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# Carbon Management by Queensland Local Councils

## Citizenship for Transitioning to a Low Carbon Future\*

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Climate change and carbon mitigation are key issues for local government. This paper evaluates carbon actions by 32 local councils in Queensland, Australia. A climate action framework and carbon management matrix were used to assess corporate citizenship by councils on emissions reduction. This study found carbon actions related to council size and capacity, coastal location and climate change strategies. Carbon mitigation actions were mainly implemented by city, then regional and lastly shire councils. Carbon leadership was mainly evident among larger councils (>30,000 population), that have climate change plans and targets. Coastal and metropolitan councils were more 'carbon-ready' (i.e. consolidating or mainstreaming carbon actions) than smaller inland rural councils (i.e. latent or emerging actions). Most Queensland councils were minimalistic or opportunistic in adopting eco-efficiency actions while a few progressively integrated low carbon measures in council operations. The paper identifies key issues for local government in transitioning to a low carbon future.

- Climate change
- Carbon management
- Local councils
- Corporate citizenship

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CLIMATE CHANGE IMPACTS AND CARBON mitigation initiatives are key issues for local government (ACELG 2011; Pillora 2011; Storey *et al.* 2012). In this context, 'Mitigation involves taking actions to reduce greenhouse gas emissions being emitted to minimise the impact from climate change' (LGAQ 2009: 58). Local government strategies and reports include advice and case studies on greenhouse gas mitigation actions for local councils (LGAQ 2009). The report *Local Action for a Low Carbon Future* (Storey *et al.* 2012) estimates that 10–20% of carbon reductions in Australia could be contributed by the local government sector by 2020.

As part of the broader national response to global warming, local government thus faces the challenge of implementing policy, organisational and technical initiatives to mitigate greenhouse gas emissions, adopt clean energy options and address carbon liability. In Australia, local governments are required to report their carbon emissions over 25,000 tCO<sub>2</sub>-e, mainly from landfill, under the National Greenhouse Energy Reporting (NGERS) Act 2007 and the Clean Energy Act 2011. The implementation of a carbon price of AU\$23 per tCO<sub>2</sub>-e from 1 July 2012 will also impact on council operations through the increased cost of energy, water, fuel, transport and raw materials (ALGA 2011; LGAQ 2012). Local councils are thus adopting eco-efficiency measures in energy, water and waste management to reduce operating costs and greenhouse gas emissions.

This paper evaluates climate change responses and carbon mitigation actions adopted by Queensland local councils at the city, regional and shire levels (Zeppel 2012b; Zeppel and James-Overheu 2012a). It thus considers the varied size and capacity of Queensland councils to implement carbon actions. It also extends a pilot carbon survey of Adelaide councils (Zeppel 2011a, 2012a; Zeppel and James-Overheu 2012b) to a state-wide carbon survey of Queensland local government. The purpose of this study was to assess the level of carbon management by Queensland councils and their readiness to address carbon price impacts on council operations. The survey was commissioned by Local Government Infrastructure Services (LGIS) to assess the level and type of emissions reporting by Queensland councils and likely carbon tax impacts on council operations. The survey assisted LGIS and Queensland local councils to benchmark their carbon mitigation actions and assess their potential liability from the carbon price/carbon tax of AU\$23 per tCO<sub>2</sub>-e after July 2012 (AU\$24.15 per tCO<sub>2</sub>-e from July 2013). The hypothesis tested in this study was: Councils apply different degrees of emissions reduction plans and activities depending on their location and size.

There are 73 local government areas (LGAs) in Queensland, including seven city councils, 30 regional councils, 24 shire councils and 12 Aboriginal shire councils. These councils range in size from five of the ten largest LGAs for Australia in the high urban growth region of South East Queensland (i.e. Brisbane, Gold Coast, Moreton Bay, Sunshine Coast and Logan); mid-size regional centres in coastal and hinterland areas (e.g. Cairns, Mackay, Toowoomba); and small rural or Aboriginal shires with less than 1,000 residents. These LGAs operate under the Queensland Local Government Act 2009. The City of Brisbane Act

2010 covers Brisbane City Council as a corporation managing the largest LGA in Australia. Some 27 Queensland councils also participated in the Cities for Climate Protection (CCP) programme that set corporate and community goals for emissions reduction (Zeppel 2011b).

The Local Government Association of Queensland (LGAQ) has published a climate change mitigation guide (LGAQ 2009) and an analysis of carbon price impacts on councils (LGAQ 2012). There is no state-wide climate change strategy for Queensland LGAs and no renewable energy, green power or other carbon targets for local councils have been set by the state government. There is one regional carbon plan completed by five LGAs for Far North Queensland, involving a greenhouse gas inventory and carbon mitigation action plan (FNQROC 2011). Queensland local government elections in April 2012 also resulted in 60% new mayors and 50% new councillors, many with limited knowledge of carbon mitigation actions. The Clean Energy Regulator has also listed 12 Queensland councils as liable entities for the carbon tax under the Clean Energy Act 2011: ten councils from landfill (i.e. Brisbane, Gold Coast, Logan, Townsville, Gladstone, Mackay, Moreton Bay, Rockhampton, Sunshine Coast, Toowoomba) and two as natural gas suppliers (i.e. Maranoa, Western Downs).

