

# Framing Climate: Implications for Local Government Policy Response Capacity<sup>1</sup>

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**Abstract:** The rapid uptake of political and community acceptance of climate change in Australia is placing significant pressures for local governments to examine their vulnerabilities to climate change as well as their need to undertake an expedited review of potential mitigation and adaptation strategies. However there is a dichotomy between the actual need for a local level strategy and the capability of Australian local governments to do so. This paper explores the challenges surrounding climate change policy and suggests the adaptation and mitigation frames limit the scope of the policy debate and inhibit the development of local government climate change strategies. It explores the costs and opportunities that climate change brings to local governments and draws on the South East Queensland experience to examine the available policy instruments. This paper fosters and strengthens the policy debate about local government's role and responsibilities in dealing with climate change. It also highlights the potential risks and vulnerabilities of local governments, both at the corporate and community level, under a range of changing climate scenarios.

## Climate Change: Framing the Policy Issue

Climate change is a relatively new area of policy development characterised by considerable uncertainties. These uncertainties were once dominated by questions over whether anthropogenic or natural factors are the root cause of climate change. However, the fourth report of the Intergovernmental Panel on Climate Change (IPCC) released in 2007 endorses the view that human activities are the principle cause of climate change. As a result, the focus of uncertainty has now moved from this broader issue to consider how governments, business and the community are contributing to climate change and what can be done about it. There is still considerable uncertainty and a lack of research about the local consequences of climate change, the identification of local risks, and the scoping and implementation of possible policy strategies (England 2007). This complexity surrounding climate change has led to a diverse array of climate policy approaches ranging from voluntary mechanisms to regulation. There is also considerable variation in the scale, targets and timing of policy responses. Although scientists have been aware of the seriousness of climate change for more than two decades this paper will show that climate change has only recently come to the forefront of Australian policy landscape. This delayed response, combined with ever increasing dire predictions, creates a sense of urgency to act, limiting the ability of the policy makers to ease the community into the new era of climate related policies.

Climate change research has gained considerable strength and credibility over the last 30 years. Coupled with its recent attention in political discourses and in public interest, climate change has been catapulted into mainstream policy relevance for all levels of government. As a result, the science of climate change has gradually moved from the margins of scientific research and credibility to occupy mainstream relevance in a range of disciplines and fields of research and practice including earth sciences, engineering, planning, health, policy sciences, politics, economics and environmental management. Despite this growing interest, there remains considerable uncertainty and, as a result, difficulty, in translating the growing body of scientific research into practical policy directions and actions. Local government is a key actor in moving climate change research from scientific discourse to action. Yet despite widespread rhetoric supporting climate change adaptation and mitigation, actions at the local level have been relatively patchy and fragmented.

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This paper explores the process through which the climate change issue is translated into local government planning and policy action. Whilst its focus is on South-East Queensland local governments, the findings shed light on the difficulty of Australian local government in dealing with this complex policy issue. This paper draws from and engages with policy literature, and, in particular, theories about the structure and framing of policy problems from which policy action emerges. It adopts a reflective, social constructionist approach to examine how climate change is framed as a policy issue at the level of local government, and how this framing combined with the particular circumstances of Australian local government, shapes the ability of local governments to act.

Critical, social constructionist policy research over the last 20 years has highlighted the gap between the research and practice of policy making. Schon and Rein (1994, p. xii) argue this is due to the impossibility of engaging with political realm of policy making, which is driven by politics and often devoid of common sense and rationality. As a result, policy researchers have tended to separate themselves from direct involvement in policy making, preferring instead to provide commentary and *ex post* evaluations. This situation has led to an emerging gap between the practice of policy making and policy research. This gap can be manifested in a time lag between understanding the nature of the policy problem and the identification, implementation and evaluation of policy solutions. It can also be manifested in policy practice and research becoming quite separate and independent activities. In the context of policy issues around which there is some urgency and a great deal of uncertainty, such as climate change, this gap between research and practice has the potential to hinder responsive and timely policy development.

