

Climate Change Strategy and Action Plan – Literature review

Background report

City of Greater Dandenong

22 May 2019



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Table of contents

- 1. Executive summary 1
- 2. Introduction 6
 - 2.1 Climate change science 7
- 3. Global policy context..... 9
 - 3.1 The 2015 Paris Agreement..... 9
- 4. National policy and legislative context.....11
- 5. State policy and legislative context14
- 6. Local Government climate policy context16
- 7. The CoGD and its socioeconomic and policy context.....18
 - 7.1 CoGD profile18
 - 7.2 CoGD local government policies and regulations.....19
 - 7.3 Climate Change Adaptation Governance Assessment21
 - 7.4 Financial Risks Adaptation Planning Initiative22
- 8. Case law and precedents24
- 9. Overview of climate trends and associated risks for Greater Dandenong.....27
 - 9.1 Climate risks to the CoGD28
 - 9.2 Key initiatives identifying climate change risks and application of adaptation actions.....29
- 10. Social and economic impacts of climate change31
 - 10.1 Social Impact and inclusion analysis.....32
 - 10.2 Economic impact analysis32
- 11. Leading practice approaches to climate change adaptation and mitigation.....34
 - 11.1 International collaboration on climate change issues by governments internationally.....34
 - 11.2 Collaboration on climate change by local government in Australia.....35
 - 11.3 Case Studies highlighting leading practice climate action.....36
- 12. Consideration of the framing for the CoGD’s Climate Change Strategy and Action Plan.....43
- 13. Next steps47
- Appendix A References49

List of figures and tables

Figures

Figure 1 - Key background reports to be delivered as part of the development of CoGD’s Climate Change strategy and action plan 1

Figure 2 - Effect of greenhouse gasses on global climate 7

Figure 3 - Global carbon emissions corresponding to each Representative Concentration Pathway (RCP) and related temperature projections to 2100..... 7

Figure 4 - Jobs in the CoGD per sector in 201618

Figure 5 - Location of the Victorian Greenhouse Alliances35

Figure 6 - 5 conditions of behaviour change according to the Changeology theory43

Tables

Table 1 - Scores across the Climate Change Adaptation Governance Assessment22

Table 2 - General overview of environmental, economic and social risks posed by projected climate change and relevant linkages to the CoGD and its operations28

Table 3 - Table of actions in the Queensland Climate Change Response37

Table 4 - Victorian Legal Tools for Adaptation38

1. Executive summary

1. Executive summary

The City of Greater Dandenong (CoGD) is a Local Government Area located in the south-east region of Melbourne, Victoria. With recent policy changes at a State level in relation to climate change, including the proposed *Local Government Bill 2018* that sees Councils' responsibilities to act in the long-term interest of residents in relation to climate change embedded within the legislation, the City of Greater Dandenong Council (Council) has engaged Ernst & Young (EY) to develop the CoGD Climate Change Strategy and Action Plan, to guide the CoGD towards zero emissions and prepare for the impacts of climate change.

This Literature Review is one of four Background Reports (outlined in Figure 1) prepared by EY to inform the development of the CoGD Climate Change Strategy and Action Plan. The literature review discusses the context of climate change and the potential impacts for Council the community.













Figure 1 - Key background reports to be delivered as part of the development of CoGD's Climate Change strategy and action plan

The climate challenge

Research from the Intergovernmental Panel on Climate Change (IPCC) and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meteorology (BoM) supports the scientific consensus that human-induced warming of the atmosphere and oceans is unequivocal, and that this is causing, and will continue to cause, significant changes in the Earth's climate. These changes will impact socio-economic and biological systems¹. The potential impacts of climate change for CoGD has been informed by CSIRO and BoM research which indicates that the CoGD will experience higher temperatures, lower rainfall and increased frequency and intensity of heatwaves, bushfires, and storms. These impacts (summarised in the table below) will have consequences for the social, environmental, and economic well-being of the CoGD.²

Table 1 - General overview of environmental, economic and social risks posed by projected climate change and relevant linkages to the CoGD and its operations

Climate Variable	Examples of how these changes to the climate may affect Greater Dandenong
Higher average (mean) temperatures	 Biodiversity loss  Electricity and water consumption
Higher maximum temperatures (hot days above 35°C)	 Postponement/cancellation of events  Infrastructure repair and maintenance costs
Frequency and intensity of heatwaves	 Reduced appeal, public amenity and use of green infrastructure  Public health and wellbeing
Frequency and intensity of bushfires	 Disruption/damage to utilities, transport, residential and commercial infrastructure
Decrease in rainfall	 Increased irrigation requirements  Exceedance of storm water drainage capacity
Increased intensity of extreme storm events	 Council-specific (i.e. delivery of key services, reputational damage)

International efforts to tackle climate change include the COP21 Paris Agreement (COP21, 2015), an historic accord made in 2015 aiming to limit global warming to 2 degrees (and to pursue best efforts to keep warming to within 1.5 degrees above pre-industrial levels) and a long-term goal to reach carbon neutrality in the second half of this century. However, the world is not currently on track to meet this goal. The IPCC estimates that global warming is likely to reach 1.5 degrees Celsius between 2030 and 2052, if warming continues at the current rate. The IPCC also outlined that the climate-related risks for natural and human systems (including risks to health, livelihoods, food security, water supply, human security, economic growth, species loss and extinction) are significant even at 1.5 degrees Celsius. Avoiding exceeding the 1.5 degrees Celsius threshold requires an increase in the scale and ambition of emission reduction action (IPCC, 2018). This reinforces the urgent need to reduce emissions (climate change mitigation) and prepare for the unavoidable consequences of climate change (climate change adaptation).

City-level climate action

As the world becomes increasingly urbanised with 66% of the world's population projected to live within metropolitan areas by 2050 (EY, 2018), cities are increasingly becoming key actors driving action to avoid dangerous climate change. Metropolitan regions currently consume more than two-thirds of the world's energy and account for more than 70% of global CO₂ emissions (C40, 2018). They also have the greatest amount to lose due to the potential of changing weather patterns and extreme events to erode the resilience of cities and their communities. If Australian cities are to deliver on the aim of the Paris agreement to strengthen the global response to climate change through efforts to limit temperature increase to well below 2 degrees Celsius, then action in cities to mitigate and adapt to climate change is crucial.

¹ An overview of climate change science is provided in Section 2 of this literature review.

² An overview of climate trends and associated risks for the CoGD is discussed in Section 9 of this literature review. Further detailed analysis on climate risks is provided in the Climate Change Risks and Adaptation Analysis Background Report.

The Australian context

Within Australian metropolitan regions local climate action is driven by local Government. However, there are key Australian government policies at the national level that shape Australia's response to climate change, including the Emissions Reduction Fund, Renewable Energy Target, National Energy Production Plan and National Climate Resilience and Adaptation Strategy, as well as Australia's emissions reduction target included in its Nationally Determined Contribution to the Paris Agreement (Australia has committed to reducing emissions by 26-28% below 2005 levels by 2030). These policies and others provide an overarching, nationally consistent, framework for investment, market-based incentives and response planning.

At the state level, the Victorian government has implemented a number of policies that support climate change mitigation and adaptation. The TAKE2 Climate Change Pledge launched in 2016 saw Victorian government agencies, businesses and organisations pledge commitments to keeping global warming below 2 degrees, and was followed up by the *Climate Change Act (2017)* that provides a legislative framework for the State to manage climate related risks, and sets a net zero emissions target for 2050.

At the local level, the proposed *Local Government Bill (2018)* increases the responsibilities for Councils and Mayors in relation to reporting on progress on Council Plans to the local community, as well as explicit reference to climate change and some specific extensions of climate and environment related benefits, including extending environmental upgrade agreements to residential as well as commercial land owners, to give residents the opportunity to tap into funding and programs to improve energy, water and waste efficiency. This sets the expectation of local government to act in the long-term interests of its community by planning to reduce emissions and improve the resilience of the local community and economy to the impacts of climate change.

CoGD's role

The CoGD has committed to developing a Climate Change Strategy and Action Plan. Whilst it does not currently have a specific climate change policy, there are several relevant policies in place that consider some aspects relevant to climate change planning, including: the Council Plan, Imagine 2030, the Risk Management Strategy and Policy and the Municipal Emergency Management Plan. These documents are general in nature and are focused on the responses to identification of risks or emergencies, rather than the nature of the events themselves. The Sustainability Strategy is more explicit in its focus on climate change, with significantly more emphasis on mitigation opportunities than adaptation activities. Developing Climate Change Strategy and Action Plan will build on these existing plans and will seek to expose the potential synergies and trade-offs with other existing CoGD plans and priorities.³

Actions to address climate change can also deliver additional co-benefits beyond reducing emissions and improving resilience to the impacts of climate change, supporting the many of the CoGD's other priorities. Actions to address climate change can deliver localised benefits such as improved health and well-being outcomes for the community. Major economic studies, considering the economics of climate change, have highlighted the economic costs of inaction; concluding that failing to address climate will in-the long run cost more than the cost of action to mitigate climate change (Stern, 2006) (Garnaut, 2008).

Examples of leading practice in neighbouring councils, and internationally, demonstrates that a range of responses and tools are available to support action on climate change, depending on the specific vulnerabilities and objectives of the Council. The level of ambition varies between existing local governments plans; the development of the CoGD's Climate Change Strategy and Action Plan represents an opportunity for the CoGD to take a leadership role in Melbourne's south east.

³ The Gaps Analysis Evaluation Background Report provides further details on the strengths of CoGD's existing approach as well as highlighting areas for improvement, and a set of recommendations of how CoGD's approach to climate change can be improved through the development of the Climate Change Strategy and Action Plan.

To support the global effort to reduce emissions and adapt to the changes we cannot avoid, networks have been established to encourage ambitious local action. The C40 Cities Climate Leadership Group is a network of cities supporting the development of best practice mitigation and adaptation activities and influencing national and international policy agendas. The Compact of Mayors, Local Governments for Sustainability and the Carbon Climate Registry are other networks and frameworks to support local governments in monitoring, understanding and reducing their impact and the impacts of climate change. The Cities for Power Partnership and Victorian Greenhouse Alliance are providing local peer support to cities acting on climate change. The tools and resources developed by these networks can be leveraged to support the development of the CoGD's Climate Change Strategy and Action Plan.

Next steps

Three additional Background Reports will be developed to establish the evidence base for the development of an informed and effective Climate Change Strategy and Action Plan. These include:

- ▶ **Gap Analysis and Evaluation report** – having a detailed understanding of CoGD's current progress on climate action is critical for determining what further action needs to be taken and where to start. EY will undertake a gap analysis to evaluate the CoGD's existing corporate and community climate change related policies, strategies plans and actions against an established climate action planning framework. The report will provide recommendations on how to improve and strengthen the CoGD's response to climate change.
- ▶ **Greenhouse gas Emissions Profile and Mitigation Analysis** – an understanding of the CoGD's current emissions profile is required before mitigation actions can be targeted to areas that will achieve the greatest impact. Two Greenhouse Gas (GHG) inventories will be developed: one for the Council's own operations and one for the broader community. Following this EY will support the CoGD to identify and prioritise a suite of proposed actions designed to reduce emissions.
- ▶ **Climate Risk and Adaptation Analysis Report** – this report will address the climate impacts that cannot be avoided. Stakeholders will be engaged to identify priority environmental, economic and social risks associated with climate change and the adaptation options to address them and improve CoGD's resilience.

