

Appendix 1

April 2002

Report for The
Sustainable Energy
Authority and The
Building Commission

Cost-Benefit Analysis of New Housing Energy Performance Regulations

Impact of Proposed Regulations

Executive Summary

Background

The Allen Consulting Group was engaged by the Sustainable Energy Authority and the Building Commission to provide an analysis of the costs and benefits of moving to a 4- or 5-Star House Energy Rating regulation standard for all new houses and major renovations undertaken in Victoria. The MMRF-GREEN economic model, operated by the Centre of Policy Studies at Monash University, was employed to estimate the economic costs and benefits.

Victoria boasts a significant building industry, worth around \$10 billion annually.

Victoria accounts for almost one third of the national building industry, with nearly 40,000 new homes and apartments being built in the State last year, 50,000 builders and sub-contractors employed in the local home building market and the industry worth around \$10 billion annually to the State.

Australia's greenhouse response strategy has focussed to a large degree on energy efficiency; at the same time consumers are exhibiting a growing interest in energy efficient houses.

An important element in Australia's response to the threat of climate change is to adopt policy measures that encourage greater energy efficiency. The trend in the Australian community towards larger dwellings combined with smaller households provides an added impetus to this in the home building sector. In addition, more than ever before consumers are placing increasing importance on the energy efficiency of houses. Substantial concerns over the environment combined with the prevalence of mandatory appliance labelling has created an increasing awareness of the potential for reductions in energy use and of course the costs of heating and cooling.

Reflecting this increasing awareness is the Victorian Government's recent in-principle support for the introduction of 4- and 5-Star House Energy Rating regulation standards for all new houses and major renovations of existing houses. Consequently, a process is now in place to examine the feasibility and desirability of introducing such regulation standards in Victoria. This study supports that process by analysing the potential costs and benefits of moving to 4- and 5-Star energy rating housing.

Assumptions

Why regulate so as to make people do what is in their own financial interests anyway? There may be a lack of information or of available products;...

One question that is often raised by economists is why regulation is required to induce consumers to do something that would be in their interests anyway. A common response to this is to identify some market failure. What is the failure in this case? There are a number of market imperfections in this area. First, consumers may not be aware that the additional costs of buying an energy efficient house are more than outweighed by the benefits of reduced outlays on energy. Secondly, builders may not provide an energy efficient product because, as with additional safety features built into motor vehicles, they fear that the 'sticker shock' will deter customers from purchasing it.

... in any case, positive environmental externalities may constitute a justification for regulation.

The main externality justifying measures of this kind, however, is that they generate environmental benefits (less pollution and lower greenhouse gas emissions). Such benefits cannot be appropriated to any significant extent by individuals but provide benefits to the whole community. Without regulation, some individuals may 'free ride' on the back of action taken by the concerned

few. Even if there are net financial costs to individuals (which our study does not suggest) it still may be appropriate to regulate if there are net *social* benefits.

The 'best case' scenario assumes rational behaviour on the part of well-informed consumers; it is a more likely outcome than the worst case (or myopic) scenario.

These issues are important and influence the modelling scenarios used in this study. The forward-looking scenario assumes that consumers are rational: once they are aware of the net financial benefits inherent in outlaying the additional cost of an energy efficient house they will not reduce their level of consumption. Under this scenario, therefore, the number of new houses constructed does not fall from the business-as-usual level when the regulations are introduced. The alternative, and worst case, scenario, on the other hand, assumes that consumers are myopic and react solely to the higher price of the house rather than taking account of the increased levels of services being purchased. In practice the outcome is likely to lie somewhere between these two extremes; our view is that it will incline much more towards the rational and best case scenario.

Two other scenarios were used. In the first (the 'A' scenarios), the costs of incorporating higher energy standards were assumed to remain constant, in real terms, through the forecast period. In the second scenario (the 'B' scenarios), a learning or experience curve assumption was made and it was assumed that costs would fall as energy efficiency was incorporated into new house designs from the bottom up. In the 'B' scenarios the cost was postulated to fall by half over the first ten years of the regulated period.

Data on the additional costs involved in incorporating 4- and 5-Star energy standards in dwellings, together with estimates of the associated energy savings, were provided by the SEA. Clearly these estimates of costs and savings constitute the most critical input to the modelling. They were the result of a separate technical consultancy that analysed these costs and savings in considerable detail and, the SEA advises, represent conservative estimates.

