Productivity Commission

Inquiry into Barriers to Effective Climate Change Adaptation

Submission by BlueScope Steel

16 December 2011

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Barriers to Effective Climate Change Adaptation
Productivity Commission
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To whom it may concern

BlueScope Steel welcomes the opportunity to make a submission to the Productivity Commission's Inquiry into Barriers to Effective Climate Change Adaptation.

BlueScope is listed on the Australian Stock Exchange (ASX: BSL) and is the only domestic flat steel products manufacturer in Australia. BlueScope has vertically integrated flat steel manufacturing operations making steel products with a forecast capacity of 2.6 million tonnes of steel per year that include steel slab, steel plate, hot rolled coil, cold rolled coil, as well as value-added metallic coated and painted products. The company operates a national network of service centres, metallic coating, painting and roll-forming facilities, and steel distribution sites. BlueScope is a major steel product supplier to the Australian building and construction, automotive and general manufacturing industries. A competitive Australian steel industry is an important foundation for a competitive Australian manufacturing sector. Australian-made steel is a key input for a large range of domestic manufacturers. BlueScope has a long term commitment to produce steel in Australia for the Australian domestic market and has recently taken action to support our viability as a long-term supplier to our Australian market customers.

BlueScope's brand portfolio contains many well-known brands including COLORBOND® steel, ZINCALUME® steel, TRUECORE® steel , and XLERPLATE® steel as well as the LYSAGHT® range of building products, AQUAPLATE® steel tanks and SURELINE® steel poles. BlueScope's domestic value proposition includes access to strong technical and product support. BlueScope has been, and will continue to, invest in innovative new products to ensure that Australian building materials manufacturers and consumers have access to world leading steel products. BlueScope has a proud history of market leading product developments and is a technological leader and innovator in the development of coated building products for the building and construction markets. The recent high solar reflectance product development, Thermatech®, in the COLORBOND® steel range showcases the benefit of innovation in Australia for Australian conditions.

BlueScope is committed to developing sustainable steel solutions and has announced a long-term joint collaborative technical agreement with Nippon Steel Corporation (NSC) to develop Next Generation coated steel technologies such as ZINCALUME® steel with Activate™ technology for the building and construction market.

BlueScope would welcome further engagement with you on issues raised in this submission.

Yours sincerely,

Richard Rowe
SUSTAINABILITY MANAGER

1. Introduction

BlueScope Steel ("BlueScope") welcomes this Productivity Commission Inquiry into Barriers to Effective Climate Change Adaptation and is supportive of initiatives that seek to better integrate climate change mitigation and climate change adaptation strategies across the economy. BlueScope's role in responding to climate adaptation challenges is as a provider of innovative and resilient steel products and solutions that offer a way to avoid or mitigate some of the impacts of climate and weather events, now and into the future

BlueScope is supportive of life cycle thinking and encourages a whole-of-building[1], whole-of-life[2], multi-metric[3] approach to sustainable development. Life cycle thinking encourages a balanced assessment of the relationships between building occupants, building components, the associated impacts before, during and after occupancy and the interaction of the building with the climate and environment in which they are positioned. Climate change adaptation is an integrated element of life cycle thinking as it is only when we consider how a community, building or piece of infrastructure interacts with a changing climate that we will be able to develop whole of life strategies that deliver the best outcome for our communities, environment and the economy.

This submission reflects BlueScope's position as a provider of products and solutions to the Australian building, construction, infrastructure and manufacturing markets and is therefore focussed on our experience and observations within these markets. We have not attempted to respond to all the questions raised in the issues paper or address barriers outside of our market expertise.

BlueScope would welcome further interaction with the Productivity Commission to explore these and other observations in more detail.

2. What does adaptation to climate change mean?

The definition of effective adaptation should include and encourage the development of resilience in our built environment, economy and communities. The IPCC defines resilience as:

> *"The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions"* (IPCC 2010, p3)

Resilience in the built environment is not just about climate change. It is about the interaction of people, buildings and infrastructure with the environment and climate in which they sit, whether the climate is stable, incrementally changing or changing with increased volatility. Building for resilience is therefore a suitable response to all climate scenarios.

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[1] Whole-of-building: takes into consideration the effect of individual components (like roofing, walling etc) on the design and performance of the building as whole.

[2] Whole-of-life: takes into consideration all stages of the lifecycle including building, occupancy and end of life

[3] Multi-metric: a balance of more than one environmental, social or economic metric including; water use, energy use, health and safety of suppliers etc.