To support the development of a robust Climate Change Strategy and Action Plan, undertaking a Social Inclusion and Economic Impact Analysis is key to identifying and assessing the costs and benefits of climate change actions and determine what economic benefits are represented by the avoided social and economic damage costs of greenhouse gas emissions.

2. Introduction

2. Introduction

The CoGD has engaged EY to develop a Climate Change Strategy and Action Plan covering both mitigation and adaptation. Council recognises that climate change will continue to cause significant climate, economic and social issues for the CoGD, and hence is committed to reducing greenhouse gas emissions and reducing the risks, liabilities and costs associated with climate change. The purpose of the Strategy is to assist the CoGD to respond to the impacts of climate change, to observe the relevant legislative obligations and guidelines, and to identify opportunities to reduce GHG emissions.

This Literature Review and Discussion Paper is one of four Background Reports prepared by EY as part of an eight-stage approach to developing the Strategy. Alongside this Literature Review and Discussion Paper, EY will prepare a Gap Analysis and Evaluation Report, GHG Emissions Profile and Mitigation Analysis Report, and Climate Change Risk and Adaptation Analysis Report. This Literature Review captures:

- ▶ Scientific literature including reports and analysis from the IPCC, the CSIRO, BoM and other independent research organisations.
- ▶ The global policy context guiding action on climate change (including the United Nations 2015 Paris Agreement).
- ▶ Federal and State government policy and regulations, that provide the Australian context for city-level action on climate change.
- ▶ The CoGD's context and existing suite of policies, strategies and action plans.
- ▶ Illustrative case law precedents outlining climate-related legal challenges and the potential implications for the CoGD in developing its Climate Change Strategy and Action Plan.
- ▶ Discussion of the social and economic impacts of climate change.
- ▶ Identification and evaluation of other local government climate change strategy and action plans, including examples of leading practice.

The Literature Review aims to provide a contextualised view of climate change as it relates to CoGD and a foundational knowledge and understanding to support and inform the development of the Climate Change Strategy Action Plan. It also considers potential framings for the Strategy's key messages, aiming to solicit support from the community as key stakeholders in achieving collective climate action.

2.1 Climate change science

The Fifth Assessment Report released by the IPCC is a seminal and widely accepted documentation of the science behind human-induced climate change (IPCC, 2013). The IPCC Report is supported by research from the CSIRO and BoM describing long-term future trends in Australia's climate (CSIRO, n.d.).

The greenhouse effect refers to the process whereby certain gases naturally trap heat in Earth's atmosphere, warming the Earth's surface and making the planet habitable. Since the Industrial Revolution, anthropogenic (originating from human activities) greenhouse gases emitted into the atmosphere have intensified this effect, trapping more energy in the atmosphere, further warming the Earth. This phenomenon is known as global warming, and is the fundamental driver of climate change (see Figure 2).

Climate change may present in many ways, including hotter days and nights, changing rainfall, wind and storm patterns, and sea-level rise. These changes may in turn increase flooding, drought, heat waves, and bushfire frequency and magnitude. These physical changes in the environment present significant challenges for socio-economic and biological systems in the near and longer term.

Due to the strong influence of anthropogenic emissions on the climate system, and the uncertainty in future emissions generating activities, the IPCC's Fifth Assessment Report made use of scenario analysis to assess the range of possible impacts from climate change using Representative Concentration Pathways (RCPs). The RCPs show the pathway, or trajectory, of GHG concentrations in the atmosphere to reach a particular level of radiative forcing by 2100. These emissions pathways are underpinned by socio-economic narratives of population, economic activity, and energy consumption and land use. Named for the radiative forcing level they each represent (the energy added to the Earth's system by greenhouse gases, usually expressed in watts per square meter (W/m²), the four RCPs are 2.6, 4.5, 6 and 8.5. In Figure 3, RCP 2.6 is shown as green, 4.5 as yellow, 6 as orange and 8.5 as red, as the temperature projections under the different scenarios out to 2100. Climate change scenarios from different RCPs will be selected for the adaptation analysis work to be conducted as part of this current analysis.

In October 2018, the IPCC released a Special Report on global warming of 1.5 degrees Celsius. The headline findings of this report outlined that human activities are estimated to have caused approximately 1 degree Celsius of global warming above pre-industrial levels (i.e. before the industrial revolution (c.1850) when human activity increased the concentration of GHGs in the atmosphere, predominantly through the burning of fossil fuels). The IPCC estimate that global warming is likely to reach 1.5 degrees Celsius between 2030 and 2052, if warming continues at the current rate. The report also outlined that the climate-related risks for natural and human systems (including risks to health, livelihoods, food security, water supply, human security, economic growth, species loss and extinction) are significant at even at 1.5 degrees Celsius. Avoiding exceeding the 1.5 degrees Celsius threshold requires an increase in the scale and ambition of emission reduction action (IPCC, 2018). This reinforces the urgent need to reduce emissions (climate change mitigation) and prepare for the unavoidable consequences of climate change (climate change adaptation).

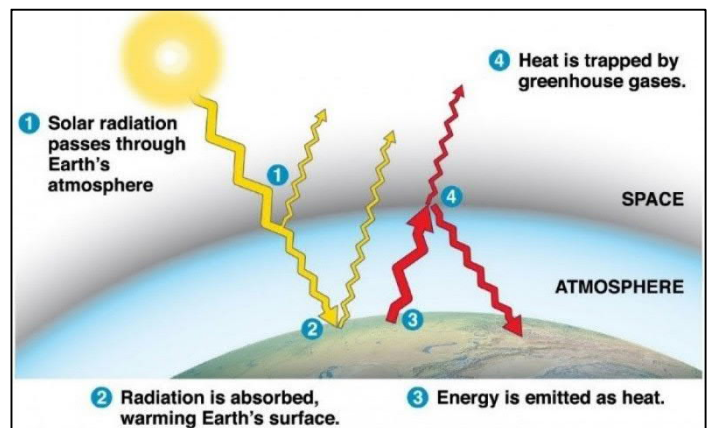


Figure 2 - Effect of greenhouse gasses on global climate (Urry et al. 2016)

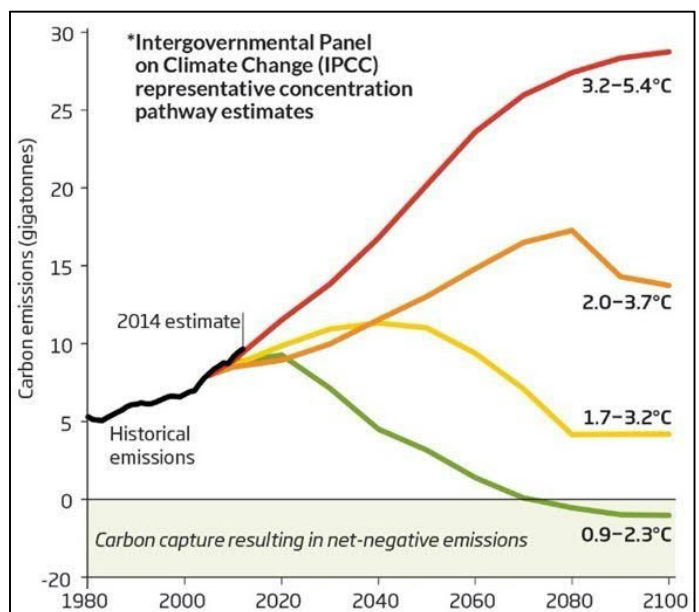


Figure 3 - Global carbon emissions corresponding to each Representative Concentration Pathway (RCP) and related temperature projections to 2100 (Yamatin, 2016)

3. Global policy context

3. Global policy context

3.1 The 2015 Paris Agreement

In 2015, over 190 countries met at the United Nations Framework Convention on Climate Change (UNFCCC) 21st Conference of Parties (COP21) Paris climate conference and formed the accord now known as the Paris Agreement. The Agreement sets out a universal goal to keep global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Countries have pledged emissions reduction targets to help achieve this goal, however the current level of ambition contained in these pledges (known as Nationally Determined Contributions (NDCs)) is insufficient to meet the 2 degrees goal.

As the world becomes increasingly urbanised with 66% of the world's population projected to live within metropolitan areas by 2050 (EY, 2018), cities are increasingly becoming key actors driving action to avoid dangerous climate change. Metropolitan regions currently consume more than two-thirds of the world's energy and account for more than 70% of global CO₂ emissions (C40, 2018). They also have the greatest amount to lose due to the potential of changing weather patterns and extreme events to erode the resilience of cities and their communities. If we are to deliver on the aim of the Paris agreement to strengthen the global response to climate change through efforts to limit temperature increase to well below 2 degrees Celsius, then action in cities to mitigate and adapt to climate change is crucial.

As part of the Paris conference, more than 440 mayors took part in the Climate Summit for Local Leaders, resulting in local leaders collectively committing to “deliver up to 3.7 gigatonnes of urban greenhouse gas emissions reductions annually by 2030 – the equivalent of up to 30% of the difference between current national commitments and the 2 degree emissions reduction pathway identified by the scientific community” (Global Taskforce, 2016).

The importance of city-level action on climate change was also highlighted throughout COP21 by the **Lima-Paris Action Agenda**, a framework for non-state actors such as cities, business and civil society organisations to reduce greenhouse gases and improve resilience to climate change. The initiatives under this agenda present concrete solutions applying technological, political and financial innovations. Alongside this and other initiatives, dozens of cities expressed their commitment to implement the Paris Agreement by signing the Paris Pledge for Action. This significant level of commitment and ambition conclusively established Cities as key players in the global effort to tackle climate change (Global Taskforce, 2016) (Gillard, 2015).

4. National policy and legislative context

4. National policy and legislative context

In the lead up to the 2015 COP21 Paris Climate Conference, participating nations were required to submit **NDC** outlining their proposed commitment to climate change mitigation actions. Australia's commitment was to set an "economy-wide target to reduce greenhouse gas emissions by 26 to 28% below 2005 levels by 2030" (Australian Government, 2015). This target doubled the ambition of Australia's previous target to 2020 of 13% equivalent below 2005 levels. Against 2005 levels, Australia's Paris NDC target represents projected cuts of 50 to 52% in emissions per capita (although Australia's per capita emissions are amongst the highest in the world) and 64 to 65% per unit of GDP by 2030. As such, this target is considered by the Australian Government to be equitable and ambitious compared to other major economies on a per capita and GDP intensity basis (Australian Government, 2015). However, the current Australian NDC is not considered to be consistent with the Paris Agreement goals, which requires carbon neutrality in the second half of this century (Climate Action Tracker, 2018). It is worth noting that the Paris Agreement also established a mechanism for enhancing the ambition of countries' emissions targets over time to ensure significant action is taken urgently to avoid exceeding the 2 degrees goal.

Part of determining the NDC involved planning processes and policies designed to contribute to the achievement of Australia's target. The **Emissions Reduction Fund (ERF)** is a part of the federal government's Direct Action Plan, where Australian business are directly supported to reduce emissions through reverse auctions, while improving productivity (Australian Government, 2016). The first auction under the Fund was held in April 2015, purchasing more than 47 million tonnes of abatement activities at an average price of AU\$13.95 per tonne (Australian Government, 2015). Supporting the abatement purchased through the Fund is the Safeguard Mechanism (Department of Environment and Energy, 2016), which commenced in July 2016 and requires Australia's largest emitters to keep emissions below an established baseline level. This program ensures emissions reductions purchased under the ERF are not offset by rises in emissions elsewhere in the economy (Department of Environment and Energy, 2016). Australia also has policy measures in place to promote the expansion of renewable energy and improve energy efficiency, such as the Renewable Energy Target (RET) scheme. Under the RET, over 23 per cent of Australia's electricity will come from renewable sources by 2020 (Australian Government, 2015).

