Cairns Regional Council
Climate Change Strategy 2010-2015

Cairns Regional COUNCIL

Adopted by Council on 25 August 2010.

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1. Executive summary

The Cairns region is an area of unique natural beauty, surrounded by tropical rainforests, beaches, mangroves, mudflats and coral reefs. It is a popular destination for domestic and international tourists because of its distinct natural beauty, and is experiencing high population growth and rapid expansion. Climate change will affect many aspects of the natural environment and the industries on which the region depends, making it a critical issue for the future of the region.

Council aims to become a leader in mitigating and planning for climate change and peak oil, and in doing so aims to provide guidance and inspiration for the broader community.

The Cairns region, which includes many low-lying coastal communities, is one of the most vulnerable areas in Australia to climate change impacts. Likewise, the region is vulnerable to peak oil impacts due to its isolation from major centres and sources of goods and services. This strategy provides a clear direction for Council and the community in responding to climate change and peak oil, and maps a course towards a resilient, vibrant and sustainable future for the region.

Climate change is the most significant issue facing human civilisation. It has the potential to affect every aspect of human existence, and to have serious consequences for the earth's ecosystems. Warming of above 2°C is predicted to cause runaway climate change triggering "tipping points" in the Earth's systems resulting in irreversible climatic and ecological changes. Our goal therefore needs to be to keep warming to below 2°C, which poses an enormous challenge to our societies and way of life. Immediate action is required to reduce greenhouse gas emissions and to begin to prepare communities for a changed climate. Climate change responses need to encompass not only emission reduction and adaptation measures, but also behaviour change, economic restructuring, and building social cohesion and resilience.

The predicted impacts of climate change on the Cairns region include increasing temperatures, decreasing annual rainfall, increasing rainfall seasonality, rising sea levels, and more intense tropical cyclones. These changes are likely to affect many aspects of our lifestyle, and are predicted to have impacts on both the Wet Tropics rainforests and the Great Barrier Reef. Such impacts have the potential to undermine the region's economy which is heavily reliant on nature based tourism. Sea level rise and increased cyclone intensity are very likely to affect Council and community assets, and need to be considered in planning decisions.

Council has identified the importance of addressing climate change and peak oil and the need for a Climate Change Strategy in the current Corporate Plan 2009 – 2014. The preparation and adoption of a holistic climate response in the form of a strategy, addresses and acknowledges the vulnerability of the region to these impacts. In addition the Strategy presents key actions to be implemented to mitigate the impacts of climate change and peak oil on the region.

The purpose of this strategy is to provide clear direction for responding to climate change risks and challenges. This strategy builds on Council's existing climate change policies and programs including the Climate Change Adaptation Action Plan and the Greenhouse Mitigation Action Plan. This strategy will be assessed and reviewed annually to ensure it is based on the latest science and policy information.

Responding to climate change is the responsibility of all areas of Council, and will require a coordinated, collaborative approach in order to successfully make the transition to a low carbon, low oil and sustainable future.

2. Strategy context

2.1 What is climate change?

Climate change refers to a change in the state of the climate that persists for an extended period, typically decades or longer. In this document, the term "climate change" is used to describe human–induced climate change, and can also be defined 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."[1]

Human induced climate change is caused by an increased concentration of greenhouse gases in the atmosphere, which trap re-radiated heat and warms the planet. The general trends are: increasing temperatures; reduced rainfall (though not in all locations); changes in rainfall seasonality; increasing ocean temperatures; changes to ocean currents and a greater number of extreme weather events such as storms, fires, droughts and floods.[2]

Many of these trends are already being observed, and climate change is now affecting communities around the world.

2.2 Climate change projections for the Wet Tropics region

Temperature

- An increase in annual average temperature of between 0.5 and 1.4°C by 2030 and between 1.0 and 4.2°C by 2070 (compared to 1990 temperatures). [3]
- An increase in the number of days above 35° C from the current annual average of three days to up to 41 days by 2070. [4]

Rainfall

- Overall drier and more seasonal conditions for the Wet Tropics, characterised by a longer, drier dry season. [5]
- A change in annual average rainfall of between -6% and +5% by 2030 and between -19% and +14% by 2070. [6]
- Inter-annual rainfall variability is expected to increase, and rainfall is expected to increase slightly in the wet season and to decrease markedly in the late dry season.
- Increased frequency of El Niño events resulting in lower rainfall and longer dry seasons.

Sea level rise

- Estimates of total sea-level rise remain uncertain due to unknown rates of polar ice cap melting. However, there is growing consensus among scientists that sea-level rise of 0.5 to 1.0 metres (compared to 1990 level) is plausible by 2100, and that a rise of 1.5 metres or more cannot be ruled out. [6] A conservative prediction of 0.8 metres by 2100 will be used for the purposes of this strategy. [8]

Ocean acidification

- As carbon dioxide dissolves into seawater, it increases the acidity of the ocean by formation of carbonic acid. This acidification of the oceans has adverse impacts on marine life, particularly corals, and presents a major threat to the health of the Great Barrier Reef.

Cyclones

- While projections of tropical cyclones in the Australian region are uncertain, available studies suggest that there may be an increase in the number of tropical cyclones in the more intense categories (categories 3–5), but a possible decrease in the total number of cyclones. [9]

Biodiversity loss

- Changing temperatures, rainfall patterns and cloud height are predicted to have negative impacts on plant and animal species in the Wet Tropics and high levels of species extinctions are predicted with warming beyond 2°C. [10, 11]
- Increasing ocean temperatures and acidification may also result in a high degree of marine biodiversity loss. [12]

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[1] IPCC Glossary of Terms 2007
[2] Allison et al 2009
[3] Suppiah et al 2007
[4] Australian Greenhouse Office 2004
[5] Wet Tropics Management Authority 2008
[6] Suppiah et al 2007
[7] Steffen 2009
[8] Sea level rise of 1.1m in Climate Change Risks to Australia's Coast (Department of Climate Change 2009), 0.8m in the Draft Coastal Management Plan and the South East Queensland Climate Change Management Plan (Queensland Department of Environment and Resource Management 2009)
[9] Short and Woodroffe 2009
[10] Still et al 1999
[11] Williams et al 2003
[12] Hoegh-Guldberg et al 2007

2.3 Peak oil and energy transition

Peak oil is a separate issue from climate change, but is included in this strategy because our responses to each of these issues need to consider the implications for the other. Solutions should be sought that do not address one at the expense of the other, and preferably that address both.

Peak oil is when global oil fields reach peak production, after which oil will become more expensive, increasingly hard to obtain and more difficult to extract (i.e. the Energy Profit Ratio, the amount of energy that has to be input to obtain a given quantity of output, will fall). Our societies rely on the availability of vast quantities of cheap oil. There are now signs that the age of cheap oil is coming to a close. The world's production of oil has been rising for at least 100 years, keeping pace with the rising demand for the product. But the world's endowment of oil is finite, and this cannot continue indefinitely.

The Cairns region, located 1700 km from Brisbane by road, is heavily dependant on road transport for the supply of food, fuel and other goods. As the cost of rising oil prices are passed on to the consumer, the price of goods will go up. Increased use of rail transport may alleviate this problem, however increased resilience should be sought by localising the supply of as many products as possible, particularly food and energy.

The 'Queensland's Vulnerability to rising Oil Prices Report'[13] found overwhelming evidence that world oil production will peak within the next 10 years. The 'Cairns Oil Vulnerability' study commissioned by Queensland Transport in 2007 found that "The risk of global oil production becoming insufficient to meet rising global demand is a very real one, probably within the next five years… The Far North Queensland region is highly vulnerable to a tightening of oil supply or a rise in oil prices…This calls for a risk management approach….local communities are not helpless but should do as much as they can to guard against the effects of peak oil, irrespective of national policy settings."