A way forward, according to Fischer (2003), is that practitioners need to adopt reflective practices that are informed by theoretical understandings and their application to current problems. While this thinking has gained considerable currency among planning and policy academics over the last decade, planning and policy making practice continues to be dominated by planning professionals working under the historical paradigm. This research seeks to address the research-practice gap by providing practitioners with insights into the local government climate change policy environment and to suggest possible policy actions that recognise the particular framings and practices to which they are subject.

Social constructionist views of planning and policy suggest that the possibilities of policy action are embedded in the context, and that this context limits the scope of policy action (e.g. Fischer 2003). In other words, creative and innovative approaches to addressing policy problems are limited by a range of factors including institutional, ideological, social, technological and scientific constructions of the policy issue. They are also influenced by the power and capacities of various stakeholders to understand and frame the policy problem. Research into the power of epistemic communities and their role in issue framing and agenda setting supports this view. It follows then, that a frame-reflective view can assist understanding how local government constructs and responds to climate change as a policy issue.

## **From Science to Action**

### ***Climate science***

There is general international consensus that climate change is real and serious, is largely brought on by anthropogenic activities and according to the Intergovernmental Panel on Climate Change (IPCC), must be stabilised by 2050 if there is any chance of avoiding “dangerous interference with the climate system” (UNFCCC 1992, p.X; IPCC WG II 2007). Although “dangerous interference” is not defined by the UNFCCC there seems to be a growing agreement that global warming must be contained to within 2°C -2.4°C above pre-industrial levels by 2050 to prevent runaway positive feedback mechanisms (Bierbaum & Ravin 2007), such as the thawing of Siberian permafrost and meltdown of the West Antarctic Ice Sheet (Tveitdal 2001; Kerr 2007).

Even if global warming was contained to below 2.4°C above pre-industrial levels, some climatic change is already locked in, raising the importance of adaptation strategies. According to prominent climate modeller, James Hansen, sea levels will more than likely increase by more than one metre by the end of the century (Kerr 2007). Other locked in impacts include reduced food and water availability for tens of millions of people and over a third of global species becoming

extinct (IPCC WGII 2007). There is a growing body of literature that suggests that we are already locked into more than 3°C and as such must prepare for significant impacts and threats to our current way of life (Monbiot 2007; Shehan *et al* 2006; Lovelock 2006).

While the evidence of climate change remains sound, there is considerable uncertainty over localised impacts. Potential impacts from climate change are dependent on a broad range of variables including geographical location, ecological constitution, economic structure, social cohesion, infrastructure design and demographic structure. Notwithstanding the adaptive capacity of a human or ecological system, many predicted impacts are also dependent on current and future mitigation strategies. For example, the adaptation strategies needed for a stabilisation of global warming at 2.4°C by 2050 may differ greatly if mitigation is ignored and the earth experiences warming of 4°C and beyond. The broad range of climate projections for Australia highlights the messy challenge of translating science into tangible mitigation and adaptation policies.

### ***Climate change impacts on the urban environment***

Urban environments face a range of risks from the predicted changes in climate. These include:

*Sea level rise and storm surge* – the current science predicts that coastal inundation is about 100 times that of the predicted sea level rise. Hence, the current predicted sea level rise of 3-30cm by 2040 and 9 - 88cm by 2100 could see the coastal foreshore retreat by 88m at the end of the century (Walsh 2004). Increased sea levels can also have ecological impacts through changing stream flow, economic impacts through altered distribution of fisheries and impacts on tourism environments, and social impacts through loss of sandy beaches (Voice *et al* 2006). Furthermore sea level rise is expected to increase coastal flooding events with “events that currently occur roughly once every 50 years might occur as frequently as once or more per decade” (Church *et al* 2006). At this stage the extent of vulnerable coastal urban areas is unknown, although there are some fragmented studies currently being conducted that seek to measure and evaluate such impacts.

