outcomes at a societal level, while providing individual consumers and companies with net benefits.

In addition, there has been extensive industry consultation through a series of working groups and technical committees coordinated by ABCB for over 5 years.

Environment Protection Authority Greenhouse Program

The Environment Protection Authority (EPA) Greenhouse Program[16] aims to reduce greenhouse gas emissions through the uptake of energy efficiency by Victorian businesses. The program helps to ensure that Victorian industries develop appropriate responses to greenhouse issues, and stimulates investment in energy efficiency.

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[14] *Electrical Peak Load Analysis Victoria 1999-2003, Energy Efficient Strategies for VENCorp,* December 2004. Preliminary modeling indicates that if all Victorian homes were built to the 5 star standard, total summer system peak demand would be reduced by over 11%.

[15] The Victorian Government requests that the Commission specifically outline what type of analysis is required and what was wrong with the original analysis approved by the ORR. Work on the BCA – Commercial Buildings, commenced in 2000.

[16] Changes to the State Environment Protection Policy (Environment Protection Authority (EPA) Greenhouse Program) were introduced in December 2003.

Under the State environment protection policy (Air Quality Management) businesses subject to EPA Works Approvals and Licensing are required to:

- implement best practice with respect to energy efficiency and greenhouse gas emissions for new investments; and
- conduct energy audits for existing licensed premises and implement actions that have a financial payback of up to three years.

Approximately 500 EPA licensees have conducted energy audits and delivered significant energy efficiency savings. A review of action plans indicates that these requirements will deliver greenhouse gas emissions reductions in excess of 1 million tonnes (CO2 equivalent) per annum with a net financial return to business.

Through the recently announced Victorian Greenhouse Strategy Action Plan Update 2005, $600,000 will be provided in 2005/06 for EPA to continue its work with energy-intensive industry sectors to drive improvements in energy efficiency and resultant reductions in greenhouse gas emissions. The funds will also aid the development of appropriate statutory greenhouse tools in line with Victorian Government policy.

The EPA Greenhouse Program is the first regulatory greenhouse gas abatement and energy efficiency program for industry in Australia. The Victorian Government considers that the EPA Greenhouse Program is a successful example of a regulatory measure that reduces greenhouse gas emissions through a mechanism that has both positive economic net private and public benefits [17]. The EPA's Greenhouse Program is part of a policy package designed to facilitate Victoria's transition to a carbon-constrained future in a way that also provides investment certainty and maintains the State's economic growth. It should also be noted that the Victorian Government is working with other Australian States and Territories to design an emissions trading scheme which, in the medium term, would provide a centrepiece of state and territory efforts to achieve efficient and effective greenhouse gas abatement.

The Victorian Government notes the Commission's comment[18] that programs such as the EPA's greenhouse and energy requirements under the State Environment Protection Policy (Air Quality Management):

> "…could distort firms' investment decisions. Even if the audit assessment is accurate — and the proposed investment passes normal profitability criteria — the regulator is unlikely to know if the firm has access to the capital required or if the project represents the best use of that capital. …The Commission does not support such schemes. "

The Victorian Government's response is on a number of levels, as follows:

- the primary objective of the SEPP(AQM) requirements is to reduce greenhouse gas emissions - within this context the 3 year payback provides a limited cost-effectiveness test, but it is not intended to be a tool for guiding broader business investment decisions;
- the guidelines for licensees (PEM) specify that financial, technical and logistical considerations are to be taken into account in developing action plans; and

[17] Marsiglio, J. EPA 2005, *Greenhouse Gas Emissions and Energy Efficiency in Industry: EPA Victoria's Role in the Victorian Greenhouse Strategy.* (Note: Payback of investments under this program averaged 20 months). The Victorian Government understanding of what defines net private benefit in the context of energy efficiency is discussed above in section one.

[18] A factual change to page 187 of the Report should read: "...Under that scheme, licensees with energy use of 500 gigajoules per annum or more, must undertake an audit, and are required to invest in projects that meet specified investment criteria (a three-year payback is the norm)."

- the operational reality of the program is that it builds on existing relationships between EPA and its licensees and allows for a dialogue around the contents of a site's action plan. The question of whether actions can reasonably be funded in the context of other investment decisions is very much a part of the discussions between EPA and the licensee, and in some cases, flexibility has been applied in approval of an action plan for these very reasons.

The Commission also suggests that:

> "A better approach might be to attach (explicitly justified) environmental performance conditions to the licences of such firms and allow them to choose the means of achieving those objectives."

The impacts of greenhouse gas emissions are not site-specific and result in long term global impacts. Further, emissions arising from electricity consumption largely occur offsite, i.e. at the point of generation. As a result, greenhouse gas emissions differ significantly from other categories of pollutants and the established approach of imposing environmental performance conditions, based on local impact considerations, is not appropriate.

The results to date from EPA's Greenhouse Program challenge assumptions about the efficacy of voluntary programs and the extent to which energy efficiency improvements are delivered through the market, as follows:

- a significant number of enterprises that have already been participants in other voluntary programs (eg. Generator Efficiency Standards, Greenhouse Challenge), have identified actions with a 3 year payback for implementation over the 2004 to 2006 period;
- greenhouse gas reductions expected to arise from approved action plans amount to 1.04 Mt (million tonnes) of CO2-e per annum after 2006, with a pro-rata increase to some 1.15 Mt expected when all action plans are approved;
- annual energy cost savings of approximately $25 million are expected to be realised, with an average payback period of less than 20 months. Many actions with extremely short payback periods (less than 6 months) were identified, indicating that significant quantities of "low hanging fruit", or actions that were easily found and implemented, were available and had not been found or acted upon previously. This was contrary to most expectations;
- further evidence of the availability of these "low hanging fruit" are borne out by schedules provided with the action plans which indicate that approximately 51% of the total GHG reductions will occur in 2004, 25% in 2005 and 24% in 2006; and
- the total GHG reduction represents on average approximately 4% of GHG emissions from these sites compared to a baseline in 2003.

