



Australian  
Institute of  
Architects

## Australian Institute of Architects

Response to the Victorian  
Climate Change Summit -  
Discussion Paper

Submission to the  
Victorian Climate  
Change Summit

July 2008

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## SUBMISSION BY

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## PURPOSE

- This submission is made by the Australian Institute of Architects - Victorian Chapter (the Institute) in response to the Victorian Climate Change Summit Discussion Paper.
- This submission has been prepared with the assistance of the Victorian Chapter Sustainable Architecture Forum and draws on the previous submission made by the Institute to the Garnaut Climate Change Interim reports.
- At the time of this submission the President of the Victorian Chapter is Karl Fender and the Immediate Past President is Professor Philip Goad.
- The Victorian Chapter Manager is Elizabeth Raut.

## INFORMATION

### ***Who is making this submission?***

- The Australian Institute of Architects (the Institute) is an independent voluntary subscription-based member organization with approximately 9,450 members. Members are bound by a Code of Conduct and Disciplinary Procedures.
- The Institute, incorporated in 1929, is one of the 96 member associations of the International Union of Architects (UIA) and is represented on the International Practice Commission.

### ***Where does the Institute rank as a professional association?***

- At approximately 9,450 members, the Institute represents the largest group of non-engineer design professionals in Australia.



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## 1.0 INTRODUCTION

The Australian Institute of Architects Victorian Chapter (the Institute) welcomes the opportunity to respond to the Victorian Government's call for input to the Climate Change Summit Paper.

The Institute sees the role of the built environment as an important part of Australia's efforts to reduce Greenhouse Gas (GHG) emissions to the targets required to mitigate climate change.

This document has been prepared with the assistance of the Victorian Chapter - Sustainable Architecture Forum (SAF) in response to the request for submissions to the Victorian Government's Climate Change Summit paper. The SAF is a proactive voluntary Institute forum of architects and design professionals.

This submission draws on an earlier submission made by the Institute to the Garnaut Climate Change Interim reports. Extracts of the earlier submission are shown in quotation marks. The work of Scott Willey, Manager Sustainability and David Parken, Chief Executive Officer (CEO), RAlA in preparing the original submission is acknowledged. The submission also draws upon the Garnaut Climate Change Review and the collaborative resources of cited reports and research documents as the foundation for this text.

"The Institute has been actively collaborating with Government, industry and environmental non-government interest groups to advance a sustainable built environment for Australia. The Institute is a member of the Australian Sustainable Built Environment Council (ASBEC), the Green Building Council of Australia (GBCA), and the Australian Council of the Built Environment Design Professions (BEDP); all of which the Institute works with collaboratively."

"The IPCC Fourth Assessment

The United Nations Environment Program and World Meteorological Organization established the Intergovernmental Panel on Climate Change (IPCC) with the aim to provide "decision-makers and others interested in climate change with an objective source of information about climate change". (IPCC, 2007)

Last year the IPCC Fourth Assessment Report: Climate Change 2007 was published and notes that world temperatures could rise by between 1.1 °C and 6.4°C within the next century, and that anthropogenic warming and sea level rise would continue for centuries due to the timescales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized" (IPCC, 2007)"

## 2.0 THE NEED FOR GHG EMISSIONS REDUCTION

### 2.1.1 Other Benefits from Sustainable Development

"Although the need to reduce GHG emissions is urgent in order to limit the degree of climate change, it should be noted that many initiatives for GHG mitigation will bring with them other environmental benefits. Potential environmental benefits include more efficient water use, increased biodiversity, cleaner air, minimized use of virgin resources, remediation of damaged land and waterways, and less pollution. As well there is the potential of greater prosperity and quality of life for Australians and the global community."

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### **2.1.2 Deep Green Emission Cuts**

“As a member of ASBEC, The Institute contributed funding to commission the Centre for International Economics to study the potential the built environment had to aid Australia achieving significant GHG emission reduction: “this study builds upon previous commissioned by the BRCC(2006) analyzing the effects of placing an economy wide GHG emissions target of at least 60 percent below 2000 levels by 2050.” The Australian Business Roundtable on Climate Change (BRCC) “reported that it is possible to achieve a 60 percent reduction in GHG emissions by 2050 while maintaining strong economic growth, and that with early action, the economic impact by 2050 would be modest”. (CIE 2007).”