*Extreme weather events* – These events consist of intense rain and wind speeds placing considerable strain on infrastructure, built environments and emergency services. Long term effects of such weather events can include a withdrawal of insurance coverage and increased public liability risks. It is important to note that extreme weather events have non-linear repercussions; for example a 25% increase of wind speeds above 40 -50 knots result in a 650% increase in damage to buildings (Hennessy *et al* 2006). Also for each 1°C increase in atmospheric temperature lightning activity increases by 40% (Reeve and Toumi 1999).

*Heat* – Climate change is expected to increase the occurrence of hot or very hot days (those over 35°C) (IPCC WGII 2007). European urban environments experienced significant impacts (more than 30,000 deaths and economic impacts of over US\$13 billion dollars) from the heat wave of 2003 (Wolter *et al* 2005). Large amounts of impervious surfaces make urban environments efficient at retaining heat. In particular areas of high density and low vegetative cover, such as central business districts and activity centres, are prone to the “heat islanding” effect. As the elderly are most vulnerable to heatwaves (Woodruff *et al* 2006), an increased number of hot or very hot days has implications for an ageing population.

*Precipitation* – Precipitation is also expected to become more variable. Depending on the particular location precipitation could increase or decrease and extreme variability (e.g. droughts and floods) will be accentuated. In Australia most urban environments are expected to see a reduction in precipitation, with much of the rainfall expected to come in the form of extreme weather events (Preston & Jones 2006).

While the above impacts highlight some of the potential implications of climate change on the urban environment, key risks will most likely come from the confluence of and interactions between physical impacts, urban design and settlement form, and the systemic reactions to the changing climate. These are the so-called ‘cocktail effects’. For example, increased fuel prices (as a result of a carbon constrained economy) combined with lack of access to good public transport may limit the capacity of some residents to gain access to essential services and / or

employment during a heat wave. Residents without access to an air-conditioned vehicle may be unwillingly confined to their home or forced to face the temperatures. Elderly and infirm people without access to an air conditioner at home (or without one due to heat related power failures) may face serious risks to their health and well-being. These scenarios illustrate that the secondary effects of climate change may be to marginalise some groups in society.

### ***What sort of policy problem is climate change?***

It is our position that, as a policy problem, climate change is not well understood and that this lack of certainty has the potential to impede effective and timely policy development. This is especially so in the rapidly changing domain of climate change, where new research and studies are being released regularly. Moreover, at the local level potential impacts are largely unknown, timeframes are long and expertise is limited (Tompkins and Adger 2005). Divergent interests and understandings about climate change, shared responsibilities across horizontal and vertical units of government, and the different values and frames being applied to climate change exacerbate the difficulty of dealing with the issue. On this basis, it is useful to diverge for a moment to consider what sort of policy problem is climate change.

Climate change is undoubtedly amongst the most contested contemporary policy problems for all governments. It is a multidisciplinary policy problem, which spreads across and has implications for environmental, social and economic systems (IPCC WGII 2007). Tompkins and Adger (2005) note that individual disciplines provide information and guidance on specific issues but can also generate 'fractured and biased images of the world and reduce the possibility of finding holistic responses' (p.563). These authors argue that, as a result, climate change policy responses are highly dependent upon individual decision makers understanding of and attitudes towards climate risks. These risk perceptions are critical ..

The frame-reflective approach asserts that different actors and agencies frame policy problems in different ways. Each agency or stakeholder frames the policy problem by applying different values, interests and beliefs about the problem. This frame reflective approach explains why in some countries a clear division between climate change adaptation and mitigation policies have emerged. 'Adaptation' refers to actions taken to address the consequences of climate change whereas 'mitigation' refers to actions taken to reduce greenhouse gas emissions and address the causes of climate change. According to Wilbanks et al. (2003) a preference for adaptation has emerged in countries where there are vested interests in not mitigating (i.e. where mitigation will reduce economic productivity and growth), and where the costs of adaptation are not considered insurmountable (partially because the consequences of climate change are not well understood and are surrounded by considerable uncertainty). In Australia, while policy debate is still embryonic, a preference for adaptation is discernable at the national level while at the local level the focus seems to be on mitigation.

