



South West Group

**Economic Development Tour
Melbourne & Sydney**

7 – 9 April 2015

TOUR REPORT

CLIMATE CHANGE ADAPTATION





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BACKGROUND

The South West Group Board has undertaken a number of economic development tours over the last few years aimed at examining best practice and innovation across a range of topics and issues. This provides the opportunity for the Board, Councillors and member Council Directors to gain first hand knowledge on the planning, development and implementation of major initiatives and projects relevant to the South West Metropolitan Region.

The tours completed include the following key themes:

- **April 2012:** Activity Centres Tour of Melbourne and Sydney
- **April 2013:** Economic Development Tour of South East Queensland covering health and knowledge precincts coastal/marina/foreshore developments and civic/library precincts
- **April 2014:** Civic precincts and activation through events, mall redevelopment, light rail, major projects, urban renewal and redevelopment in Adelaide, South Australia.

MELBOURNE AND SYDNEY 2015 – CLIMATE CHANGE ADAPTATION

The April 2015 economic development tour was undertaken in Melbourne and Sydney, with the main theme of climate change adaptation, covering key aspects such as:

- Policy and practice
- Risk and vulnerability assessments
- Development industry and financial institutions
- State Government support programs
- Regional approaches and partnership projects
- Urban heat island and greening strategies
- Research and adaptation responses
- Infrastructure assessment and economic models
- Coastal protection for sea level rise
- Stormwater management and re-use

The tour drew upon innovation and good practice projects identified by the National Climate Change Research Facility (NCCARF) and the Australian Centre of Excellence in Local Government (ACELG), whilst focussing on initiatives that have led to tangible shifts in policy, planning and decision-making at the local and regional level.

The Melbourne and Sydney Economic Development Tour was a 3 day tour from 7 to 9 April 2015 and based on the itinerary and background report provided to delegates.

This report outlines the key outcomes of the tour and lessons learnt. This information will assist the South West Group in determining a position on climate change adaptation and future activities to support the member Councils and the region.

TOUR OVERVIEW AND REPORT

OVERVIEW

Climate change research and scientific evidence are pointing toward a warmer and drier climate with more extreme weather events and rising sea levels. It is now clear that human activities have accelerated climate change impacts and there is a need for risk assessments and adaptation strategies to deal with these impacts.

Climate change threatens the liveability of cities, and is further exacerbated by the rapid urbanisation of the coast, where most of the Australian population lives.

Our cities are facing increasing challenges of weather-related disasters which damage buildings and infrastructure services including water, energy, transport, and telecommunications. For example, cyclones and storm surges destroy houses, bushfires rage at the urban fringe, and heat stress, vector borne and other climate related diseases pose health risks.

These impacts of a changing climate add to existing challenges such as urban sprawl, aging infrastructure, population growth, pollution and the loss of biodiversity.

The 2015 economic development tour to Melbourne and Sydney WAS based on the theme of climate change adaptation, with these two eastern states cities taking the lead nationally in climate change adaptation.

Relevant case studies and good practice projects in Melbourne and Sydney have been documented by the:

- National Climate Change Adaptation Research Facility (NCCARF) <http://www.nccarf.edu.au/localgov/> and
- Australian Centre for Excellence in Local Government (ACELG) Climate Change Manual for Local Government: Embedding Resilience to Climate Change Volume 1 (Report) and Volume 2 (Case Studies) <http://www.acelg.org.au/publications>

The tour aimed to showcase those organisations and projects that have successfully imbedded climate change adaptation work into their policies, programs and practices.

Site visits to areas of interest to the region covered coastal activities (sea walls, vulnerability and risk assessments, economic modelling of assets, adaption planning) as well as city climate change adaptation initiatives (built form, urban heat island mitigation, greening strategies, stormwater harvesting).

The key outcomes and lessons learnt from the presentations and site visit are outlined below. This information will be used in the identification of climate change adaptation activities for future consideration at local and regional scales.

Day 1 – Melbourne - Tuesday 7 April 2015

Venue: Municipal Association of Victoria (MAV)
60 Collins Street Melbourne

Theme 1- Climate Change Adaptation Overview

City of Melbourne
Krista Milne Manager Sustainability
“Creating an Eco-City”

The City of Melbourne has grown from a population base of under 40,000 in 1988 to over 120,000 in 2015, with an additional 800,000 people a day entering the city for work and recreation. During the period 1988 to 2009, the green cover across the city reduced from about 25% to less than 14%.



City of Melbourne 2009 – Population 94,341, Green Cover 13.6%

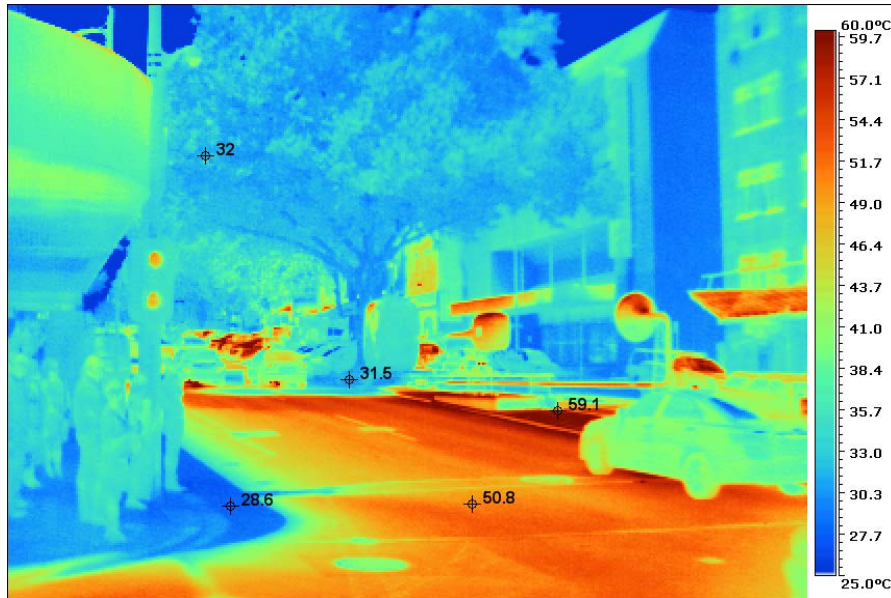
Drought and the increased incidence of heat waves over the last 15 years forced the city to initially adopt stringent water conservation strategies, only to realise that this approach was leading to stress and premature decline of mature tree species across the city and contributing to the “heat island” effect linked to tree decline and reduced permeability from built structures.

A rethink of its approach over the last decade has led the city to adopt an ecosystem based climate change adaptation pathway based on five key strategies:

- Total Watermark: City as a Catchment – to increase stormwater harvesting
- Open Space Strategy – to increase green space
- Urban Forest Strategy – to double canopy cover from 22% to 40% by 2020
- Growing Green Guide – to increase permeability
- Draft Urban Ecology Strategy – to enhance biodiversity

The City has allocated around \$10 million from a total budget of \$330 million toward the development and implementation of these five key strategies.

Thermal mapping has shown heat spots up to 30°C hotter on impermeable and dried surfaces when compared to shaded areas under tree canopies. Reducing heat island effects and making the city and its people more resilient to heat stress is a key driver for the city place makers.



Thermal mapping in the City of Melbourne

Economic analysis work undertaken by University of Melbourne showed that trees are a net asset with returns of \$3.50 in value on a \$1.50 outlay.



Example of ways to increase canopy cover in the built environment from 27% to 41%

The City of Melbourne as an organisation represents only 1% of greenhouse emissions, but has a Zero New Emissions by 2020 target which covers the entire city, initially focusses on the CBD buildings which generate the majority of emissions and offer the greatest potential for emissions reductions.

The Total Watermark Strategy has helped redefine the way that stormwater is managed at the catchment level. Rather than stormwater discharging into drains and Port Phillip Bay, the city is seeking to capture, treat and re-use stormwater as part of an integrated program of innovative projects and processes that link water sensitive urban design to precinct planning.



Water sensitive stormwater capture systems irrigate trees (above) and investment in stormwater harvesting (below) is increasing resilience to drying climate



The City of Melbourne dedicates considerable resources and funding in community engagement for initiatives with implications for residents and businesses across a range of areas including climate change adaptation.

Lessons Learnt

- The City of Melbourne (Council and staff) are taking a **strong leadership role** in climate change adaptation, which is **backed by funding and resources** to undertake comprehensive programs.
- **Well-meaning strategies in response to climate change**, such as water conservation, **can have perverse and unintended consequences** (tree decline, increased heat impacts, heat stress on vulnerable residents).
- **Significant effort and staff resources are spent on stakeholder engagement** for topical issues and strategies that **will benefit from active community involvement**. This approach has been adopted for climate change adaptation and is strongly supported by the community, creates relationship networks and requires positive staff culture to deliver.
- **Comprehensive information databases**, supported by **robust business cases** identifying costs/benefits, **are essential** to establish, maintain and expand climate change adaptation activities. Universities are well placed to undertake research and analysis.
- **Multi-disciplinary approaches to climate change adaptation initiatives (Corporate, Planning, Engineering, Community Development, Sustainability, Environmental, Parks and Gardens) are essential** and lead to innovation.
- The acceptance and **integration of climate change factors into strategic planning**, and in precinct plans, **demonstrates commitment** and **assures ongoing funding for climate change adaptation programs**.

Further information can be found via the link below (see also adapting to climate change page) <http://www.melbourne.vic.gov.au/sustainability/Pages/Sustainability.aspx> and community participation page <http://participate.melbourne.vic.gov.au/>



Alianne Rance and Fiona Silke

Part 1 - Best Practice and Knowledge Sharing

Part 2 – Private Sector and Property Development

Alianne and Fiona formed the company Loop and company following the acquisition of their previous employer (Netbalance) with Ernst and Young. The focus of Loop's work is on embedding climate change adaptation into organisations, prioritising actions and facilitation.

The key steps in the climate change adaptation process used by Loop include:

- Climate risk assessment
- Adaptation strategy/action planning
- Embedding adaptation

Climate risk assessments

The process for climate risk assessments and adaptation planning have been documented in a range of publications including the 2006 Australian Greenhouse Office guidelines and Australian Standard (AS) 5334 – Climate change adaptation for settlements and infrastructure.

In determining the most appropriate climate change adaptation pathway suitable for your organisation, consideration should be given to the “frame” of the assessment pathway as either “risk based” or “opportunity based” pathway.

There is no right or wrong answer to the way an organisation approaches climate change adaptation. It is important to adopt an approach which is supported by management and staff and is iterative and flexible to take into account the adaptation journey.

Also, the scope of the adaptation pathway will determine the level of resources and extent of ownership in the process and the outcomes.

The City of Melbourne used a program logic pathway that was very holistic and inclusive, supported by a high level of community and staff engagement. This approach considered a number of timeframes (i.e. 5, 10 and 30 years) and scenarios.

More recently, opportunity pathways approaches have gained prominence as organisations seek to take a positive action oriented approach rather than a systems risk based approach with more of a compliance focus.

Adaption strategy/action planning

Regional or local approaches to climate change adaptation strategies or action plans will also impact on the scale of the assessment and the extent of collective and local responses.



There are a number of strategies and plans prepared by Victorian local governments and regional associations that provide examples of different approaches

The Western Alliance for Greenhouse Action (WAGA) undertook a regional climate change adaptation risk assessment that resulted in regional actions as well as individual action plans tailored to each member Council.

The climate change adaptation toolkit developed as a partnership project between RMIT, City of Greater Geelong and Netbalance provides a useful guide to local government and other organisations on how to approach climate change adaptation.

The toolkit includes three tools being:

1. Exploring the risk context
2. Developing adaptation actions
3. Screening for climate change interactions



For further information, refer to the following link.

<http://global-cities.info/content/project/climate-change-adaptation-toolkit-a-comprehensive-guide-to-planning-for-climate-change-adaptation-in-three-steps>

Much of the Victorian adaptation work has been undertaken on the basis of a 0.4 metre rise in sea level by 2050 and 0.8 metre rise in sea level by 2100. These targets are currently under review by the Victorian Government.

Embedding adaptation

Embedding climate change adaptation into an organisation is fundamental to achieving outcomes and being successful. The embedding process needs to be context specific and tailored to each organisation.

Embedding approaches can be incremental or transformational. Research amongst the ASX Top 100 organisations has shown that most companies have taken limited strategic planning for climate change based on an incremental approach. In essence, these companies do not consider climate change as a “material” risk. This is despite impacts and financial losses associated with extreme weather events.

Some of the more innovative organisations have followed a transformational pathway that has helped shape their company and has been instrumental in attracting talent and establishing a strong culture based on sustainability.