### **2.1.3 Research into the Building Sector**

“The report ‘Capitalising on the Building Sectors Potential to Lessen the Costs of a Broad Based GHG Emissions Cut’ found that 23 percent of Australia’s total greenhouse gas emissions are a result of energy demand in the building sector.

Although other industries and the emissions trading scheme debated for Australia focus on GHG mitigation on the supply side of the energy market, the energy efficiencies possible in the built environment as consumer side management are likely to be at lower cost.

The building sector as a whole could reduce its share of GHG emissions by 30-35 percent whilst accommodating growth in the overall number of buildings by 2050. This can be achieved by using today’s technology to significantly reduce the energy needed by residential and commercial buildings to perform the same services. (CIE, 2007)”

Dr Michael Monitor, Senior Advisor on Carbon Management, Climate Change Services at PriceWaterhouseCoopers (Australia) and Professorial Visiting Fellow, Climate Change Research Centre UNSW, estimates that to achieve a 60% GHG emission target by 2050, we will globally need to abate the production of 750 Billion tonnes of CO<sub>2</sub>e. With long-term cost of abatement (not carbon trading price) estimated to be between US\$25-100 per tonne, using a conservative estimate of US\$50 per tonne values the emissions abatement industry to be worth US\$37.5 Trillion over the next 42 years. Dr Molitor sees this will call for the greatest activation of capital in financial history.

While the mechanism for building energy efficiency to be connected with the proposed federal Carbon Pollution Reduction Scheme (or Emissions Trading System – ETS) is yet to be determined, we believe it inevitable that energy efficiency abatements will be valued in the carbon economy in the near future. Ironically, Victoria’s high per capita use of energy in our built environment will make energy efficiency initiatives in Victorian buildings a low-cost abatement option, which will attract capital investment in a global carbon economy

To summarise, current studies and investigations show that present building practices contribute significantly to climate change, and that with a ‘business as usual’ approach there will only be limited success in reducing climate change. These studies also show that implementing policy into a more

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sustainable building industry and incorporating methodologies and technology existing in the marketplace will not only significantly reduce the impact the building industry has on the environment but it will not dull economic growth and potentially could bring about greater prosperity in related areas and improve quality of life.

#### **2.1.4 Mitigation and Adaptive Responses**

Managing the risks of climate change in the built environment calls not only for mitigation and abatement strategies, but also creates the need for our built environment to be able to adapt to possible future changes and extremes in our climate.

Architects are already responding to the realities of global warming, with the consideration of future climate scenarios already influencing the design of buildings. Hotter summer temperatures, as we have experienced in recent years, are predicted to significantly increase cooling energy use in Victorian buildings and are being considered as scenarios in the current environmental computer modeling of some buildings. Current modeling of rainwater harvesting systems are being modified drought year rainfall data, rather than 50 or 100 years of historical records.

With recent science indicating we may struggle to stabilise atmospheric carbon at 450ppm and contain global temperature increases to 2 degrees, our built environment should consider the effects of extreme weather conditions. Our future planning system and building codes need to consider bushfire intensity and risk, increased wind speeds, higher intensity rainfall, flood levels, coastal inundation and rising sea levels.

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### **3.0 URBAN PLANNING AND TRANSPORT**

#### **3.1 Car Reliance in Australian Cities**

Development of Australian cities to date has resulted in a high dependence on personal car use, typical families rely on two vehicles per household. Supporting this infrastructure has left limited funding to the development of urban public transport, leaving suburban dwellers vulnerable to rising fuel prices. Unless integrated transport solutions are built into our urban framework, vehicle emissions from outer urban households that are reliant on two or more cars will continue to increase