Schon (1994, p. xviii) explains that 'these frames determine what counts as fact and how one makes the normative leap from facts to prescriptions for action'. However, frames can also inhibit full policy debate and entrepreneurial solution building. Yohe (2006) suggests that the continued reliance on cost-benefit paradigm to organise thinking around climate change policy has limited debate. In particular, Yohe argues that uncertainty tends to be minimised because of the difficulty in understanding and quantifying it, and as a result, potentially significant consequences of climate change can be overlooked.

In a similar vein critical of dominant climate change policy response frames, Tompkins and Adger (2005) argue that the emergence of an adaptation – mitigation framing dichotomy has contributed to climate change policy inertia. They argue that climate change policy responses must take into account the full range of factors that constrain and enable adaptation and mitigation. That is, climate change policy responses are influenced by a wide range of economic, social, technological and development factors. The adaptation-mitigation framing obscures the real challenge of understanding and enhancing the 'response capacity' of governments to address climate change. This response capacity is the 'ability of governments to manage the causes of environmental change and the consequences of that change' (Tompkins and Adger 2005, p. 564). It makes sense then that governments should be seeking to enhance their response capacity.

## **Risk Perception and Policy Responses**

A risk-based approach to managing climate change policy is an emerging approach receiving considerable attention (e.g. O'Brien, O'Keefe et al. 2006; Schneider 2006). Climate risk management conceptualises climate change not as a physical-environment problem where solutions are commonly based on technological fixes to overcome environmental problems, but as a human-environment problem where risks and hazards can be addressed through combinations of social change and technology (Haque and Etkin 2007). Managing climate change therefore requires trading off consequences (i.e. *what can happen?*) with probability (i.e. *what are the chances that it will happen?*) (Schneider 2006). Herein lies the challenge for Australian local governments: to identify vulnerabilities and reduce the risks to local communities posed by climate change. Underpinning this is the notion of perceived risk and the capacity of local government to respond to those perceptions of risk.

### ***Framing Risk***

Attitudes towards and perceptions of climate related risk in Australian local governments have been given very limited coverage in literature. Yet these attitudes and perceived risks can have far reaching implications for local planning and policy development. Without a clear definition of risk or an examination of the perceptions of climate related risk those working to reduce local government vulnerabilities are in danger of achieving little.

### **Dichotomy of risk perception**

According to Elliot (2003) the perception of risk is greatly influenced by its frame and that the framing of risk, and subsequent perception of risk, differs between professionals and the lay public. Elliot argues that to professionals risk is framed using statistics, science and 'the distribution of risks across a population'. Alternatively, to many lay people . . . 'risk is much more tangible and directly observable' (Elliot 2003, p. 216). Hence the approach of risk management has the potential to exacerbate discordance between researchers/scientists and decision-makers who are generally lay people representing the public. Not surprisingly inertia or inaction may result.

This can be seen at the State and local government level in South East Queensland (SEQ) where an examination of policies, regulations and local planning documents shows that any perception of climate risk is not being reflected in the local planning instruments in this most populous Queensland region. In what follows, an analysis of South East Queensland local governments is presented. South East Queensland is identified by the IPCC as an area facing exacerbated risk due to its geographic location and strong urban development (IPCC WGII 2007).

### ***What risks do local governments face?***

Assessing the risks and vulnerabilities of a local government can be complex. As previously discussed, risk arises from physical impacts, urban design and settlement patterns and systemic reactions to change. 'Cocktail effects' which involve interactions between these factors may also emerge. Whilst O'Brien et al (2006) suggest there are three main categories of impact – on livelihoods, on settlements and on infrastructure - there are eight key categories of relevance to local government<sup>1</sup>.