The adaptation toolkit has some good examples of how this can be effectively undertaken. It is relevant to note that the embedding process takes time and needs to gain maturity of understanding on what is achievable and how to get quantifiable and long lasting results.

Private sector and property development

The integration of climate change adaptation into activities of the property development industry varies from state to state and from company to company.



The larger property developers, such as Lend Lease, Mirvac and Stockland) have strongly embraced climate change adaptation as organisations and as key design aspects for some of their flagship projects, which is pleasing to see.

There is however relatively limited take up and genuine recognition of climate change adaptation amongst the mid and lower tier developers.

This observation is reinforced with by the results of feedback sessions conducted previously and is most likely due to the lack of capacity and capability, as well as market factors in consumer preferences for their client demographic.

A recent court case relating to the Rainbow Shores development in Queensland (Rainbow Shores Development Pty Ltd verses Gympie Regional Councils, 12 June 2013) the Planning and Environment Court concluded that the development did not adequately take into account rising sea levels related to climate change. As a result, the proposal did not proceed and has set a legal precedent for other low lying coastal developments in high risk areas. Refer to the following link for more information.

<http://archive.sclqld.org.au/qjudgment/2013/QPEC13-026.pdf>

It is important that future developments take into account the legal, financial and property impacts associated with climate change, otherwise they could be exposed to the financial implications associated with legal and holding costs for developments that are subject to challenge due to the impacts of climate change.

Lessons Learnt

- ***Align with existing strategies, policies and decision making processes*** – this is usually the most efficient way that also ensures integration with organisational activities.
- ***Engage and collaborate across the organisation and beyond*** – everyone has a role to play in climate change adaptation and sharing the load amongst others has shown to be effective in the engagement process.
- ***Knowledge and ability*** – gather sound data to support analysis work and decision making and build capacity and capability across the organisation.

- **Embrace the need for organisational change** – this takes time and requires patience, however greater understanding and acceptance will enable a mature approach toward management actions increase the likelihood of success.
- **Garner senior management support** – it is necessary to have strong advocates in position that are able to influence Council and the administration. The Executive and CEO need to be on board and supportive of the approach and proposed programs.
- **Develop a shared understanding of purpose** – consistency of message and acceptance of the need for decisive action are paramount. Working across the organisation will ensure there is sufficient momentum to maintain progress.
- **Encourage organisational learning** – build from the successes, failures and learning outcomes and share experiences with others as this will help establish a stronger foundation for future action and priority setting.

Theme 2 – Climate Change Policy, Programs and Alliances

Department of Environment, Land, Water and Planning

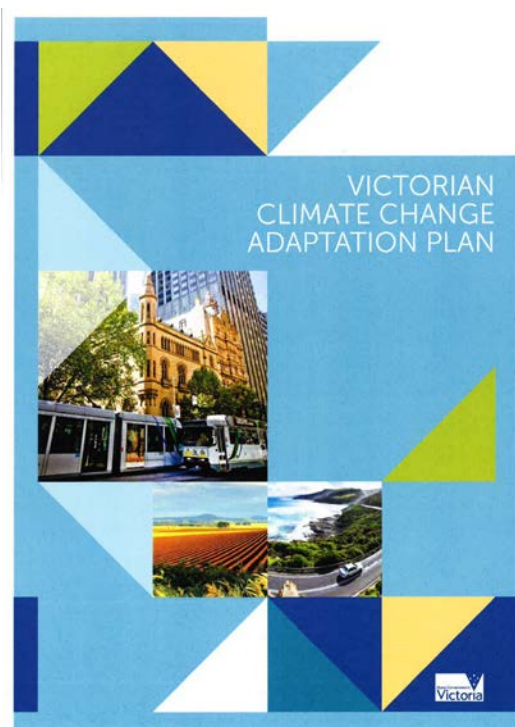
Callie Donaldson and Rod Anderson

Part 1 - Victoria's climate change adaptation policy

Part 2 - Victoria's Adaptation and Sustainability Partnership (VASP)

Climate Change Adaptation Policy and Plan

Victoria has legislated for climate change in the Climate Change Act 2010 and in 2013 the first comprehensive [Victorian Climate Change Adaptation Plan](#) was released.



The plan sets out how the Government is managing climate risks to our natural assets, essential infrastructure and services such as our waterways, transport systems, and our healthcare and emergency response systems.

It shows that to be most effective, climate change adaptation requires government, businesses and the community to work together.

The Victorian Government's critical roles and responsibilities are set out in the six strategic priorities in part three of the Adaptation Plan:

- Managing risks to public assets and services
- Managing risks to natural assets and natural resource-based industries
- Building disaster resilience and integrated emergency management
- Improving access to research and information for decision making
- Supporting private sector adaptation
- Strengthening partnerships with local government and communities.

Sustainability Victoria assisted communities with climate change and this work was subsequently progressed by the Department of Environment and Primary Industries (DEPI), which was recently renamed to the Department of Environment, Land Water and Planning (DELWP) following the recent change of State Government.



The work identified a number of barriers to Local Government engagement in climate change adaptation such as the lack of:

- Resources
- Skills
- Understanding of responsibilities and
- Awareness of legal liability

The Department set out to address these barriers through a whole of government approach involving direct support (such as the Local Government Adaptation Mentors program) and targeted funding programs to assist Local Government.

A key commitment in the Adaptation Plan is the delivery of a [Climate Change Adaptation Memorandum of Understanding](#) (MoU) with local government, which was signed on 24 September 2014.

The MoU represents an important step forward in the evolution of the relationship between state and local government on climate change adaptation, establishing a strong, shared foundation to continue to work together to clarify responsibilities.

Victoria's Adaptation and Sustainability Partnership (VASP)

Partnerships between Victoria government and local government are important for adaptation planning across Victoria and enabling action across government boundaries

Strong connection between local and state government helps to bridge the gap between the two tiers of government.

Local government partnerships provide an effective avenue for working with the community, providing information to encourage community adaptation and adaptation planning. The Sustainability Accord, which has been signed off by all 79 Councils in Victoria, provides a strong foundation for these partnerships.

Regional groupings of local governments and other stakeholders, such as the Greenhouse Alliances, have been actively engaged in the partnership with the state Government and have accessed seed funding through VASP for catalytic projects.

Since 2006, the Sustainability Accord and VASP have funded 156 projects based on \$15.3 million contribution from the State Government for projects with a total value of \$25 to \$30 million. A list of current VASP projects is provided in Attachment 1.

VASP seeks to foster continuous improvement from project to project, as well as contribute toward ongoing programs, through knowledge sharing and building capacity. The main areas of activity include hazard assessments, heat wave management, biodiversity assessment and management and embedding climate change through programs and capacity building.

The VASP program is supported by a team of 8 full time staff, as well as other roles involved in engaging Councils and communities. VASP has also established a mentoring program that works with councils, particularly those with a limited resource and capability base.

VASP is overseen by a Ministerial Advisory Committee which includes representatives from MAV, Local Government and other sectors.

Lessons Learnt

- ***Demonstrate leadership and develop a clear plan*** to guide climate change adaptation initiatives at State, Regional and local levels
- ***Establish strong partnerships between Local and State Government*** – The VASP initiative and funding program has been instrumental in establishing productive working relationships between the State Government, Local Government and Regional bodies to address climate change impacts and adaptation
- ***Place emphasis on learning and knowledge sharing*** – this will build capacity and leverage off the good work that has been done by others.
- ***Establish strong governance arrangements*** – clarity around roles and responsibilities on climate change adaptation action and transparency in decision making, particularly funding provision, will foster certainty and the establishment of shared response models
- ***Emphasise the need for monitoring and evaluation*** – rigorous assessment of programs and funded projects is critical to demonstrate value for money and to shape priorities for future investment.

Northern Alliance for Greenhouse Action (NAGA)
Kristen Jackson (City of Whittlesea) and Rob Turk (Arup)
Climate Change Adaptation – Good Practice and Innovation



The Northern Alliance for Greenhouse Action formed in 2002 as a network that shares information, coordinates emission reduction and adaptation activities and cooperates on the research and development of innovative projects.

NAGA's goal is to substantially contribute to the transition to a low-carbon future by delivering effective programs and leveraging local government, community and business action.

NAGA's members are the Cities of Banyule, Darebin, Hume, Manningham, Melbourne, Moreland, Whittlesea, Yarra, Nillumbik Shire Council and the Moreland Energy Foundation Limited (MEFL).



The City of Whittlesea is the lead Council, with NAGA activities overseen by a Project Control Group which includes representations from the 9 Councils and the Victorian State Government.

NAGA was funded \$150,000 through VASP to undertake an Integrated Regional Vulnerability Assessment (IRVA) on climate change adaptation known as “Adaptation in the North”, which extended from January 2014 to March 2015.

The IRVA identified projected climate change impacts across the region and sectors of the community that are most vulnerable, adaptation actions and barriers, as well as enabling processes to support climate change adaptation.

The IRVA methodology included an outcomes based approach and a process approach using a risk assessment model (likelihood x consequence = risk) across a range of key sectors such as:

- Human services
- Emergency management
- Natural ecosystems and
- Infrastructure

A range of exposures were identified and ranked taking into account a more sophisticated impact risk assessment model (likelihood of climate exposure x likelihood of impact x consequence = degree of risk) across the sectors through a series of stakeholder workshops. A key component of the exercise included an assessment against the most vulnerable in the community (aged, socially and economically disadvantaged, migrants, alcohol and drug dependant, victims of family violence and people with disabilities).

Management actions for a range of industry sectors identified objectives, short term actions extent to which high and extreme impact risks were addressed in the assessment.

The outputs from the IRVA included:

- Adaptation in the North Executive Summary
- Adaptation in the North Full Report (Volume 1 and 2 appendices)
- Adaptation in the North website and interactive tool

Lessons Learnt

- ***Gaining agreement on project scope*** – ensures that Councils and project funders are aligned in project process, objectives and proposed outcomes.
- ***Establish governance structure*** – to oversee the project and will required representation (e.g. Project Control Group)
- ***Value of stakeholder engagement*** – spend time getting stakeholder “buy in” and don’t be afraid to brainstorm ideas and consider how these might be considered in the assessment
- ***Application of regional outputs to local action*** – ensure that regional scale outputs can be applied at the local level to reflect the local characteristics and the capacity of the organisation.

Further information regarding the IRVA can be found at the NAGA website <http://www.naga.org.au/>



Part 1 - Climate Change Adaptation Strategy

The City of Greater Geelong has a population of 221,000 people with 147 kilometres of coastline. The City's Climate change Adaptation Strategy was prepared in 2011 and its implementation is ongoing and iterative over its three phase, 15 year timeframe.

The purpose of the strategy is to:

- Facilitate understanding of the risks of climate change within the City of Greater Geelong
- Guide the establishment of processes that allow robust and flexible decision making in response to climate risks
- Measure its success and extent to which awareness of climate adaptation becomes part of the mainstream business-as-usual operations of Council.

The Adaptation Toolkit, developed in partnership with RMIT and Netbalance, assisted in the City in adopting decision processes and mainstreaming climate change risks and adaptation within the organisation. The toolkit helped to establish the city as a leader in climate change adaptation.

The Council has looked carefully at vulnerability and developed a framework with priority work areas. This framework integrates with the broader sustainability framework already established.

A number of climate risk modules have been developed and are used for training purposes. Embedding climate change adaptation into the Strategic Plan, risk management and operational processes was integral to the strategy. Further information can be found at the City of Geelong website www.geelongaustralia.com.au.

Lessons Learnt

Embedding climate change adaptation

- ***Align climate change adaptation with the organisations strategic objectives*** – this ensures that it becomes part of the day to day business and not an “add on”
- ***Provide dedicated training and support resources*** (e.g. climate adaptation toolkit) to ensure an ***organisational culture of continuous improvement and learning***

Adaptive management approach

- **Preserve options and change course** as the climate changes – this more flexible and adaptive management approach enables you to adjust to take into account progress to date and to consider new climate change information as it becomes available
- **Avoid being locked-in to any one way** of adapting to climate change – consider alternatives and innovations that will contribute toward positive outcomes and increased stakeholder engagement
- **Increase understanding and develop triggers** for further assessment – gather and share knowledge with other influential people in the organisation and consider ongoing research needs to remain on top of emerging issues
- **Monitor and review** - important to measure not just progress on actions carried out but also the effectiveness of the program (i.e. Have we actually made a difference?)

Part 2 – Geelong Queenscliff Coastal Adaptation Program

The Queenscliff Coastal Adaptation Plan is a \$1 million initiative (\$824,000 funded through VASP) undertaken in a staged approach across the study area shown below.

