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## Co-benefits of low carbon policies in the built environment: An investigation into the adoption of co-benefits by Australian local government

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### Abstract

**Background:** In Australia, co-benefits have rarely entered policy discourse and have so far failed to gain traction in climate change-related policy debates. This is partly due to the dominant perception about the difficulties associated with identifying, quantifying and incorporating co-benefits into decision-making frameworks. There is also limited understanding on the part of policy-makers about the profound policy implications of a ‘co-benefits approach’ as a paradigm that can address multiple policy goals, including addressing climate change impacts, achieving sustainable development, and enhancing health, wellbeing and liveability.

**Objectives:** Our paper addresses this gap by contributing to current understandings of the ‘co-benefits approach’ as a means of integrating climate concerns into local planning and development control in general. At a more specific level, the paper provides an insight into the Australian local government policy context to illustrate how to plan, generate and purposively promote co-benefits in planning urban built environments.

**Methods:** A desktop review of NSW councils’ web sites and their climate change-related policies was undertaken. A comprehensive online survey was subsequently conducted to investigate the extent to which councils have adopted a ‘co-benefits approach’ in their low carbon policies.

**Results:** Major barriers to integrating co-benefits in the policy process were identified in this research. They include: (i) local government’s current practice of single-sectoral policy development; (ii) absence of an integrated and co-ordinated ‘whole-of-government approach’ to address climate change impact; (iii) over-reliance on quantitative decision-support frameworks; and (iv) over-emphasis on short term and readily quantifiable monetary consideration of benefits.

**Conclusion:** Local government’s over-emphasis on readily quantifiable ‘monetary considerations’ in targeting benefits from climate change policies excludes a wide range of environmental, social and health benefits from incorporation in policy. This limits the achievement of optimal policy outcomes across multiple sectors using a co-benefits approach.

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## 1. Introduction

As growing evidence confirms that our planet's climate is changing rapidly due to human-made emissions of greenhouse gases (GHG) into the atmosphere, the *Intergovernmental Panel on Climate Change (IPCC)* in its *Fifth Assessment Report* warns that without substantial policy and technological changes, the world is heading towards dangerous tipping points in its climate system [1]. Australia faces multiple challenges in its response to the threat of climate change, conserving its natural environment, as well as securing adequate supply of energy and natural resources to meet its development needs [2-5]. Being a country with some of the highest per capita GHG emissions in the world, and as a signatory to *Kyoto Protocol* [6, 7], the nation needs to significantly reduce its GHG emissions. If Australia is to achieve the national 2020 target of a 5% reduction (which is to cut 159 million tonnes of carbon pollution between 2001 and 2020), it needs to adopt low-carbon development pathways [3, 4].

The key to an appropriate and effective low-carbon development pathway lies in formulating effective cross-sectoral policies that integrate climate change response policy goals with broader development policies, and wherever possible, realising synergies and mutual benefits. In doing so the 'co-benefits approach' emerges internationally as an important paradigm for analysing, developing and implementing policies and strategies that simultaneously contribute to tackling climate change whilst addressing local environmental and developmental problems. Here the term 'co-benefits' means the collection of benefits accruing to actions linking climate change and other development priorities. The *IPCC* defines 'co-benefits' as:

"the benefits of policies that are implemented for various reasons at the same time – including climate change mitigation – acknowledging that most policies addressing greenhouse gas mitigation have other.....equally important rationales" [8].

This definition focuses on simultaneous effects of policies specifically introduced with explicit intention to integrate climate change response benefits with other fields. According to this definition the 'explicit intention' and integration of policy measures are considered essential in order to qualify for a 'co-benefit principle'. We adopt this definition of 'co-benefits' as it appropriately suits the scope and objectives of this paper.

Over the past two decades, a growing number of studies have demonstrated that a 'co-benefits approach' could prove more cost effective than managing climate and development issues in isolation [9-11]. With increasing global attention and interest in mitigating GHG emissions since the 1990s, several studies indicated that GHG mitigation policy co-benefits could be the same order of magnitude as the cost of implementing the policies [9, 10]. Several studies around the turn of the millennium found that co-benefits could significantly reduce the net costs of GHG reduction efforts [11]. Based on these and other studies, as well as in response to the movements towards a global climate treaty in the late 1990s, several international and government bodies (including the *UN Framework Convention on Climate Change (UNFCCC)*) directed considerable attention to understanding and integrating co-benefits analysis into climate change policy.

Evidence suggests that in the area of public health, action on climate change can bring multiple co-benefits. The *IPCC* in its *Fifth Assessment Report* stressed that the short-term and relatively localised health co-benefits from reducing emissions could be very large. Opportunities to capture health co-benefits include reducing health-damaging climate-altering air pollutants (CAPs) through: energy efficiency measures, shifting to cleaner energy sources, shifting consumption away from animal products toward less CAP-intensive healthy diets, and designing transport systems that promote active transport. In economic terms, these health co-benefits from reducing emissions would be extremely cost-beneficial [12].

