



Climate Change and Energy Taskforce Final Report

A Call for Action

Brisbane City Council

12 March 2007

MAUNSELL | AECOM

Final Report

Prepared for

Brisbane City Council

Prepared by

Maunsell Australia Pty Ltd

12 Cribb Street, PO Box 1823, Milton QLD 4064, Australia
T +61 7 3858 6700 F +61 7 3858 6705 www.maunsell.com

ABN 20 093 846 925

In association with

Taskforce Members Ian Lowe, Jim McKnoulty, John McEvoy and Scott Losee

12 March 2007

60020660

© Maunsell Australia Pty Ltd 2007

The information contained in this document produced by Maunsell Australia Pty Ltd is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Maunsell Australia Pty Ltd undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the written permission of Maunsell Australia Pty Ltd. Brisbane City Council (BCC) may re-publish this report in a BCC format and it so doing it will take final responsibility for the content.

Disclaimer. This report represents the views of the BCC Climate Change and Energy Taskforce, not those of Maunsell Australia Pty Ltd or Brisbane City Council.

Quality Information

Document Final Report

Ref 60020660

Date 12 March 2007

Prepared by Scott Losee, John Herron and Michael Nolan

Reviewed by Chris Paterson and John Herron

Final Report to Council

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	24/11/2006	Preliminary Action Plan for discussion with Taskforce	Chris Paterson Associate Director	Sent to Client
B	1/02/2007	Draft for discussion with Taskforce	Chris Paterson Associate Director	Sent to Client
C	5/02/2007	Draft for discussion with Terry Hogan	Chris Paterson Associate Director	Sent to Client
D	15/02/2007	Draft for discussion with Taskforce	Andrew Macleod Director	Signed
E	01/03/2007	Proof for Taskforce Checking	N/A	Sent to Taskforce
0	12/03/2007	Final	Andrew Macleod Director	

Table of Contents

Summary	ii
Synopsis	ii
Key Messages for the Brisbane Community	ii
A Challenge for Brisbane	iv
Summary of Recommendations	v
1.0 Introduction	2
1.1 The Climate Change and Energy Taskforce	2
1.2 The Taskforce Report	3
1.3 About Climate Change	3
1.4 About Peak Oil	5
2.0 The Taskforce's Approach	8
2.1 Development of Proposed Responses	8
2.2 Community Feedback	9
2.3 Responses Proposed in the Call for Action	10
3.0 A Possible Scenario for Brisbane in 2030	12
3.1 Introduction to the Scenario	12
3.2 Michael's Story	12
4.0 Brisbane Vulnerabilities	16
4.1 Introduction	16
4.2 Climate Change	17
4.3 Peak Oil	23
4.4 Greenhouse Gas Emissions	27
4.5 Links to Policy Responses	28
5.0 Strategy	30
5.1 Outcomes	30
5.2 Greenhouse Gas Emission Reduction Targets	30
5.3 Strategic Approach	32
6.0 Recommendations and Actions	34
6.1 Leadership and Partnering	34
6.2 Decision making	38
6.3 Communication and education	39
6.4 Strategic and land use planning	40
6.5 Sustainable transport	42
6.6 Preparedness for change, emergencies and surprises	45
6.7 Diversification and conservation of natural resources	46
6.8 Research	48
7.0 Next Steps	51
7.1 Conclusion	51
7.2 Implementation	51
7.3 What Citizens Can Do	52
Abbreviations	53
Glossary	54
References and Sources of Information	55
Appendix A Terms of Reference	a

Appendix B	Taskforce Biographies	b
Appendix C	Taskforce Meeting Process	c
Appendix D	Taskforce Issue Rankings	d
Appendix E	What the Community Said	e
Appendix F	BCC Corporate Sustainability Policy	f

List of Tables

Table 1	Summary of recommendations, priority, cost and timing	v
Table 2	CSIRO projections of Queensland's future climate	17

List of Figures

Figure 1	Unravelling the climate change story (UN & GRID 2005)	4
Figure 2	Australia's oil production vs. Australia's demand for oil (ASPO-Australia 2006)	5
Figure 3	The growing gap between oil discoveries and oil production	6
Figure 4	The production profile for oil and gas for current oil sources (ASPO 2004)	6
Figure 5	The Taskforce process	9
Figure 6	Map of Brisbane showing theoretical inundation due to storm tide	21
Figure 7	Map of Brisbane CBD and fringe showing theoretical effect of storm tide	22
Figure 8	'Leahy's View' from the Brisbane <i>Courier Mail</i> , illustrating the possible effect of exponential increase in oil prices	23
Figure 9	Map of Dodson and Sipe's (2005) oil vulnerability index for metropolitan Brisbane	26
Figure 10	Breakdown of BCC's Energy Use by Fuel Type	27
Figure 11	Annual greenhouse gas emissions attributed to the City of Brisbane until 2006 and the required future target levels to reduce the city's emissions to one million tonnes per year	31

‘Although climate change and peak oil present serious challenges for Brisbane, there are many things Council can do now to prepare the city.’

Summary

Synopsis

Brisbane City Council (BCC) convened a Climate Change and Energy Taskforce in August 2006 to advise Council on preparing the city for climate change and peak oil. The 'Final Report – A Call for Action' represents the work of the Taskforce and its recommendations to Council.

This report is a first step

The report is intended as a first step in the process of identifying the possible impacts and responses of climate change on the city of Brisbane. It provides Council with a platform to consider and develop policy and determine appropriate actions. Community input will be a vital part of future steps towards action on climate change in Brisbane. The report provides a vehicle to foster public debate and education, which is an essential step in determining and setting policies and strategies to address climate change.

As a city which has a sub-tropical climate and is situated on both a river and a coastline, Brisbane could expect to be susceptible to and experience a range of impacts from climate change including higher temperatures, drought, larger storm surges, gusting winds and bushfires. As oil prices climb due to the peaking of oil production, Brisbane will experience social and economic consequences due to its reliance on oil for both personal mobility and freight movement. In addition, Brisbane is a high per capita emitter of greenhouse gases compared to world cities and therefore will be affected by global efforts to reduce greenhouse gas emissions, such as emissions trading.

Brisbane can gain economically by responding to climate change and peak oil

The Taskforce has identified that Brisbane's response to these challenges may actually provide economic opportunities for the city (e.g. through developing sustainable industries such as manufacturing of water-efficient technologies) and that the city will be able to save money by planning now to adapt to these future challenges.

The Taskforce has analysed risks and presented solutions

The Taskforce's analysis included the development of a scenario of Brisbane in 2030 to demonstrate how climate change may impact on the city and how actions that are put in place now may help to manage these impacts. The report includes some 31 recommendations across eight strategy areas including leadership and partnering, decision making, communication, planning, sustainable transport, preparedness for change, diversification of natural resources and research. The Taskforce commends these recommendations for consideration and further exploration by Brisbane City Council.

Key Messages for the Brisbane Community

The Taskforce has identified the following basic facts that it believes all citizens need to understand about what climate change and peak oil mean for Brisbane. These key messages provide a basis for the 'Challenge for Brisbane', which is a call to action for both the Council and the community.

The climate is changing and Brisbane must adapt

- Scientists agree that climate change is occurring worldwide. This consensus was recently confirmed and enhanced by the February 3, 2007 report of the world authority, the Intergovernmental Panel on Climate Change (IPCC).
- The CSIRO and others are currently developing a clear understanding of what this will mean for Australia, including Brisbane.

- There is a need to act now, but no need to panic. In fact, there are many practical and effective steps we can take immediately that will help us adapt to climate change, and contribute to the global effort to stop climate change while still protecting our economy and way of life.
- Even if we act immediately, the impacts of climate change will be felt for years to come. Even if the world stopped emitting greenhouse gases tomorrow, there would still be years of climate change due to gases already built-up in the atmosphere. This means that the city will have to adapt to change as well as help reduce global greenhouse emissions.

Drought, heat, storms, floods and bushfires

- Climate change will have a range of direct impacts for Brisbane which may include:
 - Lower average rainfall, lower soil moisture and increased drought
 - More extremely hot days
 - More intense storms related to North Queensland cyclones
 - Sea level rise and larger storm surges
 - More bushfires.
- The range of indirect impacts associated with these climate changes is wide and difficult to catalogue (e.g. more cases of mosquito borne disease or bone fractures on dry sporting grounds).
- The current drought has permanently changed the way residents, business and government view water and provides the opportunity to develop innovative ways to use water efficiently. We may even be able to profit from this knowledge.

Inevitable rise in petrol prices will affect our economy and society

- Peak oil is closely related to climate change and means that the world will not be able to increase the rate of oil production to meet growing demand, even though we may be far from emptying the world's oil wells.
- Over a period of years, petrol prices will continue to rise. This will create hardship for people who can't afford the increases but who rely on their cars for their primary mode of transport. It will also affect our economy through higher freight costs, flowing through to the price of goods, especially food.
- As a nation (or city), if we can reduce our reliance on foreign oil we will be able to stabilise our economy and improve public health, as well positively influence Australia's balance of payments.

Council has a responsibility to act in relation to climate change and peak oil

- Timing and determination in our response to these issues is critical: too late and adaptation will be unaffordable; too weak and we may reduce community anxiety but fail to address the problems.
- Debate over whether Australia should participate in the Kyoto Protocol has been overtaken by a clear global need to reduce greenhouse gas emissions to below levels that will cause dangerous changes to Earth's climate.
- The best way to respond to climate change, peak oil and other societal challenges is to apply the concept of sustainability. Council has defined sustainability as a principle to influence its decisions to maintain and enhance Brisbane's quality of life now and in the future. It requires an integrated consideration of economic, environmental and community factors.
- Council has a responsibility to lead its community in addressing these challenges, but everybody will have to play a part and be individually responsible.

A Challenge for Brisbane

The Taskforce advises Council that although climate change and peak oil present serious challenges, Council can take many actions now that will prepare the city for these challenges ahead, while yielding valuable economic opportunities. If Council accepts the challenge presented, it will give the people of Brisbane a brighter future. Brisbane will be a better place to live than other cities that were reluctant to face the challenge and seize the opportunities provided by climate change and peak oil.

Top priority actions for Council

- The top actions Council can take in the short to medium term to respond to climate change and peak oil are to:
 - Take concerted and active leadership at all levels
 - Work towards zero net greenhouse emissions from Brisbane by 2050
 - Educate the community about climate change, peak oil and sustainability and the positive actions people can take
 - Develop a new way of thinking about planning for our future, especially in relation to public transport, walking and cycling infrastructure
 - Further drought-proof the city.

Zero net greenhouse gas emissions from Brisbane by 2050

- The City of Brisbane, its people and businesses should commit to making an equitable contribution to stabilising greenhouse gases in the global atmosphere through targeted reductions over time. An equitable contribution, allowing for Australia's developed status in world economies, is approximately a 90 per cent reduction in greenhouse gas emissions from 1990 levels by 2050. This would allow Brisbane to emit approximately one million tonnes of equivalent carbon dioxide.
- To crystallise the goal for Brisbane, the Taskforce proposes a goal of zero net emissions by 2050. This will necessarily include a component of carbon offsets (e.g. tree planting).
- To lead this push, Council should join other local governments, Federal and State agencies and leading corporations in moving towards full carbon neutrality. Carbon neutrality means reducing greenhouse gas emissions as far as possible and then using offsets to achieve net greenhouse emissions of zero.
- Council should capitalise on its strong commitment to reducing emissions by investing in energy efficiency, renewable electricity, biofuels and the Regional Carbon Sink.
- Carbon emissions trading will play a central role in Brisbane's approach to reducing greenhouse gas emissions. However, the Taskforce encourages Council to maintain a higher priority on measures to save energy and oil, and promote renewable energy, as storing carbon in trees alone is not enough to combat climate change.

A change in attitude by governments, businesses and individuals

- Council should call for a sweeping change in attitude and policy by governments at all levels, businesses and the community - a change that would provide incentives to reduce emissions, and prepare for the consequences of climate change.
- Council can extend its influence by partnering with business, media, community and government organisations. For example, it could partner with the city's top consumers of electricity and water to develop innovations that would put Brisbane at the forefront of sustainability.
- The Taskforce calls on the Lord Mayor and councillors to model appropriate behaviour and to personally lead education campaigns about climate change, including efforts to foster specific community behavioural change.
- While Brisbane is currently experiencing water restrictions and drought, the paradox of climate change is that tomorrow we may face hail, floods and storm surges. Although there are obvious first steps - such as recognising the true value of water - Council should study the city's

vulnerabilities to climate change in detail and amend its policies on planning, infrastructure, health and welfare accordingly.

- The way people and goods currently move around the city is heavily reliant on oil and is a growing source of greenhouse gas emissions. Council needs to work with its State and Federal counterparts to dramatically shift the emphasis of transport in Brisbane towards walking, cycling, public transport and telecommuting.
- Throughout all of Council's efforts, sustainability should be the common theme. If Council embeds its existing Corporate Sustainability Policy (August 2005) into its decision making, it will create an opportunity to shape the city's long-term future with each decision it faces.
- Council's planning needs to be based on a forward picture of the city under the climate change and peak oil scenarios, not a backward looking picture of delivering planning schemes, infrastructure plans and service plans based on continuing the status quo.

Summary of Recommendations

Table 1 lists all of the actions recommended by the Taskforce. It has assigned a high, medium or low (H, M, L) rating to Council's level of influence over the recommendation to achieve tangible results. Similarly, the table includes H/M/L rankings to indicate the benefit to the Brisbane community and the level of cost to Council (recognising that some actions will have low cost to Council but potentially high cost to others, like the State Government). In some cases, the Taskforce's recommendations will be revenue positive, and many will drive necessary innovation with economic spin-off benefits. Table 1 also suggests the approximate timing of implementation with 'short-term' applying to the next 18 months approximately.

Table 1 Summary of recommendations, priority, cost and timing

Rec	Short Description	Level of Control	Benefit	Cost*	Timing [†]
LEADERSHIP AND PARTNERING					
1	Pass resolution setting targets	H	L	L	Short
1a	Zero greenhouse target by 2050	L	H	H	Long
1b	Interim greenhouse targets	L	H	H	Long
1c	Oil consumption cut 50% by 2026	L	H	H	Long
1d	Zero net emissions from households	M	H	M	Medium
1e	Zero net emissions from BCC	M	H	M	Medium
1f	Develop '20 by 2020' targets	L	M	L	Short
2	Lead by example & partner	M	H	L	Medium
2a	Business units greenhouse friendly	H	H	M	Medium
2b	Extend Greenhouse Friendly to region	L	H	H	Long
2c	Climate partnership program	M	H	L	Short
2d	Hold discussions with insurers	L	L	L	Short
2e	Partner with GBCA and ASBEC	L	M	L	Short
3	Partner with and lobby government	L	H	L	Short
4	Capture economic opportunities	L	H	L	Medium
5	Visible sustainable energy	H	M	H	Medium
5a	Solar on Council buildings	H	M	H	Medium
5b	Energy from waste methane	H	H	H	Short
5c	Partner for wind power	L	M	L	Medium
5d	Help promote green power	L	M	L	Short
5e	Council car minimum fuel efficiency	H	L	L	Short

Rec	Short Description	Level of Control	Benefit	Cost*	Timing [†]
6	Assess infrastructure impacts	H	M	M	Short
6a	Climate change Infrastructure impacts	H	M	M	Short
6b	Storm surge & sea level protection	H	H	H	Long
6c	Relocate essential facilities	H	M	H	Long
6d	Study fuel sensitivity of Council ops	H	L	L	Short
6e	Study transport oil/carbon constraints	H	L	L	Short
7	SEQ water security leadership	L	M	L	Short
7a	Sustainable water in BCC buildings	H	L	H	Short
7b	Track BCC water use using EIMS	H	M	L	Short
7c	Alternative water sources	H	M	M	Short
7d	Continue drought strategy group	H	M	M	Short
DECISION MAKING					
8	Prioritise sustainability in Council	H	H	M	Short
9	Ongoing independent body	H	H	H	Short
COMMUNICATION AND EDUCATION					
10	Umbrella communication program	M	M	H	Short
11	Specific social marketing programs	M	H	H	Short
STRATEGIC AND LAND USE PLANNING					
12	Investment in TODs	M	H	H	Medium
13	Determined land use planning	H	M	M	Short
13a	Immediate City Plan amendments	M	H	M	Short
13b	Sustainable development incentives	H	H	H	Short
13c	Extend incentives to retrofits	H	H	H	Medium
13d	More shade/weather protection	H	H	H	Medium
13e	Complete urban agriculture strategy	H	M	L	Short
13f	Integrating public transport in planning	M	H	H	Medium
13g	No net loss of vegetation policy	M	H	L	Short
14	Change land use expectations	H	H	M	Medium
SUSTAINABLE TRANSPORT					
15	Public transport investment	M	H	H	Medium
16	Support walking and cycling	H	H	H±	Medium
16a	Implement a pedestrian master plan	H	H	H	Medium
16b	Pedshed analyses near stations	H	M	L	Short
16c	Review cycling policy and programs	H	L	L	Short
16d	Add paths to new infrastructure	M	M	H	Medium
17	Study innovative transport futures	M	L	L	Short
18	Travel demand management	M	H	H±	Short
19	Influence uptake of alternative fuels	L	M	M	Medium
19a	Planning/rates support for alt. fuels	H	M	H	Short
19b	Buy light diesel passenger vehicles	H	L	M	Short
19c	B20 for Council vehicles	M	M	M	Short
19d	B100 for Council vehicles	M	H	H	Medium
19e	Contractors use of biofuels	M	H	M	Medium

Rec	Short Description	Level of Control	Benefit	Cost*	Timing [†]
19f	Outreach program on biofuels	L	M	L	Medium
20	Climate proof transport facilities	H	H	H	Medium
21	Recognise peak oil risks to freight	L	M	L	Short
PREPAREDNESS FOR CHANGE, EMERGENCIES AND SURPRISES					
22	Engage on infrastructure risks	L	L	L	Short
23	Enhance disaster management	M	H	M	Short
24	Infrastructure failure response	H	M	M	Medium
25	Review community development	M	H	L	Short
DIVERSIFICATION AND CONSERVATION OF NATURAL RESOURCES					
26	Air-conditioning summit	L	M	L	Short
27	Regional carbon sink	L	H	M	Short
28	Drought-proof actions	M	H	H	Short
28a	Recycle 100% of wastewater	H	H	H	Long
28b	Phase-in water price increases	M	H	L	Short
28c	Smart meters for top water users	H	M	H	Medium
28d	Aggressive domestic water efficiency	L	H	H	Medium
28e	Plan for mandatory rainwater tanks	M	H	H	Medium
28f	Mandatory water sensitive design	M	M	L	Short
28g	Zero net town water to subdivisions	M	H	L	Short
28h	Discourage private swimming pools	M	M	L	Short
28i	Promote grey water	M	M	L	Short
28j	Mandatory business water efficiency	L	H	L	Short
29	Alternative energy systems	L	H	L	Short
29a	Brisbane water external energy review	H	M	M	Short
29b	Business energy efficiency plans	L	M	M	Medium
29c	Sustainable energy install assistance	M	H	L	Short
29d	Expand natural gas reticulation	L	H	H	Medium
RESEARCH					
30	Partner for key R&D activities	M	L	L	Short
31	Regularly update statistics	H	M	M	Short

* Cost (to Council): Low is revenue positive to \$100k; Medium is \$100-\$500k; High is > \$500k.

[†] Timing: Short-term is 18 months; Medium-term is 18 months to 5 years; Long-term is > 5 years.

± note although these actions are >\$500k, they would be lower cost for passenger movements compared to roads.

Acknowledgements

The Taskforce wishes to thank Lord Mayor Campbell Newman and Deputy Mayor David Hinchliffe for the opportunity to examine these pressing issues and advise the Council on impacts and possible causes of action. We would also like to thank former Taskforce member Patrice Derrington, Councillors Helen Abrahams and Geraldine Knapp and policy advisors Colin Chua and Sasha Fuller for their participation.

The Taskforce is grateful for the support provided by Council officers Sue Baker, Vanessa Swinson, Joanne Hamer, John Tunney, Nick Clarke and Terry Hogan, as well as other Council officers who assisted in acquiring information and presenting to the Taskforce.

The Taskforce also thanks the consultants who contributed to Taskforce deliberations including Michael Nolan and John Herron of Maunsell and Michael Whitehead of Sinclair Knight Merz. Finally, the Taskforce thanks those members of the public who took the time to contribute to the online forum and those who may read this report and contribute to BCC's efforts to respond to climate change and peak oil.

'The Taskforce aimed to challenge conventional thinking on climate change and peak oil and to present a bold vision for the future of Brisbane.'

1.0 Introduction

1.1 The Climate Change and Energy Taskforce

In August 2006 Brisbane City Council appointed a Climate Change and Energy Taskforce (the Taskforce) to advise Council on ensuring that Brisbane is adequately prepared to respond to and address the challenges of climate change, increasing energy consumption, rising petrol prices and peak oil. Council asked the Taskforce to:

- Advise on the key strategic challenges based on available data.
- Consider world's best practice.
- Review existing policies and activities to address these issues across Council.
- Consider submissions from community members.
- Recommend an appropriate role and policies for Council.
- Prepare a detailed action plan, which may include activities in the short and long term undertaken by Council or in cooperation with the private sector, the community and other levels of government, particularly SEQ region councils.

Appendix A contains the Taskforce's Terms of Reference.

The Taskforce comprised:

- Professor Ian Lowe, President of the Australian Conservation Foundation (Chairperson of the Taskforce)
- Jim McKnoulty, Chairman of Conics Ltd. and President of Greening Australia
- John McEvory, Managing Director, Peron Group
- Patrice Derrington, Chief Executive Officer, Campus Living (retired from Taskforce)
- Scott Losee, Principal Consultant – Sustainability, Maunsell Australia Pty. Ltd. (replacing Patrice Derrington).

Appendix B contains short biographies of the Taskforce members.

The Taskforce met several times between September 2006 and February 2007 and had discussions with Council officers, elected councillors, and private consultants, as well as receiving submissions from members of the public. The Taskforce presented an interim report to the Civic Cabinet in December 2006, before completing this final report for consideration by Council.

The Taskforce aimed to challenge conventional thinking and present a bold vision for Brisbane, based on a future that has a changed climate, increased fuel prices and a range of associated impacts. In presenting the challenge and vision, the Taskforce wanted to present a call for action that would encourage community dialogue and inspire consideration of new ideas, which would maintain Brisbane's livability, while setting new standards for sustainability.

