Submission to the Productivity Commission Inquiry into Energy Efficiency by the Insulation Council of Australia and New Zealand

Introduction

Insulation is a key component of any energy efficient solution for buildings and a variety of industrial processes. The insulation industry is confronted on a daily basis with many of the barriers to energy efficiency that the Productivity Commission is addressing through its Inquiry. The Insulation Council of Australia and New Zealand (ICANZ) recently commissioned a study into the costs and benefits of energy efficient buildings (with a focus on residential buildings) to help it better understand the bigger picture. This study drew together some of Australia's leading experts in energy efficiency for a two day workshop. The findings of this workshop are attached to this submission in three appendices:

- Appendix A: an executive summary of the key findings. The full report is available on request.
- Appendix B: a list of the workshops participants which provides a brief summary of their background and relevant experience.

This submission links some the findings of this project to the terms of reference for the inquiry and raises some specific additional issues with regard to the use of insulation. It focuses on the commercial and industrial sector and consumers and households.

Also attached to this submission is chapter 5 of a report from the Allen Consulting Group that was jointly funded by ICANZ and BCSE. The report outlines the many barriers which are currently impeding the efficient operation of the market for energy efficiency. The document proposes a package of policy responses aimed at specific market failures. Its breadth is far greater than this submission and it provides an excellent framework for understanding the nature of market failures within the structure of economic theory. A number of its conclusions, such as the need for mandatory energy performance disclosure, improved energy pricing signals and the importance of minimum energy performance standards are all supported by this submission.

The Commission's Issues paper poses a number of important questions. While ICANZ has some specific views regarding provision of information and incentives there are other issues which ICANZ is not in a position to make specific recommendations about such as quantifying the extent of energy savings from a variety of policy options. On these more difficult issues ICANZ argues that the processes government has used to evaluate these benefits need to be far more comprehensive than they have been to date. Better information not only helps markets to operate efficiently, it leads to better government policy. ICANZ believes that the first challenge for Australian governments in addressing energy efficiency is to ensure that its evaluation of policy options is sufficiently comprehensive to deliver the best outcomes.

Terms of Reference 1: Economic and environmental costs and benefits arising from energy efficiency improvements

Setting the framework

ICANZ has jointly sponsored preparation of a paper by the Allen Consulting Group that addresses a number of issues that set the framework for this Inquiry. A copy of the paper will be made available to the Commission by the end of November 2004. In particular, the paper discusses the nature of the 'energy efficiency gap' – the gap between the scale of energy efficiency improvement activity that is feasible and that which is actually captured. While part of this gap can be explained by a range of market factors such as perception of risk, it is clear that much of it results from market failures and imperfections. It is also clear that government action could increase the proportion of the energy efficiency potential captured, both by shifting the threshold below which action will be rejected (for example, by reducing the level of perceived risk), and by addressing market imperfections and failures.

The Allen Consulting Group paper also discusses a range of policy options, and their applicability in addressing the energy efficiency gap. ICANZ has also included some comments on policy issues in the body of this submission.

Evaluation of benefits must be more comprehensive

The traditional method of evaluating energy efficiency policy options for government has been to determine the extent of energy savings to individuals, discount these savings to a Present Value and compare this benefit to the initial cost of improvement. The policy option selected is then that option which has the best benefit to cost ratio. ICANZ believes this approach is flawed and must be reviewed as it does not consider many of the other benefits of improving energy efficiency.

The National Framework for Energy Efficiency (NFEE) is taking a more holistic approach by modelling the impacts of these energy savings on economic activity and the peak loads experienced by the energy supply infrastructure. This analysis has shown that energy efficiency programs can deliver economic growth and reduced infrastructure costs in addition to the know environmental benefits. It is therefore imperative that these

factors be taken into account in the development of energy efficiency standards for buildings and industrial processes. It is not yet clear that evaluation of these factors is part of the brief for the development of these standards and ICANZ believes that the one of the Productivity Commission's findings should be that these factors **must** be taken into account in the development of such standards.

Governments in Australia have been reluctant to pursue environmental goals for fear of adverse economic consequences, but NFEE has shown that both environmental and economic goals can be achieved through good policy. Given the environmental imperative of climate change and these new findings ICANZ believes that government has not allocated adequate resources to the development of programs and regulations for energy efficiency. In particular the slow progress of building regulations for Class 5 – 9 buildings should be addressed immediately and further resources allocated to ensure that regulations are developed as soon as possible.

Additional benefits of energy efficiency should be evaluated

ICANZ believes that there are further benefits of energy efficiency which need to be evaluated to enable government energy efficiency programs to deliver optimal outcomes:

1. Health benefits

   Existing dwellings in Australia have typically been constructed to very poor energy efficiency standards. Such buildings experience far greater extremes of internal temperature than energy efficient dwellings. There is a growing body of research available to demonstrate that these extremes of temperature have adverse impacts on both health and mortality.1

2. Productivity benefits

   The World Green Building Council have found that worker productivity is higher in a variety of highly efficient commercial buildings. Such

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1 "IMPROVING HEALTH BY IMPROVING ENERGY EFFICIENCY IN HOUSES", David Weinstein, Energy Efficiency and Conservation Authority, 29 June 2000 reports that in New Zealand mortality rates rise in cooler months and this is more pronounced in cooler climates. He reports that at temperatures below 16 degrees there is increased risk of respiratory disease while below 12 degrees there is also a risk of increased cardiovascular strain.

gains in productivity, when achieved, would be significantly greater than the economic benefits of the energy saved2.