3. Examples of resilience and effective adaptation.

3.1. Hail storms

An example of how improved resilience can deliver better adaptation outcomes in the built environment is that of hail storms.

Hail has the potential to cause extensive damage to buildings, homes and personal belongings as hail stones crack or penetrate roofing materials, allowing water to enter into a building. According to research by NRMA Insurance undertaken after the 1999 Sydney storm (BRANZ 2007, p60) and ongoing research at the University of Western Sydney (Gillmore 2008, p.30) steel roofs typically offer better protection in hailstorms than concrete, slate and terracotta tiles.

While smaller hailstones can still dent steel sheets, they are not penetrated as easily as other roofing materials and therefore the building is more likely to remain weather tight during and after the storm potentially reducing:

- Emergency callouts during hail storms;
- The need for emergency housing following hail storms;
- The emotional loss of possessions including those that cannot be replaced;
- Insurance claims for consequential damages to property and possessions; and
- Waste to landfill as damaged buildings and possessions are repaired or replaced.

It is assumed that dented steel roofs will still be replaced however, as this is an aesthetic and not structural issue, the time frame for re-roofing can be extended until the peak demand for tradespeople and materials has passed, potentially increasing competition for work and reducing costs.

The simple choice of a resilient building material or system can improve adaptation outcomes and result in:

- A more resilient built environment (reduced immediate and consequential damage, reduced waste to landfill);
- A more resilient community (reduced need for emergency shelter and dislocation, reduced damage to personal property and irreplaceable memories, quicker resumption of normal life); and
- A more resilient economy (reduced insurance claims for consequential losses keeping pressure off premiums, smoothing supply and demand for repairs and therefore lowering cost).

3.2. Bushfires

Another example of the use of resilient building materials to deliver improved outcomes in the face of variable and extreme weather events is the use of steel in bush fire zones.

In conjunction with the Bushfire Co-operative Research Centre (“Bushfire CRC”), BlueScope Steel has investigated how its steel fencing, power poles, water tanks and steel house framing perform in bushfire conditions. Results support anecdotal evidence that steel products resist fire better than other materials used to perform the same function.

<u>Fencing</u> - The first of the studies investigated the performance of the most common residential boundary fencing systems (pre-painted and metallic-coated sheet steel, hardwood and treated pine) used in urban and urban/rural interfaces in the built environment across Australia (Leonard 2006, p71). The research

investigated the potential for using fencing systems as protection for residential buildings against attack from radiant heat, burning debris and flame impingement during bushfires. Because it is non-combustible, COLORBOND® steel performed the best overall: it maintained structural integrity, acted as a heat barrier under experimental exposure conditions and did not spread flame laterally or contribute to fire intensity during exposure.

Under test conditions, it was found that the radiation levels immediately behind the fence were reduced to less than 5 kW/m^2 during all radiation exposures, and the radiant heat exposure on a structure 9 m from the fence was reduced by at least a factor of two. It can therefore be concluded that the behaviour of a COLORBOND® steel fencing system may contribute to reducing the risk of loss of life and/or property during a bushfire.

In addition to these tests, Justin Leonard (project leader for bushfire research - Bushfire CRC) identified in a presentation of an analysis of the Canberra fires, that wooden fences can provide a fuel pathway into residential areas for bushfires. (Leonard 2005)

<u>Power poles</u> - A second study also found that steel products maintain their integrity during bushfire conditions. When exposed to bushfire passages involving pre-radiation and ground fuel attack, as well as flame immersion, radiant heat and ground fuel attack, SURELINE® power pole systems maintained their integrity and serviceability and continued to perform their function during and after bushfire conditions (White 2006, p41). In comparison, wooden pole assets can continue to smoulder after a bushfire passage and thus remain a threat to the community for a time after the fire front has passed (Leonard 2005).

Power pole failure within the urban environment is also a key reason why authorities won't let people back into the urban environment to defend their structures in the hours after a fire front has passed. This is usually a critical time where many houses are lost because there are still winds blowing embers out of the forest environment causing continuous ignitions after the fire front has moved through (Leonard 2005). The use of SURELINE® power pole systems that can maintain their integrity during bushfire conditions potentially removes one of the risks of re-entering the area after the front has passed so as to continue to manage the fire risk to people and property.