In December 2015, the **National Climate Resilience and Adaptation Strategy** was released, which captures how Australia is managing the risks from climate change in Australia, while also identifying best practice adaptation and resilience building measures. It sets out principles for effective adaptation practices and resilience-building activities and describes the Government's vision for a climate-resilient future (Australian Government, 2015).

Also in December 2015, the **National Energy Productivity Plan (NEPP)** was released. The NEPP is a framework and workplan of measures to improve Australia's energy productivity by 40% between 2015 and 2030, measured in economic output (GDP) per energy unit consumed (PJ). Australia has been identified as the one of the least energy efficient developed countries in the world (ACEEE, 2018). The NEPP was developed by the COAG Energy Council in an effort to provide a nationally consistent approach to energy productivity improvement, increasing certainty and reducing regulatory burden for businesses. This was driven by three key acknowledgments: energy productivity allows businesses to reduce their energy costs through innovation and modernising their infrastructure, households benefit through lower energy bills and increased home comfort, and will support Australia to reduce its greenhouse emissions (Australian Government, 2015). The NEPP operates through two primary means, including energy market reforms to promote consumer choice and increase competition and innovation in the energy market, and energy efficiency measures that support better energy use in buildings, equipment and vehicles.

In 2017, the Australian Government reviewed its climate change policies (**2017 Review of Climate Change Policies**) to ensure they remain effective in achieving Australia's 2030 target and commitments under the Paris Agreement. Other policies identified in the Review not already mentioned here include the **Green Vehicle Guide**, which provides information to car purchasers about vehicles performance, and the **Clean Energy Finance Corporation** and **Australian Renewable Energy Agency**, which fund major investment to support transition of the energy sector.

Released in 2011, the **Our Cities, Our Future**: A national urban policy for a productive, sustainable and liveable future National Urban Policy Paper provided a framework for delivering on the aspirations for Australian cities, including supporting cities to become more productive, sustainability and liveable. Given the significant proportion of both Australian economic activity and population that resides in major cities, the Paper identifies cities as representing both a key opportunity and a key risk, especially with regards to climate change resilience and adaptation. This Paper has since been superseded by the Smart Cities Plan described below (Dept. Infrastructure and Transport, 2011).

The **Smart Cities Plan**, released in 2016, describes the Federal Government's vision for future cities and outlines a framework for achieving this vision. The Plan aims to support the development of productive, accessible, liveable cities that attract talent, encourage innovation and create jobs and growth. A central acknowledgement of the approach outlined in the Plan is that in order to achieve the best outcomes for cities and the people living within them, collaboration and partnerships between communities, the private sector and all levels of government are necessary. Local government is charged with concerns such as zoning and development approvals, connectivity between housing and job centres, local infrastructure and roads, and value capture through local rates. A key initiative in the Plan to support this is City Deals, a mechanism for the development of collective plans for growth shared by all levels of government, industries and communities (Department of Prime Minister and Cabinet, 2016).

5. State policy and legislative context

5. State policy and legislative context

The Victorian Government has taken a leadership position nationally in the fight against climate change, going beyond the NDC target by pledging to reach **net zero emissions by 2050**. **Victoria's TAKE2** Climate Change Pledge sees government agencies, business and organisations pledge their commitment to keeping global warming below 2 degrees Celsius to avoid the worst impacts of climate change (Sustainability Victoria, 2017). This pledge program, launched in 2016, was followed up by the government passing the **Climate Change Act (2017)**, which came into force on 1 November 2017. This Act gives the state of Victoria a legislative foundation for managing climate-related risks and opportunities, and supports the state's transition to a low carbon economy (Department of Environment, Land, Water and Planning, 2017b). This framework is aligned with the Paris Agreement's commitment to keep global temperature levels well below 2 degrees Celsius above pre-industrial levels, and supports action from government, business and the community to drive the successful transition to low carbon in the state of Victoria (Department of Environment, Land, Water and Planning, 2017c).

Legislated targets for emissions reductions were outlined in the Climate Change Act (2017), with a net zero emissions target set for 2050, and **interim targets every five years from 2021-2025**. While these interim targets are yet to be decided by the State Government, the Act also includes a Climate Change Strategy and Adaptation Action Plan that sees the government already moving rapidly in the climate change mitigation and adaptation space. Further to this, the Victorian Government also announced a **40% Large Scale Renewable Energy Target (VRET) by 2025** for the state, which is an Australian-leading target designed to generate investment in the sector and help reduce uncertainty in the state in relation to the national renewable energy target.

The **Victorian Climate Change Adaptation Plan 2017-2020** outlines the states approach to climate change adaptation until 2020, and their efforts to increase resilience in Victorian communities to the short, medium and long-term impacts of climate change. This report includes projections of climate change impacts on the state, and includes analysis of potential impacts to the state, the economy and the community. The Adaptation Plan includes measures to build relationships within the state and more broadly nationally to help effectively respond to climate change risks and opportunities, and prioritises actions to mitigate and adapt to climate-related risks. This document looks at impacts and actions not just at the whole of government level, but across all policy areas and across all sectors of the community. Measurement and valuation of the Plan's actions are also included as a key commitment in the Plan to ensure its objectives are being met (Department of Environment, Land, Water and Planning, 2017c).

The **Local Government Act of Victoria (1989)** is the premier piece of legislation in the state that supports and governs the new and existing councils in the state of Victoria. This Act provides a framework for Victoria's 78 councils to operate, and includes provisions for important functions such as council governance and decision making, council rate and levy setting and payment, and the council's abilities to make and enforce laws in their city (Department of Environment, Land, Water and Planning, n.d.). In 2018, the **Local Government Bill (2018)** was introduced into State Parliament by the Minister for Local Government. The bill has been discussed with local communities for three years, and would, if approved, replace the Local Government Act of Victoria (1989). The proposed Act refers to the need for Councils to act in the best interested of the community, including future generations and explicitly calls out the need for Councils to promote 'the economic, social and environmental sustainability of the municipal district, including mitigation and planning for climate change risks'. The proposed Act also extends environmental upgrade agreements to owners of residential land, rather than just commercial owners. This would enable the benefits of environmental upgrade agreements, such as funding for energy efficiency, waste reduction and water efficiency measures to be accessed by both residents and businesses (Department of Environment, Land, Water and Planning, 2017a). This sets the expectation of local government to act in the long-term interests of its community by planning to reduce emissions and improve the resilience of the local community and economy to the impacts of climate change.

6. Local Government climate policy context

6. Local Government climate policy context

Several of the Victorian policies outlined in the preceding section have implications for Local Government. The Climate Change Act (2017) outlines that ‘decision makers must have regard to climate change’ and outlines a range of related Acts and associated responsibilities for decision makers at the State and Local Government levels. Specifically, this includes **the Public Health and Wellbeing Act 2008**, which is designed to protect the health of Victoria’s population and details Council responsibilities in community health. The legislation requires councils to create an environment which protects, improves and promotes public health. Under Section 26 of the act, Councils are required to prepare a **municipal public health and wellbeing plan**. This plan must include an examination on factors that impact community health in the municipality. It must also include strategies for creating an environment in which the local community can attain their desired level of health and wellbeing. Within its municipal health and wellbeing plan a council must be aware of any impending factors that threaten the health and wellbeing of its local community, including environmental factors, and design to mitigate these factors.

The **Planning and Environment Act 1987** is the key piece of legislation for land use planning in Victoria. The Act defines the roles and responsibilities of councils in responsible use, development and protection of land. Under the Act a council is required to act as both the planning authority and the party responsible for preparing and administering planning schemes. A council is required to prepare a **municipal strategic statement** which must detail strategic land use objectives and controls in place to achieve these objectives. It is the duty of the council under this Act to ensure that land use is planned and developed in a responsible manner that represents the interest of the local community.

There are two **Emergency Management Acts** in place in Victoria, one enacted in 2013 and the other in 1986. Part 4 of the 1986 Act details the responsibilities of municipal councils in emergency management. Section 20 of the Act requires councils to prepare and maintain and an emergency management plan for their municipality. This emergency management plan must identify and specify the use of resources in emergency prevention, response and recovery. This includes allocating resources for an actual or imminent emergency that in any way threatens to endanger any person within the municipality. A council must be prepared within its emergency management plan to handle any type of emergency that may affect the health and safety of its local community.

The **Water Act 1989** outlines roles and responsibilities relating to waterways, drainage and floodplain management. The primary role of a council in the Water Act is to fund, install and maintain fire plugs. It is the council’s responsibility to ensure that water is available to fire plugs and they remain in necessary working order.

7. The CoGD and its socioeconomic and policy context

7. The CoGD and its socioeconomic and policy context

The CoGD is a very diverse city, both in relation to its cultural communities and the employment profile of the community. With a heavy industrial base, the Council’s emissions profile differs from many other Victorian local government areas, and as such the council has different challenges facing it in relation to climate change mitigation, but also has different levers available to it to make those reductions. While the CoGD has a number of key policies, plans and programs already in place that guide its climate change mitigation and adaptation efforts, the Council still has many areas to further improve, develop and refine its strategy and successfully build community engagement and acceptance of efforts to address climate change at a Council level.

7.1 CoGD profile

The CoGD is a thriving and diverse city, home to 164 thousand people with a Gross Regional Product of \$13.7b in 2017 (City of Greater Dandenong, n.d. a). Its industrial precinct is one of Australia’s most significant and productive manufacturing areas, and the CoGD is home to successive waves of migrants, resulting in a diverse and vibrant cultural mix.

The CoGD’s Gross Regional Product per capita is \$75,000, 31 per cent higher than Victoria’s Gross State Product per capita of \$57,000. Manufacturing is the CoGD’s largest sector, providing over 30% of jobs and half of total output. Health care and social assistance, construction and retail trade are also significant sectors by economic output and employment (Figure 4). The CoGD also shows strong economic performance, with labour productivity of \$127,184 in 2011, compared to \$100,394 for the rest of Victoria. Manufacturing specifically showed economic performance of \$132,614 productivity per worker in 2011, a strong performance in the largest sector, and one that is expected to remain competitive into the future (City of Greater Dandenong, n.d. a). There are approximately 12,525 business in Greater Dandenong, and almost 94 per cent employ 19 or less employees.