3. Reduction of Peak Loads

Lower peak utility loads have additional benefits to those considered by NFEE:

- Consumers can achieve savings due to reduced appliance size. Smaller appliances are cheaper (on average) and this can be used to offset increased building fabric cost3.
- In commercial buildings the savings in HVAC plant cost can exceed the increase in building fabric cost meaning that an efficient building can be cheaper to build than an inefficient building.
- The AGO recently reported that the highest 0.2% of loads on the electricity system is responsible for 16% of the cost of electricity.4 Reducing peak loads can therefore benefit all consumers by lowering the cost of electricity.
- Obviously the greatest saving in reducing peak loads comes from the fact that energy suppliers do not have to build infrastructure that is underutilised for most of the year. These savings accrue from capital cost and operating savings.

2http://www.greenerbuildings.com/news_detail.cfm?Page=1&NewsID=27182 76% of executives said that green buildings outperform non-green buildings in worker productivity

3 The Victorian 5 star Regulatory Information Bulletin states that an average saving of $500 per home is available due to reduced heating and cooling appliance size due to the introduction of the 5 star minimum performance standard.

4 Gene McGlynn,:"Realising the economic and environmental opportunities from improved energy efficiency", Business of Energy Efficiency Conference, Sydney September 2004

Terms of Reference 2: Existing and recent Australian and state government energy efficiency programmes

Building efficiency standards

Regulatory Impact Statements by the ABCB have not taken into account the full benefits for building energy efficiency as described above. While the Victorian 5 star Cost Benefit Evaluation is more comprehensive it does not account for all the issues described above. Neither study takes into account the growth in demand for heating and cooling buildings that a number of government publications predict5. Instead they assume that the energy savings delivered today will remain constant. Trends to increasing air conditioner and central heating, and greater home occupancy rates due to an increasing number of people working from home and the aging population will contribute to a growth in the demand for home heating and cooling. A mere 2% increase in use each year for the baseline results equates to a 54% increase in cumulative energy savings from an effective energy efficiency program over 40 years. If energy utilities assume growth in demand when planning for infrastructure, surely government should allow for this growth when evaluating the benefits of improved building standards.

Further, modelling for energy efficiency in the past has typically assumed energy prices do not increase in real terms. ICANZ does not believe this is realistic particularly when considering increasing infrastructure investment costs due to peak load and other cost increases.

There has been a reluctance to embrace energy efficient housing standards in northern Australia because it is claimed space conditioning does not represent a large proportion of domestic energy bills. However, it is northern Australia where some of the most significant growth in air conditioning is predicted. 95% of households are expected to use air conditioning in the Northern Territory by 2012 with 63% predicted in Queensland and 84% in WA. These trends have also been identified in

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5 e.g. **Australia's Standby Power Strategy 2002-2012, AN INITIATIVE OF THE MINISTERIALCOUNCIL ON ENERGY FORMING PART OF THE NATIONAL GREENHOUSE STRATEGY, June 2004 predicts a 60% growth in the ownership of air conditioners in the next 10 years, and various baseline Greenhouse gas emission studies prepared for the AGO**

southern Europe and the southern states of the USA. Furthermore, electricity utilities are experiencing increasing problems handling peak loads and domestic air conditioning is already making a significant contribution to this load. Failure to implement effective standards today may well lead to housing stock which will not meet future requirements for energy efficiency and cause further problems for the electricity system.

The Victorian 5 star regulatory documents introduced a number of new perspectives on the evaluation of household energy efficiency. It abandoned the traditional expression of householder benefits in terms of payback periods, preferring to focus on household cash flow. The 5 star regulation has a payback period in excess of 13 years. This is often taken to mean one must wait 13 years to recoup the initial investment. Evaluation of cash flow provides a different picture. Because energy savings from the adoption of 5 star exceeded the increase to mortgage repayments, far from having to wait over 13 years to get their money back, householders are better off from day 1. And because a 5 star house is more affordable than unregulated housing the regulation should not adversely affect housing demand. It is important to represent the cost of energy efficiency measures, not simply in terms of the initial cost, but in the way that those who are affected by the regulation actually experience the cost.

Mandatory Disclosure of Building Energy Performance

While new building standards will help to contain the growth in energy demand in new buildings there are few programs which seek to improve the efficiency of existing buildings. New building standards will help to achieve energy targets in future but the efficiency of existing buildings must be addressed if significant gains are to be made in the near future.

For most consumers the energy efficiency of a building is not immediately apparent. Mandatory disclosure programs provide consumers with information that they would not otherwise have access to and allow them to make rational purchase choices between buildings allowing them to include energy efficiency as one of the components of that choice. A mandatory disclosure program addresses the information asymmetry of adverse selection where the seller has a much better knowledge of the efficiency of the house than the buyer.

Experience with mandatory disclosure in the ACT suggests that the market does attach a positive value to the energy efficiency of a home. A survey of star ratings and house prices in the ACT shows that higher star rated houses attract higher sales prices. There are probably more factors at work than simply the efficiency of the home e.g. older less desirable stock may be less efficient. Nevertheless, the difference in prices between 4 star (the current regulated level for new housing in the ACT) and 5 star indicates that energy efficiency is playing some part in the value consumers are attaching to residential property6. This value also creates an environment where the owner can feel confident that improvements made to the energy efficiency of the house will be recouped and therefore provides some incentive to undertake such improvements.

Mandatory energy performance disclosure of houses for rent not only addresses information failure due to information asymmetry but also the issue of split incentives. Improvements made to the property by the owner do not result in direct energy savings to the owner, but to the tenan therefore there is no incentive for the owner to undertake these improvements. If the owner is required to disclose energy performance there is greater incentive to improve the efficiency of the property in order to maintain its market value.