This paper reviews the climate change and carbon actions adopted by local government as part of corporate citizenship or socially responsible business (McIntosh *et al.* 2003). By managing carbon emissions in local areas, it considers corporate citizenship by councils as ‘every action that affects a stakeholder—or the natural environment’ (Waddock 2003: 3). Key stakeholders in corporate citizenship for carbon management by local government include local councils, communities, landholders, businesses and community groups. Responses by councils can be gauged by a website list of climate change mitigation actions for strategic, operational and community initiatives (Clarence Valley Council 2013). This paper evaluates local government carbon reduction actions against the ‘Philosophy for Climate Action’ framework that assesses the level of organisational commitment to climate change planning and mitigation, ranging from minimalistic and opportunistic, to progressive and innovative (Wood and McNamara 2011). It also utilised the carbon management assessment matrix to identify five stages or steps in council responses to carbon management as latent, emerging, consolidating, mainstreaming or leading (LGAQ 2009).

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## Literature review

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Local councils are multi-million dollar business operations with significant control over local environmental and social impacts, including carbon reduction strategies and activities. Research about carbon management and mitigation by local government in Australia includes: climate change mitigation strategies of local councils in South East Queensland (Burton 2007); climate change law

and liability (England 2008); assessing local carbon emissions (Hamilton *et al.* 2008); and the Cities for Climate Protection programme (Hoff 2010). A survey evaluated carbon actions by 14 Greater Adelaide councils in South Australia, where the main reasons to reduce emissions were stated as: climate change plans; demonstrating climate leadership; cost savings; being a 'climate friendly' region; and other carbon resolutions adopted by council (Zeppel, 2011a, 2012a; Zeppel and James-Overheu, 2012b).

A related study reviewed climate change awareness among planning directors in 53 American counties (Tang *et al.* 2009). The county planning directors had high awareness (79%) but limited analysis of climate change risks (34%) while just over half (51%) had implemented land use planning strategies to mitigate climate change. The level of resources and political commitment influenced climate change actions by planning directors (Tang *et al.* 2009). The content, actions and emissions reduction targets have been reviewed in climate change action plans by US municipalities (Wheeler 2008; Bassett and Shandas 2010; Boswell *et al.* 2010). A study of 35 municipal climate plans found that emissions reduction goals vary widely, many proposed climate actions are voluntary with minimal resources allocated and many measures not implemented (Wheeler 2008). An analysis of 30 city climate action plans found one-third did not quantify emissions reduction from mitigation actions while only half expected to reach reduction targets through proposed mitigation actions (Boswell *et al.* 2010). Another review of climate change action plans by 20 US cities found they were largely based on land-use and transportation solutions and favoured mitigation actions that were highly visible or produced immediate results from energy or cost savings (Bassett and Shandas 2010). Carbon actions in the Cities for Climate Protection (CCP) programme have also been assessed in terms of climate governance by local government networks (Zeppel 2013).

In California, local governments with climate action plans have more green buildings, diverted more waste from landfill and spent more on bicycle and pedestrian infrastructure, with these actions mainly driven by citizens' environmental preferences (Millard-Ball 2012). A survey of 255 US municipalities, however, found the greatest impact on the adoption of climate mitigation policy and planning was their interaction with neighbouring jurisdictions, staff members responsible for energy or climate planning and the level of community environmental activism and engagement (Pitt 2010a, b). In Scotland, though, carbon mitigation actions by local government were driven by compliance aspects and carbon reduction targets in the Climate Change (Scotland) Act 2009 (Jackson and Lynch 2011). In the Netherlands, the city of Rotterdam is testing electric vehicles in urban climate mitigation (Whiteman *et al.* 2012). This paper evaluates the carbon actions adopted by Queensland councils against climate action (Wood and McNamara 2011) and carbon management frameworks (LGAQ 2009) that assess commitment to climate change and carbon reduction. It applies these climate and carbon frameworks to assess corporate citizenship by councils.

Carbon reduction actions by local councils can also be considered part of innovative CSR, which is 'the design of novel ways of addressing social

and environmental concerns + integration of these into business operations and interactions with stakeholders' (Preuss 2011: 23). Carbon management by councils includes technological (improved products) and organisational CSR innovation (structure, strategy, management techniques) (Preuss 2010). This paper assesses technological and organisational responses to carbon action by councils.

