

Climate Change Strategy

2009 - 2014



A key Gold Coast City Council strategy towards our...



Setting direction, enabling action



Gold Coast City Council



Australian Government
Department of Climate Change

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1 Executive summary

The dynamic nature of the Gold Coast – its location, growth, development and demand for services – makes its exposure to climate change particularly unique. Protection of our natural assets, strengthening the economy, population growth and building sustainable communities are some of our city's biggest challenges. These challenges are all affected by the potential impact of climate change.

The Gold Coast City Council is responding to these challenges at many levels. The Climate Change Strategy, for Council operations and our community, will provide a comprehensive approach to climate change on the Gold Coast: setting direction, enabling action. Council envisages that the city's leaders and the community will work in partnership to achieve climate change resilience for our future.

It is anticipated that climate change will impact Gold Coast weather patterns and amplify the occurrence of extreme events like cyclones and heat waves. Climate change will require more intensive responses to natural disasters like drought, bushfire and flood. Council will lead our community in preparing for these unavoidable events by increasing efforts to mitigate future impacts.

This strategy looks at the risks of climate change and its likely consequences for Council and the community both in the short and long term. Where possible, such impacts can be mitigated by reducing the Gold Coast's carbon footprint; however, in some areas, climate change cannot be reversed. Council and the community will need to adapt to changing circumstances within our city in response to anticipated climate change.

Climate change presents opportunities to Council and the community. National and international demand for energy

efficient technology is developing as a climate change mitigation and adaptation response. The Gold Coast has the opportunity to participate in this emerging area and to be an attractive location for business and innovative industry to prosper. This strategy considers how such opportunities may be realised and identifies potential areas for Council and community involvement, particularly in the generation of renewable energy or fuels, and in the provision of energy efficient goods, services and technology.

The management of climate change risk and opportunity should be an integrated responsibility within all areas of Council decision making. Council's governance arrangements will reflect its commitment to the treatment of climate change risks and its desire to take up relevant opportunities. This will require a coordinated, collaborative approach by Council. A contemporary, adaptive management framework providing support for all program and service owners to deliver climate change mitigation and adaptation is required.

This strategy will build on Council's existing climate change related activities; however, its main focus is to provide a well-defined direction for responding to climate change risks and challenges and to develop resilience to future impacts. The effectiveness of this strategy will be managed through monitoring, evaluation and review to ensure it reflects the most recent developments in climate change science and technology, and delivers on Council's statutory responsibilities. Council's strategic objectives to achieve this, however, are unlikely to change significantly as climate change risks and opportunities presented to Council and the community that require either a short-term mitigation or a long-term adaptation response will endure into the future.



2 Strategy background

The impacts of climate change



- hotter and cooler temperatures
- sea level rise
- heatwaves
- increased storm frequency and storm surge
- flooding
- biodiversity losses
- drought and increased bushfire risk
- vector borne disease

2.1 What is climate change?

The Intergovernmental Panel on Climate Change (IPCC) defines the phenomena of climate change as:

“a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

IPCC Glossary of Terms 2007

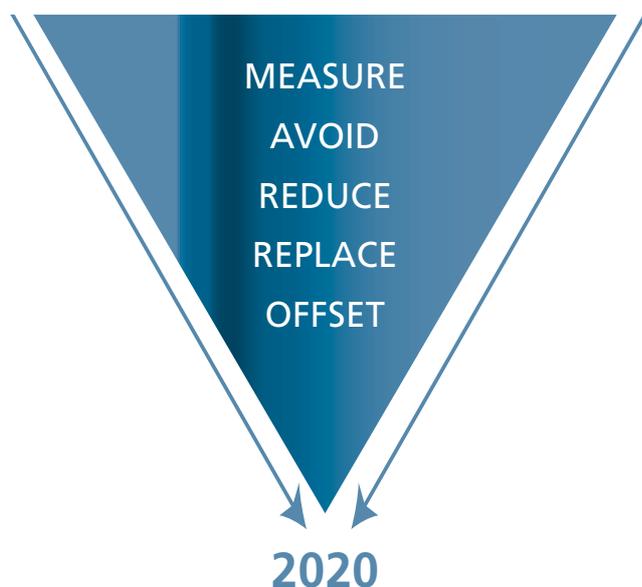
International and Australian research indicates that advanced preparation and planning in response to climate change may reduce the severity of its impacts. By assessing the risks to the city, reducing the emission of greenhouse gases and adapting to climate change impacts, Council will prepare the city and the community to be climate change resilient. Early mitigation and planned adaptation to climate change will lessen the cost of climate change on our community, our economy, our environment and our lifestyle.

Climate change action is taking place at all levels of government in Australia, by organisations in metropolitan cities and through communities in regional areas. Emerging responses from the Australian Government follow from the policy of reducing Australia's greenhouse pollution, preparing for the climate change that we cannot avoid and working with the international community to develop a global response. In addition to this, the Queensland Government is putting climate change targets and initiatives into action. Now is the time for Council to respond to the emerging risks, challenges and opportunities that climate change presents to our city.

2.2 Background

Climate change presents a variety of risks for decision makers, business owners, and the community in the Gold Coast region. Such risk generates rising expectations of leadership and appropriate action from Council. Council is committed to helping our city both mitigate and adapt to the challenges and opportunities climate change presents.

In December 2007, Council anticipated the need to accelerate its actions in response to climate change. In addition to its Cities for Climate Protection (CCP) commitment and research into the climate change impacts of sea level rise, flooding and storm surge, Council endorsed the preparation of a Climate Change Strategy and resolved to take quick carbon footprint reducing action in the interim. As a result, *Gold Coast City Council Responding to Climate Change: Carbon Neutral by 2020* was adopted, see www.goldcoast.qld.gov.au/attachment/environment/cc_strategy.pdf



Its focus is on Council operations and on achieving the reduction of greenhouse gas emissions (carbon neutrality) from Council business. Ultimately Council intends for its operations to be carbon neutral by the year 2020 through a clear hierarchy of emission reduction and offset.



The strategy adopts two broad treatment options to address the risks of climate change: mitigation and adaptation.

Mitigation

Climate change mitigation focuses on reducing the amount of greenhouse gas we emit into the atmosphere. This action will help to avoid future impacts of climate change beyond that which is already projected.

Adaptation

Climate change adaptation addresses the climate change that is already projected to occur. Adaptation increases our ability to cope with a changing climate, including its variability and extreme events.

The strategy is structured around four focus areas set by Council:

- Council mitigation – reduction of greenhouse gas emissions from Council's day-to-day operations, fleet and buildings.
- Community mitigation – reduction of greenhouse gas emissions from the Gold Coast community including residential properties, businesses and transport.
- Council adaptation – using our corporate risk management approach to respond to governance, leadership and planning challenges presented by climate change when delivering services to the community now and in the future.
- Community adaptation – managing and reducing the vulnerability of the Gold Coast community to the potential impacts of climate change and maximising the potential opportunities also presented.

The strategy's development was informed by a comprehensive risk assessment of climate change impacts on Council and the community, undertaken in consultation with Council stakeholders and service owners. A gap analysis was completed along with recommended streams of action for the strategy. At various stages in the lifecycle of strategy development, stakeholders, service owners and Council's Executive Leadership Team were invited to provide comment.

The Climate Change Strategy has interdependencies with a number of key Council strategies, plans and visionary documents. Some of those include Council's:

- Bold Future Vision
- Corporate Plan
- Gold Coast Planning Scheme
- Nature Conservation Strategy
- 2020 Vision on Waste
- Disaster Management Plan, and
- Gold Coast City Transport Plan



2.3 Our Bold Future Vision

The Bold Future Vision for the future of the Gold Coast is:

“Defined by our spectacular beaches, hinterland ranges, forests and waterways, the Gold Coast is an outstanding city which celebrates nature and connects distinct communities with the common goal of sustainability, choice and well being for all.”

This vision is supported by six themes with explicit outcome statements. The Climate Change Strategy is a key initiative of Council and delivers on a number of these outcomes. A number of the Climate Change Strategy's Key Actions outlined in Section 4 form part of the Bold Future signature projects. For more information on Bold Future, see www.boldfuture.com.au.

2.4 Our climate change exposure

The Gold Coast has over 55 kilometres of coastline with over 260 kilometres of navigable waterways. Our city has a unique combination of environmental, social and economic characteristics, coupled with a historic and anticipated high population growth rate. These characteristics present many challenges and opportunities for Council when planning and preparing for our city's response to climate change.