Findings

This study finds that the introduction of energy efficiency regulation standards into Victorian housing will produce modest but worthwhile economic benefits for the Victorian community. There will also be social and environmental gains. The benefits are significantly greater under a 5-Star than a 4-Star standard.

The introduction of energy efficiency regulation standards into Victorian housing would reduce energy consumption and generate a number of positive economic impacts.

Overall, the standards would lead to a reduction in energy consumption. That is, private consumption falls relative to base, with the gap gradually widening over time, reflecting the accumulation of reductions in spending on energy. As well as the positive environmental impact of this, the standards would have many positive economic impacts for the State of Victoria in a range of areas including Gross State Product (GSP), employment and economic welfare (Table 1). The net present value of the estimated increase in GSP is over \$500 million under the most favourable scenario and over \$200 million under the worst case assumptions. However, once expressed in proportional terms (that is, as a percentage of the NPV of 'base case' GSP), it is evident that these increases in GSP, while positive, are relatively small.

Initially, the small positive impact on GSP of introducing these housing regulations would almost appear to be counterintuitive — how could

regulations which increase the cost of construction lead to an increase in the construction expenditure of housing investors/owners and an associated increase in value added? This occurs because there are few regulations designed to *increase* an individual's consumption of a product because it is in their best interests — that is, it will benefit the private individual, and generate external benefits via other positive economic and environmental impacts. Thus, a rational and well-informed housing investor/owner has an incentive to increase their investment in housing because the value of the asset will be higher than otherwise. They are able to finance this additional expenditure via the savings made on energy costs and the increased implicit value of their house. This, combined with the additional positive impacts outlined above, leads to a small positive net impact on GSP.

Overall, labour-intensive industries will gain more than capital-intensive activities, leading to a modest increase in employment.

At a micro level, the standards would generate significant benefits for the construction industry and related industries, especially those producing goods and services that are favoured in the technology for producing compliant houses. Further, the most trade-exposed sectors in the Victorian economy, and the ones that rely least on Victorian demand for absorption of their product, would gain in terms of output and employment, reflecting the improvement in competitiveness of Victorian traded goods industries. Conversely, the industries that suffer are those for which consumer demand declines — urban gas distribution, electricity supply, agriculture (which produces firewood) and petroleum refining (which produces LPG).

In terms of the distribution of these benefits, all Victorian regions would gain except for the energy-supply regions — East Gippsland (gas) and La Trobe Valley (brown coal electricity). Regions that do benefit would experience roughly equivalent gains.

In addition to these direct impacts, the energy efficiency regulation standards will also change the perceptions of the general public over time. As developers see marketing advantages in promoting energy efficiency and low greenhouse gas emissions, the impacts will filter down into building work that would not normally require compliance, such as minor refurbishments and upgrades.

The study suggests there will also be net social benefits from the proposed regulation...

While the focus of the report was on the economic impacts, we have also commented on social and environmental issues. Overall, the measures are likely to provide welfare benefits to Victorians as measured by increases in consumption and investment. As stated above, employment is also likely to be higher than it otherwise would have been.

At the margin, however, it is possible that some people who previously would have been able to purchase a house would now be excluded from the market. This should not be the case, however, if financial institutions behaved rationally and accepted that the reduction in household expenditure on energy would increase borrowers' capacity to service debt.

... as well as worthwhile environmental benefits.

The environmental effects of the measures would be positive with less pollution and lower greenhouse gas emissions. Under the most favourable scenario, GHG emissions would be reduced by around 700Kt of CO₂-e by 2021.

Table 1

MACROECONOMIC VARIABLES (\$MILLION IN 2001 PRICES UNLESS OTHERWISE INDICATED)