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## Climate change and carbon management frameworks

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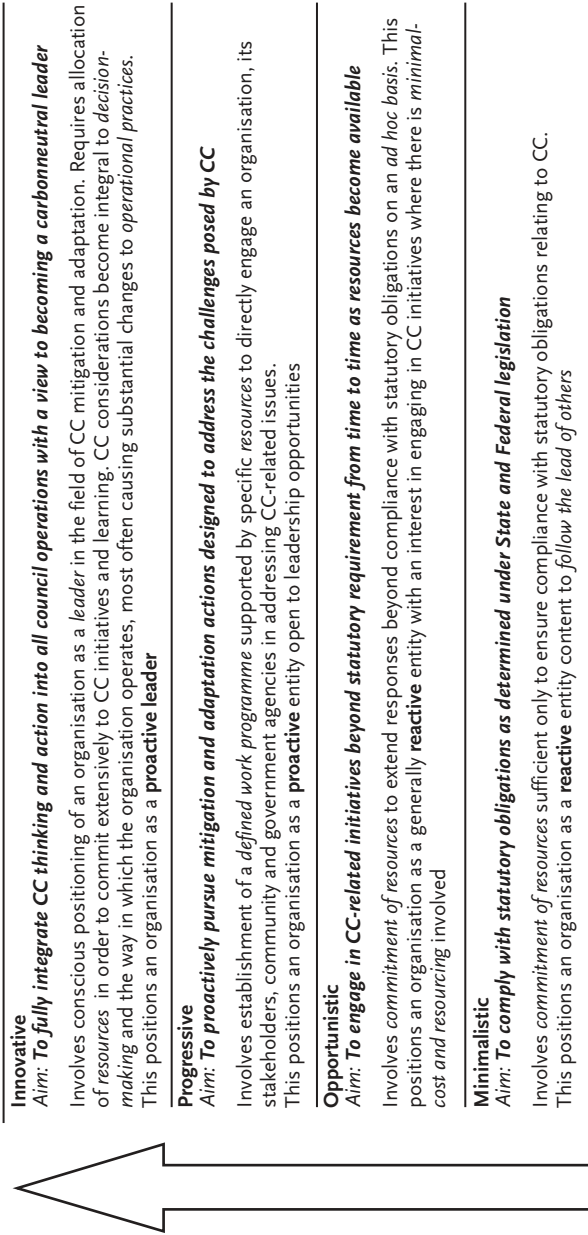
Wood and McNamara (2011) developed a framework for assessing the level and type of climate change planning and responses by Ballina Shire Council in northern New South Wales (Australia). Their 'Philosophy for Climate Action' assessed the level of organisational (and community) understanding and commitment to climate change planning (Fig. 1). It assessed leadership, engagement, policy, funding and resources, operations and organisational culture in regard to municipal thinking, action and learning on climate change. This analysis developed a continuum or sequence of climate change responses by local government, ranging from minimalistic and opportunistic, to progressive and innovative. Reactionary responses were councils complying with statutory obligations on climate change (i.e. minimalistic) or implementing other additional climate change initiatives as resources allowed (i.e. opportunistic). Proactive responses were councils actively pursuing mitigation (and adaptation) actions addressing climate change (i.e. progressive) or integrating climate change thinking across all council operations (i.e. innovative) (Wood and McNamara 2011).

A related carbon management assessment matrix developed for LGAQ's mitigating climate change guide (LGAQ 2009) assessed carbon mitigation actions across eight business areas (i.e. strategy, data, reporting, culture, operations, risk, assets and results). The matrix identified five stages or steps in council responses to carbon management (i.e. latent, emerging, consolidating, mainstreaming and leading) (Table 1). The matrix thus evaluated the level of 'carbon-readiness' exhibited by local councils across a range of carbon and climate actions. It linked organisational learning ('culture') with strategic and operational responses to climate change issues. This paper focuses on strategy, culture and operations in reviewing carbon actions adopted by Queensland local councils.

These climate and carbon frameworks thus assess corporate citizenship by local government in regard to climate change and emissions reduction. They provide a means to benchmark carbon actions and set standards to assess corporate responsibility by councils.

**Figure 1** Philosophy of climate action

Source: Adapted from Wood and McNamara 2011



CC = climate change

**Table 1** Carbon management assessment matrix

Source: LGAQ 2009 (Appendix B: 6o)

