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Evaluating climate change mitigation strategies in South East Queensland

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Introduction

This paper appears in a period of a post-Al Gore 'climatic awakening' in the Australian community. Hardly a week passes without a sensational representation in the media of the potential impact of sea levels and other elements of climate change. In turn the major federal political parties in the pre-election surge have promised an array of big fix solutions to ensure that they are portrayed as the most competent to guide the country into a path of reduced emissions (of course without causing a ripple within the economy). However how any solution would filter down to the local level has received little discussion. Likewise there is a dearth of studies which examine the best methods or even of the capacity for local governments to mitigate climate change. This paper attempts to contribute to this much needed discussion by assessing the ability of current mitigation strategies in South East Queensland to reduce greenhouse gas emissions to acceptable levels.

The reality of climate change can no longer be ignored. If the world fails to implement a substantial reduction of global greenhouse gas (GHG) emissions within the next half century then catastrophic impacts are likely (Metz et al 2006; Stern 2006). There is a growing scientific consensus that in order to avoid irreversible change the global GHG emissions in 2050 need to be 60% below the 1990 levels (Preston & Jones 2006). However many of the serious impacts are not immutable with outcomes dependent on the ability of humans to reduce current emissions and adapt adequately.

Attempts to mitigate global emissions span a range of scales with a growing attention to the importance of the local emerging recently (Bulkeley 2000; Adger 2001; Bulkeley & Betsill 2003; Bell 2005; Davies 2005; Lindseth 2005; Otto-Zimmermann 2006). The basic premise of the local argument in climate change mitigation is that as the majority of greenhouse gas emissions occur at the local level it is an important scale to target reduction efforts. Over the past decade there has been a steady increase in commitments to reduce GHG emissions among cities and local governments worldwide. This local focus is also strong in South East Queensland (SEQ) with 11 of the region's 18 local councils publicly committing to corporate and community emissions reductions through the Cities for Climate Protection (CCP) campaign (AGO 2006).

Notwithstanding the above commitment by these local governments there are no evaluation studies that have examined how the mitigation strategies compare to world best practice. This knowledge gap currently impedes SEQ from ensuring that it is playing its part in reducing human interference in the global climate system. This paper critically examines the SEQ approach to climate change mitigation and provides a comparison of SEQ strategies to identified best practice. This paper presents impediments to SEQ strategies and offers recommendations for the region's planners and local governments to improve climate mitigation strategies.

Research scope and methods

This paper reports on research undertaken in Queensland between June 2005 to June 2006. The research approach consisted of a review of literature on world best practice in local scale climate change mitigation, a desk-based policy review of Local and State planning documents, and qualitative interviews with planners and CCP officers from local government as well as a representative from a relevant State agency.

South East Queensland was chosen as the study site because it has been identified as being vulnerable to climate change (Abbs & McInnes 2004). This area is one of Australia's fastest urban regions growing and has recently commenced a program of State-led statutory regional planning (DLGSR & SEQROC 2005). These features permit an equal temporal comparison

against the world best practice in climate change mitigation as all councils in SEQ had, or were in the process of, recently updating their Planning Schemes to reflect the recently implemented South East Queensland Regional Plan (SEQRP).

The results of the qualitative research and desk-based analysis were assessed against best practice local and regional climate change mitigation strategies and practices (see below). Best practice climate change mitigation was identified through a detailed review and assessment of over 200 recent scholarly articles and case studies with best practice being decomposed into 9 key elements and components (see Burton 2007).

Best practice local and regional climate change mitigation

According to Overman and Boyd (1997, p. 69) best practice can be defined as a "selective observation of a set of exemplars across different contexts in order to derive more generalisable principles and theories of management". There are many limitations to what constitutes the world best practice of climate change mitigation. Firstly mitigation is dependent on space, place, budget and institutional arrangements. However investigating the world best practice remains a necessary process. Such analysis creates a yardstick against which SEQ and other urban regions can be compared, as well as fostering the much needed debate on local climate change mitigation practices.