Research on social, economic and environmental impacts of climate change for the Gold Coast is ongoing. However, there is still a great amount of uncertainty about the nature of climate change impacts or when they will occur. The risk identification and assessment work completed by Council to date identifies the anticipated risks and priority areas where action should be focused, based on the data available and highlights where more research is required. Planning for climate change mitigation and adaptation in this strategy has been based on the IPCC range (and other sources) for climate change impacts, and under the following assumed parameters:

- a range of 18-79 centimetres increase in sea level by 2100
- an increase in annual average temperature of 1.1° - 4.4° celsius by 2070
- an increase in the number of days over 35° celsius up to 14 days per annum by 2070
- an increase in 1-in-100 year storm surge height by 0.35 metres, and
- an increase in extreme rainfall intensity for 2-hour events of 46 per cent by 2070

These parameters (based on 1990 levels) will be reviewed regularly for currency with scientific discovery, localised research and alignment with new IPCC findings that are anticipated every three or four years.

Climate change risk extends beyond the physical environment and into the organisation's financial, legal and reputational risks. Council is acutely aware that at some point its planning decisions and land management considerations for climate change may be called into question through legal challenge or precedent-setting case law. In this event, Council may need to argue that it has taken all necessary adaptation and mitigation action to manage the impacts of climate change on the city. Should this not be proven, Council's climate change exposure will be costly and difficult to manage, impacting the city's reputation and sustainability in a changing climate.



2.5 Current trends and issues

All key climate change risks and their consequences have been considered in detail in the preparation of this strategy. The risk identification, assessment and priority ranking report is located in *Appendix B: Climate Change Strategy risk response matrix*. Within the strategy, action is proposed to mitigate or adapt to climate change risk. Risk priorities are determined on risk likelihood and the time horizon over which it occurs. The purpose of this strategy is to set direction for the treatment of climate change risks by Council and the Gold Coast community to enable action to be taken on behalf of the city. This strategy has been developed using a risk assessment model consistent with Council's corporate risk framework (adapted from the Handbook to Risk Management Guidelines Companion to AS/NZS 4360:2004).

In developing this strategy a number of risks associated with climate change have been identified that require priority action for our community. These are not limited to environmental impacts but also those of a social and economic nature. Over time climate change is anticipated to affect every part of the community in varying degrees, including areas like financial well-being, social connectivity, legal indemnity and insurance, health and lifestyle, decision making and leadership.

2.6 Council's role in community mitigation

Much of this city's community greenhouse gas emissions are generated by electricity consumption and transportation emissions. Emerging at the Federal Government level is the Carbon Pollution Reduction Scheme (CPRS) which will seek to drive behaviours across the nation to reduce emissions in these and other areas in line with national targets. The Queensland Government is introducing a complementary range of initiatives that will assist Queenslanders in both the residential and commercial sectors to take up technologies and behaviours to reduce greenhouse gas emissions.

Gold Coast City Council has a limited regulatory role in this area beyond development assessment. As such the scope of action in this area is focused on providing support to the initiatives of the other levels of government in the form of supplementary initiatives and promotion, and in seeking enhanced regulation in the review of the planning scheme.



3 The strategy

3.1 Our vision

“To lead our city in response to the risks and opportunities posed by climate change to the city, the community and Council’s operations, enabling climate change resilience for our future.”

This strategy is a comprehensive approach to managing climate change on the Gold Coast: setting direction, enabling action. It is envisaged that the city’s leaders and the community will work in partnership toward a resilient city that can respond to the impacts and opportunities presented by climate change.

3.2 Objectives of the strategy

The objectives of this strategy are to:

- ensure Council can continue to deliver its services effectively to the community in a changing climate
- reduce the vulnerability of the Gold Coast community to the potential impacts of climate change
- enable legal obligations and expectations on the Council and the community to be met comprehensively
- ensure Council’s response to climate change is capable of adaptation in light of international protocols, technological change, community readiness, state and federal policy and legislative change, improved knowledge (scientific discovery), etc
- equip Council with a robust framework to proactively seek opportunities, knowledge and partners to effectively manage the challenges and opportunities of climate change into the future
- build capacity and capability of Council’s ability to lead the community in responding to the challenges and opportunities presented to the city by climate change
- provide a dynamic and pragmatic action plan that will equip Council with a program of practical and sustainable responses to the current risks and challenges posed by climate change, and
- integrate climate change considerations into governance arrangements and, consequentially, Council’s day to day operations

3.3 Strategic outcomes

Council will take action to mitigate and adapt its operations and therefore prepare the community to achieve climate change resilience for the future. Council's response to climate change risks and opportunities targets five key areas for action: governance and leadership, research, advocacy and awareness, infrastructure, and planning and regulation. Achieving the strategic outcomes for the Climate Change Strategy will allow Council to meet the expectations of our community in managing climate change.



Governance and leadership

This part of the strategy directs Council's organisational management of climate change (governance) and the leadership required by Council to demonstrate its commitment

to the treatment of the climate change risk and drive uptake of climate change related opportunities on the Gold Coast.

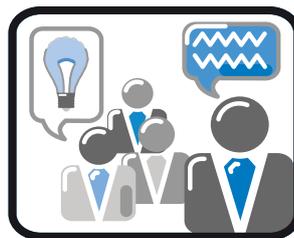
- 1. Council is a leader in localised action to address global climate change challenges and opportunities.**
- 2. The Gold Coast is a preferred location for investment in climate change opportunities and technology.**



Research

The research component of this strategy provides for the requirement for more specific information about our unique environment and its climate change exposure to allow Council to manage the risk to our city.

- 3. Council's response to climate change is informed by sound research specific to the Gold Coast.**



Advocacy and awareness

A strategic advocacy and awareness focus acknowledges that Council cannot manage its climate change risk in isolation or without support from other agencies and levels

of government. Council and the community will need to be informed and educated to have a voice in climate change issues and management.

- 4. The city's response to climate change is understood at all levels of government in Australia and internationally.**
- 5. Council and community response to climate change is enabled by improved awareness and understanding.**



Infrastructure

City infrastructure and assets are at risk from climate change impacts. Action is required to ensure that our city continues to function and to adapt its infrastructure to the changing climate.

- 6. The city's infrastructure is resilient to the impacts of climate change.**



Planning and regulation

The timing of climate change impacts such as sea level rise allows for Council to plan and regulate to manage risk. Other levels of government

impose climate change legislation and regulation on Council business. Council needs a planned response to climate change and to meet its associated legal obligations.

- 7. Council has a planned climate change response that meets its statutory responsibilities.**

4 Strategy outcomes, performance measures and reporting

4.1 Performance of the strategy

The result of Council action on an issue, risk or opportunity of climate change is the basis of the strategic outcomes of this strategy. The measure of performance of these outcomes will determine the success of strategic climate change action undertaken, and ultimately, the strategy itself.

The Climate Change Strategy will be successful when the risks to the Gold Coast community and Council operations associated with climate change are managed by a coordinated approach and risks are reduced as a result of strategic action through mitigation or adaptation. Success will also be achieved when the opportunities of climate change in our city are realised and return social, economic and environmental benefits.



4.2 Our carbon footprint

As with every measurable target, a baseline needs to be established. Council's forward thinking has resulted in the collection of its operational greenhouse gas emissions data since 1998. The greenhouse gas emissions from Council operations in the financial year of 2007-08 (excluding landfill gas) were 156,000 tonnes of carbon dioxide equivalent (T CO₂-e). Understanding Council's level of emissions and the source of those emissions from within our operational carbon footprint has enabled Council to identify specific mitigation measures to reduce emissions and in turn some operational costs.

The key areas for Council savings on cost and emissions are through energy efficiency or alternatives (primarily air conditioning changes in Council's administration buildings and renewable or efficient energy use in assets across the city including swimming pools, libraries and community buildings). Other high emitters with reduction potential are public lighting, vehicle fleet emissions and landfill gases. A comprehensive inventory of operational emissions for the purposes of identifying Council's carbon footprint is located in *Appendix C – carbon Footprint Analysis: Gold Coast City Council Operations 2007-2008*. This inventory provides a baseline to measure and monitor emissions in order to achieve our carbon neutral by 2020 target, and the success of proposed actions of this strategy that produce emission savings.



4.3 The role of offsets in this strategy

The diagram on page 4 of this strategy indicates a hierarchy of action to mitigate greenhouse gas emissions. It is anticipated that for Council's operations to achieve the target of carbon neutral by 2020, emissions unable to be mitigated by other means will need to be offset.

The focus of this strategy's mitigation actions for the next five years for Council's operations, and subsequently the financial investment on those actions, is on initiatives that will return significant reductions of direct greenhouse gas emissions. Consequently, this strategy does not focus on offsets as a primary action to be taken by Council at this time, other than the offsetting of Council's fleet and travel, which will be discussed below.