National Policy and Programs

National Framework for Energy Efficiency (NFEE)

The National Framework for Energy Efficiency (NFEE), comprising nine policy packages to promote greater uptake of energy efficiency across all sectors of the economy, was approved by the Ministerial Council on Energy (MCE) in August 2004. MCE approved the NFEE Stage One implementation plans in December 2004. Victoria, through the Sustainable Energy Authority, is the chair and secretariat for the NFEE Steering Committee. The Victorian Government's comments outlined below should not be read as representing the views of the NFEE Steering Committee.

NFEE Stage One is, in reality, a high level commitment by governments to develop and implement a range of energy efficiency policies and programs over a 3-year period, including regulatory, best practice and information programs. It should be noted that final decisions about whether and when to proceed with implementation and detailed implementation arrangements are yet to be determined and will be at the discretion of **individual jurisdictions**. The next phase of the NFEE process involves elements of research (national & international), program design and evaluation and stakeholder consultation[19]. The Victorian Government has identified that elements of the NFEE Stage One package will be incorporated in the Victorian Energy Efficiency Strategy that is currently under development.

The Commission has raised a number of issues in relation to the development of the NFEE Stage One policy package and has recommended (Draft Recommendation 11.2) that the proposed implementation process for Stage One proposals (that are not directly affected by other recommendations) should be deferred pending independent evaluations of existing energy efficiency programs. Responses to these issues are outlined below.

"Unclear" objectives

The Draft Report states (Draft Finding 11.3) that "there is insufficient clarity on the rationale for, and the objectives of, government intervention". The Victorian Government recognises that most of the NFEE Stage One programs address the key market barriers identified by the Commission (such as information barriers and split incentives) and many are based on existing programs that have been assessed with regard to objectives and alternatives over the past 10 years.

For these reasons, the Victorian Government has closely tied the implementation of NFEE Stage One to its greenhouse gas abatement objectives. NFEE implementation is to proceed as part of the Victorian Energy Efficiency Strategy (VEES), and within the broader context of the *Greenhouse Challenge for Energy position paper* and the *Victorian Greenhouse Strategy Action Plan Update.* As discussed earlier, energy efficiency, is assessed to be one of the most cost-effective forms of greenhouse gas abatement in the short to medium term, and can also play an important role in offsetting any negative economic impacts from the introduction of emissions trading.

Different estimates of the "energy efficiency gap"

The Victorian Government notes that the Commission has not undertaken or commissioned any additional work to provide alternative estimates of the 'energy efficiency gap'. While the NFEE analysis does not claim to provide the definitive measure of the 'energy efficiency gap', in the view of the Victorian Government it represents a relatively conservative estimate. Detailed discussion of the analysis of the 'energy efficiency gap' is provided in Appendix A. It is also important to note that the NFEE EEI potential estimate and subsequent economic modelling is not being used to justify the implementation of individual policies and programs that comprise NFEE Stage One.

[19] Further development of the various measures that comprise NFEE Stage One is now being overseen by multi-jurisdictional implementation groups, reporting to the Ministerial Council on Energy via the Energy Efficiency Working Group. As the Draft Report notes (Draft Finding 11.3), this has the potential to improve national coordination of energy efficiency programs, reducing compliance and participation costs for stakeholders and increasing the cost-effectiveness of government program delivery. In particular, further analytical work will be required, including detailed cost-benefit studies for measures involving regulation prior to their being agreed for implementation. RIS processes (which at a national level must be approved by the ORR) will contribute to ensuring that such policies/programs achieve their stated aims – i.e. achieve greenhouse gas abatement, are cost-effective and deliver net public benefits.

Deferring implementation

The Commission proposes placing elements of NFEE Stage One "on hold" at least in part because there has "been insufficient evaluation of past policies and programs" (Draft Finding 11.2. and 11.3). The Victorian Government asks the Commission to elaborate on its concerns in these areas. The Victorian Government notes that the Commission does not seem to be suggesting that NFEE Stage One in its entirety be put on hold.

The Victorian Government does not agree with this proposal on a number of grounds. First, a number of the elements of NFEE Stage One have already been implemented in Victoria, in advance of the NFEE process, for example, 5-star standards for new houses. As noted earlier, these policies and programs are already delivering benefits for Victorians and have been evaluated through Victoria's policy development processes.

With regard to the Commission's claim that current policies and programs have not been sufficiently evaluated, it should be noted that all nationally coordinated regulatory measures (eg. MEPS and labelling for appliances and equipment) which form part of NFEE Stage One have been subjected to a national RIS, which has been approved by the ORR, and by the Ministerial Council on Energy (or its predecessors)[20].

The Victorian Government considers that it would be ill-advised to put on hold programs such as the extension of appliance and equipment MEPS that have been extensively analysed over the past 10 years, which provide cost-effective greenhouse gas abatement and have strong (and bilateral) support at the Commonwealth and State level as well as from industry stakeholders. As noted in section 1, it is Victoria's intention to consider appropriate approaches to program evaluation in the development of the Victorian Energy Efficiency Strategy.

