



# CLIMATE CHANGE ADAPTATION ROADMAP FOR MELBOURNE'S EAST

A guide for decision makers in the EAGA Councils





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## ABOUT US

It gives me great pleasure to endorse the EAGA Climate Change Adaptation Roadmap on behalf of the EAGA Executive Committee. It is often said that “failure to plan is a plan for failure.” Importantly, this Roadmap provides practical guidance for the region’s decision makers to more effectively plan and capture new opportunities in an uncertain climate future.

Local government can be, and needs to be, a leader in adapting to climate change. The risks associated with climate change are many - our EAGA regional risk assessment identified 70 regional risks to council assets, operations and service delivery responsibilities. This Roadmap identifies ten regional adaptation responses that EAGA councils will seek to pursue collaboratively.

Adaptation is part of a continuous improvement process that builds on existing sustainability programs. The Roadmap highlights that decisions being made today need to consider that the climate is likely to be very different in the future.



A regional approach is important to achieve economies of scale and working together benefits all councils and communities involved.

As you read through this report, may I encourage you to commit to fully participating in the implementation of this Climate Adaptation Roadmap.

Cr. Bill Bennett  
City of Whitehorse  
EAGA Executive Chair

The Climate Adaptation Roadmap for Melbourne’s East was prepared by the Eastern Alliance for Greenhouse Action (EAGA) and funded by the Victorian State Government through the Victorian Adaptation and Sustainability Partnership (VASP) grants 2013.

EAGA is a formal collaboration of seven Councils in Melbourne’s east, working together on regional programs that reduce greenhouse gas emissions and facilitate regional adaptation. EAGA consists of the following member Councils:

- City of Boroondara
- Knox City Council
- Maroondah City Council
- City of Monash
- City of Stonnington
- City of Whitehorse
- Yarra Ranges Council





## BACKGROUND

This EAGA Climate Change Adaptation Roadmap identifies regional priority actions to address the impacts of climate change on council operations, assets and service delivery responsibilities. The Roadmap is informed by a regional climate change risk assessment undertaken by EAGA in August 2014.

### VISION

### GOALS

### OBJECTIVES

### REGIONAL ACTIONS

Vision: Melbourne's East is home to sustainable communities that take proactive steps to reduce risks of climate change impacts and realise the opportunities for regional adaptation

Goals:

The goals of the adaptation roadmap project are to:

1. **Raise awareness**  
Greater understanding of how climate change might impact council service areas and how those risks might be addressed
2. **Build capacity**  
Decision makers have greater capacity to manage climate change risks and the range of actions available
3. **Respond**  
Identify adaptation opportunities for the region, including priority initiatives that EAGA can pursue

#### Box 1: EAGA's Climate Change Risk Assessment

[www.eaga.com.au/projects/climate-change-adaptation-roadmap](http://www.eaga.com.au/projects/climate-change-adaptation-roadmap)

In early 2014, EAGA undertook a regional climate change risk assessment report for the EAGA member Councils. The report identified 70 priority risks to Council operations, assets and service delivery from the impacts of climate change.

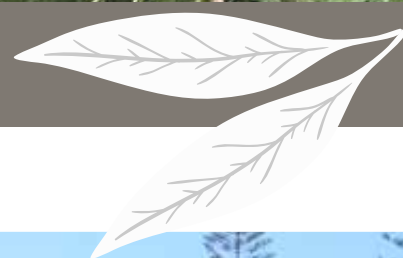
Key messages from the report were:

- Climate change is happening now and poses immediate risks to Council
- Risks affect every aspect of Council core business, climate change is not just an environmental issue
- Climate change amplifies many existing risks to Council
- Current decisions need to consider that the future climate will be different from the past
- Responding to climate change can promote many co-benefits to Council goals and community *lupis accaturerum cusam*,





## ADAPTATION & LOCAL GOVERNMENT



‘Adaptation is about increasing public and private resilience to climate risks through better decisions about managing our built and natural environment and taking advantage of opportunities.’ (Victorian Climate Change Adaptation Plan 2013)

The focus of this roadmap is on identifying actions that can be undertaken to reduce the impacts of climate change. Adaptation responses are distinct from ‘mitigation’ actions taken to reduce climate change itself, which are primarily focussed on reducing greenhouse gas emissions. There is some overlap between adaptation and mitigation, but adaptation is likely to cover a broad range of activities, many of which EAGA Councils are already undertaking. Nonetheless, adaptation actions should complement and/or contribute to mitigation efforts.

Adaptation is crucial at the regional and local scale. Many of the impacts of climate change will affect the service delivery responsibilities and assets and infrastructure of local government. In addition, Councils already have many tools and processes in place that can support our adaptive capacity such as local planning schemes, design standards, emergency response and recovery. To address the many risks adequately and cost effectively, councils should not ‘go it alone’, but rather should seek to work together in regional collaborations, and seek ongoing assistance from other levels of government.

Councils need to ensure that development and planning decisions do not create the potential for unmanageable exposure to climate-related hazards such as heatwaves, storms, flooding and bushfires. Also, Councils have a responsibility to their communities to support actions that reduce vulnerabilities to the impacts of climate change.





# CLIMATE CHANGE IN MELBOURNE'S EAST

The latest Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (2014) identifies a set of key regional risks for southern Australia including:

- Increased frequency and intensity of flood damage to settlements and infrastructure
- Constraints on water resources
- Increased morbidity, mortality, and infrastructure damages during heat waves
- Increased damage to ecosystems and settlements, economic losses, and risks to human life from wildfires in most of southern Australia
- Significant reduction in agricultural production in the Murray-Darling Basin and far south-eastern and south-western Australia if scenarios of severe drying are realized

The CSIRO prepared regional climate change projections for the EAGA region based on the latest scientific evidence. Melbourne's east can expect to experience hotter drier conditions with more frequent and prolonged extreme events in the form of heatwaves, droughts, bushfires, and more intense rainfall events. A summary of the climate projections for Melbourne's east is shown in figure 1.