### **3.2 Passenger Transport Emissions**

#### **3.2.1 Containing Urban Sprawl**

Melbourne has responded visibly in recent years to the crisis of housing affordability by pushing new development further and further out where land has been less expensive. This has led to outer suburbs being more and more distant and proving more difficult and more expensive to service with public transport, community infrastructure and forcing an ever increasing reliance upon the car to move around. Increasing fuel prices and the forecast 'peak-oil-crisis' will impact on these residents to their detriment. An attempt to remedy this would be to:

- link outer suburb settlements and new developments that are linked by a highly efficient, capacity responsive public transport system to the city and inner-urban areas;
- Show heavy rail to be the lowest energy mass-transit mode, and thus town planning within and between cities needs co-ordination to allow for further expansion of rail networks;
- improve public transport services and increase dissemination of information about the services available; and
- increase emphasis for government funding on public transport.

#### **3.2.2 Walkable Town Centres**

With private car use dominating passenger transport in Melbourne, converting shorter trips to walking or cycling journeys will require significant consolidation of the urban fabric through multi-centric cities using public transport as a linking mechanism. The offset to this would be the noticeable reduction of vehicular pollution, more pedestrian friendly precincts and a higher quality lifestyle for residents and users.

#### **3.2.3 Transit Orientated Development**

"The viability of walkable town centres within a larger city relies on efficient fast-rail connections from outer suburbs and near country towns to the CBD", while still providing benefits in reducing peak hour public transport demands from daily commuting into to a singular CBD node. This policy should be prioritized by this Government.

#### **3.2.4 Rethinking private car parking**

In the context of the urban transport challenges faced by Melbourne, we would support the review and reform of the current planning mindset of regulating minimum car parking requirements for our buildings.

We see reducing the environmental impacts of our urban transport, and dedicating less of our urban areas to bitumen and the housing of private vehicles,

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Minimum car parking requirements assuming car dependence and continued usage sends a perverse policy and regulatory signal to the market, at a time when we should be considering an integrated transport solutions utilising all modes of transport. Rewarding well connected development sites with reduced parking requirements

We believe the Victorian Government should investigate the mapping of public transport and bicycle path information in a central database that can guide integrated transport planning, and be developed into a planning tool analysing the non-motorised transport options of all properties in our urban planning schemes.

As a course NSW has pursued in their BASIX planning tool, this data can ultimately be used to quickly and accurately calculate a rational car parking requirement for all properties and uses, based on informed understanding of current and future transport options and service frequencies.

### **3.2.5 Make bicycle use a more attractive alternative**

Many bicycle user groups continuously campaign for greater awareness for the safety and practicality of existing cycle lanes and routes. Investing in dedicated cycle paths such as the St. Georges Road tram/cycle route linking Preston to Fitzroy along major routes including Heidelberg Road, St. Kilda Road, will greatly facilitate the safety, attractiveness and comfort of cycle commuting, which has flow on benefits of noticeably less pollution, and healthier communities that are less reliant on cars for transport.

### **3.2.6 Prioritise Future Efficient Transit in Planning**

“If further advancement or more energy efficient state and national freight rail projects or fast passenger train development are to occur, then planning that is coordinated across municipal and state boundaries would be required.”

### **3.2.7 Lower Cost Multi-Residential**

“If the cost of mid to high density housing around the state is to reduce, and thus take the pressure off the urban sprawl, research is needed into reducing the costs associated with higher density construction modes (Classes 2 & 3)”

Reforming our approach to the provision of car parking for higher density residential developments should form part of an integrated transport plan, creating the opportunity to reduce development infrastructure costs and lower resource use and associated emissions. The provision of car parking can commonly cost \$30- 40,000 per dwelling, with car park ventilation and lighting increasing body corporate costs and being a major contributor to the high energy use that is being witnessed in high density housing.

### **3.2.8 Increasing Suburban Density**

Sensitive adjustment of Rescode policies need to be implemented that allow for a higher level of urban and suburban density without affecting existing neighbourhood character in a detrimental way. This would allow for the population of the city to grow in a sustainable manner without relying on greater investment in establishing and maintaining outlining suburbs and towns presently reliant on motor vehicle transport for connection with the City and other suburbs.