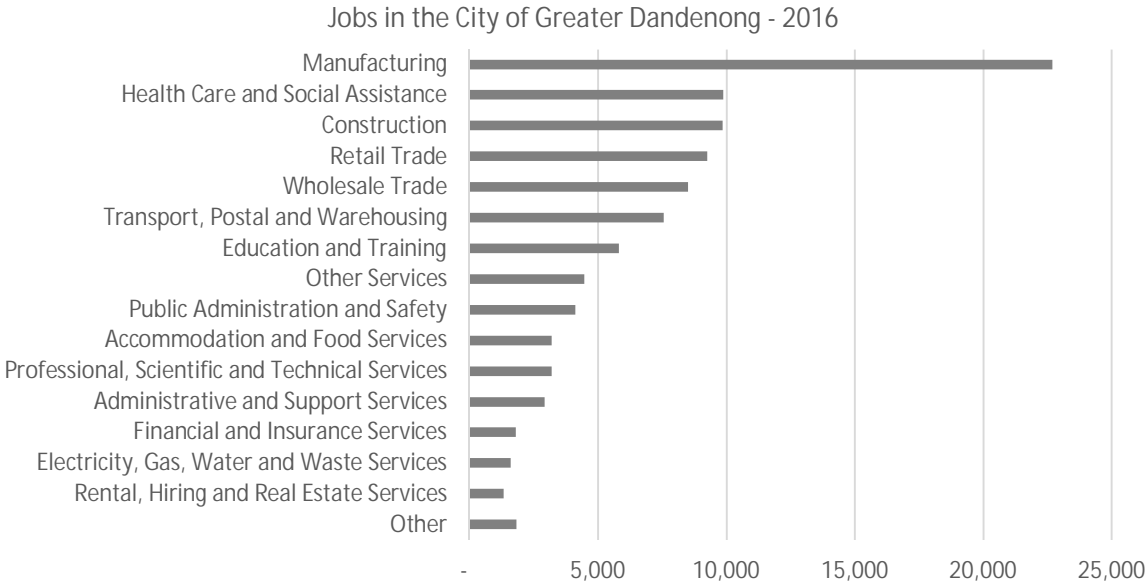


Figure 4 - Jobs in the CoGD per sector in 2016 (City of Greater Dandenong, n.d. a)

The CoGD is the most culturally diverse municipality in Victoria, with over two thirds of residents born overseas from over 150 different birthplaces and an around 1600 recently arrived migrants settling in Greater Dandenong each year, 20% of whom are refugees. Reflecting this cultural diversity is a diversity of languages, with two thirds of residents speaking a language other than English in their homes, and one in seven residents with limited fluency in English. These and other demographics are taken into consideration to inform Council’s planning processes (City of Greater Dandenong, n.d. b).

The diversity of CoGD’s socioeconomic profile is one of its strengths, with benefits of a culturally diverse workforce including connections with foreign markets, avoiding discrimination, maintain positive public image, promoting innovation, creativity and problem solving, reducing staff turnover and others. The CoGD continues to endeavour to improve opportunities for participation in the local economy, and this continues to be a key focal point of local policy development. To support this feature of the community and to support the thriving local economy, the Council’s key strategic objectives are focused in three aspects: People, Place and Opportunity. The areas of focus for service delivery for People include the shared goals of a vibrant, connected and safe community, and a creative city that respects and embraces its diversity. For Place, they are a healthy, liveable and sustainable city, and a city planned for the future; and for Opportunity they are a diverse and growing economy and an open and effective Council. These objectives inform Council’s policy design and Council Plan (City of Greater Dandenong, 2017).

7.2 CoGD local government policies and regulations

With respect to developing a Climate Change Strategy, the CoGD has existing policies in place that are relevant by nature, or makes explicit reference to resources and services that will be considered in the Climate Change Strategy. Included in this set of policies are the Imagine 2030 Community Plan, Council Plan 2017-2021, Sustainability Strategy, Municipal Emergency Management Plan and Risk Management Policy and Strategy.

The **Imagine 2030 Community Plan**, developed in 2009, is the overarching document that outlines the vision for the CoGD community and sets long term strategic objectives and goals for the community. The **Council Plan 2017-2021** is designed to operationalise that vision over the next four years. As part of the preparation of the Council Plan, Imagine 2030 was reviewed and updated to more accurately reflect the current state of the community’s priorities. The priorities are grouped under three major themes:

People	Place	Opportunity
▶ Pride	▶ Sense of place	▶ Education, learning and information
▶ Cultural Diversity	▶ Safety in streets and places	▶ Jobs and business opportunities
▶ Outdoor activity and sports	▶ Appearance of places	▶ Tourism and visitors
▶ Lifecycle and social support	▶ Travel and transport	▶ Leadership by the Council

In relation to climate change, the main priorities of interest are outdoor activity and sports (People), sense of place (Place), appearance of places (Place), travel and transport (Place), jobs and business opportunities (Opportunity) and tourism visitors (Opportunity).

Under the Local Government Act (1989), Victorian councils must release its respective four-year plans that outlines strategy, operation and budget for the time period covered. The CoGD is currently operating within the Council Plan 2017 – 2021, which was revised in 2018 to update spend and progress against key initiatives. There are six main objectives under the Plan, five of which are particularly relevant for climate change (City of Greater Dandenong, 2018a):

- ▶ A vibrant, connected and safe community (Objective 1) as it includes *Health & Wellbeing*.
- ▶ A healthy, liveable and sustainable city (Objective 3).
- ▶ A city planned for the future (Objective 4).
- ▶ A diverse and growing economy (Objective 5).
- ▶ An open and effective Council (Objective 6) – as it includes *Advocacy, community engagement and Leadership*.

These objectives consider a wide range of Council assets and operations, including urban design; asset management; residential, commercial and industrial development; parks, reserves and sportsgrounds;

jobs and business; and investment into the region. There are a number of key performance indicators under each of these objectives that the Council has committed to use to measure their progress against the aims of these objectives. However, however these are qualitative in nature and currently lack targets across most of the aims, and instead focus on reporting what has occurred. These aims also include developing key pieces of strategy or programs, like the Climate Change Strategy (Objective 3), Sustainable Buildings Policy (adopted in October 2017) (Objective 4) and the Community Revitalisation and One per Cent projects (Objective 5), which once developed, will hopefully allow the Council to progress and escalate their ambition in this space (City of Greater Dandenong, 2018a).

The **Sustainability Strategy** outlines a clear vision for the CoGD: to be one of the most sustainable Cities in Australia by 2030. The strategy covers ten themes:

- ▶ Biodiversity and Open Space
- ▶ Water and Stormwater
- ▶ Waste and Resources
- ▶ Transport and Movement
- ▶ Climate and Energy
- ▶ Buildings and Places
- ▶ Environmental Pollution
- ▶ Local and Sustainable Food
- ▶ Local Community and Culture
- ▶ Local Business and Economy

Success in the **Climate and Energy theme** is largely focused on emissions mitigation activities, the overarching goal being to become a low carbon city, with some additional examples of adaptation initiatives. Objectives are centred on reducing carbon emissions, increasing energy efficiency, increasing the proportion of energy consumption that is low carbon or renewable, and planning and awareness activities. The relatively small number of adaptation initiatives include modelling impacts of flooding and climate change, and implementing the Heat Wave plan to minimise the impacts on the community, particularly the aged and frail (City of Greater Dandenong, 2016a).

The CoGD **Risk management policy** acknowledges that risk exists in all aspects of the Council's business, and provides a guide to support effective identification and management of all risks associated with the performance and delivery of Council functions and services. Risk areas specifically discussed in the policy, in the context of risk appetite, include financial, legal and regulatory, people, environment, public safety, reputation, and business continuity/interruption. The Policy establishes expectations across the Council for analysing and managing risk, including maintaining a Risk Register in each department of the CoGD bureaucracy, outlining the inherent risk in each activity, the mitigating controls for each risk, the residual risk and an assessment of whether the residual risk is acceptable (City of Greater Dandenong, 2018b).

The CoGD's Risk Management Policy underpins the Risk Management Strategy, a four-year plan describing the risk management framework. The objectives of the Strategy are to develop a culture of everyday risk management, embed risk management in current processes, increase competency levels of staff, improve the information available for monitoring and reviewing risks, efficiently finance insurable risk and build resilience through contingency arrangements. The Strategy acknowledges that risk management is most effectively practiced across all activities and across all levels of the organisation, rather than in isolation. Implementation of these principles and those outlined in the Risk Management Policy will lead to successful delivery of Council functions and services.

With respect to development of a Climate Change Strategy, both the Risk Management Policy and the Risk Management Strategy do not explicitly identify climate change as a risk area. The focus of both documents is general and is on responding to risks to a particular asset, function or service, rather than discussion of the potential sources of risk and how this profile may change over time.

The **Municipal Emergency Management Plan** has the following objectives:

- ▶ Identify hazards and determine risks that may impact upon the municipality.
- ▶ Implement measures to prevent or reduce the causes and/or effects of emergencies.
- ▶ Assist the control agencies in the education of risks within the municipality to build resilience.
- ▶ Manage arrangements for the utilisation and implementation of municipal resources in response to emergencies.
- ▶ Manage support that may be provided to or from adjoining municipalities.
- ▶ Assist affected communities through immediate relief and to recover following an emergency.
- ▶ Complement other local, regional and State planning emergency arrangements.

The Plan sits within a broader structure of emergency management planning, response and recovery activities which covers fire management, animal welfare, medical and first aid, flood, storm and relief and recovery. The Plan covers responsibilities, systems and processes across prevention and preparedness arrangements, response arrangements, emergency recovery arrangements and support services and agencies that are in place in case of emergency in the CoGD or in neighbouring municipalities. With respect to developing a Climate Change Strategy, climate change is not mentioned explicitly in the Plan, nor is there any acknowledgement of the changing risk profile of potential environmental emergencies. The Plan is focused on the response recovery programs however, rather than the potential causes of emergencies (City of Greater Dandenong, 2012).

7.3 Climate Change Adaptation Governance Assessment

In 2017, the Victorian Government's Department of Environment, Land, Water and Planning assessed all 79 Victorian councils on their climate change adaptation governance, in an attempt to identify areas for improvement and capacity building across local government in relation to climate change risk management and adaptation. The assessment (Climate Planning, 2017) considered the integration of climate change considerations in key public corporate documents across ten indicators on a scale of None – Basic – Intermediate – High – Advanced. The indicators are:

- ▶ Corporate/Strategic/Council Plan
- ▶ Financial Management
- ▶ Public Risk Register
- ▶ Asset Management
- ▶ Land Use Planning
- ▶ Emergency/Disaster Management
- ▶ Greenhouse Gas Emissions
- ▶ Climate Risk Management
- ▶ Adaptation Planning
- ▶ Climate Change Policy.

The Climate Change Adaptation Governance Assessment found that the CoGD had scored highly in relation to its inclusion of climate change into its Corporate/Strategic Council Plan (receiving a 'High' score), but received a 'None' or 'No data' score across all of the other nine indicators (including assessment of climate change risks, understanding the corporate and community emissions profiles, policy and plans to reduce emissions and adapt to climate impacts) with either no data available (i.e. lack of publicly available information on CoGD's approach to climate change) or no consideration of climate change in the documents identified as relevant (Climate Planning, 2017). This puts the CoGD at the lower end of the councils in Victoria in relation to climate change governance. However, the same study highlighted the average Victorian council had relatively few indications of an 'advanced' and coordinated approach to climate change. The assessment was based on key-word searches of publicly available documents and as such may not reveal the full extent of the CoGD's consideration of climate change. Nevertheless, the Climate Change Strategy and Action Plan represents an opportunity to address these and demonstrate CoGD's capability and commitment in relation to responding to, and taking action on, climate change.

Table 2 - Scores across the Climate Change Adaptation Governance Assessment (Climate Planning, 2017)

Score	CoGD indicators count	Average indicator count for Victorian Councils
No data	2	3
None	7	5
Basic	0	2
Intermediate	0	1
High	1	1
Advanced	0	1

7.4 Financial Risks Adaptation Planning Initiative

The Financial Risk Adaptation Planning (FRAP) Initiative, funded by the State Government, helps local governments to integrate climate change risk into their risk assessment processes to prepare for the financial costs of climate adaptation (South East Councils Climate Change Alliance, n.d.). The CoGD case study looks at alternative approaches to planning and management of stormwater in the catchment, including infrastructure upgrades and planning controls around impervious surfaces. The assessment considered Business as Usual, overland flow management, drainage upgrade work programs and an integrated water management option. Across the different scenarios, the average annual damage costs of all roads and properties with a finished floor level 150 mm above ground level would decrease, with the most expensive scenario being business-as-usual, however a positive net positive value is only associated with an upgrade of the storm water pits (drainage upgrades). While rainwater tanks (integrated water management) would reduce flood damage the most, it had a high capital cost with negative Net Present Value, and the overland flow path has marginal reduction of flood damage with a still negative Net Present Value (Marsden Jacob Associates, 2016).