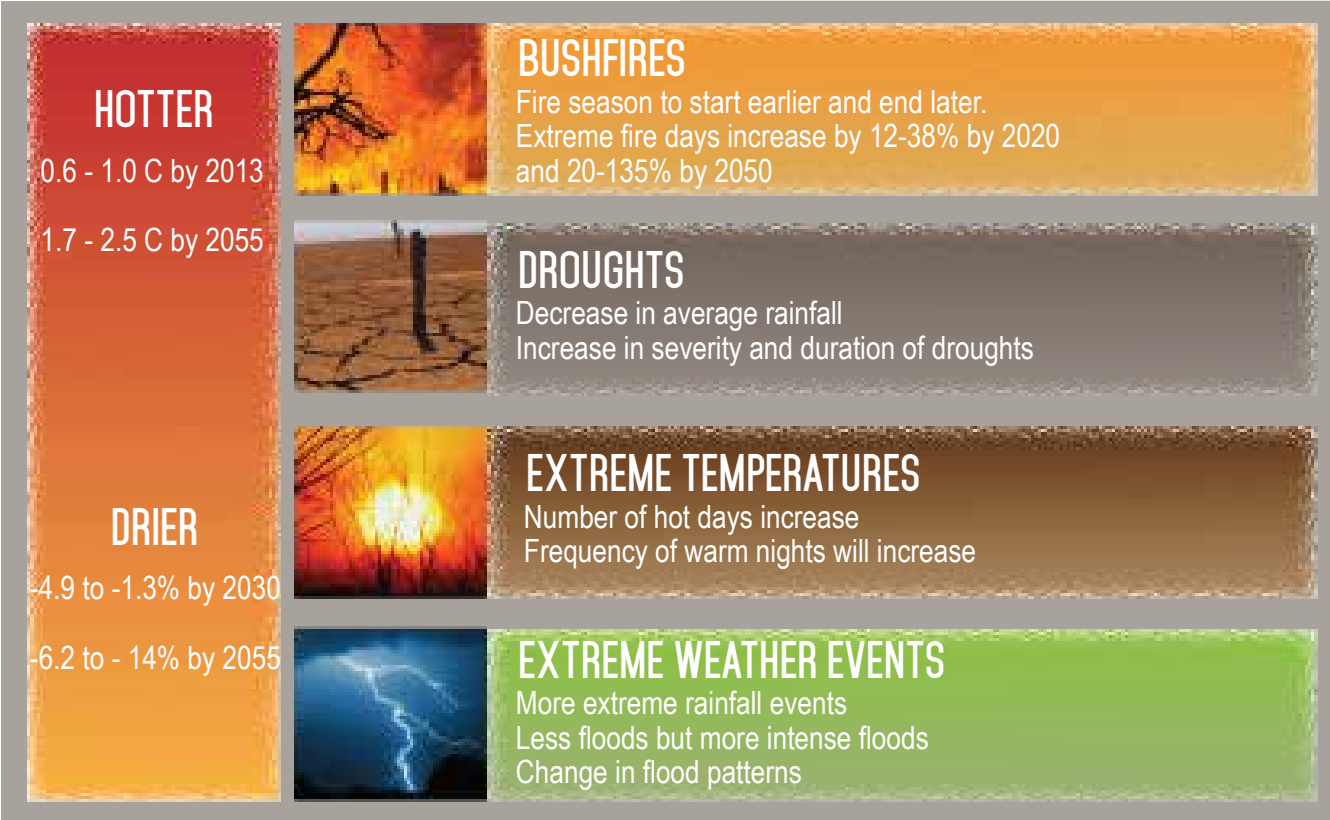


Figure 1: Climate change projections for Melbourne's EAGA region (CSIRO 2013)





## DECISION MAKING AND UNCERTAINTY

Whilst there is scientific certainty that climate change is occurring, the magnitude, timing and distribution of climate impacts across the EAGA region over time is less certain. The Victorian Climate Change Adaptation Plan recognises that making decisions in the context of this uncertainty is a key challenge for undertaking adaptation planning (DSE 2013). However, this uncertainty should not be a basis for inaction, as the costs of inaction are likely to far exceed the costs associated with proactive planning responses.

Also many of the risks from climate change are likely to have cumulative impacts that are greater than individual risks and are not always easily considered in decision making. For example, the 2009 heatwave event coinciding with the Black Saturday bushfires in Melbourne saw unprecedented impacts on council assets and service delivery (see Box 2 in the EAGA Climate Change Risk Assessment).

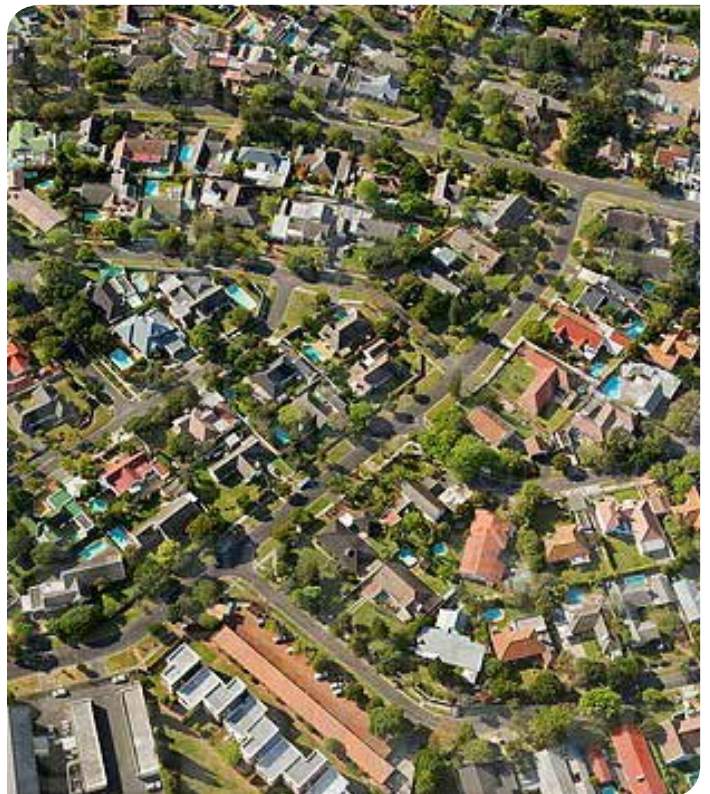
Adaptation should not be considered as a set of one off actions, but instead an ongoing process of making and revisiting decisions repeatedly as the future unfolds and more information becomes available. It is critical that decisions made today are flexible and robust and do not lock in a path that becomes unsustainable and increasingly costly as the climate changes or can only cope with a limited range of future climate scenarios.