The Taskforce believes that, through strong leadership and decisive action, it will be possible for Brisbane to address climate change and peak oil and avoid the worst of the potential consequences. Indeed, it believes that a planned and determined response can position Brisbane well for the future and be an economic boon for the city.

1.2 The Taskforce Report

This report began with an outline of key messages that should be conveyed to the people of Brisbane and 'A Challenge for Brisbane'. The challenge is a call to action for Council and provides a set of ideas which should be considered and debated as part of determining Council's response to climate change. This section also provides an overview of the major impacts that could be expected to affect Brisbane.

The introduction briefly explains the origins of the Taskforce, its outputs and provides a summary overview of global and Australian climate change and peak oil issues.

The 'Taskforce Approach' section outlines the methods used by the Taskforce to review inputs and develop recommendations and summarises feedback received from the community via an online forum. The next section presents a scenario for Brisbane in 2030 to explain, in a practical way, how climate change may directly impact the city and how adaptive measures might be applied.

The report then interprets the implications of climate change and peak oil for Brisbane, providing a basis for the strategies and actions that follow. These recommendations and actions are organised under several broad themes. A tabulated summary of recommendations appears in the 'Next Steps' section, together with advice on what citizens of Brisbane can do to actively contribute to greenhouse reduction targets.

The Taskforce calls on Council to consider the program of actions it has proposed as it seeks to develop an appropriate response for the city to adapt to climate change and reduce its greenhouse emissions. The Taskforce is confident that the actions it has proposed for consideration will stimulate debate and help Council to determine their response and to prepare its own implementation plan.

1.3 About Climate Change

A brief history

Since the nineteenth century, scientists have known that the Earth is kept warmer than it would otherwise be by the presence of a variety of gases in the atmosphere that trap heat. Scientists of the time drew comparisons between a greenhouse and the Earth's atmosphere; in that both allow sunlight to enter, yet prevent the heat that it brings to escape. From this early work comes the term 'greenhouse effect'.

The natural greenhouse effect is of great benefit, and keeps the Earth much warmer than it would otherwise be. The average temperature on Earth, 14°C, is about 32°C higher than the average temperature on our Moon, which is about the same distance from the Sun as Earth, but does not have an atmosphere and therefore a natural greenhouse effect to keep it warm.

From the beginning of the Industrial Revolution in the late 18th and early 19th centuries, people have been burning fossil fuels – coal, oil and gas – that were formed from decaying plant matter and stored over millions of years of the Earth's ancient history. Burning these fossil fuels combines the carbon within them with oxygen from the air to produce carbon dioxide (CO₂), a powerful greenhouse gas. Burning fossil fuels has now produced a dramatic increase in the amount of CO₂ in the atmosphere. This rapid increase in greenhouse gases has significantly enhanced the natural greenhouse effect of the Earth. The CO₂ that was taken in from the atmosphere by plants over hundreds of millions of years is now being released back into the atmosphere in a matter of decades. Since the start of the Industrial Revolution, the atmospheric CO₂ concentration has increased by approximately 40 per cent, most of it released since 1945.

From decades of research, it has been established that the atmospheric levels of CO₂ have been increasing. Measurements from laboratories over the past fifty years have been supplemented by assessments of trapped air in core samples of ancient polar ice dating back 650,000 years. These measurements show that the natural variation of CO₂ levels in prehistoric times varied between about 180 to 280 parts per million (ppm), and studies prove that global average temperatures are closely linked to the amount of CO₂ in the atmosphere. The amount of CO₂ currently in the atmosphere is about 380 ppm and is increasing steadily by a further 2-3 ppm each year. With this steady increase of CO₂ temperatures can also be expected to increase steadily.

The average temperature of the Earth is now warmer than at any time since human records began. Since 1990 the world has experienced all of the ten hottest years since reliable instrumental records began (about 140 years ago). A range of studies collated by the Intergovernmental Panel on Climate Change (IPCC) all agree that current global average temperatures are the highest for at least 2000 years.

As temperatures rise higher, there are major impacts on our weather systems as the heating of ocean waters can change weather patterns. Extreme weather events such as violent cyclones and flooding, to record droughts and un-seasonal snow are already occurring with greater frequency. Sea levels are increasing as thermal expansion of ocean water is supplemented by melting of land-based ice. At the same time some of the additional CO₂ in the atmosphere is being absorbed in to the oceans, raising the acidity of the waters and changing marine life cycles. Figure 1 illustrates how human-induced climate change is caused and what possible effects follow on from this change.

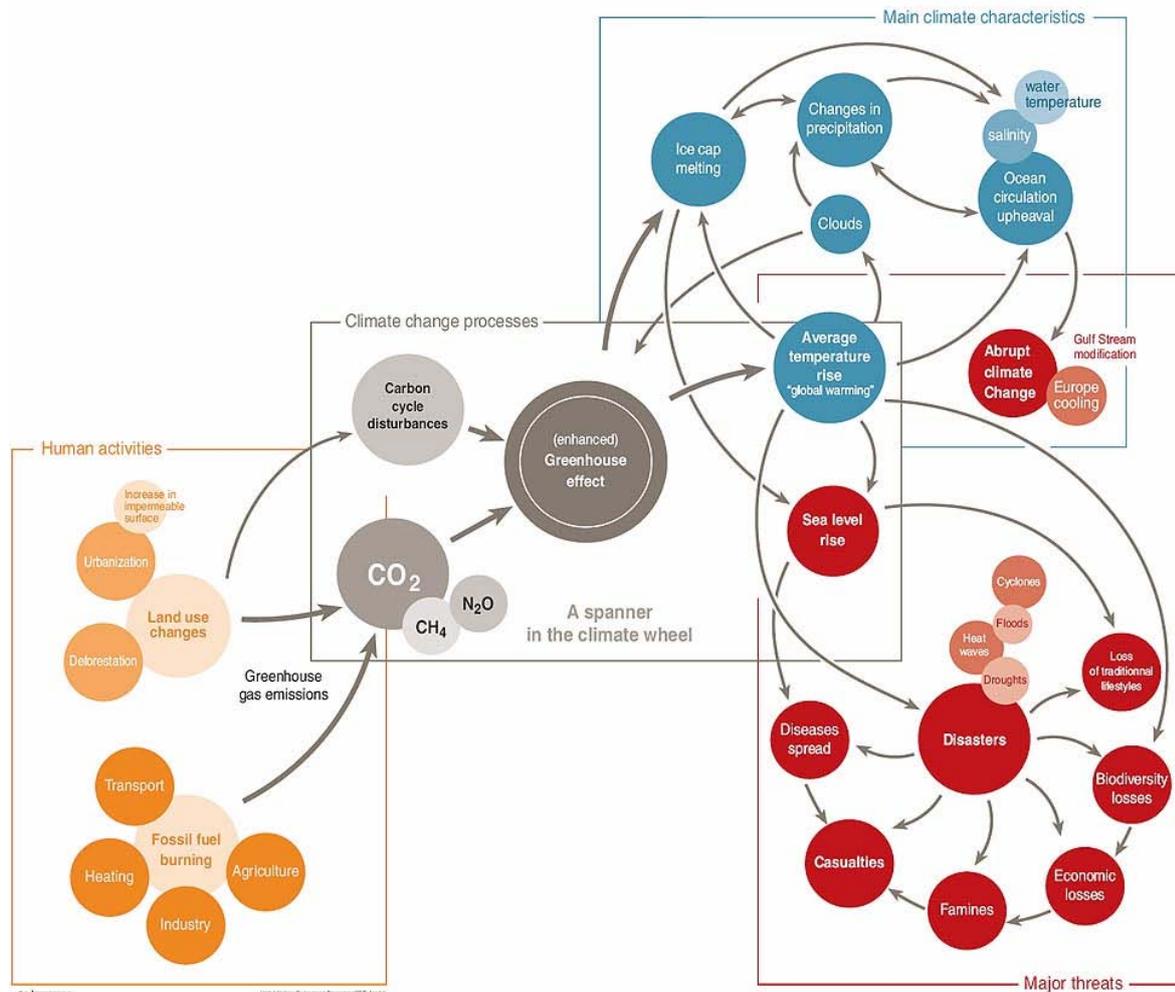


Figure 1 Unravelling the climate change story (UN & GRID 2005)

The Australian context

The Australian continent has warmed significantly over the past century (IPCC 2007). Australia has also experienced an increase in the frequency of very hot days, and a decrease in the frequency of very cold nights. These temperature changes have created abnormal climatic conditions; causing more frequent, persistent and intense droughts, more frequent heavy rainfall events, as well as increasingly frequent extreme events such as category five tropical cyclones, and violent storms. Prevailing abnormal climatic conditions have also led to an increase in the distribution and severity of bushfires. Sea levels have been increasing about two centimetres per decade, and may cause substantial problems for low lying coastal areas, as well as causing saltwater incursion into already drought stricken and fragile river systems. It is not only people who are vulnerable to climate change but the entire natural environment as well, including estuarine ecosystems, alpine ranges, and coral reefs (see Lowe, 2005, for more information).

1.4 About Peak Oil

A brief history

The term 'peak oil' comes from the work done in the 1960s by an American geophysicist Marion King Hubbert who came up with a theory based on the notion that the amount of oil under the ground is finite. In the mid-1950s, Hubbert used statistical analysis to predict that US oil production would peak in the early 1970s, changing the balance between buyers and sellers on the world market.

His predictions were criticised by most economists, who believed that scarcity would always drive up prices and bring new supplies on stream. When the so-called 1973 'oil crisis' began, Hubbert's theory about peak oil production was confirmed; however some economists still do not accept the theory (see Deffeyes, 2003, for more information).

The Australian context

Australian data shows that Bass Strait production peaked a decade ago and that overall Australian oil production has also peaked and is in decline. This trend is shown in Figure 2, which has been taken from the Association for the Study of Peak Oil and Gas submission to the Senate inquiry (ASPO-Australia 2006).

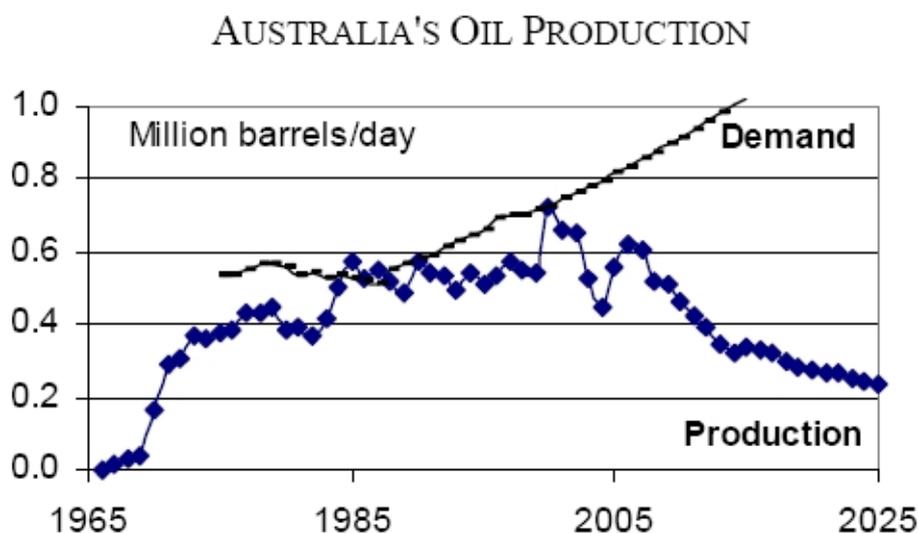


Figure 2 Australia's oil production vs. Australia's demand for oil (ASPO-Australia 2006)

Imports now account for about 30 per cent of Australian oil use, with the gap between increasing demand and declining production likely to keep widening for the foreseeable future. The 'best case' scenario is that oil will continue to be available on the world market at prices between US\$50-100 per barrel, making it possible for transport fuel use to stay at the present level or even increase, albeit at a rapidly increasing cost to the Australian balance of payments.

Less optimistic scenarios are based on the recognition that it has become increasingly difficult to discover new oil resources, with the amount of effort required to recover a barrel of oil having grown steadily for forty years. Figure 3 shows that the discovery of new oil sources peaked long ago and is now in steep decline.

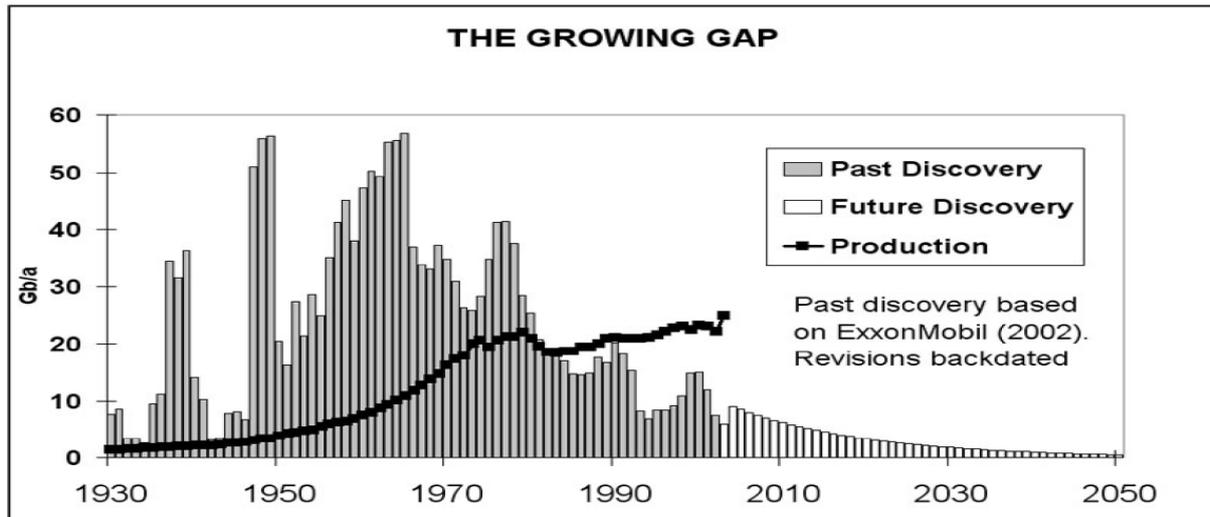


Figure 3 The growing gap between oil discoveries and oil production

The Association for the Production of Oil and Gas provide a range of forecasts of the peak of world oil production and likely future production levels. Almost all forecasters predict that the peak will be before 2015. Figure 4 presents what ASPO considers to be the most likely production profile. In this case, the overall peak occurs about 2010 and there is a subsequent steep decline.

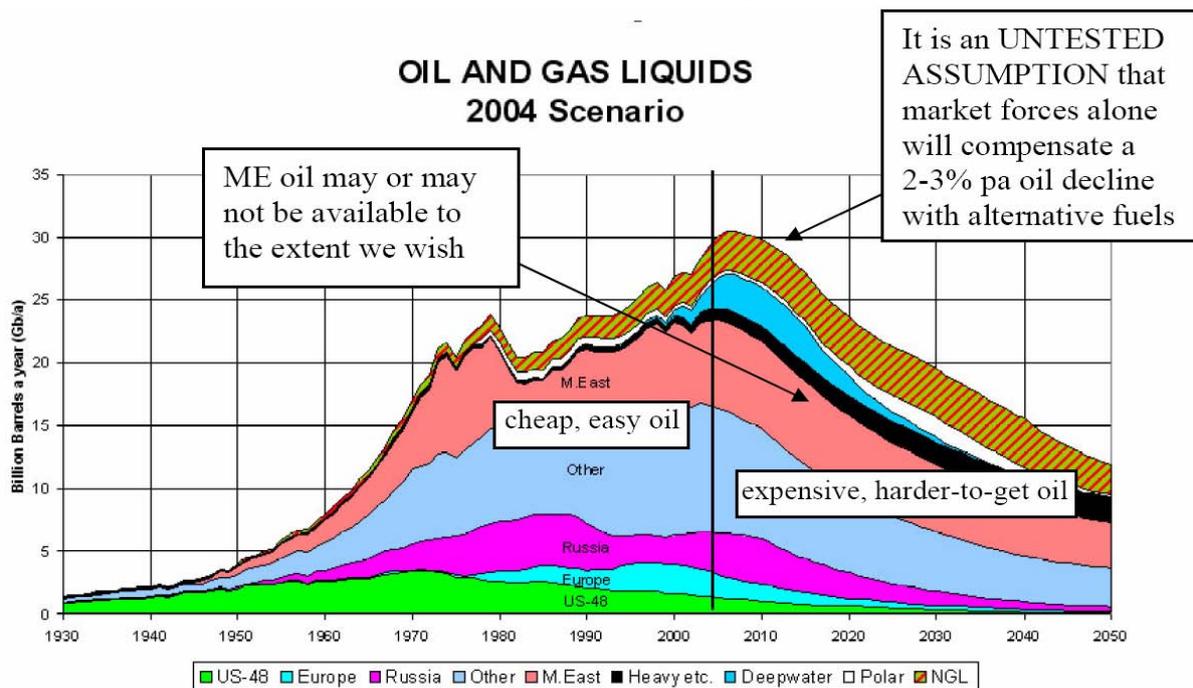


Figure 4 The production profile for oil and gas for current oil sources (ASPO 2004)

'The Taskforce has developed a comprehensive program of possible actions contained in its recommendations.'

2.0 The Taskforce's Approach

2.1 Development of Proposed Responses

Through its succession of meetings, the Taskforce drew up a list of predicted consequences of climate change to set priorities for adaptation measures. It also considered the activities that release greenhouse gases to establish priorities for reducing the city's emissions, taking account of the strategies that are already in place. Finally, it considered the implications of 'peak oil' for the proposed responses. Appendix 3 contains details on the Taskforce processes including its meetings.

Figure 5 demonstrates the process that the Taskforce followed to identify priority issues and actions. Part of this exercise was a subjective ranking by Taskforce members of the many issues identified. Appendix 4 includes the full list of these issues and the Taskforce's collective rankings. Although all of the identified issues are important at some level, the Taskforce was seeking to focus on the most critical actions that the Council could take given the need to act quickly and effectively.

The highest priority potential impacts identified by the Taskforce were:

- Risk to human life and property
- Rising prices for food, water, housing and services
- Less reliable water supply from dam catchments and reticulated water supply system
- Permanent inundation and loss of use of low level sewage treatment works and outfalls
- Greater water storage uncertainty (reduced inflow and greater evaporation)
- Increased demand on air-conditioning
- Exponential growth in demand for high quality public transport, walking and cycling infrastructure and services
- Residents in outer and middle suburbs experiencing greater financial pressures from increased petrol prices or transport costs.

The Taskforce also identified the following flow-on adaptations that will themselves have significant implications for the community:

- More stringent mandatory requirements for water and energy efficiencies for buildings and appliances.
- Forced adoption of new and innovative supply and demand management strategies to keep pace with and reduce current demand.
- Phasing out of inefficient appliances and technology.
- Households face a trade-off in their housing choices between the capacity to afford housing versus their distance from the services.
- Need for greater local food production.

The Taskforce also used the scenario development and discussion to help synthesise an integrated image of the future. Throughout, the Taskforce sought to concentrate on what climate change and peak would mean for the people of Brisbane and the city's economy.

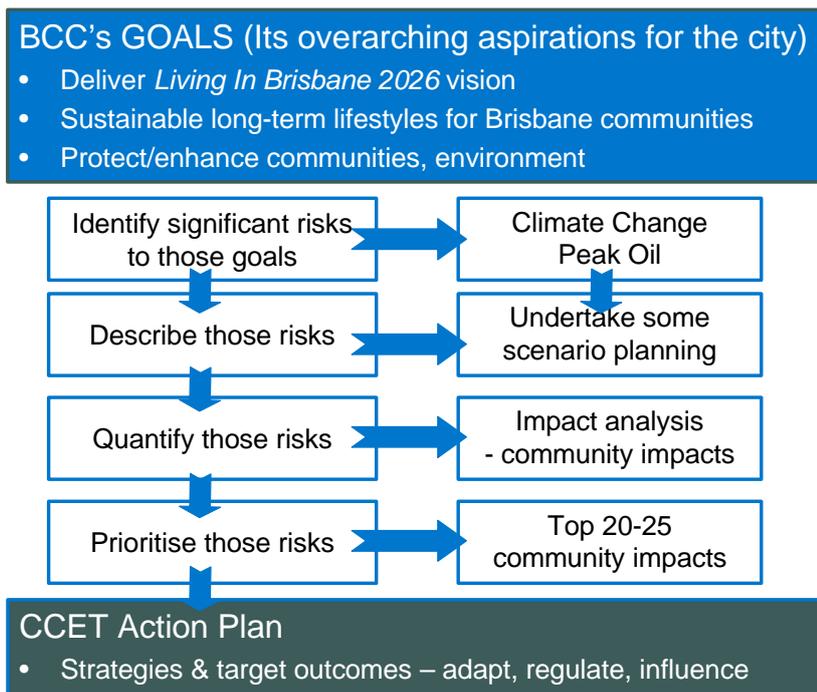


Figure 5 The Taskforce process

2.2 Community Feedback

On the behalf of the Taskforce, Council established an online forum to provide an opportunity for the public to contribute ideas for consideration by the Taskforce. The website received 69 postings, which are discussed in more detail in Appendix 5. Community input focussed more on reducing greenhouse gas emissions than climate change adaptation, although there is an overlap between peak oil response and reduction in greenhouse gas emissions from transport fuels.

Transport and energy were the dominant topics (39% and 31% of responses respectively). Transport ideas included promoting hybrid-electric cars, improving bus transport and influencing private car access to the CBD. Many postings discussed the TransApex initiative in light of climate change and peak oil.

Energy suggestions included using solar panels on homes and LED public lighting. Nine per cent of postings related to water, such as suggesting that the city make better use of storm water.

Some respondents described the frustration of renters in trying to save energy and water. Others called for different building regulations to account for climate change, such as high and gusty winds. Strong support was expressed for community education (e.g. on eco-friendly living) and working with school children.

Many of the Taskforce's recommendations are related to the important matters raised by the public and the Taskforce wishes to thank contributors to the forum.

2.3 Responses Proposed in the Call for Action

Following consideration of how climate change and peak oil issues would affect Brisbane specifically, the Taskforce has developed a comprehensive program of possible actions contained in its recommendations.