The insulation industry has daily experience with these information failures in existing housing and believes that disclosure programs will greatly assist to overcome these barriers to energy efficiency.

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6 See Appendix C

Terms of Reference 3: Barriers and impediments to improved energy efficiency

In addition to the barriers due to market failure or information asymmetry, lack of quality information with which to assess policy implications is a significant barrier to improved energy efficiency. The Victorian 5 star Cost Benefit Study was based on an average hours per week usage for heating and cooling gathered in 1985 because there has been no further nationwide research to provide this information since that date. There is no doubt that usage has significantly increased as central heating has become the norm in new housing in Victoria. ICANZ believes that government should commit to establishing and maintaining comprehensive data on energy use in buildings, occupant behaviour and the appliances and equipment in these buildings to ensure that policy is well informed.

In general building design professions have been adequately trained in the broad principles of energy efficiency. Quantitative assessment of energy efficiency and the expression of this efficiency as a star rating, however, is very new. Few training or professional institutions have developed serious undergraduate or professional development programs to help the design professions deal with new and emerging regulations. Energy raters for housing require only two days of training without prerequisite experience, sit a simple exam and submit to a few ratings to be checked each year. In some states there is no check testing or requirement to pass an exam. There is already anecdotal evidence of poor skill in design or energy rating leading to both substantial increases in costs and the construction of houses that do not meet minimum requirements. Addressing this poor skill level through the development of national curricula and competency standards and the development of professional development programs is vital to ensure existing and proposed building regulations deliver the predicted energy savings at a reasonable cost.

While insulation alone may not provide an efficient building, without insulation it is virtually impossible to construct an energy efficient building. It is therefore vital that consumers and industry have accurate information about product performance. Product labelling standards for insulation have significantly improved in recent years but still do not provide consumers with reliable information with which to compare

products. It is possible to get product R value assessments for some types of products that will vary by as much as 50% depending on the assumptions made in calculation. Performance of some products degrades over the life of the product and no allowance is made for this in either labelling or the R values required to be achieved in regulation. Enforcement of product standards has also been poor. There has been so little independent or government sponsored product testing in Australia that CSIRO recently 'mothballed' its testing facility and redeployed staff to other areas. This creates an information asymmetry of adverse selection and is a significant barrier to energy efficiency.

Distortion in the price of energy is also a barrier to the adoption of energy efficient building practices. A highly efficient house with efficient appliances/plant will have substantially lower peak loads, and as discussed above these peak loads contribute significantly to the overall cost of energy. Yet consumers in these buildings pay a similar cost per unit of energy consumed to occupants of inefficient buildings. Load control strategies where air conditioners can be temporarily shut down during peak periods would be far more acceptable to consumers in such buildings as they are able to maintain stable temperatures for much longer periods. Despite the significant advantages to energy utilities and society of constructing such buildings utility pricing structures act against the implementation of such strategies.

The cost of connections to infrastructure has been flagged by the HIA as a major contributor to poor housing affordability7. While energy connections are only a part of this equation these connection costs do not reflect the impact the house will have on the energy infrastructure – so it seems likely that energy connection charges for inefficient houses should actually be higher, while efficient homes should be charged a lower fee. As a result of the lack of clear price signal, builders and buyers receive little incentive to adopt high levels of energy efficient house construction and appliance selection.

Coordination between regulatory building energy efficiency requirement and rating schemes and between states is poor. The national housing regulations allow a 4 star rating as demonstration of compliance, but the

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7 HIA Managing Director Ron Silberberg, Housing magazine, November 2003, page 66 - 67

prescriptive requirements are not successful in delivering this level of performance in most cases. The development of the main rating scheme (NatHERS) has not met the needs of stakeholders in northern climates and has taken far too long. And it is distorted to favour larger dwellings. Further states and local government have developed their own variations to regulations e.g. in Victoria 5 stars is required, in NSW energy efficiency standards are a smaller part of an overall sustainability index, and a number of local governments have developed their own sustainability requirements as part of the planning process. Each variation has merit, but the impact on the building industry is to create confusion. A truly national approach which properly integrated rating schemes with regulations and developed a holistic sustainability requirement that met each state's needs would be preferable to the current diversity. Such an approach would require the commitment of far greater resources to these issues than is currently allocated by state and federal governments. Given the economic size of the industry and the extent to which regulations change current practices further resources would be easily justified and savings may be possible through elimination of duplication of efforts at state and federal level. Such a commitment would also be a show of good faith to the industry which has been quite vocal in their frustration with the diversity of current regulatory approaches.

In industry there are also powerful impediments to pursuit of energy efficiency. For example the Energy Efficiency Best Practice program identified a number of industrial sites where up to 15% of site energy use was wasted due to lack of insulation of pipes and tanks containing hot water or steam. Insulation would achieve savings with as short as a one year payback. In one case, it was found that the maintenance group would have to pay for insulation, while the boilerhouse group would gain the benefits, and the two groups were in different cost centres. In other cases, engineers simply misunderstood the basics of thermodynamics and did not appreciate the significance of the heat losses. At AMCOR's Botany paper mill, retrofitting insulation to the condensate return tank was so effective that the water now remains near boiling point, and not only saves energy but also increases effective steam output.

In many industries, staff often focus their limited amount of available effort on items identified as big opportunities. This means they may ignore many simple opportunities for very cost-effective savings, such as

insulation of steam traps and pipes, improved controls and sensors, and improved management strategies. For example, insulating just one metre of 50 mm steam pipe in a plant that operates continuously can save around 25 GJ of heat each year, as much energy as insulating the whole ceiling of a centrally heated house. Yet such actions are typically not a high priority in industry even though, when added together, they can be of substantial benefit.