| Macroeconomic Variable | Forward-Looking Scenario | | | | Myopic Scenario | | | |
|---|--------------------------|----------|----------|----------|-----------------|----------|----------|----------|
| | 4-Star A | 5-Star A | 4-Star B | 5-Star B | 4-Star A | 5-Star A | 4-Star B | 5-Star B |
| <i>Real Private Consumption</i> | | | | | | | | |
| 2002 | 8.2 | 16.9 | 8.2 | 16.9 | -3.4 | -7.5 | -3.4 | -7.5 |
| 2007 | -5.7 | -0.7 | -4.1 | 1.3 | -3.1 | -7.1 | -1.9 | -4.8 |
| 2012 | -23.2 | -24.3 | -16.0 | -14.4 | -3.4 | -7.6 | -1.1 | -3.0 |
| 2017 | -41.5 | -49.1 | -23.7 | -22.7 | -3.9 | -8.4 | -1.6 | -3.8 |
| <i>Real Investment</i> | | | | | | | | |
| 2002 | 41.4 | 80.5 | 41.4 | 80.5 | -1.0 | -2.0 | -1.0 | -2.0 |
| 2007 | 36.5 | 72.1 | 27.2 | 54.1 | 0.2 | 0.1 | 0.3 | 0.4 |
| 2012 | 35.3 | 70.7 | 17.4 | 35.5 | 0.5 | 0.5 | 0.7 | 1.0 |
| 2017 | 34.4 | 69.7 | 17.7 | 36.5 | 0.8 | 0.9 | 1.0 | 1.2 |
| <i>Real Total Value Added (GSP)</i> | | | | | | | | |
| 2002 | 25.4 | 48.3 | 25.4 | 48.3 | -1.6 | -4.8 | -1.6 | -4.8 |
| 2007 | 22.3 | 44.9 | 19.0 | 38.1 | 2.1 | 0.7 | 3.1 | 2.6 |
| 2012 | 17.2 | 39.0 | 12.2 | 27.7 | 4.1 | 3.4 | 6.0 | 7.3 |
| 2017 | 10.8 | 31.1 | 11.3 | 28.3 | 6.0 | 5.9 | 8.0 | 9.8 |
| Net Present Value | 257.38 | 566.4 | 233.77 | 496.97 | 45.63 | 29.58 | 63.95 | 66.94 |
| Net Present Value as a proportion of Total ^b (%) | 0.0072 | 0.0159 | 0.0065 | 0.0139 | 0.0013 | 0.0008 | 0.0018 | 0.0019 |
| <i>Employment ('000 persons)</i> | | | | | | | | |
| 2002 | 0.5 | 1.1 | 0.5 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2007 | 0.5 | 1.1 | 0.5 | 0.9 | 0.2 | 0.3 | 0.2 | 0.3 |
| 2012 | 0.5 | 1.1 | 0.4 | 0.8 | 0.3 | 0.5 | 0.4 | 0.5 |
| 2017 | 0.5 | 1.1 | 0.5 | 0.9 | 0.5 | 0.6 | 0.5 | 0.7 |
| <i>Capital Stock</i> | | | | | | | | |
| 2002 | 0.0 | 0.0 | 0.0 | 0.0 | -19.7 | -39.3 | -19.7 | -39.3 |
| 2007 | 0.6 | 11.3 | 8.7 | 26.6 | -32.4 | -58.5 | -27.0 | -47.8 |
| 2012 | -18.3 | -10.2 | -1.4 | 20.4 | -43.9 | -74.6 | -32.8 | -52.2 |
| 2017 | -43.3 | -42.0 | -13.2 | 11.2 | -55.4 | -90.6 | -43.7 | -67.2 |
| <i>Greenhouse Gas Emissions (Kt of CO₂-e)</i> | | | | | | | | |
| 2002 | -15 | -18 | -15 | -18 | -19 | -27 | -19 | -27 |
| 2007 | -137 | -187 | -138 | -188 | -141 | -195 | -140 | -195 |
| 2012 | -267 | -366 | -268 | -368 | -268 | -372 | -267 | -371 |
| 2017 | -399 | -549 | -398 | -548 | -396 | -550 | -396 | -549 |

^a The Net Present Value (NPV) of GSP is calculated using a real discount rate of 3.5 per cent. These figures represent the NPV of the absolute deviations in GSP. ^b These figures represent the NPV of the absolute deviations in GSP as a proportion of the NPV of 'base case' GSP (what GSP would be in the absence of these regulation standards).

Conclusions

There are clear benefits in moving directly to a 5-Star standard...

The findings of this study suggest that the benefits of moving to 4- or 5-Star energy standards are significantly greater than the costs. A 5-Star standard would provide the greatest net benefits, in terms of economic, social and environmental impacts.

...these benefits are maximised when housing investors are well-informed of the advantages of energy efficient housing.

This implies an important role for Government in providing information.

The benefits of imposing such standards are greatest when housing investors are well-informed of the net financial benefits of purchasing energy efficient dwellings. The provision of such information would create an environment in which rational decision-making was much more likely.

This is where the Government can play a pivotal role in providing consumers with the information necessary to make such rational decisions and thus maximise the positive impact on the Victorian economy.