This report concluded that every industry in the region would be detrimentally affected by reduced oil availability or higher oil prices and found that early action to adapt to these scenarios would minimise the negative impacts on the region, both financially and in terms of community well-being.

Another report, 'Oil vulnerability in the Australian City', found that outer-suburban areas, locations that contain low socio-economic status populations, and suburbs which have high levels of car dependence will be the most affected by oil shortages and resulting price increases.[14]

[13] Queensland Government 2007
[14] Dodson and Sipe 2005

2.4 Implications for the region

Tourism – Many tourists visit the region solely because of the natural beauty of its reefs and rainforests. Therefore, the region's tourism industry would be adversely affected by any damage to these natural icons. Rising oil prices are also likely to reduce the number of tourists visiting the region as less people choose to travel due to increased flight costs.

Infrastructure – Rising sea levels, increased storm surge levels, and increased intensity of cyclones all pose risks to public and private infrastructure.

Health – Increased temperatures may increase health risks such as heat stress and tropical diseases for vulnerable groups such as the elderly and young children.

Community well-being - Rising costs of basic goods, services and electricity will disproportionately affect residents from low socio-economic backgrounds, and basic requirements could become unaffordable for some sectors of the community. As fuel prices increase, driving may become unaffordable for some people, and unless low carbon public transport options are available this will restrict access to services for residents in outlying suburbs.

2.5 The international response

The issue of climate change has been on the international agenda since The United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Since this time, climate change has increasingly dominated international environmental negotiations, and is now widely recognised as the most serious environmental issue of our time. It is also an issue that will require a high degree of international cooperation to resolve.

The international response to climate change is coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) and regulated by the Kyoto Protocol, which Australia ratified in 2007.

The Intergovernmental Panel on Climate Change (IPCC) was set up by the United Nations Environment Program to conduct and communicate sound research on climate science. The IPCC released a report in 2007 stating that to put the world on track to reduce global greenhouse gas emissions by at least half of 1990 levels by 2050, developed countries collectively need to cut their emissions to 25-40% below 1990 levels by 2020 and by 80-95% by 2050.

2.6 The Australian response

The Australian government ratified the Kyoto Protocol in 2007. Australia has committed to reducing greenhouse gas emissions by 5-25% below 2000 levels by 2020 (depending on the level of international cooperation), and 60% below 2000 levels by 2050. To assist in achieving this, the Federal Government has passed the Renewable Energy Target which commits to generating 20% of Australia's electricity supply (45,850 GWh) from renewable sources by 2020.

2.7 Queensland State Government response

The Queensland Government's *Towards Q2: Tomorrow's Queensland* incorporates targets aimed at protecting local communities from climate change impacts. These targets include:

- Cutting Queensland's carbon footprint by one third by 2020, with a focus on reducing electricity and motor vehicle use

- Allocating 50 per cent more land for nature conservation and public recreation to protect regional biodiversity and will create more natural carbon sinks to offset emissions

Regional climate change actions will also be influenced by climate change initiatives and policies included in the following Queensland Government policies:
ClimateSmart 2050
ClimateSmart Adaptation 2007-12
ClimateQ: toward a greener Queensland
FNQ Regional Plan 2009-2031
State Coastal Management Plan

3. Council response

3.1 Local context

The Cairns region covers 4,135 km^2 from Bloomfield in the north, to Miriwinni in the south. The region extends about 190km from its northern to southern boundaries, and the eastern boundary is formed by the Coral Sea coastline abutting the World Heritage listed Great Barrier Reef Marine Park. Mountains, beaches, tidal wetlands, freshwater lakes, mudflats, mangrove swamps, estuaries and coastal plains are the dominant features of the local environment.

The Cairns region is one of the fastest growing regions in Australia, with more than 3 per cent annual growth - well above both the State and national average. The estimated residential population at 30 June 2007 was 152,137. The main industries in the region are tourism, agriculture and construction.

The major sources of greenhouse gas emissions in the region are transport (including air travel), agriculture, land use change, and stationary energy. Refer to Appendix C for further details on community emissions.

3.2 Sphere of influence

Council acknowledges that it has the ability to influence many activities that are responsible for contributing to greenhouse gas emissions. Council's sphere of influence includes energy generation and usage, waste management, vegetation management and land use planning. Land use planning influences transport behaviour, settlement patterns and proximity of population centres to economic hubs and facilities.

Council has already undertaken a number of initiatives to reduce its greenhouse gas emissions and to embed the principles of sustainability in the organisation. Council has adopted a Corporate Sustainability Policy, a Climate Change Adaptation Action Plan, a Greenhouse Gas Mitigation Action Plan, and a Carbon Emissions Reduction Policy. Council is also implementing other initiatives including the Sustainability Scorecard project and the Green Smart staff education program.

Council can further reduce its greenhouse gas emissions by implementing policies, improving energy efficiency and waste management technology and changing behaviour of Council staff and the community. It also has the ability to significantly reduce community emissions by providing for adequate low carbon transport options, planning for compact urban forms and conducting education and awareness-raising programs to encourage behaviour change. Refer to Appendix B for an analysis of Council's current greenhouse gas emissions.

3.3 Council direction

Taking action to reduce Council's contribution to the problem of climate change and to plan for resilience to climate change and peak oil impacts is supported by *Corporate Plan 2009-2014.*

One of the visions of this Plan is that "We will be Australia's greenest region". Relevant goals of the Plan are to:

- Deliver more environmentally sustainable Council operations and facilities (Goal 1.7)
- Actively reduce Council's greenhouse gas emissions (Goal 1.8)
- Deliver integrated planning (Goal 3)
- Plan for impacts of climate change including mitigation and adaptation measures (Goal 3.5)

Council has adopted the following documents relating to climate change and sustainability:

- *Climate Change Adaptation Action Plan*
- *GHG Mitigation Action Plan*
- *Carbon Emissions Reduction Policy*
- *Corporate Sustainability Policy*
- *Waste Management Strategy*
- *Water Demand Management Strategy 2009-2012*

3.4 Meeting our statutory obligations

In future it is likely that Council will be required to comply with greenhouse gas reporting and carbon permit obligations in the event that an emissions trading scheme is introduced. This strategy aims to set a direction towards carbon accountability and put in place emissions accounting and management systems that will improve the likelihood of being able to meet these anticipated requirements.

Given the current uncertainty surrounding the legal obligations of Councils in responding to climate change, formulating a clear strategy and working towards mitigating and adapting to climate change impacts is in the best interest of Council as well as the community.

Community Plan

Under the *Local Government Act* 2009 Local Governments are required to produce a long-term Community Plan that becomes the primary tool to inform council's Corporate, Financial, Asset Management plans and influences all other Council plans whether they are strategic, operational or action plans. The Community Plan will be drafted in consultation with the community and will be completed by January 2011. Community visions and objectives identified in the Community Plan that relate to climate change and peak oil will need to be addressed by the Climate Change Strategy. Any necessary changes will be incorporated into the Strategy during the annual review process.

FNQ Regional Plan 2009-2031

The FNQ Regional Plan 2009-2031 identifies climate change and oil vulnerability as critical issues in determining future ecological sustainability of the region.

The Plan's regional vision for Far North Queensland is for a stronger, more liveable and sustainable community, where people are well educated, well informed and resilient to the anticipated impacts of climate change and oil vulnerability.

The Plan outlines that "The impacts of climate change and rising fuel prices must be addressed and planned for. The future growth of FNQ must ensure that greenhouse gas reductions are achieved in order to mitigate the impacts of climate change. Strategies must be developed to adapt the region and build its resilience to such impacts."

The relevant desired regional outcomes identified by the Plan are:

1. Natural environment

The region's terrestrial and aquatic natural assets… are protected and enhanced to increase their resilience to the impacts of climate change.