Terms of Reference 4& 5: Potential for energy efficiency improvements which are cost effective for individual producers and consumers and policy options

This submission focuses mainly on energy savings that can be achieved through the use of incentives and regulation. While information services play a vital role in helping to inform behaviour and therefore maximise the benefits achieved with other energy saving programs, experience in Victoria, New South Wales and South Australia with Energy Information Centres is that information alone is not effective. The Victorian House Energy Rating scheme was considered quite successful, but never managed to achieve a penetration for 5 star houses much above 5%. While provision of information is essential to ensure that optimal outcomes can be achieved, ICANZ believes regulation is the only meaningful way to ensure that energy savings are achieved in buildings.

Regulation of Building Performance

The Issues paper talks of energy savings in the order of 10% to 30%. The unregulated efficiency of many buildings is generally so poor that ICANZ believes much higher savings levels are possible. The Victorian 5 star housing regulations predict savings in the order of 50%, and this is in a market which already had minimum insulation levels. Further, the broad range of benefits which are now being evaluated such as economic growth and reduction of peak loads together with a reasonable allowance for growth of demand in the business as usual case would imply that regulation of building performance could easily be justified at levels much higher than the current stringencies. ICANZ therefore welcomes the ABCB's announcement that 5 stars will be evaluated and implemented as a national minimum standard for housing in 2006 , though it would appear that a full evaluation of all the benefits would justify even higher levels for

housing. While ICANZ stops short of recommending a particular level for housing it believes that the current evaluation of regulatory impacts must be upgraded to better reflect the full range of benefits identified by the NFEE. Though 5 stars may sound impressive, it must be remembered that a Victorian 5 star house would not meet minimum regulations in similar climates in California. 5 stars is therefore not a high stringency by international standards.

In commercial buildings there is an increasing body of evidence that highly efficient buildings can easily be cheaper to construct due to savings in the provision of HVAC plant. Organisations such as the World Green Building Council and the Australian Glass and Glazing Association8 have case studies of buildings where this has been found. Given that many of the benefits of economic growth and reduction of peak loads evaluated by NFEE may also apply to commercial buildings higher stringency levels would also appear to be likely to be justified by comprehensive analysis.

The regulation of building energy efficiency appears to be one area where environmental objectives can be achieved and economic growth enhanced. This means that the reduction of Greenhouse gas emissions in this area will be achieved at no cost. It is a logical conclusion and good public policy to ensure that areas where cost-effective benefits can be achieved through regulation should be addressed as a matter of priority compared to other options which may have a net cost.

ICANZ believes that performance regulation in the buildings area is preferable to prescriptive regulation. The Victorian 5 star Cost Benefit Study9 showed that prescriptive regulation increased compliance costs by 50% and still did not produce a consistent minimum level of performance. As a result a performance only approach was adopted in Victoria. Experience with the use of performance ratings in Victoria also shows that this provides the flexibility the industry needs to make further compliance cost savings. Henley Properties, one of Australia's largest residential builders, upgraded all their designs to 5 stars in 2001. By using the rating

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8 Personal communication, Ian Koochew (agga@bigpond.net.au)

9 "COMPARATIVE COST BENEFIT STUDY OF ENERGY EFFICIENCY MEASURES FOR CLASS 1 BUILDINGS AND HIGH RISE APARTMENTS", prepared for the Sustainable Energy Authority by Energy Efficient Strategies, March 2002

technique to their best advantage Henley have found the cost to them of achieving 5 stars is in the order of $1500 per house compared to the government's estimate of $3300.

ICANZ is aware that many of the assumptions(such as installation labour rates for insulation) in modelling done for government policy have been incorrect. The effect of this is to also overstate the cost of energy efficiency programs.

Financial Incentives

There are a range of areas where financial incentives or the removal of disincentives can assist in removing barriers to the implementation of energy efficiency in the regulation of building energy efficiency:

- The amount of the 1st home buyers grant could be tied to the energy efficiency of the home, and could decline as house size increased above the average
- Infrastructure connection costs could be scaled to reflect the lower impacts of energy efficient development,
- The current rebate schemes for solar hot water, photo voltaic systems and water tanks could be consolidated into one grant and broadened to include further aspects of sustainability such as building fabric and appliance efficiency, and
- Rebates for the installation of insulation in existing homes where costs are higher and are therefore a greater barrier to implementation. The UK has recently introduced a retro-fit program to improve the energy efficiency of existing homes where the cost of insulation was subsidised by reduced sales tax.

Energy Market reform

Aside from finance constrained new home buyers, barriers to energy efficiency generally are not about their cost. Rather, they are about a range of other impediments, including lack of information, high private discount rates, network externalities and split incentives. Mandating uptake of cost effective levels of energy efficiency, for example through a 'white certificate' requirement on energy retailers, similar to those operating in Europe, could ensure improved energy efficiency outcomes are achieved

across the economy in an efficient manner (rather than in just the industrial sector, as currently occurs with the SEPP-AQM measure in Victoria). Crucially, such a scheme would also contribute to the development of an energy services industry, which is a vital component to deliver on the required new 'energy efficiency' culture. Significantly improved residential appliances and buildings (for example 6 star or better) could be 'deemed' to contribute savings (much as solar hot water currently does) for the MRET. This would also overcome the disincentive to promoting energy efficiency by energy retailers as a result of minimum pricing policies.

Information and education

As discussed in the previous section on barriers governments need to allocate more resources to the collection of robust information to support policy evaluation and education and training of the design profession, energy raters and engineers. Information programs aimed at energy users will help to ensure that appropriate user behaviour strategies are implemented to ensure that the energy savings due to improved energy efficiency are maximised.