There are generally three broad ways to influence the behaviour of people - changing the price signals or economic incentives; changing the regulatory environment and; through education. Where society (or government) has successfully produced major changes in behaviour, for example discouraging drink-driving and smoking tobacco, all three of these approaches have been used together. Attempts to change complex human behaviour through regulation or price signals alone is unlikely to be effective, as is clear from attempts to discourage use of illicit drugs by legislation and from the limited impact of rising prices on the use of transport fuels.

Many of the actions proposed in the Taskforce's recommendations relate to a body of policy knowledge that has developed for ten or more years. The challenges of peak oil and climate change serve to reinforce the value of these policies as well as their urgency.

Changing the pattern of energy use that is causing global climate change will require a concerted and integrated approach. Efforts to educate and persuade residents of the need for change will be ineffective unless the Council is seen to model and support the desired behaviour in its own actions. Therefore, Council must lead by example in adopting best practice in the use of energy, water, buildings and transport fuels if it is to convince the community to change its behaviour.

'2007 could be a turning point
in the global focus on climate change
– from no longer convincing people
we had caused climate change
to planning how best to respond.'

3.0 A Possible Scenario for Brisbane in 2030

3.1 Introduction to the Scenario

One way of thinking about and planning for the future is to develop scenarios. In this sense, scenarios are narratives that take the reader to a point in the future and present imagined illustrations of what life might be like at that time. This serves to make the future seem more real, draws out different perspectives and identify realistic solutions when comparing the future scenario with the present.

The Taskforce considered several scenarios during its deliberations, including a series of specific future climate assumptions. The Taskforce also considered a 'business as usual' projection of trends and compared them to scenarios where Brisbane responded to the challenges identified to varying degrees.

Rather than present a series of narratives, the Taskforce has included only one. The purpose of this one is to illustrate some of the changes people in Brisbane could be expected to see and show how adaptation responses now will influence the future livability of the community.

The story takes the perspective of 'Michael', a fictional 60 year old resident of a Brisbane bayside suburb, reflecting on his life after he has just retired. Michael would be a 'Generation X-er', born in 1970, and having started work around 1992.

3.2 Michael's Story

'As we enter another decade in 2030, retirement from my government job has given me time to reflect on the changes in Brisbane over the past 25 years as we try to adapt to the impacts of climate change, manage the rising costs of traditional energy sources and deal with the additional 2000 people that continue to move to Queensland each week. So much has happened, but the following changes sit most strongly in my mind.

2007 is still regarded as a turning point in the global focus on climate change. It was no longer about convincing people we had caused climate change; it was about planning how best to respond to the problems we had created and what we would do to reduce and offset our carbon emissions.

The Council played a leadership role in engaging its residents and businesses in creative partnerships involving all levels of Government.

While many argued about the best ways of responding to these challenges, the Council recognised that we needed to tackle them on all fronts. It led the way in providing technical solutions, incentives, education and encouragement for individual households and businesses to reduce their individual environmental footprints. It implemented contingency plans to provide emergency water and power supplies, which proved invaluable in 2009 when the worst drought in history led to water rationing and we realised that power blackouts caused by severe storms and peaking demands were going to become a fact of life.

Climate change and energy policies are now considered to be the highest priority in voter polling, but not all cities responded in time. Sydney is now suffering from the indecision, which delayed action and left them ill prepared for the 2015 Blackout Bushfire, which destroyed key power lines leaving large sections of the city without any clean water or power for almost two weeks. This really forced the issue of water and power security. Governments and businesses began large scale investments in a diversity of renewable energy sources to a point where solar and wind power are considered necessary to guarantee supply during emergency and rationing periods needed to cope with excess peak energy demands on extreme heat days.

My kids now think it is normal to have a biogas and biodiesel plant in every industrial estate that takes waste from the surrounding residential and commercial areas to supplement their power needs.

Last year's Federal election was won by policies to tackle the acceleration in global warming. It has meant that the electricity and petrol that we took for granted when we started our family, has increased in price by another 50 per cent. We all think twice before using the family car. The money we spent 15 years ago on rainwater tanks and solar power is now considered one of our best investments when you consider the ongoing escalation in the cost of living is a real struggle for most of our community.

Last year we installed a new air conditioner in the family room and were required by law to submit an energy management plan to demonstrate how we could reduce our overall household energy use. The Solar Panels helped here, but I hadn't realised how much money we were wasting on inefficient lighting and appliances. Another bonus is that we qualify as 60+ year olds to use an air conditioner during peak energy demand periods. This provides peace of mind for the future years as the increase in heat waves have been causing deaths amongst the aged.

With the cost of petrol now above \$10 per litre, the car is now considered a luxury and without the investment we have seen in biofuels over the last 15 years, I'm told we would be paying much more, now that traditional sources of oil are in rapid decline.

Buying our house close to the bayside metro bus line has also proved to be a good investment, as buses come every five minutes in peak hour and people pay a premium for properties within walking distance of all metro bus routes. This of course doesn't help the average family who can't afford housing close to major public transport and certainly can't afford to drive to work, but the bikeway network, which has been extended to connect most outlying residents to bus and train services has had the added benefit of reducing obesity, particularly amongst children.

Council's 'Living in Brisbane 2026' vision and planning documents are credited with protecting our status as Australia's most liveable city, but no one had realised how much climate change would impact on our daily lives. Rationing periods for energy and water were normal by 2025, but it was the food rationing in August of 2025 that was the real shock. The cost of fresh food and vegetables now seems to be out of control. We are now looking seriously at joining Council's local community garden program whereby we can join part of our backyard with the area already turned into vegetable gardens by two of our neighbours and run by a collective with expert assistance available over the internet from Council volunteers in water efficient local farming.

They tell me our average rainfall has only decreased by seven per cent, but with the extreme periods of drought combined with severe storms and flash floods, the traditional areas used for farming around Brisbane are simply not viable and many farmers have taken advantage of Federal funding to relocate to areas that now seem to get more consistent and heavier rain in Far North Queensland and the north of Western Australia around the Ord River Scheme. That seemed like a great idea at the time, but the cost of fuel for transportation has only added to the cost of all produce to a point where most families struggle to afford what were once considered basic fresh foods on a daily basis.

I retired to the Bayside in 2020, but many in our aging population have had to carry on working to deal with the rapid escalation in the cost of living. 2020 was also the year Cyclone Henrietta hit SEQ. We knew we had to prepare for a potential cyclone, but so many houses were just not built for wind of that strength. Corrugated roof iron killed 35 people alone; however, the four metre storm surge changed our suburb forever as homes were swept away by raging waters. The Bayside Emergency Response Volunteers came into their own in responding to the storm as we dealt with the aftermath and began rebuilding lives.

So much for retirement! Our suburb was busy becoming a community and the Council has told us that major storms of a magnitude that used to occur once every 50 years back in 1990 are now likely to occur every 15 years. So the community has worked well together following the crisis and we are much better prepared with our Emergency Response Group working with Council's Disaster Management team to deal with the next cyclone that invades our part of the city.

One challenge we are still struggling with is the sporadic outbreaks of mosquito borne diseases such as Dengue fever and Ross River Fever, which have particularly affected health of retirees along the coast.

On the positive side, we are glad both of our children chose careers in the emerging sustainable living industries, which are now booming in Queensland with employment opportunities growing not only locally but in areas of China and South East Asia, which are under far more pressure than we are, in maintaining access to the basic necessities of life.

If the last generation of the 20th Century was remembered for the social upheaval of world war and immense technological change, then the first generation of the 21st Century will be remembered for starting what is now commonly referred to as the 'Sustainability Revolution'.

'The overlapping impacts of climate change and peak oil allow for integrated responses, which is where Council should focus its efforts.'

4.0 Brisbane Vulnerabilities

4.1 Introduction

In its assessment of Brisbane's vulnerabilities to climate change and peak oil, the Taskforce is seeking to balance the need to focus attention on the pressing problems, with a desire not to cause unwarranted fear or disengagement in the community.

Petrol prices have been topical in local news over the last year, but this attention has dropped off seemingly as rapidly as the price peaks dampened. There was peripheral mention of peak oil and suggestions that prices might never come down again. Prime Minister John Howard was quoted as saying, 'Even though (the price) may recede a little bit, I'm afraid we're not going back to the days of having petrol below \$1 a litre for quite some time, if at all' (*The Melbourne Age*, September 26, 2005). Indeed, the evidence shows that this is the case, but the long-term effect is masked by short-term fluctuations or non-market activity to influence prices. Peak oil has not reached the same level of public consciousness as climate change has. In contrast, climate change has received prominent attention in both press and broadcast media. Although public understanding is increasing as a result, there is also a possibility that people will 'turn-off' or become disengaged.

In view of these perceptions, the Taskforce has presented the following section on vulnerabilities as an interpretation of what implications are likely for Brisbane. For all of these vulnerabilities and risks, the city has ample opportunity to respond, and benefit economically as a result. The discussion of vulnerabilities provides an important context for the program of action that the Taskforce has recommended.

The Taskforce wishes to stress in its advice to Council that the following section is only a discussion based on information that the Taskforce has been able to access. Further detailed studies of Brisbane's vulnerabilities and opportunities are essential for a considered and effective response by Council, although it is not necessary to put off action while further studies are considered.

Integration and overlap of issues

It is appropriate that Council requested that peak oil and climate change be addressed simultaneously because the issues are so interrelated. The relationship becomes strongest when considering appropriate policies and actions to respond to the various challenges. For example, better public transport helps:

- Climate change by gaining higher passenger movements per kilometre of transport infrastructure that might be subjected to greater climate extremes, when all infrastructure will cost more to build and maintain
- Peak oil by providing efficient and affordable means to move people as oil becomes more expensive, and it provides greater economies of scale for vehicles to use alternative fuels or technologies (of which Brisbane's CNG buses are a prime example)
- Greenhouse gas emission reduction by replacing inefficient private motor vehicle trips
- Sustainability by addressing the issue of transport disadvantage and environmental issues like air pollution.

Moreover actions like this have even wider benefits. Socially and economically, passenger movements by public transport can reduce conflict with freight traffic, enhance public safety by reducing road accidents and contribute to a 'world city' status for Brisbane with a first-rate transit system.

Similar to public transport, many of the recommendations will have co-benefits and respond to more than one dimension of the issues that have been put to the Taskforce.

4.2 Climate Change

The Queensland Government has partnered with the CSIRO to produce analyses of climate change implications for Queensland. This work began in 1995 and a considerable body of knowledge has been established since that time.

Table 2 provides a guide to the current level of confidence that experts have for various projections of future climate changes for Queensland. There is greatest confidence in temperature projections, as there is a direct relationship between atmospheric concentrations of greenhouse gases and temperatures. Rainfall, however, is much more complex with variability over years and decades (Source: data supplied to BCC by the Department of Natural Resources and Water).

Table 2 CSIRO projections of Queensland's future climate

Level of Confidence	CSIRO Climate Change Projection for Queensland
Very high - >90% chance	<ul style="list-style-type: none"> Higher temperatures and changes in extreme temperatures Global sea level rise Declining soil moisture
High - 90% chance	<ul style="list-style-type: none"> Decreasing average rainfall Increasing potential evaporation Increasing storm surge heights/risk along the East coast of Qld Increasing tropical cyclone intensity Increasing temperatures at the regional scale, including extremes
Medium - 66% chance	<ul style="list-style-type: none"> Increased risk of bushfire Increased incidence of extreme rainfall
Moderate >50% chance	<ul style="list-style-type: none"> Decline in overall amount of rainfall and seasonality of that change Changes in average stream flow Increased drought
Low	<ul style="list-style-type: none"> Abrupt changes, such as melting of polar ice sheets and changes in global ocean currents.

Temperature

Brisbane's average and maximum temperatures will very likely increase. A Queensland Government report has likened the future climate of Brisbane (in 2070) to the present climate of Rockhampton (DNRM 2006).

While the current drought has meant that variations in rainfall intensity are foremost in people's minds, heatwave events remain the natural events responsible for more deaths in the region than any other. A recent report for Brisbane City Council (Granger 2005) advised that heatwave events in South-east Queensland since January 2000 have directly resulted in more than 34 deaths and almost 2000 hospitalisations across the region. The report goes on to note that heatwaves are the most lethal of all natural hazards, yet their impacts are not formally recognised as being natural disasters. The majority of these fatalities were to older people who stayed indoors during the heatwave event and perished due to extreme heat stress (Aitken and Losee 2006).

Accordingly, increasing temperature will encourage the greater use of air-conditioning, and for extreme temperatures, people will require some form of refuge. Bushfires are a known hazard in Brisbane and the effect of climate change will be to increase the likelihood of them occurring and possibly the resulting damage.

Ecosystem impacts

Related to temperature is the effect of climate change on natural areas. Because of the competition for land in urban areas, there are few remaining areas that have been kept as bushland, parks or natural reserves. The flora and fauna that would have had the entire city available to it before Brisbane was a city, has now been confined to these small areas. Accordingly, they have limited capacity to adapt by changing habitat. An effective response to climate change would be to increase the size and connectivity of natural areas to ensure that adaptation is possible. This is increasingly difficult in cities, but Brisbane is fortunate that it has committed to bushland preservation and biodiversity conservation for many years.

As ecosystems shift, there may be further human implications, such as potentially greater concerns with mosquito-borne diseases. These will affect Council insect control programs. Economically, there is a potential to affect tourism revenue. The threats to the Great Barrier Reef, such as coral bleaching, are already well documented and known throughout the world. This could affect the desirability of Brisbane and Queensland as tourist destinations.

Drought

Brisbane is one of the fastest growing cities in Australia, and is located on the driest inhabited continent in the world. Enhanced weather extremes and uncertainty will compound our difficulties in understanding the periodic drought nature of south east Queensland over millennia.

Although the city could be vulnerable to both greater storm surges and river flooding, the irony remains that South-east Queensland is already experiencing its harshest drought in recorded history. The effect of climate change on Brisbane and the region is not only from global scale sources such as sea level rise. Intensification of local weather patterns could also lead to a prolonging of current drought conditions into the foreseeable future.

A worsening of current drought conditions will have serious implications for the region's population carrying capacity and growth management strategies may struggle to cater for the potential impacts of climate change on water supply. Water restrictions have become a way of life for residents throughout the region. Current restrictions are already impacting on the way of life that many have become accustomed to, and we are now facing the reality that our traditional usage of water and the way that we value it may have changed forever.

The diminished water supply in the region is already affecting industries that are heavily reliant on water, such as electricity generation. The Tarong power station near Kingaroy has already reduced its power generation by approximately one quarter, hoping to extend the life of the Boondooma Dam until a recycled water pipeline can supply water in June 2008. Tarong draws between 50 million and 80 million litres a day from Boondooma, which is at 16 per cent of capacity and dropping faster than one per cent a month. It is evident that the water supply problem affects a range of services outside the normal consideration of most people (Brisbane *Courier Mail*, 9/2/07).

The solution to the region's water supply problem does not lie in any single measure, but in a range of measures, which are combined to improve water security. Likewise, a range of demand-reducing factors are necessary as well as prudent supply and costing strategies correctly geared toward long-term solutions.

The effects of water restrictions are well appreciated by Brisbane residents now. There are significant cultural and social implications. Drought has affected what has been Australia's most popular pastime – gardening. If we are not longer able to have backyard pools, will we develop different ways of living? The Council is also acutely familiar with the economic impacts that drought has had on Brisbane businesses, particularly those such as nurseries (though there is clearly a boom in the rainwater tank market). A lack of long-term water security is likely to affect the value of property in Brisbane as well.

Storms and sea level rise

In the medium-term, extreme weather events may prove damaging to buildings, settlements and infrastructure. The potential for severe storms, storm surges, and flooding of low-lying areas will be far greater. In the long-term, rising sea levels are likely to compound the extreme weather events causing more extensive flooding, inundating areas previously considered to be flooded infrequently.

Like many other Australian cities, Brisbane is in a coastal location, and situated on a significant river system. Not only does the close proximity of Brisbane to the sea expose it to the effects of sea level rise from the expansion of the warmer ocean waters and terrestrial ice melt; it also enhances vulnerability to extreme weather patterns.

Seasonal cyclonic weather has traditionally been associated with the smaller and more northern cities in Queensland rather than Brisbane. With climate change, cyclone activity is predicted to gradually move further south with the continuing increase in global average temperatures. The severity of cyclonic activity is also expected to increase, with Category 5 cyclones to become more common than previously recorded. The increase in range and severity of cyclones will affect Brisbane, not only because of the proximity to the coastline and the destructive winds themselves but also because of the storm surges, bringing flooding waters that will spill out along affected river systems.

Although one must be very cautious about comparisons, what the world saw in the Hurricane Katrina event provides a provocative image of what a 'worst case' situation might entail. Apart from the outright destruction, it was apparent that the hurricane also created major social, cultural and long-term economic impacts. Council's commitment and policies towards building stronger communities in Brisbane are even more important when one considers the potential implications of climate change. Economic costs from weather events include displacement of communities, relocations costs, re-construction, insurance, loss of life and property and effects on industry (e.g. the impact of Cyclone Larry on banana production in Innisfail last year).

Storm tide maps

Brisbane City Council has prepared two maps of theoretical storm tides at the request of the Taskforce. The inundation levels are based primarily on topography. These maps illustrate areas where consideration should be given to undertaking more detailed modelling of storm surge potential. The Taskforce presents these maps for illustrative purposes only. That is, they do not necessarily represent an approach that would be taken for modelling potential storm surges for engineering design. Engineers currently follow guidelines published by the EPA (2004), and detailed modelling would be required to determine levels for individual sites.

A storm surge is a raised dome of sea water typically 60-80 km across and two metres to five metres above the normal sea level caused by the low pressure centre of a cyclone. As a cyclone reaches the coast the high winds whip-up the sea and push the dome of water over low-lying coastal areas. The waves and sea water can move inland quite quickly, damaging buildings and cutting off escape routes, with an associated risk of drowning. A storm surge is not the same as a tidal wave (which is a towering wall of sea water that comes crashing into shore). A storm surge comes in like a rapidly rising tide but it can be extremely dangerous and destructive.

The height of the storm surge will depend on the following:

- The intensity of the cyclone - the stronger the winds the higher the surge;
- The speed of the cyclone - the faster the cyclone crosses the coast the higher the surge;
- The angle at which the cyclone crosses the coast - a right angle crossing will increase the surge;
- The shape of the sea floor - the more gentle the slope the greater the surge; and
- Local features such as bays, head lands or islands can funnel the surge and amplify its height.

A cyclone crossing the coast at high tide would be the worst case for flooding (State Disaster Management Group 2004).

Figures 6 and 7 show the theoretical effect of a storm surge of five metres occurring during a cyclone event at the highest astronomical tide with a 30 cm sea level rise. Storm surge is significant as it accounts for most direct fatalities associated with cyclones. The largest storm surge event ever recorded was 48 feet (14.6 metres) at Bathurst Bay in the Cooktown region off the North Queensland Coast in 1899.