8. Case law and precedents

8. Case law and precedents

Not taking action to reduce emissions or adequately prepare for the physical and transition risks of climate change may expose local government to legal challenge. A report for the Australian Local Government Association outlined the liability risks for Councils including claims related to loss and damage from climate impacts to residents and the business community (Baker & McKenzie, 2011).

Liability risks can generally be categorised into:

- ▶ **Failure to adapt** – claims seeking to establish liability for emissions and/or associated climate change impacts.
- ▶ **Failure to mitigate** – claims deriving from failures to risks associated with climate change into account, and/or to accurately disclose related exposures.
- ▶ **Regulatory compliance** – claims arising from laws and standards introduced to implement energy transition policies, and related consumer protection law claims (Minter Ellison & 2 Degrees Investing Initiative, 2017).

In the CoGD, there are a range of adaptation related legal risks from climate change that fall within the Council's scope of services, including planning and development of settlements and working with vulnerable members of society such as youth and the elderly.

Failure to mitigate risks exist commonly in the form of energy consuming assets such as buildings, plant and equipment and transport fleet. Given the strong industrial base of the CoGD, there are significant transition risks associated with the decarbonisation of the economy in relation to energy costs and energy efficiency requirements.

Regulatory compliance is an evolving field in Australia. The Australian Prudential Regulation Authority (APRA) and the Australian Securities and Investments Commission (ASIC) are actively surveying and promoting reporting on climate risks. While climate risk disclosure is not yet mandatory, it may be on the horizon as stakeholders are increasingly demanding information relating to climate risk and what organisations are doing to prepare for these risks. Mandatory climate risk disclosure has already been formally proposed in the parliaments of the UK and European commission (Commons Select Committee, 2018) (European Commission, n.d.). The role of States to better regulate climate risks can be seen as an increasing responsibility, to both manage risks to Government, as well as to promote an economy and society that is more resilient and better prepared for the opportunities from the low carbon transition. State Governments will then rely on local councils to implement and administer the regulations set by the state.

Our team has observed a growing risk of litigation for failure to plan for climate change extend to litigation against government in an array of areas such as tort, contract, constitutional and human rights law due to action or inaction in addressing the risks associated with climate change. A few examples of legal challenges facing Government are described below.

There is an increasing gap between climate related damages and the ability of insurance companies to cover the damage of government and the communities that they serve. The Black Saturday bushfire payouts in Victoria saw almost AU\$700 million paid out to bushfire victims through Maurice Blackburn's class action suits in relation to the Kilmore East Kinglake fire and the Murrindini-Marysville fire. The Kilmore East-Kinglake fire saw a record payout of over \$494 million, with power company SP AusNet agreeing to pay \$378.6m, Utilities Services Corporation paying \$12.5m and three state government agencies splitting the remaining \$103.6m – these agencies are Victoria Police, the CFA and the Department of Sustainability and Environment (now Department of Environment, Land, Water and Planning) (ABC News, 2014). The basis for the claim against the state, and their contribution to the payout (covered by Government insurance) was due to inadequate warnings in the lead up to, and during, the fire; and for insufficient burning of vegetation prior to the fire, providing more fuel for the fire (ABC News, 2014).

In 2015, climate non-profit Urgenda won a case on behalf of 886 Dutch citizens against the Netherlands Government, holding the government accountable to contributing to human induced climate change. The Hague ruled that the government's existing targets of greenhouse gas emissions (14 – 17% on 1990 levels by 2020) were insufficient in the face of the dangers posed by climate change, and ordered the government to cut emissions by at least 25% on 1990 levels by 2020 (Urgenda, n.d.). In 2018, the Dutch Government unsuccessfully appealed the 2015 decision, despite the new government's ambitions in relation to emissions reductions. The appeal is more around the *de Rechtspraak* judiciary's ability to make rulings on policy decisions, and to overturn the legal precedent set by the case in relation to the ability of judges to influence and enforce policy aims of the government (Rechtspraak, 2018) (Apparicio, 2018).

A number of US cities have launched civil lawsuits against major fossil fuel companies over their contributions to climate change. Recently, the city of Baltimore filed a lawsuit against 26 of the world's largest oil and gas companies for knowingly undertaking activities that contribute to climate change. Plaintiffs include British Petroleum, Chevron and Exxon Mobil, and the city outlined research in their complaint that link oil and gas production to climate change impacts including sea level rise. The city of Baltimore is particularly vulnerable to sea-level rise as it has a large coastline and one of the US's largest ports, it has had two one in 1000-year storms within three years, and the City is seeking an unspecified amount of compensation for damages, penalties and relief from climate change impacts including in relation to property damage, economic injuries and public health (Brice, 2018).

9. Overview of climate trends and associated risks for Greater Dandenong

9. Overview of climate trends and associated risks for Greater Dandenong

Australia's climate is characterised by variability and extremes. It is also the driest inhabited continent on Earth. Alongside this, changes in large-scale atmospheric circulations are driving changes in Australia's climate, impacting the short to medium term weather and climate conditions across the country (BoM & CSIRO, 2016) (CSIRO & BoM, 2015).

The 2016 State of the Climate Report proposes with a high degree of certainty that mean temperatures across Australia will continue to increase, with more extremely hot days above 35 degrees Celsius (BoM & CSIRO, 2016). A decline in winter and spring rainfall is projected across southern Australia with the likelihood of more frequent and severe drought conditions being experienced in future. Concurrently, extreme storm events are projected to increase in intensity by the end of the century across the Australian continent and sea level rise is projected to continue across Australia, further exacerbating these effects (BoM & CSIRO, 2016) (CSIRO & BoM, 2015) (Steffen et al., 2015).

The CoGD can expect an increase in average temperature throughout the year, with more intense and frequent hot days. Annual average warming by 2030 is projected to range between 0.6 and 1.2 degrees Celsius above 1986-2005 levels, and by 2070 this may rise between 1.1 and 3.3 degrees pending future emissions levels (RCP4.5 and RCP 8.5 respectively). In line with this temperature increase, Melbourne is expected to have more hot days (over 35 degrees Celsius), rising from 8 days a year in 2015 to between 14 and 17 a year in 2070 under the low and high emissions scenarios. Concurrently, frost days (below 2 degrees) will also decrease from the current 36 a year in 2015 to between 10 and 18 in 2070 (Department of Environment, Land, Water & Planning, 2015).

While natural climate variability will still be the major driver in short term rainfall patterns, by 2050 under a high emissions scenario, winter rainfall will significantly reduce due to climate change. Despite this decrease, the intensity of rainfall will increase, with more extreme storm events occurring (Department of Environment, Land, Water & Planning, 2015), which could contribute to flash flooding and overflow in local waterways.

Finally, the fire season for the region will likely extend as the number of hot, dry and windy days increase, leading to increased fuel dryness and longer seasons where fire can easily start and spread, with the number of days with a very high or extreme fire danger days projected to increase (Department of Environment, Land, Water & Planning, 2015). Further analysis will be performed to determine specific projections for the wider CoGD region as part of the Climate Risk Analysis and Adaptation stage of this project.











These trends can have a number of different impacts on different parts of the CoGD's economy, community, and ecosystems. For example, the decrease in rainfall and increase in heat conditions will change seasons for different crops, reduce water security, and change the nature and distribution of pests and diseases in the region, which can drastically impact primary production. Infrastructure, key to the CoGD's industrial base, may see increased flood damage with rising in the level of water in the Patterson River, Dandenong creek and/or the Melbourne Water Dandenong catchment, with associated flooding costs, and increased costs of maintaining buildings and key support infrastructure like roads, railways, powerlines and water services (Department of Environment, Land, Water & Planning, 2015).

9.1 Climate risks to the CoGD

The CoGD faces a range of social, environmental and economic risks from climate change that will need to be considered in the Climate Risk Analysis and Adaptation stages of our project. A preliminary literature review was conducted to understand the broader environmental, social and economic risks that local councils will be subject to under projected climate change scenarios. Table 3 provides a general overview of these risks posed by projected climate change for the wider Melbourne region within which CoGD lies and the relevant linkages to CoGD and its operations. Both community and corporate risks have been considered, with a focus on domestic literature and case studies (outlined in Appendix B). Key risks were identified through a preliminary literature review including consideration of CoGD's current Sustainability Strategy (CGD Sustainability Strategy) and the National Climate Change Adaptation Research Facility (NCCARF)'s Impacts and adaptation responses of infrastructure and communities to heatwaves (QUT 2010).

It is noted that following the conduct of stakeholder interviews and further review of the current work and studies undertaken by the CoGD, these risks will be further refined prior to the climate change risk assessment stakeholder workshops and described in the Climate Change Risk Analysis and Adaptation Report.

Table 3 - General overview of environmental, economic and social risks posed by projected climate change and relevant linkages to the CoGD and its operations

Climate Variable	Examples of how these changes to the climate may affect Greater Dandenong
Higher average (mean) temperatures	<ul style="list-style-type: none">  Biodiversity loss  Electricity and water consumption
Higher maximum temperatures (hot days above 35°C)	<ul style="list-style-type: none">  Postponement/cancellation of events  Infrastructure repair and maintenance costs
Frequency and intensity of heatwaves	<ul style="list-style-type: none">  Reduced appeal, public amenity and use of green infrastructure
Frequency and intensity of bushfires	<ul style="list-style-type: none">  Public health and wellbeing  Disruption/damage to utilities, transport, residential and commercial infrastructure
Decrease in rainfall	<ul style="list-style-type: none">  Increased irrigation requirements
Increased intensity of extreme storm events	<ul style="list-style-type: none">  Exceedance of storm water drainage capacity  Council-specific (i.e. delivery of key services, reputational damage)

9.2 Key initiatives identifying climate change risks and application of adaptation actions

The CoGD has already implemented a number of key initiatives to help address climate risks and implement adaptation actions across the region. For example, the CoGD has developed a Heat Wave Strategy with specific actions to protect vulnerable members of the community from heatwave events. As recent heat related events have seen pollution increase in water, air and land, and freshwater decrease and arable land, vulnerable communities are overwhelmingly facing the costs of adapting to climate change. This extends beyond just residential buildings, but also into the public health and education system, in public buildings such as offices and government buildings (City of Greater Dandenong, 2013).

The Flood Management Plan outlines key roles and responsibilities in relation to preparation and response to floods in the CoGD region, and describes at a high level, the Council's and Melbourne Water's key flood management activities. The Plan identifies specific actions to improve flood management in the municipality over the next five years, including:

- ▶ Information availability
 - ▶ Updating flood overlays in planning scheme
 - ▶ Sharing of information between stakeholder organisations
- ▶ Reducing flood risks and impacts for social, economic and environmental outcomes
 - ▶ Infill of northern catchments to increase stormwater runoff and improve flood impacts
 - ▶ Residential redevelopment of the Sandown Racetrack
 - ▶ Upstream development of the Willow Lodge caravan park to reduce flooding and protect the vulnerable residents
 - ▶ Capital works and community awareness programs to manage the flood hotspots in the region
 - ▶ Collaboration with Melbourne Water for the Mile Creek redevelopment and funding
 - ▶ Updating the flood prioritisation tool prepared by the council to prioritise risks
- ▶ Coincidence and cascading event management
 - ▶ Maintenance and operation schedule of council drains and management support from Melbourne Water (City of Greater Dandenong & Melbourne Water, 2018).

