TASMANIAN GOVERNMENT SUBMISSION

Barriers to Effective Climate Change Adaptation

December 2011

CA405923

Tasmanian Government

1. Overview of Tasmanian Government Submission

The Tasmanian Government accepts there are climate change impacts that are now unavoidable and it has a role to play to help Tasmanians prepare for these impacts. Significant work is currently underway to assist local and state government, industry and the community understand how they will be impacted by climate change and how to adapt to these impacts.

The Tasmanian Government welcomes the opportunity to contribute to the Productivity Commission *Inquiry into Barriers to Effective Climate Change Adaptation* (the Inquiry). This submission includes input from across the Tasmanian Government and has focussed on those aspects of the Inquiry that are particularly relevant to the Tasmanian situation and where evidence is available.

1.1 Tasmanian Context

Over the 21st century, Tasmania's temperature is projected to rise by approximately 2.9 °C under the International Panel on Climate Change (IPCC)'s high emissions scenario (A2), and about 1.6 °C under the low emissions scenario (B1). Tasmania's projected temperature changes, for both emissions scenarios, are less than the projected Australian and global average temperature changes for the same period. This is largely due to the moderating influence of the Southern Ocean[1].

There is no significant change to projected total annual rainfall over Tasmania under the two emissions scenarios. However, rainfall patterns across Tasmania, and from season-to-season, show significant changes under high and low emissions scenarios[2].

Projections show a steadily emerging pattern of increased rainfall over Tasmania's coastal regions, and reduced rainfall over Central Tasmania and in the North-West. A slight increase is projected in the total amount of runoff in the state by 2100, though there are different responses in different regions. Runoff is projected to decrease markedly in Tasmania's Central Highlands by 2100. However, runoff is likely to increase in the important agricultural regions of the Derwent Valley and the Midlands over the same period[3].

Changes are expected to the frequency and severity of extreme events, resulting from increasing energy in the atmosphere from increases in greenhouse gases. For example, rainfall intensity is projected to increase across Tasmania, with longer dry periods in between heavy downpours[4].

Like other coastal jurisdictions, Tasmania will be impacted by rising sea levels resulting from climate change and warming oceanic temperatures. The IPCC Fourth Assessment Report of 2007 conservatively estimated a sea level rise of up to 79cm above 1990 levels by 2100[5]. A recent summary of projections of sea level rise published since the IPCC Fourth Assessment Report suggested a pragmatic range of 0.5-2m for 21st century sea level rise relative to 1990 levels[6], assuming a 4 °C or more rise in temperature. It is anticipated that some of the more recent projections will be reflected in the next IPCC report, expected in 2014.

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[1] Tasmanian Government, *Fact sheet 4: Projected Climate Change Impacts for Tasmania*, available at http://www.dpac.tas.gov.au/__data/assets/pdf_file/0008/146987/Fact_Sheet_4_Impacts_FINAL.pdf

[2] As above

[3] As above.

[4] White CJ, Grose MR, Corney SP, Bennett JC, Holz GK, Sanabria LA, McInnes KL, Cechet RP, Gaynor SM & Bindoff NL 2010, *Climate Futures for Tasmania: extreme events technical report*, Antarctic Climate and Ecosystems Cooperative Research Centre, Hobart, Tasmania.

[5] Intergovernmental Panel on Climate Change, 2007, *Climate change 2007: the physical science basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Geneva, Switzerland.

[6] Nicholls R, Marinova N, Lowe J, Brown S, Vellinga P, de Gusmao D, Hinkel J, Tol R (2011) *Sea level rise and its possible impacts given a 'beyond 4 c world' in the twenty first century*. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 369: 161-181, DOI 10.1098 / rsta.2010.0291

In the 2009-10 State Budget funding was provided to establish the new Climate Change Adaptation Unit within the Tasmanian Climate Change Office in the Department of Premier and Cabinet. The Adaptation Unit's role is to co-ordinate adaptation actions across government and to work with stakeholders and the community to communicate information on climate change impacts and ensure Tasmania is prepared for climate change and takes advantage of the opportunities that climate change presents.

2. What does adaptation to climate change mean?

How is effective adaptation best defined? How can it best be assessed? In other words, is the rate of adaptation 'too much' or 'not enough', 'too soon' or 'too late'? What other considerations may be relevant for maximising the net benefits to the community from adaptation?

The Tasmanian Government agrees with the Productivity Commission's interpretation that effective adaptation means something more specific than "producing the desired or intended result". It agrees that consideration of factors such as cost, net benefits to the community and the environment as a whole and the timing of adaptation, are all important factors to consider when assessing effective adaptation.

Climate change adaptation needs to be factored into planning decisions by both the private and public sectors. As a general principle, those who bear the risk and benefit from the mitigation of that risk (e.g. reduced damages) will be in the best position to manage a particular risk. Accordingly, local initiatives and private responsibility should be at the fore front of climate change adaptation in Australia because the great majority of direct action to anticipated climate change will be undertaken by the private sector. Further, because private adaptation is primarily market-driven, it is likely to be efficient and socially optimal, particularly where there is already existing capacity and adaptation options available.