Technology

Insulation is a proven major contributor to achieving energy efficiency. World class insulation technology is available in Australia and does not require R&D investment to deliver sustainable outcomes outlined in this submission.

Conclusion

ICANZ believes that energy efficient buildings are cost effective for individuals and firms. A thorough evaluation of the full benefits of energy efficiency will show individual and environmental benefits grow over time and that there are a number of substantial economic societal benefits. Improved economic growth10, together with benefits for the energy supply system in reduced peak loads11 have both shown economic benefits that easily outweigh direct energy bill savings. The implication of these substantial benefits is that the stringency of regulation for building energy efficiency should be set at levels well above those now in place.

The Commission's inquiry into building regulation suggested that only minimal stringency be set but ICANZ believes that a thorough evaluation of the benefits of energy efficient buildings and industrial processes should lead to significantly higher levels of stringency. Further, the use of regulation will help to contain the cost of energy efficiency. When insulation regulations were introduced into Victoria in 1990 the price of insulation fell considerably. Regulation provides the market certainty required to stimulate innovation and allows economies of scale that will reduce the cost of energy efficient building products such as double glazing.

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10 in part, through a redistribution of resources from the capital intensive energy sector to the more labour intensive building sector (as predicted by the Victorian 5 star housing regulation analysis)

11 as shown by NFEE

Appendix A Workshop Findings: Executive Summary

Introduction

The Insulation Council of Australia and New Zealand (ICANZ) sponsored an expert workshop to explore all aspects of the value of improving the energy efficiency of buildings in general with a specific focus on housing. The workshop brought together multidisciplinary team with expertise in building, environmental planning, rating schemes, thermal modelling, eco-design, macro economic modelling, peak load analysis, appliance efficiency and use, ethical investment, utility energy analysis and energy auditing. A full list of workshop participants (the 'Gilmore Group') is listed at the end of this paper. The workshop met over two days to consider the issues and the outcomes were documented by the lead consultant: Tony Isaacs Consulting. The workshop was given an open brief and was not limited to consideration of specific issues such as insulation, or to make findings that supported the particular interests of ICANZ.

The economic value of energy efficient buildings is significantly underestimated

The value of saving energy in buildings is traditionally modelled by discounting the value of consumer energy savings over the life of a building to a Present Value and comparing this to the expenditure required to achieve these energy savings. The workshop found that this perspective does not adequately account for all the benefits of energy saving and that energy savings are often significantly underestimated as heating and cooling energy demand is not assumed to grow.

Finding 1 : Growth in demand for heating and cooling is not modelled

There are many measurable trends which will lead to an increase in household energy use for heating and cooling over time and consequently and increase in energy savings due to efficiency standards such as Increasing market penetration of air conditioners and central heating, growth in house size, and increased home occupancy due to the aging and The trend to telecommuting/working from home.

Some of these trends have already been evaluated by some parts of government but this has not been accounted for by regulatory impact

statements, e.g. the stock of air conditioners is predicted to grow by 60% in the next ten years.12

Assuming modest rates of increase in energy use for heating and cooling of between 1% and 3% would increase the amount of energy saved over 40 years by between 23% and 94% respectively.

Finding 2 : Potential for economic growth should be modelled

Economic modelling for the Victorian 5 star regulations13 and the National Framework for Energy Efficiency has shown that well designed energy efficiency measures lead to economic growth. In Victoria a 4 star stringency level has a superior Net Present Value to 5 star on the basis of costs and benefits to consumers, yet produces $300 million less economic growth. The potential for economic growth was not accounted for in the development of national house efficiency regulations for the BCA.

Finding 3 : Impacts of improved building fabric efficiency on peak utility loads is not modelled

More efficient building fabric provides more comfortable internal temperatures and therefore lower peak loads. Indicative calculations for Victoria show that the annual value of deferred plant construction from the 5 star regulations is similar in size to the total value of energy savings to consumers. In climates with lower total space conditioning demand it is likely to be of much greater value than the current energy savings to consumers. Furthermore, work by MMA for the NFEE14 suggests that operating, maintenance and fuel costs savings from improved energy

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12 Australia's Standby Power Strategy 2002-2012, AN INITIATIVE OF THE MINISTERIALCOUNCIL ON ENERGY FORMING PART OF THE NATIONAL GREENHOUSE STRATEGY, June 2004

13 **The Allen Consulting Group, Cost Benefit Analysis of New Housing Energy Performance Regulations, prepared for SEAV, March 2002**

14 **McLennan Magasanik and Associates 2004, *National Energy Efficiency Target*, Report to the Sustainable Energy Authority of Victoria, http://www.seav.vic.gov.au/energy_efficiency/NFEE/index.asp. This study calculates the benefits of achieving a range of energy savings targets**

efficiency are worth 4 to 5 times the capital cost savings from deferred generation and transmission. Further benefits such as reduced appliance cost, greater ease of implementation of load control, reduction in the cost of energy and protecting economic capacity from power interruptions have also not been evaluated.

Finding 4 : Costs of energy efficiency are often overestimated

Costs of building improvements are often taken from standard industry references yet it is well known that far more competitive pricing is available in the market, particularly for volume builders. Economies of scale created by increased demand for energy efficient products will lower prices but this is rarely accounted for. Experience with performance rating shows that skilled use of rating tools can assist builders to substantially lower compliance costs. Henley Properties reports that the cost of achieving 5 stars in Victoria is less than half the cost predicted by the government's cost benefit study. More efficient buildings can reduce the capacity of heating and cooling plant leading to cost savings but these savings are rarely accounted for. Overestimation of the cost of energy efficiency will lead to suboptimal policy outcomes.