Best practice in climate change mitigation can be identified through a selective assemblage of a set of case studies. Burton (2007) has argued that world local best practice for climate change mitigation must, at a minimum, integrate the following elements:

1. clear greenhouse gas baseline data, targets and monitoring;
2. an acknowledgment of the problem;
3. community and government education;
4. reduced reliance on fossil fuels;
5. appropriate urban and rural land use planning;
6. statutory support;
7. integration across all levels of governance; and
8. the application of the precautionary principle[1].

Although these individual actions or policy approaches may lead to a reduction of emissions, this research suggests that climate change mitigation requires a dynamic integrated approach.

SEQ regional policy review

Recent amendments to the Integrated Planning Act 1997, seek to ensure that the SEQ region is developed in accordance with the South East Queensland Regional Plan (SEQRP) (Queensland Government 2006). The SEQRP came into force in 2005 and has the potential to encourage regional land-use behaviour that may have some ancillary benefits to climate change mitigation, such as containment of urban sprawl (DLGPSR 2005). It also gives some recognition to the importance of GHG by including these as an environmental indicator, although targets or baseline data are not provided (DLGPSR 2005, p.25). The SEQRP references the Queensland Government's Greenhouse Strategy (DLGPSR 2005, p. 32).

[1] For a more comprehensive discussion on the defined best practice local climate change mitigation see Burton (2007).

The Queensland Greenhouse Strategy forms the main mitigation response of the Queensland Government to climate change (EPA 2004). The Greenhouse Strategy states that 'Queenslanders are rising to the challenge of reducing greenhouse gas emissions to address climate change' (EPA 2004, p.vii). However it does not set out what targets for emissions, if any, Queensland should pursue. The Queensland Greenhouse Strategy (EPA 2004) outlines some key policy directions but offers no binding targets. Its approach is based mainly on expectations to increase energy efficiency.

The Greenhouse Strategy also emphasizes that "local governments in Queensland play a pivotal role in that State's response to greenhouse" and that the *Integrated Planning Act 1997* gives local governments "an opportunity to incorporate emissions reduction into the local planning process" (EPA 2004, pp.59-62). The majority of local governments in SEQ have acknowledged the need to mitigate climate change through participating in the CCP program.

Only the local governments who are members of the CCP program have publicly available GHG mitigation plans. These plans (Table 1) set various targets set on varying base years with all but one having the shared target year of 2010 (Beaudesert Shire uses 2012). The dominant theme in all of the strategies are fleet vehicle downsizing, improved energy efficiencies of corporate buildings, alternative fuels for fleet and public transport vehicles, community education programs and display homes. An examination of individual local government climate change strategies shows there is no evidence to suggest that there is any significant depth or strength to the strategies.

The strength of commitment of these approaches is easily measured by simply reviewing the GHG emissions targets against what scientific evidence suggests is required. Of the eighteen local councils only seven of the sixteen planning schemes mention climate change mitigation. Of the few schemes which do include mitigation these are either introduced in the main vision statement, incorporated as a desired environmental outcome, or refer to energy efficiencies through building design and orientation (Table 2).

At the regional level it is difficult to ascertain current levels of GHG emissions because there is no publicly available data available at this scale. Queensland's emissions are predicted to increase dramatically over the next few years (Burton 2005, p.21) in part due to the expected increased population. It is reasonable to assume that most of Queensland's GHG emissions will be produced in SEQ given the proportion of the state's population who dwell in this region.