10. Overview of climate trends and associated risks for Greater Dandenong

10. Social and economic impacts of climate change

Actions to address climate change can also deliver additional co-benefits beyond reducing emissions and improving resilience to the impacts of climate change. Governments at all levels are increasingly recognising the social and economic benefits of climate action. Efforts to avoid the worst impacts of climate change can deliver localised benefits such as improved health and well-being outcomes for the community.

Major economic reviews worldwide have sought to understand the economic costs and benefits of climate action. For example, the Garnaut Review in Australia and the Stern Review in the UK address the challenge of investing in responding to climate change through mitigation and adaptation actions with immediate economic costs where the corresponding benefits are predominantly delivered well into the future. Two fundamentally important points are highlighted in these reviews that refute the notion that there is an irreconcilable conflict between economic prosperity and environmental protection. The reviews highlight the economic costs of inaction, concluding that failing to address climate change causes economic damage in excess of the cost of action (Garnaut, 2008). Inaction has also been linked to increased climate change risks.

While the timing of these economic costs and benefits can present a challenge (the costs of action occur now while the costs of inaction occur in the future), research in recent years has highlighted that these near-term costs can be relatively minor. In 2014, the Climate Change Authority (Climate Change Authority, 2014) compared Gross National Income (GNI) per person under three different emissions reduction scenarios (for 2020 emissions relative to 2000 emissions) and found:

- ▶ Under a 5% reduction scenario, GNI per person is estimated to grow at 0.80% annually between 2012 and 2020.
- ▶ Under a 15% reduction scenario, GNI per person is estimated to grow at 0.78% annually between 2012 and 2020.
- ▶ Under a 25% reduction scenario, GNI per person is estimated to grow at 0.76% annually between 2012 and 2020.

Overall, while there are certainly near-term costs to climate action, the available literature suggests that these costs are lower than the costs of inaction in the long term, and are relatively minor in terms of their effect on overall economic prosperity in the short term.

“The world does not need to choose between averting climate change and promoting growth and development” (Stern, 2006)

There are likely to be projects for which there is no financial incentive for an individual organisation but which would provide a positive economic impact to society. In particular, our analysis will consider economic costs and benefits at a societal level (e.g. costs such as those from continuing emissions in a business-as-usual scenario).

There are clear links between climate change and extreme weather events (Climate Council, 2017), and an increasing number of these events are leading to greater health concerns. An individual example which may be representative of this effect is the heatwave in Victoria in January 2014. In this week, the number of heat-related public hospital emergency department presentations was five times higher than the expected number (Victorian Department of Health, 2014).

Studies in Europe have calculated the co-benefits of improved health as a result of lower carbon emissions, such as increased life expectancy, a reduction in hospital admissions and a reduction in days of restricted activity due to respiratory health problems (EY, 2014). These health effects predominantly represent the increased utility for individuals enjoying more years of healthy life, however they also provide the basis for wider benefits to the economy as a whole. Population health improvements flow through to increased employment and productivity which drive economic growth.

Climate Change mitigation actions, such as those modelled for CoGD in Mitigation Report, relating to transport, energy, buildings and waste all generate health and social wellbeing co-benefits.

Previous work for other councils in Australian has highlighted the following findings:

- ▶ **Energy** – if an action is focused on renewable energy, the key social co-benefits from renewable energy switching relates to physical health via improved air quality close to fossil fuel generators.
- ▶ **Buildings** – “carbon neutral” buildings will create health benefits driven by improved temperature and ventilation management. With additional co-benefits if you broaden the agenda to include other factors which shape the sustainability of buildings such as fittings and furnishings.
- ▶ **Transport** – if an action is focused on a modal shift (for example, private vehicle to active transport such as walking and cycling) and transition to more sustainable transport energy sources (for example, lower emissions public transport options) it presents significant co-benefits related to physical activity (health), improved air quality and reduced road trauma. Modelling the value of such actions could result in significant cost savings and health benefits.
- ▶ **Waste** – if an action is focused on city user engagement, education and neighbourhood co-operation it is anticipated to generate health co-benefits (driven by air quality), citizen engagement (environmental education and causes) and neighbourhood connections. Disposal practices have the potential to have a strong impact and can increase inclusivity of vulnerable groups through increasing participation in community waste management, job creation, reducing contamination and preventing health problems, educating community members and engaging youth and adults around waste issues.

Due consideration must be given to vulnerable groups to ensure the actions are designed in an inclusive manner.

10.1 Social Impact and inclusion analysis

A Social Impact and Inclusion Analysis can help to identify and measure social benefits and costs of identified climate actions and provide recommendations to enhance social inclusion in climate action planning, policy decisions and the delivery of priority actions that can be implemented fairly for all citizens. To maximise social value, policies need to be implemented with a community lens, balancing the opportunities and risks for social inclusion and improving the terms on which individuals take part in society, including access and affordability.

10.2 Economic impact analysis

Previous analyses undertaken by EY indicate that there are significant economic benefits from climate actions. The benefits of these actions are likely to increase over time, while many of the costs are higher in the short term. An Economic Impact analysis would support the development of the CoGD’s Climate Change Strategy and Action Plan to determine what economic benefits are represented by the avoided social and economic damage costs of greenhouse gas emissions. The Economic Impact analysis quantifies these benefits using the Social Cost of Carbon (SCC) in accordance with the Victorian Department of Treasury and Finance guidelines. The SCC was developed by the US Environment Protection Authority (EPA) to assess the cost of actions with marginal impacts on cumulative global emissions. It estimates the dollar figure of damages over the next 100 years (or more) from one extra tonne of greenhouse gas emissions. This gives a monetised cost of inaction, which is then used to represent the quantitative benefit of the actions (and resulting emissions trajectories) developed in a detailed climate analysis. It also represents a subset of the total effects, which include the unquantified benefits and broader effects.

**11. Leading practice
approaches to climate
change adaptation
and mitigation**

11. Leading practice approaches to climate change adaptation and mitigation

There are a number of groups and networks of cities that are championing ambitious action on climate change. The resources and example provided by these groups can be leveraged to support the development of CoGD's Climate Change Strategy and Action Plan.

11.1 International collaboration on climate change issues by governments internationally

The following set of networks are internationally and comprise cities from around the world willing to share experiences on how to address climate change at the municipal level.

11.1.1 C40 Cities Climate Leadership Group

The C40 Cities Climate Leadership Group is a network of more than 90 cities, representing over 650 million people and one-quarter of the global economy. C40 is committed to addressing climate change and driving urban action that reduces greenhouse gas emissions and climate risks, while increasing the health, wellbeing and economic opportunities of urban citizens. The Network connects city officials globally to exchange best practices and help deliver solutions to climate challenges, inspires innovation by capturing ideas and solutions, advises city peers with similar projects and policies, and influences national and international policy agendas (C40 Initiatives & Networks, 2016).

Since 2009, C40 cities have taken 14,000 actions in sectors including adaptation, green energy, solid-waste management and energy efficiency in buildings. According to C40 statistics released last year, over 70% of citywide actions are being financed by city governments themselves (Global Taskforce, 2016). In 2018, C40 published a Climate Action Planning Framework to guide cities hoping to develop ambitious and inclusive climate action plans that are consistent with the objectives of the Paris Agreement. C40 analysis has highlighted that the next few years are crucial to take action that will put the world on a trajectory to halt and reverse climate change (C40 Deadline 2020: How Cities will get the job done).

11.1.2 Compact of Mayors

The Compact of Mayors is the world's largest cooperative effort among mayors and city officials of over 9,000 cities, to prepare for the impacts of climate change and reduce greenhouse gas emissions. This enables cities to compile emissions inventories based on a single reporting standard: the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories, or GPC. After making an initial pledge to the Compact, cities have up to three years to meet a series of requirements to fully comply with the Compact, including greenhouse gas (GHG) measurement and target setting, which culminates in creating a full climate action and adaptation plan (Global Taskforce, 2016).

11.1.3 ICLEI – Local Governments for Sustainability

Founded in 1990 as the International Council for Local Environmental Initiative, ICLEI is a global network of over 1,500 cities, towns and regions in 124 countries, committed to building a sustainable future. ICLEI focuses on addressing local impacts and promotes local action for global sustainability by supporting cities in becoming sustainable, low-carbon, resilient, eco-mobile, biodiverse, resource-efficient and productive, healthy and happy, with a green economy and smart infrastructure. ICLEI provides technical consulting, training and information services to build capacity, share knowledge and support local government in the implantation of sustainable development at the local level (ICLEI, n.d.). The CoGD was a member of ICLEI and through this initiative developed its 2004 Greenhouse action plan.

11.2 Collaboration on climate change by local government in Australia

The following set of organisations comprise of Australian and Victorian local governments.

11.2.1 Cities for power partnership

The Cities for Power Partnership is made up of over 100 councils from across Australia. Its focus is to support cities in pursuing increased renewable energy to help reduce emissions and improve energy efficiency and energy security. CoGD is a member of the Cities for Power Partnership. Through its 'partnership action pledge' CoGD has committed to install renewable energy on council buildings and encourage local buildings to do the same. The CoGD has also committed to promoting knowledge sharing and adopt 'best practice' energy efficiency measures across all council buildings (City Power Partnership, n.d.)

11.2.2 Victorian greenhouse alliances

The Greenhouse Alliances are organised partnerships of local governments driving climate change action across 70 of Victoria's 79 municipalities. The Alliance are designed to foster collaboration and support councils to respond and adapt to climate change. This includes the implementation of 'joint initiatives that provide economies of scale and enable projects typically beyond the reach of individual councils' (Victorian Greenhouse Alliances, n.d.).

The alliances include (Figure 5):

- ▶ **South East Councils Climate Change Alliance** (including CoGD and neighbouring councils)
- ▶ Northern Alliance for Greenhouse Action
- ▶ Central Victorian Greenhouse Alliance
- ▶ Western Alliance for Greenhouse Action
- ▶ Eastern Alliance for Greenhouse Action
- ▶ Gippsland Climate Change Network
- ▶ Goulburn Broken Greenhouse Alliance
- ▶ Wimmera Mallee Sustainability Alliance

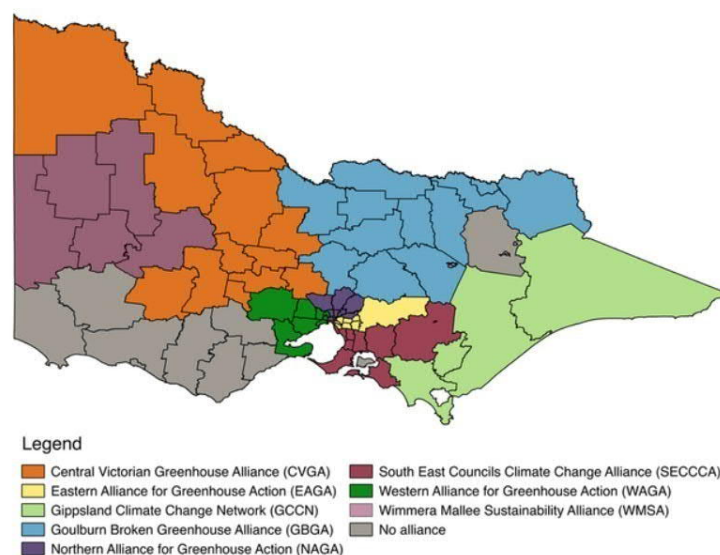


Figure 5 - Location of the Victorian Greenhouse Alliances
(Victorian Greenhouse Alliances, n.d.).