More resources are need to provide industry capacity and incentive for energy efficient buildings

Finding 5 : Inadequate building industry skills and training and product certification limit the ability to achieve policy outcomes

While both graduate and professional development training courses for builders and designers include information about the principles of energy efficiency few if any provide quantitative advice based on understanding of house energy rating techniques.

Trade education also provides little information on correct installation procedures for energy efficient products. Incorrectly installed product will significantly limit the energy savings achieved.

There is inadequate information available to designers, builders and suppliers on the performance of energy efficient products. Regulations and standards need to set effective and verifiable product performance targets which are rigorously enforced. Demand for product performance evaluation has been so low that CSIRO recently redeployed staff away from their product testing facilities.

Finding 6 : Better data collection is required to ensure accurate evaluation of policy

There is virtually no recent, national and comprehensive data on how Australians heat and cool their homes. The last national survey of hours of use of domestic heating and cooling equipment was released by the ABS in 198815. The Victorian 5 star cost benefit evaluation was based on this information, yet it is clear that Victorians use their heating and cooling far more than they did almost 20 years ago. Further there is little data on extent of houses heated and cooled, thermostat settings, ventilation strategies used to avoid artificial cooling, sales weighted energy efficiency of appliances and comfort preferences. Good policy is based on sound

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15 ABS 8218.0, 1988, National Energy: Survey Weekly Reticulated Energy and Appliance Usage Patterns by Season Households, Australia 1985-86, October 1988.

data. More resources must be allocated to the collection of this information.

Finding 7 : Better validation of rating tools is required

While the validation of existing rating tools has met international standards several sections of industry believe that their products are not adequately modelled. This leads to delays through disputes with industry and weakens industry's confidence regarding the effectiveness of policy. This distracts industry from the task of modifying their practices to achieve compliance leading to suboptimal outcomes.

While logic dictates that better fabric will result in lower energy use the exact amount of savings will be influenced by appliance selection and user behaviour. There has been no study in Australia on impact of improved fabric star rating on energy use. Such study would identify key elements leading to effective delivery of outcomes and give confidence to industry that their efforts to achieve compliance will achieve results.

Given the many billions of dollars spent on new housing each year and the important role of these rating tools the expenditure on validation is patently inadequate.

Finding 8 : Lack of coordination leads to industry confusion

The effort to develop a nationwide approach to house energy efficiency has been slow and unresponsive to industry concerns. The ability of ratings to adequately account for ventilation strategies has been a concern of industry for over 6 years and is only now being addressed. As a result there is inadequate correlation between Deemed to Satisfy provisions and performance targets and many state jurisdictions and local governments have taken matters into their own hands. The result is a plethora of different sustainability requirements at both state and local government level. The president of the HIA has been strident in his criticism of these outcomes and the confusion this has created.16 This concern is not unreasonable and highlights the need for better coordination, consistency and simplification of building energy efficiency and sustainability requirements.

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16 **Peter Griggs, National President HIA, Housing Magazine, April 2004, page 6**

Finding 9 : Incentive and finance options have not been adequately explored and can greatly assist industry to achieve policy objectives

Incentives are needed to achieve higher levels of energy efficiency commensurate with the overall economic welfare benefits to society. There are a number of options, for example:

- The amount of the 1st home buyers grant could be tied to the sustainability of the home,
- Infrastructure costs could be scaled to reflect the lower impacts of sustainable development,
- The current rebate schemes for solar hot water, photo voltaic systems and water tanks could be consolidated into one grant and broadened to include further aspects of sustainability such as building fabric and appliance efficiency, and
- Mandating uptake of cost effective levels of energy efficiency, for example through a 'white certificate' requirement on energy retailers, could ensure improved energy efficiency outcomes are achieved *across the economy* in an efficient manner. This would contribute to the development of an energy services industry, which is a vital component to deliver on the required new 'energy efficiency' culture.

Conclusion

The logical conclusion to be drawn from the underestimation of the benefits and overestimation of the costs of energy efficient buildings is that higher stringency levels are justified. These higher benefits mean that the allocation of additional resources needed for education, data collection, incentives, certification and validation identified above as key to achieving the policy objectives will also be justified. Though inadequacies in these areas are serious, because the benefits have been so comprehensively underestimated these shortcomings do not invalidate existing policy initiatives and better information is likely to support increased stringency. Finally, better coordination by all levels of government and improved responsiveness to the needs of industry are essential for industry to successfully implement regulatory requirements.

Appendix B Workshop Participants

Name	Relevant experience
Robert Foster	Robert is Practicing Architect with extensive experience in modelling the impacts of energy efficiency programs. Robert undertook the modelling of the energy benefits for Victorian 5 star regulations. This is the most extensive evaluation of its kind in Australia with impacts evaluated over 4,500 houses. He has also evaluated the impact of planning height and setback restrictions on the energy efficiency of housing development and examined the impact of house rating on heating and cooling appliance size. At Energy Efficient Strategies Robert has consulted with federal and state governments on appliance efficiency for several years.
Trevor Lee	Trevor is a director of Energy Strategies one of Australia's leading energy efficiency and renewable energy consultants. He was a founding director of the Sustainable Energy Industry Association (now BCSE), is a director of Australian Ethical Investment Ltd and former editor of Solar Progress. He undertakes key thermal performance simulation modelling work for AGO and ABCB to assist them to evaluate the energy savings delivered by building regulation. Trevor was the first technical adviser to the ACT House Energy Rating (the first minimum energy performance requirements for housing in Australia) scheme for a number of years guiding it through its difficult initial phase.
Jan Telacko	Jan has extensive experience in the analysis and implementation of sustainable design initiatives for buildings, infrastructure and the development of land. His company Ark Resources has carried out more than 3,000 energy ratings for architects, builders, developers, individual owners and Councils. Jan has developed comprehensive ESD rating tools for residential and commercial development and was responsible for the development of the City of Port Phillip ESD Scorecard is acknowledged as a cutting edge assessment framework.
Monica Oliphant	Monica is a research scientist specialising in renewable energy and residential end-use efficiency. She was Convenor of the 2001 International Solar Energy Society Solar World Congress; the Principal Energy Research Scientist for the Electricity Trust of SA - Power and Energy; a member of the South Australian Government's Research Advisory Committee; and a member of the South Australian Government's Renewable Energy Working Group. Monica was appointed to the federal government's MRET review panel in 2003.
Stephanie Pillora	Stephanie worked with the NSW Sustainable Energy Development Authority as a program manager. An Environmental Manager and Planner with over twenty years experience in Local and State Government Stefanie specialises in sustainable development in local government and has diverse experience in the fields of energy, greenhouse and the built environment, waste and recycling, stormwater and catchment planning, and natural resource management.