Table 1: SEQ local government commitment to the CCP program

SEQ Council	Cities for Climate Protection	Corporate Goal	Community Goal
Beaudesert Shire	Milestone 2	20% reduction on 2000 by 2012	10% on 1998 levels by 2012
Boonah Shire	Not a member	N/A	N/A
Brisbane City	CCP Plus	20% reduction on 1990 levels by 2003; 45% by 2010	Stabilise at 2000 levels by 2010
Caboolture Shire	CCP Plus	20% reduction on 2000 levels by 2010	10% per capita reduction on 1998 levels by 2010
Caloundra City	Milestone 3	20% reduction on 1999 levels by 2010	20% reduction on 1999 levels by 2010
Esk Shire	Not a member	N/A	N/A
Gatton Shire	Not a member	N/A	N/A
Gold Coast City	CCP Plus	20% on 1997 levels by 2010, measured on a per capita basis	10% per capita reduction on 1997 levels by 2010, measured as a per capita
Ipswich City	Milestone 4	20% reduction on 2000/2001 levels by 2010	20% reduction on 1998 levels by 2010
Kilcoy Shire	Not a member	N/A	N/A
Laidley Shire	Not a member	N/A	N/A
Logan City	Milestone 1	Not available	Not available
Maroochy Shire	Milestone 5	20% below 1994 levels by 2010	5% below 1998 by 2010
Noosa Shire	Milestone 5	20% below 2000 levels by 2010	20% below 1996 levels by 2010
Pine Rivers Shire	Milestone 1	Not yet available	Not yet available
Redcliffe Council	Not a member	N/A	N/A
Redland Shire	Milestone 5	25% reduction of 2000 levels by 2010	15% reduction on 1996 levels by 2010
Toowoomba City	Not a member	N/A	N/A

Source: (AGO 2006)

Table 2: Summary of climate change inclusion in planning schemes

Council/ Agency	'climate change'	'global warming'	'greenhouse' (gas)	Comments
Beaudesert Shire	✖	✖	✖	Not mentioned
Boonah Shire	✖	✖	✖	Not mentioned
Brisbane City	✓	✖	✓	Discussed as performance criteria in Kelvin Grove Local plan; Energy efficiency code that encourages design and fittings to reduce GHG; Industrial performance criteria state that GHG 'emissions must not cause harm' (p.109) Air Quality Policy discusses electricity generation controls. Also GHG are classed as a performance indicator for Desired environmental Outcomes.
Caboolture Shire	✓	✖	✓	GHG discussed in supporting outcomes and climate change is mentioned in Natural Hazard section
Caloundra City	-	-	-	Unable to access plan
Esk Shire	✖	✖	✖	Not mentioned
Gatton Shire	✖	✖	✖	Not mentioned
Gold Coast City	✓	✓	✓	GHG emissions are used as performance indicators. Energy efficient design required in new developments (Policy 5).
Ipswich City	-	-	-	Unable to access plan
Kilcoy Shire	✖	✖	✖	Not mentioned
Laidley Shire	✖	✖	✓	Under specific for industrial code the scheme states 'Emissions of greenhouse gases (carbon dioxide, nitrous oxide and methane) do not cause environmental harm' (p.99). No acceptable solution is provided and environmental harm is not defined.
Logan City	✖	✖	✓	Assessment Provisions for Localities, Zones and Sub-Areas lists GHG emissions to be considered in specific outcomes referring to Schedule 3 as Air Emissions as acceptable and probable solution. However under Schedule 3 there is no mention of GHG
Maroochy Shire	✖	✖	✖	Not mentioned
Noosa Shire	✖	✖	✓	Desired environmental outcomes include reduction of greenhouse gases. Code 14.53 requires hot water systems to minimise GHG emissions.
Pine Rivers Shire	✖	✖	✖	Not mentioned
Redcliffe Council	✖	✖	✖	Not mentioned
Redland Shire	✖	✖	✖	Not mentioned
Toowoomba City	✓	✖	✓	Desired environmental outcomes include reduction of greenhouse gases. Encourages energy efficient design for climate.
OUM (SEQRP)	✓	✖	✓	Listed as a year SEQ State of the Region Yearly Indicator (although no mention of how).Highlighted in 2.3 Atmoshphere. Directs reader to the Queensland Greenhouse Strategy.

Planners' views

This study undertook a series of interviews with urban planners practicing within local government in South East Queensland to assess current l responses to climate change. A mixed method was used to select participants for these interviews. Respondents were identified through initial telephone conservations to the relevant local government switchboard, through informal meetings or through a 'snowball' approach. Those recruited for the study included environmental and strategic planners as well as environmental and CCP officers. Some respondents were chosen through feedback on an article previously published by the author (Burton 2005). Some interviews involved more than one respondent. Multiple respondent interviews were typically at the request of the initial respondent who invited others to provide backup (e.g. a planner may have invited a CCP officer to the interview to provide more information).