Planning and preparing for future climate changes requires thinking about the lifetimes of different decisions or what is otherwise known as decision timeframes. Many of the decisions made on a daily basis by local governments have consequences that range from the short term to decadal.

For example a decision to set mowing heights higher for council reserves during drought conditions has a much shorter lifetime than a decision to allow for a new housing development in an area likely to be impacted by future changes in flood patterns.

Considering adaptation in decision making involves considerations of:

- How is this decision likely to influence/be influenced by climate change impacts?
- How long will the consequences of this decision last and what climate change futures might the decision be faced with?
- Is the decision robust over multiple possible futures and flexible to allow for changed conditions?







## INCENTIVES FOR ADAPTATION



Addressing the impacts of climate change is only one of many competing concerns for Council decision makers. Therefore it can be tempting to discount consequences that are further into the future, and give priority to more immediate concerns.

However, there are many important reasons why adaptation should be a key consideration in decision making today:

- Rising insurance premiums and liability issues for local government
- Financial sustainability; small investments today will avoid larger costs in the future
- Duty of care
- Strong community expectation that local governments are preparing for climate change
- The multiple benefits of adaptation responses such as improved health and wellbeing, lower energy bills, lower maintenance costs.
- Existing climate impacts are already more frequent and more intense than previous decades

### Adaptation Principles:

- Adopt the precautionary principle, and uncertainty is not a basis for inaction
- Promote flexible and adaptive management approaches that leave a range of future options available
- Use the best science available at the time of planning and review regularly
- Give priority to adaptation strategies that build on existing programs or policies and provide co-benefits with mitigation and sustainability goals
- Adaptation efforts should be mindful of, and include, planning to meet the unique needs and conditions of people who are most vulnerable to climate change

- Adaptation efforts are best achieved by working together to achieve economies of scale, sharing of knowledge and resources and acknowledging that climate impacts and adaptation responses do not stop at council boundaries
- Understand adaptation as an ongoing process of learning

## ADAPTATION PLANNING

This Adaptation Roadmap identifies key regional responses to address the risks identified in the risk assessment. The responses were developed from a combination of a detailed literature review and two regional adaptation planning workshops held by EAGA with Council staff in late 2014. The workshops were themed as Community planning, services and health, and Infrastructure and assets.

The workshops provided an opportunity for Councils to come together to share learning's and best practice case studies as well as to identify new regional opportunities for collaboration. The roadmap identifies 10 regional adaptation objectives and priority actions, as well as a set of supporting adaptation response options for consideration by individual councils or other regional networks for further development.

The response options were evaluated and prioritised by the project team using an evaluation criterion that considered sustainability, effectiveness, costs and co-benefits (see Appendix 1). It also assessed the adequacy of the responses to address the risks in the climate change risk assessment.

The Roadmap has focussed on actions that can be implemented now based on current priorities and risks. It will be important that adaptation responses are monitored and evaluated over time as climate change impacts increase and more significant actions become or are required.





## REGIONAL RESPONSE INITIATIVES

	Theme	Adaptation Objective	Action
1	Infrastructure	Improve the resilience of existing and new built infrastructure to cope with projected climate change impact	Conduct a regional building vulnerability assessment and conduct targeted upgrades
2	Planning	Reduce the heat island effect through the region to mitigate projected temperature increases	Develop a Greening for a Cool East Strategy
3	Public health	Reduce impacts of heat waves on vulnerable members of the community	Solar rates for low income households
4	Emergency management	Improve emergency preparedness and response	Work with Emergency Management Victoria to improve heatwave preparation and response
5	Economy	Improve the adaptive capacity of the regional economy to climate change	Understand economic impacts of climatic events on strip shopping precincts and identify opportunities for building resilience
6	Energy	Improve the resilience of electricity infrastructure to projected increase in extreme weather events	Work with Distribution Network Service Providers to identify initiatives for improving electricity network reliability and community resilience
7	Water	Improve the regions drought and flood resilience by diversifying water supply, improving water use efficiency and redirecting stormwater overflow	Collectively work with Melbourne Water to identify regional stormwater capture and reuse opportunities
8	Organisational	Build organisational capacity across EAGA Councils to respond to climate change risks	Build a training program for CEO's to build capacity and champion adaptation through collaboration
9	Environment	Improve the management of biodiversity and open space under hotter and drier conditions with more extreme events	Seek further funding for reporting and analysis of data associated with the EAGA Biodiversity Monitoring Framework.
10	Food	Increase regional food security	Understand the regional food network and work together to diversify and promote urban food production





## OBJECTIVE 1

### Improve the resilience of existing and new built infrastructure to cope with projected climate change impacts

#### Action 1: Conduct a regional building vulnerability assessment and conduct targeted upgrades

One of the key priority risks identified for the EAGA region is the increased potential damage to council facilities from climate change impacts, leading to increased maintenance costs, reduced asset lifespan, increased OHS hazards for staff and reduced service delivery capacity.

A regional buildings vulnerability assessment would assess risks associated with climate change impacts for the built assets of the EAGA councils and prioritise key assets for targeted upgrades or other improvements.

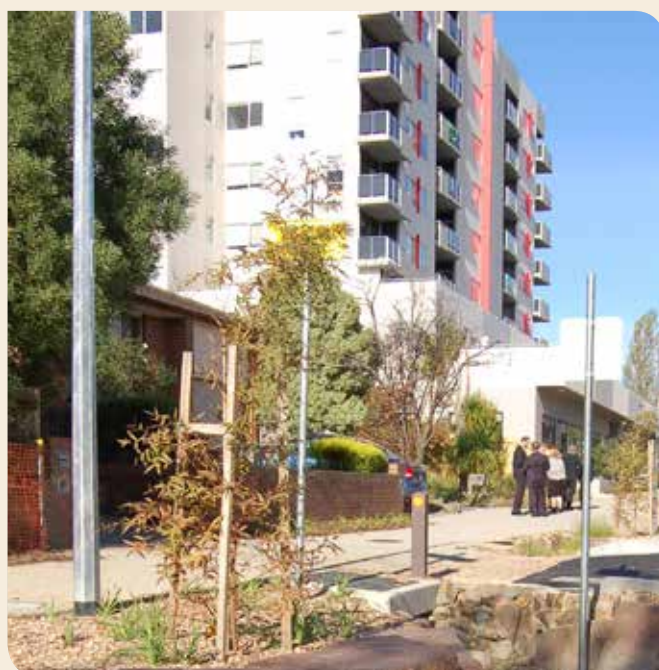
A regional methodology could be developed that builds upon the experiences of embedding climate change into asset management at the City of Whitehorse (Vic) and City of Canada Bay (NSW).