2. Regional landscape and natural resources

The environmental, cultural, social and economic features that comprise the region's unique tropical and rural landscapes are identified, maintained and managed sustainably and are more resilient to the impacts of climate change.

3. Strong Communities

The region's communities are vibrant, safe and healthy and resilient to climate change, and diversity is welcomed and embraced.

4. Urban Development

The region has an interlinked network of well planned, discrete, sustainable urban centres which reflect best practice urban and tropical design and offer convenient and accessible residential, employment, transport and other service opportunities.

5. Economic Development

A strong, ecologically sustainable and diversified economy, building on new and existing regional and subregional competitive advantages and specialisations.

8. Transport

Communities are connected through an integrated transport system that promotes tourism, public transport use, walking and cycling, provides safe, efficient and effective movement of goods and people, and facilitates access to places and services.

"The available scientific evidence overwhelmingly indicates that climate change is a serious global threat demanding an urgent response" (FNQ Regional Plan 2009-2031)

State Coastal Management Plan
The State Coastal Management Plan identifies that coastal areas need to be managed with consideration to climate change and sea level rise.

Coastal management outcome 2 in this plan is that:
"The coast is managed to allow for natural fluctuations to occur, including any that occur as a result of climate change and sea level rise, and provide protection for life and property."

To achieve this outcome the Plan outlines the following principles:

- Trends in climate change including sea level rise, more extensive storm tide flooding and associated potential impacts are taken into account in planning processes.
- Erosion prone areas which exist on open coasts and along tidal waterways are secured and maintained largely free from development.
- The consequences of physical coastal processes are recognised and such processes generally are allowed to occur naturally.
- Risks associated with all relevant hazards including storm tide inundation and cyclone effects are minimised.
- The natural topography and physical features of coastal dune systems which provide adjacent areas with protection from inland erosion are to be protected and managed on an ecologically sustainable basis.

This Plan states that planning for the coast must address the potential impacts of climate change through the following hierarchy of approaches:
Avoid — focus on locating new development in areas not vulnerable to the impacts of climate change;
Planned retreat — focus on systematic abandonment of land, ecosystems and structures in vulnerable areas;
Accommodate — focus on continued occupation of near-coastal areas but with adjustments such as altered building design; and
Protect — focus on the defence of vulnerable areas, population centres, economic activities and coastal resources.

3.5 Why act now?

It is now widely accepted that global climate change is occurring and that it is primarily human induced.[15] While there is still a degree of uncertainty about the exact nature of predicted impacts, the general trends are fairly well understood.

Given this knowledge, we cannot wait for greater certainty before acting, but have a responsibility to act now to protect the community and the natural environment. It is in the best interest of Council and the community to act immediately to mitigate our impacts and prepare for the changes to come.

"The earlier effective action is taken, the less costly it will be" [16]

Climate change and peak oil have the potential to affect every aspect of our lives, from the health and integrity of natural systems, to economic prosperity and community health and well-being. Making the transition now to a low carbon, low oil economy will give the region a competitive advantage and help to avoid the worst of the negative economic, environmental and social impacts.

[15] Allison et al 2009, IPCC 2007
[16] Stern 2006

4. The Strategy

4.1 Vision

To create a roadmap that will lead to a low carbon, low oil, sustainable future for the Cairns region

4.2 Scope

The Cairns Regional Council Climate Change Strategy will provide clear direction for addressing climate change and peak oil vulnerability in the Cairns region. It will draw together and build on current Council projects, policies and plans that relate to climate change and sustainability to create a unified strategy for responding to these issues, capitalising on related opportunities, and leading the community towards sustainability.

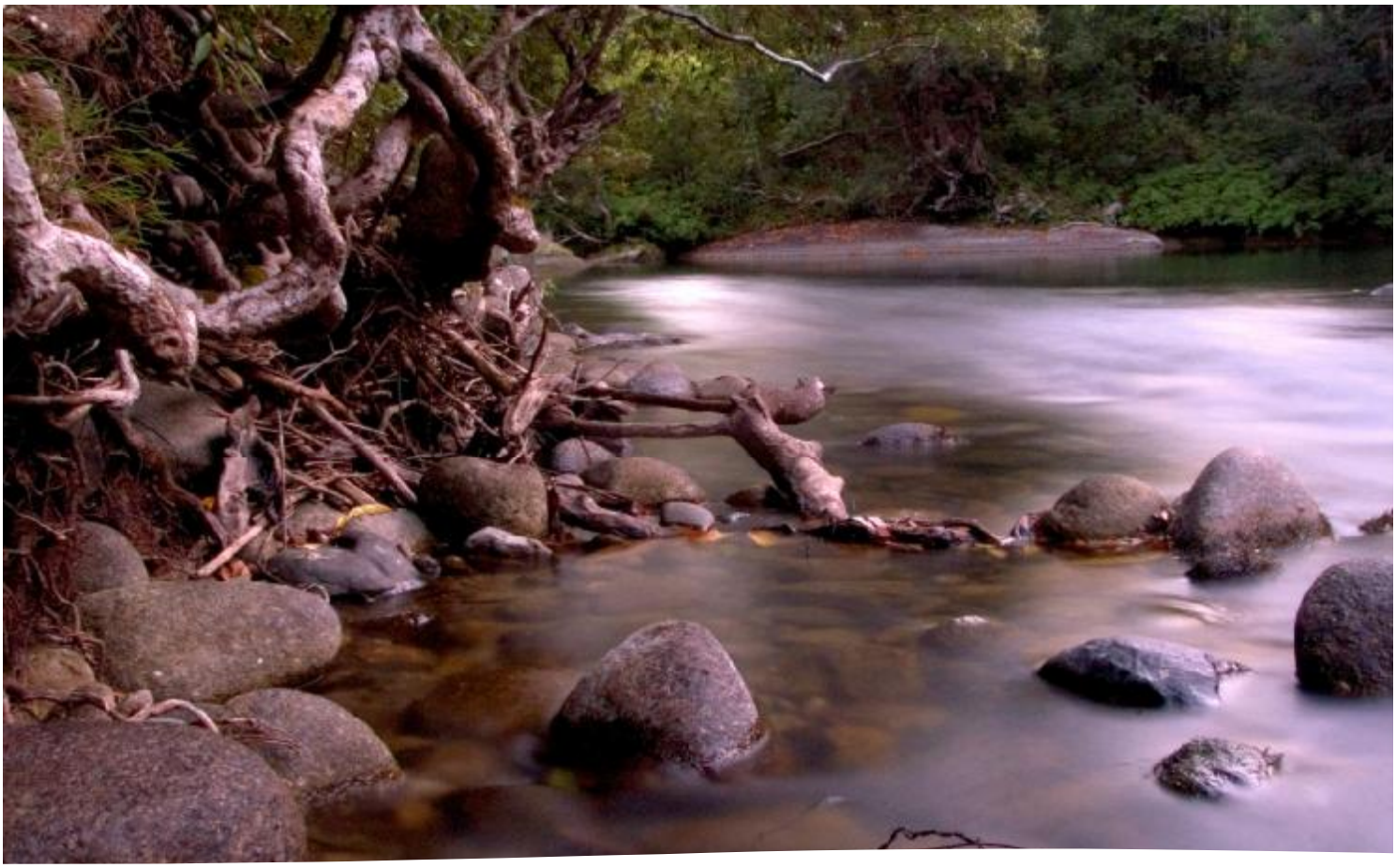
4.3 Intent

To inform council's response to climate change, direct action to minimise Council's and the community's contribution to the causes of climate change, and enhance the resilience of Council and the community to potential impacts from climate change.