<u>Water tanks</u> - In a third study, polyethylene and metal water tanks were exposed to ember, radiation and flame attacks – commencing with a low category attack and progressively increasing to medium, high and extreme conditions (Blanchi 2007, p146). Overall, metal tanks performed better than polyethylene tanks. Metal tanks maintained their structural integrity through all fire exposures tested. Conversely, the polyethylene tanks were found to be involved in the combustion process during leaf litter/ember exposure. During higher level exposures, the polyethylene tank portion above the waterline melted and was involved in flaming combustion. Below the waterline, surface flames were observed, and in the more intense exposures, the polyethylene tank wall swelled under the static pressure load of the water due to softening of the outer surface of the plastic. In a number of cases this distortion led to catastrophic rupture at the swollen polyethylene tank section.

It can therefore be concluded that resilient water tanks can form part of a property's bushfire plan to maximise the opportunity to access water during a fire as well as through the transition to recovery.

<u>House framing</u> - More recently the National Association of Steel Framed Housing ("NASH") and BlueScope Steel in conjunction with the Bushfire CRC have developed a bushfire resistant steel house consisting of a steel frame, including floor joists and trusses, with steel roof and wall cladding. Combustible materials were eliminated from the structure of the house. The design has been refined through a series of realistic bushfire tests with flame temperatures up to 1100°C.

3.3. Cyclones and other wind events

Climate change scenarios indicate a potential for increased occurrence of cyclones and other wind events. The Cyclone Testing Station ("CTS")[4] was established in the mid 1970's as a response to cyclone Althea - Townsville (1971) and cyclone Tracy - Darwin (1974).The Centre researches the effects of wind events and the damage to building systems in Australia, South East Asia and the Pacific.

The CTS's report *Tropical Cyclone Yasi -Structural damage to buildings (CTS 2011)* indicates that overall, metal roof cladding performs well with the vast majority of cladding remaining attached to roof battens. (CTS 2011, p53). The report also highlights that damaged tile roofs are over represented when compared to metal clad roofs for houses of similar age and location (CTS 2011, p50). Therefore the choice of building material and building system is important in designing resilient buildings for climate adaptation.

The report also highlights the role of improving building codes in managing climate adaptation risks. The report classifies buildings into Pre 1980's and Post 1980's to reflect the significant structural improvements to housing in resisting strong winds introduced by the Queensland Home Building Code in 1981. The improved Code has translated into a more resilient built environment, e.g. the report finds just more than 70% of Post-80s buildings sustained no roof damage compared with just more than 50% of Pre-80s buildings (CTS 2011, p24)

Other important recommendations from the report include:

- During reconstruction, where part of a roof has been damaged the whole roof should be upgraded to the required standard. Undamaged portions left unimproved could initiate failure of the whole roof in the next event (CTS 2011, p104); and
- Due to the less stringent requirements pre 1980, the strength of these houses should be assessed, and where necessary, upgraded to comply with the current standards (CTS 2011, p104).

These examples presented for hail storms, bushfires and cyclones clearly demonstrate that using resilient building materials and systems can result in more effective adaptation to climate and associated weather events. The more volatile the climate including frequency and intensity of weather events, the more important resilience in the built environment will be.

3.4. How can uncertainty be addressed in the context of adaptation to climate change?

One way in which uncertainty about climate change can be addressed is to encourage the adoption of existing best practice in resilience using products and solutions that already exist in the market and that can provide benefits both in the current and the changing climate scenarios. These include:

- The use of COLORBOND® steel or ZINCALUME® steel roofs in areas that are and / or will be prone to hail storms;
- The use of COLORBOND® steel fences, SURELINE® steel power poles, AQUAPLATE® steel tanks in bushfire prone areas;
- The use of high strength lightweight roofing materials such as COLORBOND® steel or ZINCALUME® steel in high wind and cyclone prone areas; and
- The use of high solar reflectance roofing materials such as COLORBOND® steel with Thermatech® as part of the solution to manage heat waves and the Urban Heat Island (UHI) effect (Heat waves and UHI are covered in detail later in the submission).

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[4] http://www.jcu.edu.au/cts/index.htm

4. Barriers to effective climate change adaptation.

There are a number of barriers to moving to greater adaptation activity.

4.1. Climate change mitigation vs. climate change adaptation

There are many elements to sustainability that must be assessed and balanced to achieve a relevant sustainable outcome for a given development, geography and community. From a climate change perspective these elements are often classified into the two broad categories of climate change mitigation and climate change adaptation.

Whilst both of these categories are often referred to in the literature, it is climate change mitigation that has had more social, political and economic attention and action to date. This focus on mitigation is important however, its priority of attention over climate change adaptation potentially creates a "market failure" as defined in the Productivity Commission's *Issues Paper:*

> *"Market Failures occur when markets do not allocate goods and services in a way that maximizes the overall welfare of the community*." (PC 2011, p7)

This focus on mitigation over adaptation reveals itself in a number of areas.