National Building Standards

The Victorian Government has already moved to implement mandatory standards for new houses and apartments. The Victorian Government supports the proposed nationally consistent 5-star standard for new houses, which will proceed subject to a national RIS process. The Draft 5 Star Building Code of Australia RIS published by ABCB (April 2005) was signed off by the ORR prior to release confirming the validity of its methodology. Cost benefit analyses provided in the RIS clearly demonstrate that the proposed measures will deliver significant economic and environmental benefits at the societal level, while at the same time not disadvantaging consumers.

[20] NAEEEP is most probably the most thoroughly evaluated of Australia's energy efficiency programs. Since 1998, NAEEEP has published and publicly released:

- A series of three-year work plans, subjected to stakeholder consultation, and approved by MCE;
- Annual reports on its achievements and activities;
- Regular *Greening Whitegoods* reports that provide information on the sales-weighted energy efficiency trends for energy-labelled electrical appliances;
- Annual reports tracking the standby power consumption of new appliances sold;
- Regular projected impacts reports, which provide information on the past greenhouse gas abatement achieved by the program and the projected impacts of the current work program;
- A targeted check-testing program to verify MEPS compliance & labelling details;
- Regular audits of retail outlets to determine levels of compliance with MEPS and labelling;
- RIS to satisfy CoAG requirements prior to the implementation of all MEPS or labelling measures.

The Victorian Government therefore rejects the Draft Report's recommendation that introduction of the national 5 Star housing standard should be deferred beyond the planned date of May 2006 to allow for further evaluation[21]. The Victorian Government notes that all BCA energy efficiency measures (and their stringency levels) are founded on a comprehensive cost-benefit analysis that takes account of distributional effects.

National Building Rating Tools

The Victorian Government has played an active role in the development of building rating tools to underpin effective building regulation. The FirstRate rating tool is a mechanism for assessment under the Victorian 5-star standards. The Government therefore has a strong interest in and commitment to ongoing work at the national and state level, aimed at refining and improving rating tools[22].

The Victorian Government notes that the Commission (Draft findings 7.2 and 7.3) raises concerns over the accuracy of house energy rating tools such as NatHERS or FirstRate in predicting the actual energy performance achieved by homebuyers and tenants.

House energy rating schemes such as NatHERS and FirstRate clearly rate only the thermal efficiency of a building shell. Energy ratings (for existing and new buildings) cannot and are not intended to measure the actual total energy consumption of a household. Total energy consumption depends on the energy efficiency of the building shell, the physical size of the home, the climate and the actual energy use conditions (such as occupancy, equipment type and efficiency, use settings and user behaviour). The rating tools only estimate the thermal energy required to achieve specified comfort conditions, based on standard occupancy and user behaviour profiles[23].

The Victorian Government does not dispute that there are limitations to rating measures (for buildings, and appliances and equipment) and indeed, these are acknowledged world-wide. While supporting further development of building rating tools, the Government is also addressing issues such as the energy efficiency of the equipment and appliances that impact on household energy use (including heating and cooling systems) and user behaviour, through other energy efficiency programs[24] at state and national levels.

With regard to the directions for further development, the Victorian Government supports overall building sustainability benchmarking. This enables households to identify how they relate to average energy end-use for different sized households, and for different energy sources. This approach has been adopted in Victoria for water

[21] The Victorian Government asks the Commission to specifically outline what type of analysis is required and what was wrong with the original analysis approved by the ORR.

[22] It is important to note that some sustainability rating tools are now being developed that incorporate some of the fixed appliances (heating, cooling, water heating & lighting), e.g. NSW BASIX and IDEAS being developed in Victoria. These tools use outputs from the house energy rating tools (such as NatHERS and FirstRate), and may allow people to get a more holistic appraisal of the relative energy end-use and greenhouse gas emissions of the house and fixed appliances. However, such tools are still in their fairly early stages of development and implementation.

[23] An energy rating provides a relative indication of the energy output (from heating and cooling systems) required to maintain thermal comfort in a building. The higher the rating, the more thermally comfortable the building will be and, other factors being equal, the lower its heating and cooling energy consumption will be.

[24] The energy efficiency of key domestic appliances and equipment is being progressively increased through nationally consistent MEPS and energy labelling and through the *National Standby Strategy*. In Victorian change in user behaviour is being targeted through a range of information, advisory and communication programs.

consumption, and a similar approach, supported by information tools, is proposed as a measure in NFEE Stage One.

Appliances & Equipment MEPS & Labelling

The Victorian Government supports mandatory MEPS and mandatory energy labelling of appliances and equipment as providing a strong complementary set of policies and programs. The Commission states a preference for mandatory labelling over MEPS, however, the Victorian Government notes that there is ample evidence that MEPS is a highly cost-effective form of greenhouse gas abatement and is a much more effective measure to achieve this than mandatory labelling[25].

Governments around the world have implemented MEPS-type measures as a successful mechanism to achieve net benefits.[26] Australian MEPS are based on world's best regulatory practice (e.g. are set to match the most stringent MEPS of our major trading partners), but are adapted to suit Australian conditions. They are adopted with timeframes agreed with industry stakeholders, so that local industry has time to re-design products and production processes or to source suitable products from overseas manufacturers.

In addition, the RIS that are conducted before new MEPS (or mandatory labelling) requirements are introduced take into account the effects on producers and consumers, including the likely cost impact and cost-effectiveness. This involves a formal public consultation process, where producers who feel they may be disadvantaged in any way are also able to make formal representations. Measures are not introduced unless they are shown to be cost effective. Further, the RIS must be approved by the ORR before it proceeds to MCE for final approval. Governments have shown a willingness to negotiate with industry about the stringency of the MEPS levels regulated, and the timing of their introduction.