- **Phase 1:** Bellarine Peninsula and Corio Bay Hazard Assessment at property scale (\$360,000) - Completed
- **Phase 2:** Bellarine Peninsula and Corio Bay Coastal Climate Change Assessment (\$200,000 funded through VASP) – recently commenced
- **Phase 3:** Geelong – Queenscliff Coastal Adaptation Project (\$560,000)



The program staging involved the following key steps.

1. Identify hazards
2. Model hazards
3. Monitor environmental indicators
4. Assess risks associated with hazards
5. Develop adaptation responses
6. Develop adaptation pathways
7. Monitor and evaluate adaptation responses
8. Adjust adaptation responses accordingly

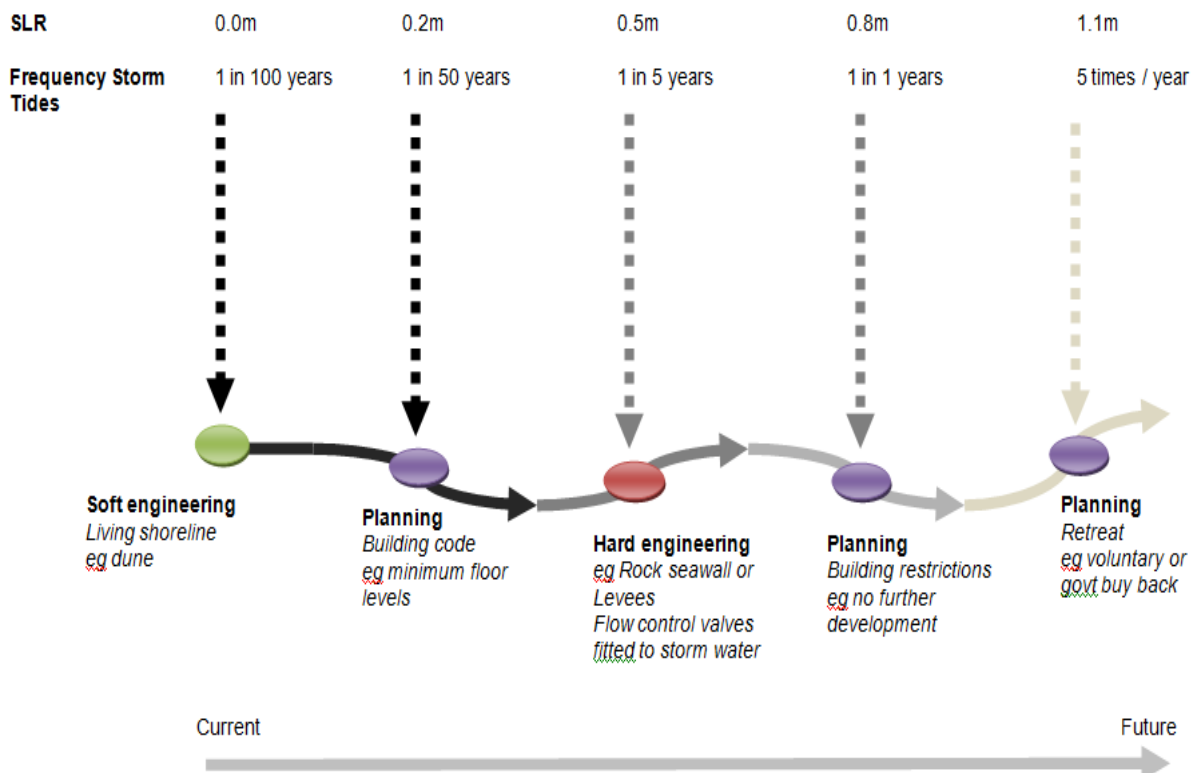
The aims of the project are to:

- Assist in providing a strategic approach to upgrading & maintaining & protection installations
- Protect of coastal assets, including cultural, infrastructure, private and environmental assets
- Reduce the need for individual coastal vulnerability assessments for applications relating to the development of coastal land

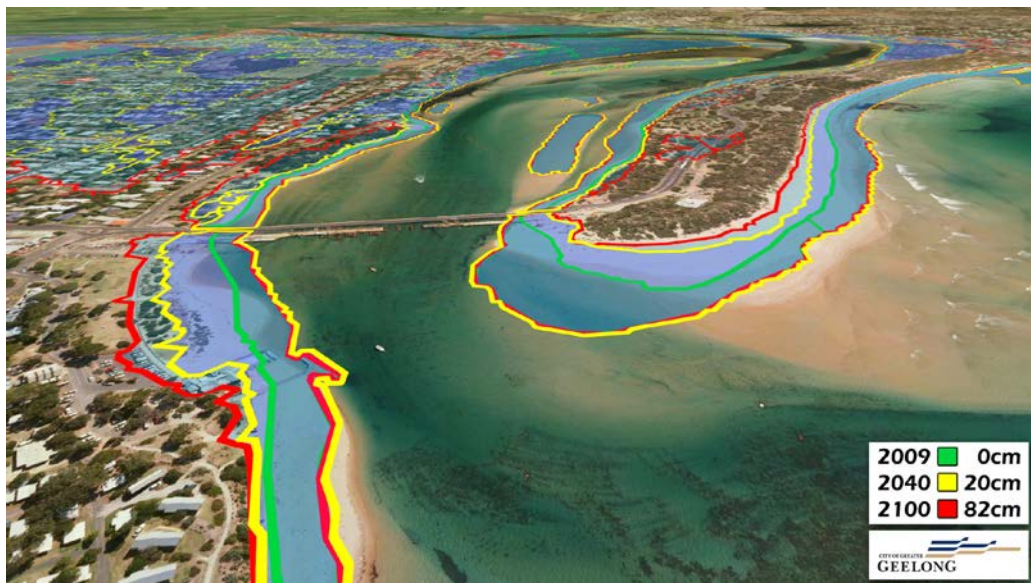
Issues such as flooding caused by sea level rise and storm events were considered, including the extent and time of inundation. This assisted in identifying hot spots where properties and assets were at risk. The local coastal hazard assessment provided detailed data to assist in scenario planning, emergency response and inundation/erosion risks for use in planning.

A list of trigger points based on extent and frequency of inundation identified a range of responses from soft engineering through to retreat.

Trigger points



This information has been mapped and shows those areas most vulnerable to inundation across a number of time scales and sea level rise scenarios.



The work completed to date has informed adaption planning in regards to:

- Planning responses
- Engineering works
- Living shorelines
- Behavioural change
- Areas for further research

Some modelling has also been undertaken on coastal protection works and the impact that this infrastructure may have on coastal processes such as erosion rates.

Lessons Learnt

- **Ensure that your climate change adaptation research work adds value**, particularly in regards to Geographic Information Systems (GIS) coverages and on-ground works
- **Develop trigger points across a spectrum of scenarios** that match to the types of responses required to address impacts
- **Test the market for research and investigation work** in the government and private sector. There is competition amongst consultancies in this space at a time when there is considerable expertise in Australia, but limited work as a result of Federal Government policy settings
- **Plan community engagement early in the process** and seek feedback on the proposed responses to different scenarios
- **Consider other coastal trends** that may be influencing dynamics (e.g. erosion, accretion processes) and potential future inundation impacts

- **Establish governance structures** that ensure collaboration, transparency and partnerships. Report outcomes on progress to funding bodies, participating Councils, key stakeholders and the community

A dedicated website is being established for the Geelong Queenscliffe Adaptation Program and is currently under construction.

Theme 3 – Regional Climate Change Alliances

Association of Bayside Municipalities
Berne Cotter
Adaptation, Partnerships and Pathways



ASSOCIATION OF BAYSIDE MUNICIPALITIES

The Association of Bayside Municipalities (ABM) was founded in 1974 to address issues of common concern to bayside councils. Today the ABM represents the interests of the 10 councils with frontage to Port Phillip Bay on various coastal and marine issues.

The ABM Councils include a population of 1.2 million people, with a total of 4.5 million in the wider catchment. The ABM is guided by their Strategic Directions 2012 to 2016 plan.

The role of the ABM is to identify, resolve and advise on matters of common interest to the bayside councils to improve the overall management of the Port Phillip Bay environment.

The value of the Association is that it can approach matters on a regional basis and the ABM actively represents its members through a range of political, community and media outlets.

Port Phillip Bay Coastal Adaptation Decision Pathways Project

The Association of Bayside Municipalities (ABM), Municipal Association of Victoria (MAV) and Central Coastal Board (CCB) secured funding from the Australian Government (Coastal Adaptation Decision Pathways initiative) to develop leading practice approaches to better manage future climate change risk to coastal assets and communities. Additional funding has been provided by DPCD as well as in-kind support from councils and partners.

The Partners include Melbourne Water, Department of Sustainability and Environment (DSE), Department of Planning and Community Development (DPCD) and ABM member councils.

The combined effects of sea level rise and increased rainfall as a result of climate change will exacerbate flood risk in many coastal areas, exposing areas to more frequent and severe inundation.

A growing number of people and properties will be exposed to flooding during this century, resulting in damage to or loss of property and natural assets as well as economic and social disruption unless proactive adaptation is considered. Identifying the most cost effective adaptation options, and deciding when to apply those options, presents significant new challenges for both government and the community.



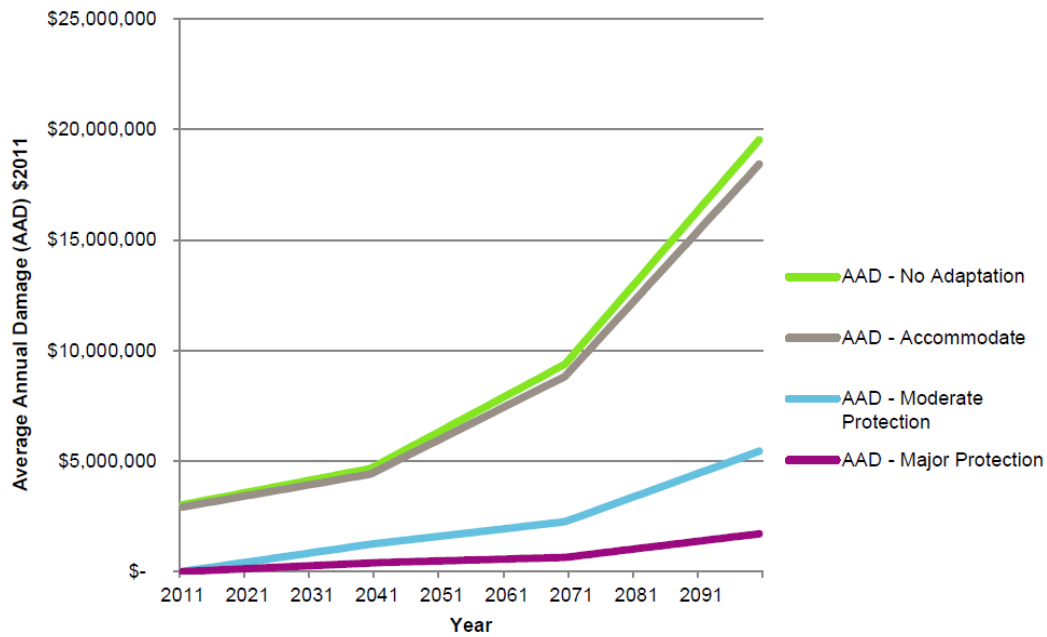
An adaptation pathways approach can provide a flexible course of action taken over time in response to potential or actual inundation in the short and long term.

The Port Phillip Bay Coastal Adaptation Pathways Project has taken an applied research approach to develop a framework to identify adaptation pathways to support coastal adaptation planning in urbanised areas in response to changing inundation risks as a result of climate change.

The framework was applied at five sites around Port Phillip Bay in conjunction with local government authorities to test its practical application. Properties at risk were identified and probabilities of inundation determined.

Costed options in response to adaption pathways, through a cost benefit analysis, have been provided to assist the Councils and others in decision making based on the following pathways:

- *Accommodate* - reduction in damages by 15%. Costs \$1 to \$2 million upfront, with \$50,000 per year annual costs
- *Moderate Protection* – small scale engineering costing \$9 to \$100 million upfront, plus \$100,000 to \$200,000 annual costs
- *Major Protection* – large scale engineering costing \$64 to \$350 million, plus \$100,000 to \$600,000 annual costs
- *Retreat* - excluded as the net benefits for remaining on the land are high



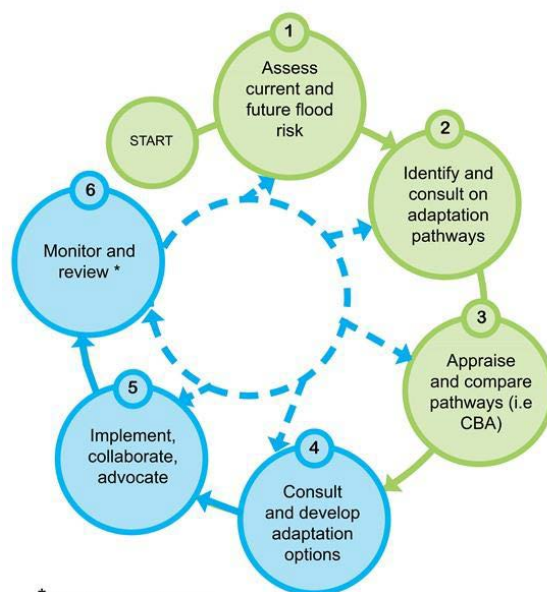
Further information on the project can be found at the website link [here](#).