4.4 Objectives

The objectives of this strategy are to:

- build capacity of Council to lead the community in responding to climate change
- ensure Council can continue to deliver its services effectively to the community in a changing climate
- reduce the vulnerability of the Cairns community to climate change impacts
- ensure Council's response to climate change is relevant and informed by research, international protocols and current standards
- provide a clear plan for how to mitigate and adapt to climate change and meet Council's statutory obligations
- integrate climate change considerations into Council decision-making processes and governance structures
- inspire the community by demonstrating leadership in addressing climate change



5. Strategy outcomes

The strategic outcomes of the Strategy have been divided into four categories: leadership; mitigation; adaptation and transition. These strategic outcomes are:

Leadership

- Improved and innovative Council leadership and practices in addressing climate change risks and opportunities
- Improved understanding of locally relevant research informing Council's response to climate change
- Increased capacity for Council and community to respond to climate change through partnerships and advocacy
- Increased investment in climate change opportunities and technology in the region

Mitigation

- Council on track to achieve the goal of 50% reduction on 2007/2008 levels and to be carbon neutral by 2020
- Increased community participation in addressing climate change, and greater community awareness of the need for action through engagement, partnership and planning
- A plan for reducing community emissions
- Reduced community emissions through considered land use planning for low carbon communities

Adaptation

- Informed and integrated adaptation responses to climate change that meet Council's statutory obligations to protect the community and the environment
- Improved resilience of Council's infrastructure to the impacts of climate change

Transition

- Reduced oil and carbon dependency and increased community resilience to climate change and peak oil impacts

6. Strategy implementation

Key actions have been developed for achieving each of the strategic outcomes listed. These actions are included in the Implementation Plan (see Appendix A).

6.1 Financial requirements

To effectively implement this Strategy, Council will need to allocate adequate funding and human resources. In addition it will be important to commit to capacity development across the organisation. Achieving the objectives identified in this Strategy will require centralised coordination, as well as regular monitoring, measuring and reporting.

The key actions identified in this Strategy will come at varying degrees of cost and resource requirements. Some objectives could be achieved with minimal cost increases, with costs embedded in existing operational costs.

Other objectives, however, will require substantial financial support if Council's goals of mitigating and adapting to climate change risks and capitalising on associated opportunities are to be achieved. The climate change strategy will require a dedicated and ongoing budget of approximately $700,000 per annum to ensure the actions documented in the implementation plan are followed through.

Opportunities for partnerships could reduce the overall cost of action for Council, enabling the full cost of action to be shared with other stakeholders.

6.2 Review, success and accountability

Council will integrate its climate change response into governance and decision making frameworks and will be transparent and accountable for enacting the strategy. The implementation of the Strategy will be the responsibility of all staff across the organisation.

The actions in this Strategy will require input from all areas of Council. The General Manager of each Department will be responsible for ensuring any actions assigned to their team are implemented. Due to the broad range of actions, implementation will need to be well integrated into annual Operational Plans and well monitored to ensure success.

This Strategy will be reviewed annually, and progress towards key outcomes will be evaluated at this time. The review will be undertaken by Council's climate change team.

The success of Council's Climate Change Strategy will be measured in a variety of ways. Council conducts an annual greenhouse inventory in accordance with National Greenhouse and Energy Reporting System (NGERS) methodology which provides an annual carbon footprint (see Appendix B for Council emissions analysis). Council also reports on sustainability indicators as part of the annual State of the Environment Report and Sustainability Scorecard.

The key performance indicators in section 6.3 will be used to measure Council's performance towards implementing the Climate Change Strategy.

6.3 Key Performance Indicators

#	KEY PERFORMANCE INDICATOR	DATA SOURCED FROM
1	Percentage by which Council's total greenhouse gas emissions are reduced	Annual greenhouse gas inventory
2	Percentage by which Council's consumption of Petrol and Diesel is reduced	Annual greenhouse gas inventory
3	Number of Council decisions that consider climate change or peak oil	Sustainability scorecard
4	Number of Council Policies and Plans that incorporate Climate Change or Peak oil considerations	Sustainability Officer
5	Percentage of Council staff that undertake training for climate change considerations	Staff induction/Human Resources
6	Percentage of Cairns region mapped for the impacts of sea level rise and storm surge	Disaster Management
7	Percentage of total government funding and grants received by Council that are for climate change initiatives	Sustainability Officer
8	Percentage decrease in community and Council waste going to landfill	Water and Waste
9	Percentage of Council buildings with renewable energy generation capacity	Facilities Maintenance
10	Percentage of Council's energy use that is generated from renewable resources	Greenhouse gas inventory
11	Percentage decrease in energy consumption across Council buildings and assets	Greenhouse gas inventory
12	Percentage increase in public and active transport use by the Cairns community	Census, FNQROC, Queensland Transport
13	Percentage of Council staff commuting to work by public or active transport or car pooling	Staff survey
14	Number of public climate change and peak oil presentations or events conducted by Council	Sustainability Officer
15	Percentage increase in number of Council buildings abiding by the 'Sustainable Design Principles'	Sustainability Officer
16	Percentage increase in the proportion of trees planted in public spaces that produce edible fruit (by humans)	Infrastructure Services

6.4 The role of offsets in achieving carbon neutrality

Council will follow the hierarchy of "measure, avoid, reduce, offset" on the path to becoming carbon neutral.

MEASURE EMISSIONS ↓	Council will measure their emissions by implementing an Energy and Emissions Data Management System.
AVOID AND REDUCE EMISSIONS ↓	Council will avoid, reduce and replace emissions through the mitigation actions listed in the Implementation Plan, the GHG Mitigation Action Plan and the Climate Change Adaptation Action Plan.
OFFSET EMISSIONS	Council will offset residual emissions to achieve carbon neutrality.

Guidelines for purchasing carbon offsets

Carbon offsetting is where consumers voluntarily pay or undertake activities to reduce or remove a certain amount of carbon dioxide from the atmosphere, to compensate for another carbon dioxide emitting activity. The premise is that by funding projects that would not happen without the offset funding, the sale of carbon offsets can result in important investments in a low carbon future.

When selecting carbon offset projects, Council will endeavour to:

- preference and encourage local carbon offset projects
- preference projects that provide emission reductions rather than carbon sequestration
- purchase carbon offsets accredited under the Clean Development Mechanism (CDM), Gold Standard, Greenhouse Friendly or Voluntary Carbon Standard (VCS)
- preference offset providers ranked as 'Outstanding' by Carbon Offset Watch

Some examples of carbon offset projects

Renewable energy: 'Clean' energy is generated from sources like water, wind and sun. This means coal-based energy production is avoided, so there are fewer carbon emissions.

Trees/forestry projects: Trees remove ('sequester') carbon from the atmosphere. So projects that avoid deforestation or plant new trees can result in a net reduction in atmospheric CO2.

Energy efficiency projects: Perhaps the most effective way to reduce emissions is to use less energy, and use it more efficiently. For the purposes of offsets, a company might set up projects that increase energy efficiency and sell credits for the resulting emission reduction as a carbon offsets.[17]

[17] Carbon Offset Watch, 2010

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8. Appendices

APPENDIX A - Climate Change Strategy Implementation Plan

Leadership

Strategic outcome 1. Improved and innovative Council leadership and practices in addressing climate change risks and opportunities