4.2. Market signal to stimulate activity

A primary policy focus for the Australian Government has been climate change mitigation and de-carbonising the Australian economy. This has seen the introduction of legislation to create new market instruments to build demand for renewable and low greenhouse gas outcomes. The legislated examples are:

- Renewable Energy Target Scheme ("RET") - a 20% renewable energy target by 2020; and
- Clean Energy Future through a carbon tax (transitioning to an Emission Trading Scheme) with a target of 5% reduction in emissions on 2000 levels by 2020 (80% reduction on 2000 levels by 2050).

In addition to these legislative market signals, a traditional signal driving increased change is the underlying cost of energy. Higher energy costs are hitting the budgets of all consumers resulting in increased focus on energy efficiency and managing down exposure to energy price risks.

By comparison, there has been comparatively little policy work undertaken to identify and develop market signals that will drive the economy towards effective adaptation. The commissioning by the Government of this Productivity Commission study is an encouraging development in this area.

4.3. The development of green and sustainable building tools

The majority of green or sustainability tools used in the built environment have an emphasis on energy efficiency and reducing the overall embodied environmental footprint of a building which aligns with the climate change mitigation driver.

The need to better integrate mitigation and adaptation into sustainability / green tools is not uniquely Australian as demonstrated by a report from the US Federal Emergency Management Agency (FEMA) on Natural Hazards and Sustainability for Residential Buildings. FEMA has commented:

> "While the environmental benefits associated with adopting green building practices can be significant, these practices must be implemented in a manner that does not compromise the building's resistance to natural hazards, such as high winds, earthquakes, floods, or wildfires" (FEMA 2010, p ES-1); and
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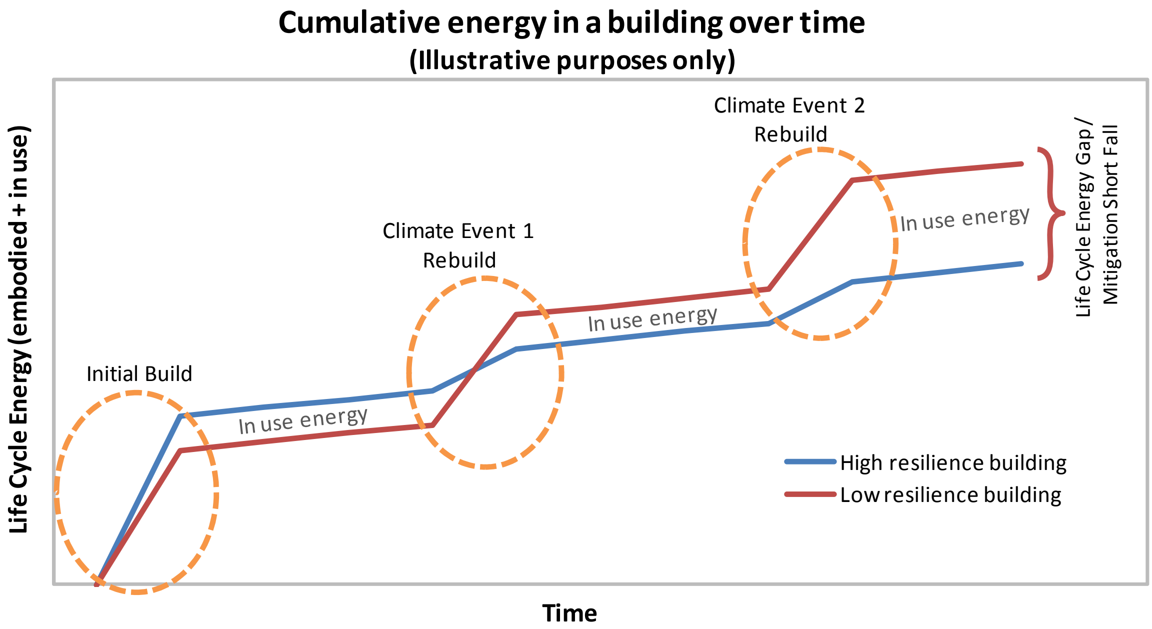
> "Understanding interactions between green building practices and natural hazards will benefit users – particularly designers, builders, code officials, and those who develop green building rating systems, codes and standards – by providing a perspective that green building practices, while important in their own, must be a part of a larger context that encompasses life safety, disaster resistance, and other related considerations" (FEMA 2010, p ES-1).