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### **3.2.9 Costing Development Impact**

“The implementation of a system for the cost of externalities to be calculated for development proposals would produce more equitable development and provide greater environmental outcomes.”

### **3.2.10 Develop Assessment Metrics**

It is an opportunity that the Government of Victoria can become forefront leaders within Australia and perhaps South-East Asia in pioneering research into the metrics for measuring the ecological footprint of development and the thus gaining a holistic understanding of the impact of proposed development. Such knowledge will allow measures to improve operational efficiency and achieve greater environmental outcomes.

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## **4.0 BUILDINGS**

“The following list of policy suggestions is partially based on research conducted by the Centre of International Economics (CIE) commissioned by the ASBEC Climate Change Task Group. Suggestions taken from the CIE are cited as such.”

### **4.1 Private Investment Incentives**

#### **4.1.1 White Certificates**

- “Create a transferrable commodity based energy saving arising from energy efficiency investments. Certificates should work in two ways:
  - o in conjunction with the present emissions trading scheme as proposed by the Victorian and Federal Governments, and
  - o independently with an energy efficiency target imposed on electricity retailers
  
- Victoria should push for greater standardization of schemes across the national level, allowing for a lower cost for the implementation of energy efficiency measures.
  
- If a value is to be put on embodied energy within existing building stock, white certificates could also be issued for major renovations that retain existing building fabric as well as the efforts in improving the energy efficiency of the building.”

#### **4.1.2 Rates and Charges Relief**

“Reform rates and charges (eg stamp duty) to encourage energy efficient retrofit of existing building stock and investment in energy efficient buildings. This approach would apply across the building sector including both investment property and owner occupied buildings. (CIE/ASBEC 2008)”

#### **4.1.3 Neighbourhood and precinct scale infrastructure**

The urban design of new and infill suburban development should seek to maximise the environmental and social benefits available from neighbourhood and precinct scale infrastructure.

If land titling can create management structures for the operation of shared infrastructure, we need to facilitate processes to allow energy and water to be supplied across property boundaries in new ways. The increased scale and professional management of providing distributed infrastructure on a neighbourhood scale can increase the cost/benefit of a range of sustainable technologies.

These include district heating, co-generation and tri-generation, waste to biogas systems, rainwater capture and resupply, storm water management and treatment, wastewater treatment, off-road pedestrian and cycle paths, zones of biodiverse low maintenance common landscape.

#### **4.1.4 Density Bonus**

“Victorian Government and individual local councils could provide increased flexibility in the development approval process for projects that satisfy a given environmental performance threshold. Examples could be to offer exemptions to restrictions around building height or permissible floor space

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ration in exchange for buildings with better thermal comfort. (CIE/ASBEC 2008)”

#### **4.1.5 Green Doors**

A system for local councils to prioritise the review and approval of development applications associated with sustainably designed buildings “(that is, buildings satisfying a given a threshold of energy efficiency/thermal comfort performance) (CIE/ASBEC 2008).”

#### **4.1.6 Procurement of Green Buildings**

The Victorian Government should take the lead nationally by purchasing/leasing only ‘Green Buildings’, and by taking ownership of non-conforming building and commissioning high performing retrofits.

### **4.2 Funded Incentives**

#### **4.2.1 Public Funding of Retrofits**

“Public funding of retrofits would require a range of government-funded financial assistance (ie grants, subsidies, rebates) for energy efficiency improvements undertaken by households or small businesses.”

The funding of energy efficiency measures forms a cost effective mechanism for the Government to insulate for lower income households from rising electricity and gas prices. In considering the social equity issues involved in introducing an ETS, funding of energy efficiency retrofits to lower income families, commonly living in poor quality buildings, will provide a greater cost/benefit than direct subsidy policies.

Lowering household energy use will not only negate the anticipated price increases an ETS will have on retail gas and electricity, but provide ongoing emission reduction and wider environmental benefits.

It may be anticipated that the emission reductions achieved by energy efficiency retrofitting will be valued as part of the emerging global economy. While the mechanism accounting for these reductions is still in development, a linkage to the Australian ETS will create an investment opportunity that the Victorian Government should endeavor to support.