The Tasmanian Government believes that intervention should target demonstrated market failures, where the benefits of intervening are expected to exceed the costs. Unnecessary intervention through over-regulation or unwarranted subsidies will lead to market distortions and unintended consequences, and ultimately lower welfare.

In March 2010, Heads of Treasuries developed and agreed on a set of principles for the management and allocation of climate change risk. One of the key principles was that governments should respond to market and regulatory failures that prevent effective and efficient climate change risk management, focusing on:

- providing good quality information about climate change to facilitate climate change adaptation by the private sector;
- ensuring that regulations, markets and institutions are capable of supporting private climate risk management;
- effectively managing risks to public goods/assets and government service delivery; and
- taking account of climate change risk in policy and planning.

The Tasmanian Government supports these principles.

Assessing effective adaptation to climate change requires good quality information. This information should include climate projections and non-climatic data, such as situation analysis for industry sectors. Effective adaptation will also differ across sectors, geographic areas and communities. Measures to assess the effectiveness of adaptation actions will need to be sufficiently nuanced to reflect these differences. The complexity of evaluating the effectiveness of adaptation is further increased when the emphasis moves from project outputs to industry outcomes.

A place-based approach both to policy development and service provision, as well as assessment of adaptation effectiveness, can help ensure particular states, communities and households can effectively respond to the challenges and opportunities faced by climate change and the effectiveness of these policies and services is appropriately evaluated.

Regarding the timing and scale of adaptation actions, the Tasmanian Coastal Adaptation Decision Pathways (TCAP) project funded through the Commonwealth Government's *Coastal Adaptation Decision Pathways Program* is providing some practical insights into workable approaches. This project is focussing on four discrete low lying coastal settlements and developing a range of scenarios for possible futures for the settlements. The project is considering the impact of projected future coastal hazards (including sea level rise) on the value of occupation of these coastal zones, which will assist in determining the style and cost of adaptation response and the speed with which it is implemented.

In order to implement these adaptation responses most effectively, combined support from the Commonwealth, state and local governments will be required.

What kinds of adaptation to climate change (and variability) have proven most effective to date?

Tasmania has experienced reduced rainfall and higher evaporation in recent years, with the effects of climate variation resulting in a major drop in catchment inflows over the last 12 years. As an adaptive response, a significant investment has been made by the Tasmanian Government in irrigation infrastructure.

The Tasmanian and Commonwealth Governments have committed $220 million ($80 and $140 million respectively) to develop reliable irrigation in partnership with local communities, with private sector investment of up to $120 million expected. The introduction of irrigation to areas of the State that have not previously had access to it will require producers to adapt their practices by learning and applying new skills in areas such as irrigation systems, technology and automation.

The Tasmanian Government's *Wealth from Water* pilot program is supporting the implementation of adaptive practices. The project aims to assist farmers and potential investors develop their irrigation businesses and transition to the production of high-value crops best suited to their area. The pilot is pioneering new ways of providing soil, climate and enterprise suitability information, as well as market and business support.

Other active adaptation actions include the Tasmanian Government's participation in the Millennium Seed Bank Project. The Royal Tasmanian Botanical Gardens, in partnership with the Department of Primary Industries, Parks, Water and Environment, are participants in this international conservation project, led by Kew Gardens in the United Kingdom. The project aims to provide an 'insurance policy' against the extinction of plants in the wild by storing seeds for future use. The project is collecting seed from about half of Tasmania's native flora, including most of Tasmania's rare and threatened flora. Plant species identified as potentially at risk from climate change are a priority.

The Tasmanian Government has also invested $540 000 over five years into a project titled *Biodiverse carbon for landscape restoration: The establishment of a permanent research site in the Derwent Catchment.* The project is being conducted in partnership with Greening Australia and the University of Tasmania. It involves trialling new carbon sequestration techniques for landscape restoration and will inform the capacity of the Bothwell and Hamilton agricultural regions to adapt to the impacts of climate change.

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

Uncertainty can be addressed in a number of ways. Firstly, the adoption of a precautionary approach can ensure that a lack of full scientific certainty does not prevent action being taken where there is a risk of severe or irreversible harm. A precautionary approach must be combined with monitoring and review, as many adaptation actions will require refining over time given the inherent uncertainty associated with climate change projections.

Secondly, research, development, and extension, at a national, regional and localised level, can also assist with managing uncertainty. Climate change impacts and adaptation research must be coordinated between scientific institutions and have clear links to policy and management to ensure effective adaptation outcomes. This is being effectively pursued in Tasmania for the agricultural sector through the Tasmanian Institute of Agriculture[7] (TIA). TIA is a joint venture between the University of Tasmania and the Tasmanian Government. A strategic approach to research, development and education relating to climate change adaptation in agriculture has been achieved through the development of multidisciplinary teams and industry advisory councils that identify key industry priorities. Similarly, the *Indicative Mapping of Tasmania's Coastal Vulnerability to Climate Change and Sea Level Rise* study is integral to addressing uncertainty in coastal adaptation responses. In particular, this work will assist in further development of a sea level planning tool for Tasmania.