Key Performance Indicators: 3, 4, 14

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When	Related documents
1	Integrate relevant visions and objectives from the Community Plan into this Strategy during annual review.	Low or embedded cost^	Not applicable	Corporate Performance, Planning Strategies	2011-2012	Community Plan
2	Integrate climate change and peak oil considerations into Council's Corporate Plan	Low or embedded cost	Not applicable	Organisation-wide	2014	Corporate Plan
3	Ensure climate change and peak oil considerations are included in Council's policies and strategies	Low or embedded cost	Not applicable	Organisation-wide	Ongoing	All Council documents
4	Include climate change as a causation in the Corporate Risk Framework and identify clear risk treatments to embed a system of climate change risk assessment in corporate decision making	Low or embedded cost	This is an adaptation action	Corporate Performance	2010-2011	
5	Integrate climate change and peak oil considerations into Council reports by implementing the Sustainability Scorecard	Low or embedded cost	Not applicable	Organisation-wide	2010-2011	
6	Integrate Sustainability Scorecard tools into Council's procurement and decision-making frameworks	Low or embedded cost	Emissions savings unknown	Planning Strategies	2010-2011	
7	Demonstrate good governance by informing the general community about climate change and peak oil impacts and risks	Low or embedded cost	This is an adaptation action	Planning Strategies	Ongoing	
8	Make technical information available to the public regarding climate change risks	Low or embedded cost	This is an adaptation action	Planning Strategies, Disaster Management	Ongoing	
9	Provide an annual progress report to Council on Strategy implementation	Low or embedded cost	Not applicable	Planning Strategies	Ongoing	

Leadership

Strategic outcome 2. Improved understanding of locally relevant research informing Council's response to climate change

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
10	Monitor the latest climate change science and international best practice standards for addressing climate change and peak oil and update Council's response accordingly	Low or embedded cost	Not applicable	Planning Strategies	Ongoing

Leadership

Strategic outcome 3. Increased capacity for Council and community to respond to climate change through partnerships and advocacy

Key Performance Indicators: 5, 7

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
11	Identify and pursue external funding opportunities for collaborative projects	Low or embedded cost	Not applicable	Organisation-wide	Ongoing
12	Engage and share information with neighbouring Councils on regional projects	Low or embedded cost	Emissions savings unknown	FNQROC	Ongoing
13	Develop staff learning opportunities that will equip staff to identify and respond to climate change and peak oil risks	Dependant on opportunities developed	Not applicable	Planning Strategies, Human Resources	Ongoing
14	Establish a cross-departmental climate change team to coordinate Council's climate change response	Low or embedded cost	Not applicable	Organisation-wide	2010
15	Include climate change and sustainability in staff induction training	Low or embedded cost	Not applicable	Human Resources	2010

Leadership

Strategic outcome 4. Increased investment in climate change opportunities and technology in the region

Key Performance Indicator: 10

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
16	Encourage and investigate options for alternative fuel and renewable energy production in the region	Low or embedded cost	Emissions savings unknown	Economic Development Officer	Ongoing
17	In partnership with industry and State Government, support initiatives that attract low carbon investment	Low or embedded cost	Emissions savings unknown	Economic Development Officer	Ongoing
18	Investigate options for Council-owned renewable energy generation facilities	Low or embedded cost	Emissions savings unknown	AMDP	2010-2012

Mitigation

Strategic outcome 5. Council on track to achieve the goal of 50% reduction on 2007/2008 levels and to be carbon neutral by 2020

Key Performance Indicators: 1, 9, 10, 11, 15

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When	Related documents
19	Implement an Energy and Emissions Data Management System for Council	$100,000*	Not applicable	Information Services, Planning Strategies	2010-2011	GHG Mitigation Action Plan
20	Implement the Greenhouse Gas (GHG) Mitigation Action Plan	See GHG Mitigation Action Plan	Emissions savings unknown	Organisation-wide	Ongoing	GHG Mitigation Action Plan
21	Develop a Carbon Neutral Accounting Plan to set an emissions trajectory to achieve Council's emissions reduction goal	$50,000*	Not applicable	Planning Strategies	2010-2012	Greenhouse Gas Reduction Policy
22	Generate 20% of Council's electricity requirement from renewable energy systems by 2020	Funded as separate capital works & by action 24	6,600	Organisation-wide	Ongoing	Greenhouse Gas Reduction Policy
23	Write and adopt Renewable Energy Installation Guidelines as part of the Carbon Neutral Accounting Plan	See action 21	Not applicable	Planning Strategies	2010-2011	Greenhouse Gas Reduction Policy
24	Allocate 10% of Council's annual electricity expenditure to installing renewable energy generation systems according to the Renewable Energy Installation Guidelines	$500,000*/yr	As above	Organisation-wide	Ongoing	Greenhouse Gas Reduction Policy
25	Continue to improve energy efficiency in Council buildings and encourage behaviour change among staff	Low or embedded cost	2,000	Planning Strategies, Facilities maintenance, Asset owners	Ongoing	Green Smart
26	Allocate $100,000 annually to undertaking energy efficiency upgrades of Council buildings and facilities	$100,000/yr	Emissions savings unknown	Facilities Maintenance	Ongoing	
27	Develop and adopt a Sustainable Design Policy and Sustainable Design Guidelines by which all new and renovated council buildings will abide	Cost dependant on measures implemented	Emissions savings unknown	Planning Strategies, Project Services, Asset owners	2011-2012	
28	Continue trialling energy efficient street lighting in collaboration with electricity provider and aim for a 25% reduction in streetlight energy use by 2015 by improving efficiency and installing solar lighting	Cost neutral at present	1,800	Infrastructure Services, FNQROC	Ongoing	
29	Develop and implement Energy Management Plans for all Council buildings and facilities	$50,000*/yr	Emissions savings unknown	AMDP, Planning Strategies, Asset Owners, Technical Support Services	2010-2013	
30	Conduct energy audits for Council-owned swimming pools and implement Energy Management Plans and Agreements with lessees as part of an overall Quality Assurance Program.	$80,000*	950	AMDP, Planning Strategies, Asset Owners, Technical Support Services	2011-2012	
31	Reduce Council fleet vehicle use, prioritise fuel efficient vehicles and encourage fuel efficient driving	Will result in cost savings	1,100	Council Fleet	Ongoing	Greenhouse Gas Reduction Policy
32	Continue to investigate options for alternative fuel use with the aim of using bio-diesel and ethanol blended fuels in fleet vehicles	Council Fleet	Emissions savings unknown	Council Fleet	Ongoing	Greenhouse Gas Reduction Policy
33	Encourage Council staff to travel to work by public transport, active transport or car pooling	Low or embedded cost^	Emissions savings unknown	Planning Strategies, Infrastructure Maintenance	Ongoing	
34	Abide by the guidelines included in the Climate Change Strategy when purchasing carbon offsets	Cost dependant on offsets purchased	Not applicable	Corporate Performance, Planning Strategies	Ongoing	

Mitigation

Strategic outcome 5. Council on track to achieve the goal of 50% reduction on 2007/2008 levels and to be carbon neutral by 2020 (*continued)*

Key Performance Indicators: 1, 9, 10, 11

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When	Related documents
35	Explore and encourage internet and telephone conferencing options to reduce corporate air travel emissions	Will result in cost savings	Emissions savings unknown	Organisation-wide	2010-2011	
36	Implement the Water Demand Management Strategy to improve water efficiency and increase water security	See Water Demand Management Strategy	Emissions savings unknown	Water and Waste	Ongoing	Water Demand Management Strategy 2009-2012
37	Design and implement Energy Management Plans for all water and wastewater treatment plants	$40,000*	Emissions savings unknown	Water and Waste	2011-2012	GHG Mitigation Action Plan
38	Implement the Waste Management Strategy and associated Action Plans to improve resource recovery and decrease landfill gas emissions	See Waste Management Strategy	Emissions savings unknown	Water and Waste	Ongoing	Waste Management Strategy 2010-2015
39	Work with local industry to create a market for reused and recycled construction, demolition, commercial and industrial materials	Low or embedded cost	Emissions savings unknown	Water and Waste	Ongoing	Waste Management Strategy

Mitigation

Strategic outcome 6. Increased community participation in addressing climate change, and greater community awareness of the need for action through engagement, partnership and planning