Research indicates that erosion of the coastal areas has been at a rate of 2mm per year over the last 8 years. This is mainly caused by wind and wave energy.

Flood inundation and simulation modelling work has provided a useful tool for visualising the impacts of future sea level rise across a range of scenarios and weather conditions

This work has led to the development of processes and solution tools to assist with determining the appropriate adaptation pathway and responses.

Work is now started on the Bay Blue Print 2070, which is a \$300,000 funded through VASP for three years involving 25 partner organisations including 10 Councils. The aim is to develop an evidence based framework, undertake coastal modelling and create a Port Phillip Bay adaptation plan to that embeds climate change adaptation to 2070.



Lessons Learnt

- **Determine pathway/s for action** - triggers may be used to identify types of responses required to address impacts
- **Data collection, analysis, storage and modelling is critical** – you need to have sound and robust information sources to understand your environment and assess impacts with the required level of certainty
- **Economic analysis useful tool to assess adaptation options** – this approach provided costed options for different pathways depending upon the risk and potential loss. It assisted in decision making and the critical examination of options and their costs
- **Leadership and multi-agency partnerships are important** – working in collaboration with others opens up opportunities to leverage off the work of others and to add value to current initiatives. The State Government needs to undertake a leadership role to support the initiatives and work undertaken by Local Government and regional groups.
- **Consistent methodology required** – having a sound scientific research basis and an agreed pathways approach enables a better understanding of risks, required response options and their costs
- **Regional responses support local responses** – regional scale research and responses are able to get economies of scale that effectively link to supporting local responses

South East Councils Climate Change Alliance

Greg Hunt

Climate Change Adaptation – Good Practice and Innovation

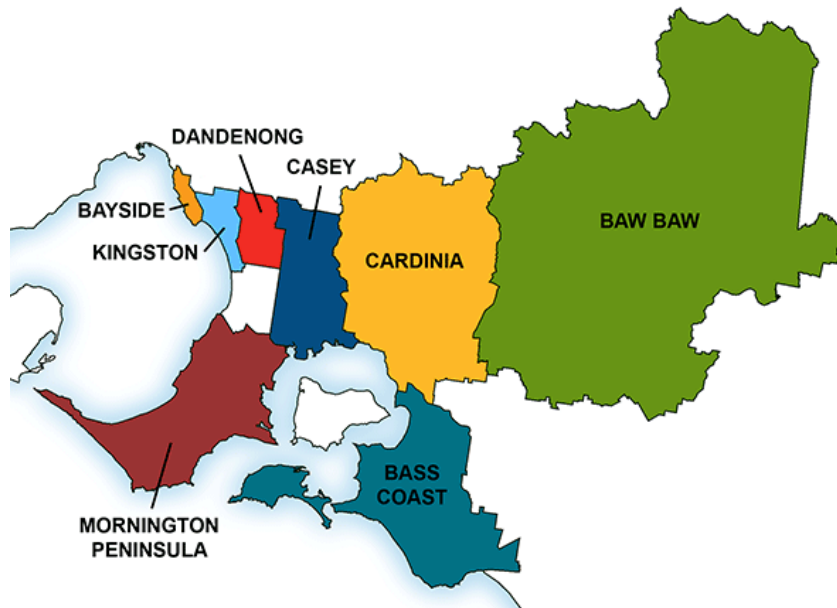


Unlike most of the regional groupings and alliances established in Victoria, SECCCA is an incorporated association and has membership across a range of government, research and private sector stakeholders.

Established in June 2004, SECCCA has secured \$9.1 million of investment to deliver 20 innovative climate change related projects over the last decade.

SECCCA works through partnerships involving Councils, community, industry and state and national government and involve as many groups within our communities as possible in responding to climate change.

SECCCA is a network of eight councils committed to delivering high-quality, innovative projects and research programs at a regional level including Bass Coast Shire Council, Baw Baw Shire Council, Bayside City Council, Cardinia Shire Council, City of Casey, City of Greater Dandenong, Kingston City Council and Mornington Peninsula Shire Council.



SECCCA is governed by a Management Committee, with representatives from its core membership, and supported by sub-committees that have project management, business development, financial and communications oversight. This model is apolitical and has shown to be effective in attracting funding for strategic projects for the benefit of its membership.

A report on the impacts of climate change on human settlements in the Western Port region identified sea level rise (0.17m by 2030, 0.49 m by 2070), storm rise and storm surge as major factors with the potential to impact on:

- 2,270 people
- 1030 residential properties
- 60 commercial properties
- 87 km of road, including the South Gippsland Highway



In terms of heat impacts, modelling has indicated that average annual temperatures would rise by 1.3°C in 2030 to 3.5°C in 2070, with increased days per year over 30°C (2030 from 3-6, 2070 from 6-25) and 40°C as well as longer runs of hot days above these temperatures.

The City of Kingston has undertaken some excellent education, communication and social network in regards to heat waves and managing heat stress.

A financial risk adaptation process has been formulated to assist partners to understand costs and likely returns for adaptation responses to address climate change and the impacts of severe weather events.

SECCCA has initiated a suite of community consultation activities on protecting communities from climate change, in partnership with their local government members.

This was tailored to the local community (villages, farmers, residential, rural residential) to communicate key messages, strategies and tactics required to respond to climate change.

Lessons Learnt

- ***The Incorporated Association is able to extend its membership beyond local governments*** and is therefore well placed to recruit other parties (research institutions, private sector, not-for profits etc.) to contribute toward direction and decision making.
- An Incorporated Association is a governance model suited to ***delivering shared, strategic projects and managing funding from multiple sources.***
- ***Climate change adaptation activities can be driven from a range of perspectives*** additional to the traditional environment and sustainability benefits including, active community participation, economic development and the ability to address tourism regional scale and local projects
- ***Active partnerships and shared activities are critical to the success of climate change adaptation work.*** The activities also need to be aligned to the objectives of the member organisations to ensure maximum involvement and uptake of outcomes.

Western Alliance for Greenhouse Action (WAGA)

Fran McDonald

Low Carbon West/Adaptation Strategy and Action Plan

The Western Alliance for Greenhouse Action (WAGA) is a partnership of eight councils to the west of Melbourne, covering 4,700 square kilometres and a population of 838,500 people.



Its members are the Cities of Brimbank, Greater Geelong, Hobsons Bay, Maribyrnong, Melton, Moonee Valley and Wyndham, and the Shire of Moorabool.



WAGA councils work collaboratively to respond to climate change across the region and encourage their communities – residents and businesses – to make a transition to a low carbon society. WAGA's plans and projects focus on both mitigation of greenhouse gas emissions and adaptation to the impacts of climate change.

Climate change in Melbourne's west is expected to result in:

- Rising temperatures and increased extreme heat days
- Reduced rainfall, droughts, floods and storm events
- Sea level rise (0.10m by 2030, 0.5m by 2070) and storm surge increases by 0.20m by 2030 and 0.50m by 2070
- Extreme fire days (increase by 12% to 38% by 2020)

A risk assessment identified 88 risks, with 17 of those identified as high priority for issues such as:

- Assets and infrastructure
- Transport, Open space and recreation
- Natural environment
- Emergency management
- Health and community
- Planning and building
- Business continuity

WAGA is progressing a number of key initiatives to address climate change impacts such as Low Carbon West and its Climate Change Adaptation Strategy and Action Plan.

WAGA has developed an overlay of what climate change adaptation may look like to assist in raising awareness and understanding.



Low Carbon West

Low Carbon West is a partnership between WAGA, LeadWest and Western Melbourne Regional Development Australia to develop a blueprint for transition to a low carbon economy in the WAGA region. This strategy will provide the main guidance for WAGA's carbon mitigation work in future with objectives around:

- Leadership and collaboration
- Identification of opportunities for business
- Improved liveability, health, wellbeing and resilience

In 2013-2014, the project developed a baseline for the west's carbon emissions, identified objectives for the plan and consulted on actions to fulfil them. These include projects that will significantly reduce emissions and actions to facilitate business opportunities.

The strategy identified that around 50% of all emissions were from non-residential buildings. As a result, a concerted campaign was launched specific for small to medium enterprises (SMEs) involving energy efficiency upgrades and the installation of solar photovoltaic energy generation units.

Climate Change Adaption Strategy and Action Plan

In 2011-2012, WAGA developed a Climate Change Adaptation Strategy and Action Plan with funding from the Victorian Government's Local Sustainability Accord. This followed an assessment of regional climate change risks.

The strategy and action plan summarise the future climate in Melbourne's west, outline the benefits of adapting at a regional level, and set out a regional adaptation framework. This is designed to:

- Mainstream adaptation across councils
- Embed adaptation in planning processes
- Review progress of adaptation work carried out by the WAGA councils at the municipal level as well as WAGA's regional work.

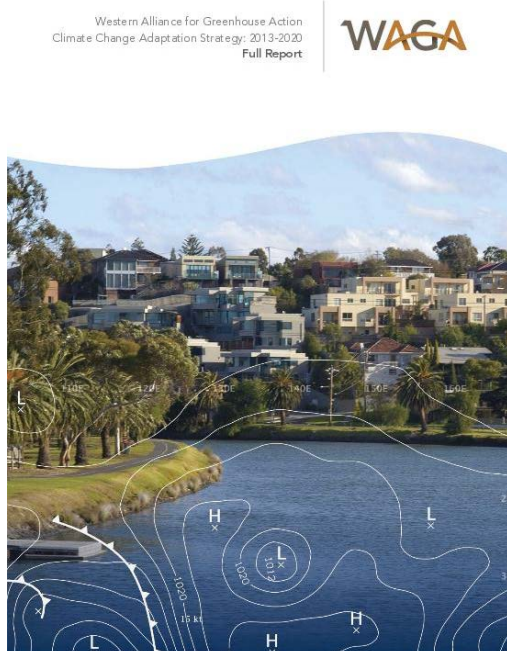
Of the 88 risks identified across the region, 17 risks have been assessed as particularly severe. These risks cover a wide range of council service areas, including:

- Assets and infrastructure
- Transport
- Open space and recreation
- Natural environment
- Emergency management
- Health and community
- Planning and building
- Business continuity.

Adaptation annual implementation plans are developed to implement the strategy and aim to embed climate change adaptation in the region.

Four approaches emerged from this work including:

- Risk register – Melton City Council
- Council Planning – Hobsons Bay City Council
- Adaptation Toolkit – City of Greater Geelong
- How well are we doing evaluation? - WAGA



Lessons Learnt

- **Regional emissions baseline data is critical** to the development of strategies and for targeting industry sectors with greatest potential for emissions reductions
- **Other initiatives may emerge from the regional scale work** such as integrated transport plans and clean tech industries clusters with broader application and economic development outcomes
- **Regional aggregation roles** can leverage member contributions to access funding for significant projects
- Councils that established **emissions reduction or revolving energy funds** were well placed to secure additional funding for organisational and community based climate change adaptation activities

Site Visit Day 1 City of Melbourne Council House (CH2)

The City of Melbourne's Council House Building No. 2 (CH2) was built in 2006 and set a benchmark for sustainable design and operations for a public administration and civic building. Located at 240 Little Collins Street Melbourne, CH2 has changed the landscape of its local area and inspired developers and designers across Australia and the world.



Automated solar louvers on the east facing side of CH2 adjust to solar activity



The CH2 building incorporates mixed uses on the ground level to facilitate activation

The building has generated substantial interest, with many people keen to see for themselves how its features appear and work. CH2 has been designed to reflect the planet's ecology, an immensely complex system of inter-related components.

The first focus of the design process for CH2 was to gain an understanding of Melbourne's climate and weather patterns. An ecosystem responds to its environment, its ability to adapt to take advantage of changing weather conditions contributing greatly to the success of the system

The air flows on the inside of the building are managed through solar passive design and automated ventilation through the ceilings and window recesses – there is no air

conditioning. The air quality is tested regularly and exceeds typical office building standards. Surveys have identified a high level of productivity for the staff working in CH2 compared to the older Council building, which is still operational.

The design team found that responding to the site's climactic conditions highlighted a range of opportunities for energy efficiency and, in doing so, gave rise to some of CH2's most innovative features.