Thirdly, the cost of avoidance of risk, for example by phasing in retreat in the coastal zone, should be considered against the value of occupying these areas and managing risks in a precautionary way. This matter is also being considered through the TCAP project.

And finally, clear articulation of the risks associated with the impacts of climate change and communication of the information available to government within specific policy/ planning/ management/ legislative contexts is vital to addressing uncertainty, and perceptions of uncertainty, in the community.

3. Are there barriers to adaptation?

What is the most useful way to classify, define and identify barriers to adaptation? Are the categories set out above appropriate? Are there other types of barriers?

Consistent with the IPCC Fourth Assessment Report, it may be useful, when defining barriers to adaptation, to differentiate between *limits* and *barriers*[8]. Limits to climate change adaptation are absolute thresholds beyond which existing activities, land-uses, ecosystems, and species cannot be maintained. Barriers are obstacles to adaptation that can be overcome, although this may require concerted effort. Some limits that seem insurmountable could be overcome with technological advances or with sufficient resources, social support and political will. Those

[7] Formally known as the Tasmanian Institute for Agricultural Research (TIAR).
[8] For discussion see Moser, S.C. and Ekstrom, J.A. (2010) *A Framework to Diagnose Barriers to Climate Change Adaptation*. Proceedings of the National Academy of Sciences of the United States of America, available at http://www.pnas.org/content/107/51/22026.full> Accessed 25 November 2011.

issues that in the first instance may seem insurmountable but can later be overcome are considered barriers. Therefore an issue that is first classified as a limit maybe redefined as a barrier, and vice versa. The distinction between barriers and limits is important because it could guide where resources for climate change adaptation should be directed.

The Tasmanian Government broadly agrees with the four categories of barriers to effective adaptation, these being market failures, regulatory, behavioural and cultural and organisational. In addition to these categories, the physical and ecological barriers to effective adaptation may warrant consideration. In Tasmania, research from the *Climate Futures for Tasmania* project, which produced fine-scale climate projections for the State from 1961 to 2100, has enabled the identification of potential physical and ecological barriers to adaptation. For example, blackcurrant production may be forced to higher elevations while some other fruit varieties, such as cherries, may be adversely affected in lower elevation, warmer coastal areas where they are currently farmed[9].

What market failures could inhibit adaptation in any specific sector or region?

Adaptation policy responses are limited by the depth of understanding of how information pertaining to climate change impacts relates to different end users, sectors and purposes. Across a number of industry sectors in Tasmania, imperfect information on how climate change may impact economic performance has been identified as a barrier to adaptation. For example, the agricultural industry is characterised by fragmented small to medium enterprises with minimal research, development and extension capability in their own right and little incentive at the enterprise level to invest in climate change information. The incentive to undertake adaptation may be enhanced if industry has a better understanding of how climate change impacts may affect its profitability and performance in the long run. As a result TIA is focussing on communicating information on projected climate changes to the Tasmanian agricultural sector.

The failure for markets to capture the value of biodiversity (both in terms of marine biodiversity and terrestrial biodiversity), as an ecosystem service, may also have significant implications in relation to adapting to climate change. For example, soils form a critical link between landforms and vegetation, providing valuable ecosystem services controlling vegetation health and moderating infiltration and runoff. Tasmania's domestic, agricultural and industrial water catchments (including extensive hydro-electric developments) critically rely on an adequate quantity and quality of runoff, generally from reserved lands. Climate-induced changes to rainfall intensity, vegetation cover, fire frequency and intensity and windstorm intensity all have the potential to impact on soils, leading to changes in soil hydrology, soil organic carbon, salinity, erosion and sedimentation[10]. These changes could have substantial economic impacts.

[9] Holz, G.K., Grose, M.R., Bennett J.C., Corney S.P., White C.J., Phelan, D., Potter, K., Kriticos, D., Rawnsley, R., Parsons, D., Lisson, S., Gaynor, S.M., and Bindoff, N.L. (2010) *Climate Futures for Tasmania: impacts on agriculture technical report*, Antarctic Climate and Ecosystems Cooperative Research Centre, Hobart, Tasmania. Available at http://www.dpac.tas.gov.au/__data/assets/pdf_file/0004/140197/CFT_-_Impacts_on_Ag_Summary.pdf

[10] DPIPWE (2010) *Vulnerability of Tasmania's Natural Environment to Climate Change: An Overview.* Department of Primary Industries, Parks, Water and Environment, Tasmania. Hobart. Available at http://www.dpiw.tas.gov.au/inter-nsf/WebPages/DRAR-88P8CY?open

Are there examples of policy or regulatory barriers that could inhibit adaptation? What are these? Could the objectives of these policies or regulations be met in alternative ways that have greater benefits and/or lower costs and distortions?