The Australian Greenhouse Office, on behalf of NAEEEC, is currently preparing a guide to the preparation of RISs for MEPS and labelling to help ensure consistency and best practice in the preparation of RISs for NAEEEP, and this has involved a workshop in which the Office of Regulation Review has participated[27].

The Victorian Government notes that the Commission (Draft Finding 11.1) acknowledges the national uniformity that has been achieved for regulated MEPS and labelling of electrical products, and supports a similar approach for gas products. However, the Commission recommends that future RIS of appliances and equipment MEPS should include a more comprehensive analysis of the need for a mandatory standard and the extent to which such a standard impacts upon consumer and producer sovereignty. This recommendation, and the Commission's view that MEPS adversely impacts on consumer and producer sovereignty, are not supported by the Victorian Government.

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[25] *When You Keep Measuring It, You Know Even More About It! NAEEEP: Projected Impacts 2005-2020*, April 2005, prepared by George Wilkenfeld & Associates

[26] *Cool Appliances Policy Strategies for Energy Efficient Homes: Energy Efficiency Policy Profiles*, International Energy Agency, 2003. This report was not referenced in the Commission's Draft Report. The key findings of the report are provided in Appendix D. The report provides a comprehensive review of appliance EEI policies in OECD countries (and South Korea). It should be noted that mandatory appliance standards have been implemented in countries, such Canada, with low carbon intensity electricity systems.

[27] In fact, the Office of Regulation Review uses a number of NAEEEP RISs (air conditioners and electric motors) as good practice examples of RISs that meet the CoAG requirements. They note that:

> "These RISs are examples of the level of analysis appropriate in a COAG RIS at the consultation stage for quite significant proposals. Each RIS examined the economic and environmental impacts of varying efficiency standards on business, consumers, the Government and the general public. "

The limitations of the Commission's views on consumer and producer sovereignty and the constraints imposed by the focus on private net benefits, as discussed in section 1 of this report, are borne out in the Draft Report's discussion of the MEPS program.

The Victorian Government supports a broader interpretation of consumer sovereignty that encompasses group as well as individual choices about the economic, social environmental and ethical dimensions of consumption and production. The view that MEPS prevents access to less energy efficient products and hence is bad policy[28] does not consider the negative environmental impacts of inefficient energy use or the negative economic impacts on energy end-users or overall energy system energy efficiency. Governments have introduced programs such as MEPS because they provide overall net environmental, economic and social benefits. Consumer organisations such as the Australian Consumers Association, who exist to defend consumer rights, are also highly supportive of mandatory labelling and MEPS.

The Commission (Overview page XXXV) states that the use of appliance standards is appropriate to ban goods that are dangerous and defective, but argues that appliance and equipment MEPS may reduce the welfare of *some* (undefined number of) consumers[29]. There is an assumption in the Draft Report that higher levels of energy efficiency may only be achieved through trading off other features[30], that consumers might value, or through an increase in price.

With regard to price, experience in Australia and overseas over the past 30 years, has shown that progressively higher MEPS have led to overall product redesigns that reduced, for the same output scale, overall manufacturing costs[31]. While very inefficient appliances and equipment probably would cost less than high efficiency units, there is often not a good correlation between efficiency and price[32]. Within the range of appliances meeting MEPS[33] consumers can trade off features (efficiency, appearance, etc) in making expenditure decisions.

In evaluations of the MEPS program, issues to be considered should include the impact of the program on average improvement in energy efficiency of appliance and equipment covered by the program. Approaches used overseas should also be assessed in terms of their potential to complement MEPS and labelling and enhance appliance and equipment energy efficiency improvement. These approaches include: the use of sales weighted 'fleet' averages of units marketed by manufacturers and importers; and the Japanese Top-Runner Program in which standards are set according to the efficiency level of the most efficient product available in given category[34].

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[28] MEPS are quite explicitly designed to do this to achieve their greenhouse abatement outcomes.

[29] From a longer-term and broader social perspective, inefficient appliances, equipment and buildings are contributing to an increase in global carbon dioxide levels. As noted in the recent Victorian Greenhouse Strategy Update: it “is now widely understood and accepted that climate change, due to the enhanced greenhouse effect, poses a serious threat to the world community”.

[30] The Commission provides no evidence to support the claim that consumers may be being denied desired product features by MEPS. In fact, the only example provided to support this claim (page 125) – a refrigerator with narrower sidewalls – is purely a fictional one.

[31] As an example, the sales weighted average price for refrigerators has increased in normal dollars from $911 in 1993 to $1,023 in 2001, a change of 1.5% per annum and somewhat less than the inflation rate and average use of electricity per refrigerator has decreased by, 20 percent despite increases in the average size of refrigerators. Also see IEA, *Cool Appliances*, pages 95, 96, 106, 129 and 130.

[32] For example, in the case of refrigerators, for units of similar size and features within the star rating system range (1 to 6 stars) higher rated units may cost less than lower rated units.

[33] MEPS only restricts consumers ability to select very low efficiency products, and there is no evidence that it restricts the number of brands and models available to consumers, or their choice of product.

[34] Refer to IEA, *Cool Appliances* and http://www.worldenergy.org/wec-geis/publications/

With regard to energy labelling, the Victorian Government views mandated energy labelling at point of sale as a very important policy tool for overcoming information barriers relevant to the purchase of key energy using appliances and helping to create a consumer pull in the market for higher efficiency products. The Government acknowledges, as the Commission notes, that energy rating labels are not the key factor taken into consideration when consumers purchase a labelled appliance, however they do have a high level of awareness and influence amongst appliance consumers. Mandatory energy labelling is preferred to voluntary labelling schemes, although voluntary (endorsement) labelling can complement both MEPS and mandatory labelling measures[35].