1. *Infrastructure Risk* – Including the physical effects of climate change on local council assets and investments, as well as the increased costs of obtaining insurance cover for those assets. Also the risks of sudden depreciation of assets due to withdrawal of insurance cover or other climate related market change. Infrastructure risks also include risks to the social, economic and ecological attributes of the local government area as well as residential and commercial buildings, natural assets and business continuity.
2. *Planning and Policy Risk* – Including compliance with an evolving regulatory environment such as changes to regional planning directions, planning codes, regulated industry standards and risk disclosure compliance.
3. *Market and Competitiveness Risk* – Including changing markets, loss of productivity with respect to competitors and the effects of the changing relative value of assets based on

exposure to primary (direct) and secondary (market adaptation) climate change impacts. This market and competitive risk may result in businesses and/or developers locating to a neighbouring local government area, impacting on job provisions and the economic base.

4. *Litigation Risk* – Including the liabilities associated in inadequate disclosure to the community and developers of associated climate change risks or inadequate preparation of the traded commodity for climate change. The litigation risks for LGA's include maladaptive actions that lead to negative health impacts, loss of business and private property insurance and values (McDonald & England 2007).
5. *Environmental Risk* – Including species loss, water availability and quality, scenic amenity, reduced pollination and clashes between rolling easements and urban development. Challenging decisions will have to be made with limited resources.
6. *Community Risk* – The physical effects of climate change and subsequent adaptation and mitigation strategies have the potential to place significant strain on communities, especially the elderly, infirm, socially isolated and indigenous Australians. Impacts include health impacts (from disease, heatwaves and extreme weather events) and increased financial strain (from rising fuel, energy, water, property & health insurance and food costs).
7. *Political Risk* – Including the risk that politicians face from their specific stance, action or inaction on climate related issues. As climate change becomes more prominent in the public arena there is growing evidence that the community are prepared to vote on a politician or political party's approach to climate change strategies.
8. *Emergent Risk* - New and future risks, including as yet unknown secondary risks associated with actions or inactions taken to address climate change. These include non linear events or step changes as well as the confluence of impacts, or cocktail effects.

### **South East Queensland and Climate Risk: A Case Study**

The following case study presents an examination on the Queensland Government's framing of climate change, how it has recently gained media and political interest and how this has filtered down into the local government arena. There currently exists a wide range of State policies and regulations that ensure local governments consider the impacts of climate change in planning and other activities. This opportunity to include climate change into planning mechanisms allows local governments to increase its resilience to climate change and spread the risk burden. While this paper focuses on the perception of risk in South East Queensland, similarities exist throughout Australian local governments. The following provide a general overview of State expectations of local governments in regards in addressing the causes and consequences of climate change as well as a brief overview of where South East Queensland sits against the eight key risk classes.

#### ***ClimateSmart 2050 and ClimateSmart Adaptation 2007-2012***

The Queensland Government has recently released the ClimateSmart strategy with staged short, medium and long term goals for a 'low carbon future' (Queensland Government 2007a). While the strategy is yet to declare Queensland's first ever greenhouse gas emissions targets it commits to helping achieve a national greenhouse gas target of 60% reduction of 2000 levels by 2050. The ClimateSmart Adaptation 2007-2012 strategy lays the foundation for the next four decades of climate change adaptation. It sets priorities which include reviewing the effectiveness of climate change strategies in State planning policies and local planning schemes (Queensland Government 2007b) The ClimateSmart 2050 strategy relies heavily on partnerships with the coal industry with \$900 million of the \$1.2 billion government and industry funds available specifically reserved for clean coal and geosequestration technologies (Queensland Government 2007).

#### ***South East Queensland Regional Plan***

Although the South East Queensland Regional Plan (SEQRP) has received some criticism for failing to guide councils on climate change mitigation it provides more tangible options for councils in regards to adaptation. The SEQRP does state that "local government planning schemes must

be consistent with the intent of the desired regional outcomes, principles and policies” (OUM 2005, p.32). These include the following climate change specific policies:

2.3.4 Assess the impact of potential climate change in preparing planning schemes and land use strategies.

2.3.5 Raise community awareness, knowledge and understanding of air quality, greenhouse gas emissions and climate change impacts.

2.4.4 Ensure use and management of the coast provides for natural fluctuations in coastal processes, including storm tide inundation, climate change and sea level rise.