The tubes attached to CH2 capture rain water and provide ventilation



Balconies on south side of CH2 include plants to increase green space

Melbourne is well known for its 'four seasons in one day'. This variability could be viewed as a problem, but in the case of CH2, it was viewed as an opportunity to design the building around the concept of cold energy storage.

The building therefore operates in two seasonal modes (winter and summer), as well as day mode and night mode.

CH2's many parts work together to heat, cool, power and water the building, creating a harmonious environment



The rooftop garden is an inviting place for staff and also houses the wind turbines



The rooftop garden adds to green space and reduces heat island effects

It was noted that the wind turbines were not operational due to a design error (i.e. made from steel plate that was too heavy) and the City has had to decommission them to save on operational costs related to regular audits for structural integrity.

Day 2 – Site Visits Melbourne Wednesday 8 April 2015

City of Kingston

Presentation and Site Visits – Alan West (Team Leader Engineering Design)

Alan provided a presentation on the City of Kingston's climate change journey and its current role and activities for adaptation.

The presentation was held at a venue on the banks of the Mordialloc Creek, which includes a catchment encompassing one third of Melbourne and a population of 2 million people.



The City of Kingston is located in the eastern part of Port Phillip Bay



Mordialloc Creek's catchment covers one third of Melbourne

Mordialloc Creek is susceptible to flooding as many of the commercial and residential areas are only marginally above sea level.



The Mordialloc Creek lower reaches include marinas and a range of community and commercial uses

The area is threatening by both sea level rise and flooding from the catchment, with approximately 15,000 flood prone properties identified as shown below.



Flood prone land in the City of Kingston

Mordialloc Creek is one of the project sites under investigation through the VASP funded Port Phillip Bay Coastal Project coordinated by the Association of Bayside Municipalities.

Predictions for sea level rise by CSIRO in the Aspendale area in the City of Kingston identified the following scenarios.

- 2030 : 1.29 m to 1.34 m
- 2070 : 1.61 m to 1.83 m
- 2100 : 1.96 m to 2.54 m

A sea level rise of 2.5 metres would result in shops along the main street near Mordialloc being 1 metre underwater, and this does not take into account storm surge.



Storm surge breaching the Mordialloc Pier (2009)

A lot of the area has relatively narrow width coastal reserves, which limits the treatments available to deal with erosion and flooding impacts and places properties adjacent to the reserves at considerable risk.

The City of Kingston recently completed some coastal stabilisation work at North Aspendale using innovative geotextile sand bags rather than tradition sea walls. The sand bags were keyed in at depth below the water mark and provide a softer option that was more inductive to dune rehabilitation and maintaining access. The sandbagging based on 7 bag depth costs about \$1,000 per linear metre.



Narrow setbacks limit treatment options along the North Aspendale foreshore area



Sand bagging has been effective in stabilising and rehabilitating the dunes

As well as the foreshore work, the City has been active in managing stormwater drainage through the replacement of pipe outfalls on the beach with retention basins and constructed wetlands.



Vegetated retention basins along the North Aspendale foreshore have replaced pipe outfalls and treat and infiltrate stormwater runoff rather than direct discharge into the ocean

The Carrum foreshore is the site of the recently constructed Carrum Surf Lifesaving Club and rock protected boardwalk that provides access to along the section of foreshore eroded by past storm events.



The Carrum foreshore is subject to erosion from storm surges and rising sea levels

The 250 metre long boardwalk and rock walling was achieved at a total cost of \$750,000, noting that a successful tender using local companies was \$180,000 cheaper than tenders received from some of the larger companies. The rock walling is constructed using local rock and provides added protection to the boardwalk and properties adjacent to the foreshore reserve.



The Carrum Surf Life Saving Club is connected to the boardwalk and rock walling

The City of Kingston is recognised leaders in water sensitive urban design and innovative stormwater management practices.

Due to the low lying nature of the land, the City has installed large stormwater pumping stations to direct drainage into the creek systems.

The pumps can also be used to redirect excess flows caused by flooding or coastal related inundation caused by flood water.

The pumping stations cost about \$1.5 million each and involving the installation of larger pipes to increase capacity.



Stormwater pumping stations direct excess drainage and flood waters to the creek system

The City of Kingston has a large and dedicated team of over 30 design and drainage engineers that has enabled them to undertake the majority of their water sensitive urban design work in-houses, rather than having to outsource this work.

The capability and level of experience in their engineering teams has been a key success factor in the innovative work that has been undertaken and widely recognised.



This vegetated infiltration basin replaced an ocean pipe outfall and was integrated into the redevelopment of a local park. The infiltration basin overflows to swale located behind the primary dunes to provide further infiltration in high flow conditions.

Lessons Learnt

- ***Developing their own engineering design team*** has provided the City of Kingston with a high level of specialist expertise and capability that enables innovative work to be done in house

- The City of Kingston’s engineering design team and their work is **widely recognised and highly regarded in responding to climate change, coastal and stormwater management issues.**
- **Linking with regional organisation such as ABM is beneficial and opens up opportunities** to be included for pilot projects in broader climate change adaptation studies and programs
- **Be pro-active in working with Federal and State Government departments** on climate change
- Gain an **excellent understanding of your environment and risks**, particularly in areas such as sea level rise, flood mapping and drainage management
- Ensure you have **adequate funding to undertake drainage upgrades and improvements** as aging and ineffective infrastructure is a major risk and significant cost in cases where it fails

**City of Melbourne - Fitzroy Gardens
Climate Change Adaptation Projects
Landscape Architecture and Sustainability Teams**

Melbourne’s tree population is vast – with 70,000 council-owned trees, worth around \$650 million. Trees are a defining part of Melbourne. Being the world’s most liveable city, the parks, gardens, green spaces and tree-lined streets contribute enormously to this status.

But the trees are now under threat. More than a decade of drought, severe water restrictions and periods of extreme heat, combined with an ageing tree stock, have put our trees under immense stress and many are now in a state of accelerated decline.

As a result, we expect to lose 27 per cent of our current tree population in the next decade and 44 per cent in the next 20 years.



Trees in Fitzroy Gardens have significant heritage and public amenity values

Combined with this loss, Melbourne's urban forest is facing two significant future challenges: climate change and urban growth.

The City of Melbourne's Urban Forest Strategy seeks to manage this change and protect against future vulnerability by providing a robust strategic framework for the evolution and longevity of Melbourne's urban forest.

Staff from the City of Melbourne's Landscape Architecture and Sustainability teams provided an overview of the Urban Forest Strategy and other initiatives associated with the recent work and ongoing management of Fitzroy Gardens.

The Urban Forest Strategy has a number of specific strategies and targets as outlined below

Strategy 1: Increase canopy cover

Target: Increase public realm canopy cover from 22 per cent to 40 per cent by 2040.

Strategy 2: Increase urban forest diversity

Target: The urban forest will be composed of no more than 5 per cent of any tree species, no more than 10 per cent of any genus and no more than 20 per cent of any one family.

Strategy 3: Improve vegetation health

Target: 90 per cent of the City of Melbourne's tree population will be healthy by 2040
Design for health and wellbeing

Strategy 4: Improve soil moisture and water quality

Target: Soil moisture levels will be maintained at levels to provide healthy growth of vegetation
Become a water sensitive city

Strategy 5: Improve urban ecology

Target: Melbourne's green spaces will protect and enhance a level of biodiversity which contributes to the delivery of ecosystem services.

Strategy 6: Engage the community

Target: The community will have a broader understanding of the importance of our urban forest, increase their connection to it and engage with its process of evolution

The strategy to increase canopy cover is the green rooves and walls program that is a key element in reducing the heat island effect in the city.

The City of Melbourne has entered into long term growing contracts to supply the required quality of advanced tree stock. The tree must be able to be planted without staking and more focus is on a robust root system rather than a fully developed canopy.

Many of the mature trees in Fitzroy Gardens are nearing their expected life or are in a state of declining health. An ongoing replacement program, taking into account heritage and community values, is a major focus of the team.



The City of Melbourne Landscape Architecture and Sustainability teams work together to implement the Urban Forest Strategy



Many mature trees in Fitzroy Gardens and in decline and a replacement program is in place

The last decade or more of drought has contributed to the tree decline in across the city.

The recent focus on stormwater harvesting has provided a source of much need water for trees and gardens managed by the City of Melbourne.

A massive 5 million litre concrete storage tank was constructed at Fitzroy Gardens to capture stormwater from the site for later use in irrigation.

The stormwater harvesting now supplies 40% of water demands for Fitzroy Gardens, with an annual saving of \$180,000 in water costs.



The underground storage tank, constructed wetland and water transfer pumping and storage system at Fitzroy Gardens ensures that the water quality is maintained for irrigation purposes

The stormwater harvesting project included the development of a new visitors centre and café.

The visitors centre and café incorporates a range of sustainability and energy efficiency aspects such as solar orientation, natural ventilation, green walls (refer to steel wire structures below) and low carbon materials.

The City of Melbourne has multiple stormwater harvesting sites established across the city and is seeking to expand the storage network to increase water harvesting volumes.



The vegetated wetland filter basin is located adjacent to the recently constructed visitor centre and café, which was built based on sustainability and energy efficiency principles

The city has also put in place a range of simple measures to capture and reuse water that would otherwise be directed to the stormwater drainage system, such as permeable areas around street trees.



Simple and effective measures such as providing permeable areas surrounding street trees maximises infiltration and reduces compaction of tree roots

Day 3 – Sydney – Thursday, 9 April 2015

Venue: Local Government NSW, Boardroom
Level 8, 28 Margaret St, Sydney

Theme 4 - State Policy and Local Council Responses

Office of Environment and Heritage

Presenter: Suzanne Dunford

Minimising the Impacts of Climate Change on NSW

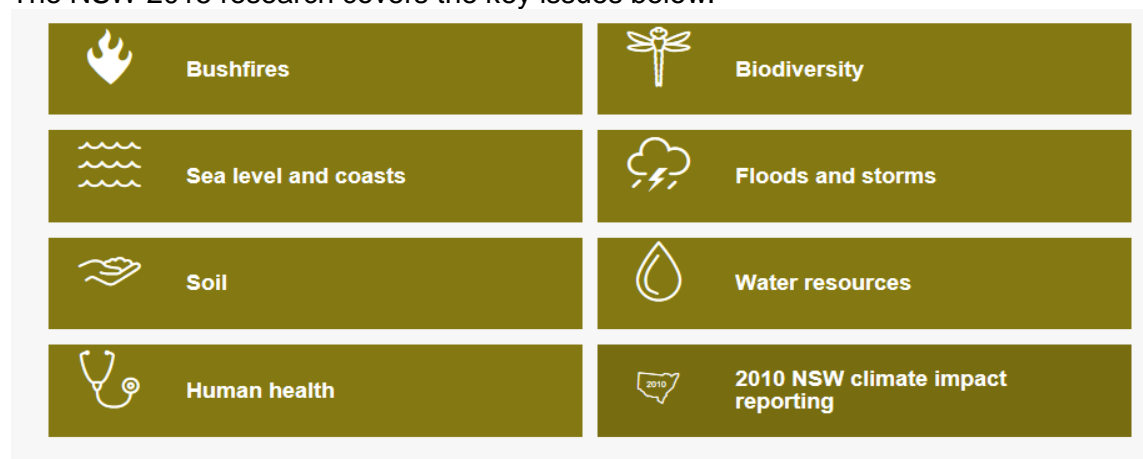


The Office of Environment and Heritage (OEH) take the lead role in climate change adaptation in New South Wales through a range of programs that support local government and communities. The NSW Government has a dedicated team of six people working specifically with Local Government as part of their AdaptNSW program.

A key focus for the team has been the gathering and verification of fine resolution data to provide baseline information on climate change, undertake vulnerability assessments, develop required responses to climate change, engage with stakeholders and build capacity.

The research has been undertaken with a range of research institutions and partners, including the Climate Change Research Centre and the University of NSW, and is developing climate change snapshots and future climate projections (2030 to 2070) for each region in NSW.

The NSW 2015 research covers the key issues below.