A proposed methodology could be:

- Analyse the potential exposure of Council buildings to projected climate change impacts
- Combine the exposure analysis with essential building function analysis to examine the risks for Council service delivery
- Carry out site specific building audits and make adaptation recommendations
- Wherever possible and relevant, undertake building upgrades in combination with Environmentally Sensitive Design (ESD) upgrades and leverage relevant financing mechanisms (eg. Energy Performance Contracts)

#### Complementary actions:

- ◇ Continue to advocate through Municipal Association of Victoria (MAV) and Council Alliance for a Sustainable Built Environment for a state-wide ESD Policy in the Victorian Planning Provisions
- ◇ Research life cycle costs and payback periods of different ESD standards for council buildings
- ◇ Develop a coordinated and consistent ESD policy and guidelines throughout the region for council buildings
- ◇ Analyse the comparability and complementarity of ESD standards and adaptation options
- ◇ Facilitate broad adoption by Councils of the latest Built Environment Sustainability Scorecard (BESS) in statutory planning processes
- ◇ Integrate climate change risks into Asset Management Plans and capture trend data on asset damage and reduced lifespans from climate change impacts, and of management actions to reduce or manage those risks



## OBJECTIVE 2

## Reduce urban heat through the region to mitigate projected temperature increases

### Action 2: Develop a Greening for a Cool East Strategy

One of the significant challenges for Melbourne's east is reducing the combined impact of urban heat island effect and more frequent, severe and longer duration heatwave events.

Green infrastructure is one well recognised solution to reducing the urban heat island effect and providing cool spaces for the community (Hunter Block et al. 2013). It refers to designed and natural vegetation found in urban areas, including public parks, recreation areas, remnant vegetation, residential gardens, street trees, community gardens, as well as innovative and emerging new urban greening technologies such as rain gardens, green roofs and green walls (Norton et al. 2013).

Research also shows that establishing more 'green infrastructure', including enhancing tree canopy throughout the east could lead to many co-benefits such as:

- Reduced urban heat island effect
- Interception of stormwater runoff
- Lower cooling demand for electricity
- Carbon sequestration
- Wildlife habitat
- Increased property value
- Improved amenity
- Improved health and wellbeing
- Reduced asset damage

Monitoring during heatwaves has shown that in areas with adequate tree canopy shading, a person's physiological equivalent temperature can be up to 18°C lower at midday compared to non shaded areas (Norton et al. 2013). Also suburbs with mature trees can be 2-3C cooler than new suburbs with no trees (see Table 1).

Despite the multiple benefits from developing green infrastructure and improving the urban forest, there are many complex considerations that could potentially lead to perverse or maladaptive outcomes if poorly planned. For example, the choices of tree species maybe vulnerable to decreased water availability, rising temperatures, and changing patterns of disease and pests and potentially facilitate further intrusion of bushfire risk into urban areas.

Table 1: Benefits of urban greening (USEPA 2008)

Function	Benefit
Shade from trees	Surface temp reduction of 11-25°C for walls and rooftops
Green walls	Temperature reduction of 20°C
Trees shading parked cars	25°C cooler inside shaded car
Shade from small groups of trees	5°C cooler than open terrain
Suburban areas with mature trees	2-3°C cooler than new suburbs with no trees
Air temperatures over irrigated fields	3°C cooler than bare ground





Inappropriate tree species selection and location can also cause conflict with the built environment through disruption or displacement of structures through direct damage as branches fall or through causing soil shrinkage. Similarly, trees are a contested variable in urban planning and often ignite considerable community passions that can make decision makers wary or cautious.

Recent research has shown that out of Australia's major cities Melbourne has the lowest percentage of canopy cover (Jacobs et al. 2014). The EAGA region is diverse, with Yarra Ranges and Maroondah having comparatively high percentage canopy cover with City of Monash at the other end of the spectrum with between 10-20%.

Many of the EAGA Councils are already pursuing some form of an urban forest strategy, green infrastructure projects and or open space strategies.

A regional greening for a cool east strategy could help to:

- Identify priority urban space for green infrastructure
- Align council's goals and targets
- Develop a common vision
- Assess differences between public versus private realm
- Develop a common supportive policy framework for increasing green infrastructure in the region
- Build habitat connectivity
- Share the key learnings between councils that are trying to 'go it alone'
- Build community awareness of the value of green infrastructure for urban cooling
- Work with regional stakeholders such as VicRoads, energy and water companies to address the tensions between needs and values of managing the urban forest over time

Complementary actions:

- ◇ Ensure linkages and connections are made between strategy and integrated water management principles and open space planning projects such as the MPA Metropolitan Open Space Strategy
- ◇ Review existing development controls for heat island effect, seeking to ensure new developments do not exacerbate heatwaves
- ◇ Work with regional agencies such as VicRoads, Public Transport Victoria and gas and water retailers to implement and coordinate investment in green infrastructure when they are doing works for other purposes.
- ◇ Work with regional stakeholders to pilot more heat tolerant, permeable and reflective bitumen/pavement materials
- ◇ Work with research institutions to map thermal hotspots and social vulnerability at higher resolution





## OBJECTIVE 3

### Reduce impacts of heatwaves on communities

#### Action 3: Solar rates for low income households

Households suffering from 'energy poverty' are particularly vulnerable in heatwave events, creating morbidity and mortality risks, particularly for the aged. This was most clearly demonstrated in the summer of 2009 where heatwave related mortalities significantly outnumbered the deaths due to the Black Saturday bushfires.