Name	Relevant experience
Richard Begley	Richard is one of Australia's most experienced economists in the economic modelling of environmental programs and now works with the Allen Consulting Group. He designed and commissioned the Commonwealth Government's economic modelling and sensitivity analyses assessing the impacts of the Kyoto Protocol under a range of global scenarios for 2008-12 and beyond. Richard managed a two-year project developing projections to 2020 of Australia's greenhouse gas emissions. The projections gave for the first time a robust indication of the likely gap to Australia's Kyoto target for 2008-12. His recent work includes ground breaking modelling for the National Framework for Energy Efficiency.
Prof. Chris Ryan	From 1989, Professor Ryan was the founding Director of the National Key Centre for Research into Environmental Design, involved in Eco Design. Chris spent 4 years as Director of the prestigious International Institute for Industrial Environmental Economics in Sweden. From 1989, Professor Ryan was the founding Director of the National Key Centre for Research into Environmental Design. Chris has worked throughout Europe and Asia and for the UN.
Adj. Prof. Alan Pears	Alan is one of Australia's most experienced and broad ranging consultants in the energy efficiency and renewables field. His experience ranges from his pivotal role in the introduction of Victorian insulation regulations and national appliance labelling through to analysing the potential for cost-effective greenhouse emission reduction in a number of industries, and developing educational resources. Alan has also been involved in development of energy efficient products and appliances as well as helping his clients identify and implement substantial energy savings.
Tony Isaacs	Tony is one of Australia's leading experts in the thermal performance of buildings. He has been a lecturer in thermal performance of buildings at Melbourne University and was among the first in Australia to use computer thermal simulation programs. Tony managed a high volume public housing program for the Victorian government where he was responsible for the production of over 2,500 houses in 4 years. At SEAV he developed the *FirstRate* house energy rating software. *FirstRate* is the largest selling thermal performance evaluation tool in Australia and has won a number of building industry awards. Tony has trained over 1500 building industry professionals in energy efficient housing. Tony managed the Cost Benefit Study for the Victorian 5 star regulations which was the first of its kind in the world to include comprehensive macroeconomic modelling of an environmental policy.

Appendix C: Star Ratings and House Prices Press Release

A recently completed independent 4 year study has proven that House Energy Ratings definitely have a positive link with house prices – and, in a turning market, the more Stars the better the price.

In three monthly intervals for over four years, local Canberra design and consulting firm Energy Partners, has been recording the price, location and energy rating of homes advertised for sale in the ACT.

Chart 1 (next page) shows that a 1 star improvement in a home's energy rating coincides with an average increase in advertised sale price of around $15,000. This huge effect is so marked that 5 star energy rated homes sell on average for 33% more than their 1 star competition. (4 year average advertised sale price: 1 Star = $237k, 5 Star = $315k)

The sales data collected by Energy Partners also provides a fascinating insight into how the overall sales market is progressing. For most of the last four years better rated homes have consistently sold for higher prices than their poorer rated cousins. Only during the last year of dramatic price inflation has this not been the case.

However the latest data set (up to June 30, 2003) shows a return to the long term trend, where lower energy rated homes are less valued by the market - buyers are starting to be picky again. This change as indicated in Chart 2 (next page) may also be an early indicator of the 'heat' leaving the residential sales market.

Further cost benefit analysis conducted by Energy Partners has found that less than $2,000 will improve the performance of many Canberra homes by more than 1 star band. Minor renovations, such as adding insulation, good curtains, blinds and pelmets can raise most homes to more than 4 stars. Such a small investment returning a considerable increase in resale value has the additional advantage of also saving on running costs.

Additional Detail

Detailed analysis of the 4 year weighted mean house price data, provides a breakdown of the market value placed on energy efficiency. The data set shows:

- a minor increase in value in 0 star rated homes, due to the impact of the aged inner-city housing stock which is valued more for the land on which it stands than for the nature of the houses themselves
- a bulge around the 2.5 star band representing the bulk of ACT housing
- a third bulge at 4 star driven by mandatory 4 star new homes
- a clear increase in value for 5 star rated homes
- overall a clear market preference for energy efficient homes.