Energy Market Reform

The Victorian Government agrees with the Commission's Draft Finding (13.1) that more cost reflective pricing has the potential to improve energy efficiency by influencing both consumer and supplier behaviour. There is a broad range of potential positive impacts that energy efficiency can have on the national electricity market (which is outlined in the second section: Scope of Inquiry) – but notes that the issue requires much more analysis than was possible in the Inquiry.

The Victorian Government endorses the remarks in the Draft Report on national energy market reforms. These reforms are well advanced and include substantial streamlining of regulatory process, with benefits for more timely and efficient outcomes. Market mechanisms to promote demand side response are also being investigated. The MCE is working with NEMMCO to investigate the potential of a short-term forward market to reduce barriers to demand side management.

With over quarter of the State's energy consumers now taking supply under market contracts from an alternative retailer, Victoria's energy retail market is the most competitive and efficient in Australia. The Victorian Government has nevertheless indicated that it will protect consumers in the transition to effective retail competition. One key element of the "safety net" package of protections is retail price oversight. Such price regulation however is minimal, and is in the form of a four-year price path that was negotiated with retailers. The price path provides significant flexibility for retailers to rebalance tariffs for safety net consumers, and includes all reasonable risks and costs likely to be faced by retailers driving the price path period. Further, retailers have full discretion for setting prices under market contracts. The tariff equalisation arrangement in Victoria for reducing the differential between rural and metropolitan network charges is a transparent on-budget measure.

The Draft Report recommends that comprehensive cost-benefit analyses be undertaken prior to the mandating of interval meters. As noted in the Draft Report, the Victorian *Essential Services Commission* undertook a comprehensive benefit–cost analysis prior to its decision to mandate a roll-out of interval meters commencing in 2006.

[35] Market research undertaken for SEAV in 2000, covering Victoria and NSW, indicated that 88% of major appliance consumers were aware of energy rating labels and that of these 81% were influenced by them when making purchase decisions (or a total of 71% of purchase decisions influenced). Later studies undertaken by SEDA (in 2001 and 2002) indicated that there was an increasing trend in both the awareness and influence of energy rating labels. In contrast, this research found that only 6% of appliance consumers were aware of the voluntary Galaxy Energy Award (a high efficiency endorsement label) and of these only 61% were influenced by this. (*Household Appliance Survey*, McGregor Tan Research, July 2000.)

APPENDIX A

NFEE Energy Efficiency Improvement Potential Estimates

Introduction

The Energy Efficiency Improvement (EEI) potential estimates and subsequent macro-economic modelling that was undertaken as part of the NFEE development process was project managed by the Sustainable Energy Authority Victoria (SEAV). Research and analysis undertaken as part of the development of the NFEE Stage One policy packages, estimated the energy efficiency improvement (EEI) potential across Australia over a 12-year period for measures up to a 4-year payback. This formed the basis of macro-economic modelling of the impacts of an economy-wide increase in energy efficiency which assumed that only 50% of the estimated EEI potential was implemented over this period.[36]

This work has been reviewed and critiqued as part of the Commission's Draft Report, with the two main conclusions being:

> Current levels of energy efficiency are below the levels that might appear (to an outsider) to be privately cost effective. But the benefits of energy efficiency improvements may be overstated and the costs of adoption underestimated. The real gap is likely to be much small than it appears. (Key Point 4)
>
> Numerous case studies have found that producers and consumers fail to adopt some energy efficiency improvements that appear to be cost effective for them. These case studies, however, are based on many debatable assumptions, including:
> - the criterion for cost effectiveness;
> - business-as-usual improvements in energy efficiency;
> - extrapolation of audit and best-practice study results to a whole sector representativeness of simulated producers and consumers. (Draft Finding 6.1)

The Commission (Draft Finding 6.1), whilst recognising that there is cost-effective energy efficiency potential that is not being taken up by producers and consumers, suggests (Key point 4) that this potential *may* be overstated and the costs of adoption underestimated, due to what they regard as a number of debatable assumptions. The Commission has not undertaken any separate studies into the 'energy efficiency gap', but have simply critiqued a number of published studies, including the energy efficiency potential studies undertaken as part of the development of NFEE.

Inherent in the Commission's criticism seems to be an assumption that the NFEE work sought to provide a definitive measurement of the 'energy efficiency gap' (their term). This quite clearly was not the case. The work was undertaken to provide an estimate of the potential, costs of and savings of beyond-BAU energy efficiency improvement across the Australian economy as the input data into macro-economic modelling of the impact of implementing these over a 12-year period. In practice only 50% of the identified potential was implemented in the economic modelling.

Overstating the benefits?

In terms of overstating the benefits, the key reasons put forward by the Commission seem to be:

- Use of a simple payback criterion that they believe does not match business practice;

[36] The Allen Consulting Group, *Economic Impact Analysis of Improved Energy Efficiency*, November 2003.

- Underestimating the business-as-usual (BAU)uptake of energy efficiency;
- Extrapolating audit results and best practice studies to sub-sectors;
- Not taking into account additionality (that is, the interaction between different measures) in the industrial sector;
- Not taking the rebound effect into consideration.