	<b>Business area</b>		
	<b>Strategy</b>	<b>Culture</b>	<b>Operations</b>
Stage 1 Latent	No CM strategy	No internal awareness of the significance of CM and links to GHG and CC No internal programmes to raise awareness No understanding of how CM relates to individuals' work	No CM actions or planning implemented No energy or GHG initiatives in place Limited understanding of energy expenditure
Stage 2 Emerging	CM strategy acknowledged and committed to by board/senior management CM policy or position written Preliminary carbon targets set	Limited internal awareness of the significance of CM and links to GHG and CC Limited internal programmes (e.g. educational workshops) to raise awareness	Need for initiatives identified First implementation plan developed First initiatives undertaken
Stage 3 Consolidating	Short-term (< one year) CM strategy developed Implementation commenced Responsibility allocated Carbon targets reviewed and amended as required	Coordinated communications to raise employee awareness Implementing behaviour change programme	Energy and GHG management initiatives implemented Preliminary actions result in emissions reduction Energy spend reduced
Stage 4 Mainstreaming	Longer-term (>two year) CM strategy development Strategic planning process includes CM and leads to business improvements	Strategic internal marketing/communications High level of organisational awareness around CM and individuals' responsibility Measurable behaviour change	Business energy efficiency in 'how we do business' Continuous improvement is evident in measurable financial outcomes Product responsibility procurement policy in place and implemented
Stage 5 Leading	CM is embedded in business planning	High levels of employee engagement in developing CM solutions—bottom-up approach	Seeking out 'game changing' energy efficiency initiatives

CM = carbon management, GHG = greenhouse gas, CC = climate change

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## Methodology

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A survey profiled climate change responses, carbon actions and council motives for emissions reduction by Queensland councils. The climate change mitigation survey for Queensland councils was based on carbon mitigation actions recommended in the Cities for Climate Protection (CCP) programme, and a desktop review of climate change plans and carbon actions listed on Queensland council websites (Zeppel 2011b). The survey also adopted some questions from ICLEI's review of the CCP programme (Hoff 2010) and previous climate change surveys of New South Wales local councils (LGSA 2010; Urbis 2010). Sustainability officers at two large Queensland councils with climate change programmes provided feedback on questions in the draft survey. The survey data covers carbon actions by Queensland councils, and findings may vary in other Australian states or territories with different climate policies and emissions reduction programmes. A pilot climate change survey was also conducted of 14 Greater Adelaide councils in 2011 to assess their carbon mitigation actions (Zeppel 2011b, 2012a; Zeppel and James-Overheu 2012b).

The Queensland council survey included 36 main questions organised in five sections: A: Your Local Council; B: Climate Change; C: Climate Change Mitigation; D: Carbon Offsetting; E: Preparing for the Carbon Price. The survey included climate change responses, a checklist of 64 carbon mitigation actions, ranking of council motives for carbon actions, and open-ended questions on reasons for climate change actions by councils. This survey was circulated to all 73 Queensland councils, by email, post and follow-up telephone calls, during January to May 2012. A total of five (of seven) city councils (CC), 18 (of 30) regional councils (RC), 8 (of 24) shire councils (SC), and 1 (of 12) Aboriginal shire councils (ACS) completed the survey. Of the 32 councils, 15 were on the coast, while 17 were inland councils. Excluding the Aboriginal shire councils, the response rate for this survey among all other Queensland councils (31 of 61) was 51%. In the results, councils are referred to by type (city, regional or shire) and geographic location (coastal or inland). Of the 41 councils that did not complete the survey, some advised they lacked climate change policies, had limited staff or resources or other priorities, or were unsure about their carbon emissions.

The survey data was analysed by descriptive statistical analysis of key findings on council responses to climate change, carbon mitigation actions and carbon price impacts. There was limited data on the total amount of council emissions or cost of carbon actions. Comments by council respondents are included to highlight key issues in carbon mitigation.

The survey was mainly completed by council staff with roles related to environmental, sustainability and climate change areas (78%). At smaller councils, the survey was completed by environmental health officers or the CEO, and by building or engineering staff.

Other council staff may have different responses to climate change and carbon issues.



## Climate change responses by Queensland councils

The key people identified as responsible for climate change issues at councils were: planning staff (19), environmental managers (17), sustainability officers (13), the CEO (13), and water and waste managers (11). Only six councils indicated their finance manager had responsibility for climate change matters. Other council staff responsible for climate change issues included the infrastructure manager, fleet and hydrology managers, and engineer. Just four larger councils had a dedicated energy and carbon manager (4) or a climate change officer (2). Four small rural councils had no one delegated to climate change issues.

**Table 2** Council response to climate change action

	Climate change response				Total
	Statutory	Additional	Proactive	Integrated	
	(minimalistic)	(opportunistic)	(progressive)	(innovative)	
Type of council	(coastal/ inland)	(coastal/ inland)	(coastal/ inland)	(coastal/ inland)	
Ab. shire council (1)	1/0	0/0	0/0	0/0	1
Shire council (8)	0/3	2/2	0/1	0/0	8
Regional council (18)	2/7	3/3	3/0	1/0 <sup>#</sup>	19 <sup>#</sup>
City council (5)	0/0	1/2	2/0	0/0	5
Total	13	13	6	1 <sup>#</sup>	
Size of council					
<30,000 residents (17)	3/8	2/2	1/1	0/0	17
>30,000 residents (15)	1/1	4/5	4/0	1/0 <sup>#</sup>	16 <sup>#</sup>