The NSW Government also provided seed funding of \$2.75 million to establish the Adaptation Research Hub that is generating \$6 million in collaborative research over three years in the key areas of:

- ***Biodiversity*** (Climate Futures at Macquarie University and CSIRO)
- ***Adaptive Communities*** (Institute for Sustainable Futures and CSIRO) and
- ***Coastal Processes and Responses*** (Sydney Institute of Marine Science and ACCARNS)

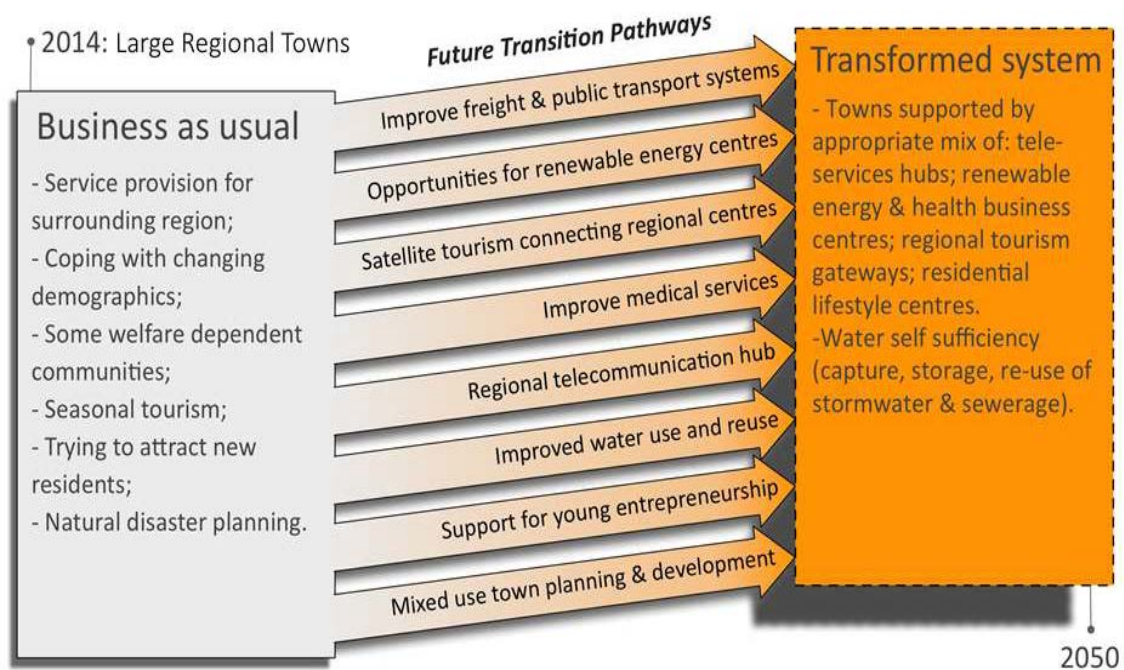
Further information on these hub nodes is available via the following link <http://climatechange.environment.nsw.gov.au/Adapting-to-climate-change/Adaptation-Research-Hub>

A comprehensive website has been established to assist Local Government, industry and other stakeholders in understanding climate change, its impacts and ways to adapt.

AdaptNSW is also developing Integrated Regional Vulnerability Assessments (IRVA) across the state, with assessments completed for regions covering 61% of Local Governments and 73% of the population.

The program considers the inter-related nature of climate change impacts and how well a region is prepared in managing those impacts. The IRVA plans outline transition plans that can be built into the Strategic Planning documents for Local Governments and Regional Organisations.

An example of potential transition pathways toward a transformed system adapting to climate change is shown below.



The Office of Environment and Heritage also has developed tools and resources for local Government aimed at increasing their ability for adaptive capacity.

This information resource is supported by AdaptNSW “Building Resilience to Climate Change” grants program, which provides funding between \$15,000 and \$80,000 for climate change risk assessments and vulnerability assessments.

This program encourages collaboration with Councils, regional organisations, researchers and the private sector. The \$875,000 Round 1 funding program received 56 applications seeking \$3.3 million, of which 6 projects were funded.

Funding for some of the AdaptNSW activities are provided through the NSW waste levy on landfills.

In terms of coastal management, a new Coastal Advisory Committee has been formed to provide expert advice to the Minister for the Environment. The committee will oversee reviews on studies related to sea level rise and other coastal processes to determine their applicability to NSW.

A new Coastal Management Manual will also be prepared for Local Government and address requirements in the proposed Coastal Management Act. The Act will include clear cost sharing principles (funding and financing options) and is supported and part funded through Statewide Mutual, who covers insurance for NSW Councils.

NSW Councils are recognised as key players in adaptation to climate change.

Councils have responsibility for a broad range of functions that are likely to be affected, such as public infrastructure, local emergency responses, building regulation and planning, public health and environmental management.

With each Local Government area having a unique set of geographical, environmental, economic and social circumstances, the effects and risks of climate change will differ. Early planning and preparation can minimise long-term economic, social and environmental costs to communities.

For this reason, the NSW Government has provided the following information for Councils to help residents understand, prepare for and minimise the impacts of future extreme events and hazards caused by climate change. The information sources and guides are listed below, together with links to the various programs.

Identifying climate risks and vulnerabilities

- [A Guide to Climate Change Risk Assessment](#)
- [Integrated Regional Vulnerability Assessments](#)
- [Regional Climate Data](#)

Planning adaptation

- [Adaptation Planning for Local Government checklist](#)
- [Enabling Adaptation in the South East \(EASE\)](#)

Resources and information

- [Building Resilience to Climate Change Grants program](#)
- [Leading land-use case studies by local government](#)
- [Urban green cover](#)
- [The NSW Adaptation Research Hub](#)

Further information on can be found at <http://www.environment.nsw.gov.au/>

Lessons Learnt

The NSW Government provides an essential and significant leadership and support role for Local Government in the area of climate change risk assessment and adaptation through the following initiatives:

- **Leadership, policies, strategies and supporting legislation** are essential roles required to be provided by the State Government
- **AdaptNSW recognises the importance of Local Government**, in responding to climate change and working with local communities, and is active in

undertaking engagement activities, information provision, strategy development, guidelines and pathways to integrate climate change adaptation into Strategic Plans

- The ***Adaptation Research Hub is an excellent partnership model*** that brings together research institutions ***to tackle the big issues in understanding and responding to climate change***
- The “***Building Resilience to Climate Change***” ***grants*** program provides much needed ***support for Local Government in undertaking climate change adaptation research, pilots and projects***

Denise Anderson

Local Government NSW

Overview of Climate Change Adaptation Work of NSW Councils



The Local Government Climate Change program started in 2006 and is supported by funding from the NSW Government. Over that time, 82% of the 152 Councils have conducted risk assessments. 70% of these have been conducted by Statewide Mutual and identified a range of adaptation initiatives available to address risks.

The NSW Government previously adopted sea level rise benchmarks based on an increase above 1990 mean sea levels of 0.40 metre by 2050 and 0.9 metre by 2100. These benchmarks were used by Local Governments in the planning and development of coastal communities and in research work.

In 2012, the NSW Government removed the sea level rise benchmark, although it is recognised that Local Governments have continued to apply these given the lack of more accurate information. A number of Local Governments, such as the Shoalhaven City Council, have undertaken their own research and adopted their own benchmarks.

LGNSW has been assisting Local Governments on climate change through a range of activities including:

- Providing information updates
- Identifying case studies
- Developing tools and
- Undertaking workshops



Climate change adaptation workshops facilitated by LGNSW

The “climate risk to resilience” workshops targeted decision makers, focussed on risk management frameworks and included expert presenters covering climate science, legal risk and insurance. Courts have ruled that climate change is a legal risk, although NSW Councils have defences under the Civil Liability Act 2003 (NSW) and the Local Government Act 1993 – Section 733 (NSW).



Manfred Street, Belongil Beach 26/02/13, Byron Shire Council

The Building Resilience to Climate Change program has been established to encourage:

- Enhanced consideration of climate change impacts in local and regional decision making.
- Delivery of projects that minimise climate change impacts for local and regional decision makers.
- Implementation of climate change adaptation beyond current projects and programs.

A number of Local Governments were successful in securing funding from the Building Resilience to Climate Change grants program as follows:

- **Albury City Council** – Retrofit of Remote IT Transmission stations
- **Manly Council** – Adapt Roads Pilot
- **Penrith City and Leichhardt Council** – Adapting to Heat Events
- **Southern Sydney Regional Organisation of Councils (SSROC)** – Heat Map
- **Shoalhaven City Council** – Cooling the Nowra CBD
- **Wollondilly Shire Council** – Mapping Sydney’s Potential Flood Sheds

LGNSW undertakes a coordination role in the application and administration of the grants program. Round 2 of the grants program opens in May 2015.

LGNSW have identified a number of key challenges for Local Government in the area of climate change adaptation including:

- The politics of climate change – State and Federal policy/legislation
- Community expectations – protecting properties, insurance/compensation
- Who pays – is there an equitable model for funding?

Lessons Learnt

- **Pro-active State Government** climate change adaptation programs, **with a strong emphasis on Local Government engagement and support**, enable the establishment on **partnerships and positive working relationships** with sector based associations such as LGNSW
- State based Local Government associations are **well placed to undertake a coordination role in grant application and administration** on behalf of its members
- **Sharing best practice initiatives** and facilitating activities that **build capacity on climate change risk assessments and adaptation** are valuable roles undertaken by LGNSW
- **Increasing understanding on risks and legal liabilities for Councils on climate change impacts** in NSW **is led by the Local Government insurer** Statewide Mutual on behalf of its members

Theme 5 - Regional and City Council Response

Sydney Coastal Councils Group
Geoff Withycombe
Adaptation in a Global Coastal City



The SCCG was established in 1989 as a voluntary Regional Organisation of Councils (ROC) to promote co-ordination between Member Councils on environmental issues relating to the sustainable management of the urban coastal environment.

The Group consists of 15 Councils adjacent to Sydney marine and estuarine environments and associated waterways. Member Councils include: Botany Bay, Hornsby, Leichhardt, Manly, Mosman, North Sydney, Pittwater, Randwick, Rockdale, Sutherland, Sydney, Warringah, Waverley, Willoughby and Woollahra.

SCCG Mission and Aim

“To provide leadership through a coordinated approach to sustainable coastal management”

“To promote cooperation between, and coordination of actions by Member Councils on issues of regional significance concerning the sustainable management of the urban coastal environment”

The functions and powers of the Group are provided in the Constitution and have been ratified by all of the Member Councils. The Group was incorporated in February 1998 under the *Associations Incorporation Act, 1984*.

The SCCG structure as an Incorporated Association includes a secretariat, incorporated group, executive committee (policy and management) and technical committee (technical and implementation) and supporting working groups and advisory committees (strategy development and campaigns).

The secretariat is supported by three FTEs, with an additional three FTEs undertaking project management roles.

SCCG has an outcomes oriented focus around:

- **Leadership** – to its members and their stakeholders across a range of coastal issues
- **Collaboration** – knowledge sharing, innovation and best practice, peer support and mentoring, interpretation and translation of information, in-field learning
- **Research** – Diverse range of research projects and areas of investigation, Memorandum of Understanding with Institute of Environmental Studies, NSW
- **Capacity building** – workshops, presentations, technical reviews
- **Advocacy** – submissions, research papers, lobbying, stakeholder engagement

The SCCG undertakes a range of projects across key themes around climate change, emergency risk, biodiversity and infrastructure vulnerability.

The projects and links listed below are most relevant to climate change assessment and adaptation, however further information and other projects can be found via the following link. <http://www.sydneycostalouncils.com.au/Projects>

- [Sydney's Salty Communities - Turning the Tide on Blue-Green Carbon](#)
- [Sydney Harbour Coastal Zone Management Plan: Stage 1 - a Scoping Study](#)
- [Coastal Vulnerability to Multiple Inundation Sources Project \(COVERMAR\)](#)
- [Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure Project](#)
- [Prioritising Coastal Adaptation and Development Options for Local Government Project](#)
- [Assessment and Decision Frameworks for Seawall Structures Project](#)
- [Landslide Risk Management Education Empowerment Interactive Website](#)
- [Underwater Sydney](#)
- [Mapping and Responding to Coastal Inundation](#)
- [Beach Sand Nourishment Scoping Study: Maintaining Sydney's Beach Amenity Against Climate Change Sea Level Rise](#)
- [Monitoring, Evaluating and Reporting Climate Change Adaptation in Local Government](#)
- [Adaptation Actions for Local Government](#)
- [Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises](#)
- [A Method for Assessing the Vulnerability of Buildings to Catastrophic \(Tsunami\) Marine Flooding](#)
- [Coastal Councils Planning for Climate Change](#)
- [Landslide Risk Management: Geotechnical Investigations](#)
- [Sydney Regional Coastal Management Strategy / Implementation Program](#)
- [Coastal Risk Management in Member Councils](#)
- [Protecting Sydney's Wetlands](#)
- [Regional Implementation Strategy for Water Quality / Environmental Monitoring](#)



Lessons Learnt

- ***The gathering, consolidation and peer verification of information sources*** regarding climate change risk assessment and adaptation is ***an important and beneficial regional scale activity***
- ***Research and targeted investigations enhances regional understanding*** and provides direct support to member Councils dealing with climate change issues
- ***Innovative programs and projects***, supported with funding and resources for implementation, ***are effective in determine best practice approaches to climate change adaptation***
- ***Being a credible organisation*** with a track record of applied research and project delivery ***enhances advocacy and lobbying activities and outcomes***

City of Sydney
Hudson Worsley
City of Sydney Adaptation Planning



The City of Sydney's Sustainable Sydney 2030 Community Strategic Plan (2014 update) outlines the vision for Sydney as a sustainable and prosperous city. The plan contains a range of environmental and sustainability activities being undertaken or planned for the future.