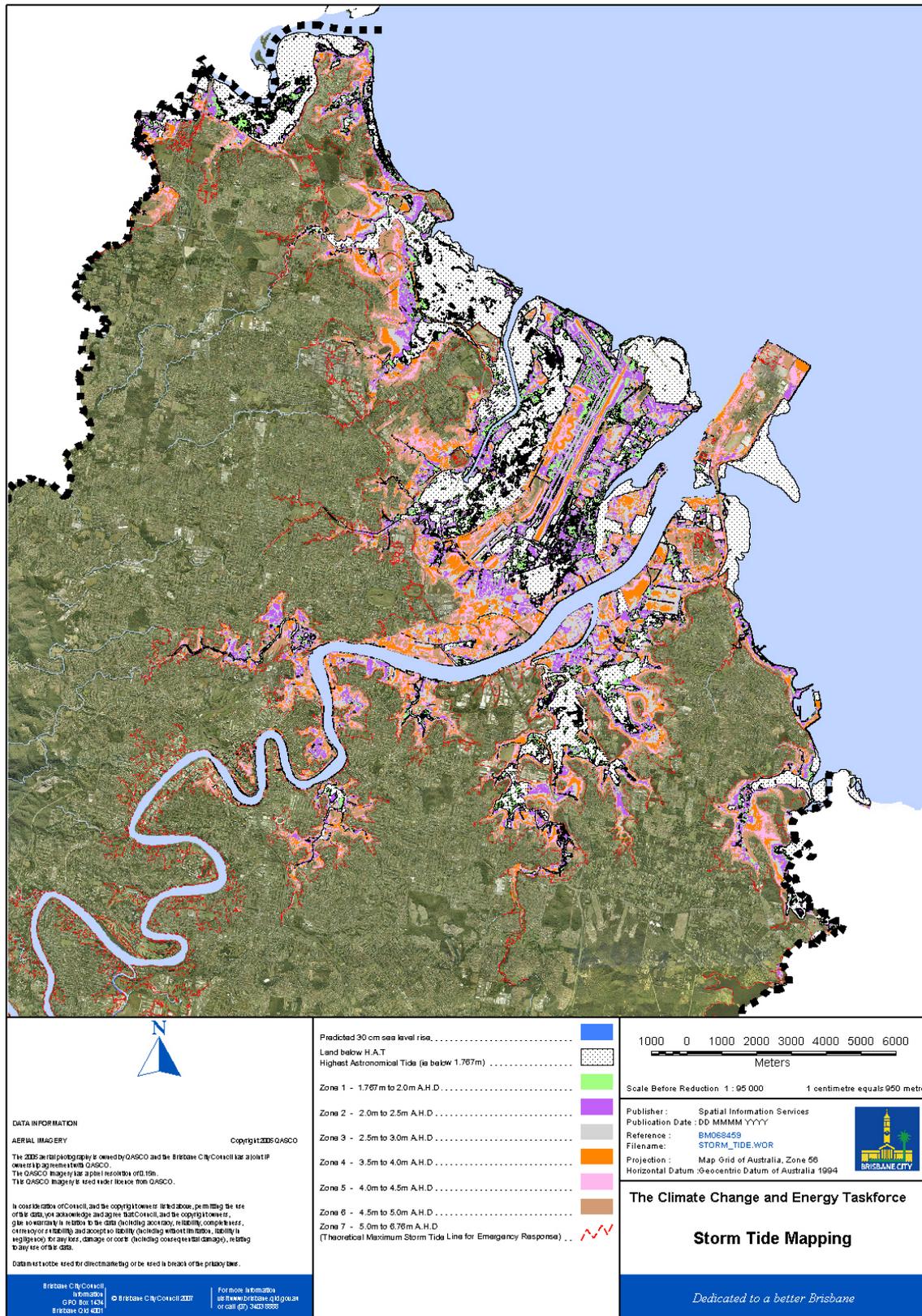


Figure 6 Map of Brisbane showing theoretical inundation due to storm tide

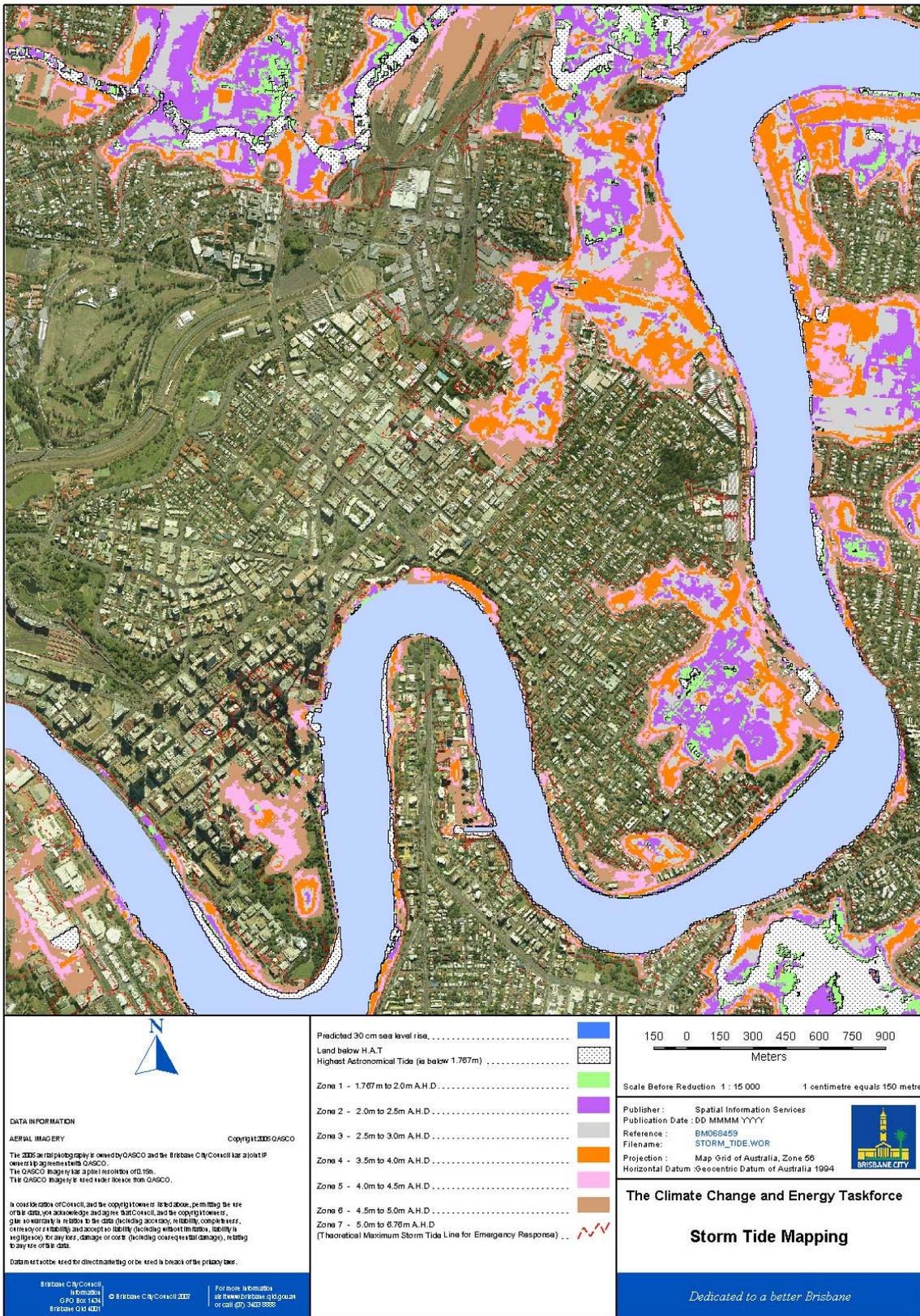


Figure 7 Map of Brisbane CBD and fringe showing theoretical effect of storm tide

4.3 Peak Oil

As discussed in the previous section, climate change will have a wide range of impacts on Brisbane. Peak oil is different in that it is basically about the change in one variable in the economy, namely oil price, and the direction of that change will be upwards. However, this one change will have multiple flow-on implications throughout the economy and society. Availability of oil-derived products like petrol may also emerge as a factor.

The most direct change will be the increase in price for petrol and diesel – petrol being the current dominant source of energy for people movement, and diesel being the dominant fuel for freight movement. Fluctuations in fuel price will continue, but the long-term trend will be upwards. The short-term volatility may confuse residents as they make decisions about their living and travel patterns.

Even though people around the world only really started using oil about 100 years ago, most societies have become economically and socially dependent on the commodity in that short time. Adding some complexity to this situation is the fact that the oil resource is not just a transport fuel. It is also a feedstock for many products such as fertilisers, asphalt, adhesives, plastics, textiles, tyres and contact lenses (Nielsen 2006). Brisbane does have one advantage in that fuel oil is not used for heating in the city as it is in many others.

Petrol price has been topical, especially with the sharp increase in prices that occurred in 2006 (see Figure 8). These high prices caused people to think about their travel choices. Fuel efficient vehicles and public transport travel may have become more popular. Events like this and the oil supply constrictions that occurred in the 1970s reveal how important oil is to Brisbane and they suggest how lifestyles might change as a result of high oil prices or supply disruptions.

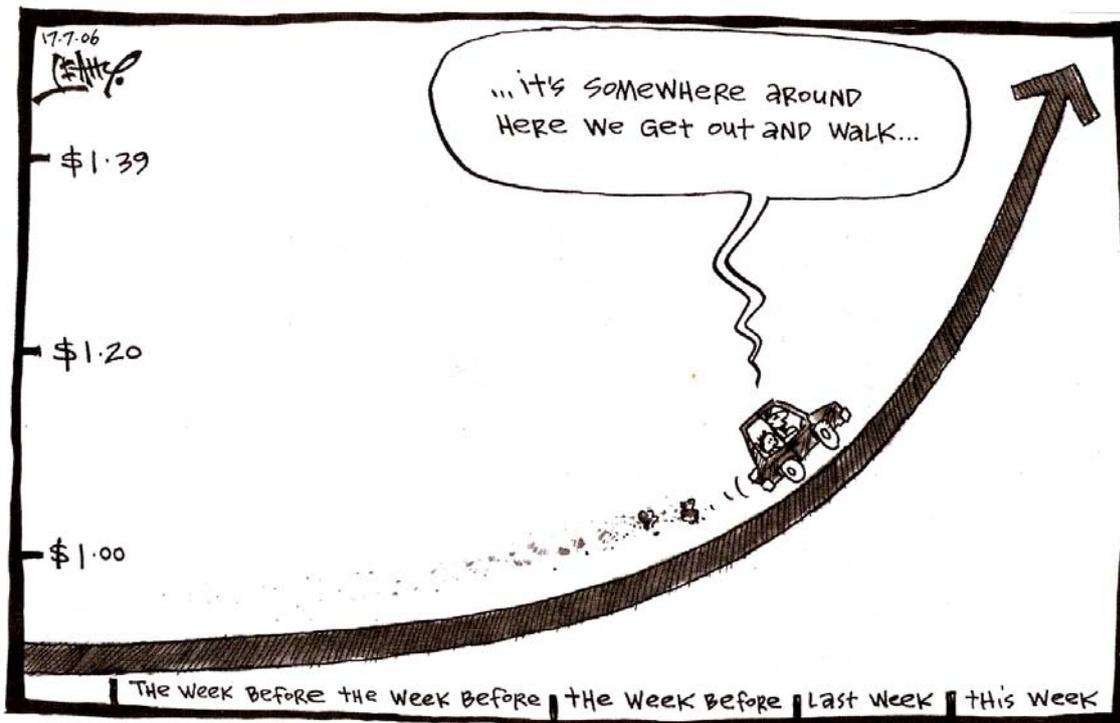


Figure 8 'Leahy's View' from the Brisbane Courier Mail, illustrating the possible effect of exponential increase in oil prices

Several reports similar to this Taskforce report, notably the Portland (Oregon) Peak Oil Taskforce, have delved into great detail about what the flow-on implications of peak oil will be (City of Portland Peak Oil Taskforce 2007). Although compelling, these analyses are necessarily speculative to some degree. For example, it is difficult to predict what innovations will arrive to aid adaptation to expensive or unavailable oil. Nonetheless, it is the opinion of the BCC Climate Change and Energy Taskforce that no 'magical' solutions will arrive to permit a smooth transition to, for example, alternative fuels.

The following assessment of Brisbane's vulnerabilities will identify and discuss likely priority issues for Brisbane, indeed drawing on the thinking contained in the Portland report and others. However, it will go in to less detail. This Taskforce's aim is to raise the issue and provide some discussion, but recommend that BCC undertake further detailed studies into vulnerabilities and adaptation. The Portland report remains an excellent reference and the Taskforce commends it to interested Brisbane residents.

Urban form issues

Like many cities, Brisbane has developed in a low density form since the middle of the last century. This form of development went hand-in-hand with reliance on private motor vehicles for personal transport. The shape of our present city largely demonstrates this reliance on cars and roads. In some estates it is very difficult to do anything (e.g. shop or attend school) without driving.

Formal strategic and local and regional planning has been addressing this decentralised pattern of development for reasons other than peak oil for many years, with mixed success. Transit-Oriented Developments (TODs), higher densities near transit stations and urban renewal of inner city areas have featured in formal planning, but oftentimes economic structures (e.g. the extra cost of building units versus detached houses) and traditional housing preferences work against these planning initiatives. Peak oil has the potential to strongly and quickly reinforce the planning intentions to increase densities. TODs, which are very difficult to make happen without strong investment and leadership by governments, are likely to become more viable and attractive to investment. Peak oil will magnify, accelerate and reinforce the need for and the viability of more efficient land-use and transport patterns. Of course the corollary is that well-located properties will become more expensive.

Very broadly, land values tend to decrease with distance from the Brisbane CBD (aside from special locations such as riverfront). Consequently, those less able to afford housing have bought or rented in the outer suburbs, even beyond Brisbane's borders in adjacent local government areas. These outer-lying suburbs have less access to employment and fewer services (notably public transport) than inner suburbs. As oil price climbs, these people will simultaneously face difficulty in accessing employment, education, recreation, etc., and be unable to afford to move to more desirable locations because of rapidly increasing prices. Peak oil will exacerbate 'locational disadvantage' for these residents.

As the planning authority, BCC will need to direct its policies, planning instruments and development assessment practices toward facilitating a more compact and efficient urban form. It will be helpful in future planning exercises to imagine how a land use plan would work if it were not possible to use private motor vehicles. Council will need to integrate sustainable transport into its land use planning, giving public transport priority on the roads and in accessing destinations, as well as expanding pedestrian and cycling facilities and access. The Taskforce's message to Council is that although it has been moving in these directions for some years, the combined phenomena of peak oil and climate change will elevate the urgency of effective integrated transport and land use planning. As always with planning, the challenge is in turning the plans into on-the-ground outcomes.

Another dimension to this direction in planning is managing these changes for the city. With peak oil, there is a prospect of rapid change to higher density living and concentration of population around nodes. This reflects the intent of planning, but the rapidity of this change could stress the planning and Council regulatory systems.

Higher density living also brings with it an array of issues including noise, traffic (at least while petrol is still affordable) and pollution from a close mix of residential, commercial and light industrial land uses. A rapid transition would magnify these issues unless they are well managed.

Finally, there are metropolitan-wide land use considerations that require attention. Peak oil will increase the cost of food - one adaptation strategy to which is to produce more food locally. However, dispersed urban development that continues to occur within Brisbane and its surrounds is replacing former agricultural land with housing. Peak oil also raises questions about the long-term viability of major infrastructure that is associated with the present dependence on diesel and petrol, such as industrial areas that only have road access.

Economic and business vulnerabilities

Peak oil will require Brisbane firms and the city's economy to adjust to increasing costs, changes to the advantage of locations, labour supply difficulties and different freight modes. Oil price increases will translate into business input cost increases, which will be passed on throughout the chain from raw materials to end consumers. They will also affect businesses' access to labour given the potential extra costs of getting to work and desirability of some business locations.

If prices rise rapidly - as the oil production bell curve steepens downwards – unexpected cost increases could cause market stresses on existing businesses leading to unemployment. Even with a smoother oil price increase, there will be an adjustment period to factor-in new cost structures, demand for products and services, and upstream supplier issues (e.g. raw materials and semi-processed goods). These adjustments could entail significant economic and social disruptions.

Approximately 90 per cent of freight movement in Brisbane has both an origin and a destination within the Brisbane Metropolitan Area. Within the metropolitan area, less than five per cent of freight is moved by rail or water, with more than ninety per cent travelling by road (BCC 2001). To keep inventory levels low, businesses have adopted the 'just-in-time delivery' strategy, but it relies heavily on road freight movements. Peak oil is likely to impact heavily on freight operations. These impacts could be mitigated by making rail freight a more viable option for Brisbane firms.

Air travel for people and goods may become unaffordable. It also has significant climate change implications that may further affect its desirability. A reduction in the movement of passengers and goods by air would be a major change to Brisbane's economy and the investments that have been made in airport-related facilities. Air travel is also a typical part of business operations in the more globalised economy; business people may become less frequent flyers.

Trade growth has been a cornerstone of Brisbane's economic planning. Unfortunately, peak oil has the potential to make distance to world markets a more significant factor than it was assumed to be in the formulation of these trade-focussed plans.

Social vulnerabilities

Those who can least afford it are likely to be most affected by peak oil. The structural changes in the economy due to peak oil will increase social disadvantage generally. The increases in commodity prices (e.g. petrol, food), will be compounded by a reduced capacity to adapt, for example as a result of unemployment.

If marginal populations located in areas with poor transport access suffer occurrences of unemployment, it will be even more difficult for these people to find employment due to the cost of travel and the need to find work with affordable access.

Disadvantaged populations may face further difficulties. Food price will increase, and the variety of food available may decrease. This could cause deterioration in diet and nutrition. As well, travel to school may become an impediment to consistent attendance for children from less affluent backgrounds. Moving into areas with better transport access is unlikely to be a viable solution for these people in the absence of effective social housing policies, because better located dwellings will become even more expensive.

Dodson and Sipe (2005) completed an assessment of the vulnerability of Metropolitan Brisbane suburbs to oil price increases. They developed an index using census data based on existing levels of social disadvantage, household motor vehicle ownership and current dependence on motor vehicles for work trips. This enabled them to prepare a map of vulnerability, which the Taskforce has included here as Figure 9. The red areas are most vulnerable and the dark green areas are least vulnerable.

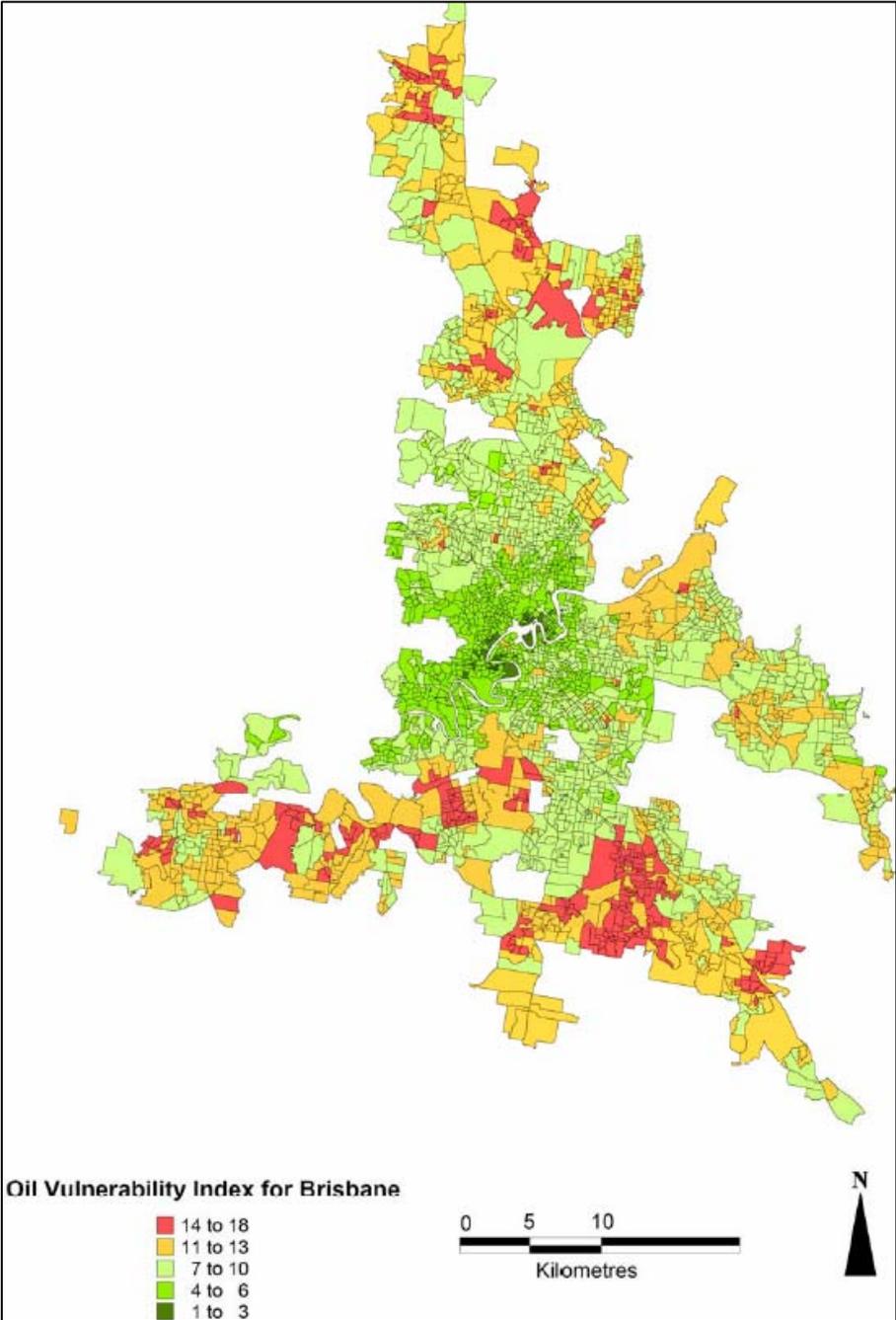


Figure 9 Map of Dodson and Sipe's (2005) oil vulnerability index for metropolitan Brisbane

Direct implications for council business

As the largest Council in Australia, serving approximately one million people, including water supply and the bus service, BCC is a large 'business' in its own right. Peak oil will have an array of direct impacts on Council's operations for which it would be wise to anticipate and prepare. Figure 10 illustrates council energy use by fuel type – a total of 2.1 million gigajoules per year. As with other businesses, there will be an overall increase in input costs. Council will have to consider passing these costs on to ratepayers, or acting to minimise costs.

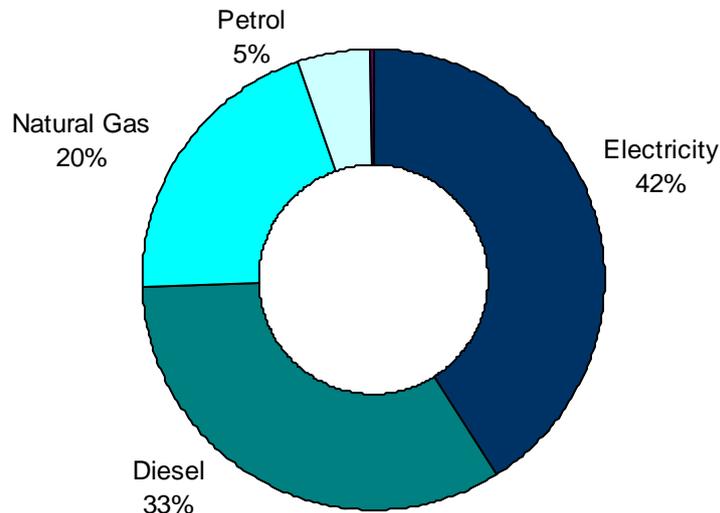


Figure 10 Breakdown of BCC's Energy Use by Fuel Type

Brisbane Transport would be the service most affected by peak oil, both in terms of coping with rapidly escalating demand, and in diesel price pressure. Council's decision to move towards Compressed Natural Gas (CNG) buses will assist in reducing fuel price pressure. Brisbane Transport will also have to address changing demand patterns. For example, shift workers who normally drive on congestion free roads may be seeking public transport access for work as petrol becomes unaffordable.

There will be increased demand for community development services, following the increases in social disadvantage discussed above. Other services may have to adjust to changing community behaviour patterns; for example, 'regional parks' that people normally drive to, may not meet the community's recreational needs. Council may also have to intervene more to manage local amenity impacts associated with higher density living. Finally, as a road-builder, Council will face price and supply difficulties with asphalt and bitumen, which are oil-based.

4.4 Greenhouse Gas Emissions

In addition to Brisbane's vulnerabilities to climate change discussed in Section 4.2, Brisbane is also vulnerable to the way the world responds to climate change by reducing greenhouse gas emissions. Some of Brisbane's characteristics such as low density, car dependence and coal-fired electricity mean that efforts to control greenhouse gas emissions could hit hard.

At the heart of any response to mitigating climate change is the control of greenhouse gas emissions. The Kyoto Protocol established mechanisms to track and reduce greenhouse gas emissions within mandatory national targets including carbon emissions trading. Although Australia did not ratify this protocol, Kyoto only covers the period from 2008 to 2012 and it is likely that Australia will participate in the next phase. It is also possible that Australia will commence emissions trading sooner to bring it into line with other countries.

Participation in emissions trading would mean that a 'price' would attach to the carbon in fossil fuels. It would also require an accounting and regulatory system like the tax system to ensure carbon transactions are fair and proper. Adding a price to carbon would mean there would be a series of cost-related impacts similar to the peak oil discussion above. However, as with peak oil, there is a clear advantage to acting quickly to reduce greenhouse intensity (oil dependence in the case of peak oil). Reducing greenhouse intensity would limit the impact of greenhouse gas regulations, carbon trading or taxes on Brisbane. The Taskforce has recommended an ambitious target to set Brisbane on a course to substantially reduce its risk profile on carbon intensity.