There are a number of regulatory barriers that have been identified by Tasmanian Government agencies that could inhibit climate change adaptation. Regulations and policies relating to building control and responses to natural disasters and emergency events are usually based on historic extreme events (and associated probabilistic performance criteria) and other climate data. As a result, policies and regulations based on historical data alone are likely to lag behind changes due to climate change if they do not apply the precautionary principle.

For example, with regard to building regulations and policies, the compliance criteria for considering rainfall and flooding events in building regulations are based on calculated criteria such as annual exceedance probabilities. Climate change impacts may also render obsolete some current design requirements in, for example, the Building Code of Australia, the Australian Rainfall and Runoff national guidelines and Australian Standard AS3500.3 National Plumbing and Drainage Code – Stormwater Drainage.

In relation to building regulation, application of the Council of Australian Government's *Best Practice Regulation: a Guide for Ministerial Councils and National Standard Setting Bodies* (October 2007) could potentially be a regulatory barrier to adaptation.

Practically applying principle 3 of the Guide, 'adopting the option that generates the greatest net benefit for the community', has required historical data and demonstrable building failures before any regulatory proposal designed to prevent harm can be justified. Application of a precautionary approach to principle 3 of the Guide could be considered as acceptable to facilitate pre-emptive regulation to reduce the harm caused by climate change.

Heritage legislation may also constrain the community's ability to adapt buildings to handle more extreme flooding and rainfall events and increased air conditioning loads.

Land use planning and zoning systems can impede transport asset owners in adapting to climate change. This may occur when urban growth areas that require infrastructure are located in areas susceptible to climate change impacts, such as coastal inundation or flooding. This barrier may arise when transport planning is not sufficiently integrated with land use planning. Past land use or transport planning decisions can also create 'legacy' issues that impede effective adaptation. This provides an example of how inconsistent planning and land use policy may function as a barrier to climate change adaptation and reduce the efficiency of planning processes. Tasmania's lack of a sea level rise planning tool is another barrier that contributes to uncertainty around building new developments in coastal areas. As noted earlier, work is currently underway to address this and will be informed by the work being undertaken in other jurisdictions.

Tasmania's current system of land tenure, regulated through the *Land Titles Act 1980*, may inhibit effective adaptation in circumstances where private land is threatened or changed through dynamic coastal or fluvial processes brought about by climate change. The existing development rights and expectations from historic zoning provisions in planning schemes is another barrier to implementing climate change adaptation strategies, contemporary planning provisions and management actions.

In the agricultural sector, policies relating to gene technology may have the potential to impede adaptation, although further analysis would be required. The Tasmanian Government has maintained a policy on gene technology and primary industries since 2001, including a moratorium on commercial release of genetically modified organisms to the Tasmanian environment. This position was adopted because a Parliamentary Committee found there was potential for use of gene technology to negatively impact on Tasmania's ability to market locally produced food domestically and abroad. The Gene Technology Policy Statement 4 reaffirms this commitment until 2014.

What other significant barriers (for example, behavioural or organisational) might inhibit adaptation? What effects might these have on decisions about whether and how to adapt to climate change?

In an increasingly constrained budget environment, climate change adaptation projects compete for a finite amount of available funding with other projects that may provide comparatively higher (and more easily defined) returns in the short term. Furthermore, it may be difficult to secure government commitment to adaptation when the time horizon of some climate change impacts and adaptation actions is long, and outside the election cycles of political representatives.

As noted earlier, there is a lack of clarity around mitigation measures and therefore uncertainty around future emission scenarios. This means that balancing the investment between emission reduction or energy efficiency activities, while at the same time planning for climate change adaptation, may present challenges for policy development and regulation. This is compounded by having a constrained budgetary environment.

Within the broader Tasmanian community, behavioural and cultural barriers to adaptation are also evident. For example, the willingness of some farmers to seek assistance, take-up new initiatives or trial new technology that may assist them adapt to climate change is likely to be affected by factors such as time, pride, lack of technical expertise and limited literacy skills.

4. What policy instruments could be used to address the barriers?

4.1 Facilitating Insurance Markets

Are any existing regulatory arrangements (including state-based insurance taxes and disaster recovery policies) impeding the efficient operation of the Australian insurance market, or reducing incentives to take up insurance?

The Tasmanian Government considers that existing disaster recovery policies (the Commonwealth Government's Relief and Recovery Arrangements (NDRRA) and the Tasmanian Government's own arrangements) do not impede the efficient operation of the Australian insurance market, or reduce incentives to take up insurance. The Tasmanian Government considers that these policies should continue to be a financial safety net both for jurisdictions and local councils affected by significant natural disasters. This supports the principle of shared responsibility for the costs of natural disasters across all tiers of government.

The Tasmanian Government presently operates a self-funding arrangement covering specific identified insurable liabilities of agencies. The Tasmanian Risk Management Fund operates on a cost-recovery basis with contributions set to ensure adequate financial provision for the cost of risk now and into the future. All participating agencies pay annual contributions to meet claim costs, administrative expenses and, where applicable, insurance premiums and reinsurance costs. An independent actuary determines the level of contribution by agencies and this

contribution reflects the agency's risk exposure, claims experience and nominated excess amounts.