*Note:* Response categories based on 'Philosophy for Climate Action' (Wood and McNamara 2011)

<sup>#</sup>Cairns Regional Council gave both proactive and integrated options as their response to climate actions

The planning and environmental sustainability divisions of councils (19) were identified as most responsible for climate change issues, along with the environmental services (water, waste) (9) and corporate/finance areas (9). Only 14 Queensland councils identified their manager/CEO (10) or their mayor and councillors (5) as responsible for climate change issues. Other minor council areas for climate change actions were noted as policy and planning (5) and infrastructure services (5), followed by assets and environment (3) and community development (2). Additional council areas responsible for climate change included environmental planning and compliance, environmental health, building services and regulatory services. Just two city councils and two coastal regional councils had a dedicated sustainability unit or division to implement climate change and carbon actions.

Two-thirds of surveyed Queensland councils (20) considered that climate change was an important issue for local government. This included all five city councils, and three-quarters of regional councils (13 of 18), but only two shire councils. Climate change was considered important because of the potential impacts on council infrastructure, service delivery, risk minimisation, community safety, biodiversity and economic development. Five shires and three inland regional councils stated climate change possibly was an important issue, but could also be the result of natural weather variability. One shire noted it was an 'important [issue] but only state and federal agencies have resources to implement change'. Three small councils were not sure whether climate change was an important issue, because there was limited climate change evidence or the council did not have a formal perspective on the issue.

The main climate-related initiatives undertaken by half of the surveyed councils included participation in the Cities for Climate Protection (CCP) programme (16) and the annual Earth Hour Event held in March (15). Other council measures included carbon footprinting (14), holding climate seminars (8) and environmental certification (ISO 14001) (8), followed by the ecoBiz program (7), Water Week (7), the Low Carbon Diet (6), sustainable street lighting (5), climate change workshops (5) and Climate Smart business (4). Overall, the average number of climate initiatives implemented per council was: city councils (9.2), regional councils (3.5) and shire councils (1.3). For regional councils, there was a difference in the average (2.6) for nine inland councils, with 16 of 24 climate actions implemented by Toowoomba and Tablelands Councils, versus 36 climate actions adopted by nine coastal councils (average = 4). Overall, the range of climate actions implemented were city councils (7–11), regional councils (0–10) and shire councils (0–3).

In terms of council response to climate change (Table 2), around one-third are either complying with statutory obligations on climate change (13), or implementing other additional climate initiatives beyond legal requirements as resources allow (13). Nine of the regional councils (six inland) and three inland shires are basically complying with their statutory obligations on climate change (i.e. minimalistic). Another 13 councils (3CC, 6 RC, 4 SC) engaged in climate change initiatives beyond statutory requirements as resources allowed (i.e. opportunistic). Just six Queensland councils, including five coastal councils with climate strategies (Cairns, Gold Coast, Sunshine Coast, Townsville and one remote RC) and one inland shire in the CCP programme, were proactively pursuing climate change actions (i.e. progressive). Only Cairns Council was integrating climate change thinking and carbon actions into all areas of council operations (i.e. innovative), aiming to be carbon neutral by 2020.

Households (15), community groups (12), schools/youth groups (12) and businesses (9) are the main groups that Queensland councils work with on climate change actions. There was only a minor focus by councils on advising developers and landholders of climate change actions (four each). Townsville City Council implemented climate actions with conservation groups (NGOs

Conservation Volunteers Australia, Reef Check), while Sunshine Coast Regional Council utilised Advisory Panels for advice on climate change actions.

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## Climate change planning by Queensland Councils

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In terms of strategic planning, climate change actions were included in waste, water, climate change, environment and energy plans prepared by Queensland councils. The councils mainly integrated climate change actions into their waste (20) and water (16) management plans, as a result of increased state government charges for bulk water services and a waste levy. Dedicated climate change plans (11), a climate change risk assessment (10) and climate change adaptation plans (8) had mainly been prepared by larger city and regional councils. Moreton Bay Council noted their 'Community plan has targets on emissions reduction and [a] Sustainability Policy', while Cairns Council had an overarching Corporate Sustainability Policy. Some eight councils had also prepared a greenhouse gas plan, while nine councils included climate change actions within an environmental policy, or healthy environment/environmental management plans. Three shires had no climate change plans.

Only a few larger councils have developed official policies on climate change (3), or renewable energy, carbon emissions or sustainability (2 each). A few metropolitan councils have devised action plans for sustainable energy (4), energy transition (2) and peak oil (2). Logan City Council had a draft combined climate change strategy and peak oil plan. The climate change plans of four Queensland councils set a goal of being carbon neutral by 2020 (i.e. Brisbane, Cairns, Gold Coast and Sunshine Coast). Climate change strategies were also in preparation (2011/12) for Moreton Bay and Whitsunday Regional Councils. South Burnett Regional Council also reported it was developing a biodiversity and climate change strategy.