Key Performance Indicator: 14

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
40	Inform, consult and involve community groups and individuals	Low or embedded cost	Not applicable	Planning Strategies, Community Development	Ongoing
41	Implement community energy demand reduction programs in partnership with energy provider	Low or embedded cost	Emissions savings unknown	Planning Strategies, Community Development	Ongoing
42	Develop and implement education and engagement programs in partnership with community groups and the education sector	Low or embedded cost	Emissions savings unknown	Planning Strategies, Community Development	Ongoing
43	Liaise with industry groups to support industry in responding to climate change and peak oil	Low or embedded cost	Emissions savings unknown	Planning Strategies, Community Development	Ongoing
44	Develop and implement a communication campaign to inform community, industry and business about energy efficiency, carbon trading and renewable energy	Low or embedded cost	Emissions savings unknown	Council and external partners	Ongoing

Mitigation

Strategic outcome 7. A plan for reducing community emissions

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
45	Conduct a community greenhouse gas emissions inventory and establish a clear methodology for future monitoring to ensure continuity	$30,000*	Not applicable	Planning Strategies in collaboration with external organisations	2011
46	Draft a community emissions reduction plan in consultation with the community, including an emissions forecast, target and trajectory	$20,000*	Emissions savings unknown	Planning Strategies, Community Development, Corporate Performance	2011-2012

Mitigation

Strategic outcome 8. Reduced community emissions through land use planning for low carbon communities

Key Performance Indicators: 4, 12, 16

	Key action	Cost	Annual emission savings (tCO_2e)	Responsibility	When
47	Incorporate the consideration of climate change impacts into Council's land use planning and development assessment activities	Low or embedded cost	This is an adaptation action	Planning and Environment	Ongoing
48	Embed climate change and peak oil considerations into the Planning Scheme	Low or embedded cost	Not applicable	Planning and Environment	2013-2014
49	Advocate for improved public transport, reduced private vehicle use, and increased active transport (walking and cycling)	Low or embedded cost	Not applicable	Infrastructure Management, Planning and Environment	Ongoing
50	Develop a Sustainable Transport Plan for Cairns	Low or embedded cost	Not applicable	Infrastructure Management, Planning and Environment	2011-2012
51	Support and strengthen settlement patterns that follow compact urban forms and mixed use and allow for low emissions transit	Low or embedded cost	Not applicable	Planning and Environment	Ongoing
52	Promote renewable energy use and generation in new and existing housing developments	Low or embedded cost	Emissions savings unknown	Development Assessment, Planning and Environment	Ongoing

Adaptation

Strategic outcome 9. Informed and integrated adaptation responses to climate change that meet Council's statutory obligations to protect the community and the environment

Key Performance Indicators: 3, 4, 6

	Key action	Cost	Annual emission savings (tCO_2e)	Responsibility	When
53	Undertake climate change hazard and vulnerability mapping to identify major risk areas	Low or embedded cost	This is an adaptation action	Technical Support Services	2011
54	Incorporate climate change projections into all hydrological mapping	Low or embedded cost	This is an adaptation action	Technical Support Services	2011
55	Develop planning approaches to manage potential conflicts in relation to competing land use demands for energy production, food production, open space, nature conservation, carbon sequestration and urban development	Low or embedded cost	This is an adaptation action	Planning and Environment	2011-2012
56	Protect and enhance strategic wildlife corridors and riparian corridors to allow for species migration	Low or embedded cost	This is an adaptation action	Development Assessment, Planning Strategies, Infrastructure (works)	Ongoing
57	Recognise species and habitats at risk from climate change and avoid placing any further stresses on these	Low or embedded cost	This is an adaptation action	Development Assessment, Planning Strategies, Infrastructure (works)	Ongoing
58	Consider public health implications of climate change in policies and planning	Low or embedded cost	This is an adaptation action	Environmental Health	Ongoing
59	Incorporate climate change adaptation into disaster planning	Low or embedded cost	This is an adaptation action	Technical Support Services	Ongoing

Adaptation

Strategic outcome 10. Improved resilience of Council's infrastructure to the impacts of climate change

Key Performance Indicator: 3

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
60	Implement the Climate Change Adaptation Action Plan	See Adaptation Action Plan	This is an adaptation action	Organisation-wide	Ongoing
61	Liaise with insurance companies annually regarding changes in coverage for Council assets as a result of climate change	Low or embedded cost	This is an adaptation action	Corporate Performance	Ongoing

Transition

Strategic outcome 11. Reduced oil and carbon dependency and increased community resilience to climate change and peak oil impacts

Key Performance Indicators: 12, 16

	Key action	Cost	Annual emission savings (tCO2 e)	Responsibility	When
62	Assess and identify vulnerability of food supply, airport and tourism to oil shortages and carbon rationing and identify areas of household vulnerability	Low or embedded cost	This is an adaptation action	Organisation-wide	2011-2012
63	Develop and deliver an education program to raise awareness of peak oil and encourage behaviour change for increased community and industry resilience	Low or embedded cost	Not applicable	Planning Strategies, FNQROC	2011-2015
64	Promote small-scale and decentralised sources of water and energy	Low or embedded cost	Not applicable	Planning Strategies, Water and Waste	Ongoing
65	Promote and support community garden initiatives and plan for urban agriculture to localise food supply	Low or embedded cost	Not applicable	Community and Cultural Services, Community Development, Planning Strategies	Ongoing
66	Prioritise native and edible fruit tree species for roadside plantings and in parks, gardens and other public spaces	Low or embedded cost	Not applicable	Infrastructure Services	Ongoing
67	Conduct a 'buy locally grown' campaign to strengthen local food supply	Low or embedded cost	Not applicable	Community Development, Planning Strategies	2011-2012
68	Protect open spaces and encourage revegetation of appropriate areas	Low or embedded cost	Emissions offsets unknown	Natural Resource Management	Ongoing
69	Implement a grant program to encourage initiatives that promote sustainability and enhance community resilience to climate change or peak oil	$20,000/yr	Not applicable	Community Development	2011-2015
70	Support initiatives that enhance community resilience to climate change and peak oil impacts	Low or embedded cost	Not applicable	Organisation-wide	Ongoing

^ Actions listed as "Low or embedded cost" will most likely be cost neutral, with costs embedded in existing operational costs of the organisation, however some of these actions may require a limited amount of additional funding

* Cost estimated based on quotes

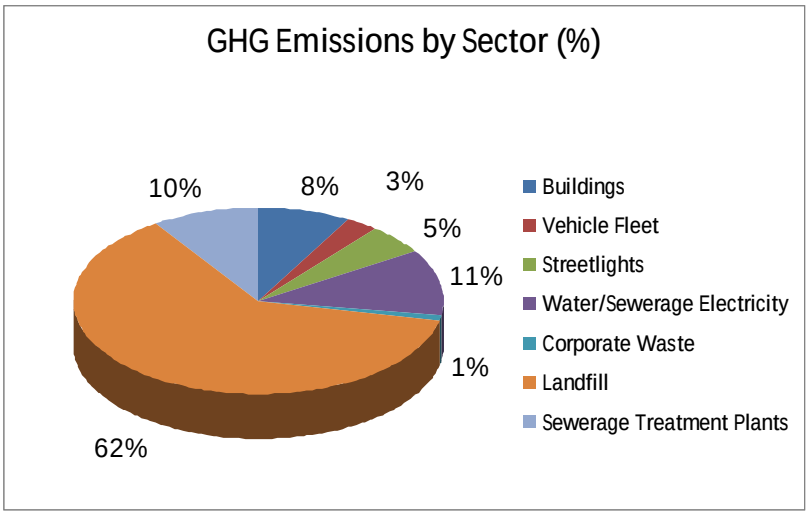
APPENDIX B - Council's carbon footprint analysis

(From Cairns Regional Council's GHG Mitigation Action Plan)

An analysis of Cairns Regional Council's greenhouse gas (GHG) emissions was conducted for the financial year 2007-2008. This analysis found that Council's total GHG emissions for this year were 134,800 tonnes CO_2 equivalent (tCO_2e). This includes energy emissions and direct waste emissions. Note: data excludes employee air and taxi travel.