It is recognised that offsets have the desirable effect of nullifying the climate change impact of greenhouse gas emissions. However, the investment in offsets detracts from the financial capacity of Council to take substantive action to reduce greenhouse emissions at a time when investment in these actions is strategically important to the achievement of our long term target of carbon neutral by 2020. The investment that Council makes now and

over the life of this strategy on the reduction of greenhouse gas emissions from its own operations will return significant benefits. This includes reduced energy consumption costs and the avoidance of financial risks associated with anticipated increases in future energy costs flowing from the introduction of an emissions trading scheme by the Australian Government.

This strategy does however invest in the offsetting of the total greenhouse gas emissions resulting from the Council's fleet and travel. This investment will result in the offset of 11 per cent of Council's total (without landfill) emissions (2007/08 financial year). Offsetting of these emissions has been included as the Council's vehicle fleet is very visible to the community on a daily basis throughout the city. By simple messaging displayed on Council's vehicles, its leadership in climate change mitigation can be conveyed to the community. Further, investment in offsets for these specific emissions provides an opportunity with partners to establish formally recognised carbon sinks into operation in this city and further position the Gold Coast as a location for investment in climate change industries.

It is anticipated that in future reviews of the Climate Change Strategy the mix of reduction and offset actions will change as the opportunities for significant reduction actions diminish following the implementation of actions under this strategy.

4.4 Strategic outcomes, key actions and performance measures

Governance and leadership – key actions

Strategic outcome 1. Council is a leader in localised action to address global climate change challenges and opportunities.

Performance measures:

- Percentage by which Council's carbon footprint is reduced
- Percentage of relevant Council decisions and policies that contain climate change considerations
- Percentage of Council staff that undertake training for climate change considerations as part of routine risk assessment

1. Review Corporate Governance Framework to integrate and embed climate change risk mitigation and adaptation.
2. Review Information Management arrangements to support climate change actions and strategy implementation.
3. Ensure climate change considerations and statutory responsibilities are incorporated in the development of new (and the review of existing) corporate strategies, plans and policies.
4. Implement Climate Change Impact Statements into Council's decision making and governance framework.
5. Deliver the Gold Coast Light Rail Project as a collaborative infrastructure project of Council, and the Queensland and Australian Governments to mitigate community greenhouse gas emissions arising from transport within the city.
6. Host and deliver in collaboration with the Bold Future Team and Griffith University's National Climate Change Adaptation Research Facility, a Bold Future – Climate Change Summit.
7. Investigate financial potential for Council investment in carbon trading and energy generation or technology revenue streams.
8. Minimise Council's financial exposure to emissions trading and legislative penalty from landfill emissions through continued landfill gas capture and electricity production and other activities.
9. Accelerate Council's carbon footprint reduction initiatives programme.*
10. Accelerate Council's green fuels programme (including E10 and biofuels) for operational fleet.*
11. Upgrade Council's barbeque facilities to energy efficient technology.*
12. Install solar heating at all Council owned public pool facilities.*
13. Install solar hot water heating in Council owned Tourist Parks.*

*existing action already underway as part of Carbon Neutral by 2020 Action Plan, December 2007



Governance and leadership – key actions

Strategic outcome 2. The Gold Coast is a preferred location for investment in climate change opportunities and technology.

Performance measure:

Percentage of the city's economic growth attributed to climate change related industry and technology

- 14. Accelerate the work travel emissions offset program including full offset of Council's fleet on an annual basis.
- 15. Undertake a scoping study to develop a bulk purchasing model for energy efficient technology.
- 16. Undertake a pilot project to plant trees for carbon sequestration on Council land.
- 17. Investigate options for alternative fuel and renewable energy production and partnerships on the Gold Coast.

Research – key actions

Strategic outcome 3. Council's response to climate change is informed by sound research, specific to the Gold Coast.

Performance measures:

Percentage of Council's budget dedicated to Gold Coast specific climate change research initiatives

Percentage of Gold Coast specific information available compared to broader information for decision making purposes

Percentage of Gold Coast mapped for the impacts of climate change

- 18. Develop and coordinate a climate change research plan for the Gold Coast partnering with university research facilities.
- 19. Undertake a planning study to establish specific climate change parameters, based on existing internationally accepted science, for input into each of Council's land use, infrastructure and community planning functions.
- 20. Undertake a planning study to determine the climate change considerations that will inform the Planning Scheme Review.
- 21. Identify and map the Gold Coast environments most at risk from the impacts of climate change.
- 22. Having regard to emerging science, analyse the potential risks to the city posed by a range of future climate change scenarios including sea level rise parameters occurring at a more rapid rate than anticipated.



4.4 Strategic outcomes, key actions and performance measures

Advocacy and awareness – key actions



Strategic outcome 4. the city's response to climate change is understood at all levels of government in Australia.

Performance measures:

Percentage of government funding and grants received by Council for climate change initiatives
 Percentage of Council participation in state, national and international climate change partnerships

- 23. Advocate on behalf of Council and the community for improved climate change outcomes, including energy efficient public lighting, improved health services and emergency management outcomes.

Advocacy and awareness – key actions



Strategic outcome 5. Council and community response to climate change is enabled by improved awareness and understanding.

Performance measures:

Percentage decrease in the city's carbon footprint
 Percentage increase in uptake of government programs by the Gold Coast community
 Percentage increase in Council staff enquiry for climate change related information and resources

- 24. Establish information sharing and collaborative partnerships with community service providers to manage the risks of climate change for the city.
- 25. Develop and deliver an integrated community-wide education and awareness campaign on climate change mitigation and adaptation.
- 26. Develop an internal training and awareness campaign for Council staff to increase understanding and awareness of climate change risk mitigation and adaptation and its application to decision making processes.



Strategic outcome 6. the city's infrastructure is resilient to the impacts of climate change.

Performance measures:

- Percentage of city assets and infrastructure that meets climate change design standards
- Percentage of Council buildings with 40 per cent or better Greenhouse 5 Star Rating
- Percentage decrease in energy consumption across Council buildings and assets

27. Review maintenance requirements for Council's recreational facilities and public spaces to assess the risk and impacts of climate change (particularly environmental risk).
28. Identify and prioritise Council infrastructure and assets at risk from climate change impacts.
29. Review and progressively amend design standards of Council infrastructure and assets to include established climate change parameters (following completion of Action #19).
30. Construct all new Council buildings to a performance standard 40kgCO₂-e/m²/annum or better than the Australian 5 star Greenhouse Building Rating*.
31. Conduct energy audits of Council owned assets to develop and implement management plans for each to address climate change risks, mitigation and adaptation¹.

*existing action already underway as part of Carbon Neutral by 2020 Action Plan, December 2007

¹ Energy audits and management plan implementation for facilities management air conditioning and lighting retrofit have already commenced for Evandale Administration Building through existing funding of \$400,000 received in 2008-2009.



4.4 Strategic outcomes, key actions and performance measures

Planning and regulation – key actions



Strategic outcome 7. Council has a planned climate change response that meets its statutory responsibilities.

Performance measures:

Percentage increase in public transport services available for the Gold Coast community

Percentage of locally grown food available to the Gold Coast community

Percentage increase in the implementation of Council strategies, plans and policies that meet climate change requirements and responsibilities

32. Incorporate climate change considerations in the review of Council's Integrated Transport Plan.
33. Develop a scoping study for local food production and purchase on the Gold Coast.
34. Designate carbon sinks in the Gold Coast Planning Scheme to increase carbon sequestration potential on the Gold Coast.
35. Apply Council's established climate change parameters (*following completion of Action #19*) to develop and implement a shoreline Management Plan to mitigate and adapt to climate change risks.





4.5 Corporate governance and climate change

In responding comprehensively to climate change it is essential that Council, as a leader in this city, integrates climate change considerations into its corporate governance arrangements. Council will ensure that its overarching Corporate Governance Framework (CGF) enables climate change considerations to permeate the organisational planning, resource allocation, performance management and the organisational foundation components that govern Council's operations.

The elements of the CGF of particular significance to the integration of climate change into Council business and service delivery are: corporate planning, service planning, long-term financial planning, annual budget, performance management, control environment, risk assessment, control activity and monitoring.

Given that by its nature climate change poses dynamic risks and opportunities, it is necessary for Council's governance functions and services to be continually informed by a contemporary understanding of climate change. This will result in ongoing adaptive risk-based management responses. It is essential that within the context of the CGF functions, enabling this resilience and adaptability to occur, that such measures as environmental scanning and scenario planning occur.

As management of climate change challenges requires a risk-based, adaptive management approach, Council's Corporate Risk Management Framework will be the structure within which Council will ensure its responses to climate change are comprehensive, prioritised and integrated across the organisation.

The monitoring and reporting on the implementation and performance of the strategy will be directed by the Corporate Performance Management Framework resulting in quarterly and annual reporting of strategy implementation and progress to achieving performance measures through the Annual Report and the Corporate Performance Report.