A potential adaptation risk is introduced into the built environment when mitigation and adaptation are not appropriately integrated. If a bias for mitigation over adaptation is untested in the design phase of a development then the necessary strength and resilience required for adaptation may be compromised in order to lower the embodied environmental footprint or energy consumption of a building at a single point in time.

What is needed is to extend the vision and scope of relevant green tools to ensure adaptation is integrated as an important element of their outputs. Encouraging low embodied energy with no resilience targets may not produce the best embodied environmental performance over the lifetime of the building, as that building may have to be rebuilt time after time. While the embodied energy investment of a low resilience building is initially lower, this can change as the building is rebuilt as a result of poor adaptation design choices. Over the life cycle of the building it could end up using more energy than the high resilience building.



Put simply, ignoring resilience may have a long term detrimental effect on climate change mitigation.

4.4. Research into climate change and resulting innovation

Another area of emerging market failure is climate change research. Whilst there is a large body of climate change research being undertaken by global bodies, governments, universities and Non Government Organisations ("NGO"), this research is often focused on global or regional outcomes and generally looks at first order consequences (e.g. sea level rises, frequency of floods or heatwaves).

Climate change adaptation is often a local issue addressing local circumstances and needing local solutions and actions. Whilst there will be many first order consequences to be addressed at a local level there will also be countless second and third order consequences that will need to be addressed.

For example:

- Sea level rises leading to a change in sea salt spray exposure leading a changed corrosion risk in the built environment which could compromise long term resilience of buildings and infrastructure, especially in extreme weather events[5];
- More frequent floods washing away chemical termite barriers stimulating the movement and growth of termite outbreak leading to a change in the termite risk profile for flood prone areas; and
- Heatwave events increasing peak energy demand flowing through to overloading of the electricity network, demand management and local blackouts leading to heat related admissions to hospitals as buildings are not designed for resilience against heat and cannot be actively cooled.

In the absence of quality science and research at a local level that also focuses on second and third order consequences, what is the basis upon which local adaptation strategies and actions should be based?

Research needs to be developed from a "Public Good" perspective to inform local level adaptation plans. This same research will also guide industry to understand potential market needs and therefore inform innovation into new products and solutions for resilience and adaptation.

Another area where more research is required is in how to move existing building stock towards adaptation. Once climate adaption scenarios and risks are identified at a local level, how do owners renovate for adaptation? The University of Wollongong is developing a Sustainable Buildings Research Centre[6] which will have a strong focus on renovation for sustainability but initially it will be focussing on renovating for energy efficiency and improved footprint, rather than renovating for adaptation. There is a real research gap and therefore an adaptation barrier due to the lack of research and innovation on renovating for adaptation.

Compared to climate change mitigation, the market signals informing climate change adaptation are weak and uncertain. Couple this with a lack of research focussing on local climate change risks, scenarios and flow through consequences then a barrier develops in attracting innovation investment in new building designs, products, systems, solution and business models to tackle the adaptation challenge in both the new build and renovation markets.

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[5] http://www.csiro.au/files/files/p107f.pdf
[6] http://www.innovationcampus.com.au/sustainable-buildings-research-centre-sbrc/

5. What is the role of the Insurance industry in effective adaptation?

Insurance is the equitable transfer of the risk of a loss from one entity to another in exchange for payment (Wikipedia 2011). The payment or premium is based on an assessment of the likely occurrence, frequency, severity and consequences of events being insured.

The insurance industry therefore has a critical role to play in generating a necessary market signal for effective adaptation through the assessment and pricing of climate risk, weather events and subsequent damage into insurance premiums. To the extent that premiums do not reflect the expected frequency, severity and consequences of events then a market signal and driver of effective adaption will be lost.

This is already an area where BlueScope sees room for improvement in Insurance industry practices.

An example is how the Insurance industry currently assesses the risk, severity and consequences of hail storm events and therefore how it values house insurance premiums. As already mentioned, a COLORBOND® steel roof has advantages over tile roofs during and after hailstorm events. COLORBOND® steel roofs are more resilient to hail damage, helping to minimise the ingress of water and limiting consequential damage to buildings, chattels and personal goods. Overall the risk, severity and potential financial loss to a house associated with a COLORBOND® steel roof is lower for hail damage than of an equivalent tile roof. At present this rarely translates into a lower valuation of risk or home insurance premiums.

As a result there is no market signal i.e. financial benefit, for the consumers in choosing the more resilient product. There should be a strong market signal that encourages building for resilient and therefore effective adaptation.