Tasmania maintains these self-insurance arrangements as the cost of private insurance has previously been found to be prohibitive having regard to Tasmania's risk profile and the likely benefits for the State.

In additional to this arrangement, the Tasmanian Government currently administers the Tasmanian Relief and Recovery Arrangements Policy (TRRA) that provides the overarching financial arrangements for recovery in Tasmania. The TRRA includes the:

– personal hardship and distress assistance policy;

– local government relief policy; and

– community recovery policy.

Unlike the NDRRA, the elements of the TRRA may be activated by the Premier where the impact of an eligible natural disaster is a serious disruption to a community. This will involve a consideration by the State of the capacity of a local council to fund the response to, and recovery from, the eligible natural disaster and an assessment of the impact on the local community. Once activated, various assistance measures are available. Activating the TRRA too often could lead to a disincentive to insure.

The local government relief policy provides a financial safety net once a council's expenditure on eligible relief and recovery measures exceeds its pre-determined first threshold. More assistance is available if the council's second threshold is passed.

The eligibility criteria for assistance under this policy require a council to demonstrate that they have taken all reasonable steps to mitigate the potential impact of natural disasters in their municipality. This may include, but is not limited to, local councils:

– having appropriate planning controls in place to mitigate the potential impact of natural disasters;

– where available, taking out insurance for council assets where insurance terms are commercially acceptable to the council; and

– having emergency management plans in place to enable a council to effectively respond to a natural disaster.

Tasmania's experience has been that these arrangements support communities to understand and own the risks that they face. As such, the Tasmanian Government supports a positive approach to risk management within communities.

What kinds of government intervention, if any, would be most appropriate for addressing any market failures or regulatory barriers? What are the costs and benefits of these interventions?

The Tasmanian Government understands that there is an interest at the national level to address perceived issues of market failure in the insurance industry for natural disasters. However, the Tasmanian Government is not aware of any research that has clearly made the case for government intervention in this market. Furthermore, while the Tasmanian Government recognises that insurance is an important strategy for individuals to manage their risks from natural hazards, it regards it as one of many measures that can be utilised to achieve this outcome.

It is the view of the Tasmanian Government that changes to insurance markets to address climate change and its impacts should have regard to the:

– roles and responsibilities of individuals in managing private risks;

– role of governments in supporting individuals to manage private risks;

– intersection between private risks and public risks;

– impacts of government policy on the ownership of risks and the capacity to or likelihood that risks from natural hazards caused by climate change will be factored into investment decisions; and

– impact of government policy on community resilience and the ability of communities to own and manage risks at the local level.

Clarity around these roles and responsibilities would also assist the Tasmanian Government in working through issues of liability raised by Local Government in coastal areas

It is also important that any legislative approach to address a market failure should have the flexibility to respond to adaptation issues as the science and policy evolves.

4.2 Regulatory Responses

Are any new regulations justified to facilitate adaptation? What would be the costs and benefits to the wider community?

There may be some need to clarify the scope of Tasmania's environmental management and pollution control regulation, to ensure the capacity to require climate change adaptation measures to be taken by existing industrial activities.

An example of a measure that might be considered here is the sizing of retention ponds or drains to take into account projected extreme rainfall events. Where the original permit has covered the issue of pond sizing, for instance, it may be desirable to amend permit conditions to account for revised projections. However, the ability to retrospectively impose new conditions on existing activities is unclear.

The situation in relation to proposed developments may be simpler. Proponents of proposed developments must provide a development plan to the Environment Protection Authority (EPA) specifying the impacts of the proposed activity on the environment; these plans are based on guidelines issued by the EPA. Currently, decisions on aspects of the plan such as sizing of tailings dams, drains and erosion prevention are made based on historical climate data.

Permit conditions often refer to sizing a drain, for instance, to withstand a 1:20 year rainfall event; longer term infrastructure such as tailings dams may need to be sized to withstand a 1:100 or 1:1000 year rainfall event. The ability of the EPA to require reference to climate modelling in determining the appropriate design criteria has not been tested, but there does not appear to be a legislative barrier to this.

The ability to take account of modelled climate change clearly depends on the accessibility of such information. It should be noted that the design life of most premises is 10 to 20 years, and although most premises are in operation long after this timeframe it may be difficult to require upfront consideration of climate conditions anticipated in several decades.

How have state and local governments responded to the potential impacts of climate change through their planning and zoning policies? Are there existing planning policies that could constrain the ability of individuals and businesses to adapt, or reduce their flexibility? What reforms may be needed to meet community objectives while facilitating effective adaptation — are there good examples?

Climate change impacts may result in natural ecosystems retreating or shifting in certain areas. This can then impact on settlement patterns and other land uses. However, current land use planning scheme provisions may not adequately provide the flexibility to deal with these changes to natural ecosystems.