The climate change strategies prepared by Queensland councils covered key topics such as waste reduction (15), community education (15) and energy efficiency (14), water conservation (12), sustainable living (11) and sustainable transport (10) programmes, followed by sustainable business (8) and renewable energy initiatives (5). Other areas covered in climate strategies by nine larger mainly coastal councils included climate change adaptation, risk assessment, energy transition, strategic/land use planning, infrastructure and nature conservation. One remote northern island council considered 'climate change migration' as an issue in its plan. Just two coastal shire councils had climate change plans, covering energy, water and waste. Only a few larger coastal or urban councils incorporated clean energy business opportunities within their climate change plans (5). Most climate change plans regarded carbon mitigation as a cost for councils rather than an opportunity.

Only half of the surveyed councils (16), mainly larger regional (10) and city (4) councils, stated that climate change actions were incorporated into their

corporate or strategic plans. Among smaller shire and regional councils (6) climate actions were not included in their corporate plans. Eight respondents indicated uncertainty about whether climate actions were incorporated in their council's strategic plan. Only the 13 larger councils (population over 30,000) had completed an assessment of carbon emissions, while five councils planned to assess emissions (4 RC, 1 SC). Some 18 councils reported that reduction of carbon emissions was either a low priority or not a priority at all, while 23 councils did not consider carbon mitigation guidelines for renewable energy or energy efficiency in planning decisions. Only Sunshine Coast, Townsville and one inland shire set renewable energy guidelines in plans.

### Carbon mitigation actions by Queensland councils

With respect to carbon mitigation, 30 councils implemented a total of 433 carbon reduction actions, with the average number of carbon actions adopted per council at 14. The five city councils implemented 162 carbon actions (average = 32.4), the 18 regional councils employed 231 carbon actions (average = 12.8), while eight shire councils implemented 32 carbon actions (average = 4). Wujal Wujal Aboriginal Shire Council listed eight carbon actions. One inland shire council and one small coastal regional council did not list any carbon reduction actions.

**Table 3** Carbon mitigation actions adopted by councils

Type of council	Energy	Water	Waste	Behaviour	Offsetting	Total	Average
City-coastal (3)	55	15	14	12	4	100	33.3
City-inland (2)	31	10	8	12	1	62	31.0
City-total (5)	86	25	22	24	5	162	
Regional-coastal (9)	78	27	19	22	5	151	16.7
Regional-inland (9)	47	17	11	4	1	80	8.8
Regional-total (18)	125	44	30	26	6	231	
Shire-coastal (2)	7	2	2	1	0	12	6.0
Shire-inland (6)	12	1	3	4	0	20	3.3
Shire-total (8)	19	3	5	5	0	32	
Ab. shire-coastal (1)	5	3	0	0	0	8	8
Total, all councils	235	75	57	55	11	433	
Size of council:							
<30,000 residents (17)	54	16	12	8	1	91	5.35
>30,000 residents (15)	180	60	45	47	10	342	22.8

Overall, the main types of emissions reduction initiatives implemented by Queensland councils included: energy efficiency actions (235), water efficiency actions (75), waste efficiency actions (57) and behaviour change actions (55). Less than 3% related to carbon offsetting actions (11) (Table 3). Just three councils purchased green power from renewable energy (i.e. Tablelands, Townsville and Redland). However, Brisbane City Council 'bought 100 per cent green power' to offset its vehicle fleet and public transport (Hepworth 2012).

The top 20 carbon actions implemented by at least one-quarter of surveyed Queensland councils related to energy efficiency initiatives in council buildings; waste reduction; water conservation and recycling; fuel efficient vehicles; and behaviour change action such as providing information on reducing emissions. The main energy reduction actions at council buildings and facilities were buying energy efficient appliances, installing energy saving lights and light sensors, energy efficient computers, roofing insulation, solar or heat pump hot water heaters, solar powered public lighting, variable speed pumps at water plants and public pools, and solar power. The main water efficiency actions were installing water efficient technology, using recycled water, collecting rainwater, other water initiatives (i.e. leakage control), water purification and stormwater harvesting. The main waste efficiency actions were recycling, waste reduction, composting organic waste and other waste initiatives such as using recycled paper, gas flaring from landfills and recycling bio-solids. The main behaviour change actions (Table 4) related to council information on reducing emissions, training staff, marketing carbon mitigation actions, setting emissions reduction targets, choosing suppliers that are reducing emissions, and providing community rebates. Only Logan, Mackay, Toowoomba and Townsville Councils had implemented a green purchasing programme, choosing suppliers taking actions to reduce carbon emissions.