Another barrier is that the payout value of insurance policies are generally based on like for like replacement. The primary community motivation post disaster is speed of re-entry into homes. For this reason like for like replacement is seen as the quickest rebuilding or repair solution. This often results in limited improvement in building resilience and adaptation for future climate scenarios when this is the perfect time for adaptation improvements to be made.

Education focussing on “rebuilding for resilience” needs to be addressed in order to improve the resilience of housing and infrastructure during post disaster rebuilding programs. Insurance companies can play a role in rebuilding for resilience either directly or through furthering relationships with NGOs like Green Cross Australia which has programs such as:

- **Build it Back Green –** assistance to Victorian communities recovering from the Black Saturday bushfires; [7] and
- **Harden Up - Protecting Queensland** - encouraging Queenslanders to assess their vulnerability to key natural disaster hazards and to take practical action to become more self-reliant.[8]

A final complexity in rebuilding for greater resilience is a split incentive risk for insurers. If the cost of a rebuild for resilience is higher than a rebuild for replacement, and the insurer has no ‘lock in’ with the home

[7] Build it Back Green - http://builditbackgreen.org/bushfires/on-the-road-to-rebuilding.aspx,
[8] Harden up Queensland - http://hardenup.org/

owner for ongoing business, then why would the insurer pay out more than they need to. If, however, a resilient rebuild meant the insurer's risk profile is reduced for the same premium income (revenue stream), then perhaps they would be more amenable to toughening up buildings.

6. Regulatory response

BlueScope can identify a number of areas where regulations, codes and standards potentially reduce the flexibility of individuals, business and other organisations to adapt to the potential impacts on climate change.

6.1. Local Government restrictions on the use of high solar reflectance roofs / cool roofs.

A regulatory barrier exists at the local government level which will affect the widespread and consistent adoption of cool roofs in Australia. The Commonwealth Department of Infrastructure and Transport – Major Cities Unit - released the report *State of Australian Cities 2011* in October 2011 (DIT 2011) with a key finding on Sustainability being:

> *"In terms of fatalities, heatwaves are the largest threat to Australian cities from natural disasters. The record breaking heatwaves in January 2009 severely tested the resilience of Adelaide and Melbourne in particular. In reports on the heatwave, South Australian and Victorian authorities have highlighted the need for more heatwave-resilient urban systems."* (DIT 2011, p5)

The report has a substantial section on Urban Heat Islands (UHI) which is where cities and urban areas are often significantly warmer than the rural or undeveloped areas that surround them. UHI's form when vegetation is replaced with non-reflective, high mass, water resistant, impervious surfaces that absorb a high percentage of incoming solar radiation. [9] [10]

The development of UHIs will most likely be a significant adaptation issue for Australia given the potential for more frequent heat waves and extremes in temperature and the fact that "heatwaves kill more people than more obvious natural disasters such as bushfires and floods"(DIT 2011, p127). These consequences have also been recently highlighted in a report issued by the Australian Climate Commission.

> *"Children, the elderly, people who work outdoors and those on low incomes are statistically more likely to die due to heat, the report said. While people in rural areas generally had less access to immediate medical help, people in cities usually endured temperatures one to three degrees higher due to the 'urban heat island' effect…."* (The Age 2011)

Cool roofs assist in reducing the intensity of UHIs, as well as helping maintain thermal comfort and minimise energy demand in buildings. Cool roofs have high solar reflectivity, and preferably, high thermal emittance. This reduces the heat that can move from the roof to the atmosphere by convection and radiation. The surface temperature of a cool roof can be up to 39°C less than a traditional dark coloured roof (US EPA 2008).

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[9] For more information on Urban Heat Islands, refer to pages 125-129 of The Department of Infrastructure and Transport – Major Cities Unit - released the "State of Australian Cities 2011"

[10] For more information on Urban Heat Islands, refer to the BlueScope Steel Sustainability Technical Bulletin No.2, Version 3, Urban Heat Islands, 10 May 2010.
http://www.colorbond.com/files/dmfile/SustainabilityTechBulletinUrbanHeatIslandsJuly2010.pdf

The use of cool roofs is part of the solution to UHI as is identified in the State of Australian Cities 2011 report (DIT 2011, p127) which refers to a Melbourne study (Coutts, Beringer et al. 2010, pp. 27-47) that recommends "improvements in local climate (reducing surface temperatures) could be made by using lighter-coloured building and roofing materials to increase albedo" (DIT 2011, p127.)