4.5 Links to Policy Responses

The overlapping implications of climate change and peak oil allow for integrated responses. The Taskforce believes this is where Council should concentrate its efforts – on those actions where it will achieve multiple benefits for these issues, as well as broader social and economic outcomes.

The Taskforce's Final Report demonstrates that there are numerous actions that the Council could consider taking on its own and in partnership with the community, business and government. The range of actions proposed span short, medium and long time-frames as well as low to high costs. Some actions would actually be revenue positive, though Council will need to apply this revenue to pay for related actions.

'The ultimate goal is a future city that adapts to climate change, copes with peak oil, reduces greenhouse gas emissions and becomes more sustainable.'

5.0 Strategy

5.1 Outcomes

The overall goal is a future city that adapts to climate change, copes with peak oil, reduces greenhouse gas emissions and generally becomes a more sustainable city. To achieve this goal, the community needs to be well informed and engaged, exemplify sustainable lifestyles, and be safe and healthy. The local economy must be robust and well positioned to capitalise on the opportunities and Brisbane must be recognised as a world leader in sustainability and reducing greenhouse gas production.

5.2 Greenhouse Gas Emission Reduction Targets

Setting goals for the reduction of greenhouse gas emissions is a key part of any climate change and energy strategy. The most familiar targets are those associated with the Kyoto Protocol. Even though the Australian Parliament did not ratify the Kyoto Protocol, the Commonwealth Government committed to achieve its Kyoto goal to limit its emissions to only eight per cent above 1990 levels over the 2008 to 2012 period.

Cities around the world have set targets for their communities. Following one of the early international conferences on climate change in Toronto, many cities adopted 20 per cent reduction targets. BCC's first target was established with the Lord Mayor's Environmental Vision in 1991, calling for a reduction in greenhouse gas emissions of 20 per cent based on 1991 levels. Later, following significant advances in understanding greenhouse gas pollution, Council adopted a target to stabilise greenhouse emissions at year 2000 levels by 2010 in the 2001 Sustainable Energy and Greenhouse Action Plan (SEGAP). Most recently, the *Living in Brisbane 2026* document set a target of a 50 per cent reduction in greenhouse emissions between 2006 and 2026.

The current global scientific consensus (from the work of the IPCC) is that the world will have to reduce greenhouse gas emissions by 60 per cent from 1990 levels by 2050 to stabilise the level of greenhouse gases in the atmosphere. However, the 60 per cent does not account for the fact that countries like Australia already emit far more per person than less developed countries. Accordingly, Australia would have to make a greater contribution to reducing global emissions per capita to reach a target that approaches an equal share of emissions for all people. The approximate reduction accepted for affluent countries like Australia and the United Kingdom is 90 per cent.

SEGAP estimated Brisbane's 1990 emissions at 9.15 million tonnes (Mt) per year. It follows that the target for Brisbane in 2050 should be only approximately one million tonnes of greenhouse gas emissions per year. Figure 11 plots the trend for the City of Brisbane until 2006, and then plots a curve that would turn-around the city's emissions and reduce them to the required level of 1 Mt/y by 2050. To work towards this target, the city needs to first ensure that emissions do not grow any further. Then it must achieve interim goals of 16 Mt by 2015, the *Living in Brisbane* goal of 9.3 Mt by 2026 and 5 Mt by 2035.

Looking at the slope of the exponential trend between 1990 and 2006, and recognising that population has been growing at approximately 10,000 people per year, it is clear that a fundamental change in the way we use energy and produce greenhouse gas emissions is urgently required.

Figure 11 also shows what the Kyoto target would look like if it were interpreted for Brisbane (i.e. an average of 9.4 Mt over the years 2008 to 2012). The Commonwealth Government claims that Australia will meet or get close to its Kyoto target, due mainly to anticipated reductions in land-clearing. Figure 11 shows that Brisbane is not currently making a proportional contribution to meeting Australia's Kyoto target.

To help the city achieve its target, citizens should aim to have zero greenhouse gas emissions from their households by 2020. Households emit about 15 tonnes per year presently, including each car contributing an average of about 4 tonnes. Citizens can achieve this by saving electricity and fuel, buying green power and offsetting any residual emissions by buying carbon credits (e.g. for storing carbon in trees).

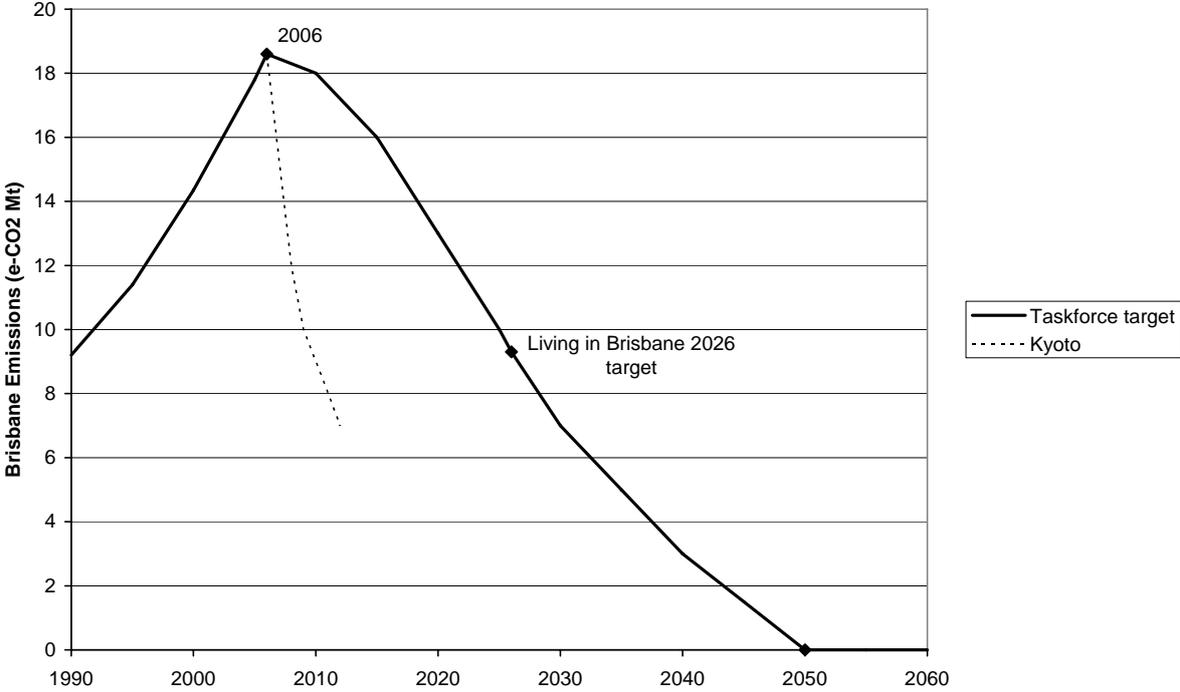


Figure 11 Annual greenhouse gas emissions attributed to the City of Brisbane until 2006 and the required future target levels to reduce the city’s emissions to one million tonnes per year

In the course of its deliberations, the Taskforce had considered a wider range of targets, which were to be known as ‘20 by 2020’ to capture public imagination. Ultimately, the Taskforce decided that it did not have sufficient background data to set these goals appropriately, and it was important to shift some additional emphasis towards adaptation to climate change and peak oil effects. The possible 20 by 2020 targets that the Taskforce considered were:

- 20 per cent of transport fuels non-petroleum sources (n.b. the Taskforce ultimately recommended a more stringent target than this)
- 20 per cent of electricity from renewable sources
- Additional 20 per cent vegetation cover for the region
- 20 per cent of domestic water from rain or ‘grey water’
- 20 per cent absolute reduction in water consumption
- 20 per cent increase in residential density across SEQ
- Additional 20 per cent of houses using solar or gas hot water
- 20 per cent of urban travel on public transport
- 20 per cent of urban trips on bicycle or foot
- 20 per cent of CBD road space pedestrianised.

5.3 Strategic Approach

The Taskforce considered a series of overall strategies that Council may wish to consider in preparing its response to climate change and peak oil. The strategies are a combination of general areas of activity, concepts and policy approaches covering leadership, decision making processes, education, land use planning, conservation, research and sustainable transport.

The taskforce selected 'Leadership' as the first strategy because it was apparent from past successes that Council has an influential position within government and the community and is able to set and lead agendas for change. The diverse activities that Council undertakes also provide the opportunity for Council to lead by example. The Taskforce has combined 'partnering' with the concept of leadership because it recognised that Council could gain greater benefits from its actions by working closely with other parties and agencies. Partnering will enable the Council to extend its influence, consider the perspective of others and build more robust and effective solutions through collaboration.

Council has become aware of climate change and peak oil as pressing issues for which it needs to develop a response. However, there is a fundamental difference between being aware of a problem and doing something about it. The Taskforce recognised the need for Council decisions at all levels to consider climate change, peak oil and sustainability and it has proposed a range of significant enhancements to Council's decision making processes to achieve this.

A comprehensive and integrated approach to 'communication and education' is recommended as an integrated part of any Council response. In times of crisis or natural disasters, effective communication from authorities such as Council can maintain calm and bring the community together. Council can also advance the community's understanding of the range of issues related to climate change and peak oil and consolidate these messages broadly under the idea of sustainability. Finally, Council can apply social marketing techniques (similar to anti-smoking campaigns) to influence specific desired behaviours.

Council is the lead agency for land use planning in the city and it is extensively involved in planning for and delivering transport infrastructure and services. Accordingly, the Taskforce identified 'strategic and land use planning' and 'sustainable transport' as central strategies. Council's land use planning influences the broad shape of the city as well as its detailed urban design. The link between planning and transport is critical to the city's adaptation to peak oil and climate change. Brisbane's transport system is highly dependent on petroleum fuels, which will be subjected to increasing prices and each litre consumed releases greenhouse gases.

The Taskforce organised a range of measures under 'preparedness for change, emergencies and surprises'. This strategy seeks to build-up the city's resilience and response capability for future challenges that cannot be precisely predicted.

The effects of climate change include reduced reliability of access to water and changes to habitat and habitat ranges for species. Although Council is only one among many influential authorities in these areas, it is an important stakeholder (e.g. it is the largest electricity customer in SEQ and is also responsible for selling water). Therefore, the Taskforce has proposed an overall strategy of 'diversification and conservation of natural resources'.

Finally, the Taskforce proposed a 'research' strategy to account for the emerging knowledge in this area and the need to generate innovation and entirely new ways of thinking. As well, the Taskforce does not have all the answers for Council – as a city and a community, we must continue to learn and explore solutions.

‘The Taskforce does not have all the answers for Council – as a city and a community, we must continue to learn and explore solutions.’

6.0 Recommendations and Actions

In this section, the Taskforce has presented to Council a series of policy recommendations that it believes can direct the city toward the necessary change of course to adapt to climate change and peak oil.

The purpose of the recommendations is to sponsor an open debate about the community's most appropriate and effective responses to these critical issues over time and to integrate those responses into Council's strategic planning processes.

The Taskforce calls on Council and the residents of Brisbane to engage in an open and vigorous debate on the issues that this report has raised, and to consider the program of actions it has proposed in its recommendations. However, this document is not an implementation plan for Council. Council will need to develop its own response and adopt the Taskforce's recommendations as it sees fit.

These recommended actions have varying time horizons and costs for implementation. The summary of recommendations in Table 1 provides a broad indication of the benefit and cost of actions, together with indicative timing. The detailed recommendations below should be read in this context.

The Taskforce notes that it was beyond its scope to undertake a detailed costing of the policy ideas that it has put forward, though it hopes that they will be useful in Council's determination of policies to be implemented. Nonetheless it realises that they come at a cost. An appropriate analysis of cost would compare the cost of early adaptation with late adaptation, and consider the full range of benefits (and costs) that may attach to a policy recommendation.

6.1 Leadership and Partnering

Leadership

Change will inevitably occur in Brisbane from climate change and peak oil, but we have a choice about how we manage that change. We can take action now to anticipate climate change and peak oil and adapt, or we can postpone action and be forced to adapt later at far greater cost. The Taskforce is unified in its view that Brisbane would be better off as a whole, if it were to anticipate and adapt early, rather than having to react at a later time.

A key challenge to action is that the inconvenience and cost of acting now is apparent, however, the consequences and costs of postponing action are hard for people to visualise or believe. This can make it difficult for people to accept the need for change or to make positive steps towards solutions.

In general, people fail to adapt to new and unsettling situations by employing avoidance mechanisms, such as:

- Blaming others and finding scapegoats
- Externalising 'the enemy'
- Denying that a problem exists
- Jumping to conclusions
- Finding a distracting issue (Heifetz 1994).

Firm leadership is required to help the community engage in dialogue about the problem and participate actively in finding solutions.

BCC's elected representatives and professional staff are in an excellent position to influence others positively by demonstrating leadership. The Taskforce see this as entailing:

- Helping the community engage with the problems
- Articulating a clear vision
- Enticing those outside of Council's direct influence to join the effort
- Inspiring action
- Leading by example.

BCC is particularly well placed to lead by example, being such a large and influential government. The breadth of its activities gives it opportunities to lead by example in nearly every area of adaptation and mitigation. Council's position in society and the economy also allows it to exert influence on numerous players, thereby leveraging Council's direct powers.

A past example of this is BCC's decision to buy the new low-pollution form of diesel called ultra-Low Sulphur Diesel (ULSD). Because of BCC's decision (which added cost to the bus fuel bill), BP decided to sell only ULSD in Queensland, thereby magnifying Council's clean air initiative.

Partnering

All individuals, businesses and government agencies will be affected by climate and peak oil risks. It therefore follows that all have a common interest in adapting to climate change and peak oil, including adjusting to the necessary worldwide efforts to reduce greenhouse gas emissions. Finding the common ground amongst interested parties and presenting a united front will be the key to partnering.

As we move into the future and encounter the worsening effects of climate change and higher and more volatile oil prices, the challenge will be avoiding conflict and blame between stakeholders, and working together for the common good.

The power of partnering should not be underestimated. The benefits of any actions will be magnified by parties working together and will enable the development of more holistic and cost effective responses. It will also assist in gaining public support, particularly if elected representatives are seen to be united in their efforts.

As the largest local government in Australia, Council is an influential organisation, which can undertake a number of direct actions within its control to demonstrate to other governments and businesses what can be achieved. It can also extend its influence through developing effective partnerships. Natural partners would include:

- The Premier and State government agencies
- Other local governments through the SEQ Council of Mayors
- Businesses that are at risk from climate change or peak oil, or those that may be able to innovate and take advantage of opportunities
- Interest groups that are addressing these issues (e.g. the Green Building Council of Australia).

Recommendation 1

Pass a resolution of full Council to adopt a series of ambitious targets to focus the attention of the community and Council on the challenge the city faces.

Recommended targets are:

- a) Zero net greenhouse gas emissions per year from Brisbane by 2050.
- b) Interim targets limiting greenhouse gas emissions to 16 Mt by 2015, 9.3 Mt by 2026 and 5 Mt by 2035.

- c) With reference to the rate at which known oil reserves are being depleted, reduce mineral oil consumption for the city as a whole by at least 50 per cent by 2026.
- d) Zero net greenhouse emissions from households by 2020, including private car use.
- e) A 'zero emissions' target (net) for BCC operations, following Council's 'zero harm' workplace health and safety campaign, to be achieved as soon as possible.
- f) A series of targets determined based on current trends, objectives and policies similar to the '20 by 2020' targets that the Taskforce considered (see above).

Recommendation 2

Council should lead by example and use its position of leadership to influence others to follow in meeting the challenges of climate change and peak oil, particularly through the Council of Mayors and by developing partnerships with a wide range of business, industry and community groups.

Action items:

- a) Work towards gaining AGO 'Greenhouse Friendly' certification for Brisbane Water, Brisbane Transport and other Council business units.
- b) Extend Greenhouse Friendly certification regionally to all SEQ water and transport authorities.
- c) Establish a Climate Partnership program similar to the Seattle program (a voluntary pact among Seattle-area employers to take action to reduce their own emissions, and to work together to help meet the community-wide goal), but connecting to the Australian Government's Greenhouse Challenge program and extending it region-wide.
- d) Commence discussions with home and business insurers about 'weather insurances' to plan ahead to make sure Brisbane homes and businesses are always able to obtain and be protected by affordable insurance.
- e) Develop a strong working relationship with the Green Building Council and ASBEC (e.g. ensuring Council officers have time to actively participate), to ensure rating tools are relevant to SEQ and effective.

Recommendation 3

Develop partnerships with the Queensland and Commonwealth Governments to achieve policy changes.

Priorities for State policy change include:

- a) Establishing and empowering a clear lead agent for State Government leadership on climate change.
- b) Creating a State round table for sustainability, including responsibility for climate change and peak oil adaptation.
- c) Funding adaptation measures such as relocation of buildings and infrastructure from high risk areas as necessary.
- d) Reducing the carbon intensity of electricity generation.
- e) Supporting the CitySmart Regional Carbon Sink by committing agencies to use the greenhouse offset mechanism, and providing technical and legislative support as necessary.
- f) Providing incentives for fuel efficient vehicles.
- g) Further strengthening building code requirements for energy efficiency and sustainability and extending them to multi-unit development and existing homes.
- h) Accelerating the move towards efficient public lighting.

Priorities for advocacy to the Commonwealth Government include:

- a) Establishing a National Sustainability Commission reporting to a senior minister.
- b) Recognising heatwave hazard as a Natural Disaster event.
- c) Fixing tax arrangements for vehicles that currently serve to encourage fuel wastage and remove tax and other barriers impeding adoption of biofuels.

- d) Incorporating sustainability and enhanced weather protection provisions into the Building Code of Australia and plumbing codes for all classes of buildings.
- e) Increasing the Mandatory Renewable Energy Target and associated penalties.
- f) Accelerating the phasing out of inefficient technologies from Australian markets.

Recommendation 4

Plan to capture the economic development opportunities that come with addressing the challenges of climate change and peak oil and make Brisbane a model of sustainable living; for example, by seeking to attract and retain sustainable industries (i.e. alternative water technology, biofuels, etc.)

Recommendation 5

BCC should invest in sustainable energy alternatives to power its own operations in significant and visible ways.

Potential action initiatives:

- a) Install solar PV and solar hot water panels on Council buildings and infrastructure, focusing on high-visibility locations.
- b) Expand Council's involvement in energy from waste (landfill and sewage methane and greenwaste).
- c) Partner with land owners and industry to have wind turbines installed in effective locations (e.g. coastal or elevated positions).
- d) Partner with electricity retailers to assist them in promoting green power products (e.g. an option for households and businesses to sign-up to green power prominently on their rates notices).
- e) Set an average fuel efficiency requirement for all City Fleet passenger vehicles, including executive vehicles (e.g. 10 L/100 km), and reduce over time to less than 5L/100km by 2026.

Recommendation 6

Council should assess the implications of climate change and peak oil for all of its facilities and infrastructure and implement measures to increase the city's resilience to potential consequences.

Action items:

- a) Undertake a comprehensive assessment of the impacts of climate change on BCC infrastructure;
- b) Implement measures to protect facilities at risk from storm surge or sea level rise where appropriate.
- c) Relocate *essential* community facilities to low risk areas or introduce physical adaptations.
- d) Examine the sensitivity of Council operations to fuel availability and price.
- e) Assess the functioning of existing and planned transport infrastructure under carbon constraints and higher and more volatile oil prices.

Recommendation 7

Council should continue and strengthen its leadership in South East Queensland in increasing water security by planning for a future climate with less certainty about water availability.

Action items:

- a) Identify opportunities within Council buildings to innovate and incorporate water efficiency and source substitution.
- b) Carefully track all Council water use through the Energy Information and Management System.
- c) Take the initiative with alternative water sources including recycled water, rainwater and greywater.
- d) Make a commitment to continue the drought strategy group as an ongoing function of Council.

6.2 Decision making

Real change will require a fundamental shift in decision making processes to ensure total integration of sustainability principles into Council decisions. If Council accepts the challenge to reduce greenhouse gas emissions demand immediate, determined and sustained action, then it must embrace an overall corporate change management process. This is one of the most important recommendations, as it is within Council's power to immediately start changing the way it makes decisions and decides on alternatives.

The change management process needs to evaluate the necessary changes in mindset, thinking, planning and concentration for the City to succeed in addressing climate change and peak oil, and apply proven change management techniques to align Council's efforts accordingly.

Fortunately, Council already has a Corporate Sustainability Policy that provides an initial basis for the change (see Appendix F).

Recommendation 8

Fully integrate sustainability into Council decision making processes at all levels and promote integrated and future-focussed decisions. Use available means of influence to focus the attention of Council staff and suppliers on sustainability, climate change and peak oil.

Action items:

- a) Initiate discussions with the State regarding further embedding sustainability in local government legislation.
- b) Develop decision support tools to enable staff at all levels to frame proposals and decisions in the context of sustainability and take into account climate change and peak oil.
- c) Plan for budget implications and provide mechanisms to ensure the future-focussed dimensions of decisions are effectively considered.
- d) Quantify and build-in the true costs of greenhouse emissions and long-term resource consumption into financial analyses.
- e) Incorporate sustainability into BCC's Corporate Values.
- f) Educate staff and elected representatives about the implications of climate change and peak oil adaptation and incorporate these topics in employee inductions.
- g) Develop performance expectations in relation to the Corporate Sustainability Policy and climate change and peak oil risk management for Council executives, facility managers, enterprise bargaining agreements, staff planning for performance agreements, suppliers and contractors.
- h) Include the consideration of and reporting on sustainability as part of normal Stores Board processes.

Recommendation 9

Recognising the magnitude of the impacts on Brisbane, the Taskforce has identified the need for a strong body to provide guidance for Council. The Taskforce recommends that Council set up an ongoing body and appoint a strong and independent leader to facilitate integrated decision making for urban and infrastructure development. The Taskforce hopes that such a body would be as successful as the Urban Renewal Taskforce.

Features of this body may include:

- a) An advisory board of directors including business, government and services sector representation;
- b) Reporting to Civic Cabinet;
- c) A complement of staff and recurrent budget;
- d) A brief to cross boundaries within Council and develop partnerships between Council and the outside world; and

- e) Capability to facilitate Transit Oriented Developments (TODs) including direct investment by Council where necessary to catalyse TODs.