One solution is for the development of long-term structure planning that builds in buffer and expansion/relocation areas that conserve and protect natural systems (i.e. zoning protection for moveable wetlands). Planning reform is a key priority of the Tasmanian Government. The Regional Planning Initiative, a joint state and local government project that commenced in 2008, is an important part of the planning reform agenda. The Tasmanian Government has provided approximately $2.4 million to progress the Regional Planning Initiative and work with local government to prepare regional land use strategies and new planning schemes. This part of the reform is in its final stages of implementation.

Planning reform in Tasmania includes a range of responses to facilitate effective adaptation to climate change. This reform includes regional planning, the preparation of new and consistent planning schemes, hazard planning and the provision of improved planning information.

In 2011, the Tasmanian Planning Commission (TPC) received additional funding from the Tasmanian Government for the next stage of its planning reform agenda. The reform agenda over the next two years includes:

- providing for the ongoing review and further development of regional land use strategies;
- assessing and approving new planning schemes for each municipal area in Tasmania;
- expanding the provisions in planning schemes that are consistent across Tasmania by working with local government, industry and professional bodies; and
- providing a single, on-line point of access to planning schemes that are accurate and incorporate all amendments.

The TPC is also currently preparing a number of statewide planning provisions for a range of issues considered as being fundamental to delivering good planning outcomes for use and development in Tasmania. Statewide planning provisions for bushfire, landslide, flooding and coastal hazards are under preparation.

Work currently being undertaken by the TPC's Coastal Planning Advisory Committee on a coastal planning framework, as well as development of a sea level rise planning tool, may give rise to the need for new policy and legislative responses.

The scope of the draft interim Coastal Hazards Code, which will also be considered by the TPC's Coastal Planning Advisory Committee, covers a range of hazards relevant to coastal areas including sea level rise, storm surge, permanent and periodic inundation and coastal erosion. The emphasis of the draft interim Code is on managing development in coastal areas to ensure that it does not result in the risk to people, property and infrastructure exceeding an unacceptable level. An acceptable level of risk will vary depending on the specific use or development risk profile.

Following the Victorian bushfires, the Tasmanian Government reviewed the arrangements for development and use in bushfire prone areas and agreed to implement new arrangements to ensure that appropriate standards are consistently applied to the construction of houses and other buildings in bushfire prone areas in Tasmania. This includes:

– the introduction of a definition of a 'bushfire prone area' for the purposes of applying the relevant national standard for construction; and

– a requirement that all new subdivisions incorporate bushfire mitigation measures, including appropriate separation distances between buildings and bushfire prone vegetation and a certified bushfire safety plan.

A planning directive is also being developed that will encourage high-risk development, such as schools, hospitals and aged care facilities to be located outside of bushfire prone areas if possible.

In addition to the above work, the Tasmanian Government is currently developing a State framework for managing natural hazards in the planning and building system. The primary objective of the project is to improve the clarity and consistency of advice and support to local government and others regarding mitigating the impact of natural hazards through appropriate strategic planning, planning and building controls and development decisions.

There are four secondary objectives for the project. These are:

– provide a clear framework for identifying and classifying the best available information on hazards for consideration in zoning and planning decisions, including information to support judgements regarding whether information is of appropriate scientific rigour, is expressed in an appropriate form and is of adequate detail to inform local decision-making;

– provide a clear framework for the provision of advice to local government on the appropriate processes for assessing 'acceptable levels of risk' and an agreed statewide approach on interpreting future scenario-based risk or hazard modelling;

– identify an effective 'single point of authority' in hazard specific statements as a tool to deliver information to local government on hazards and ensure that local government has confidence that the information presented is the best available information on the hazard and/or risk; and

– agree to a process for considering the consequence of new information made available with regard to hazards or risks that impacts on existing development and or planning decisions.

What implications might climate change have for local councils' planning policies and development approval processes? Has concern about legal liability restricted the ability of councils to achieve good economic, social or environmental outcomes?

Some Tasmanian local councils have undertaken significant research and policy work in regard to climate change and associated climate change strategy development, hazard analysis and community consultation. They have also focused their efforts on assessing the implications of climate change for their operations and planning decisions (i.e. the Clarence City, Launceston City, Hobart City, Break O'Day and Kingborough Councils).

For example, the Clarence City Council is widely regarded as a leader in coastal climate change adaptation planning. Climate change is identified in the Council's planning policy framework as one of the key influences affecting the strategic direction of the Clarence Planning Scheme 2007. Clause 2.2.1(h) of the planning scheme states: "the effects of climate change, particularly related to coastal erosion and inundation caused by both sea level rise and storm events will need to be addressed in the planning of affected areas".

The Council's planning scheme was amended in September 2011 (Amendment A-2009/13) to better address the findings of earlier work on coastal hazards from climate change[11]. The amendment included replacing the provisions of the existing Subject to Inundation Overlay, amending the Coastal Management Overlay and replacing the Sea Level Rise and Storm Surge Overlay with a Coastal Erosion Hazard Overlay. Planning scheme maps were also updated to show areas covered by these overlays.