11.3 Case Studies highlighting leading practice climate action

This section outlines some international examples of different approaches to climate action, which CoGD can learn from as it devises its Climate Action Plan and considers the optimal framing for promoting climate action in its community.

The case studies have been selected based on their innovative approach or comparability to Dandenong by featuring both international leading practice case studies as well as examples how neighbouring councils have responded to climate change. The case studies include:

11.3.1 Carbon Climate Registry

The carbon Climate Registry (cCR) is a leading global reporting platform for local and sub-national climate action. The cCR supports governments in progressing their mitigation and adaptation actions through supporting enhanced transparency, accountability and credibility. The cCR is a global mechanism used to enhance measurable, reportable and verifiable local climate action (Carbonn Climate Registry, 2017).

The tools and resources developed by these networks can be leveraged to support the development of CoGD's climate action planning.

- ▶ **California Impact Assessments** – clear preparation and release of critical climate related information to be used by communities to build resilience to climate change impacts and better manage climate risks. Dandenong can use the learnings from California to guide how city specific climate information can be prepared and released to work closely with communities to ensure buy-in and relevance of the data sets.
- ▶ **Queensland Climate Change Response** – specific actions and programs developed for different elements of climate change and its impacts. Highlights different types of actions the city may wish to pursue across transition, adaptation and risk assessment and management, and shows the benefit of using data to inform and execute strategies.
- ▶ **Victorian Legal Tools for Adaptation** – assessment of legal tools available in the state of Victoria to advance climate change adaptation efforts. Given the increasing risk of legal liability in relation to climate change, the council could evaluate the legal tools as outlined in the report to identify key levers for adaptation action (VCCCAR, n.d.)
- ▶ **City of Darebin Climate Emergency Plan** – mitigation plan outlining key actions for the city with considerations for communication and engagement with diverse communities. The CoGD may wish to leverage the thinking in the Climate Emergency plan to develop its own community engagement plans, as well as identifying cost effective ways of demonstrating council leadership in mitigation activities.
- ▶ **City of Casey Western Port Hazard Assessment** – Multi-organisational approach to mapping coastal inundation risk to the city. The CoGD may consider a similar inundation and erosion risk assessment given that the Patterson River, Dandenong Creek and Melbourne Water Dandenong catchment all sit within city boundaries.

11.3.2 California impact assessments

The California government has completed a wide range of climate change impact assessments to better understand how climate change will impact the state. To date, the state has released four impact assessments, each of which look at the issue of climate change and potential responses through a different lens. These impact assessments are listed below:

- ▶ **First Climate Change Assessment (2006)** – potential impacts of climate change on key state resources such as the water supply, public health, agriculture, coastal areas, forestry, and electricity production and demand.
- ▶ **Second Climate Change Assessment (2009)** – initial estimates of the economic impacts of climate change. Concluded that adaptation, as a complementary approach to mitigation, could substantially reduce economic impacts of loss and damage from a changing climate.
- ▶ **Third Climate Change Assessment (2012)** – information on vulnerability and adaptation impacts of the changing climate, including the interactions of those potential impacts with on the ground exposure, sensitivity, and response capacity of natural and human systems. This report includes transitional risks such as the adaptive capacity of local governments, low-income communities' vulnerability, and challenges in meeting growing energy demand, but also considered opportunities to reduce social vulnerabilities related to health (State of California, n.d.).

The California government has also completed a range of more specific climate change impact assessments which focus on different sectors, variables or socio-economic factors. The CoGD may consider undertaking their own specific climate change impact assessment for certain economic sectors or industries, and then based off response and reaction to that, expand to a wider city level climate change assessment (State of California, n.d.).

11.3.3 Queensland Climate Change Response

The Queensland Government has developed a Climate Change Response which focuses on transition and adaptation separately. The Transition aspect involves reducing environmental impact and preparing for a low carbon economy, while Adaptation focuses on preparing for climate change impacts. A diverse range of strategies, programmes, funding, and risk assessments have been developed as part of this Response, outlined in Table 4 below (Department of Environment and Heritage Protection, 2017a) (Department of Environment and Heritage Protection, 2017b):

Table 4 - Table of actions in the Queensland Climate Change Response

Transition	Adaptation	Risk assessments
Queensland Climate Transition Strategy -Outlines the transition to a zero net emissions future that supports jobs, industries, communities and the environment.	Queensland Climate Adaptation Strategy - outlines preparation for current and future climate change impacts to reduce risk, increase resilience and embrace adaptation opportunities.	Regional Climate Change Impact summaries - Regionally specific, interactive information on projected future climate change impacts for 13 Queensland regions.
CarbonPlus and Land Restoration fund - \$8.4 million fund to support and expand the carbon farming industry and create jobs.	Queensland Climate Resilient Councils - Program to develop capacity of local government to respond to climate change impacts.	Climate Change Map application - Information about the projected impacts of climate change for 2030, 2050 and 2070.
Land Restoration Fund - \$500 million fund to support land-sector projects that deliver clear environmental and economic co-benefits.		Sustainability Assessments – Inclusion of climate change considerations required for all government capital projects over \$100 million in value

Using the work undertaken by the Queensland state government, the CoGD could look to model their own transition and adaptation actions, or risk assessment work, off the Queensland government's policies, programs and initiatives. While the city has a smaller budget and reign than the state government of Queensland, there are key lessons to be learn and utilised, specifically in relation to the development of data driven initiatives to better understand climate change impacts on different regions in the state across a range of different time horizons.

11.3.4 Victoria’s Legal Tools for Adaptation

The Legal Tools and Measures for Adaptation and Managing Climate Risk in Victoria project looks at how law and governance arrangements influence climate change adaptation in Victoria, with a focus on the legal, regulatory and institutional considerations of managing extreme weather-related events and their associated risks. This report focuses on the legal aspects of these considerations, and aims to provide insight into the ways in which different measures and tools within the legal system work and how they can be used for climate change adaptation and risk response. Table 5 below come from the report, and summarise the different legal tools that can be used by the CoGD to support climate change adaptation (Godden et al, 2013):

Table 5 - Victorian Legal Tools for Adaptation (Godden et al., 2013)

Type of legal tool	Details	Examples
Conventional legal tools	Legislation (Acts, regulations and delegated legislation)	Targeted legislation setting up a framework for climate change adaptation
		Legal tools specifically requiring consideration of climate change impacts
		Legal tools related to matters that will be directly impacted by climate change (e.g. managing the risks of extreme events)
	Judge-made law	Allocating risks and responsibility Setting out guiding principles Incorporating scientific information
Other legal measures	Information-based tools	May be mandated by law Designed to inform consumer/community behaviour or improve transparency around government decisions
	Market and financial mechanisms	May be mandated by law Terms of scheme are legally binding Provides a flexible, and incentive oriented approach to regulation
	Voluntary schemes	Framework for these schemes generally provided for by law
	Community participation tools	May be mandated by law or emerge as a 'bottom up' partnership process To build community resilience To enhance transparency around government decisions

11.3.5 City of Darebin Climate Emergency Plan

The City of Darebin released a Climate Emergency Plan in 2017 that outlines the Council's commitment to take action within its boundaries and influence other major stakeholders, including industries, business and other levels of government to address climate change. This plan supports the council's commitment for net zero emissions by 2020 for council and community (City of Darebin, 2017), and has nine pillars:

1. Climate Emergency mobilisation and leadership
2. Energy efficiency
3. Renewable energy and fuel switching
4. Zero emissions transport
5. Consumption and waste minimisation
6. Fossil fuel divestment
7. Adaptation and resilience
8. Engaging the community
9. Darebin Energy Foundation

Key actions within the plan include the establishment of the Climate Emergency Conference in September 2018, the creation of the Darebin Energy Foundation for climate change mitigation and increase community resilience to climate change impacts, increasing the solar photovoltaic capacity of the Council, supporting energy efficiency in the residential and commercial sector to increase resilience to heatwaves and energy cost increases, continued support for vulnerable residents, increased engagement with the community including tailored approaches to culturally and linguistically diverse (CALD) communities, and leadership by the Council including upgrades to council buildings and fleet, and increase to renewable energy (City of Darebin, 2017).

The City of Darebin is one of Victoria's leading councils on climate adaptation, having received top scores in on asset management, greenhouse gas emissions and adaptation planning on the Victorian Climate Change Adaptation Governance Assessment conducted in 2017 (Climate Planning, 2017). Given the ambitious actions undertaken by the Darebin Council, and the similarly culturally and linguistically diverse communities of Darebin and Greater Dandenong, the CoGD could look to leverage and build on Darebin's approach to community engagement to generate buy-in within the community for climate strategies, targets and actions.

City of Darebin is one of a growing number of cities (in Australian and globally) that have chosen to declare a climate emergency with the aim of 'restoring a safe climate at emergency speed, in order to avoid dramatic and negative impacts on our community and around the world' (City of Darebin, 2018). This framing of climate action is designed to emphasise the severity of the situation, the urgent need to act, and focus on the solutions for 'restoring a safe climate.'

11.3.6 City of Casey Western Port Hazard Assessment

The City of Casey has worked with the Department of Environment, Land, Water and Planning (DELWP), Melbourne Water, the South East Councils Climate Change Alliance (SECCA), Bass Coast Shire Council, Cardinia Shire Council and the Mornington Peninsula Shire Council to better understand how climate change and its impacts (such as sea-level rise and storm surge) would impact Western Port and its important social, economic, built and natural values. Western Port had a Local Coastal Hazard Assessment undertaken as part of the Future Coasts Program run by the Department of Environment and Primary Industries (DEPI), which saw detailed mapping and information produced for coastal areas at risk of significant impacts from climate change (SECCA, 2014).

This study included a hazard assessment that focused on inundation and erosion risks to Western Port. The report found that coastal inundation and erosion varied significantly across the port area, including significant impacts on inlets and on groundwater reserves, including increased sea water intrusion and reduce freshwater recharge. It also found that shoreline erosion impacted shorelines based off the coastal morphologies within the Western Port area. A number of recommendations were made to manage the inundation and erosion hazards, including collecting additional data to reduce uncertainties for future hazard assessments (SECCA, 2014).

For the City of Casey, the report found that selected study area within the Council region, the Tooradin and coastal villages with a coastal wetland fringed estuarine shoreline, had the following key coastal hazards:

- ▶ Inundation Hazards
 - ▶ Storm tide inundation
- ▶ Erosion Hazards
 - ▶ Loss of coastal wetlands
 - ▶ Backshore tidal inundation (SECCA, 2014).

While the CoGD does not have a port area similar to the City of Casey, the Patterson River, Dandenong Creek and the Dandenong Melbourne Water catchment all pose similar threats in relation to inundation and erosion to the city. Therefore, the Council may wish to consider undertaking an inundation and erosion study for commercial and residential areas in the City along the riverine system.

11.3.7 City of Monash Environmental Sustainability Strategy

The City of Monash released their Environmental Sustainability Strategy in 2016 outlining the next ten years for the city to become environmentally sustainable, resilient, diverse and thriving. There are seven pillars of the strategy being:

1. Building Environment
2. Urban Ecology
3. Climate Change
4. Waste and Resource Management
5. Integrated Water Management
6. Partnerships and Leadership
7. Education, Engagement and Reporting (City of Monash , 2016)

Within Priority 3: Climate Change, the City included a number of mitigation approaches, included the development and implementation of a Climate Change Action Plan for a whole-of-Council approach to mitigation, adaptation, risk management, innovation an alternative energy; and working with other levels of government and relevant organisations to meet climate change mitigation and adaptation outcomes. The Plan includes influencing planning and design within the council area, reducing methane gas emissions, and encouraging the community to reduce emissions. The Council has also pledged to reduce its operational emissions, including investigating establishing a greenhouse gas reduction target and renewable energy target for the Council, and developing an environmental and cost-benefit analysis criteria for internal decision-making processes (City of Monash , 2016).