Criterion for cost effectiveness

The Commission (page 77) notes that there are several approaches that could be taken to defining cost-effectiveness criteria for energy efficiency investments, but have criticised the NFEE work for adopting a criterion based on simple payback and for not providing a rationale for taking this approach. In fact, the rationale for choosing simple payback as the criterion, as opposed to the other approaches, is provided in the preliminary assessment of the EEI potential[37]. While IRR is recognised by Armstrong/SEAV as the superior criterion (and is generally used for major business investments) it was noted that most available EEI data in the commercial and industrial sectors is based on simple paybacks and that investment lives are rarely given. A simple payback approach was selected to suit the data available. This report also notes that this approach ultimately may lead to a conservative estimate of the EEI potential, as the total energy savings of many larger projects with long investment lives will not all be included under a simple payback criterion, especially with a relatively short payback time of 4-years, which is in agreement with the Commission report (page 87).

The Commission has criticised the use of a 4-year payback as the basis of the energy efficiency potential estimates for the Phase 2 NFEE economic modelling, as they argue that this is not the criterion used by the producers and/or consumers being studied (page 87). However they note that an ABARE study of participants in the EEAP program found that 80% used a payback rule, 53% used an IRR criterion and 30% used an NPV criterion, with some firms using more than one approach. Where a payback criterion was used, the average requirement was a 3.5 year payback (page 87).

In general, the simple payback is used most frequently for smaller investments, while an IRR and NPV approach is used more commonly for major capital projects where the investments are large. In the commercial and industrial area, the EEI potential work undertaken for NFEE concentrated on retrofits for existing technologies (generally at end of life for large equipment or processes), or changes to operating procedures. In these cases it is more likely that a simple payback criterion would be used.

It should also be noted that for the NFEE EEI potential estimates an up to 4-year payback criterion was placed on individual energy efficiency measures. The average payback for packages of measures as a whole was somewhat less than this, between 2 and 3.4 years in the various industrial sub-sectors, and around 1 year in the commercial sector. In firms, many energy efficiency improvements are likely to be implemented as a package of measures, and in this case the average payback for measures up to and including a 4-year payback will generally be somewhat less than 4 years, not greatly at variance with the average 3.5 year payback that was considered to be acceptable in the ABARE study.

Business as usual improvements

The Commission report criticises the NFEE work for not providing detail on how the business as usual scenarios were constructed, especially for the industrial sector.

[37] NFEE Background Report, *Preliminary Assessment of Demand-Side Energy Efficiency Improvement Potential & Costs*, October 2003, SEAV & Armstrong, pages 12 - 13;

However, this work has been described in each of the various reports that underpin the NFEE EEI potential estimates (residential, commercial & industrial) and is summarised in the NFEE Phase 2 modelling report[38].

For the industrial sector case studies an estimate of the BAU uptake of energy efficiency was provided by Energetics based on their experience working in a wide range of various industry sectors. Clearly this is not an exact measurement of the BAU uptake of energy efficiency, but the Commission does not put forward a better methodology.

For the various case studies undertaken by Energetics a total saving of 93.8 PJ pa (12%) was identified over a 12-year period. They estimated, based on their experiences with clients in a range of industries, that 44.9 PJ pa of this would be accounted for by BAU improvements, resulting in a net energy saving potential of only 48.9 PJ pa (6.2%), or a BAU improvement in energy efficiency of around 5.8%.

In Chapter 5 of the Draft Report, the Commission notes an ABARE analysis of changes in manufacturing energy use during the 27 year period from 1973-74 to 2000-01 found that:

> … changes in manufacturing energy use … would have reduced Australia's total energy consumption by 11.9 percent if there had not been an increase in the sector's output. Most of this fall in energy use (10.4 percentage points) was due to structural change. However, there was a widespread shift by manufacturers toward fuels with a higher conversion efficiency (accounting for 4.0 percentage points of the 11.9 per cent decline in Australian energy consumption). This was partially offset by technical changes that increased the amount of energy used per unit of output (2.5 percentage points). (page 161)

If anything, this suggests that the Energetics estimate of 5.8% over a 12-year period somewhat overestimates the BAU uptake of energy efficiency and therefore underestimates the beyond BAU EEI potential. Similarly, estimates of the BAU EEI for the commercial sector was based on EMET's consulting experience with a range of clients over the last 10 years.

Extrapolation of case studies to a whole sector

The Commission (page 76) notes that a comprehensive assessment of the 'energy efficiency gap' in Australia would be "computationally demanding", yet have criticised a case study approach to estimating the energy efficiency potential, especially in the commercial and industrial sectors. Clearly the only way to do a comprehensive study would be to undertake an on-site review of a very large number of firms in most industry sub-sectors, requiring a very large time and resource commitment from government.

The only realistic approach was the one adopted, where a wide range and significant number of case studies were undertaken in the key energy using industrial and commercial sub-sectors, and for the key residential energy services. These studies were undertaken by consultants who has undertaken many EEI studies for clients in a wide range of industries and who are regarded as experts in their relevant fields. In addition to being technical energy efficiency experts, Energetics also operate as an energy performance contractor, and are familiar with the commercial risks associated with implementing energy efficiency initiatives.

[38] The Allen Consulting Group, Economic impact analysis of improved energy efficiency, Phase 2 report, April 2004, pages 42 to 45.

Additionality

The Energetics report and the NFEE Phase 2 modelling report[39] both note that additionality was not taken into account in the industrial sector, due to the inherent complexities of this. The Energetics report (pages 7 to 9) provided an analysis on the various factors which contributed to the uncertainty of their energy efficiency improvement (EEI) potential estimate – the non-inclusion of additionality being one of these – and concluded that, on balance, these various factors tended to result in an underestimate of the potential.

The rebound effect

The economic rebound effect - the use of some energy savings to use more energy for the same service and/or to purchase more energy-consuming goods and services is included in some energy efficiency potential estimates but more commonly is estimated in the modelling of EEI potential data. Thus, as noted in the NFEE Phase 2 modelling report, the rebound effect was taken into account in the economic modelling, and this resulted in a significant reduction in the net economy-side savings which could be achieved from implementing 50% of the identified energy efficiency potential over a 12-year period[40].