All SEQ councils were initially approached so that a representative sample could be obtained. Twelve of the eighteen councils agreed to be interviewed. Of those who did not wish to be interviewed three said that they did not have any staff available and the remaining three failed to reply to interview requests. The Office of Urban Management (OUM) was also approached as their role is to "prepare and implement key regional planning strategies in SEQ" (OUM 2006). Furthermore as the OUM was often referred to by local government interviewees it was determined that it was important to interview officers from this agency. Where this occurred their answers were recorded separately. All interviews occurred between August 2005 and January 2006.

The interview participants were asked a range of questions surrounding two of the key research questions:

- What is the current state of climate change mitigation in SEQ?
- What is impeding SEQ from achieving world best practice?

The following section provides sets out and discusses the interview findings.

Current state of climate change mitigation in SEQ

None of the respondents surveyed showed any depth in their council's climate change mitigation strategies. Strategies undertaken at local level were very similar across the region. Council size often reflected the resources allocated to mitigation strategies. The main strategies included retrofitting council buildings with energy saving lights and other equipment, attempts to reduce the size of cars in the corporate fleet, waste minimisation and basic community education programs. Many councils were members of the CCP program as they offered a certain level of support which they could not obtain from higher levels of government. Any council that had a specific target had not committed to internationally recognised targets or time scales discussed in the literature review. It seems that while satisfied to commit to voluntary targets through the CCP program, mandatory targets were met with resistance.

An examination of the responses highlighted that emissions reduction objectives across the SEQ region were very short-lived with none of the councils having specific emissions targets beyond 2012. Typical reasons cited for this included uncertainty about climate change science and reservations about committing too far ahead to a target that may be unachievable. All respondents indicated that presently their councils were not on target to meet their community goals, although one council thought that they may achieve their corporate targets by 2010.

The councils that based their strategies on those of other councils demonstrated that they have no clear understanding of what is needed to run an effective climate change mitigation program.

Three respondents said that their council 'fudged' their data or selectively chose base years that had abnormally high GHG emissions in order to be seen as having an effective strategy.

Impediments to achieving world's best practice in climate change mitigation

The respondents identified a range of common themes which they believed were impeding council progress on climate change. The limitations discussed were issues across all levels of government. However, the two most common themes were that the population of SEQ was growing too quickly for the councils to reduce emissions and that the best they could hope for was a reduction in emissions per capita. The second response, which was linked to lack of leadership, was the fact that the planning framework in the region (IPA and the SEQRP) does not include any clear visions for appropriate baseline years or expected targets and that councils are only just coming to terms with the IPA which was introduced in 1997.

All respondents classed the climate change problem primarily as an environmental problem, with little recognition of the social or economic implications (although some used economic growth as a reason not to mitigate). Most respondents, especially the planners, seemed to be challenged with the scientific understanding behind the problem. Interviewees often struggled with discussion of technical data, time frames and expected climate change impacts. The CCP and sustainability officers had a better grasp of the science but struggled with the discussions about the role and capacity of planning. The CCP and sustainability officers those who were best equipped to champion the cause of climate change mitigation were also the officers who had a limited understanding of the planning policy environment.

Discussion

Local governments can play a critical role in climate change mitigation. But climate change mitigation depends on three conditions: i) awareness of the problem; ii) capacity to change, and iii) the willingness to do so. The following discussion of climate change mitigation strategies in SEQ examines these three elements in turn.

Awareness of the climate change problem

Awareness of the problem among SEQ local governments is demonstrated by the fact that eleven of the region's eighteen councils are members of the CCP program and that climate change is mentioned in the SEQRP. The failure of this awareness has to lead to effective climate change strategies shows that this recognition does not extend beyond general acknowledgement of the problem. This effect was observed in the interviews where most respondents addressed climate change as an environmental problem when, as the literature demonstrates, it may have a profound economic and social ramifications. Furthermore responses from the interviews also show that the majority of key decision-makers, such as the councilors, have a limited understanding of the problem. Many of the respondents did not have a complete understanding of the science surrounding climate change and at times this was raised as an obstacle for further mitigation strategy development.

The interview respondents who did have a good grasp on the issues reported the challenge of relaying the severity of the problem to the key decision-makers. This communication problem involved both sending and receiving information. Planners and environmental staff seemed to struggle to convince key decision makers to undertake emissions reduction strategies based on ethical responsibilities to the global common. Many of the key decision-makers have a poor understanding of the science associated with climate change and only seemed to be concerned when climate change issues fell within their political district or if direct impacts were explained.