EAGA's risk assessment identified significant implications of this issue for councils through the increased demand for support services and increased pressure on council facilities.

Recent research highlights that many EAGA councils are particularly vulnerable to the impacts of heatwaves (see fig. 3). The study analyses risk factors such as a lack of tree cover, housing types and age, health and socio-economic status.

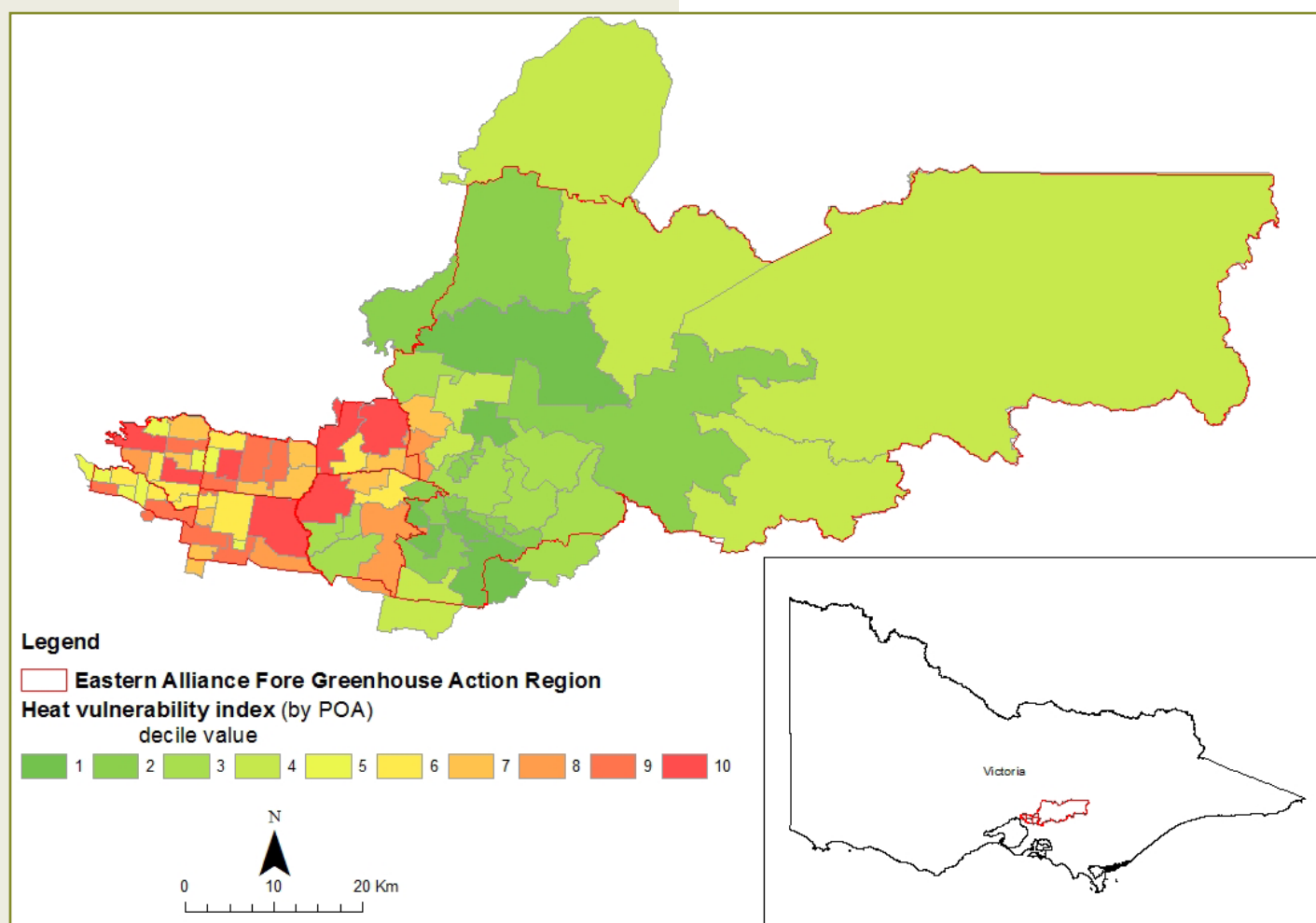


Figure 3: Heatwave vulnerability in Melbourne's EAGA region (Source: Loughnan et al. 2013)





There is mounting evidence to demonstrate that the installation of solar PV supports greater capacity for cooling in households where energy costs represent a large proportion of ongoing living costs. Council staff in the regional workshops shared anecdotes of low income households avoiding using any cooling in heatwaves because of fear of a high power bill. The ability of the technology to provide low cost energy throughout the day means these householders can cool their homes without fear of 'price shock'.

EAGA councils could seek to undertake an analysis of the costs and benefits of implementing a regional scale Solar Rates program.

The outputs of such a project (report, tools and assumptions) will build on previous analysis and work undertaken by the Moreland Energy Foundation Limited (MEFL) in the implementation of the Darebin Solar Savers program.

The project will evaluate the scalability of this proven approach, and take the model one step further to assess the viability of funding its implementation through an external financier (such as the Clean Energy Finance Corporation) and quantify the economies of scale possible through regional implementation. It will also investigate the options for the establishment of a dedicated entity (i.e. a public private partnership) to deliver the initiative versus implementation through an existing intermediary.

#### Complementary actions:

- ◇ Development of state-wide material and education for Culturally and Linguistically Diverse (CALD) groups around energy efficiency, heatwave preparedness and sustainability. Collating information from all councils to develop clear messages and save resources.
- ◇ State-wide capacity building program for Home and Community Care (HACC) staff to engage with vulnerable communities on energy efficiency and heatwave preparedness
- ◇ Identify designated council cooling facilities and plan for 'cool precincts'

#### Case Study: Darebin Solar Saver Program

In 2014, the Darebin Solar Saver program pioneered the use of the existing Special Charges Scheme (Sec 163) of the Local Government Act to apply a charge for 300 pensioner residential home owners to repay a solar system. In this instance, the project was entirely funded by Darebin Council.