The City of Sydney is already working to prepare the community to adapt to climate change and to protect its assets and services through a range of programs and initiatives.

Although quite extensive in the scale and cost of its climate change activities, the work undertaken by the City of Sydney to date has been relatively ad hoc and lacked a strategic focus.

The City of Sydney is embarking on the preparation of a consolidated Adaptation Plan that will bring together existing activities and combine these with new initiatives to address climate change impacts.

90 Councils in Australia (almost 20%) have already prepared climate change adaptation plans and are much better positioned to work with their communities to respond to the challenges ahead.

There is much that can be learned from those Councils that have already gone down this path and have started on their climate change adaptation journey.

The process adopted by the City of Sydney in the development of its climate change adaptation plan has a strong emphasis on community engagement based on the following methodology:

- Background research (climate data and models)
- Risk assessment (inter-dependency analysis engagement)
- Adaptation pathways (assessment engagement)
- Citizens Panel
- Draft Adaptation Plan
- Public comment

The City of Sydney has established a Science Group to provide input into the adaptation plan comprising CSIRO, NCCARF, Office of Environment and Heritage and Climate Institute. Some of the initial work has concentrated on climate models (SimClim, NarClim) and the lines of connectivity between the models.

A risk assessment is being undertaken by RPS and KPMG and is looking closely into dependency analysis (one risk triggers another, cluster of risk) and next generation risks.

Climate related incidences, such as the October 2013 NSW bushfires, had a significant impact on the Sydney CBD and there is now greater recognition of the economic and social implications associated with the drier climate with more extreme weather events.



Smoke and haze from the October 2013 NSW bushfires impacted on the Sydney CBD

Another area that the City has been very active in is energy efficiency and generation. To date, economic growth has led to increased energy use and the City of Sydney has begun to move towards the decoupling of this process.

In response, a number of plans have been preparing and are being implemented including:

- Decentralised Water Master Plan
- Energy Efficiency Master Plan
- Decentralised Energy Master Plan
- Advanced Waste Treatment Master Plan

The City of Sydney has estimated that it can save \$200 million through a 30% increase in energy efficiency.

The City has adopted a 20% energy reduction target by 2020, based on 2006 baseline.

Tri-generation Energy

The City of Sydney will produce its own low-carbon energy for power, heating and cooling at Sydney Town Hall and its staff offices after Council approved a tender for a tri-generation plant in Town Hall House.

The project will reduce the City's annual carbon emissions by 3 per cent and reducing energy bills for Town Hall and Town Hall House by an average of \$320,000 per year over the life of the project.

The tri-generation plant will also improve the NABERS energy efficiency rating of Town Hall House from 3.5 to 4.5 stars. Tri-generation is more than twice as efficient as coal-fired power stations that produce around 80% of Sydney's electricity – heat by-products created at coal-fired power stations are wasted but tri-generation captures and uses them for air-conditioning, heating and hot water services.

The City has received a grant of \$3.05 million from the Federal Government's Community Energy Efficiency Program for the project. Design and construction will begin in early 2016 and the plant will become operational by mid-2016.



Tri-generation Energy Plant

The 'tri' in tri-generation refers to 3 simultaneous outputs from the gas-fired engines, low-carbon electricity, hot water to heat buildings and chilled water to cool buildings. A tri-generation engine runs on natural or renewable gases producing low-carbon electricity.

Tri-generation is an extremely efficient decentralised energy technology where electricity is made near where it is used, avoiding the need to bring electricity over long distances. It replaces coal-fired electricity and reduces emissions from connected buildings. Producing energy locally helps avoid expensive upgrades to the NSW electricity grid of poles and wires which have pushed up power prices. Consumers are forced to pay for upgrades to an aging and inefficient network that moves coal-fired electricity from the Hunter Valley to Sydney.

The City's Urban Forest Strategy is also being rolled out and seeks to increase tree canopy cover from its current level of 15.5% to 24% by 2030 and 27% by 2050.

This compares to the City of Melbourne's ambitious target of 40% green cover target by 2020 from a similar baseline.

There has been considerable consultation, awareness raising and education undertaken with the community as part of the Urban Forest Strategy.

The City recognises that impacts caused by the heat island effect and has put in place a number of strategies and trial to combat this including green roofs on buildings and the retention of mature trees as key features of the CBD environment.



Green roofs on buildings and tree retention in the CBD are among measures to reduce heat island impacts

The City also undertook a trial using lighter coloured road pavement to determine if the greater reflectivity would reduce heat island impacts, although recent results indicate that the heat reduction was negligible.



Although of limited success, the light road pavement trial provided the City of Sydney will useful information to apply to other areas.

The Adaptation Plan will be based on multiple pathways over the next 10 years and be supported by an Implementation Plan covering the short term (2 , 3 and 5 years).

The Implementation Plan will be embedded in business unit plans to ensure funding and delivery, with actions monitored to determine progress and performance.

Some useful links to the work being undertaken by the City of Sydney

Home page: <http://www.cityofsydney.nsw.gov.au/>

Sustainable Sydney 2030 (2014 update):

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0005/209876/Community-strategic-plan-2014.pdf

Green Reports: <http://www.cityofsydney.nsw.gov.au/council/forms-and-publications/environmental-plans-reports>

Decentralised Energy Master Plan:

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0003/153282/Renewable-Energy-Master-Plan.pdf

Energy Efficiency Master Plan: <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/energyefficiency>

Decentralised Water Master Plan:

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0005/122873/Final-Decentralised-Water-Master-Plan.pdf

Advanced Waste Treatment Master Plan:

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0014/215204/2014-429946-Advanced-Waste-Treatment-master-plan-FINAL-amended-as-per-Council-resolution.pdf

Urban Forest Strategy:

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0003/132249/Urban-Forest-Strategy-Adopted-Feb-2013.pdf

Urban Heat Island projects: <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/urban-heat-island>

• **Green Roofs and Walls:** <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/greening-the-city/green-roofs-and-walls>

Lessons Learnt

- **Significant resources are immobilised for community engagement activities** in all areas of the City of Sydney's work, and is particularly evident in development of their the climate change adaptation plan
- **Competition with Melbourne for leadership around sustainability and climate change** initiatives helps the City of Sydney to strive for innovative approaches to adaption
- **Decentralising local water services and energy generation** contributes toward sustainability and supports climate change adaptation
- Generational change occurs over time and **progress on climate change adaptation will be an ongoing and iterative journey**

Theme 6 – Local Councils and Best Practice Initiatives

Ku-ring-gai City Council

Jennifer Scott

Cost Benefit Analysis for Climate Change Adaptation in Local Government



Climate change is a multi-dimensional, sustainability issue requiring a different and targeted response that takes into account local characteristics and conditions. A business as usual approach or lack of action will not lead to the changes necessary to confront climate change impacts. A paradigm shift is required

NSW legislation does provide for some limitations for consequences of action or inaction by Local Government under Acts such as the Civil Liability Act 2002 and the Coastal Protection and Other Legislation amendment Act 2010.

Some current issues related to climate change are having major social, economic and environmental impacts on the community, such as the consequences of fire:

- Loss of life and property
- Biodiversity loss
- Land degradation
- Psychological and physical health impacts
- Insurance costs
- Property value decline



Climatic modelling indicates more extreme weather days and bushfire risks

Around 14,000 houses in the Ku-ring-gai Council are located in high fire risk zones, and surrounded by three National Parks.

Lessons learnt from past Australian extreme bushfire events include:

- Community complacency to risks
- Need to reduce exposure to loss
- Defendable homes and spaces are critical to reducing loss of life
- Reducing intensity and spread of fire is difficult in catastrophic conditions
- Community education and engagement critical
- Provisions for a place of last resort necessary

The Ku-ring-gai City Council engaged the services of Macquarie and Bond Universities to undertake a cost benefit analysis for climate change adaptation. This work included the use of various models and theories to assist with prioritisation and decision making including:

- Regional climate models and uncertainties
- Poisson Distribution (identifying future trends from historical data)
- Bayesian Inference theory (using expert opinion in the absence of data)
- Borda Count theory (for ranking in priority order)

This study helped to identify a broad range of adaptations and developed a prioritisation method using financial and non-financial cost benefit and taking into account a range of social, economic and environmental criteria.

Through this process, Ku-ring-gai City Council was able to identify bushfire vulnerability factors and resilience factors that were important to understand when developing adaptation responses.

The actions with the greatest cross criteria benefits identified by Ku-ring-gai City Council and, possibly applicable to all fire risk communities, included:

- Fire rated storm shutters
- Rainwater/storm water retention tanks
- Landscaping
- Back up power supply
- Underground power lines
- Weather warnings/communications
- Access to a safe refuge area
- Fire rated roof, wall and sub floor insulation
- Connected neighbourhoods
- Community Fire Units



Fire damage caused by local bushfire

Useful references and links to Ku-ring-gai City Council work are listed below

- [Climate Change Adaptation Strategy \(pdf. 1MB\)](#)
- [Climate Change Report 2007 \(pdf. 4MB\)](#)
- [Economic Evaluation of Climate Change Adaptation Final Report \(pdf. 2MB\)](#)
- [Ku-ring-gai Council Case Study - Economic Evaluation of Climate Change Adaption Strategies - Macquarie University report \(pdf. 2MB\)](#)

Lessons Learnt

- The recent bushfires across NSW and Victoria have ***raised awareness on climate change and extreme weather impacts on communities in high risk bushfire areas***
- ***The Ku-ring-gai City Council has actively taken a leadership role in climate change adaptation***, particularly in areas such as ***bushfire risks and biodiversity management***.
- ***Links with research institutions such as universities to undertake the cost benefit analysis work on climate change adaptation*** has helped Council gain an understanding of costs implications for responding to climate change.
- ***Actions identified for high risk bushfire areas through the work undertaken by Ku-ring-gai City Council are relevant to most high fire risk areas in Australia*** and provide a useful checklist for local councils and emergency response agencies.

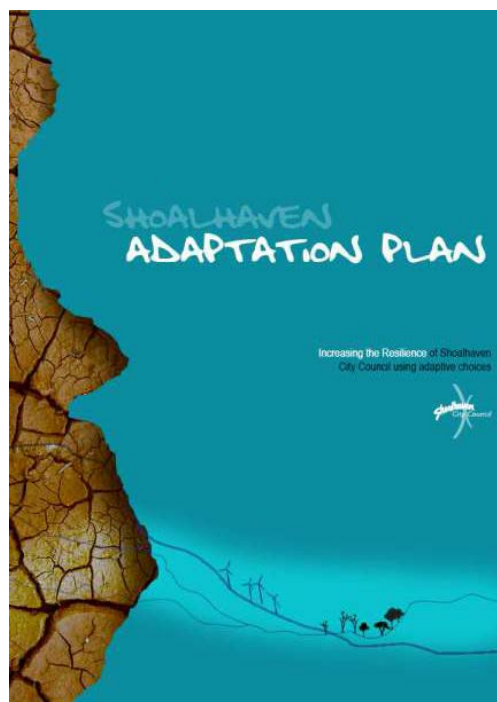


The Shoalhaven City Council has a population of almost 100,000 and is located in the south east coast of NSW with around 170 kilometres of coastline.

The City of Shoalhaven has initiated research on sea level rise and has set levels of 0.23 metre rise for 2050 and 0.36 metre rise by 2100 for future planning purposes. This work was done as part of a Climate change Risk Assessment undertaken by State Wide Mutual

The city has developed the Shoalhaven Adaptation Plan, which forms part of the Community Strategic Plan rather than a separate business plan, which resulted in a number of outcomes such as:

- Demonstration to the community that the city is serious about climate change and adaptation
- Helps document and consolidate risk management strategies and work already being done that contributes toward adaptation
- Involvement and active participation of staff – they have a wealth of knowledge
- Adopting common terminology for adaptation work



The adaptation plan framework identifies adaptation options and an actions table incorporating short, mid and longer term schedules. The Council used a methodology adapted from the WESROC Climate change Risk Assessment and Adaptation Action Plan for categorising actions into areas to assist in prioritising and implementing activities.