The research demonstrates that there is very little institutional knowledge of climate change at the local and State level. These findings suggest that in order to ensure that climate change is recognised as an issue which transverses traditional environmental concerns, government staff and the general community needs to be adequately educated.

Leadership is important in generating support for changes to traditional policies. Dawson (2001) argues that good leadership in the public sector is imperative for making the connection between global thinking and local action. One of the SEQ concerns relates to the fact that many of the interviewees felt that local political leadership was weak on climate change. Many of those interviewed complained about difficulties in trying to persuade key decision-makers to bring about a change in policy.

The lack of acceptance of the problem in SEQ by local leaders is also apparent at the State level. Although the Queensland Greenhouse Strategy (EPA 2004) shows that the Queensland Government is very much aware of the greenhouse problem and its potential ecological, social and economic impacts this is not reflected in the mechanism that guides future action of the SEQ region, namely the SEQRP. This paradox may have arisen through issues of political leadership. One State agency respondent stated that a reason why climate change mitigation strategies were not included in the SEQRP was 'it was not on the political agenda'. This omission has subsequently impacted on local climate change initiatives (or the lack thereof). However climate change policy may soon be influenced by some key contributions to the climate change debate, such as the Stern Review (Stern 2006) and the film *An Inconvenient Truth*, which have raised the profile of climate change in the Australian media. The specific political ramifications of these events remain to be seen.

Good education can greatly support leadership. Contrary to world best practice current SEQ climate change education campaigns seem tokenistic and do not allow the community to adequately take ownership of the problem and solution. The community may be more prepared to act if their local council champions the cause. Many of the local councils stated that they do not have adequate resources or the knowledge base to undertake community education campaigns. Findings from the interviews show that climate change education in SEQ is only incorporated into general environmental education campaigns, if any and only some of the councils undertook these.

Utilising the capacity to change attitudes

The capacity to change includes having the appropriate resources, technology and regulatory support to enable GHG reductions. At first glance it seems that SEQ has the capacity to change. It is an economically booming region established within the 'Smart State' of Queensland.

An important first step in the mitigation process would be the establishment of accurate baseline data. Eleven of the eighteen councils have generated their emissions data for both the corporate and community sectors. Because these data form the foundation for future analyses, it is important they be as accurate as possible. This study shows that as the councils have commenced their mitigation strategies at various times and used differing approaches, there is no common baseline data used in SEQ. Many of the greenhouse local action plans are outdated and there is little evidence which suggest that any attempt has been made to have a regular review of the action plans. Furthermore, there is no emissions target set at the State level (i.e. the SEQRP), impeding the ability for SEQ to evaluate temporal changes in GHG emissions. The findings of the interviews have highlighted that some councils take a less than professional approach to the collation of GHG data. This suggests the need for data to be collected by a separate and independent agency. It is important to maintain transparent data and this is often done by using a third-party such as an environmental or community group. Establishing the baseline data and targets requires constant evaluation. It is important to have regular reporting of emissions data

by an independent agency. Independent auditing allows for a transparent approach and limits 'data fudging' by councils and agencies.

The interviewees expressed concerns that their councils did not have the resources or the technical know-how to generate accurate data, and that they relied on support from the CCP program, as there was little support at the State level. Although the CCP Australia program is a Federal initiative the funding it provides is very limited.

An appropriate climate change mitigation goal is in the range of a 60% reduction of the 1990 GHG emissions by 2050 (Preston & Jones 2006). None of the council or State targets in SEQ come close to what is required to achieve this. Councils have only generated targets that they felt could be achieved given the region's rapid population growth. The approach most councils followed was one of achieving the goals of a 'bad' target as opposed to failing to achieve a good one. Ironically the evidence from this research suggests that councils are even failing to achieve the easy targets they set themselves.

Electricity generation contributes significantly to national and international GHG emissions. As is evident in the Queensland Greenhouse Strategy (EPA 2004) and interview findings the mitigation focus of SEQ is based on improving energy efficiencies. This approach is an economically attractive one with great short-to-medium-term potential. However, to be included as world's best practice it must be complimented with long-term strategies (Edenhofer et al. 2005).