These policies are significant for local councils now entering the review stage in preparation for the development of their second *Integrated Planning Act (IPA) 1997* planning scheme. The IPA requires councils to consider policies of the State (Sch 1, s 11 (1)), and planning schemes must also be consistent with the policies provided in the SEQRP. Given the vague directions contained within the above State policy directions, councils are in the awkward position of having to find their own way across a minefield of addressing climate related risks and local vulnerabilities.

The SEQRP also gives some recognition to the importance of ‘greenhouse gases’ by including it as an environmental indicator, although neither targets nor baseline data are provided (OUM 2005, p.25). More specifically, the SEQRP directs the reader to the Queensland Government’s Greenhouse Strategy (OUM 2005, p. 32). The Greenhouse Strategy (2005), superseded by the recently released ClimateSmart 2050 (2007), highlights that ‘local governments in Queensland play a pivotal role in that State’s response to greenhouse’ and that the *Integrated Planning Act (IPA) 1997* gives local governments ‘an opportunity to incorporate emissions reduction . . .into the local planning process’ (Q.EPA 2004, p.59)

### **State Planning Policy 1/03**

State Planning Policy 1/03 *Mitigating the Adverse Impacts of Flood Bushfire and Landslide* seeks to ensure that councils consider climate change in a range of natural hazard assessments. Although at this stage it excludes bushfires ‘likely changes to relevant factors such as rainfall intensity and duration, temperature change, sea level changes and the like’ can and should be incorporated by local governments into hazard assessment studies (Q.DLGP & Q.DES 2003).

### **Local planning schemes**

A recent review of SEQ planning schemes (Burton 2007) shows that half of the planning schemes reviewed fail to include the terms “climate change” and /or “global warming”.

It is interesting to note that these targets themselves are not on par with what much of the international community anticipate is necessary to stabilise and contain runaway global warming beyond 2.4C. Furthermore these targets are based on, not any Australian National targets but what the Australian Business Round Table suggest, highlighting that the Queensland Government see economic risks as the dominant frame.

### **South East Queensland and Climate Change Risk**

South East Queensland is vulnerable to the impacts of climate change (IPCC WG II 2007) with projections that there will be an increase in average temperature (0.3°C to 1.7°C by 2030) and an increase in rainfall intensity (CSIRO 2001; Abbs & McInnes 2004). The following provides a very brief overview of some of the challenges South East Queensland faces from climate change and responses to climate change. The impacts below are only indicative and are part of a much wider stream of research being undertaken by the authors.

*Infrastructure Risk* - More than \$82 billion will be spent on infrastructure in South East Queensland over the next twenty years (Q.DOI 2007). As shown by Preston and Jones (2006) a 2°C -3°C increase will see maintenance costs of infrastructure in Australia increase. Furthermore the choice of infrastructure, such as increased roads or tunnels, may not be the best option for a transition into a carbon constrained society.

*Planning and Policy Risk* - As discussed earlier the SEQRP guides local governments to consider climate change in their planning schemes. The risk for councils is that many do not have the capacity or capability to do so and may now be perceived by some to be in breach of this regulation. The SEQRP also requires local governments to prepare a Local Growth Management Strategy by 30 June 2007 (SEQROC & OUM 2005). The aim of each LGMS is to bed down the local details of the South East Queensland Regional Plan. This task cannot be properly achieved without a proper examination of current and future risks that climate change brings to the region.

*Market and Competitiveness Risk* – Local governments are placed in a precarious position by the enormous revenue potential from development. Without a concerted effort by all eighteen local councils, individual councils may be apprehensive about implementing climate related restrictions on development if it means that the development will move to a neighbouring council or shire.

*Litigation Risk* - South East Queensland has been identified by the IPCC as an area that may face exacerbated risk (IPCC WG II 2007). For example if local governments have approved developments in areas that they know or should have known to be at increased risk from climate change, then the owners of those properties may at a later date seek redress if their property becomes uninsurable for climate related impacts (England 2007).