**Table 4** Behaviour change actions adopted by councils

<b>Behaviour change actions for carbon mitigation</b>	<b>Number</b>
Share information with neighbouring councils on emissions reduction	11
Provide information to residents on reducing their emissions	10
Train council staff or volunteers on your emissions reduction actions	8
Provide information to businesses on reducing their emissions	7
Market the emissions reduction initiatives of your council	6
Include emissions reduction targets in council corporate plans	5
Choose suppliers taking actions to reduce their emissions	4
Provide community rebates for energy/water/waste efficiency products	4
Total: 55	

The major reasons for Queensland councils to implement carbon reduction actions, by rank order of responses from one (highest) to five (lowest) were: cost savings (1.8); environmental regulations (2.2); council climate strategy (2.4); council resolutions on climate change (2.6); and to demonstrate climate

leadership (3). Cost savings was the main reason to reduce emissions for the majority of surveyed Queensland councils of all types (88%), and was the sole motive to reduce carbon emissions stated by five small inland councils. Demonstrating climate leadership, complying with environmental regulations such as the Queensland Government Waste Management Strategy, or meeting targets in a climate change plan were also important reasons to reduce emissions for one-third to half of surveyed councils. Other minor reasons to reduce council carbon emissions included climate certification (e.g. CCP); business reporting; the Queensland renewable energy plan; to attract low-carbon industry investment; preparing for carbon legislation; prior Queensland government carbon targets; and differentiating the council as a 'climate friendly' region. Other reasons to reduce council emissions were: 'SEQ Regional Plan requirements'; 'prolonged drought throughout 90s and 2000s'; and to 'reduce climate change impact risk'.

The main barriers cited by council participants as impediments to adopting carbon reduction actions were: cost and lack of funding; reliance on the operating budget; lack of council policies; indifference to climate change by some councillors and managers; lack of staff to implement climate action; and environmental regulations such as 'restrictive DERM licence conditions on WWTPs' (wastewater treatment plants), and 'uncertain RECs [renewable energy certificates] market over past 3 years'. One city council reported a barrier was 'lack of funds for any mitigation even though demonstrated return is three to five years. Things are very tight'. Shire councils were also 'too small to qualify for most funding and grants' or had a 'low return on investment in terms of impact' (on climate change). Council waste practices that reduce emissions such as recycling, phytocapping, bio-covers, revegetation and organic waste diversion also don't earn Carbon Farming Initiative (CFI) carbon credits (Roberts 2011). Hence there were a range of internal or external barriers to implementing carbon actions.

The main opportunities identified by Queensland councils to reduce their carbon emissions were through managing methane from landfills, allied with waste management and recycling initiatives such as 'improved organic matter management'. This was followed by planting trees on council land for carbon offsetting, and green building design for new council buildings, focusing on sustainability and energy efficiency. These included: 'New build to green Star level', 'retrofits to NABERS level' and a focus on 'tropical design and energy efficiency'. Investment in renewable energy, mainly solar power, was also listed. Logan City Council highlighted a 'Regional renewable energy station e.g. solar thermal; [and] working with State to generate commercial PV installation incentives'. One shire council focused on renewable energy from geothermal power as a future opportunity. Other additional measures cited by councils included water/wastewater management such as 'recent technologies that treat waste'; behaviour change programmes such as staff training on carbon reduction, or 'ClimateSmart business clusters'; utilising sustainable technologies (i.e. lighting, cooling, IT); and integrated projects such as electricity demand management.

Only six councils identified leasing council land for renewable energy projects. Just two larger councils in SEQ listed carbon offset markets as an opportunity, with Sunshine Coast building a 'portfolio of offsets'. Other opportunities to reduce carbon emissions were through 'continued retrofit of facilities' and 'joint ventures with other businesses and local community'. Larger city and regional councils focused on opportunities to reduce emissions through significant investments in renewable energy, green building and managing landfills, while smaller shire councils focused on recycling waste, and some installation of solar panels.

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## Discussion

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This study found significant variations among the main types of Queensland councils in terms of their climate change responses, emissions assessment and carbon mitigation actions (Zeppel 2012b). With regard to the average number of climate change and carbon actions, the highest is by city, then regional and lastly shire councils. Climate change leadership is mainly evident among coastal councils and some larger inland councils (>30,000 resident population), which have adopted climate change plans and goals. Conversely, smaller shire and regional councils with a resident population under 30,000 were the least likely to assess emissions, have a climate plan or implement carbon actions. Carbon mitigation actions by Queensland councils are more likely to occur where climate change policies and targets are included in a corporate plan or a climate change strategy. This study found a positive correlation between institutional size and capacity, coastal location and climate change strategies, for driving carbon actions. Mainly larger Queensland councils had already completed an assessment of carbon emissions, or planned to assess their emissions. However, reducing carbon emissions was also a low priority or not a priority at all, owing to the smaller size of many councils or being below the NGRS threshold for landfill emissions. The carbon actions per capita of rural councils may still be significant and reduce costs. Overall, larger metropolitan and/or coastal councils are more 'carbon-ready' (i.e. consolidating or mainstreaming climate actions) than smaller inland rural councils (i.e. latent or emerging actions) (LGAQ 2009). In both Queensland and New South Wales, coastal and metropolitan councils with larger populations have implemented more climate change actions than smaller inland councils (Urbis 2010). Larger councils are more likely to have staff and resources dedicated to climate change and carbon actions.