Current requirements for Council on its energy consumption are via the *Energy Efficiency Opportunities Act 2006*. Emission reductions are reported through the Cities for Climate Protection program which Council has participated in since 1998. It is anticipated that Council will report on its carbon emissions via the *National Greenhouse and Energy Report Act 2007*.

4.6 Climate change strategy review arrangements

The implementation of this strategy will be reviewed annually to ensure it is consistent with the most recent and relevant information, science and response methodology available. The world authority in this area is the IPCC that comprehensively reports on climate change science, indicators and responses. It is appropriate that this strategy undergoes a full review in the year that those reports are released.

However, should an increase in corporate risk scores occur (for those risks identified as applicable to climate change) this will also trigger a review of this strategy. Council will continue its collaborative research and knowledge partnerships with the CSIRO, universities and all levels of government to provide informed and localised responses to climate change science.



5 Strategy implementation

5.1 Implementation plan

A risk-based strategy such as this needs to consider not only the risks and consequences of climate change but also how those risks and consequences might be treated through the implementation of mitigation and adaptation actions.

The key actions identified in Section 4 are within the focus areas determined in Council's resolution for developing the strategy, being: Council and community mitigation and Council and community adaptation. These actions are further detailed in *Appendix A – implementation plan: key actions of the Climate Change Strategy*. The implementation, change management and communication activities of this strategy will be primarily coordinated by the Strategic & Environmental Planning & Policy Branch, in the Planning Environment & Transport Directorate within Council.

5.2 Financial and resource requirements

The options available for Council and the community to mitigate climate change risk come at varying degrees of cost and resource requirement. Internally focused action, such as that required for Council to mitigate or adapt to its own operational risks, will require funding, dedicated resources, and capability development across the organisation.

Human resources will be required for the centralised coordination of the Climate Change Strategy. It will need to support service owners and coordinate the monitoring, measuring and reporting on the strategy. It is important to recognise that not all climate change action within Council

will require its own funding, but will become embedded in the operational business of Council through appropriate governance arrangements, planning and policy. Similarly, additional funding may not be required to support the development of climate change resilient assets and infrastructure, if existing budget expenditure occurs with regard to climate change considerations. Ultimately, however, some climate change related actions will require substantial financial support and resource input in order to deliver the strategic outcomes that Council seeks for mitigating and adapting to its climate change risks and capitalising on its climate change associated opportunities. This figure is likely to be, on average, two million dollars per annum in the initial years of strategy implementation.

Opportunities for partnerships can reduce the overall cost of action for Council, enabling the full cost of action to be offset.

5.3 Responsibility and accountability

Climate change actions for risk mitigation and adaptation within Council will require input across all directorates as will actions required to capitalise on climate change opportunities. Service owners are assigned the lead responsibility for actions directly relating to their businesses. A coordinated approach to managing the ongoing implementation of the Climate Change Strategy is necessary in enabling a comprehensive and adaptable strategy. Council will integrate its climate change response into governance arrangements to provide the transparent responsibility and accountability for enacting the strategy.



6 Appendices

6.1 Appendix A – implementation plan: key actions of the Climate Change Strategy

Governance and leadership



Strategic outcome 1. Council is a leader in localised action to address global climate change challenges and opportunities.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
1. Review Corporate Governance Framework to integrate and embed climate change risk mitigation and adaptation.	C-M C-A Co-M Co-A	\$ Cost neutral (resourced in-house)	This is both a mitigation and adaptation action	Corporate Planning & Performance, City Governance (governance arrangements) SEPP, Planning Environment and Transport (coordination in all directorates)	End 2009
2. Review Information Management arrangements to support climate change actions and strategy implementation.	C-M C-A Co-M Co-A	\$50,000	This is both a mitigation and adaptation action	SEPP, Planning Environment and Transport (coordination in all directorates) Office of the CIO, Organisational Services	End 2009
3. Ensure climate change considerations and statutory responsibilities are incorporated in the development of new (and the review of existing) corporate strategies, plans and policies. <i>(Note: Including, but not limited to, Sustainable Flood Management Strategy, Water Cycle Strategy and Nature Conservation Strategy)</i>	C-A Co-A	\$ Cost neutral (resourced in-house)	This is an adaptation action	Corporate Planning & Performance, City Governance SEPP, Planning Environment and Transport	End 2010
4. Implement Climate Change Impact Statements into Council's decision making and governance framework.	C-M C-A Co-M Co-A	\$50,000 (2009-2010)	This is both a mitigation and adaptation action	Corporate Planning & Performance, City Governance (governance arrangements), SEPP, Planning Environment and Transport (coordination in all directorates)	End 2009

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation



Strategic outcome 1. Council is a leader in localised action to address global climate change challenges and opportunities.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
5. Deliver the Gold Coast Light Rail Project as a collaborative infrastructure project of Council, and the Queensland and Australian Governments to mitigate community greenhouse gas emissions arising from transport within the city.	Co-M	<i>(Funded as separate capital works program at each financial year)</i>	11,400 – 40,000 per annum <i>(measurable once construction has been completed for Sections 2 and 3, Southport to Broadbeach, and in operation)</i>	Transport Planning Branch, Planning Environment and Transport	End 2013
6. Host and deliver in collaboration with the Bold Future Team and Griffith University's National Climate Change Adaptation Research Facility, a Bold Future – Climate Change Summit.	C-M C-A Co-M Co-A	\$50,000 <i>(funded as part of Bold Future actions)</i>	This is both a mitigation and adaptation action	Bold Future Team - SEPP, Planning Environment and Transport (to coordinate)	End 2009
7. Investigate financial potential for Council investment in carbon trading and energy generation or technology revenue streams.	C-M C-A Co-M Co-A	\$ Cost neutral <i>(resourced in-house)</i>	This is both a mitigation and adaptation action	Economic Development (Liaison), Economic Development and Major Projects	End 2009
8. Minimise Council's financial exposure to emissions trading and legislative penalty from landfill emissions through continued landfill gas capture and electricity production and other activities.	C-M	<i>(Dependent on actions implemented)</i>	Fugitive emissions calculation to be finalised	Commercial Services, Community Services	End 2010
9. Accelerate Council's carbon footprint reduction initiatives program. <i>(Note: Funded through electricity savings and coordinated through existing organisational functions)</i>	C-M	\$ Cost neutral	1000tCO ₂ -e per annum	SEPP, Planning Environment and Transport, Facilities Management, Organisational Services	Ongoing Action
10. Accelerate Council's green fuels program (including E10 and biofuels) for operational fleet	C-M	\$ Cost neutral	1,710 (2009-2012) 6,270 (2009-2020)	Fleet and Plant Services, Engineering Services	Ongoing Action
11. Upgrade Council's barbecue facilities to energy efficient technology	C-M	\$86,500 (2009-2010) <i>(projected estimate \$865,000 for 2009-2020)</i>	6,000 (2009-2012) 22,000 (2009-2020)	Parks and Recreational Services, Community Services	Ongoing Action
12. Install solar heating at all Council owned public pool facilities	C-M	\$500,000 (2010-2012) <i>(further facilities to be costed on individual site requirements)</i>	750 (2009-2012) 2,750 (2009-2020)	City Venues, Community Services	Ongoing Action
13. Install solar hot water heating in Council owned tourist parks <i>(funded with tourist park revenue through asset renewal)</i>	C-M	\$200,000 (2009-2010) <i>(projected estimate \$2,000,000 for 2009-2020)</i>	To be determined	Commercial Services, Community Services	Ongoing Action
14. Accelerate work travel emissions offset program including full offset of Council's fleet on an annual basis <i>(Note: Council will purchase offsets to ensure that emissions generated by Council's work travel, including light fleet, are offset. This is linked with Action #15)</i>	C-M	\$220,000 (2009-2010) <i>(projected estimate \$2,200,000 for 2009-2020)</i>	2,680 (2009-2020) Emissions savings available 5 years after planting	Fleet and Plant Services, Engineering Services	Ongoing Action

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation

Governance and leadership



Strategic outcome 2. The Gold Coast is a preferred location for investment in climate change opportunities and technology.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
15. Undertake a scoping study to develop a bulk purchasing model for energy efficient technology.	C-M Co-M	\$50,000 (2009-2010)	To be determined	SEPP, Planning Environment and Transport	End 2009
16. Undertake a pilot project to plant trees for carbon sequestration on Council land.	C-M	\$ Cost neutral	To be determined	Parks & Recreational Services, Community Services, SEPP, Planning Environment and Transport, Fleet and Plant Services, Engineering Services	End 2010
17. Investigate options for alternative fuel and renewable energy production and partnerships on the Gold Coast.	C-A Co-A	\$60,000 (2009-2010)	This is an adaptation action	Economic Development (Liaison), Economic Development and Major Projects	End 2009