6.3 Communication and education

Community education and awareness raising are cornerstones of the approach that the Taskforce recommends for Brisbane. A strong social fabric, preparedness through education and excellent communication will greatly enhance Brisbane's ability to cope with local changes, as well as contribute to a global solution to greenhouse pollution. Communication and education will play important roles in:

- Developing robust approaches to dealing with climate change and peak oil by ensuring community involvement in the ongoing development of responses;
- Sharing information that is important for community members to know (e.g. about potential effects on property);
- Contextualising Council actions to build a shared understanding of the need for difficult decisions (e.g. water price increases or new regulations);
- Undertaking social marketing activities to encourage or change specific behaviours.

Community education must form part of an integrated strategy and is not a substitute for necessary regulations or investments. Community education requires significant effort and sustained commitment, however it will only work as part of a suite of measures.

Council already has experience in effective techniques of community-based social marketing, such as with the transport cafés it has run in shopping centres to provide individualised information to people about their personal transport options. It should continue to draw on this expertise. The Taskforce considers that Council has a special opportunity to undertake an ongoing conversation with the community about these issues through its councillors and the Lord Mayor.

Recommendation 10

Council should establish a significant umbrella communication and branding program (i.e. meta campaign) for public awareness to communicate messages about sustainability, climate change, peak oil and other related issues in a holistic way.

Action items:

- a) Research baseline awareness and develop awareness and attitudinal targets for residents and undertake periodic surveys to track progress.
- b) Identify and refine key 'rich' messages using focus groups and pilot projects. The many potential topics for consideration include:
 - Understanding of climate change, peak oil and their impacts at a community and individual level
 - Overall explanation and rationale for specific behaviour changes (see social marketing below) and government policy and regulatory changes
 - Changing risk profiles associated with changed weather patterns
 - Heat-related illness, disease risks, precautions and symptoms
 - Effect of changing temperature range and rainfall patterns on gardens and bushland, including weeds.
- c) Partner with other interested public and private sector groups to pool communication resources, ensure consistency of messages and maximise the value of communication.
- d) Allocate sufficient budget to support television or radio advertising and leverage through media partnerships where this would maximise rather than restrict coverage.
- e) Link to broader community initiatives.
- f) Gain agreement amongst elected representatives at all levels that certain messages will be standardised and agreed to enable maximum public benefit from media contact.

Recommendation 11

Undertake carefully crafted and targeted, individualised and community-based social marketing efforts designed to achieve specific behaviour changes.

Action items:

- a) Establish a calendar of monthly behaviour change messages to be promoted by public figures (i.e. the Lord Mayor, councillors, partners, etc.).
- b) Identify priority behaviours to be targeted and ensure they are related to the umbrella marketing campaign.
- c) Work with primary and secondary schools to enable them to participate and provide fun opportunities for school children to get involved.
- d) Priority areas of behaviour to be targeted include:
 - Sun smart, heat stress, how to stay cool and increasing thermal comfort
 - Safer food production and storage for local business and communities
 - Active travel and public transport use (reducing car dependence)
 - Enhanced water security for homes and businesses (i.e. greater efficiency and source substitution)
 - Emergency preparedness
 - Locational decisions such as living close to work and avoiding flood areas
 - How to save energy and water and reduce waste
 - Purchase of green power and greenhouse offsets.

6.4 Strategic and land use planning

Planners have been aware of the potential implications of climate change for some time, and some basic considerations have been included in planning schemes. Peak oil is a more recent consideration. On the surface, peak oil adds further weight to the arguments to favour public transport, walking and cycling. Beyond this, there are additional planning considerations including potentially isolated communities, stranded infrastructure and local food production.

Planners and councils have tended to think about climate change as a distant future issue, and less important than other pressing matters such as managing growth pressures. Now, not only is climate change more pressing, but it is clear that the decisions we make about urban form now, will survive decades into the future, in markedly different climatic conditions.

There are a variety of issues that require a planning response, including flood and storm surge exposure, provision of shade and weather protection and providing incentives for sustainable development.

In many cases, plans are heading in the right directions – they just require far greater commitment and follow through. Fundamentally, BCC has a responsibility to the people of Brisbane to use its land use planning powers to ensure the future welfare of its citizens.

An integrated solution that has the potential to provide community, economic and environmental benefits is the encouragement of Transit-Oriented Developments (TODs), which can serve as mixed use urban villages. Council's efforts should change the trend in Brisbane development towards more compact and mixed use development (featuring TODs) that is well integrated with public transport, cycling and walking networks.

Recommendation 12

Combine Council's planning support for TODs with direct investment and regulatory intervention as necessary, obtaining a return on investment through subsequent land sales.

- a) Develop a holistic TOD strategy that goes beyond planning controls and focuses on removing barriers and taking advantage of opportunities to yield commercially viable and sustainable TODs;
- b) Ensure that TODs maximise sustainability in design including energy and water efficiency, rainwater harvesting and stormwater reuse and provide opportunities for urban agriculture;
- c) Where Council is directly involved, insist that TOD design account for higher winds, stronger storms, higher stormwater loads and high temperatures (e.g. through efficiently air-conditioned and well insulated community areas); and
- d) Discuss infrastructure needs for TODs with the State Government.

Recommendation 13

Account for climate change and peak oil in the upcoming major City Plan review and ensure that these planning instruments are used to their full potential for climate change and peak oil adaptation.

Potential action initiatives:

- a) Immediately develop a discrete package of interim amendments to City Plan that will upgrade the plan to address policy issues that are already well understood, such as:
 - Stronger safeguards against development in areas subject to flooding and storm surge
 - An interim further safety margin to the Q100 flood level
 - Mandatory rainwater tanks or stormwater capture for new residential, commercial and industrial development
 - Enhanced stormwater and flood-related infrastructure requirements
 - Specific climate change studies required for large-scale, impact assessable development
 - The need for additional shade and weather protection
 - Solar access for roofs and encouragement of embedded electricity generation, especially co-generation
 - Enhanced attention to walking and cycling planning and infrastructure in development
 - Higher quality and mandatory footpaths for all new development
 - Reduced minimum parking requirements wherever practical
 - The provision of bike lockers, showers and changing facilities
 - Greater integration of commercial development and public transport
 - Recognition for urban agriculture.
- b) Ensure that infrastructure charges plans incorporate the full costs of infrastructure development, and then consider providing transparent incentives to encourage sustainable development (e.g. the Sustainable Development Incentives Policy).
- c) Develop a means for extending the Sustainable Development Incentives Policy to building retrofits.
 - a) Increase the provision of shade and weather protection throughout the city with direct Council works (such as improved bus shelters and public spaces) and introducing City Plan amendments to influence new development.
 - b) Complete development of an urban agriculture strategy for Brisbane; actively promote urban agriculture and amend City Plan and Local Laws as necessary to reduce barriers to food production within the city.
 - c) Place greater emphasis on integration of public transport systems with key destinations including open space.

- d) Establish a policy of no net loss of vegetation through development and require satisfactory compensatory planting for any clearing, including a net gain in vegetation cover.

Recommendation 14

Change land use expectations in City Plan to anticipate aspects of climate change such as flooding and storm surge, as well as continuing to increase urban density to address peak oil. These issues must be addressed strategically in the Local Growth Management Strategy, with detailed provisions to be included in City Plan and Neighbourhood Planning.

Action items:

- a) Undertake a detailed study to map climate change risk bands for people and property across the city:
- Make the results public in a careful manner that provides people with additional information about how the risk bands were determined and what it means for them.
 - Incorporate the map into City Plan with associated policies to progressively reduce the proportion of the population at risk.
 - Develop a program in partnership with the Queensland Government to reduce the risk profile (e.g. local infrastructure upgrades and withdrawal from very high risk areas).
 - Consider increasing rates in high risk areas to reflect additional planning and emergency response requirements and draw attention to these factors in locational choice decisions.
- b) Investigate adding an increased margin to the Q100 flood line to account for sea level rise and storm surge.
- c) Incorporate climate change and peak oil adaptation as a fundamental principle to City Plan and Neighbourhood Plans, rather than just a matter for consideration as required by the Regional Plan.

6.5 Sustainable transport

Transport is a vital consideration in addressing climate change and peak oil for three main reasons. First, Brisbane's current travel patterns rely heavily on oil, except for electrified trains (which are indirectly powered by coal), walking, cycling and natural gas vehicles (though natural gas production will also peak at some point). Second, transport involves hundreds of kilometres of infrastructure that, over its lifespan, will be subjected to future climates that are different than those for which they were designed and built. Third, greenhouse gas emissions from the transport sector are the fastest growing source of greenhouse emissions and difficult to reduce given the predominance of fossil-fuelled transport.

If we consider transport infrastructure as a total package, it is one of the greatest and most valuable assets of the city. We have an international and a regional airport, an important seaport, channels, streets, roads, freeways, bridges, tunnels, footpaths, bikeways, boat harbours, rail lines, streetlights, traffic lights, train signals and car parks. Building infrastructure to higher standards and facing escalating maintenance requirements will be a challenging issue for this city's future.

We have been aware for many years of the need to shift more of our trips to modes other than private vehicles (especially those occupied only by the driver). Council and the State and Federal governments have undertaken a series of important initiatives in these areas, such as busways and the extensive passenger rail network. Indeed, the *Brisbane 2026 Vision* goal is for 41 per cent of morning peak trips to be made by walking, cycling or public transport by 2026. Now, our awareness of peak oil and climate change have dramatically increased the urgency and importance of policies to move towards more sustainable transport, complemented by integrated land use planning. People's past reluctance to take more trips by public transport might change rapidly in the face of escalating oil prices or fuel rationing.

The Taskforce's recommendations are based in the recognition that Brisbane has made improvements towards sustainable transport, but that Brisbane must now consolidate its commitment to ensuring that people and goods move by more sustainable means.

Specifically, the Taskforce considers that half of all passenger movements should be made by public transport in the long term. This level has already been achieved by major world cities, though they have different social, physical and cultural characteristics than Brisbane. To take this goal seriously, Council, together with the State and Federal governments, must invest heavily and quickly in high quality public transport. Facilities must be available before demand, not just in response to increased pressure from passengers.

Recommendation 15

Increase investment in public transport to achieve frequent, reliable, high quality, comfortable and attractive services. Plan ahead to provide the buses and public transport infrastructure and facilities needed to meet required increases in public transport patronage.

Potential action initiatives:

- a) Increase the available kilometres of bus priority lanes for the city's road network every year, especially in bottleneck areas.
- b) Increase direct investment in comprehensive public transport for city and work closely with Translink to achieve the greatest effect for investment of public dollars.
- c) Work with the State Government to establish busway services to Australia Trade Coast (ATC) employment destinations from the CBD (to complement Airtrain) and from likely settlement areas for ATC employees.
- d) Develop and follow an accelerated schedule for acquiring bus chassis and building buses, as well as ensuring parking, refuelling, staff and other facilities are ready. Liaise with QR and other operators to promote rapid acquisition of trains and buses.
- e) Assess the expansion of light or heavy rail services in the CBD to connect key points such as the Queen Street Mall and Fortitude Valley.
- f) Design all new bridges to accommodate potential future light rail.
- g) Investigate economic incentives in relation to public transport fares for CBD access.

Recommendation 16

Take measures to ensure that walking and cycling can play an increasingly significant role as modes of transport, with investment in infrastructure that meets access and mobility needs with less fuel.

Action items:

- a) Assign a high priority to making Brisbane more pedestrian friendly by:
 - Developing a Pedestrian Master Plan to create a comprehensive network of routes and paths that make walking easy and safe
 - Addressing shade, security and safety
 - Re-connecting footpaths that dead-end to the footpath network
 - Improving connectivity between destinations that are currently car-focussed, such as large shopping centres
 - Accelerating investment in footpath development and maintenance, focusing on quality and connectivity
 - Raising the standard of footpaths (e.g. width, vertical alignment, energy-efficient lighting).
- b) Conduct 'pedshed' analyses of walking access within one kilometre of all major public transport stops and stations in Brisbane. Implement improvements identified through the analyses.
- c) Review the status of Council's policy and planning for cycling to identify gaps in implementation and opportunities for enhanced effort, with particular attention to:
 - The effectiveness and coverage of the integrated network of cycleways

- Capacity in view of possible significant increases in bike traffic
 - Signage, lighting, safety and security
 - Connectivity between urban nodes
 - Cyclist priority on the road network
 - End-of-trip and bike holding facilities associated with public transport stations.
- d) Incorporate cycling and walking paths with all new road and public transport infrastructure.

Recommendation 17

Conduct a multi-faceted study, in conjunction with the State Government, universities and transport professionals, to understand what innovative and long-range transport options might help Brisbane reduce oil-dependence and reduce greenhouse gas emissions. Specifically, explore:

- Ultra-light rail, monorail or cybernetic transport systems.
- Alternative fuels and vehicle-fuel systems (e.g. biodiesel hybrid-electric buses).
- Underground rail (subway sections for the CityTrain network).
- Intelligent transport systems.

Recommendation 18

Use travel demand management techniques to maximise the efficient use of transport infrastructure and provide price signals that reflect the social costs of travel to various locations at various times.

Possible strategies that the Council should consider include:

- a) Change the economics of travel to the CBD and other locations well served by public transport (e.g. by increasing charges or making public transport less expensive).
- b) Use a variety of techniques to spread peak hours including refined differential public transport fares, road tolls and social marketing.
- c) Investigate the role that libraries can play to support telecommuting and other means by which BCC can promote telecommuting (e.g. 'hives' with hot desk offices for rent, like internet cafés).
- d) Oblige large employers to consider employees' access to transport and produce corporate travel plans.
- e) Expand community-based social marketing of public transport, walking and cycling.
- f) Introduce a parking levy on employee parking spaces provided by businesses.
- g) Provide bus ticket packages to employers for employee travel packages through salary sacrifice.
- h) Investigate incentives within Council powers for fuel efficient, alternative fuel and hybrid cars.

Recommendation 19

Use available Council powers to encourage and promote alternative transport fuels.

Action items:

- a) Give favourable planning and property rates support for alternative transport fuels refuelling networks (e.g. rates incentives for petrol stations depending on the number of fuel alternatives they provide: E10, B20, LPG, CNG, etc.).
- b) Buy light diesel passenger vehicles for City Fleet.
- c) Move immediately to a B20 biodiesel mix for all Council diesel uses.
- d) Move Council diesel vehicles to B100.
- e) Consider contractors' willingness to use available alternative fuels in procurement processes and set minimum biofuel use requirements as soon as feasible.
- f) Following Council success with biofuels, identify the city's major diesel fleets and undertake an outreach program.

Recommendation 20

Change practices and specifications for the siting, design and maintenance of transport infrastructure to incorporate the implications of climate change.

Action items:

- a) Increase the attention given to subsidence, heave, flood risk, bushfire exposure and adaptability in siting and design of new infrastructure and, where necessary, build to higher standards.
- b) Increase monitoring and maintenance activities at embankments and bridge piers, and gully emptying activities.
- c) Anticipate budget implications of increased effort in siting and design and higher build standards.
- d) Resist the fiscal temptation to delay or reduce the frequency of infrastructure maintenance to fund new initiatives.

Recommendation 21

Recognise the economic risks associated with freight transport's reliance on diesel fuel by encouraging alternative thinking in the freight industry.

Action items:

- a) Design infrastructure to facilitate the efficient movement of freight and prevent stranded investments.
- b) Protect inter-modal freight terminals for future shifts to rail freight.
- c) Work with the Council of Mayors to protect food production in SEQ.
- d) Support State and Federal government efforts to enhance the national rail freight network.

6.6 Preparedness for change, emergencies and surprises

Deliberate planning will help Brisbane cope with the changes it will experience due to climate change and peak oil. Council cannot achieve this on its own because it only has responsibility for part of the city's infrastructure and services. If Council is to be a leader on climate change, it needs to create a dialogue with other parties in the city who are in critical positions to influence how the city copes.

It is not possible to predict all the consequences that peak oil will have in Brisbane, nor the full range of effects of climate change. We have to expect that there will be surprises and emergencies. The best way to deal with these is to build greater community resilience, and establish strong channels of communication with the community.

The Taskforce acknowledges that Council has some excellent disaster management planning and is regarded as a leader in Queensland. An ongoing and enhanced commitment to disaster management will be an essential component of Council meeting its obligations to protect its residents.

Recommendation 22

Engage with owners and managers of critical infrastructure in the city and encourage them to address risk from climate change and peak oil.

Action items:

- a) Write to the owners of critical infrastructure in the city and request that they advise Council of the status of their forward plans for their assets in view of predicted climate change and peak oil impacts. Examples include:
 - Airport and seaport
 - Telecommunications
 - Electricity and gas
 - Oil refineries
 - Roads and rail.

- b) Undertake contingency and forward planning for Council assets, especially water supply, wastewater treatment plants, stormwater, roads and bridges.
- c) Develop Council expertise in contingency and forward planning for critical infrastructure to be able to assist asset owners and managers.
- d) Write to major employers and significant businesses to alert them to climate change and peak oil risks and encourage them to conduct contingency and forward planning.

Recommendation 23

Enhance Council's commitment to disaster management and ensure that disaster management planning fully accounts for climate change related impacts.

Action items:

- a) Establish a heatwave and heat stress response plans that include:
 - Consideration of vulnerable communities
 - Access to climate controlled public facilities, swimming pools and outdoor drinking facilities
 - Community awareness and education (as mentioned above).
- b) Establish flooding and storm surge response plans.

Recommendation 24

Council ensure that it is prepared to react to impacts on critical infrastructure and buildings that may lead to community disruption or discontinuity to essential services.

Action items:

- a) Identify alternative options in the event that existing buildings and infrastructure are impacted to maintain services and connections (e.g. to minimise isolation of communities during an adverse storm event).
- b) Enhance monitoring of Council buildings and infrastructure for any changes to the condition of structures so that any modifications or retrofitting occur on time and prior to failure.

Recommendation 25

Undertake a review of how Council can enhance its community development work to build greater community resilience and protect vulnerable and marginalised populations.

6.7 Diversification and conservation of natural resources

The Taskforce considers that diversifying Brisbane's sources of energy and water is an excellent way to build the city's resilience as it faces a more uncertain future with climate change and peak oil. For example, clean local electricity generation from renewable sources avoids transmission losses and contributes to greenhouse gas reduction, while also enhancing local self-sufficiency for power.

The Taskforce strongly supports carbon emissions trading and the Lord Mayor's Regional Carbon Sink concept. The order of priority should be as follows:

- Enhance local energy security, reliability and self-sufficiency.
- Rapidly decrease the carbon-intensity of energy sources.
- Use carbon trading to offset residual fossil-fuel sourced energy.

Air-conditioning is a challenging issue for climate change and energy. On the positive side, air-conditioning does offer shelter during heat waves, and reverse cycle air-conditioners can provide energy-efficient heating. However, cooling consumes a great deal of electricity at the worst possible times for the electricity network.

Although buildings can be designed to ensure they do not require air conditioning (through passive thermal design), the Taskforce recognises that air conditioning will remain prevalent in Brisbane for the foreseeable future. The Taskforce considers that market price signals alone are unlikely to achieve a reduction in demand for air conditioning and that there is a place for regulation. There are many policy options available that should be thoroughly examined by Council and the State Government (Aitkin and Losee 2006).

People clearly have a better capacity to adapt to climate change than other living things. Development of Brisbane has reduced the pre-existing natural areas to only remnant vegetation. These remnants provide critical habitat for species, but the micro-climatic circumstances are now likely to change due to human-induced climate change. Council needs to reconsider the effectiveness of its biodiversity strategies in recognition of the implications of climate change.

Finally, water resources have risen to prominence due to the current drought. We have simultaneously realised that there have been pre-historical periods of greater drought in many areas of the world and that we are increasing the risk and intensity of drought through climate change. It is no longer tenable to waste water as much as we have. The Taskforce believes that Brisbane's successful adaptation to climate change depends heavily on its ability to manage water resources better than it ever has in the past.

Recommendation 26

The Lord Mayor should partner with the Premier to convene a summit on managing air-conditioning. The summit should include a wide range of interested parties, including the air-conditioning industry.

Policy options for the summit to consider include:

- a) The possibility of requiring new air-conditioning installations to be accompanied by solar panels of equivalent capacity to provide peak electricity at time-of-use.
- b) Raising the standard of air-conditioners for Queensland, such as requiring inverters, higher efficiencies and possibly reverse cycle products to reduce electric space heating.
- c) A user-pays arrangement for the extra costs to the electricity network for each new air-conditioning installation.
- d) Incorporating advanced subtropical and passive thermal design features into new buildings to minimise or avoid air-conditioning.
- e) A requirement for Council approval prior to air-conditioning installation, where ceiling insulation would be physically inspected and a fee paid.
- f) The concept of a one-room, insulated and climate controlled refuge (e.g. lounge) in homes rather than conditioning the whole house.
- g) A separate electricity tariff for air-conditioning.

Recommendation 27

Proceed to develop the CitySmart Regional Carbon Sink in conjunction with the Council of Mayors and the State.

Action items:

- a) Ensure that carbon trading arrangements are compatible with the National Emissions Trading Taskforce, Commonwealth Government initiatives and the NSW program.
- b) Increase bushland reserves and connectivity between them as a vital component of the Regional Carbon Sink and to provide additional protection of natural areas from changing micro-climatic conditions.
- c) Investigate the vulnerability of significant local natural areas (e.g. wetlands) to climate changes.
- d) Review and enhance the biodiversity strategy to account for current understandings about climate change risks to remaining natural areas in Brisbane.

- e) Balance carbon sequestration objectives with the need to retain viable local food production in view of peak oil implications for food accessibility.

Recommendation 28

Build on the momentum of the current drought response to further drought-proof Brisbane for the long-term. Possible strategies for Council to consider include:

- a) Recycling 100 per cent of wastewater by 2026 (as stated in the *Brisbane 2026 Vision*).
- b) Phasing-in significant increases in water price for excess water use by business and residential customers over a notified period.
- c) Converting top business water users to smart meters that provide remote data to BCC for tracking and exception reporting.
- d) Establishing an aggressive program to remove all inefficient toilets, showers and washing machines from the city (in keeping with the *Brisbane 2026 Vision* that called for all households to be fitted with 5A water saving devices by 2026).
- e) Setting dates for mandatory installation of rainwater tanks, phased in according to property size; for example:
 - 2010 for residential properties 1000 m² or greater – 5000 L minimum
 - 2012 for residential properties 750 m² or greater
 - 2012 all commercial properties unless exempted due to infeasibility (setting a target tank capacity per square metre)
 - 2015 for all remaining properties – 3000 L minimum.
- e) Making the most feasible components of the BCC water sensitive urban design guidelines mandatory.
- f) In the long term requiring new subdivisions of 10 or more properties to have zero net draw on town water (though subdivisions would still be connected to mains water).
- g) In the long term discouraging further private swimming pool construction and partner with pool owners (e.g. schools) to provide community swimming opportunities.
- h) Actively promoting the use of grey water.
- i) Using State and local government regulatory powers to mandate a higher level of water efficiency by businesses and extend the Water Efficiency Management Plan program.