Most Queensland councils consider climate change an important issue that will have some impact on council operations. However, they mainly comply with statutory obligations on climate change (i.e. minimalistic) or implement other additional climate change initiatives as resources allow (i.e. opportunistic), rather than being proactive in adopting carbon reduction measures (Wood and McNamara 2011). Progressive or proactive climate actions were implemented

by five coastal councils with climate strategies, and one inland shire council involved in the CCP programme. Only Cairns Regional Council integrated climate change thinking and actions into all areas of operations. Key barriers to carbon actions were the lack of funding, staff or policies, and environmental regulations. Overall, the carbon actions adopted by Queensland councils were similar to those of Greater Adelaide councils, except for minimal investment in green power and limited use of reclaimed water (Zeppel 2011a, 2012a; Zeppel and James-Overheu 2012a, b). Respondents in both studies noted the legal liability of local councils for climate change actions, but some stated it was not a priority for council action or funding, or staff overlooked opportunities in this area.

In Australia's new carbon price regime, energy efficiency and cost savings will be key drivers for local government to reduce their emissions and carbon liability. Rate increases by local governments in 2012/13 budgets now include carbon price impacts from the higher cost of electricity and materials, through waste management and landfill charges, or new levies. Mayors also want municipal waste and council landfills to be exempt from the carbon tax. In mid-2012, the Liberal National Party Queensland State Government ended the industry waste levy, reduced solar power feed-in tariffs and scaled back state-funded sustainability or carbon programmes, stating these were the 'responsibility of the Australian government'. Waste is being moved from coastal cities to peri-urban or adjacent rural areas, while 8,660 tonnes of hazardous waste was transported in 2011/12 from New South Wales and other states with higher waste fees into Queensland landfills (Chamberlin 2012). The Waste Avoidance and Resource Efficiency Fund and the Local Government Sustainable Future Fund were cut in the 2012/13 Queensland state budget. In 2012, three Queensland councils were awarded federal government Community Energy Efficiency Program grants to upgrade their facility and street lighting and energy usage (Brisbane, Cairns and Townsville). A 2012 Local Government Energy Efficiency Program will also allow all LGAs to apply for a one-off grant to install solar or heat pump hot water systems in community facilities (DCCEE 2012). These policy aspects both hamper and enhance corporate citizenship by councils on carbon action.

All of these factors influence the capacity of Queensland councils to implement climate change responses, resulting in largely opportunistic approaches to carbon mitigation actions. However, councils can still progress and support emissions reduction measures by establishing carbon and energy targets in their asset management, procurement and tenders, or in planning and development regulations. Strategic partnerships with energy providers (e.g. electricity demand management, solar PV, performance contracts, bio-energy) could also help councils to reduce emissions (Steffen *et al.* 2012; Storey *et al.* 2012).

However, penalties for reduced energy use in bulk electricity contracts, or higher fees to service energy efficient street lighting, need to be minimised or removed for local councils. The drivers of and barriers to responsible citizenship need to be further investigated for councils.

This study found carbon management by local councils includes both technological CSR innovation (eco-efficiency products) and organisational CSR



innovation, through council structures and strategies integrating emissions reduction into operations (Preuss 2010). Proactive carbon actions were implemented by five coastal councils with climate strategies. The findings of this study provide a useful template for other local governments, and also large and small firms, to benchmark and target their carbon reduction efforts and activities.

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## Conclusions

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This paper evaluated carbon actions by 32 local councils in Queensland, Australia. A climate action framework (Wood and McNamara 2011) and carbon management matrix (LGAQ 2009) were used to assess corporate citizenship by councils on emissions reduction. This study found carbon actions related to council size and capacity, coastal location and climate change strategies. Coastal and metropolitan councils were consolidating or mainstreaming carbon actions, while smaller inland rural councils had latent or emerging actions. Most Queensland councils were minimalistic or opportunistic in adopting eco-efficiency actions while a few progressively integrated low carbon measures in council operations. In terms of corporate responsibility for climate actions, council progress in reaching carbon targets can be assessed against the 'Philosophy of Climate Action' (Wood and McNamara 2011) and against the key business areas in the carbon management assessment matrix (LGAQ 2009). This will help to reduce costs, address carbon liability and enhance the corporate citizenship of local councils among residents and businesses. These climate and carbon frameworks thus provide a means to benchmark carbon actions and set standards to assess the level of corporate responsibility by local councils, for stakeholders and the natural environment. The relative importance of technological and organisational CSR innovation for implementing carbon actions can also be assessed for a range of local councils in rural and urban areas. Transitioning to lower carbon futures will be an ongoing challenge for all cities and regions.

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