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation

Research



Strategic outcome 3. Council's response to climate change is informed by sound research, specific to the Gold Coast.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
18. Develop and coordinate a climate change research plan for the Gold Coast partnering with university research facilities (including, but not limited to, the Griffith University Climate Change Adaptation Research Facility).	C-A Co-A	\$120,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport	End 2010
19. Undertake a planning study to establish specific climate change parameters, based on existing internationally accepted science, for input into each of Council's land use, infrastructure and community planning functions.	C-A Co-A	\$120,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport	End 2010
20. Undertake a planning study to determine the climate change considerations that will inform the Planning Scheme Review.	C-A Co-A	\$100,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport	End 2009
21. Identify and map the Gold Coast environments most at risk from the impacts of climate change.	C-A Co-A	\$50,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport	End 2009
22. Having regard to emerging science, analyse the potential risks to the city posed by a range of future climate change scenarios including sea level rise parameters occurring at a more rapid rate than anticipated.	C-A Co-A	\$50,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport	End 2009

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation



Strategic outcome 4. The city's response to climate change is understood at all levels of government in Australia and internationally.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
23. Advocate on behalf of Council and the community for improved climate change outcomes, including energy efficient public lighting, improved health services and emergency management outcomes.	C-A Co-A	\$ Cost neutral (resourced in-house)	This is an adaptation action	Economic Development, Economic Development & Major Projects	Ongoing Action

Strategic outcome 5. Council and community response to climate change is enabled by improved awareness and understanding.

24. Establish information sharing and collaborative partnerships with community service providers to manage the risks of climate change for the city.	C-A Co-A	\$ Cost neutral (resourced in-house)	This is an adaptation action	SEPP, Planning Environment and Transport Corporate Risk, City Governance (for risk management framework)	Ongoing Action
25. Develop and deliver an integrated community-wide education and awareness raising campaign on climate change mitigation and adaptation (campaign to be based on communication programs such as waste and water initiatives, "watch every drop" model).	Co-M Co-A	\$100,000 (2009-2010)	This is an adaptation action	SEPP, Planning Environment and Transport Corporate Communications, City Governance	Ongoing Action
26. Develop an internal training and awareness campaign for Council staff to increase understanding and awareness of climate change risk mitigation and adaptation and its application to decision making processes.	C-M C-A	\$100,000 (2009-2010)	This is an adaptation action	Organisational Learning & Development Unit, Organisational Services SEPP, Planning Environment and Transport	Ongoing Action

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation





Infrastructure



Strategic outcome 6. The city's infrastructure is resilient to the impacts of climate change.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
27. Review maintenance requirements for Council's recreational facilities and public spaces to assess the risk and impacts of climate change (particularly environmental risk).	C-A Co-A	\$100,000 (2009-2010)	This is an adaptation action	Parks & Recreational Services, Community Services City Venues, Community Services	End 2009
28. Identify and prioritise Council infrastructure and assets at risk from climate change impacts.	C-A	\$100,000 (2009-2010)	This is an adaptation action	Corporate Asset Management, City Governance Corporate Risk, City Governance	End 2010
29. Review and progressively amend design standards of Council infrastructure and assets to include established climate change parameters (following completion of Action #17).	C-A	\$125,000 (2009-2010)	This is an adaptation action	Technical Services, Engineering Services	End 2010
30. Construct all new Council buildings to a performance standard 40kgCO ₂ -e/m ² /annum or better than the Australian 5 star Greenhouse Building Rating.	C-M	(Funded as separate capital works program at each financial year)	1000 tCO ₂ -e per annum	Economic Projects, Economic Development and Major Projects	End 2012
31. Conduct energy audits of Council owned assets and develop and implement management plans for each to address climate change risks, mitigation and adaptation measures.	C-M	\$150,000 (2009-2010) (energy audits and implementation plans have already commenced with existing funding of \$400,000 received in 2008-2009)	4,100 (2009-2010) 12,000 (2009-2020)	Facilities Management, Organisational Services	End 2012

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation



Strategic outcome 7. Council has a planned climate change response that meets its statutory responsibilities.

Key Actions	Focus Area	Cost	Emissions Savings (tCO ₂ -e)	Responsibility	When
32. Incorporate climate change considerations in the review of Council's Integrated Transport Plan.	C-A Co-A	<i>(Funded as a separate strategic initiative)</i>	This is an adaptation action	Transport Planning, Planning Environment and Transport	End 2010
33. Develop a scoping study for local food production and purchase on the Gold Coast.	Co-A	\$100,000 (Strategy development only 2010-11 not implementation)	This is an adaptation action	Economic Development (Liaison), Economic Development and Major Projects	End 2011
34. Designate carbon sinks as a land use in the planning scheme to increase carbon sequestration potential on the Gold Coast.	Co-A	No budget required	This is an adaptation action	SEPP, Planning Environment and Transport	End 2009
35. Apply Council's established climate change parameters (following completion of Action #18) to develop and implement a Foreshore Management Plan to mitigate and adapt to climate change risks.	C-A	\$50,000 (Development only - identified for 2010-2011)	This is an adaptation action	Catchment Management Unit, Community Services	End 2011

Focus Area: C-M: Council Mitigation C-A: Council Adaptation Co-M: Community Mitigation Co-A: Community Adaptation



6.2 Appendix B – Climate Change Strategy risk response matrix

Risk response matrix

Risk – business disruption

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • Inability for Council to provide services to the community. • Loss of income and tourism by reduction of services and a growing population. • Poor outcomes for growth, employment and education prospects.
Level	Moderate
Priority	Medium
Context	Business continuity plans are already in place in Council; however, these will require review to incorporate climate change considerations (governance arrangements).
Response	
Strategic outcome	<i>Council is a leader in localised action to address global climate change challenges and opportunities.</i>
Key action	<i>Action # 1, 2, 3, 32</i>

Risk – water supply

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • Reduced volume and quality of supply. • Increase in purchase price and decrease in availability of water. • Flooding and inundation of drinking water and sewage networks. • Salt gradient/sedimentation will affect catchment and waterway health.
Level	Major
Priority	High
Context	Restructure of Council's responsibility for water assets and supply will be final July 2010.
Response	
Strategic outcome	<i>The city's response to climate change is understood at all levels of government in Australia.</i>
Key action	<i>Action # 23, 24</i>

Risk – people resources

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • Flooding and extreme weather events will prevent Council staff from attending work and delivering services to the community. • Unsuitable/unskilled staff lacking awareness of climate change impacts and training will make poor decisions for the community's future.
Level	Major
Priority	High
Context	Climate change will alter the frequency and intensity of existing weather-related risks and hazards – the organisation will manage this via a risk-based approach.
Response	
Strategic outcome	<i>Council and community response to climate change is enabled by improved awareness and understanding.</i>
Key action	<i>Action # 1, 2, 3, 5, 23, 24, 32</i>

Risk response matrix

Risk – built infrastructure processes

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> Burden of cost and responsibility falls to Council to implement changes to building codes and development standards to account for anticipated climate change impacts. Early retirement of capital infrastructure. Poor design and construction processes will result in reduced investment return and reputational damage for Council.
Level	Major
Priority	High
Context	Current infrastructure design does not consider the risks and exposure generated through a changing climate. Given anticipated climate changes expected into the future, historic conditions are no longer accurate indicators for planning, maintenance and upgrades.
Response	 
Strategic outcome	<i>Council's response to climate change is informed by sound research, specific to the Gold Coast. The city's infrastructure is resilient to the impacts of climate change.</i>
Key action	Action # 15, 23, 25, 27, 29, 30

Risk – financial sustainability

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> Cost of retrofitting systems (planning and development instruments). Increasing carbon emissions by Council and the community incurring financial penalty or hardship flowing on to social implications. Increased maintenance and recovery costs of infrastructure (including stormwater, roads, coastal facilities, beaches, shoreline erosion and waterways). Increased conservation and recovery costs for the natural environment after climactic events (weed and pest management of invasive species, changes to wetlands and biodiversity, increased vector borne diseases, plant and species impacts or loss). Increased insurance costs for Council and community. Reduced tourism, industry and development results in Council's reduced financial capacity to deliver services.
Level	Catastrophic
Priority	High
Context	Every risk and its consequence will result in a financial impact on Council, whether direct or indirect.
Response	  
Strategic outcome	<i>Council is a leader in localised action to address global climate change challenges and opportunities. Council and community response to climate change is enabled by improved awareness and understanding. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	Action # 1, 2, 3, 4, 7, 8, 9, 15, 17, 27, 28, 30, 31, 33, 35