The approach taken by the Clarence City Council to respond to coastal climate change impacts is helping to inform the approach being taken through the TCAP Project. Through this project, the Local Government Association of Tasmania, the Tasmanian Government and the TPC are working with the Break O'Day, Clarence City, Kingborough and Latrobe Councils to consider adaptation and planning responses to coastal climate change impacts.

At the local and state government levels there is concern that action or inaction by governments to defend private property from natural hazards and climate change impacts (particularly in the coastal zone) may result in liability. This concern seems to be a considerable barrier to adaptation even though the Tasmanian Government understands that governments generally do not have a responsibility to defend private property from natural hazards and climate change impacts. This issue is compounded by the lack of certainty in the roles and responsibilities that the Tasmanian Government, local councils, private landowners and the general community have with respect to managing hazards and risks to public or private property and land.

How might building regulation affect the ability of individuals and businesses to adapt to climate change? Are there any inconsistencies across the States and Territories that could impede adaptation?

In most instances, the National Construction Code Series (NCC) is both the minimum standard and maximum provided by developers. A small regulatory increase, based on a precautionary approach, may be justified to ensure the building capital stock is capable of handling climate change. As noted earlier in this submission, building regulation based on historical data may inhibit effective adaptation. If a precautionary approach is not adopted for building regulation, it would be desirable for the suggested climate zones (based on historical data) to be reviewed every ten years to allow for the changing climate.

[11] See Tasmanian Planning Commission, 2011, Clarence Planning Scheme 2007, Draft Amendment A–2009/13 available at http://www.planning.tas.gov.au/__data/assets/pdf_file/0007/166426/CLA_A-2009-13_Delegate_decision.pdf

4.3 Government Provision of Public Goods

What government-provided goods and services might be significantly impacted by climate change? What decisions or trade-offs may have to be made — for example, about the balance between emergency response and preparedness, or the best way to protect natural environments when species may need to migrate?

There are likely to be many trade-offs that will need to be made in response to climate change adaptation due to the range of government objectives impacted by climate change. Several examples that have been identified for Tasmania are outlined below.

Extreme rainfall events, which are predicted to increase in frequency and intensity with climate change, may cause significant damage to bridge and road infrastructure in Tasmania. Information to enable more accurate prediction of the timing and magnitude of such events could assist in making infrastructure more resilient, although it is acknowledged that building this information and evidence would take considerable time and resources. In managing the impacts on transport infrastructure, the Tasmanian Government recognises that trade-offs may need to be made on whether to take a 'real options' or 'adaptive management' approach by delaying major investment decisions until a solid evidence based analysis can be undertaken to determine potential costs and benefits. Remedial action to improve safety and political barriers may impact on the approach taken.

Measures to protect property and infrastructure from the impacts of climate change, including sea level rise and increased fire regimes, may conflict with objectives to protect natural values by reducing connectivity between ecosystems or directly impacting on species threatened by climate change. The provision of fuel reduction fire management, in the face of increasing intensity and frequency of wildfire, may also be significantly impacted by climate change. Trade-offs between protection of infrastructure and natural values will need to be made. Potentially significant impacts on biodiversity may occur where fire regimes are more frequent than the preferred fire ecology.

In addition, climate change may require a re-definition of species that have historically been considered invasive or non-indigenous. This issue is potentially most significant in southern Australia given that the distribution of many species is likely to move south as temperatures increase.

What kinds of information are already provided by governments to help individuals or businesses to understand risks? Is there a case for more government provision of climate-related information, or to disseminate this differently?

The provision of climate change impacts information and contribution to local and regional research has been a particular focus of the Tasmanian Government's climate change adaptation effort to date. Of particular significance is the *Climate Futures for Tasmania* project which the Tasmanian Government was a partner to, along with the Antarctic Climate and Ecosystems Cooperative Research Centre, the Commonwealth Government and Hydro Tasmania.

The project provided the first fine-scale climate information for Tasmania under a range of accepted greenhouse emission scenarios for the period 1961 to 2100. It examined general climate impacts, such as changes in rainfall and temperature, and it also analysed the impact of climate change on agriculture, water and catchments and extreme events.

Seven reports have been released under the *Climate Futures for Tasmania* project and over 60 complementary projects have been established to continue the extension and application of the *Climate Futures for Tasmania* results[12].

Other significant information that has been provided to assist communities and businesses understand climate change related risks include:

– *The Vulnerability of Tasmania's Natural Environment to Climate Change: An Overview*[13], which is the first assessment of the potential impacts of climate change on Tasmania's terrestrial, freshwater and marine systems.

– *Indicative Mapping of Tasmania's Coastal Vulnerability to Climate Change and Sea Level Rise*[14], which outlines the vulnerability of the Tasmanian coastline to the impacts of climate change and sea level rise. It provides a valuable tool for the assessment of coastal development, zoning and land use planning.