Recommendation 29

Contribute to the introduction of alternative energy systems to reduce Brisbane's reliance on electricity from large-scale coal-fired power stations. This aligns with the *Brisbane 2026 Vision* that Brisbane's per capita energy use will be the lowest in Australia.

Action items:

- a) Undertake an external review of energy efficiency opportunities for the Brisbane Water network.
- b) Develop an Energy Efficiency Management Plan system program to leverage off the interaction with businesses achieved through the Water Efficiency Management Plans.
- c) Establish a mechanism to assist residences and businesses to install sustainable energy systems.
- d) Partner with the State government and energy retailers to expand and upgrade natural gas reticulation throughout the city, including promoting the use of natural gas. Consider the possibility of gas pipelines that could later serve for hydrogen reticulation.

6.8 Research

The understanding of climate change and peak oil implications and adaptation is a relatively recent area of knowledge. Although Council is not traditionally a research body, the Taskforce believes that it can play an invaluable role in focussing research activities on priority questions for the community.

With so many unknowns, the city must invest effort in trying to understand and envision future urban systems that will be compatible with the challenges and constraints caused by peak oil and climate change.

Recommendation 30

Partner with research bodies and experts to conduct research and development for questions directly relevant to Brisbane's response to climate change and peak oil.

Topics include, amongst other things:

- a) Understanding sea level rise and storm surge impacts on Brisbane.
- b) Life cycle analysis of local biofuel sources.
- c) Bio-fixation of fugitive methane emissions from closed landfills.
- d) Feasible means for adopting green roofs in Brisbane (e.g. roof top gardens and horticultural production).
- e) Expanding city farms to encourage local food production.
- f) Energy trade-offs with new water technology (e.g. water pumping and treatment for recycling or desalination are heavy consumers of electricity).
- g) Sustainable construction materials for Council infrastructure (e.g. low embodied energy, low oil requirements, high recyclability).

Recommendation 31

Provide sufficient resource and priority for annually tracking of key statistics to enable performance measurement of progress towards the goals identified in this action plan.

Performance measurement should include:

- a) Updates of the greenhouse gas emissions inventories (and liaise with the State and SEQ councils to ensure these occur for the whole region).
- b) Monitoring petroleum dependence.
- c) Updating transport statistics (e.g. mode share and vehicle kilometres travelled).
- d) Surveys of community attitudes and understanding.
- e) Information about climate changes to support public education programs.

'The time is right to engage in open and robust dialogue about climate change and to have public debate about the solutions that are best for Brisbane.'

7.0 Next Steps

7.1 Conclusion

The Taskforce has three main conclusions from its work.

First, there is a great urgency to face up to the challenges of climate change and peak oil. The Intergovernmental Panel on Climate Change has demonstrated that we are already experiencing the effects of climate change. For example, severe weather events can occur at any time and the experience in New Orleans is a horror that every city must work to avoid. Recent petrol price spikes have captured people's attention. Even if they ease temporarily, it would be foolish to lapse into a feeling of security that they will not inevitably rise at much sharper rates. The greenhouse gas emissions reduction target that the Taskforce proposes is so significant that it requires a completely different mindset and breakthroughs in urban living – and it means that we can ill-afford our city's emissions to increase even one more tonne despite our ongoing population growth.

Second, it is not all bad news. Confronting these challenges will force us to innovate, develop new technologies and smarter ways of living and working. The saying goes, 'Necessity is the mother of invention.' The most important economic dimensions of climate change and peak oil for Brisbane are twofold: early action will avoid much higher costs later; and early action allows Brisbane to be a pioneer in developing solutions that the whole world will need.

Finally, there are many practical actions that Council can take alone or in collaboration with others that will quickly and substantially move Brisbane towards the goals the Taskforce has identified. This too is good news. Council and residents can take heart that the solutions to these challenges are now relatively well understood. A lack of opportunities to act is not a barrier. Having the courage and will to act swiftly and in a determined way will be the making of Brisbane in its future world of changing climate and natural resource constraints.

We have moved well beyond the pop-politics of second-guessing climate scientists who have been trying to tell the world that big problems loom, in their own fashion, for many years now. The time is right to engage in open and robust dialogue about climate change and to have public debate about the solutions that are best for Brisbane.

Climate change, greenhouse gas emissions, peak oil and sustainability are matters that concern all humans. Our institutions do need to act and be responsible, but so do individuals, especially in 'lucky' countries like Australia where we have the knowledge, power and money to act.

7.2 Implementation

Council should nominate a responsible officer to manage the next steps towards implementation and ensure that they have sufficient team resources to review and prepare for implementation of the recommended actions.

Acting on this plan, however, does not need to await further study or analysis. Council divisions and business units can immediately look for ways to begin addressing climate change and energy impacts within their activities in keeping with Council's Corporate Sustainability Policy. Civic Cabinet can challenge divisions and business units to align their investment and activities with the recommendations in this plan (City of Portland Peak Oil Taskforce 2007).

Finally, the Taskforce members would like to express their willingness to continue to assist the City of Brisbane as it informs Council officers and the public about climate change and energy.

7.3 What Citizens Can Do

Everybody has a role to play and can help the community reach its greenhouse reduction target, ease the effects of climate change and prepare for peak oil.

Make your own contribution by cutting greenhouse gas emissions from your home by:

- Walking, cycling or taking public transport for some of the trips you normally do by car;
- Save energy at home (e.g. use fluorescent lights, turn appliances off at the wall and shut off extra fridges); and
- Buy greenpower and join your car up to Greenfleet.

More tips: www.energy.qld.gov.au/housing.cfm
www.greenhouse.gov.au/gwci/index.html
www.greenpower.gov.au
www.greenfleet.com.au/

Increase your personal water security and contribute to the city's water security by:

- Installing rainwater tanks and greywater systems;
- Taking advantage of the State home water audit service; and
- Change to a front-loading clothes washer.

More tips: www.nrw.qld.gov.au/water/saverscheme/index.html

Get ready for peak oil by:

- Become less dependent on your car (e.g. choose a home close to work and services); and
- Organise 'walking buses' to take your children to school with neighbours.

Prepare for climate uncertainties by:

- Ensuring your home is well insulated and ventilated;
- Keeping your home storm safe (e.g. by cleaning gutters);
- Check flood levels carefully when buying property; and
- Always keep at least two days' supply of food and water for your household.

Abbreviations

4WD	Four Wheel Drive
ABARE	Australian Bureau of Agricultural and Resource Economics
AGO	Australian Greenhouse Office
ASBEC	Australian Sustainable Built Environment Council
ASPO	Association for the Study of Peak Oil and Gas
ATC	Australia Trade Coast
B100	100 per cent biodiesel mixture
B20	20 per cent biodiesel mixture
BCC	Brisbane City Council
CBD	Central Business District
CNG	Compressed Natural Gas
CO ₂	Carbon dioxide
E10	10 per cent Ethanol mix petrol
EBA	Enterprise Bargaining Agreement
e-CO ₂	Equivalent carbon dioxide (greenhouse gas emissions)
EIMS	Energy Information and Management System
GBCA	Green Building Council of Australia
IPCC	Intergovernmental Panel on Climate Change
LPG	Liquefied Petroleum Gas (known as propane in North America)
Mt	Mega tonne
ppm	Parts per million
PV	Photovoltaic (solar electricity)
Q100	100 year flood line
QR	Queensland Rail
SEGAP	Sustainable Energy and Greenhouse Action Plan
SEQ	South East Queensland
TOD	Transit-Oriented Development

Glossary

Biodiesel	An alternative to petroleum-based diesel fuel and is made from renewable resources such as vegetable oils or animal fats.
Biofuel	Any fuel that derives from biomass - recently living organisms or their metabolic by-products, such as manure from cows. It is a renewable energy, unlike other natural resources such as petroleum, coal and nuclear fuels. The carbon in biofuels was recently extracted from atmospheric carbon dioxide by growing plants, so burning it does not result in a net increase of carbon dioxide in the Earth's atmosphere.
Biogas	Gas, rich in methane, which is produced by the fermentation of animal dung, human sewage or crop residues in an airtight container. It is used as a fuel to for stoves and lamps, to run small machines and to generate electricity.
Carbon emissions trading	Involves the trading of permits to emit carbon dioxide (and other greenhouse gases, calculated in tonnes of carbon dioxide equivalent, e-CO ₂ in tonnes). It is one of the ways countries can meet their obligations under the Kyoto Protocol to reduce carbon emissions and thereby mitigate global warming.
Carbon neutrality	A term meaning the net output of CO ₂ is zero. That is to say, if an individual or corporation is to release CO ₂ into the atmosphere, they can offset this by undertaking activities which capture the equivalent amount of CO ₂ back from the atmosphere, such as planting trees.
Carbon sink	A carbon dioxide sink is a carbon reservoir that is increasing in size, and is the opposite of a carbon 'source'. The main sinks are the oceans and growing vegetation. The concept has become more widely known through its application by the Kyoto protocol. A regional carbon sink could be a managed forest that offsets regional carbon outputs effectively leading to regional carbon neutrality.
Greenhouse gas	A gas that traps heat in the atmosphere, inhibiting the cooling of Earth's surface. The main greenhouse gases are carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons, perfluorocarbons and water vapour (which is not normally counted). Greenhouse gases are expressed as an equivalent in carbon dioxide, which is shortened to e-CO ₂ .
Storm surge	The storm surge is a long gravity wave with a length scale similar to the size of the generating tropical cyclone, and lasts for several hours depending on the cyclone size and speed of movement. It is thus of a similar scale to an astronomical tide and should not be confused with short gravity wind waves, which have wave-lengths of metres and periods of seconds. The surge usually consists of a single passing wave that elevates or depresses the still water height. In some special situations, especially for cyclones moving parallel to the coast, secondary waves or resurgences can form behind the tropical cyclone (BOM 2007).

References and Sources of Information

- Abbasi, D. R. (2006). *Americans and Climate Change - Closing the Gap Between Science and Action - A Synthesis of Insights and Recommendations* (New Haven, CT: Yale School of Forestry & Environmental Studies.)
- Aitken, A. and S. Losee. (2006). To A/C or Not to A/C? That is the Question – Climate Control for Houses in the Mixed Subtropical Climate of South-east Queensland, *Subtropical Cities 2006, Brisbane, 27-29 September*, QUT Gardens Point Campus.
- ASPO. (2004). ASPO Newsletter, Association for the Study of Peak Oil & Gas, www.asponews.org.
- ASPO-Australia. (2006). 'Main Submission - Senate Inquiry into Australia's Future Oil Supplies,' unpublished, <http://www.aspo-australia.org.au/content/view/82/1/>
- BOM. (2007). *Global Guide to Tropical Cyclone Forecasting*, Chapter 4, The Habitation Layer, Storm Surges (Bureau of Meteorology), http://www.bom.gov.au/bmrc/pubs/tcguide/ch4/ch4_2.htm, Accessed 14/02/2007.
- Brisbane City Council. (2001). *Sustainable Energy and Greenhouse Action Plan* (Brisbane: BCC.)
- Brisbane City Council. (2001). *Brisbane's Transport Plan – Planning Horizon 2001-2016*, October Draft (Brisbane: BCC.)
- Brisbane City Council. (2006). *Living in Brisbane 2026 Vision Document* (Brisbane: BCC.)
- City of Portland Peak Oil Taskforce. (2007). *Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas*, Report of the City of Portland Peak Oil Taskforce, Draft for Discussion, January 16, 2007.
- City of Seattle. (2007). 'Seattle Climate Partnership,' www.seattle.gov/climate/partnership.htm.
- DNRM. (2005). *Climate Smart Adaptation – A Public Discussion Paper* (Brisbane: DNRM.)
- Deffeyes, K.S. (2003). *Hubbert's Peak* (Princeton: Princeton University Press.)
- Dodson, J. and N. Sipe. (2005). *Oil Vulnerability in the Australian City*, Griffith University, Urban Research Program, Research Paper 6, December 2005 (Brisbane: Griffith University.)
- Environmental Protection Agency. (2004). *Queensland Climate Change and Community Vulnerability to Tropical Cyclones, Ocean Hazards Assessment, Surge Plus Tide Statistics for Selected Open Coast Locations along the Queensland Coast* (Townsville: EPA, JCU, BOM.)
- Granger, K. (2005). *Heatwave Risks in South-east Queensland: A Macro Analysis* (Brisbane: Brisbane City Council).
- Heifetz, R. (1994). *Leadership without easy answer* (Cambridge, MA: Harvard University Press.)
- IPCC. (2007). *Climate Change 2007: The Physical Science Basis – Summary for Policymakers* (Geneva: IPCC.)
- Lowe, I. (2005). *Living in the Hothouse – How Global Warming Affects Australia* (Melbourne: Scribe Publications.)
- Nielsen, R. (2006). *The Little Green Handbook* (New York: Picador.)
- SKM. (2006). *Review of Best Practice Local Government Climate Change Actions*, Report to Brisbane City Council.
- SKM. (2007). *Summary of Best Practice Local Government Climate Change Actions and Possible Brisbane Initiatives*, Report to Brisbane City Council.
- SMEC. (2007). *Development of No Regrets Climate Change Adaptation Actions for Local Governments – Issues Paper*, Report to the Australian Greenhouse Office.
- State Disaster Management Group. (2004). *Storm Surge: Ignore a Storm Surge and You'll Be in Deep Water* (Brisbane: Department of Emergency Services,) <http://www.disaster.qld.gov.au/disasters/surge.asp>.
- UNEP & GRID Arendal. (2005). *Vital Climate Change Graphics Update*, VitalGraphics.net.

Appendix A Terms of Reference

Terms of Reference

Membership of the Taskforce

- Professor Ian Lowe will Chair the Taskforce.
- Members of the Taskforce include:
 - Professor Ian Lowe
 - John McEvoy
 - Dr Patrice Derrington (retired from committee and replaced by Scott Losee)
 - Jim McKnoulty.
- The Sustainability Team will provide secretariat support for the Taskforce.

Observers of the Taskforce

- Observers of the Taskforce may attend Taskforce meetings. Observers may participate in Taskforce discussion as directed by Taskforce members.
- Observers of the Taskforce include:
 - Invited professional officers (as indicated on agenda)
 - Councillors and/or policy advisors
 - Key stakeholders.

Key stakeholders of the Taskforce

- The Taskforce must consult with key stakeholders of the Taskforce.
- Key stakeholders of the Taskforce include:
 - Lord Mayor Campbell Newman and nominated proxy
 - Deputy Mayor David Hinchliffe
 - Councillor Helen Abrahams
 - State and Commonwealth agencies as required.

Key deliverables of the Taskforce

Objective of the Taskforce

To ensure Brisbane is adequately prepared to respond to and address the challenges of climate change, increasing energy consumption, rising petrol prices and peak oil.

The Taskforce is to achieve the above objective through the provision of the following key deliverables:

- Advice on the key strategic challenges posed by available data on the issues identified
- Audit of world's best practice on the issues identified
- Review of existing policies and activities to address these issues across Council
- Review of submissions from community members and organisations about Council's capacity to adopt strategies that mitigate and address climate change and other strategic energy issues
- Recommendation of appropriate role and policy positions for Brisbane City Council in addressing these issues and their impact on our activities
- Preparation of detailed action plan, which may include activities in the short and long term undertaken by Council or in cooperation with the private sector, the community and other levels of government, particularly SEQ region councils.

Responsibility of members of Taskforce

- Members of the Taskforce will provide the key deliverables (as set out above) to Brisbane City Council. This will involve:
 - Attendance at six (6) meetings between 6th September 2006 and 31st March 2007
 - Review of Taskforce minutes as required
 - The Chair will be responsible for setting agenda items for the next upcoming meeting
 - Accurate requests for information via Chair and Secretariat to support agenda items for the next upcoming meeting
 - Reviewing public submissions from the community and organisations
 - Drafting of action plan and report(s) as outlined in the key deliverables.

Responsibility of secretariat to Taskforce

- The secretariat will provide administrative and co-ordination support to the members of the Taskforce. This will involve:
 - Attendance at all Taskforce meetings
 - Recording meeting minutes
 - Distribution of meeting minutes and agenda in a timely manner to Taskforce members
 - Co-ordination of information requests from Taskforce
 - Co-ordination of appropriate professional officers to attend Taskforce meetings as requested by Taskforce
 - Support in preparing action plan(s) and report(s) as directed by the Taskforce.

Key Dates

- The Taskforce will provide a Stage 1 report to Civic Cabinet on 16th October 2006, consisting of a work plan that will outline policy areas and issues the Taskforce will consider.
- The Taskforce will provide an interim report to Civic Cabinet addressing the key deliverables sought by 11th December 2006 for consideration by Council.
- The Taskforce will provide a final report to Civic Cabinet addressing the key deliverables sought by 13th February 2007 for consideration by Council.
- The Taskforce will dissolve on or before 31 March 2007.

Appendix B Taskforce Biographies

Taskforce Biographies

Professor Ian Lowe AO

One of Australia's most respected environmental scientists, Ian Lowe is President of the Australian Conservation Foundation (ACF). He is also emeritus professor of science, technology and society at Griffith University, an adjunct professor at Sunshine University and QUT, an honorary research fellow at the University of Adelaide and a consultant to CSIRO Division of Sustainable Ecosystems.

Ian earned a D.Phil in physics from the University of York and became Director of Griffith University's Science Policy Research Centre (1980-1992) and subsequently Head of the School of Science. His principal research interests are in the broad area of policy decisions influencing use of science and technology, especially in the fields of energy and environment.

He directed Australia's Commission for the Future in 1988 and chaired the advisory council that produced the first national report on the state of the environment in 1996. In 2000 he received the Queensland Premier's Millennium Award for Excellence in Science and the Australian Prime Minister's Environmental Award for Outstanding Individual Achievement. He is a Fellow of the Australian Academy of Technological Sciences and Engineering, Vice-President of Queensland Academy of Arts and Sciences and President of the Australian Conservation Foundation. He wrote a weekly column for New Scientist for 13 years and received in 2002 Eureka Prize for Promotion of Science.

John McEvoy

John McEvoy is managing director of The Peron Group, a boutique consultancy that specialises in strategic advisory services to government. He has over twenty-five years experience in advising Commonwealth, State and local government clients on public infrastructure, and includes a wide range of major economic, social and environmental infrastructure programs in Australia and internationally.

He has established a reputation in those fields as a strategic thinker, especially in the challenging arenas of project initiation and implementation, and finds his skills in increasing demand on a broad range of complex community projects. His resume includes a number of landmark Brisbane projects such as Brisbane's SouthBank, the Brisbane Convention and Exhibition Centre, the Inner City Bypass and the Western Corridor Recycled Water Scheme.

John is an engineering honours graduate from the University of Queensland and an invited Fellow of the Institution Engineers Australia. He holds certificates in Local Government and in Enterprise Management. John has also pursued particular interests in public infrastructure and leadership studies at Mount Eliza, at Harvard Business School, and at the John F Kennedy School of Government.

John is an invited member of the Commonwealth government's Barton Group, an industry advisory body for the environment sector. He is the current Past-Chairman of the Infrastructure Association of Queensland and previously chaired its Water and Local Government Panels. John was also previously a State President and Director of the Australian Institute of Project Management.

Jim McKnoulty

Jim is Chairman of Conics Ltd, a Town Planning and Land Management consultancy and specialises in creative partnerships between the development industry and local authorities to produce more sustainable communities, which are economically viable and socially cohesive. He was instrumental in the establishment of the Rochedale Taskforce, Ripley Valley Taskforce and Oxley Creek partnerships, which have set new standards in community development and planning.

As past Queensland President and now National President of Greening Australia, Jim has worked to establish links between the development industry and the environment movement to create positive partnerships working to restore natural environments surrounding Urban Development projects. Jim is on the board of Greening Australia's Land Innovation Fund that is a venture capital investment vehicle to promote sustainable farming projects in regional Australia. He has also held the position as Chairman of the Business and Marketing portfolio.

Jim's passion for sustainable development has resulted in a long-term involvement as a member of the Faculty Advisory Committee of the School of the Design and Built Environment at QUT, where he is an adjunct Professor providing a leadership role in Research and Development.

Jim was founding President of The Australian Green Development Forum and was one of five national finalists in the 2004 Prime Minister's "Environmentalists of the Year Awards", for his work in advancing the adoption of sustainable development practices in Australia's property industry.

Scott Losee

Scott is Principal Consultant for Sustainability with Maunsell Australia and AECOM Sustainability Market Segment Leader for Australia, New Zealand and Asia. Maunsell is part of the global AECOM network of companies, recognised as one of the leading design firms in the world.

Scott focuses on incorporating holistic sustainability concepts into large scale infrastructure, building and planning projects. He also provides specialist sustainability services in water resource management, corporate sustainability, climate change, energy and greenhouse.

Scott's previous positions include eight years with the Brisbane City Council (1998-2006) and eight years with the Queensland Government. Scott's achievements with BCC included the change to CNG buses, the Sustainable Housing Code, the Efficient Brisbane community education campaign and the Regional Air Quality Model.

Scott holds an MPhil in Environmental Sciences and Engineering (Griffith) and a BES, Honours Environment and Resource Studies (Waterloo).

Patrice Derrington

Patrice Derrington is currently CEO of Campus Living, a company involved in the provision of student accommodation. She was previously the executive responsible for the economics and funding of the revitalisation effort led by the Lower Manhattan Development Corporation (a Governor-appointed state agency) following the September 11, 2001 terrorist attacks on New York City. Previous positions have included Managing Director at the US asset management firm, Spears, Benzak, Salomon and Farrell, Vice President in the Real Estate Finance Group at Chemical Bank (now, JPMorgan Chase) and in 1997 founded the Victory Real Estate Investment Fund. Patrice is a recipient of the prestigious Harkness Fellowship, studying at the University of California, Berkeley for her Ph.D. in architecture/civil engineering, and holds a MBA from Harvard University.