Impact of constant prices

It should also be noted that the EEI potential estimates undertaken for NFEE were based on constant energy and capital prices, an approach of which the Commission seems to approve.

If government policy facilitates a significant uptake of energy efficiency, and due to on-going technological development, it might be expected that the cost differentials between energy efficient and standard technology would decrease over a 12-year period, thereby making investments in energy efficiency more cost effective. This is one element of conservatism in the NFEE EEI potential estimates.

The Commission supports changes to the regulation of electricity networks and retailing that would result in more cost-reflective price signals being sent to consumers, and also support the inclusion of environmental externalities in the price of energy. They acknowledge that this would most probably increase the price of energy and increase the uptake of energy efficient technologies. Thus, an assumption that energy prices are constant generates a conservative estimate of the EEI potential if governments do move to implement these policy changes to some extent.

[39] *NFEE: Energy Efficiency Improvement Potential Case Studies – Industrial Sector",* Energetics, March 2004; The Allen Consulting Group, *Economic impact analysis of improved energy efficiency, Phase 2 report*, April 2004

[40] The Commission believes that, in many analyses of energy efficient improvement opportunities, the benefits of energy efficiency improvement may be overstated and costs understated. Those improvement benefits overstatement and costs understatement stems from the use of analytical criteria that do not take into account all the expenditure options available to energy users and, in the case of benefits, failure to account for the "rebound" effect. However, these analyses, which are deficient in the Commission's view, use benefit and cost evaluation criteria, which are widely accepted in the public policy analysis to obtain an estimate of potential EEI benefits and costs. That is, these analyses often discount the net gains in the light of market and policy effectiveness realities. In the case of "rebound", that is the energy demand stimulating effect of reducing the cost of energy services (heating, cooling, lighting, etc.), this is often taken into account explicitly in the analyses or in the modelling using the EEI potential inputs.

Underestimating the costs?

It's not entirely clear from the body of the report, but the main reasons suggested for underestimating the costs of adopting energy efficiency seem to be:

- The opportunity cost of decision makers time;
- Implementation costs;
- Not taking into account non-energy costs in the industrial sector;

Transaction costs

As was noted in the NFEE Phase 2 modelling report[41], in the commercial and industrial sectors a transaction cost (which includes implementation costs and staff time) of 7.5% of the basic capital cost was added to the basic cost to derive the net implementation costs for the energy efficiency improvements being modelled.

Non-energy costs

While non-energy costs were not taken into account in the industrial sector, as acknowledged in the Energetics report[42], this report noted that the non-energy saving benefits were also not included. On balance, the non-energy saving benefits were felt to outweigh the non-energy saving costs and this would contribute to a conservative energy saving potential estimate. In the work in the commercial sector undertaken by EMET[43] non-energy costs and savings related to maintenance were taken into consideration, and accounted for around 25% of the overall operational savings resulting from energy efficiency improvements.

Summary

The Commission tends to concentrate on factors that might tend to indicate that the NFEE EEI potential work has overestimated the energy efficiency potential or underestimated the costs. However, it has largely ignored factors that tend to indicate that the NFEE work has underestimated the energy efficiency potential or overestimated the costs.

Our view is that, on balance, the EEI potential estimates developed as part of the NFEE process tend to underestimate the cost-effective energy efficiency potential (based on individual measures up to a 4 year payback) that could be taken up over a 12 year period. More stringent payback criteria (1,2,3 year) would show lower EEI potential but the studies undertaken by energy efficiency consultants indicate that even in the 1 year payback case there would still be a beyond BAU EEI potential.

It is important to note that this is not a definitive figure and is not necessarily the target of government policy. Instead, it gives and indication of what it might be possible to achieve and through the macro-economic modelling, the potential size of the net economic, environmental and social benefits of pursuing this.

[41] The Allen Consulting Group, *Economic impact analysis of improved energy efficiency, Phase 2 report*, April 2004, pages 42 to 45.
[42] *NFEE: Energy Efficiency Improvement Potential Case Studies – Industrial Sector",* Energetics, March 2004.
[43] *Energy Efficiency Improvement in the Commercial Sectors*, EMET Consultants, February 2004.

APPENDIX B

Definitions of energy efficiency, conservation and demand-side management

Energy efficiency, conservation and demand side management (DSM)

Energy efficiency, energy conservation and demand side management (DSM) comprise a group of expressions used to describe efforts to improve the efficiency of energy use. DSM particularly refers to these efforts by electrical authorities and utilities, and more recently by their counterparts in the gas industry.

Energy conservation has, unfortunately, several definitions. Firstly, it was used to describe efforts to most efficiently manage the extraction of gas and oil from reservoirs/fields of those resources. Secondly, it was used rather loosely in the post-1973 oil "crisis" for a range of efforts (excluding rationing) to reduce the growth of energy consumption. Finally, it has come to be associated with demand restraint or "lifestyle" changes to (e.g. lower room temperatures in winter) reduce energy demands, even though in the opinion of the writer, it should be used to describe the application of conservation technologies (such as insulation) to cost effectively reduce the energy inputs into the production of energy services, such as specified level of comfort, a specified level of lighting, getting from A to B in a specified time, etc.

The latter group of activities, i.e. the production of energy services by the cost effective use of non-energy inputs has come to be known as energy efficiency.