#### **4.2.2 Environmental Qualifier for First Home Owners Grants (FHOG)**

Significant environmental and economic opportunities arise for the Victorian Government to increase FHOGs based upon whether the home meets a minimum energy efficiency/performance standard. Safeguards should be implemented within the scheme to prevent false claims or dishonest assessments of new or existing building work. (CIE/ASBEC 2008)”

#### **4.2.3 Green Banks**

“Low interest loans for renovations to buildings used for community services or by non-governmental organisations (NGO). Renovations would need to meet specific environmental standard in order to qualify. This policy has the potential to expand to new building stock (CIE/ASBEC 2008).”

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## **4.3 Regulated Performance**

### **4.3.1 Comprehensive Assessment of Residential Sustainability**

Having led Australia in the introduction of energy rating requirements, we see a pressing need for the Victorian Government to introduce a more comprehensive assessment of residential sustainability.

We understand the Government is currently looking at this issue and fully support any initiatives to move the environmental assessment and rating of our housing beyond modeling of the building fabric to direct and verified energy outcomes.

We believe there is value to Victoria in the Government looking to provide a long range vision that gives the public some reassurance that building emissions and resource use can be significantly reduced over time, without great lifestyle hardship or huge cost. With 2020 and 2050 targets gaining public understanding and acceptance, housing sustainability policy should seek to quantify and start framing Government aims and targets on these climate change response timescales.

While such an undertaking would take a number of years, a great deal of research and some industry transition to achieve, such a vision could provide an umbrella policy on sustainable buildings into which current and future research and regulatory frameworks could be fitted.

Sustainability goals could be plotted on a time line to 2050, indicating areas where research is being undertaken, when assessment methodologies for different elements may start functioning, when performance requirements are likely to be introduced in different areas, and how these will all come together over a defined time scale to get us to an end goal - based on emission reduction targets linked to climate change policy.

### **4.3.2 Increase Minimum Energy Efficiency / Thermal Performance**

“Impose higher standards on the design and materials of buildings as required by the Building Code of Australia. Presently, the BCA is a ‘minimum standard’ for the design, construction and performance of new buildings. The BCA part J has become the standard for energy efficiency of plant and electrical items and thermal performance of building envelope, however Part J is limited in it’s scope and Victorian amendments to the BCA Part J should be introduced to increase the number and type of buildings under it’s range and to promote higher standards of building compliance. (CIE/ASBEC 2008)”

### **4.3.3 Benchmarking and Capping CO<sub>2</sub>-e of New Buildings**

The Victorian Government should lead a movement to impose a GHG benchmark on new residential buildings, “with an annual maximum budget of 20 tonnes of CO<sub>2</sub>-e per house. This policy focuses on actual usage rather than current approaches (ie emissions/m<sup>2</sup>) and therefore would work to reverse the McMansion trend of house sizes increasing as occupant numbers fall. This policy could also be expanded to commercial buildings (CIE/ASBEC 2008)”

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#### **4.3.4 Use of Smart Metering**

The Victorian Government should promote the development of Smart Electricity Meters is strongly supported, so variable timed electricity prices can be utilised to drive behavior changes, especially in relation to the operation of air conditioning. Increased tariffs upon air-conditioning or during periods of peak demand would encourage users to source and implement measures that meet their comfort requirements using less power. Tenant display functions, breaking down where power is being used by households (heating, cooling, lighting, etc) create the opportunity to further inform Victorian's of their energy use, and encourage behavioral change.

#### **4.3.5 Renewable Energy Feed-In tariffs**

The Victorian Governments recently introduced feed-in tariffs for embedded household renewable generation (primarily the installation of photovoltaic solar cells). These tariffs only apply to households on a 'net export' basis, meaning they only apply to energy exported to the grid, beyond that consumed by a household.

With very few households installing PV arrays with capacity beyond their household consumption (typically requiring a \$30-40,000 investment), we see these tariffs will have virtually no impact on the installation of renewable energy in Victoria. Unoccupied holiday houses form the only common exception to this position.