The Darebin experience demonstrated that councils can play a pivotal role by utilising rates charges to underpin a stable finance model that encourages low interest lending and allows debt transfer to a new property owner to increase household and business confidence in investment. The model can support both households to invest more confidently in solar and energy efficiency and at the same time stimulate a competitive green economy with minimal need for incentives or council debt liability.



## OBJECTIVE 4

### Improve emergency preparedness and response

#### Action 4: Work with Emergency Management Victoria to improve heatwave preparation and response

The recent Victorian Auditor General's Audit into Heatwave Management in Victoria (2014) identified that there needs to be greater clarity and quality assurance of heatwave planning by different government agencies.

Although there have been many improvements to heatwave planning since the 2009 heatwaves, the experiences of the 2014 heatwave show that more needs to be done. The January 2014 heatwave saw regional health services under strain with the most 000 calls ever recorded. For many Councils this required calling staff back from holidays in order to make contact with more vulnerable members of the community.

The audit also found that although training and emergency incident exercises are regularly conducted across agencies, the impacts of extreme heat and subsequent impacts on resources and infrastructure has not been adequately tested as an emergency exercise.

Existing heat health messaging is also not well understood and should be underpinned by more education and awareness raising activities with different segments of the community.

Currently the messaging from Councils to the community is very diverse and can range from simply forwarding on the state alert as an email or a newsletter, to establishing an incident control centre.

In particular EAGA should seek to advocate on behalf of the member Councils and work with EMV to:

- Clarify roles of Councils during heatwaves and develop quality assurance mechanisms for Municipal Emergency Management Plans (MEMPs)(N.B. the current SES audit process of MEMP's does not examine sub-plans which relate to heat).
- Advocate to Department of Health to develop public awareness and education activities for communicating heatwaves, particularly to CALD communities and people with disabilities
- Develop emergency management exercises with a heatwave component linked to the failure of critical infrastructure.
- Develop better understanding of how people interpret heatwave communications and information and what are the key drivers that puts people at risk

#### Complementary actions:

- ◇ Improved standardised emergency communications to CALD community and people with disabilities for extreme weather (including fire) education programs
- ◇ Conduct a regional emergency preparation exercise that considers multiple widespread events
- ◇ Work with regional bodies such as SES and other councils to develop maps which identify roads susceptible to flooding, the location of vulnerable populations and alternative routes to reach these vulnerable populations and other key areas in the case of road closure.



## OBJECTIVE 5

### Improve the adaptive capacity of the regional economy

Action 5: Understand economic impacts of climatic events on strip shopping precincts and identify opportunities for building resilience

One of the key regional economic risks from climate change is the decline in strip shopping activity during extreme events, particularly heatwaves, in favour of air conditioned shopping centres. Similarly strip shopping centres in the east are vulnerable to flooding events, leading to significant loss of stock and building damage.

It is necessary to first understand the scale of economic impacts incurred by strip shopping due to heatwaves and storm events. EAGA could seek to conduct a regional economic impact analysis of extreme weather impacts on Melbourne's eastern strip shopping precincts.

The results could then be used to engage with strip shopping businesses on identifying a range of mechanisms for reducing the impacts of climate change.

This action could be part of the development of a broader network of cool precincts that could act as refuges for people seeking relief from heatwave events. Strip shopping centres also act as important hubs of community activity, social cohesion and promote walkability.

Thus it is important that the region's Councils can support strip shopping businesses to adapt to climate change.

Complementary actions:

- ◇ Develop an eastern adaptation network with government agencies, businesses and other stakeholders





## OBJECTIVE 6

### Improve the resilience of electricity infrastructure to projected increase in extreme weather events

Action 6: Work with Distribution Network Service Providers to identify initiatives for improving electricity network reliability and community resilience

Many of the risks from heatwaves, bushfires and storm events are exacerbated by power failures. These risks have been realised in recent extreme weather events and act to further threaten vulnerable members of the community and disrupt council business continuity.

As well as the impacts on council service delivery, distribution businesses are financially penalised when power failures affect critical assets. Thus, there is a shared incentive to improve the resilience of the electricity infrastructure to respond to the impacts of climate change.

EAGA should seek to work collaboratively with Distribution Network Service Providers (DNSPs) to increase the physical resilience of electricity infrastructure and address the following:

- Reduce the risk of bushfires from powerlines
- Ensure street trees are valued as community assets and important solutions to heatwaves and that all reasonable steps are taken to ensure their preservation
- Reduce the number of mortalities associated with heatwave events by decreasing the cost exposure and dependence on centralised energy supply for vulnerable segments of the community
- Identify critical council facilities and seek to improve energy reliability during climatic events

In particular collaboration should seek to:

- Replication of the Ausnet Services program that links code red/extreme fire days with critical peak pricing to reduce demand and bushfire risks within the Powercor region by summer of 2015/16
- The development of a clear, transparent and consistent process for the application of engineering solutions to vegetation management (including the recognition of all costs and the value of natural assets)
- Leverage DNSP investment and Council engagement channels (and rate based mechanisms) to install renewable energy generation on vulnerable households (see Action 3)
- Develop a unified protocol for engagement with vulnerable segments of the community and implement pricing structures for the supply of energy that recognise financial hardship in identified segments and supports reducing demand

Complementary actions:

- ◇ Critical council infrastructure requiring reliable electricity could include potential for off-grid renewable energy backup supply during heatwaves and other extreme weather events
- ◇ Continue EAGA projects to increase energy efficiency in council operations and assets



## OBJECTIVE 7

# Improve the regions drought and flood resilience by diversifying water supply, improving water use efficiency and redirecting stormwater overflow

**Action 7: Collectively work with Melbourne Water and water retailers to maximise opportunities for alternative water use including identification of regional stormwater capture and reuse opportunities**

Many of the risks identified in the climate change risk assessment relate to projections of reduced water availability for the region as well as increased likelihood of flooding events from intense rainfall events.

It is important that the region can diversify its water supply, and reduce water usage and reliance on existing reservoirs, planning for flexibility as rainfall patterns change. This will be increasingly important as the population in the region is expected to increase in the coming decades.

Integrated Water Cycle Management (IWCM) considers the water cycle holistically. It looks at different approaches to water supply and demand management, stormwater management and wastewater treatment against multiple criteria, including environmental, social, technical and economic factors as well as those concerning biodiversity and public health. Facilitating IWCM is an important climate adaptation response, and successful implementation across the region will reduce many of the existing water management risks already being realised by EAGA councils.