Energy efficiency can be defined as the ratio, expressed as a percentage, of energy output to the energy input for the production of a specific energy service. Examples of specified energy services are a specified level of heat comfort delivered by a household furnace, and the production of a given level of artificial light. **Energy intensity**, on the other hand, is defined as the amount of energy to produce a unit of economic output, for example gigajoules of energy per thousand dollars of Gross Domestic Product.

The difference between energy efficiency and energy intensity can be illustrated with reference to the aluminium industry. Production of aluminium is very energy intensive (high energy input/value of output) but new aluminium plants are very energy efficient compared with plants built in the 1950-70 period.

It is now over thirty years since energy conservation/efficiency of energy use came to prominence in the wake of the rapid escalation of oil prices which resulted from OPEC exercising an effective level of monopoly control over international oil markets. Over the past thirty years much has been learned about energy efficiency – its potential and means of tapping that potential. Thirty years on it is timely to assess the current status and future of energy efficiency.

Demand side management (DSM) is now generally used in discussions of how to control growth in peak loads.

APPENDIX C

Evolution of the role of energy efficiency

The evolution of energy efficiency thinking can be roughly broken down into four periods. Prior to 1973, the year of the SUEZ/OPEC crisis, i.e. the year in which oil prices began to escalate rapidly, little attention was paid to the subjects of energy conservation and energy efficiency. But several analysts had noted the improved efficiency of energy use in processes (e.g. steel), in homes (e.g. heating requirements per unit of space) and offices (e.g. replacement of incandescent with fluorescent lighting). There were, however, very few references to the subject and virtually no recognition of it as a separate area of management at the level of the household or firm, nor as an area of energy policy.

The events of 1973 changed attitudes to energy efficiency and conservation significantly. A range of energy analysts and commentators began to point out that energy use in specific activities could be substantially reduced with little or no change in amenity or service, while others argued that energy conservation would lead to reduced standards of living, lower GDP and employment, etc. This debate in a much more sophisticated form continues today.

Over time it was recognised that the analysis of energy conservation and efficiency could be conducted along economic lines, distinguishing between changes in energy service (e.g. lower heating temperatures in winter, lower speed limits) and providing the same level of energy service (e.g. maintaining a given heating temperature) by substituting non-energy inputs for some energy inputs in the production of an energy service. Thus, the concept of an energy service was developed in recognition of the fact that the demand for energy is a derived demand; derived from the demand for energy services such as process heat, motive drive, getting from A to B, convenience and comfort. Further, the type and level of energy service could be quite tightly specified, e.g. a frost free refrigerator of a certain size.

Through much of the 1973-1983 period, the pressure for improved energy conservation/efficiency practices largely came from the perceived need to conserve scarce energy resources. In the early 1980s the economic basis for energy efficiency came to be firmly established as analyses improved. By 1983 concern for energy shortages began to diminish in the wake of new oil and gas discoveries and the reduction of energy (particularly oil) growth rates. These trends were confirmed and strengthened by real and absolute reductions in energy prices in the mid to late 1980s.

In the mid and late 1980s a new factor emerged: that of environmental concern over the production, transmission and use of energy. Thus the emphasis began to shift to the environmental benefits, consistent with economic concerns, of using energy more efficiently. Another important factor has been the increased pressures to improve the competitiveness of national economies by using all economic inputs more efficiently and effectively. Also over the past ten years the analysis of energy efficiency/conservation improved greatly and a much better appreciation of the issues and problems of implementing energy efficiency improvements was gained by individuals, firms and governments. During the late 1980s there was also much greater interest was shown in using electricity more efficiently, whereas formerly the emphasis was on improving the efficiency of oil and gas use. Demand side management or demand management (DSM/DM) programs were first developed by electrical utilities in the United States in the mid-1980s and later by utilities in many other regions to improve the efficiency of electricity use and improve load patterns.

APPENDIX D

Key Findings and Conclusions from *Cool Appliances Policy Strategies for Energy Efficient Homes: Energy Efficiency Policy Profiles*[44]

- By cost-effectively improving the energy efficiency of residential appliances - or more precisely, by using efficiency policy to target the least life-cycle cost for appliances from 2005 onwards - IEA Member countries could save some 322 million tonnes (Mt) of CO_2/year by 2010, compared to what they will save under existing policy settings.

- In terms of greenhouse gas emissions, this would be equivalent to taking over 100 million cars off IEA roads. By 2030, this same policy would avoid nearly 1,110 TWh/year of electricity or 572 Mt CO_2/year, equivalent to taking over 200 million cars off OECD roads.

- This measure alone would achieve up to 30% of IEA Member countries' targets under the Kyoto Protocol on climate change.

- These savings can be achieved at negative cost to society, since the extra costs of improving energy efficiency are more than offset by savings in running costs over the appliance's life. In the US, each tonne of CO_2 avoided in this way in 2020 will save consumers $65; while in Europe, each tonne of CO_2 avoided will save consumers 169 Euros (reflecting higher electricity costs and currently lower efficiency standards in Europe). Significant savings are available in all OECD regions despite widely diverging situations.

- Additional policy action is required to capture these benefits. Existing policies in IEA Member countries, while cost-effective, do not capture many of the cost-effective savings available. For maximum impact, appliance policies would need to be strengthened and broadened in coverage. In some cases, they would need to be redesigned, supported with an adequate legal and institutional framework, given adequate resources and appropriately resourced.

- Appliance policies have already proven to be a cost-effective option for energy and greenhouse gas savings in IEA Member countries. By 2000, these policies had reduced greenhouse gas emissions by some 46Mt CO_2/year, avoiding the need for at least 25 gas-fired power stations. Even without further strengthening, these same policies will go on to reduce emissions by 146 Mt CO_2/year by 2010.

[44] International Energy Agency, 2003