At the local level mitigation measures in SEQ primarily consist of energy efficiency activities. There were no attempts to become less reliant from the main coal-powered grid. In the interviews economic reasons were most often given for not having a more proactive renewable energy policy. However fiscal constraints can be overcome through public bond schemes as discussed earlier.

With respect to transport emissions, local councils have done very little except to purchase low emission fleet cars. At the State level the urban footprint defined in the SEQRP has been introduced to contain urban sprawl. However its supporting infrastructure plan dedicates more than 62% (OUM 2005) of the transport funds to building roads and tunnels which will do little to reduce vehicle kilometres travelled. The Transit Oriented Development (TOD) concept incorporated in the SEQRP was highlighted by several of the interviewees as the main strategy to reduce vehicle kilometres travelled. However research suggests that TODs may have minimal impact because they fail to reduce non-work travel (Nelson et al. 2001).

Willingness to change

Climate change is now widely accepted as a scientific reality with strong potential to have a considerable impact on society and the natural environment. As discussed earlier the local scale is a logical level at which to mitigate GHG emissions. The severity of the issue highlights the need and ethical responsibility for all who have the capacity to reduce their GHG emissions. This responsibility was the basis for the introduction of Article 3 on the UNFCCC. Its basic premise is that it was the developed countries that created most of the initial emissions and reaped the economic rewards, thus they should shoulder the responsibility for fixing the problem (UNFCCC 1994).

Beyond ethical considerations, the argument in favour of climate change mitigation has many other strengths. The present study shows that mitigation can lead to global and regional adaptation savings as well as providing a considerable range of local environmental, social and economic ancillary benefits. While SEQ has more CCP member cities than many countries it appears as though the willingness is present, however this research suggests many SEQ councils

only join the CCP program because they want to be seen as doing something. The Queensland Greenhouse Strategy (EPA 2004) promotes the involvement of local governments in the CCP program as the main local government mitigation strategy, although provides no evidence of their success (or lack of) against the voluntary targets. The presentation of information in the Queensland strategy could mislead observers into thinking that much is being done at the local level. The CCP is a valuable program but as shown in this research it has its limitations. Bulkeley and Betsil (2003) found that international participants of the CCP program who have been successful at reducing emissions often achieved their goals independent of the CCP program.

The literature review confirmed that the reasons to mitigate are clear. However, what is not clear are the reasons why some, such as SEQ, do not show a willingness to participate in resolving what may be the most serious challenge facing humanity. In SEQ there are no substantive provisions in the planning schemes or the SEQRP for climate change mitigation. The lack of willingness to change by some councils is most evident by those who have falsified their emissions data or based their targets on extreme years. The interviews suggest that this type of behaviour stems from the pressure leaders face in trying to ensure political longevity. One interview respondent argued that no councillor would mitigate climate change if it was seen as limiting economic growth because economic arguments win elections.

Impediments to change

Although economic growth is an obstacle which seems to limit the willingness to change, it was not one of the main impediments mentioned by the interviewees. The main impediment that was raised however was rapid population growth combined with a lack of support from the State government. However population growth has not impeded some local governments in adopting climate change robust mitigation policies. Portland (U.S.) has achieved credible reduction targets with a growing population (US. EPA 2006) while the City of Melbourne aims to be carbon neutral by 2020 also have a growing population (Melbourne City 2006). Current trends show that global population is increasing at a very steady rate and it is this very reason, combined with the fossil fuel economy, why GHG emissions are increasing.

Rapid population growth may be a factor behind the poor performance of SEQ mitigation strategies but these are the parameters that local government must work within. A combination of factors is limiting SEQ's performance in climate change mitigation. Environmental lag times associated with climate change limit our awareness of the impact we have had on the natural environment. Because leaders cannot see the immediate impacts of climate change they seem unwilling to alter their 'business as usual' approach. This restricts mitigation strategies which often need to go beyond the standard election cycle. This places the onus on planners and other environmental professionals to convince councillors and the community that there is no choice but to acknowledge the problem and act.