EAGA councils should seek to identify opportunities for cross council stormwater recapture sites and promote water recycling initiatives and fit for purpose water sources. These sites could provide an important alternative source of water for irrigating local parks, reserves and sports grounds.

Councils should continue to work with Melbourne Water, Yarra Valley Water, and the Victorian State Government to develop an Integrated Water Management Strategy for the region, in addition to continuing on the journey towards becoming water sensitive cities.

### Complementary actions:

- ◇ Continue to advocate through MAV for new revenue streams for councils to fund IWCM
- ◇ Promote IWCM and WSUD design principles at plan making and development assessment stages and promote water sensitive precincts
- ◇ Seek to use existing heat vulnerability data to identify priority areas for WSUD (See action 2)
- ◇ Promote water recycling initiatives and fit for purpose water sources
- ◇ Work with other stakeholders such as the CRC for Water Sensitive Cities to improve regional downscaled modelling of climate change and associated hydrological projections

### Case Study: Little Stringybark Project

The Little Stringybark Creek Project started in 2008 in Melbourne's east and is an Australian first catchment scale stormwater retrofit project focussed on urban stream restoration. The project has carried out works on private and public land at a range of scales to improve stormwater harvesting, integrated with stormwater filtration and infiltration techniques.

The project has successfully tested and evaluated alternative approaches to community engagement (including market-based incentives) for funding stormwater management. It has also developed and refined Water Sensitive Urban Design (WSUD) techniques that are cheaper, easy to design and construct, robust and low-maintenance, and suitable for protecting streams around Melbourne.

Data has been collected on the energy efficiency and reliability of rainwater harvesting systems. Also, the project has re-evaluated the costs and benefits of stormwater retention and harvesting at different scales, which is being fed into a number of Melbourne Water and related policy initiatives.

## OBJECTIVE 8

### Build organisational capacity across EAGA Councils to respond to climate change risks

#### Action 8: Develop a regional adaptation capacity building program to champion adaptation through collaboration:

The EAGA regional climate change risk assessment identified risks to almost every aspect of council decision making. It also recognised that to date, most of the risks from climate change sit with sustainability and emergency management teams.

To properly address the wide ranging risks of climate change to Council operations and service delivery it is important that support is maintained at the executive level.

Local Government is engaging with the Victorian State Government to gain further clarity on a Memorandum of Understanding on adaptation roles and responsibilities, as part of the Victorian Climate Change Adaptation Plan (DSE 2013). Therefore it is important that there is a deeper understanding by local government of the issues at stake when negotiating.

The Roadmap project has helped Council staff to engage with climate change as a local issue. Through the risk assessment and adaptation planning staff responded that they came to understand how climate change is likely to impact on their work area. This is an important element of capacity building, for staff in different service areas to understand how they can mitigate climate change risks in their decisions.

To ensure that climate change risks are considered by each Council, it is suggested that EAGA engage with the senior management and Councillors by developing a regional template for a program to promote climate adaptation 'champions'.

#### Complementary actions:

- ◇ Work with Victorian Government adaptation mentors to scope and implement the adaptation capacity building program
- ◇ Continue to embed climate change risks and responses in council risk registers, strategies and plans
- ◇ Develop adaptation resources/tools and regional events for sharing of knowledge, consolidating best practice case studies between Councils
- ◇ Research on the potential financial impacts of climate change on existing land use planning and estimate costs of inaction versus costs of adaptation

#### Case Study: Goulburn Broken Local Government Sustainability Training Program:

As part of a VASP funded project, the Goulburn Broken Greenhouse Alliance undertook a series of sustainability training programs across the Local Government Authorities in the region.

In particular, one training program of the project was directed at senior management and Councillors to facilitate support for effective integration of sustainability into the leadership, decision making and day to day operations of LGAs.

The program involved a 5 hour workshop at each of the 8 Councils to help build greater capacity for integrating sustainability principles into decision making. Despite the projects successful evaluation, it was noted that further follow up sessions would have improved the longer term outcomes.



## OBJECTIVE 9

### Improve biodiversity and open space management responses to climate change



Action 9: Seek further funding for reporting and analysis of the EAGA Biodiversity Monitoring Framework and developing regional responses.

As part of another VASP funded project, EAGA is developing and trialling a draft framework for monitoring biodiversity health from the impacts of climate change. By using the framework, Councils will develop a body of information that will inform adaptive Natural Resource Management (NRM) practices in the context of climate change, provide an evidence base to inform future investment and capture 'stories' to share with communities.

EAGA should seek further funding to assist with the ongoing reporting and analysis of data associated with the roll out of the trial framework.

It should also seek to interpret the data and work with Council staff and other stakeholders to develop regional responses to the impacts of climate change on biodiversity.

Complementary actions:

- ◇ Develop a procurement project for regional sharing arrangements of arborists after major storm events
- ◇ Identify opportunities to improve and increase biodiversity in the region such as through Action 2
- ◇ Consider provisions for migration of animals and plant within a regional greening strategy eg. corridors
- ◇ Work with the community to increase awareness and capacity for support strategies for animal and plants in extreme weather events and fires and heatwaves
- ◇ Participate in and support the Port Phillip and Western Port Catchment Management Authority (PPWPCMA) Climate Change Adaptation Strategy for biodiversity across the region by ensuring council plans compliment the strategy



## OBJECTIVE 10

### Increase regional food security

#### Action 10: Understand the regional food network and work together to diversify and promote urban food production

Climate change will affect regional food security through prolonged droughts and sudden extreme events including bushfires, on top of existing pressures of urban growth and population pressures and rising energy costs.

An analysis of Victoria's food supply chain (Larsen et al. 2011) found that there are significant food security risks in the region for the future, in particular to the provision of critical and non exchangeable foods such as fruit and vegetables.

A key part of building resilience to these future food security risks is to strengthen and diversify the regional food economy; food that is grown and processed locally and sold primarily for local or regional markets.

Local government can play an important role through delivery of its programs, policies and management of its land and resources as well as encouraging, facilitating and advocating for food production in urban and peri urban areas.