Risk response matrix

Risk – social sustainability

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • High temperatures – high energy demand, increasing emissions and financial implications, affecting lower socio-economic groups. • Extreme weather events lead to decline in general health, mental health issues, violence, strained health and emergency services and death. • Higher temperatures compromise food safety and increase food borne disease. • Less rainfall leads to water harvesting and rain tanks with increasing incidence of mosquitoes and vector borne disease. • Flooding and storm surge causes cross-contamination of water and sewerage systems and pathogen exposure. • Temperature increases and bushfire threat intensifies causing loss of life and property. • Extreme events lead to pressure on essential services and evacuation refuges.
Level	Catastrophic
Priority	High
Context	The community is the highest priority for Council and the provision and currency of timely information and awareness will be vital to managing climate change impacts.
Response	 
Strategic outcome	<i>The city's response to climate change is understood at all levels of government in Australia. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	Action # 1, 2, 3, 4, 5, 19, 28, 29, 32, 33, 35

Risk – economic sustainability

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • Impacts from extreme events on infrastructure and assets will increase costs of repair and replacement, insurances, and are a risk to public safety. • Extreme events will lead to decrease in tourism and significant economic loss for the city. • Increased temperature and flooding will damage the landscape and infrastructure on both public and private land. • Threats/loss of ecosystem services; loss of tourism income through loss and/or degradation of natural areas; loss of individual species, ecosystems and communities through climate change threats; loss of reputation as a green tourism destination; loss of ecosystem services.
Level	Catastrophic
Priority	High
Context	Industry development and the city's future economic viability rests on the appropriate management of climate change impacts. Most of the economic consequences will be long term; however, the priority requires a substantial forward planning response to reduce future risk.
Response	  
Strategic outcome	<i>Council is a leader in localised action to address global climate change challenges and opportunities. The city's response to climate change is understood at all levels of government in Australia. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	Action # 1, 2, 3, 4, 5, 15, 16, 17, 32, 33

Risk response matrix

Risk – contributed assets

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> Impacts from extreme events on infrastructure and assets will increase costs of repair, replacement and insurances, and are a risk to public safety. Increasing incidence of litigation and financial burden placed on Council. Increase in sea level and storm surge impacting low lying roads and drainage assets. Extreme rainfall events will result in flooding of roads, property and inaccessibility. Impact on coastal strip buildings, recreational facilities and property from sea level rise causing increased erosion and debris, and loss of property and financial impacts.
Level	Major
Priority	High
Context	All Council assets will be directly impacted as a result of changing climatic conditions. A forward planning response and continued research will provide Council with the most current, Gold Coast specific information to make the most appropriate decisions about its assets.
Response	 
Strategic outcome	<i>Council's response to climate change is informed by sound research, specific to the Gold Coast. The city's infrastructure is resilient to the impacts of climate change.</i>
Key action	<i>Action # 1, 2, 3, 4, 9, 10, 11, 15, 24, 25, 27, 28, 29, 30</i>

Risk – environmental sustainability – sea level rise

Likelihood	Rare
Consequence	<ul style="list-style-type: none"> Private and public asset loss / damage. Erosion and inundation of low lying areas. Impacts on coastal recreational infrastructure. Increased coastal erosion and inundation. Loss of tourism impacting on economy and long-term financial viability of city. Loss of life – inability to evacuate or access inundated areas. Insufficient or ill-prepared planning parameters to respond to sea level rise will impact on public and private property, as well as health, financial and environmental impacts. Impacts to low-lying coastal regional ecosystems and habitats of threatened species..
Level	Catastrophic
Priority	Medium
Context	This will not occur during the life of this strategy; however, the priority requires a substantial forward planning response to reduce future risk.
Response	   
Strategic outcome	<i>Council's response to climate change is informed by sound research, specific to the Gold Coast. Council and community response to climate change is enabled by improved awareness and understanding. The city's infrastructure is resilient to the impacts of climate change. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	<i>Action # 1, 2, 3, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 31, 35</i>

Risk response matrix

Risk – environmental sustainability – flooding

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • Inundation of drinking water and sewage networks. • Increased emergency response and recovery operations. • Decreased drainage capacity. • Changes to acid sulphate soil behaviour. • Changes in groundwater levels and on floodplains. • Flow related impacts on waterways. • Compromise of existing flood defences. • Private and public asset loss or damage. • Challenge to Council's base planning assumptions. • Increased legal implications/obligations for Council. • Decreased biodiversity resilience and changes in the distribution of plant and animal species. • Power outages and disrupted communication and transport networks. • Impacts on Council's ability to provide adequate services to the community. • Impacts on health, public safety, tourism and the economy. • Increased demand for resources. • Stormwater system failure.
Level	Major
Priority	High
Context	The flooding vulnerability of the Gold Coast is due to its exposure to the coast, canals and waterways that surround the city. The risks and impacts of flooding have been realised by Council and the community with action already commenced with emergency warning systems, flood levels and modelling available for building and development works for the community.
Response	
Strategic outcome	<p><i>Council's response to climate change is informed by sound research, specific to the Gold Coast.</i></p> <p><i>Council and community response to climate change is enabled by improved awareness and understanding.</i></p> <p><i>The city's infrastructure is resilient to the impacts of climate change.</i></p> <p><i>Council has a planned climate change response that meets its statutory responsibilities.</i></p>
Key action	Action # 1, 2, 3, 4, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 31, 35

Risk – environmental sustainability – drought

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • Increased vector borne disease. • Uncertain water quantity and quality for consumption. • Increased demand for public facilities e.g. pools. • Decreased biodiversity resilience and changes in the distribution of plant and animal species.
Level	Moderate
Priority	Medium
Context	From July 2010 (due to water reforms in SEQ) Council will have an advocacy role in providing tools and assistance to residents.
Response	
Strategic outcome	<i>Council and community response to climate change is enabled by improved awareness and understanding.</i>
Key action	Action # 1, 2, 3, 4, 19, 20, 21, 22

Risk response matrix

Risk – environmental sustainability – bushfire

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • Landfill destruction. • Air quality impacts. • Increased emergency response and recovery operations. • Decreased biodiversity resilience and changes in the distribution of plant and animal species. • Power outages and disrupted communication and transport networks. • Impacts on Council's ability to provide adequate services to the community. • Private and public asset loss or damage. • Health and public safety impacts.
Level	Major
Priority	High
Context	A bushfire event may not occur in the life of this strategy. However, risk mitigation and forward planning of action to take in the event of a bushfire is consistent with Council's Bold Future target: "By 2040, native bush land covers a higher proportion of our city than any other major city in Australia".
Response	 
Strategic outcome	<p><i>Council is a leader in localised action to address global climate change challenges and opportunities. Council and community response to climate change is enabled by improved awareness and understanding.</i></p>
Key action	Action # 1, 2, 3, 4, 19, 20, 21, 34

Risk – environmental sustainability – extreme weather events

Likelihood	Almost certain
Consequence	<ul style="list-style-type: none"> • Increased emergency response and recovery operations. • Air and water quality impacts. • Housing impacts and poverty. • Private and public asset loss or damage. • Decreased biodiversity resilience and changes in the distribution of plant and animal species. • Power outages and disrupted communication and transport networks. • Impacts on health, public safety, tourism and the economy. • Increased demand for resources. • Stormwater system failure. • Impacts on Council's ability to provide adequate services to the community. • Increased demand for public facilities e.g. pools, libraries.
Level	Catastrophic
Priority	High
Context	Historically, the Gold Coast has experienced a number of significant extreme weather events such as flooding, inundation, erosion, cyclones, heatwaves and bushfires. However, these events will be magnified by the increasingly severe weather and climatic systems projected to impact on South East Queensland.
Response	   
Strategic outcome	<p><i>Council is a leader in localised action to address global climate change challenges and opportunities. Council and community response to climate change is enabled by improved awareness and understanding.</i></p> <p><i>The city's infrastructure is resilient to the impacts of climate change.</i></p> <p><i>Council has a planned climate change response that meets its statutory responsibilities.</i></p>
Key action	Action # 1, 2, 3, 4, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 35

Risk response matrix

Risk – environmental sustainability – biodiversity

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • Decreased biodiversity resilience and changes in the distribution of plant and animal species. • Shifts in distribution or extinction of plant and animal species. • Changes to habitats due to salt water intrusion. • Increase in ecological stress and disturbance. • Threat to our existing natural assets (parks, waterway buffers, wetlands, environmental corridors).
Level	Major
Priority	High
Context	Climate change will alter the frequency and intensity of existing weather-related risks and hazards, as well as producing long-term trends that will impact on the city's diverse natural environment and species.
Response	 
Strategic outcome	<i>Council's response to climate change is informed by sound research, specific to the Gold Coast. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	<i>Action # 1, 2, 3, 19, 20, 21, 32, 34, 35</i>