We believe the Victorian feed-in tariffs should be revised to 'gross export' basis and broadened to include schools, not-for-profit organisations and local governments as a minimum. As noted in Chapter 17 of the Garnaut Climate Change Review Draft Report, a 'gross export' tariff applying to all renewable energy generated by a system will better reflect the benefits of embedded generation (lower transmission losses, deferred costs of network augmentation and displacement of high cost generation during peak periods) that are produced by every unit of renewable electricity generated.

We also see it important to acknowledge that we are currently in a transition period to a national Emissions Trading Scheme, with a range of state and federal policies likely to distort the clear pricing mechanism an ETS will introduce.

While the fee-in tariff requires some surety to it's pricing structure, we believe the tariff should be re-presented as an interim scheme for 2008-2010. The effect the ETS will have on a range of renewable energy technologies should be understood before a long term feed-in tariff policy is considered as a further pricing mechanism to support the installation of small scale embedded renewable energy generation. Ideally we would see such policies on feed-in tariffs falling under a federal umbrella, with the ability to provide a coordinated national approach to further funding mechanisms to support renewable technologies.

#### **4.3.6 Natural Ventilation**

New Victorian commercial buildings and retrofits should be mandated to have operable windows, and economy cycles on air-conditioning, in order to minimize artificial heating and cooling and hence energy consumption and associated pollution and financial costs.

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#### **4.3.7 Enhance Performance Standards in MEPS**

“Accelerate and increase minimum standards for energy efficiency of appliances through MEPS. The Victorian Government should encourage and provide assistance to local businesses to remain at the forefront of sustainable practice and their integration into ‘green buildings’. The earlier local businesses can raise their minimum standards, the greater the potential profits can be as consumers turn to more efficient products. (CIE/ASBEC 2008)”

#### **4.3.8 Remove Barriers for shared plant**

“New models of efficient shared plant could be encouraged in adjacent buildings with similar heating/cooling needs. These easements would allow a single geo-thermal heat pump to be built and operated by an energy provider.”

#### **4.3.9 Red Tape Review and Streamlining Regulatory Regimes**

“Local Government Councils to review the regulatory requirements of commercial and residential buildings that may be imposing unnecessary or onerous compliance and transaction costs – particularly for smaller scale energy efficiency upgrades. (CIE/ASBEC 2008)”

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## **4.4 Research**

### **4.4.1 Research and Development Funding**

The Victorian Government should invest in the intellectual community of the state and fund research and development of energy efficient buildings.

Research has the potential to produce significant reductions in GHG and plays an important role in innovation as well as providing avenues for future profitability and efficiencies. Our knowledge of the energy embodied in our buildings, and how it may be tracked and quantified, remains limited.

Embodied energy will play an increasingly important role in understanding the emission impacts of our built environment and making intelligent retro-fitting and adaptation decisions on the 97% of existing building stock.

### **4.4.2 Certified Carbon Assessors / Efficiency Experts**

The Victorian Government should support a certification scheme that qualifies individuals/companies to assess carbon abatement / energy efficiency potential, and build into this periods of review and performance compliance to safeguard against dishonest assessments and profiteering from experts.

## **4.5 Knowledge Dissemination**

### **4.5.1 Education and Awareness Campaigns**

“Campaigns take on a range of forms from awareness raising events to skills development and capacity building activities and materials. They should be tailored to different segments in the building sector: building occupants (household and business), property managers, architects, builders, etc. (CIE/ASBEC 2008).”

### **4.5.2 Increased Energy Costs**

“The temptation to choose quantity over quality is a consequence of low energy prices and perceived value. With cheap electricity home owners are more likely to purchase a dwelling of a particular look than of sustainable performance or efficiency, and a shop more likely to be concerned with maximising glazed street exposure than the effects of western sun on air-conditioning.” Victorian Government would be prudent to raise energy costs associated with brown coal power generation to favour those suppliers that source fuel from cleaner sources or from sustainable generators such as wind, solar or wave sources.