Urban and peri urban food production facilitates opportunities for local management of harvested rainwater, waste water and nutrient waste. Also, promoting local food reduces energy and transport demand, builds community and social cohesion, creates local employment and can also help to reduce other climate change risks such as heatwaves and flooding.

EAGA Councils should seek to engage with the community, food producers and food businesses to understand the issues and key barriers to building a stronger local food economy in the East. A series of community/stakeholder workshops could be undertaken to map activity in the regional food economy and identify opportunities for joint projects.

This could identify projects that seek to:

- Take advantage of waste and nutrients concentrated in population centres and seek to redirect waste streams (food, water etc.) back into food production systems (this would include retrofitting existing areas and innovative approaches for new developments).
- Diversify urban food production to promote more resilience to extreme events
- Reduce overall energy and transport demand in both domestic travel and industrial freight
- Reduce import dependency and act as a buffer to food system shocks in other regions that may experience prolonged droughts or other events
- Identify dormant landholdings that could be utilised for community food production (eg. Council, Vicroads, Melbourne Water, those awaiting development etc.) on a permanent or temporary basis.

Complementary actions:

- ◇ Develop a food business network with regular networking events including a food forum focused on business
- ◇ Support community food projects eg. local food swapping activities such as the Whitehorse Urban Harvest Food Swap and Croydon Food Swap
- ◇ Advocate for recognition of urban food production in the State Planning Policy Framework
- ◇ Develop a composting hub (eg in-vessel composter) as a demonstration project for how food waste can be managed locally.
- ◇ Develop Council policies regarding growing of food in public spaces eg verges, parks, roadsides etc. to increase the visibility of food growing in the community.





## CONCLUSION

### Recommendations for Implementation

The Roadmap has identified and prioritised 10 high value adaptation initiatives that EAGA Councils could adopt now and in the medium term. The majority of the objectives and responses outlined in this roadmap are interrelated and connected. Actioning a response to one objective can, if appropriately designed and coordinated, deliver outcomes for other objectives. For example, projects around green infrastructure will also improve stormwater management, and potentially help to address food security and reduce energy demand. Similarly, identifying stormwater recapture sites could also deliver benefits for community food gardens or irrigation of urban forests. It is important that these linkages are maintained in the development of any initiatives. Equally, it is important that actions taken to address one objective do not conflict with other objectives. For example increasing food production on dormant landholdings should be designed to ensure there is no adverse impact upon biodiversity.

The responses have focused where possible on initiatives that EAGA can pursue, subject to funding and member Council support. Other initiatives will require more regional and external partners to local government where responsibilities and influence over control is less clear. Certain responses may also fit better within existing regional structures, for example Action 7, whilst other options may be best implemented by individual Councils.

### Next Steps

An ongoing monitoring and evaluation framework will be developed to ensure the Roadmap and adaptation responses can evolve over time as windows of opportunity arise and with changing Council priorities.

The mix of priority initiatives identified in this Roadmap is based on current risks and priorities. The actions identified in the Roadmap have been prioritised for those that can be undertaken now based on current risks and opportunities. In coming years, climate change may require more transformational adaptation actions.

The factors that influence these priorities will change over time and therefore need regular re-evaluation utilising the methodology in Appendix 1 and further response options that are included in Appendix 2.





## GLOSSARY

**Adaptation:** Adaptation is about increasing public and private resilience to climate risks through better decisions about managing our built and natural environment and taking advantage of opportunities.

**Adaptive capacity:** potential or capacity for a system to adjust to climate change, including variability and extreme events, so as to reduce potential risks, take advantage of opportunities or cope with the consequences.

**Climate risk:** a risk (likelihood x consequence) resulting from climate change and affecting natural and human systems and regions.

**Green infrastructure:** is the network of designed and natural vegetation found in our cities and towns, including public parks, recreation areas, remnant vegetation, residential gardens, street trees, community gardens, as well as innovative and emerging new urban greening technologies such as rain gardens, green roofs and green walls.

**Mitigation:** actions taken to reduce the occurrence of climate change, focussing on greenhouse gas reductions and carbon sequestration

**Precautionary principle:** an approach to risk management that has been developed in circumstances of scientific uncertainty, reflecting the need to take prudent action in the face of potentially serious risk without having to await the completion of further scientific research.

**Stormwater:** Rainfall runoff from all types of surfaces. Stormwater is mostly generated in urban catchments from hard surfaces such as buildings, roads and pavements.

**Urban heat island effect:** The additional heating of the air over a metropolitan area as the result of the replacement of natural, vegetated surfaces with asphalt, concrete and rooftops.

**Vulnerability:** is the degree, to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is often a measure of how a system is exposed to a particular hazard, its sensitivity and adaptive capacity.

**Vulnerable people:** community members with diminished capacity to anticipate, cope with, resist and recover from the impacts of climate change such as low income households, homeless people, people with disabilities, elderly citizens and young people, people who require frequent access to medical services and or with mental illness.

**Water sensitive urban design (WSUD):** A broad term for achieving water efficiency, stormwater treatment to improve water quality, and the capture and reuse of alternative water sources such as rainwater, stormwater and wastewater

## ACRONYMS

**EAGA:** Eastern Alliance for Greenhouse Action

**IPCC:** Intergovernmental Panel on Climate Change

**CSIRO:** The Commonwealth Scientific and Industrial Research Organisation

**OHS:** Occupational Health and Safety

**MAV:** Municipal Association of Victoria

**MPA:** Metropolitan Planning Authority

**PV:** Photovoltaic

**MEFL:** Moreland Energy Foundation Limited

**HACC:** Home and Community Care

**CALD:** Culturally and Linguistically Diverse

**MEMP:** Municipal Emergency Management Plan

**EMV:** Emergency Management Victoria

**DNSP:** Distributed network service provider

**IWCM:** Integrated Whole Cycle Management

**NRM:** Natural Resource Management

**VASP:** Victorian and Adaptation Partnership

**PPWPCMA:** Port Phillip and Western Port Catchment Management Authority





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# CLIMATE CHANGE ADAPTATION ROADMAP FOR MELBOURNE'S EAST

A guide for decision makers in the EAGA Councils



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