*Environmental Risk* – At present South East Queensland is under level five water restrictions. Under expected changing conditions providing adequate water supplies for urban and rural areas will prove a considerable challenge. Furthermore, infrastructure responses to the water dilemma may see developments occurring without appropriate concern for the surrounding environment (e.g. Traverston Dam).

*Community Risk* – South East Queensland has an ageing population. By 2026 the over 65 cohort is expected to increase from 11.9% in 2001 to 19.6% in 2006 (PIFU 2007) and as discussed earlier it is the elderly who are at most risk from heatwaves. Responses to climate change, such as a carbon tax on petrol, may also have negative repercussions for the community as many households in South East Queensland are vulnerable to increases in fuel prices (Dodson & Sipe 2006). Without appropriate planning responses there may be a possibility of “climate slums” in South East Queensland’s future.

*Political Risk* – Climate change is now on the political agenda. Any politician or political party who fails to address climate change may lose the support of their constituents. If climate change is poorly managed at the political level political instability may result, which has potential impacts on economic growth and investment (Alesina & Perroti 1994).

*Emergent Risk* – Emergent risks for South East Queensland may include security issues, food supply and civil unrest.

### **Discussion: Possible Directions for Local Climate Policy**

Whilst it is acknowledged that climate policy is an emergent area of debate and that policy development could still be considered embryonic, the above case study of South East Queensland illustrates a dearth of policy leadership on the part of the State government and a clear lack of direction by local governments. This situation has likely resulted from:

- A lack of clear and direct information about the local impacts of climate change;
- Lack of debate about climate related risks and poorly formed perceptions of those risks amongst policy officers and decision-makers;
- The uncritical adoption of the dominant frames of adaptation and mitigation which shape the policy response field;
- An emerging preference for adaptation over mitigation; and
- Lack of clear understanding about the response capacity of local governments.

It seems that current Queensland climate change strategies do very little for the mitigation greenhouse gas emissions or prepare human settlements for the consequences of climate related change. Current Queensland policies illustrate the State's willingness to transfer much of the responsibility, and risk, to local governments, without the support of resources, information and systems. According to Thom (2007) some of the reasons behind non-implementation of State

based strategies come from a dearth of regional / local climate models and detailed mapping as well as a lack of Federal direction;

Without firm national leadership, support and direction, most local authorities will find it too hard to go beyond “business as usual” until climate change ‘crises’ hit their constituents and then the costs to society will be staggering (Thom 2007, p. 6)

Under current political conditions it is possible that a “climate change crisis” in South East Queensland is eminent with serious potential to reverberate through the region’s population and economic boom.

## Conclusions

Climate change is a complex human-environment policy problem still in its embryonic stages of debate and development. While technological solutions may address some of the causes of climate change, long term policy approaches require an integrated approach that builds institutional and social capacities to respond to climate change. The case study of South East Queensland suggests that, at the level of local government, the possible field of policy solutions has been heavily influenced by the dominant frames of adaptation and mitigation which have been adopted by State government. In this paper we have argued that adaptation and mitigation frames limit the scope of the policy debate and inhibit the development of a clear understanding and appreciation of the response capacity of local governments. However, as a result of their responsibilities in land use planning, infrastructure and protection of community well-being, local governments will be at the coalface of managing the consequences of climate change in the future. The eight categories of risk identified illustrate the extent of local government’s vulnerabilities to climate change and illustrate the need for a co-ordinated and considered approach to enhancing the policy response capacity of local governments. So what can local governments do to enhance their response capacity and rise to the challenge? Local governments should weigh up and make balanced decisions about the need to address climate change risks and vulnerabilities. The field is in a state of flux with new research and developments introduced at a rapid rate. Local governments need to develop a considered approach that takes into account emerging research and policy developments. Local governments also need to critically examine their policy response capacity and undertake considered responses to the risks and vulnerabilities identified.

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<sup>i</sup> These categories have been developed by Burton in his work with Climate Risk Pty Ltd.