Council's GHG emissions

Council's emissions profile is shown in the chart below. The estimated landfill emissions from the Portsmith Landfill, is the most significant portion of emissions at 63%, followed by electricity for water and sewerage pumping which accounted for 11%, and direct emissions from sewerage treatment plants at 10%. Emissions from electricity and natural gas consumption in Council buildings account for 8% of total emissions, street lighting accounts for 5% and vehicle and plant fuel emissions accounts for 3%.



Energy costs

These emissions figures, along with estimated energy cost per sector are listed in the table below. Streetlights had the highest associated energy costs, followed closely by vehicle fleet, water and sewage pumping and treatment, and Council buildings.

Emissions by Sector	Greenhouse (tonnes)	Greenhouse (%)	Energy Cost ($)	Energy Cost (%)
Buildings	10,800	8%	$1,550,700	22%
Vehicle Fleet	3,880	3%	$1,837,800	26%
Streetlights	6,900	5%	$1,901,500	27%
Water/Sewerage Electricity	15,300	11%	$1,712,500	24%
Landfill (including Corporate Waste)	84,000	63%	N/A	N/A
Sewerage Treatment Plants	13,000	10%	N/A	N/A
Total	**133,880**	**100%**	**$7,002,500**	**100%**

Key findings of this analysis:

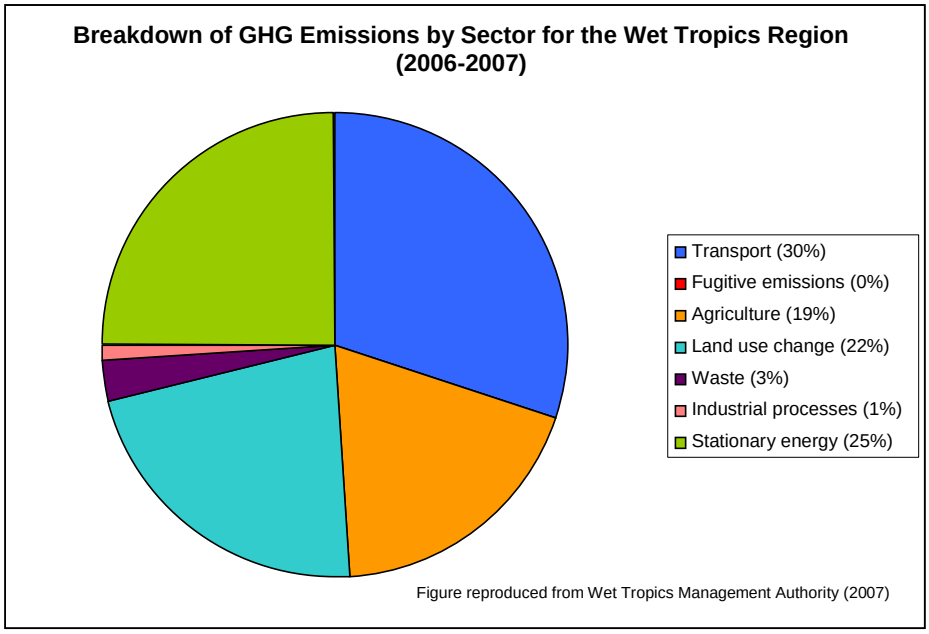
Council could achieve a goal of reducing GHG emissions by 50% (from 2007/8 levels) and becoming carbon neutral by 2020 by implementing a combination of energy efficiency and GHG mitigation measures, as well as offsetting residual emissions. The estimated cost of undertaking these measures was a total of $9 million.

APPENDIX C – Community Greenhouse Gas Emissions in the Wet Tropics Region *((From Wet Topics Management Authority 2007)*

A preliminary study of greenhouse gas (GHG) emissions across the whole community in the Wet Tropics region was carried out in 2006/2007 (Wet Topics Management Authority, 2007). The study region comprised the amalgamated local government areas of Tablelands, Cairns, Hinchinbrook and Cassowary Coast.

The total Wet Tropics Region GHG emissions were estimated to be 5,145 kilo tonnes or 23.6 tonnes per capita. Per capita emissions in the Wet Tropics Region were less than average per capita Australian emissions of 28.2 tonnes in 2005 and substantially below per capita emissions in Queensland of 38.9 tonnes for the same period. However, they are almost 70% greater than average per capita emissions for industrialised countries subject to emissions targets under the Kyoto Protocol.

The four highest emitting sectors were: transport; stationary energy; land use change; and agriculture. Carbon dioxide was the dominant greenhouse gas (74%), followed by methane (17%) and nitrous oxide (8%).



Stationary energy

Stationary energy emissions in the Wet Tropics Region (5.8 tonnes per capita) are substantially below the equivalent source in Queensland (16 tonnes per capita) or Australia (14.1 tonnes / capita). This situation can be explained by:

- an absence of energy intensive industries in the Wet Tropics Region (for example aluminium and steel smelting); and
- zero or low emission intensity of electricity generators in the region.

The Wet Tropics Region also has close to zero emissions from fugitive fuels (e.g. coal mining and gas distribution) and low industrial process emissions.

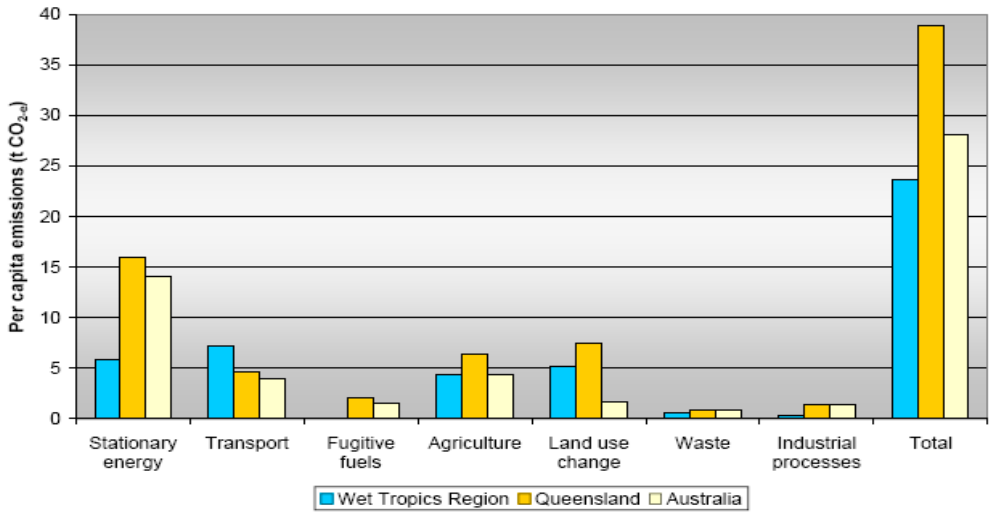
Transport emissions

Transport emissions in Wet Tropics Region are very high (7.2 tonnes / capita) compared to Queensland and Australia (4.6 and 4.0 tonnes / capita respectively). A large portion of these emissions (35%) is a result of air travel in the region, predominantly tourism-related.

Land use change and agriculture

Land use change emissions and agriculture emissions in the Wet Tropics Region are also moderately high compared with other regions in Australia.

Breakdown of Per Capita GHG Emissions in the Wet Tropics Region



Differences between the emissions profile of the Wet Tropics Region, Queensland and Australia point to some important considerations when framing emission abatement policies:

- An emissions trading system that focuses primarily on electricity generators and energy intensive industries is unlikely to have much impact on greenhouse gas emissions in the Wet Tropics Region.
- If a system of accounting for air travel emissions is implemented under the CPRS or other legislation, it will greatly affect the Cairns region.