Risk – corporate governance – legal

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • Legal impacts such as litigation resulting from property damage or loss of life. • Potential liability implications for past planning decisions. • Reduced financial capacity by Council to provide services to the community.
Level	Major
Priority	High
Context	Climate change action must be embedded into Council's corporate risk framework – governance is a priority for city planning requirements and an adaptive management response.
Response	 
Strategic outcome	<i>Council is a leader in localised action to address global climate change challenges and opportunities. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	<i>Action # 1, 2, 3, 4, 8, 19, 22, 32</i>

Risk – corporate governance – leadership

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • If no mitigation or adaptation action is taken, it will result in a loss of community confidence and reputational decline of Council. • Unclear direction and land-use planning decisions to adapt to changing assumptions resulting from climate change.
Level	Major
Priority	High
Context	A coordinated and comprehensive approach by Council to climate change on the Gold Coast will provide climate change resilience for the future of the city.
Response	 
Strategic outcome	<i>Council is a leader in localised action to address global climate change challenges and opportunities. Council has a planned climate change response that meets its statutory responsibilities.</i>
Key action	<i>Action # 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 19, 27, 28, 29, 30, 31, 32, 33, 34, 35</i>

Risk response matrix

Risk – information and communication technology

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • Asset loss and replacement costs. • Loss of corporate records (including financial and planning).
Level	Moderate Medium
Priority	Medium
Context	Council is required to protect and maintain its development and corporate records including electronic planning and mapping applications for the city.
Response	 
Strategic outcome	<p><i>The city's infrastructure is resilient to the impacts of climate change.</i></p> <p><i>Council has a planned climate change response that meets its statutory responsibilities.</i></p>
Key action	Action # 1, 2, 24, 32

Risk – economic stimulus for the Gold Coast economy

Likelihood	Possible
Consequence	<ul style="list-style-type: none"> • A thriving economy which is a key target in both the Corporate Plan and Bold Future vision. • New industry and business bolsters economy. • Enhanced industry leader in natural environment tourism.
Level	Major
Priority	High
Context	Council and the community to participate in this emerging area and to be an attractive location for business and innovative industry to prosper.
Response	
Strategic outcome	<i>The Gold Coast is a preferred location for investment in climate change opportunities and technology.</i>
Key action	Action # 1, 2, 3, 4, 5, 6, 15, 17

Risk – financial savings for the organisation and individuals

Likelihood	Likely
Consequence	<ul style="list-style-type: none"> • A thriving economy which is a key target in both the Corporate Plan and Bold Future vision. • Reduction in carbon footprint and electricity costs for Council and the community.
Level	Major
Priority	High
Context	Council and the community to participate in this emerging area and to be an attractive location for business and innovative industry to prosper.
Response	 
Strategic outcome	<p><i>The Gold Coast is a preferred location for investment in climate change opportunities and technology.</i></p> <p><i>The city's infrastructure is resilient to the impacts of climate change.</i></p>
Key action	Action # 1, 2, 3, 4, 5, 6, 15, 16, 17, 29

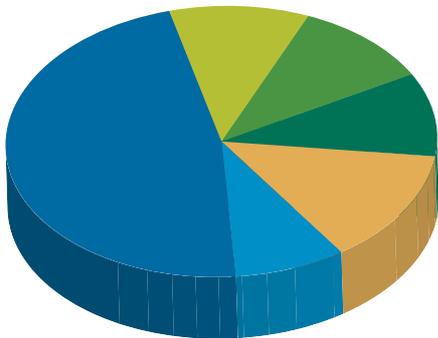
6.3 Appendix C – carbon footprint analysis: Gold Coast City Council operations 2008

Carbon footprint – overview

Council has been collecting emissions data and analysing its carbon footprint since 1998, when it joined the Cities for Climate Protection (CCP) program². At that time Council's total full fuel-cycle greenhouse emissions were 118,000 tonnes of carbon dioxide equivalent (T CO₂-e). By 2001-02 the emissions had grown to 125,000 T CO₂-e.

The greenhouse emissions from Council operations in the last complete financial year of 2007-08 (excluding landfill gas) were 156,000 T CO₂-e. This was an increase from the previous year by 3,000 T CO₂-e due to an increase of non-energy emissions from wastewater treatment plants. Gold Coast Water contributes approximately 50 per cent of Council's total emissions. This contribution has been consistent over the last 10 years.

**Emissions from Council (TCO₂-e)
2007-08
(without landfill)**



■ Wastewater	48%
■ Buildings	10%
■ Fleet	11%
■ Facilities	10%
■ Lighting	13%
■ Water	8%

- Buildings include administration, depots, libraries and community centres.
- Lighting includes street lighting and traffic signals (but not parks).
- Fleet includes all liquid fuels consumed by plant and fleet.
- Waste water includes treatments plants, pumping and associated fugitive emissions.
- Facilities includes all other Council assets (pools, parks, cemeteries, etc).

The top five greenhouse-emitting asset categories of Council in order of magnitude are:

1. wastewater treatment plants – electricity
2. Gold Coast Water non-energy emissions (nitrous oxide and methane)
3. public lighting
4. fleet emissions
5. waste water pumping

If Gold Coast Water is excluded (which will occur following water reform), the largest contributors of emissions within Council become:

1. public lighting³
2. fleet emissions
3. administration buildings
4. swimming pools
5. libraries and community centres

² Cities for Climate Protection is an ICLEI program designed for targeted emissions reduction for Council and the city.

³ Council has ownership over a small proportion of public lighting fixtures which limits control over emissions.





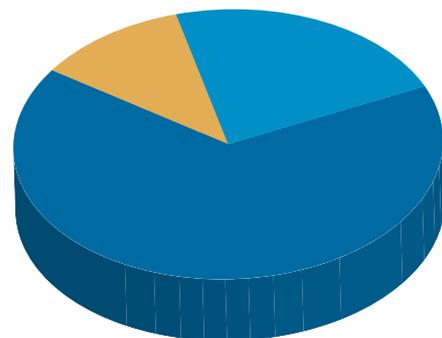
Reportable emissions

Council has always reported its emissions using full fuel-cycle factors provided by the Federal Government for the gases covered by the Kyoto Protocol. These factors are a summation of the scope 1, 2 and 3 emission factors which, in the future, will need to be reported separately as part of the legislative requirements under the *National Greenhouse and Energy Reporting Act 2007*.

Scope 1 emissions are those that are released directly by the organisation as a result of an activity. Council's vehicle emissions and landfill gas are examples of these type of emissions. Scope 2 emissions are indirect emissions that occur in the generation of electricity purchased by Council. Scope 3 emissions occur outside the boundary of the organisation as a consequence of activities by the organisation. Council does not have to report on scope 3 emissions as they will be captured by other organisations as their own scope 1 or 2 emissions. Examples of these emissions include employee business travel, the embodied energy of products and energy consumed by contractors.

Scope 1, 2 and 3 Council emissions (excluding landfill) are illustrated here. Scope 1 is made up of vehicle emissions and waste water treatment plant methane and nitrogen fugitive emissions. Scope 2 emissions are from our electricity consumption and scope 3 emissions consist of our up-stream contribution from all of our emitting assets.

Council Emissions by Scope 2007-08



■ Scope 1	22%
■ Scope 2	67%
■ Scope 3	11%

To determine its greenhouse emissions, Council has developed a customised energy management database for collating its electricity data which includes all of Council's operating assets. Additionally, information is collated into spreadsheet reports for vehicle fuel, landfill gas and other emission categories.



Municipal Solid Waste (MSW) generated emissions

For reporting purposes MSW generated emissions from our landfills have been regarded as a community emission. However, Council will likely be required to report on and be financially responsible for scope 1 landfill emissions (volume of equivalent emissions from this source) on implementation of the Carbon Pollution Reduction Scheme (CPRS).

Council's emissions are calculated using the National Greenhouse Factors (2008), which are calculation methods available on the Department of Climate Change website. Council is unaware of the precise composition of its landfills, and therefore, the recommended generic municipal solid waste factor of 1.11 T CO₂-e per tonne of waste has been used to

establish our emission profile. Some of the methane produced from our landfills is captured for electricity generation. The total methane produced from our landfill sites is considerably less than the total MSW factor indicates when calculated. Methane capture efficiency at Council's landfills may be as high as 75 per cent, resulting in considerably less total emissions (NGERS Technical Guidelines 2008). The methane captured is subtracted from the total landfill gas emissions generated but the green electricity generated as a result is not considered an offset as it is on-sold to an electricity provider, rather than consumed as green power for Council purposes.