### **4.5.3 Victorian Energy Efficiency Target (VEET) scheme**

The Victorian Government has introduced the VEET scheme as a method of empowering residential owners and occupiers to proactively choose to reduce their energy consumption by incorporating energy efficient products in new construction or retrofitting them into existing building stock. This scheme due to be launched in 2009 has the potential to be utilized in new or existing commercial and institutional buildings and have green credits attached to their power bills.

Baseline or minimum standards of energy efficient products and methods have already been established in forums and reports to date, however small fitted items such as draft-proofing, individual energy efficient light fittings, caulking of gaps etc., which may not be worth much individually, could be

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bundled together under a separate category to enhance their contribution and aid clarity in the accreditation process.

The Victorian Government is encouraged to capitalize on existing television marketing schemes (eg. black balloons campaign) and begin the advertisement of this scheme to all Victorians as early as possible in preparation for the 2009 – 2011 evaluation period. Allowing all Victorians time to learn and adjust to this new scheme is imperative to a rewarding start to the project and successful returns for the first three years.

Furthermore, there is also potential for the Victorian Government to push the merits of this scheme as a model for the possible Federal Energy Efficiency Trading Scheme (FEETS) and aim for standardization for Australia; hence provide a scheme that ranks amongst the world's leading energy efficiency schemes.

#### **4.5.4 Information Flow throughout Building Life Cycle**

An area where Victorian Government can be a leader would be to prioritise a method of transferring the knowledge and intent from the design team into the construction phase, from the construction team to the building occupants, building managers and maintenance staff. "Poor understanding of the intent of the building systems restricts potentially efficient buildings to operate no better than buildings which were constructed decades ago. Many of the most efficient building principles for passive solar design and thermal mass fail if the contractor and building users do not understand how the systems implemented require different building operation to low-performance conventional systems."

#### **4.5.5 Skilling Architects to Advance Sustainable Built Environments**

"Architects are equipped with a unique skill set, and receive more training in design than any other practitioners in the built environment." Melbourne is particularly fortunate that it has world-class universities training potential architects for careers in the built environment for Victoria, interstate and overseas. Government promotion schemes within these institutions to continue the excellent work of educating students of recent years is essential for the transfer of this knowledge into the wider communities locally, nationally and beyond.

There are already practicing architects who have little or no knowledge of, or perhaps no interest in sustainable design. A scheme to ensure every architect in Victoria must receive continuing education and demonstrate an essential minimal understanding of sustainable design practices is a high priority for the success of our state's economic and environmental future. An assisted Government funding program of continuing education, collaboratively with the Institute renewable every year would ensure that every architect would receive this minimum understanding and be kept up to date with changing standards and technologies.

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#### **4.5.6 Skilling Architects to be Carbon Educators**

In a range of building industry sectors, the commissioning and design of a new building forms a common point for Victorians to consider their environmental impact and carbon footprint.

Architects are well placed to engage with the public at a time when they are actively considering their resource and energy use in building or renovating buildings. Placing emissions from household or commercial buildings into a context that considers overall lifestyle impacts, including vehicle and flight has the ability to increase carbon literacy and climate change understanding.

Architects should be supported in developing their skills to advise the public on the context of emissions their lifestyle will generate, and place this into a wider carbon context.

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## 5.0 CONCLUSION

To conclude, the ideas suggested above are the cumulation of many reports and countless hours of research by leaders in the field of sustainability in the built environment. These suggestions require further development by the Victorian Government in conjunction with industry and the community to assess their efficiency and cost effectiveness, and to prioritise their implementation to achieve the significant potential GHG abatement. This will result in early and affordable gains particularly when compared with other sectors of the economy, which rely on new technologies with long lead times to develop and implement. “The economy wide impact is also positive with reduced negative impact on other sectors, should the potential of GHG abatement through energy efficiency in the building sector be achieved.”

“The resultant initiatives will provide (Victoria) with opportunities to meet GHG emission reduction targets, bring economy wide benefits, and will result in the design, construction and management of the building sector being skilled to a level of International Leadership.”

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