Appendix C: Star Ratings and House Prices Press Release

Chart 1

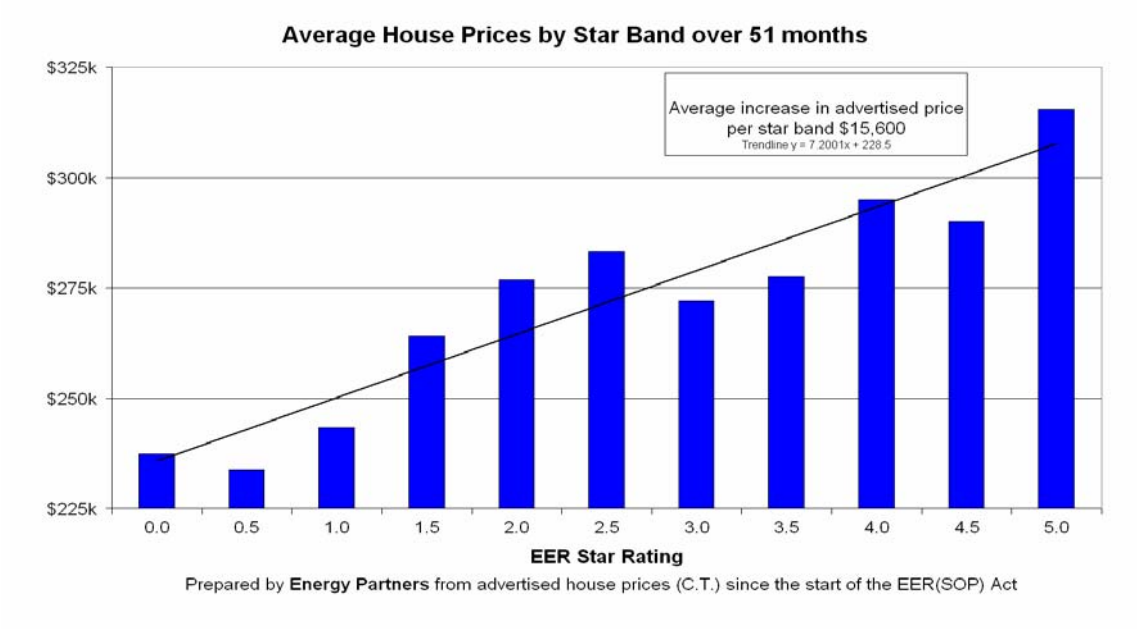
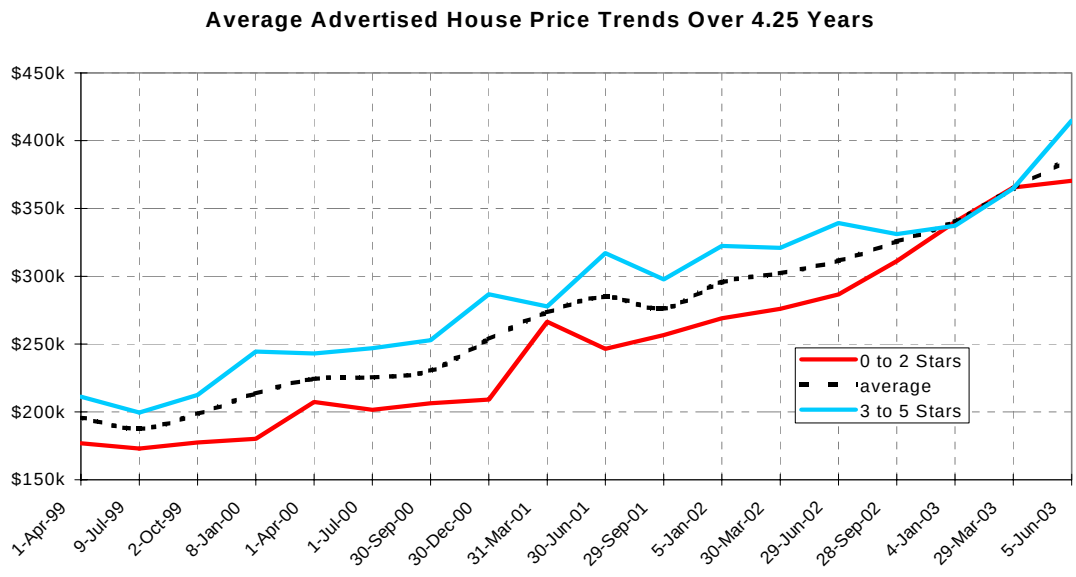


Chart 2



Insulation Council of Australia and New Zealand

New Insulation body goes trans-Tasman

The Insulation Council of Australia and New Zealand (ICANZ) was formed in July 2004 to replace the industry association, FARIMA. This new body now includes New Zealand membership reflecting the trend towards common building standards, closer ties in research, testing and other trans-Tasman building initiatives.

Issues of future energy supply, energy efficiency, climate change and sustainability are now high on the agendas of both Governments and Industry. The Insulation Industry has an important role to play in helping address these issues.

The insulation market in Australia and New Zealand has an estimated valued of over $450 million and employs directly and indirectly over 5000 people. ICANZ members represent approximately 70% of this market.

ICANZ will focus on the contribution insulation can make to address these issues now and into the future. It will and will be actively involved in advocacy at both State and Federal Government levels on matters of policy development.

Insulation has a fundamental role to play in improving the energy efficiency of the built environment. But it is also only part of the total mix of product and design. ICANZ will work closely with other allied associations both locally and internationally to provide better data and practical cost-effective solutions to meet requirements for energy efficiency and environmental design in buildings.

ICANZ members are committed to producing products that meet the new insulation performance standard, AS/NZS 4859.1, for the life of the project to ensure the maximum cost savings and environmental benefits for the life of the project.

The recent introduction of regulation for minimum energy requirements in residential dwellings has unearthed a significant lack of knowledge of energy efficient design and insulation performance. ICANZ will provide additional education and information to assist building professionals and consumers have a better understanding of these matters.

For more information visit **www.icanz.com.au**

ICANZ
THE RIGHT INSULATION MATTERS