This builds on the Council's 3% reduction in greenhouse gas emissions in 2015/16 compared to the 2010/11 baseline. Major initiatives implemented by the Council include upgrading the efficiency of street lights, retrofitting 333 houses with low energy devices, undertaking energy audits for 17 buildings, upgrading 10 Council facilities with energy efficient lighting upgrades, 7 facilities with heating, ventilation and air conditioning (HVAC) upgrades, implementing co-generation/tri generation feasibility study for aquatic centres with the Boroondara, Yarra and Darebin Councils, and installing solar panels at a number of community facilities such as libraries and pavilions (City of Monash , 2016).

The City of Monash is one of the CoGD's bordering city councils, and the sustainability strategy as released above is a solid foundation for the City of Monash but is not particularly ambitious. With other neighbouring councils like Knox and Frankston also not particularly involved or ambitious in the climate change space, there is an opportunity for the CoGD to become a leading council in the South East in terms of climate change action.

**12. Consideration of the
framing for the
CoGD's Climate
Change Strategy and
Action Plan**

12. Consideration of the framing for the CoGD’s Climate Change Strategy and Action Plan

The case studies outlined in the preceding section outline that there are a number of ways in which a Climate Change Strategy and Action Plan can be presented to the community. For example, City of Darebin is one of a growing number of Councils globally to declare a ‘climate emergency.’ This framing of climate action is designed to emphasise the severity of the situation, the urgent need to act, and focus on the solutions for ‘restoring a safe climate’ (City of Darebin, 2018). Other councils have opted for less emotive messaging, highlighting the evidence supporting the need to act and the benefits of action.

The CoGD recognises that climate action will not simply occur organically, partly because many of the actions to reduce emissions are beyond the direct control of the Council; the Climate Change Strategy and Action Plan may include advocating for supporting action taken by the State and Commonwealth Government and incentivising behaviour change by residents, business, and visitors of the CoGD. The Climate Change Strategy and Action Plan, therefore, needs to consider potential framings of the key messages; aiming to solicit support and engagement from the community as key stakeholders in achieving a low-carbon, sustainable, city.

The proposed Local Government Bill (2018), includes increased responsibilities for Councils and Mayors in relation to reporting on progress on Council Plans to the local community, as well as some specific extensions of climate and environment related benefits. This sets the expectation of local government to act in the long-term interests of its community by engaging with them, refining its strategies, and successfully building community engagement and acceptance of efforts to address climate change at a city-level and planning to reduce emissions and improve the resilience of the local community and economy to the impacts of climate change.

The CoGD has a diverse and vibrant cultural mix. This cultural diversity extends to diversity of languages, with two thirds of residents speaking a language other than English in their homes, and one in seven residents with limited fluency in English. These culturally and linguistically diverse (CALD) communities and other demographics need to be taken into account when creating a tailored theory of change and corresponding communications strategies. City of Darebin has a comparably diverse community which provides an interesting trial for how its approach to inspiring action amongst different community groups is (or is not) working.

Behavioural change models can provide insights as to how councils can inspire action from its community. Two examples include ‘Changeology’ and the ‘BehaviourWorks’ Method.

‘Changeology’ is theory of behaviour change based on five conditions or factors that need to be present in the actors lives to enable them to modify their behaviour. The five conditions are outlined in Figure 6, below:

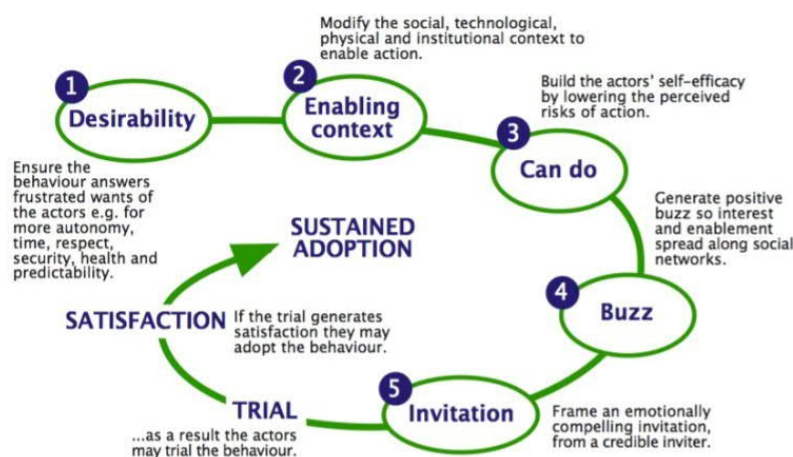


Figure 6 - 5 conditions of behaviour change according to the Changeology theory (Robinson, n.d.)

- ▶ **Desirability** suggests that for someone to adopt a new behaviour or product into their lives, they have to want it. It suggests that to achieve sustained change, 'people must believe they are getting an outcome that matters for their lives or businesses.' To create buy-in to the proposed climate actions, the solutions should be targeted to address stakeholders' concerns. So instead of asking "How can we make the public share our passion and concerns for the climate change?", you need to instead be asking "How can we be of service to the concerns and frustrations they already have?" and frame the actions to positively address those concerns.
- ▶ **Enabling context** provide opportunities to influence change. This includes infrastructure, services, social norms, social organisation, leadership, technology, pricing, regulation, governance. Environments can change behaviour through at least three ways, as they shift the balance of convenience, through familiarity they create expectation and they create social norms.
- ▶ **Can do** refers to increasing the actors' self-efficacy or belief in one's own capacity to get results. People must have the confidence they can manage the social, physical and financial risks of change. Building this confidence requires using tactics such as familiarity, autonomy, social proof, being part of a purposeful group, clear goals and regular feedback, personal interactions, incentives, commitments and enjoyment.
- ▶ **Positive buzz** is creating a story that explains how the behaviour has changed someone's life. It needs to have an emotional impact (creating motivation) and it also has to reveal something about how to do the behaviour.
- ▶ **Invitation** relates to the way in which the need for change is communicated and should include a 'clear call to action' which outlines what stakeholders can do to play their part in deliver of the strategy. It should be communicated by someone (or an organisation) that is passionate and can win people's attention and commitment by authentically modelling the change in their own lives.

(Robinson, n.d.)

The BehaviourWorks Method (BehaviourWorks, 2017) consists of three primary phases: Exploration, Deep Dive and Application.

- ▶ **Exploration** involves examining "What is the problem?" and clearly 'unpacking' and defining it so there is a shared understanding of it amongst stakeholders. This stage includes stakeholder engagement, understanding the system to identify where behaviour change will have the greatest impact, reviewing and collecting evidence and identifying priority behaviours that require change.
- ▶ **Deep dive** involves understanding the explicit drivers and barriers influencing the behaviour from the target audience's perspective. Then reviewing and collecting evidence on what works to develop intervention options.
- ▶ **Application** is the stage where measures of success are identified and trial interventions are introduced to tests several different intervention options in smaller groups. These trials can test assumptions and provide insights to refine the actions to maximise impact.

(BehaviourWorks, 2017)

Both of these behaviour change models highlight the need to consider: how the climate change challenge is presented the community, how actions can be designed and communicated such that they are desirable, and achieve buy-in from the required stakeholder groups, and provide realistic solutions for the community to adopt.

The drivers and motivations of internal stakeholders is also an important consideration. Climate change is a relatively complex and multi-disciplinary challenge. Both the problem and solutions are linked to other areas of interest and Council priorities. Capitalising on these synergies, the development of a climate change strategy can support local government to become 'more integrative and less-compartmentalised institutional models where links between departments are strengthened and cross-cutting communication and engagement is encouraged' (Fünfgeld, 2013). Other studies have found that environmental and emergency planning officials commonly work across sectors and departments (Dannevig et al., 2012). The CoGD's Sustainability Advisory Group is one structure that can be leveraged to obtain buy-in for climate action across Council.

The way in which the Council frames climate change to its stakeholders will affect the uptake of the required actions to reduce greenhouse gas emissions. The scale of the climate change challenge can disempower and immobilise people. It is important that the Strategy offers solutions and makes it as easy as possible to adopt actions that demonstrate how the behaviour change or action will improve the stakeholders' lives. It is therefore critical that the CoGD considers potential framings for the Climate Change Strategy's key messages to internal and external stakeholders that will inspire the action needed to realise the Strategy's objectives.

13. Next steps

13. Next steps

This Literature Review and Discussion Paper is one of four background reports prepared by EY to support the development of the Climate Change Strategy and Action Plan. Three additional Background Reports will be developed to establish the evidence base for the development of an informed and effective Climate Change Strategy and Action Plan. These include:

- ▶ **Gap Analysis and Evaluation report** – having a detailed understanding of CoGD’s current progress on climate action is critical for determining what further action needs to be taken and where to start. EY will undertake a gap analysis to evaluate the CoGD’s existing corporate and community climate change related policies, strategies plans and actions against an established climate action planning framework. The report will provide recommendation on how to improve and strengthen the CoGD’s response to climate change.
- ▶ **Greenhouse gas Emissions Profile and Mitigation Analysis** – an understanding of the CoGD’s current emissions profile is required before mitigation actions can be targeted to areas that will achieve the greatest impact. Two greenhouse gas (GHG) inventories will be developed: one for the Council’s own operations and one for the broader community. Following this EY will support the CoGD to identify and prioritise a suite of proposed actions designed to reduce emissions.
- ▶ **Climate Risk and Adaptation Analysis Report** – this report will address the climate impacts that cannot be avoided. Stakeholders will be engaged to identify priority environmental, economic and social risks associated with climate change and the adaptation options to address them and improve CoGD’s resilience.

To support the development of a robust Plan, undertaking a Social Inclusion and Economic Impact Analysis is key to identifying and assessing the costs and benefits of climate change actions and determine what economic benefits are represented by the avoided social and economic damage costs of greenhouse gas emissions.

The next stage of developing the Climate Change Strategy and Action Plan is initial Public consultation due to take place in mid- 2019. This stage will include stakeholder workshops to understand the community’s requirements for the Strategy and develop an appropriate framing, narrative, and key messaging for the Climate Change Strategy and Action Plan. Beyond this stage, EY will prepare the Draft Strategy, support public consultation and stakeholder feedback discussion sessions on the Draft Strategy, before producing the Final Climate Change Strategy and Action Plan.

The Literature and Discussion Paper provides foundational knowledge and understanding of climate change and how it relates to the CoGD. From this literature review, the Council may wish to consider:

- ▶ The ways in which the Council can use the proposed legislation in the Local Government Bill (2018) to deliver environmental benefits to the community and progress the climate change agenda.
- ▶ The legal liability risks the council faces in relation to climate change, and how the Council can use existing legal tools to advance adaptation actions and limit its liability.
- ▶ How the gap analysis, performed by EY as part of this engagement, can be used to identify the ways in which existing policies and plans can be strengthened and extended, and new policies created, to help the CoGD become one of Victoria’s, and Australia’s, leading councils on climate change action.
- ▶ Conducting a social impact and inclusion analysis to identify and assess the social costs and benefits of climate change actions, to ensure these are distributed equitably across the CoGD’s diverse population.
- ▶ The key lessons from other cities and states across Victoria, Australia and the world can be applied within the CoGD to advance its climate change mitigation and adaptation action.

Appendices

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