1. **Important and Easy:** These options should be taken immediately as they have limited barriers to implementation and will treat a number of high priority risks.
2. **Important but Tricky:** Action should be taken to remove the potential barriers to implementation so that options assigned to this category can move across to the 'Take Action Now' category.
3. **Not So Important But Easy:** Action to implement these options may not start immediately. However, when opportunities arise e.g. funding sources, they should be acted upon.
4. **Too Hard for Now:** The objective is to remove the barriers to implementation for options in this category; however, efforts will be focused on removing the barriers in the 'Important but Tricky' adaptation actions.

(This concept is from WESROC Climate Change Risk Assessment and Adaptation Action Plan)



The city is currently developing a carbon management framework, which is an extension to the climate change adaptation work. This work represents a collaboration with Deakin University using funding provided through the NSW Government's Waste and Sustainability Improvement Payment (WaSIP) program.

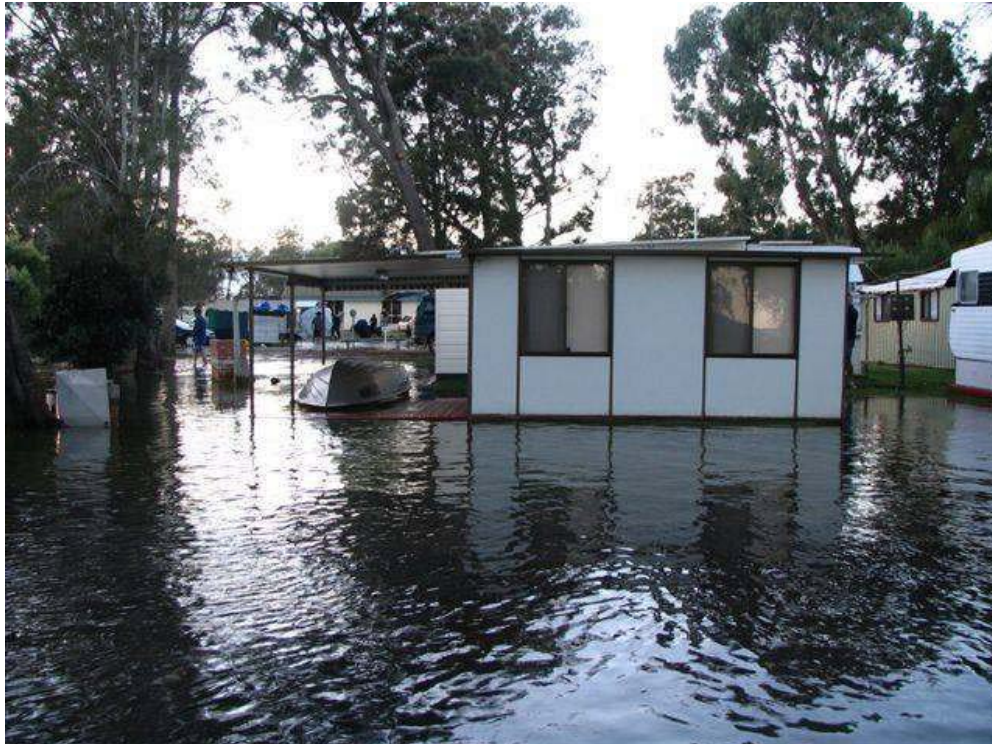
Recommendations from the study include:

- Setting targets for energy reduction
- Developing a carbon management framework
- Resources for implementation
- Annual reviews on progress
- Review of supplier agreements
- Creation of a revolving energy fund
- Investigating indigenous carbon farming options

Resilience is the ability and capacity of the community to adapt to change. The City of Shoalhaven has investigated the resilience of two coastal communities to sea level rise and flooding - Lake Conjola and Sussex Inlet.

Lake Conjola is a tourist destination and caravan park settlement with many of its 4 caravan parks and houses below the 1 in 100 year flood line.

There is an expectation in the community that the Council will save residents subject to flooding, however the episodic nature of the flooding and limited warnings meant that the community needed to become more active in responding themselves.



Flooding at Lake Conjola can occur quickly and therefore community response and capacity is essential to building resilience.

An investigation with Griffith University identified ways that the community can better respond and thereby increase their capacity to adapt to changing conditions. This work involved workshops with the residents and others, using SWOT analysis approach and led to the development of a strategic action plan.

Scenario based planning assisted in the prioritisation of actions and decision making towards the desired vision for the community. The idea here is to identify decisions and pathways that pose the least risk and are most flexible.

A similar facilitation and community engagement approach is being undertaken for Sussex, which is also subject to flooding as well as bushfire risk. The city received a \$60,000 grant through the NSW Ministry for Police and Emergency Services under the Community Resilience Innovation Program.

Although Griffith University was the lead for the Conjola work, the Council has been much more active in the Sussex initiative through a more collaborative approach backed by enhanced governance and communication arrangements.

The city was also a recipient of funding from the Building Resilience for Climate Change grant program for its “Cooling Nowra CBD” study and has constructed a sustainable house in Nowra.



The Nowra sustainable house demonstration project has generated much community interest in sustainable design

Lessons Learnt

- Ensure your **community consultation work facilitates input from a wider section of the community** – self-interest and dominant people may not be the leaders
- **Active involvement and participation in consultation** will ensure that the Council is aware of the issues and at the table for negotiations
- **Establish adequate governance arrangements** - a reference group can be an effective mechanism to achieve both community and Council outcomes
- **Incorporate climate change adaptation and resilience building work into your Community Strategic Plans**
- **Document process to determine performance and progress** and as a record of what has been done well and not so well
- **Be clear with the community where they need to take on more responsibility for the actions**
- **Train your staff in the use of decision support tools** – this will help with better decision making internally and more open and transparent community consultation
- **Work with others involved in similar work, establish partnerships and access available information** to support your direction and pathways to be supportive of innovation



The Victorian Local Sustainability Accord (the Accord) and the Victorian Adaptation and Sustainability Partnership (VAS Partnership) programs have been running since 2005. With the Accord program starting in 2005, the VAS Partnership builds on the success of the former Accord program.



The Accord and VAS Partnership Grants programs deliver funding and support to work undertaken by local government on climate change. \$15,3 million has been provided to local government from state government for 156 climate change projects.

Port Phillip Region climate change adaptation projects: Out of 79 councils across Victoria there are 31 local government councils in the Port Phillip region. Out of the 38 projects, 15 of these projects focus on adapting to climate change.

Lead Council	Partners	Project	\$ VASP Funding	DELWP Contact officer
Melbourne City	Banyule, Kingston, Moonee Valley, Victoria University	Assessing the economic value of Green Infrastructure: Developing a model to identify economic values of green roofs & green walls to help understand all the benefits of installing them.	200,000 (Project total 265,000)	Sandi Bowles 9637 9428
Melbourne City	Stonnington, Yarra, Port Phillip, Maribyrnong, Melbourne University.	Growing Green Guide For Melbourne: A How To Guide For Green Roofs, Walls and Facades: A practical tool that increases knowledge and reduces the technical barriers of green roof wall and facade construction. The Guide includes best practice and policy recommendations that can be used by councils, building developers and planners across Victoria. http://www.growinggreenguide.org/	250,000 (Project total 668,300)	Ben Johnson 9637 9436
Port Phillip City	Association of Bayside Municipalities, Melbourne, Bayside, Frankston, Mornington Peninsula, Wyndham, Hobsons Bay, Geelong, Queenscliffe, Kingston	Port Phillip Bay Adaptation Framework: Developing a regional coastal adaptation framework to support Port Phillip bay councils prepare for the impacts of sea level rise, coastal inundation and storms on the coast that affect communities and assets. http://abm.org.au/index.php/vasp	200,000 (Project total 376,000)	Annette Hatten 9637 9453
Darebin City	Northern Alliance For Greenhouse Action, Melbourne, Whittlesea, Yarra, Moreland Energy Foundation (MEF)	Adaptation for Vulnerable Low Income & Rental Households: Raising real estate institute member's awareness of financial & sustainability benefits to tenants & landlords of energy efficiency properties (those using less electricity due to insulation, pelmets & blinds, weather stripping & energy efficient light globes). Also assisting low income home owners obtain loans for solar panels repaid via council rates. http://www.mefl.com.au/news-and-events/item/1146-darebin-solar-aver.html	85,000 (Project total 135,485)	Sandi Bowles 9637 9428



Hume City	Kildonan Uniting Care.	Heatwave Help for Hume Home Care Clients: Providing education & retrofitting vulnerable home care client's homes to improve extreme hot weather resilience by installing exterior blinds, sealing drafts and providing portable fans.	100,000 (Project total 162,345)	Lou Cramsie 9637 9437
Moreland City	Ballarat, Banyule, Boroondara, Brimbank, Darebin, Frankston, Greater Dandenong, Hobsons Bay, Kingston, Knox, Manningham, Moonee Valley, Moreland, Port Phillip, Stonnington, Whitehorse, Whittlesea, Yarra, MEFL, Council Alliance for Sustainable Built Environments, MAV	Environmentally Sustainable Design Tools for Council Planners: Developing an online tool 'BESS' (Built Environment Sustainability Scorecard) to support town planners assess dwelling environmental performance when reviewing planning applications. Suggestions to increase performance are provided. Performance areas include: storm water collection, energy emissions, water use, building materials. http://bess.net.au/	131,800 (Project total 262,389)	Sandi Bowles 9637 9428
Whittlesea City	Northern Alliance For Greenhouse Action, Banyule, Darebin, Hume, Manningham, Melbourne, Moreland, Nillumbik, Yarra, MAV, ARUP, MEFL	NAGA Climate Integrated Regional Vulnerability Assessment: Developing an adaptation action plan to identify, assess & prioritise regional climate change risks.	150,000 (Project total 305,400)	Sandi Bowles 9637 9428
Boroondara City	Eastern Alliance for Greenhouse Action, Knox, Maroondah, Monash, Stonnington, Whitehorse, Yarra Ranges	Biodiversity Monitoring in Melbourne's East: Developing a consistent approach for councils to monitor biodiversity and habitat health over time to inform regional biodiversity asset management.	73,000 (Project total 94,900)	Sandi Bowles 9637 9428
Knox City	Alpine, Melbourne, Port Phillip, Yarra, Department of Education, SV	Seedlings: Developing and trialling an education program for teaching sustainability concepts to children from birth to pre-school. Including: reducing energy and water use, making toys and growing food. http://www.knox.vic.gov.au/seedlings	250,000 (Project total 882,970)	Ben Johnson 9637 9436
Maroondah City	Eastern Alliance For Greenhouse Action, Knox, Maroondah, Monash, Stonnington, Whitehorse, Yarra Ranges	Adaptation Roadmap: Engaging within and across councils to identify increasing regional climate risks such as heatwaves, flooding, and drought. Strategic planners will use this information to ensure continuity of council operations and service delivery during climate events, both locally and regionally. http://eaga.com.au/projects/climate-change-adaptation-roadmap/	100,000 (Project total 130,000)	Ben Johnson 9637 9436



Yarra Ranges		Bushland Management and Climate Change: Adapting management practices in response to landscape change Investigate the potential impacts of climate change on the ability of local governments to manage their biodiversity and bushland assets.	90,000 (Project total 110,500)	Sandi Bowles 9637 9428
Casey City	South East Councils for Climate Change Action, Kingston, Mornington Peninsula, Bayside, Cardinia, Greater Dandenong, Bass Coast, Baw Baw, Marsden Jacobs	Financial Risk Adaptation Planning: A model to assist financial planners calculate unbudgeted costs of extreme weather and climate changes. For example: replacing drainage pipes or repairing washed-out culverts. http://www.secca.org.au/projects/financial-risk-adaptation-planning-frap/	200,000 (Project total 382,000)	Sandi Bowles 9637 9428
Mornington Peninsula Shire	Bayside, Kingston, Federation University	Climate Ready?: Developing an online tool residents can use to prepare for extreme weather eg. bush fires, heat waves and storms. http://www.climateready.com.au	200,000 (Project total 290,000)	Sandi Bowles 9637 9428
Wyndham City	Western Alliance for Greenhouse Action, Brimbank, Greater Geelong, Hobsons Bay, Maribyrnong, Melton, Moorabool, Moonee Valley	How Well Are We Adapting?: Developing and testing methods to measure & report on adaptation activities in Melbourne's West to assist council decision making & raise comm http://waga.com.au/climate-change-action/how-well-are-we-adapting/ unity awareness.	200,000 (Project total 363,000)	Ben Johnson 9637 9436
Maribyrnong City	Brimbank City, City of Greater Geelong, Hobsons Bay City, Maribyrnong City, Melton City, Moonee Valley City, Moorabool	Climate Change Risk Adaptation Response Plan: that addresses climate change risks to the Western Metropolitan Melbourne Region. http://www.sustainability.mav.asn.au/vasp/WAGA_Climate_Change_Risk_Response_Project_-_Final_Report-6010	100,000 (Project total (137,000)	Ben Johnson 9637 9436



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