Appendix C Taskforce Meeting Process

Taskforce Meeting Process

Background

There is growing awareness of the global challenges posed by environmental and energy issues such as climate change, increasing energy consumption and affordability, and oil depletion.

Events such as the Earth Dialogues Conference and the Queensland Government's Climate Change Summit highlighted the international and state-wide impact of these phenomena. They have also emphasised that changes in energy use patterns can and will affect communities at a local level.

As a responsible local government, Brisbane City Council needs to understand the vulnerability of our city to climate change and scarcer more expensive conventional energy sources.

Brisbane City Council is a member of the International Council for Local Environmental Initiatives (ICLEI) and has recently completed the Cities for Climate Protection program. In 2001, the Council adopted a Sustainable Energy and Greenhouse Action Plan, which has now been effectively completed.

In the last year, Civic Cabinet received strategic presentations on the effects of climate change that highlighted potential impacts such as: flooding; biodiversity; water supply; waterway health; infrastructure provision and capacity; public health; disaster management and insurance and other risk management issues.

In August 2006, the Environment and Sustainability Committee was advised by environmental planning experts that Council needed to consider the city's vulnerability to oil shortages and price increases, and in particular on our urban planning, service planning, and service delivery activities.

In August 2006, two Brisbane City Council Standing Committees identified the need to ensure Council consistently and responsibly investigates and responds to these issues, and recommended that a taskforce be established.

Climate Change and Energy Taskforce Meeting Dates

- 6 September 2006
- 21 September 2006
- 12 October 2006
- 15 November 2006
- 30 November 2006
- 21 December 2006
- 17 January 2007 (Workshop)
- 2 February 2007
- 21 February 2007.

Presentations to Civic Cabinet

- 11 December 2006 – interim report addressing policy areas and issues the Taskforce will consider
- 12 March 2007 – to deliver the Action Plan.

Information supplied by Council

Brisbane City Council briefing notes on:

- Biodiversity
- Economic Development
- Coastal Management
- Stormwater
- Energy
- Social Policy
- Waste water
- Water Supply
- Waterways
- Disaster Management
- Peak Oil
- Roads
- Transport
- Planning and Policy Development.

Brisbane City Council documents:

- Brisbane City Council Organisational Chart
- City Policy and Strategy Division Organisational Chart
- Crime Prevention through Environmental Design (CPTED) Planning Scheme Policy, 2004
- Corporate Sustainability Policy, 2005
- Brisbane Air Quality Strategy (BAQS), 2004
- Water for Today and Tomorrow, 2005
- Brisbane Active Transport Strategy – Walking and Cycling Plan 2005-2010
- Transport Plan for Brisbane 2002-2016
- BCC Hurricane Katrina Presentation, 2006
- Program Reports (achievements across Council's 12 programs), 2006
- Draft Brisbane Economic Development Plan, 2006
- Draft CityShape 2026
- Disaster Management Plan
- Draft Corporate Plan 2006-2010, 2006
- Draft Urban Agriculture Strategies for Brisbane's Local Growth Management Strategy
- Our Shared Vision, Living in Brisbane 2026
- Brisbane 2025 – Strategic Challenge Climate Change Scoping Paper, September 2005
- Report on Brisbane City Natural Disaster Risk Management Study
- Sustainable Energy and Greenhouse Action Plan.

External documents:

- Sinclair Knight Merz Report – Review of Best Practice Local Government Climate Change Actions – Brisbane City Council
- SMEC Issues Paper – Development of No Regrets Climate Change Adaptation Actions for Local Government
- Jago Dodson and Neil Sipe, Griffith University Shocking the Suburbs: Urban Location, Housing Debt and Oil Vulnerability in the Australian City, July 2006
- Jago Dodson and Neil Sipe, Griffith University Oil Vulnerability in the Australian City, December 2005
- CSIRO – Using Sea Level Rise Projections for Urban Planning in Australian, 2002
- Abare – Energy Update, June 2006
- CSIRO – The Heat is On – The Future of Energy in Australia, December 2006
- Australian Greenhouse Office – Climate Change Adaptation Actions for Local Government
- Queensland Conservation Council – Towards Queensland’s Clean Energy Future – A Plan to cut Queensland’s Greenhouse Gas Emissions through Electricity by 2010
- City of Portland Peak Oil Taskforce – Descending the Oil Peak : Navigating the Transition from Oil and Natural Gas, January 2007
- Intergovernmental Panel on Climate Change (IPCC) Climate Change 2007: The Physical Science Basis – Summary for Policymakers, February 2007
- Stern Review: The Economics of Climate Change, 2006.

Key Topics of Discussion at Meetings:

- Pressures impacting on BCC
- What can BCC do?
 - As a business
 - Legislative jurisdiction
 - Advocacy
 - Education and awareness
- Priority of Impacts
- BCC Strategies and Initiatives – completed and scheduled
- Short, medium and long term options
- Adaptation Strategies
- Mitigation Strategies.

Appendix D Taskforce Issue Rankings

Taskforce Issue Rankings

The following tables record the average rankings of these issues by Taskforce members as part of the process in determining priorities for Brisbane.

Climate Change Impacts

Category and Cause	Hazard or possible impacts	Importance*
<i>Natural Environment</i>		
Sea Level Rise	Increase coastal flooding (particularly when combined with storm surge)	M
Increased Temp	Changes in frequency of natural disturbances (e.g. fires)	L
Increased Storms	Possibly greater extremes of dry and flood flows	L
<i>Built Environment</i>		
Sea Level Rise	Inundation of previously immune areas of land by high tides	M
	Increase exposure to storm surge and wave run up	L
Increased Temp	Increase demand on air-conditioning	H
Increased Drought	Less reliable water supply from dam catchments and reticulated water supply system	H
Increased Storms	Greater number of structure will be exposed to loadings beyond their capacity and will be prone to destruction and collapse	L
	Flooding with incursion into buildings and potential erosion of foundations of structures	M
<i>Services</i>		
Sea Level Rise	Sewerage – permanent inundation and loss of use of low level treatment works and outfalls	H
	Water - Higher water consumption demand	M
	Electricity - Increased electricity demand for air-conditioning	H
	Electricity - Possible overheating of conductors, substations and electrical equipment leading to breaks in services	L
Increased Drought	Water - Greater water storage uncertainty (reduced inflow and greater evaporation)	H
Increased Storms	Flood flows may exceed dam or spillway design capacity	M
	Increased risk of sewage overflows	M
	Wider flood plains	L
	Higher peak runoff	M
<i>Social</i>		
All	Unnecessary injury or property damage due to lack of an educated community/Council	M
Sea Level Rise	Foreshore development at risk	M
	Loss of residential land, agricultural, commercial or industrial areas or coastal communities through inundation	M
Increased Temp	Heat stress, particularly elderly and vulnerable populations	M
Increased Drought	Availability of water supply per capita may be reduced	H
Increased Storms	Risk to human life and property	H
	Property damage and potential increased insurance claims, premiums or uninsurability	M

* H = high, M = medium, L = low

Energy Issues

Category	Hazard or possible impacts	Importance*
<i>Built Environment</i>	Introduction of more stringent mandatory requirements for water and energy efficiencies for buildings and appliances	H
	Increased cost of operating traditional buildings	L
	Increased energy costs are driving greater numbers of building retrofits	L
<i>Services</i>	Phasing out of inefficient hot water systems	H
	Increased use of renewable energy sources such as wind, hydroelectricity, solar energy	M
	Increased black and brown outs with the potential to damage systems (e.g. IT)	L
	Greater supply of energy from distributed sources.	M
	Forced adoption of new and innovative supply and demand management strategies to keep pace with and reduce current demand	H
	Changes to how energy is used e.g. just in time power	L
<i>Social</i>	Rising prices for food, water, housing and services	H
	Increased purchase of Green Power electricity	L
	Increasing residential electricity prices are placing greater pressure on the low-income earners	L
	Greater demand for energy services rather than products	L
	Increased costs of essential services places greater pressure on disadvantaged sectors and increases their need for more welfare subsidies	L
	Mainstay traditional industry sectors such as tourism and agriculture experience greater cost pressures from increased energy prices	L

* H = high, M = medium, L = low

Peak Oil

Category	Hazard or possible impacts	Importance*
<i>Natural Environment</i>	Greater local food production	H
	Increased demand for organic food production units in urban areas with local farmer markets	L
	Increased competition for good agricultural land	L
	Improved air quality in the region as a result of greater use of energy efficient vehicles and alternative fuels	M
<i>Built Environment</i>	Increased construction, building and fitout costs	L
	Shift in the market - with greater demand for non-petroleum based building products	L
	Adaptation of equipment to utilise fuel alternatives such as liquid petroleum gas (LPG), compressed natural gas (CNG) and other transitional fuels	M
<i>Services</i>	Increased research and development into new technologies and alternative fuels	L
	Rising prices for food, water and services	H
	Increased use of alternative fuels	M
	Installation of distribution systems and end-used equipment for alternative fuels	M
	Expansion in reticulated gas infrastructure	M
	Exponential growth in demand for high quality public transport, walking and cycling infrastructure and services	H
	Emphasis on transit orientated development	M
	Increased walking and cycling to local destinations	M
	Increased fuel efficiency standards for vehicles	L
	Renewed emphasis on local and small scale infrastructure to link local centres and services	M
<i>Social</i>	Residents in outer and middle suburbs will experience greater financial pressures from increased petrol prices/transport costs	H
	Residential households face a trade-off in their housing choices between the capacity to afford housing versus their distance from the services	H
	Many residents work from home to avoid work travel	L
	Increased prices for fuel, bitumen, and petrochemical products	L
	Growth in businesses and industries associated with the research and development of new technologies, particularly renewable energy technologies such as solar hot water, bioenergy and wind power	M
	Decreased housing affordability in inner city areas.	L

* A73H = high, M = medium, L = low

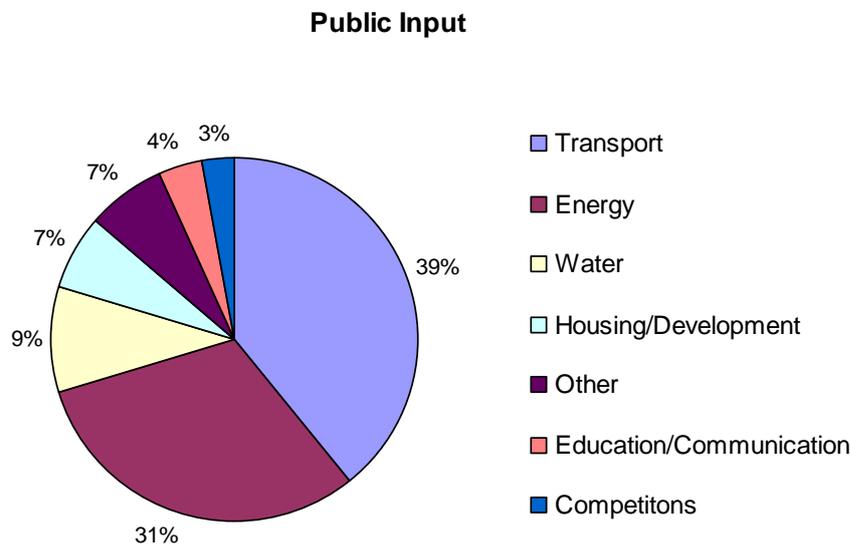
Appendix E What the Community Said

What the Community Said

The BCC online forum for the Climate Change and Energy Taskforce provided an opportunity for members of the public to provide their ideas on how to make Brisbane City a more sustainable city. A total of 69 posts were made by members of the public during the eleven days that the forum was open. The posts crossed a wide range of issues and have been categorised according to their topic (see the pie graph below).

The forum indicated that members of the public who contributed considered transport and energy the most important issues by a considerable margin. The input from the public also indicated that there was a bias toward ideas on how to reduce greenhouse gas emissions, with considerably less input regarding the planning for climate change adaptation.

The ideas that members of the public raised are discussed in more detail below.



Transport

Some members of the public put forward the idea that council should provide incentives for people to use hybrid powered vehicles. Incentives suggested included free parking in the CBD, unrestricted use of transit lanes, lower registration fees, and free licence renewals. The increased use of hybrid powered vehicles would go a long way toward reducing greenhouse gas emissions of the city.

There was a perception that inefficient use of public buses was leading to overcrowding during peak hours and under-utilisation during off-peak times. One suggestion was to use a combination of large and small sized buses that could be better tailored to suit the varying needs of the public. Contributors indicated that there should be greater incentives to use public transport, and a campaign to raise the profile and provide information to the public to stimulate greater use of public transport was suggested. One contributor suggested a system to deter private passenger vehicle entry into the CBD, such as a charge for private vehicles entering the CBD. This system has been successfully implemented in London. Passenger vehicles are charged to enter, whilst buses, taxis and motorcycles are exempt from the charge.

A relatively large proportion of contributors suggested that there should be a synergy between the goals of the TransApex initiative and the goals of the Climate Change and Energy Taskforce.

Some members of the public questioned efforts to ease congestion as efforts were perceived to be an encouragement for private vehicle use. There was some strong support for moving away from private car use to public transport and cycleways.

Energy

Many contributors suggested that Council employ renewable energy sources and make alternative energy more affordable and available for members of the public. A program of subsidising solar energy for private homes was also suggested.

An improvement in public lighting was put forward. One idea was the use of LED lighting for public areas as it has advantages over traditional lighting in that it is far more efficient and the lights more durable.

Energy efficiency and renewable energy were the most discussed topics within the energy debate, as well as an aversion to the use of coal and nuclear power.

Water

Some suggestions for increasing water supply were put forward, including the collection and use of stormwater to alleviate the strain on our potable water supplies by providing a source for irrigation of council parks and gardens.

Housing and Development

One contributor suggested that council review building regulations with the consequences of climate change in mind. Ideas included increasing the wind speed ratings for buildings, disallowing construction on areas prone to inundation from sea level rise and the construction of protective sea walls, and the establishment of emergency plans.

Postings also indicated a frustration from renters that they are unable to contribute to reducing greenhouse emissions and conserving water as home owners can. One contributor said that they were unable to make the changes that needed to be made to the house in which they live.

Postings also voiced concern that current legislation makes it relatively easy for developers to clear trees. Suggestions included making it more difficult for developers to clear, and make developers offset their clearing by compensatory planting of trees.

Education/Communication

A suggestion for a public forum on the internet for ideas on how to plan for and combat greenhouse gas emissions for the city was put forward. A publicly available database of progress in the fight against greenhouse gas emissions to was suggested as an integral part of the strategy.

Some posters suggested that there was a greater need to educate the community in improving the eco-friendly approaches to living in Brisbane. One suggestion was that every Council notice should prioritise and emphasise what is recyclable and have better information which is easier to understand. The contributor suggested that every council notice, electricity, or any business sending a bill should be encouraged to detail better approaches to sustainable living, such as not using four wheel drive cars as city cars.

Competitions

One contributor suggested a competition be held between schools where students have an involvement in making their school as sustainable as possible. The use of renewable energy, lowering consumption of energy and consumables and tree planting initiatives would benefit the city as well as providing an education for students. The suggestion also included the idea that an annual competition be held, enabling each grade of students each year to become well educated on how to be more environmentally friendly in their own homes and business that they will be creating by 2026.

Appendix F BCC Corporate Sustainability Policy

BCC Corporate Sustainability Policy

Overview

This sustainability policy formally adopts a way of thinking and a process that will help us work towards our Living in Brisbane 2010 Vision. Brisbane 2010 is a city to look forward to living in – a clean and green city that is smart, prosperous, accessible, inclusive, creative and healthy, and that leads the region by example.

Several current trends challenge our ability to achieve the 2010 vision. South-east Queensland will experience constant and significant population growth into the foreseeable future. With each new person comes an additional demand on resources (e.g. land, water, electricity and petrol), and the creation of more waste. The impact of this growing population is magnified because people are using more resources per person. These population pressures and individual preferences also have implications for our economy and our community.

In simple terms, Brisbane City Council and its staff need to make some changes in direction if we are to achieve the 2010 Vision. Innovation and outstanding leadership will be keys to a sustainable future. We have already made commitments to sustainability in many policies, plans and strategies. Following the 1992 Rio Earth Summit, Council adopted the principles of the National Strategy for Ecologically Sustainable Development. Council's Environmental Policy states Council's aim to be a leader and champion of sustainability. An internal Action Plan for Sustainability was completed in 2000 and, in 2003, Civic Cabinet endorsed A Framework for Delivering Environmental Sustainability. In 2004, the Administration introduced policies to promote sustainability, especially in urban development, and in 2005, the budget, program structure and branch names were changed to incorporate sustainability. This Corporate Sustainability Policy renews a high-level commitment to sustainability and refreshes and consolidates our approach.

Establishing a common understanding of sustainability within Council and the community will help us to focus on actions leading to greater sustainability. The following definition of sustainability is designed to be relevant to Brisbane and BCC (see 'More About Sustainability' below for more discussion about the concept).

Sustainability is a principle to influence our decisions to maintain and enhance our quality of life now and in the future. It requires an integrated consideration of economic, environmental and community factors.

Policy

BCC commits to applying the principles of sustainability to all of our decision-making and activities. We will lead by example and become an inspiration to the Brisbane community and the region.

Applicability

Sustainability is a principle that Council and its employees should apply to their decisions and activities.

Definitions

Biodiversity

The variety of all life forms: the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form. It is a concept that emphasises the inter-relatedness of the biological world. It is often considered at three levels: genetic diversity, species diversity and ecosystem diversity.

Community Engagement

The involvement of people, businesses and stakeholders in decision making. There is a spectrum of ways in which we can involve people - from informing and consulting them, to collaborating and partnering with them.

Integration

In this context, integration means bringing together multiple, sometimes conflicting, objectives and considerations – as well as time (short and long-term) and space (local, regional, global). It requires an understanding of how different objectives and systems are linked and affect each other.

Natural resources

All the resources that are produced by the Earth's natural processes including mineral deposits, fossil fuels, soil, air, water, plants and animals and are used by people for agriculture, industry and other purposes.

Quality of life

The level of enjoyment and fulfilment derived by humans from the life they live within their local economic, cultural, social and environmental conditions.

Outcomes

Sustainability will be embedded in the organisation's work. All employees will have a clear and shared understanding about what it means and how they can apply it to their daily tasks. Management support, cross-program integration, corporate systems and new 'tools' will assist staff in their decision making.

We will have learned more about sustainability and have applied some of the best available sustainable technologies. We will be using realistic performance indicators to measure and report on our progress with sustainability. Our growing knowledge and skills in community engagement will allow us to gain insights from the residential and business communities, and achieve a high level of trust with citizens.

For the city, our application of sustainability will have allowed us to take an integrated approach to the Living in Brisbane 2010 Vision's eight strategic directions, contributing to the Vision's realisation.

Focus Areas

To enable an effective and realistic response, we have identified four target areas to make sustainability easier to promote, interpret and implement. These areas are where we will place our initial focus:

Resource efficiency: saving energy and water and reducing waste.

Sustainable places and urban form: improving Brisbane' built environment, especially the interactions between land use, transport and the environment.

Biodiversity conservation: protecting and enhancing biodiversity, natural areas and waterways.

Health and wellbeing: developing a city where our people and communities enjoy physical, mental and social wellbeing.

Principles

To determine if a decision or action is likely to make a positive contribution to sustainability, we need a basic understanding of the key considerations or criteria of sustainability. The following principles build on and update our existing commitment to the principles in the National Strategy for Ecologically Sustainable Development. They provide a set of core issues for consideration and broad objectives to be pursued as part of our decisions. All of our decisions and actions should:

- a) Integrate long and short-term economic, environmental and community considerations. Decisions need to consider the linkages between economic, environmental and community dimensions, and take account of impacts that may occur over several years;
- b) Provide for equity within and between generations. Ensure that everyone and every community has enough for a decent life and opportunities to seek improvements. We should not simply use up all available natural resources. Instead, we should commit to ensuring that all community members have equitable access to resources now, and into the future;
- c) Enhance and maintain biodiversity and natural environmental systems. Natural systems, and the plants and animals that inhabit them, have important benefits to the community. We need to build a relationship between people and the environment that will maintain the long-term integrity of these systems;
- d) Act cautiously when there is a risk of serious or irreversible impacts on the environment or the community. This is the 'precautionary principle'. We should avoid causing serious or irreversible damage and not use uncertainty as a reason to not protect the environment or community;
- e) Recognise dimensions beyond our border while concentrating on issues we can influence. Environment and development issues operate on a global scale. Our local actions should connect with regional, national and global scale activities and directions. For example, although we cannot single-handedly stop climate change, we can demonstrate leadership by taking actions to reduce greenhouse gas emissions as part of a global effort; and
- f) Provide for broad public involvement on issues that affect the community. We need to engage individuals, communities, stakeholders and businesses and adopt more open deliberations to build an understanding of sustainability and promote collective responsibility.

Authority

Adopted by full Council on August 8, 2005.

Policy Owner

Chief Executive Officer.

Further Assistance

Contact the Sustainability Team, Natural Environment and Sustainability Branch, 3403 4724.

More About Sustainability

This policy's definition of sustainability identifies the three areas of environment, economy and community, but these are not separate areas to think about. To be sustainable, we have to look at them together and emphasise where we can make progress with all three concurrently. We also have to move beyond our tendency to focus on the short-term and combine short-term with long-term thinking.

Sustainability is a challenge to our normal ways of thinking and doing things. We need to look for positive alternatives to unsustainable paths. Sustainability is a comprehensive way of looking at things – not just an add-on to our usual list of considerations.

To move in a sustainable direction, our decisions and actions have to recognise that our wellbeing and the wellbeing of natural systems are connected and depend on each other.

We have to appreciate that there are absolute physical limits in our world, but that we have an endless opportunity for innovation to work within these limits. While it is tempting to think of Brisbane becoming a 'sustainable city' at some point, sustainability is really a set of principles and a process, not an end point to be achieved. The process we use to make decisions, and the ways we consult in that process, are important, as well as the decisions themselves.

Our sustainability policy connects us to the numerous sustainability efforts around the world. Sustainability contains some basics that apply everywhere, but we also have to tailor our approach to our own place and circumstances.

Review Date

One year after approval. In particular, we should periodically re-consider the focus areas.