The need to disseminate climate change impacts information in a form usable and appropriate to end-users is also recognised by the Tasmanian Government. Examples of different types of communication include:

– making publicly available the *Climate Futures for Tasmania* results on the Land Information System Tasmania geographic information website[15]. This enables users to 'zoom-in' and access localised climate change information for their area.

– supporting the ClimateAsyst™ infrastructure tool developed by consulting firm pitt&sherry, which applies the *Climate Futures for Tasmania* climate change projections to infrastructure.

– developing climate change profiles at a local government area level for all Tasmanian councils. These profiles, which are presently under development, will provide localised climate change impacts information for councils to use in risk management.

These information generation and dissemination projects will help guide the formulation of adaptation policy and management responses in Tasmania. Continued investment is required by governments, as well as industry, to ensure that this information is enhanced over time, effectively communicated to industry and community, and comprehensively informs public policy development. It is also essential to build support among the user communities of climate related research and projections and promote greater collaboration between the providers and users of this information.

[12] The *Climate Futures for Tasmania* reports are available at http://www.climatechange.tas.gov.au
[13] Available at http://www.dpiw.tas.gov.au/inter-nsf/WebPages/DRAR-88P8CY?open
[14] Available at http://www.dpiw.tas.gov.au/inter.nsf/webpages/pmas-6rg5wx?open
[15] Available at http://www.thelist.tas.gov.au.

4.4 Direct Assistance

In what areas or sectors might structural pressures as a result of climate change be greatest? Are there any existing regulatory and policy barriers that might impede adjustment?

Governments often assume that rural and regional communities are homogenous and are similarly impacted by factors such as climate change. This is not the case, with some communities more vulnerable to climate change impacts due to a range of social and economic factors that may limit their adaptive capacity. While Tasmania is expected to experience less severe climate change impacts compared to many parts of Australia, it is important to recognise that the social and economic structure of the Tasmanian community may affect its capacity to adapt.

The Tasmanian Government's October 2011 report, *A Cost of Living Strategy for Tasmania*, notes that mechanisms to oversee the cumulative impact of government pricing changes and policy settings on the wellbeing of the most vulnerable individuals and households are inadequate. It notes that although individual price increases may have a sensible policy or industry rationale, these are often made without reference to other changes that can also result in increased costs for consumers and regressive outcomes for those least able to afford the changes. It is therefore important that the range of policy and regulatory reforms that may result from the Inquiry take into account where the cumulative and disproportionate impacts are likely to occur, who is most likely to experience these, and how to mitigate these impacts.

What pressures might be placed on the existing social safety net as the impacts of climate change are felt by households?

For vulnerable and low income households to have sufficient capacity to invest in and take advantage of adaptation measures, reforms to support effective climate change adaptation are required that take into account and address the adequacy of government income support and concessions. The recent Anglicare Tasmania report, *The Price of Poverty: cost of living pressures and low income earners* (September 2011), documents a number of ways in which low income Tasmanians are subject to a 'poverty penalty' – i.e. an additional cost in money, time or health which they incur in their attempts to purchase basic goods and services.

These findings are relevant to the Inquiry, particularly in relation to issues of affordable energy consumption and the penalties low income consumers incur when purchasing goods and services associated with responding to climate change impacts.

4.5. Which governments are responsible for addressing the barriers to adaptation?

Is there a need to alter policy responsibilities (or clarify responsibilities) across the different levels of government in order to facilitate adaptation?

The Tasmanian Government considers that the allocation of government's adaptation task across Australia's three levels of government should balance subsidiary and national interest considerations. All levels of government will need to work together to determine appropriate and complementary roles and responsibilities for adaptation. The Tasmanian Government supports the guidance provided by the Commonwealth Government on the clarification of roles and responsibilities for government. With regard to addressing barriers to adaptation, state governments are likely to be responsible for ensuring that appropriate regulatory frameworks are in place and delivering an adaptation response in their own areas of policy and

regulation. State governments will also have a pivotal role in information provision at a state and regional level and the delivery of public good infrastructure for adaptation.

Local and State Governments in Tasmania have recognised that there are significant overlaps in adaptation roles and responsibilities and desired outcomes between these levels of government. This recognition has resulted in a collaborative approach to climate change adaptation actions under a Premier's Local Government Council work program on climate change. For example, $400 000 has been provided to assist Local Government adapt to climate change. Regional, land use and council adaptation plans will be developed for the 12 Southern Tasmanian Councils during 2011 and 2012. Furthermore, $500 000 is being provided to assist four Tasmanian councils improve their decision making capacity to address coastal hazards, and prioritise and implement coastal adaptation investment options.

The Tasmanian Government would welcome the opportunity to clarify responsibilities with the Commonwealth Government through a Council of Australian Governments or related work program.

5. Setting priorities for reform

Are these criteria relevant for assessing reforms to reduce barriers to adaptation?

The Tasmanian Government agrees that adaptation reforms that can be delivered at a relatively low cost to government, businesses and the community as a whole should be prioritised.