Years	Municipal Solid Waste (tonnes)	Methane capture for generation (tCO ₂ -e)	Total emissions (tCO ₂ -e)	Emissions if assume 75% capture efficiency (tCO ₂ -e)
2001-2002	409,760	14,702	440,131	113,708
2002-2003	420,185	55,522	410,883	116,601
2003-2004	454,634	84,687	419,956	126,161
2004-2005	442,480	82,267	408,885	122,788
2005-2006	498,706	85,627	467,936	138,391
2006-2007	548,705	58,088	550,974	152,266
2007-2008	553,582	58,810	555,666	153,619

Public lighting

Public lighting contributes over 19,000 T CO₂-e to Council's total carbon footprint. Electricity consumed by these 44,500 assets is unmetered. They are considered as scope 2 emissions along with all the other electricity consumed by Council. However, in this case Council does not own or have operational control of 42,000 of these assets as they are currently in transition to our electricity provider for reporting control from July 2010 in line with other local governments in Queensland. This means Council's ability to influence the level of emissions from our public lighting is limited.

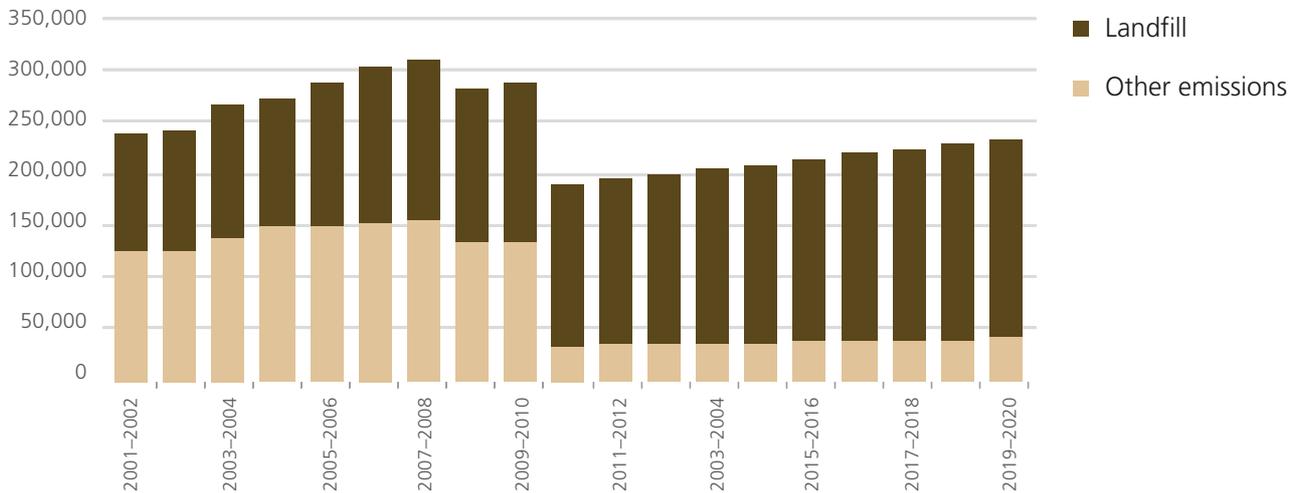
Gold Coast Water

Greenhouse emissions from the Gold Coast Water directorate in Council is likely to be transferred from Council to the distribution entity in July 2010 as part of water reform in South East Queensland. Emissions from this part of Council contribute approximately 50 per cent of Council's total carbon footprint yet have also contributed towards the largest reduction in Council emissions through significant water consumption decreases and an active energy efficiency maintenance program since 2002.

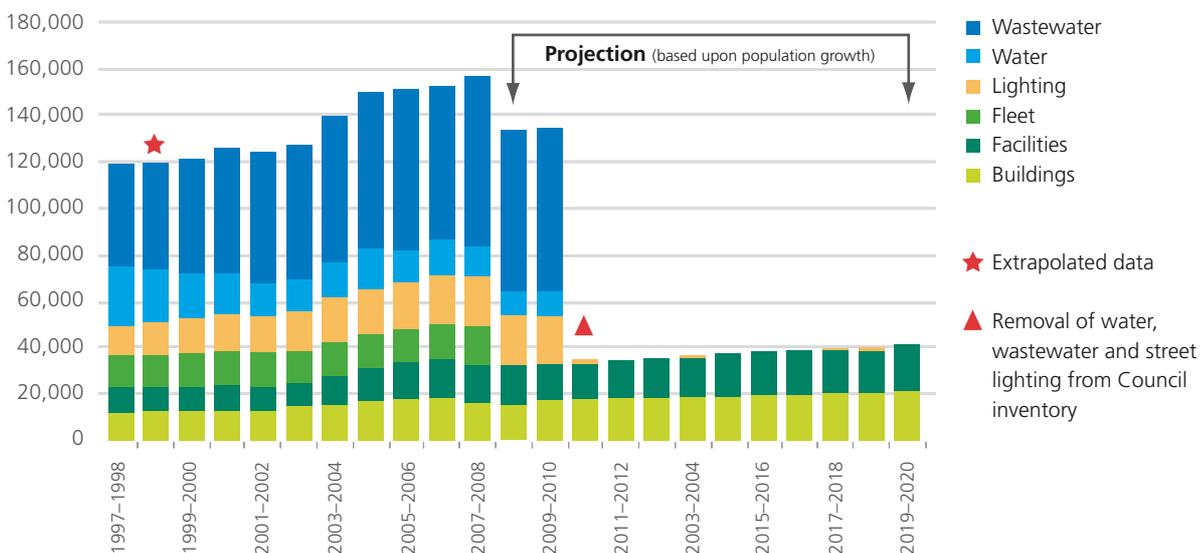
Carbon footprint profile for Council

The carbon footprint of Council's emissions profile is shown below with historical data from 2000-01 to 2019-20 including forecast indicators looking towards the Carbon Neutral by 2020 target.

Total emissions of Council (75% of landfill gas captured)



Council emissions (excluding landfill)



Graphical highlights

- The landfill gas capture efficiency is assumed to be 75 per cent which is consistent with NGERs published guidelines.
- Water treatment energy consumption moved to state ownership from July 2008; however, water pumping remains under Council control until the rest of the distribution system and water reform process is completed in July 2010.
- The fleet emissions have been completely offset from July 2008.
- The drop in emissions in 2010-11 is due to the removal of Gold Coast Water assets from Council's inventory if they move outside Council's operational control. A majority of public lighting assets will probably be transferred to ENERGEX reporting control from July 2010 in line with EEO and NGERs reporting parameters in relation to operational control.
- The future projection of Council emissions are in line with population growth. There are no assumptions of changes to Council business operations as far as administration building occupation or vehicle efficiency technology.



Gold Coast City Council emissions (operational usage) 2007-08

Source: GCCC Energy (Electricity) Management Database, fleet fuel monthly summary, landfill total tonnage and Gold Coast Water WSAA online database

Asset category	Volume (KWH or L)	Energy (PJ)	Total emissions (tCO ₂ -e)	Scope 1	Scope 2	Scope 3
Administration building total	10375350	0.037351	10790		9442	1349
Depot total	1115480	0.004016	1160		1015	145
Civic centre / community centre / library total	4220965	0.015195	4390		3841	549
Water pumping total	9696071	0.034906	10084		8823	1260
Water treatment total	2496163	0.008986	2596		2272	325
Waste water pumping total	13585758	0.048909	14129		12363	1766
Waste water treatment total	38427984	0.138341	39965		34969	4996
Ornamental fountain total	453905	0.001634	472		413	59
Public lighting total	18744732	0.067481	19495		17058	2437
Traffic signals total	1424611	0.005129	1482		1296	185
Miscellaneous total	369504	0.001330	384		336	48
Effluent pumping total	26103	0.000094	27		24	3
Park and recreational facilities total	2911412	0.010481	3028		2649	378
Reservoir total	227215	0.000818	236		207	30
Tourist park / caravan park / campground total	2681678	0.009654	2789		2440	349
Swimming pool / aquatic centre total	4861105	0.017500	5056		4424	632
Refuse management total	83899	0.000302	87		76	11
Cemetery total	14348	0.000052	15		13	2
Car park / ticketing machine total	123846	0.000446	129		113	16
Telemetry / communications total	4588	0.000017	5		4	1
Not yet confirmed total	2190614	0.007886	2278		1993	285
Unleaded petrol	4005593	0.136991281	10014	9213		801
Diesel	2023433	0.078104514	5868	5463		405
LPG	325528	0.008268411	553	521		33
GCW Methane WWTP (tonnes)	88		1848	1848		
GCW Nitrous Oxide WWTP (tonnes)	57		17670	17670		
Landfill garbage from Council staff	734			734		
Rental space electricity consumption	440000	0.001584	462			462
Air travel		342			342	
Landfill gas from tips (tonnes)	553,582		153619	153619		
Emissions Total		309,707	188,334	103,772	17,601	

Scope 1 emissions are those that are released directly by the organisation as a result of an activity.

Scope 2 emissions are those indirect emissions due to purchased electricity by the reporting organisation.

Scope 3 emissions occur outside the boundary of the organisation as a consequence of activities by the organisation.



6.4 Appendix D – acknowledgements

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