However if there are not enough planners and related professionals with the appropriate environmental knowledge it will be very difficult to bring about a change. Currently there is a shortage of planners in SEQ and as borne out in the interviews there appears to be an acute shortage of those professionals who are able to translate climate change language so that it can be easily understood by councillors and the lay community.

One of the key impediments to climate change mitigation in SEQ is the lack of recognition and understanding of the climate change phenomenon at all levels of government. In SEQ climate change is seen solely as an environmental problem which in a development driven region traditionally has little weight with decision-makers. The community's lack of understanding leads to individual decisions which may result in dangerous interference with the climatic system. This then results in unwillingness by politicians to try to implement plans which are at odds with the community.

Another key impediment is that SEQ leaders and key decision-makers fail to see the range of immediate and long-term benefits which mitigation can provide. Because they choose not to adequately mitigate, they increase their vulnerability to the changing environment as well as the subsequent level of adaptation which will be required.

Conclusion and recommendations

This research has provided an insight into South East Queensland's mitigation strategies, rating them against world best practice, and identifying obstacles to provide a possible way forward for the region. Although there has been an initial response by some councils to generate an emissions database, SEQ falls well short of best practice.

Evidence presented in this research shows that climate change is real and is being increasingly acknowledged at the local level. Information presented, combined with national and international examples show that strategies to mitigate climate change require an integrated approach as there is no single panacea for mitigation. It is important to recognise that most aspects of a climate change mitigation strategy will provide a number of ancillary benefits, particularly at the local level.

This research found that local level climate change strategies were focused on the voluntary CCP program, whilst strategies at the regional level were almost nonexistent. When compared to world's best practice, SEQ strategies rate poorly, and show few signs of improvement in the foreseeable future.

While it would seem that the CCP program is good for the promotion of climate change mitigation, it may actually be doing more harm than good in the SEQ context. This is because information presented in the Queensland Greenhouse Strategy (EPA 2004) may mislead us to believe that local governments are 'on top' of mitigation strategies. However this research has presented that most local councils tend to set 'bad' targets that they can achieve rather than 'good' targets which might not be reached. If local governments in the SEQ were not members the CCP program it may be easier for the community to recognise that their region falls considerably short of world best practice in climate change mitigation. Although concerns were raised by interviewees about population growth, a key impediment seems be the failure at all levels of government in SEQ to recognise climate change for what it is – a phenomenon that has the ability to permanently alter social, economic and ecological systems.

The dilemma of climate change brings about a great opportunity to change the structure and the mindset that created this situation. The SEQ region's rapidly growing population is already placing considerable strains on the region's natural environment. All elements of best practice climate change mitigation strategy listed in this paper have considerable ancillary benefits which may help alleviate some of SEQ's growing pains. Furthermore, although the emissions of SEQ may seem miniscule in comparison to the global common, mitigation strategies will better prepare the region's adaptability to the changing climate.

Towards achieving best practice in mitigating climate change

The first major step would be for all levels of government to acknowledge the seriousness of the climate change situation. Climate change will greatly challenge the environment, economy and social equity of the region. To achieve a best practice approach to climate change mitigation there needs to be an absolute change in the mindset of the government and general community. This requires a concerted community education campaign and training of local and state government planning and policy staff. Planning schemes need to move away from a token acknowledgment of the challenge and incorporate climate change mitigation into every element

of planning. Appropriate guidance from the State through the SEQRP and the Greenhouse Strategy is needed to change planning schemes.

If the SEQRP is to be deployed to its full capacity the region's planners need to acknowledge climate change as one of the most serious risks of this century. There needs to be an establishment of accurate regional baseline data with emissions targets that coincide with world's best practice incorporated into the SEQRP.

If the State fails to show guidance then local governments need to take ownership of the problem and lobby the State to provide them with the support they require. There seems to be a limited time frame in which to introduce measures before significant change is 'locked in'. As shown in this research, a top down approach may be the best option. This places a significant weight on the shoulders of environmental planners and other climate change strategists in SEQ to convince the key decision makers the importance of mitigation. If the current 'business-as-usual' approach to climate change mitigation continues, SEQ may find that it is missing out on considerable opportunities.

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