The Building Code of Australia already provides insulation concessions for high solar reflectance roofing as recognition of a cool roof's ability to reduce cooling loads. The benefit of cool roofs is increasingly recognised and encouraged throughout the world. US Secretary for Energy, Nobel Laureate Professor Stephen Chu in 2010 stated that *"cool roofs are one of the quickest and lowest cost ways we can reduce our global carbon emissions and begin the hard work of slowing climate change*."[11] Leadership in Energy and Environmental Design ("LEED") in the US provides a credit for high solar reflectance cool roofs and it is likely that the Communities Tool being piloted by the Green Building Council of Australia ("GBCA") will include a credit for cool roofs. As can be seen, a benefit of cool roofs is that they can be part of the solution for both mitigation and adaptation goals.

A regulatory barrier currently exists at the local government level which affects the widespread and consistent adoption of cool roofs in Australia. Roofing material policies vary by local council resulting in a range of approaches to roof reflectance including:

- Low barrier - Encourages the use of high solar reflectance roofs whilst still providing a process for the small number of exceptions where glare may be a real issue;
- Medium barrier – Placement of arbitrary hurdles on reflectivity levels after which building permits are required. This policy approach encourages the choice of products under the hurdle level that are generally on the highly absorbent side of the colour pallet to avoid red tape; and
- High barrier – Blanket bans on high solar reflectance roofs and a strong emphasis on highly solar absorbent colours.

A policy that places blanket bans on highly reflectant roofs and demands highly absorbent roofing is based on an overly simplistic understanding of reflectivity and an incorrect causal relationship between reflectivity and glare. These policy settings are arguably out-of-step with good environmental design principles and if not corrected will continue to limit the solutions available to local adaptation to heat events.

It is submitted that good policy design encourages cool roofs and only limits their use in the few cases where real glare issues are known to exist.

An example of good practice in local government policy towards cool roofs is extracted below[12]:

- "The objective of this [reflective roofing] policy is to:
  - Define the circumstances in which reflective glare needs to be taken into consideration, and where consultation with potentially affected property owners is required; and

[11] http://newscenter.lbl.gov/news-releases/2010/07/19/cool-roofs-offset-carbon-dioxide-emissions/
[12] Details of the policy examples are available on request.

- Provide an objective basis for assessment of nuisance glare in the event of objection being received from potentially affected property owners."

- It identifies the principles where cool roofs may be an issue and provides an objective basis for assessing each case individually. For all other circumstances, the use of cool roofing is encouraged.

An example of poor practice in local government policy towards cool roofs is extracted below[13]:

Building Colours, Materials and Construction

External colours and materials shall be dark and earthy tones as shown below:

Black ✓ Dark gray ✓ Dark green ✓
Dark brown ✓ Mid gray ✓ Green ✓
Brown ✓ Dark blue ✓

White, light coloured, red or orange roofs and walls are not permitted

White ✗ Light Blue ✗ Red ✗
Orange ✗ Light gray ✗ Beige ✗

This represents a blanket ban on roofs with high reflectance and therefore a clear barrier to adaptation for the local area.

The removal of policy barriers to cool roofs should be viewed as a 'no regrets' adaptation action. Cool roof solutions already exist in the market, a high solar reflectance roof does not have to cost any more than a high solar absorptance roof, the insulation concessions in the Building Code already exist and finally the benefits in better managing UHI effects and making buildings more thermally comfortable are available in both a stable and a changing climate.

6.2. Building codes and standards

There are potential barriers to effective adaptation associated with building codes and standards. The four areas BlueScope would like to highlight are:

- Relevance of current building codes to encourage effective adaptation;
- Building codes set minimum standards and encourage 'tick a box' behaviour;

[13] Details of the policy examples are available on request.

- Consistency of application of adaptation building codes across all building systems and materials; and
- Infrastructure codes and standards.

Relevance of current building codes to encourage effective adaptation.

Building codes in Australia have a history dating back to Federation. The foundation of the codes is drawn from over 100 years of historic climate experience and data. The codes tend to look back to the past to tell us how to build for the future.

This is a barrier to effective adaptation as the climate of the future will be different to that of the past with changes in average weather outcomes (rain, hail, temperature, wind) and the risk of more frequent, volatile and intense weather events. The current building codes will not prepare the built environment for these changes.

To some extent climate change is being addressed as the Australian Building Codes Board ("ABCB") has worked in conjunction with the Australian Greenhouse Office since 2000 to develop the energy efficiency provisions that are now part of the Building Code of Australia ("BCA"). Once again though, this is a focus on climate change mitigation and energy efficiency and not adaptation.