APPENDIX D – Recommendations from Council's Climate Change Adaptation Action Plan

*(*Direct excerpt from *Positive Change – Climate Change Risks and Opportunities for the Cairns Region 2009)*

Recommendations

The recommendations below provide a 'blueprint' for Cairns Regional Council to move forward on climate change adaptation in a comprehensive manner, both within its own operations and more broadly in the Cairns region. Many of the actions entailed in these recommendations will be beyond the current financial capacity of Cairns Regional Council. Cairns Regional Council should prioritise the actions it wishes to implement directly, and seek funding support for them. Seeking funding support can occur both proactively through representation and advocacy to Queensland and Commonwealth Governments, and opportunistically by having the business case developed and ready for submission to funding programs as they arise.

6.1 Corporate governance

1. Directly recognise the challenge that climate change presents to the Cairns region in the new Cairns Regional Council Corporate Plan.

2. Establish a dedicated climate change team within Cairns Regional Council to coordinate the Council's ongoing climate change response.

3. Develop a climate change awareness raising program within Cairns Regional Council to build the capacity of officers to consider climate change impacts in their daily decisions

4. Prepare climate change guidance materials to support Cairns Regional Council's decision-making on climate change and ensure consistency in assessing climate change risks, and consistency in the assumed levels of climate change impacts across different areas in Council.

5. Require agenda items presented to Council to discuss the implications of climate change (both adaptation and greenhouse gas emissions) within either the 'Sustainability' or 'Risk' sections of the agenda item template.

6. Develop an integrated Climate Change Strategy for Cairns Regional Council.

7. Engage with the community on the possible impacts of climate change and the steps Cairns

Regional Council has taken to better understand its exposure and prepare for it.

8. Require the outcomes of this assessment of climate change risks and opportunities to be considered in the annual review of the corporate risk register.

9. Develop an assessment and evaluation framework to evaluate the relative costs and benefits to the community of Cairns resulting from adaptation actions.

10. Require Cairns Regional Council's departments to evaluate the possible climate change adaptation actions relevant to them against the assessment framework and identify the preferred climate change adaptation actions for their business.

11. Require relevant departments to undertake detailed project planning for their preferred adaptation actions, including the development of performance indicators and measures within the context of Cairns Regional Council's strategic, budgetary and operational planning procedures.

12. Make it a formal requirement for climate change to be considered in business continuity, natural disaster, asset management and service delivery planning.

13. Adopt a 'process based' performance reporting approach for whole-of-council reporting on climate change adaptation action.

14. Plan for, and negotiate with staff and unions for more flexible working and contracting arrangements,

including staff multi-tasking.

15. Monitor developments and legal precedents in climate change legislation and liability and, as required, reassess Cairns Regional Council's insurance requirements and potential liabilities.

16. Review Cairns Regional Council's approach to climate change adaptation and greenhouse gas mitigation in 2013.

6.2 Land Use Planning and Development

17. Assess and map the areas within the jurisdiction of Cairns Regional Council that are vulnerable to climate change impacts.

18. Assess the changing levels of flood immunity resulting from climate change, especially from more intense rainfall events and higher storm surge heights.

19. Review the materials and information that guides Cairns Regional Council's land use planning and development assessment activities to determine where amendments are necessary to incorporate the consideration of climate change impacts.

20. Monitor developments and amendments to technical standards, codes and guidelines to accommodate climate change considerations (especially with respect to flooding). As appropriate, based on an analysis of cost and benefits, apply them in land use planning, development assessment and infrastructure design processes.

21. Engage with the Department of Infrastructure and Planning to ensure Cairns Regional Council's adaptation approach for land use planning and development is consistent with the direction provided on how climate change should be considered in regional infrastructure planning and delivery in the Far North Queensland Regional Plan 2009-2031.

6.3 Assets and Operations

22. Assess and map the assets and operations of Cairns Regional Council that are vulnerable to climate change impacts.

23. Require climate change risk assessments to be undertaken for major Council projects on a project-by-project basis.

24. Prioritise the assets and operations of Cairns Regional Council that require maintenance or upgrades to cater for changing climatic conditions.

25. Progressively upgrade Cairns Regional Council's drainage and transport networks to provide a higher level of flood immunity.

26. Monitor technological developments in materials and construction techniques to make infrastructure more resilient to climate change impacts. As appropriate, based on an analysis of cost and benefits, apply them in land use planning, development assessment and infrastructure design processes.

27. Review Cairns Regional Council's asset management plans to ensure climate change is considered in decisions about asset maintenance, upgrading and replacement.

28. Review Cairns Regional Council's business continuity plans for essential operations that are not fixed spatially to ensure the possible impacts of climate change on service delivery are considered.

29. Engage with the Department of Infrastructure and Planning to ensure Cairns Regional Council's adaptation approach for assets and infrastructure is consistent with the direction provided on how climate change should be considered in regional infrastructure planning and delivery in the Far North Queensland Regional Plan 2009-2031.

30. Engage with other infrastructure and service planners and providers in the Cains region, where disruption to their business from climate change could cause disruption to Cairns Regional Council's business or influence its adaptation approach.

31. Advocate for, and participate in the development of a comprehensive assessment of climate change risks and an adaptation action plan for infrastructure in the region.

6.4 Natural disaster planning and response

32. Enhance Cairns Regional Council's natural disaster coordination capacities, including establishing a new flood immune disaster coordination centre.

33. Enhance Cairns Regional Council's natural disaster response capacity to cater for potentially more frequent and more extreme natural disasters.

34. Update storm surge maps for the Cairns region to take account of projected changes in storm surge heights resulting from higher sea levels and more intense tropical cyclones.

35. Ensure the potential impacts of climate change are considered in the development of business continuity plans for essential Cairns Regional Council services.

36. Identify flood immune community evacuation routes, taking into consideration the changing patterns of flood immunity arising from climate change.

37. Enhance community and business awareness of the risks associated with natural hazards and measures they can put in place to reduced their individual vulnerability and build their resilience.

38. Engage with agencies that have responsibilities for natural disaster planning and response including the Queensland Department of Community Safety, the Bureau of Meteorology and other emergency planning and response organisations to ensure a regional approach is taken in planning for potentially more frequent and more intense natural disasters.

6.5 Environment

39. As Cairns Regional Council's natural resource management and environment strategies and management plans are reviewed and updated, incorporate consideration of the potential impacts of climate change.

40. Engage with natural resource management and environment agencies in the Cairns region to advocate for, and participate in the development of a comprehensive assessment of climate change risks and an adaptation action plan for the natural environment of the Cairns region.

41. Engage with the Department of Infrastructure and Planning to ensure that Cairns Regional

Council's proposed climate change adaptation actions for the environment are consistent with the direction provided in the Far North Queensland Regional Plan 2009-2031.

42. Review Cairns Regional Council's erosion and sediment control management practices to determine if they are adequate to cater for projected increase in intense rainfall events.

6.6 Community health

43. Enhance community and business awareness of the public health risks arising from climate change and the practical steps they can put in place to reduce their risks.

44. Undertake scenario based planning to ensure appropriate strategies and sufficient resources are in place to response to potentially more frequent and more severe public health incidents.

45. Review public health management programs on a regular basis to ensure that are maintained at a level that is capable of meeting any additional demand arising from climate change.

46. Clarify Cairns Regional Council's role in community health to determine where climate change, community health and 'urban management systems' intersect.

47. Engage with other regional health agencies including the Queensland Department of Health, Queensland Department of Community Safety, Queensland Department of Communities and health related professional associations to advocate for, and participate in, the development of a comprehensive assessment of climate change risks and the development of an adaptation action plan for community health in the region.

"... a roadmap that will lead to a low carbon, low oil, sustainable future for the Cairns region"

Cairns Regional COUNCIL