Whilst the building codes need to continue to draw from Australia's climate history they also need to be modernised to be forward looking, refer to the best available climate scenarios, be risk focussed, performance based and responsive to change as new information and circumstances develop. They also need to recognise that adaptation is a local issue with local consequences and no one standard solution can apply for all geographies of Australia. Therefore flexibility will be a key to effective adaptation at a local level.

Building codes set minimum standards and encourage a tick a box outcome.

The BCA works on a model of setting minimum standards to build. The problem with this model is that it encourages compliance behaviour to building design. To design and build beyond the minimum standard introduces bureaucracy, which discourages best practice and encourages a default to the minimum standards.

There will be segments in the market that will innovate and work through the proof of design process such as showcase developments, architecturally designed buildings, high end homes. However, when it comes to volume and value builders, time and cost are key drivers and the path of least resistance and lowest cost is to build to the minimum standard of the building code.

If the minimum standards are appropriately set and the climate is stable then this BCA model could be effective but effective adaptation is building for a changing and more volatile climate. Innovation will be a key to meeting the challenge of effective adaptation and the BCA needs to encourage and stimulate innovation for built environment adaptation, not hinder it.

Consistency of application of adaptation building codes across all building systems and materials

Whilst the BCA sets minimum requirements for building in Australia, it also relies upon many standards that exist outside of the BCA. Where this happens the standards should be designed for consistency across States and building product systems to ensure the resilience of the built environment against extreme weather events is not compromised.

An example of inconsistent treatment of building systems is the development of the Australian Standard for bushfire protection which now covers the bulk of Victoria and will be considered for implementation in other States.

Australian Standard AS3959-2009 specifies the requirements for construction of buildings in bushfire-prone areas in order to improve resistance to bushfire attack from burning embers, radiant heat, flame contact and combinations of the three attack forms. The objective of the Standard is to provide greater protection for the occupants who may be sheltering in a building while the fire front passes and to increase the chances of the building and residents surviving.

An outcome from the standard's development was the development of steel building systems that minimise the risk of embers entering roof spaces in the event of bushfires therefore making the building more resilient and safe.

The inconsistency arises as the roof tile industry was not required to develop a comparable solution to address embers penetration to roof spaces even though the existing tile roofing system may introduce higher levels of bushfire attack risk than the new steel roofing solution.

In the absence of strong markets signals that reward more resilient solutions and therefore effective adaptation, cost sensitive purchasers may move to tiles in bushfire prone areas. This is a potentially high risk outcome for effective adaptation and the protection of people and communities during bush fires.

<u>Infrastructure Codes and Standards</u>

Infrastructure codes and standards is another potential barrier to adaption. Although infrastructure owners and managers may build to a range of standard, the community is reliant on a level of self monitoring. For example, electricity authorities recognise the need to deploy resilient assets in bushfire areas but this can be largely self-monitored. In addition, the frequency of climate risk assessment and updating of these standards may not be governed.

Depending on the form of public investment funding for a given asset and its insurance cover, the community may ultimately bare the cost of its replacement, be it through tax or increased pricing of a delivered good or service.

7. **Conclusion**

BlueScope has highlighted a number of opportunities in this submission to ensure greater climate change adaptation in the built environment. These can be summarised as:

- The inclusion of the concept of Resilience into the definition of climate change adaptation;
- Improved integration of climate change mitigation and climate change adaptation strategies to ensure appropriate focus is given to each area and to where they overlap;
- The development of tools that integrate adaptation outcomes with the existing footprint and energy efficiency focus;

- The development of research on local outcomes of climate change as well as second and third order consequences;
- Research and development into adaptation for renovation so as to encourage innovation, resilience and adaptation in the existing building stock;
- The creation of market signals that will inform and lead the market towards adaptation activities and innovation. A key part of this should be through the insurance industry and its processes of assessing risk and premium pricing;
- The removal of local government barriers that prevent the adoption of cool roofs and ensure consistency of application;
- The encouragement of the use of existing resilience solutions regardless of the climate scenarios (stable to changing) to manage UHI's, bushfire, hail, wind and other weather events;
- Modernisation of the Building Codes of Australia to integrate adaptation, be forward looking at local climate scenarios, be responsive to climate change as it unfolds and be risk and performance based. The codes need to actively encourage innovation and improvement (not compliance) in building outcomes and facilitate widespread adoption of new best practice by all sectors of the building industry; and
- The ability to cover infrastructure (not just buildings) in any code for adaption so that public assets and funds are protected.

BlueScope would welcome the opportunity to further explore any of the points made in this submission with the Productivity Commission.

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