Active transportation modes, such as walking and cycling, are widely recognised for their zero carbon impact and benefits for public health [13-17]. In a recent *Lancet* series, leading health researchers argued for the alignment of policy responses to climate change with those to tackle epidemics of chronic illnesses such as cardiovascular disease, diabetes and cancers. Moreover, special issues in the *Health Promotion Journal of Australia* [18] and the *NSW Public Health Bulletin* [19] have examined the co-benefits for health from action on climate change in the Australian context. This body of research advocates that aligning policy responses to climate change with those of public health can simultaneously contribute to addressing climate change and health problems, which could also have other local environmental and social benefits.

In Australia, co-benefits rarely enter climate change-related policy discourse and there is limited understanding of the approach. While the legislation implicitly recognises the potential of co-benefits, they are not explicitly defined in the *Carbon Credits (Carbon Farming Initiative) Act 2011* [20, 21]. This observation points to the need for a systematic assessment of the local policy context that could help to identify, plan, generate and purposively promote co-benefits in the policy process. The research reported here intends to address this gap by contributing to current understanding of the 'co-benefits approach' in Australian local government as a means of integrating climate concerns into local development. This paper provides an insight into the Australian local government policy context to enable better understandings of how to plan, generate and purposively promote co-benefits in planning urban built

environments.

### *1.1 Climate Change in the Australian Local Government Policy Context*

The policy context for using a ‘co-benefits approach’ widely varies across national boundaries and geographic locations (i.e. urban and rural). This diversity reflects local situations (political, economic and social contexts), governance challenges, varied institutional frameworks and population density [22]. In the absence of any available standardised methods or universal tool kits for identifying, quantifying and incorporating co-benefits into decision-making frameworks, these challenges necessitate careful and comprehensive analysis of local context [23]. As a ‘co-benefits approach’ is seen as a means of integrating climate concerns into local development, any policy intervention must consider the local situation. Ultimately, implementation of all policies with co-benefits is local, and therefore, appreciating local concerns as key drivers is central to promoting co-benefits in policy processes. This section of our paper focuses on understanding the Australian local government policy context that informs the local government sector’s contribution to climate change-related policy measures.

In Australia’s three-tiered governance system - federal, state and local - there is no recognition of the role of local government in the national Constitution. However, local councils are granted status by virtue of the respective local government acts in each state. Through these acts, state governments control the form, function and boundaries of local authorities [24, 25]. Accordingly, federal government plays a limited role in environmental regulation with the states developing their own, largely independent, systems.

This inter-governmental arrangement poses complexities and overlaps which led the Australian national and state governments to outline a set of principles for governance of the environment through the *1992 Inter-Governmental Agreement on the Environment* [26]. This clarified that the federal government has responsibility for international matters (such as implementation of treaties) and those issues that are of direct Commonwealth relevance (e.g. Commonwealth land). Each of the states and territories has prime responsibility for all environment and natural resource management within its borders, and an ‘interest’ in international matters. Importantly, local government is also recognised as playing a role, yet with virtually no formal powers. Each local government is responsible for management of the environment within its boundaries, but in compliance with the relevant state and Australian laws and policies.

However, this situation started to change after the *Kyoto Protocol* was signed in 2007. Australian Commonwealth, state and territory governments cooperated to develop the *National Greenhouse Strategy (NGS)* to reduce GHG emissions to meet the nation’s international commitment [27]. *NGS* prescribed many actions that would need to be implemented by local government. The Commonwealth government acknowledged the key roles local councils could play in adapting to the local impacts of climate change, suggesting the engagement of councils would be a critical part of any national reform agenda [28].

In responding to the call of the forum of the *Council of Australian Governments (COAG)* to develop its own response to *NGS*, the *New South Wales (NSW)* government in 2005 published the *NSW Greenhouse Plan (NSWGHP)* [29]. *NSWGHP* identified three pathways to respond to the problem of climate change: i) awareness-raising, ii) adaptation planning, and iii) GHG emissions reduction. The Plan suggested many actions that would need to be implemented by local councils. The *NSW Local Government Act 1993* provides councils with an extensive list of functions, many of which could potentially be affected by climate change. For example, councils control land use, development and building in their areas. They manage and maintain infrastructure, such as roads, bridges, public buildings, recreational areas, storm-water systems, water supply and waste facilities. They also provide a range of services, such as emergency services, public health and community services [30]. Thus councils are considered ideally placed to provide a localised response to the climate problem [28].

Within this context local councils in *NSW* are required by the state government through the *Integrated Planning and Reporting (IP&R)* framework to develop their own set of comprehensive local policies via a *Community Strategic Plan (CSP)*. The *IP&R* framework defines state government’s control over local government and also influences councils’ policy responses to all of its activities, including climate change.

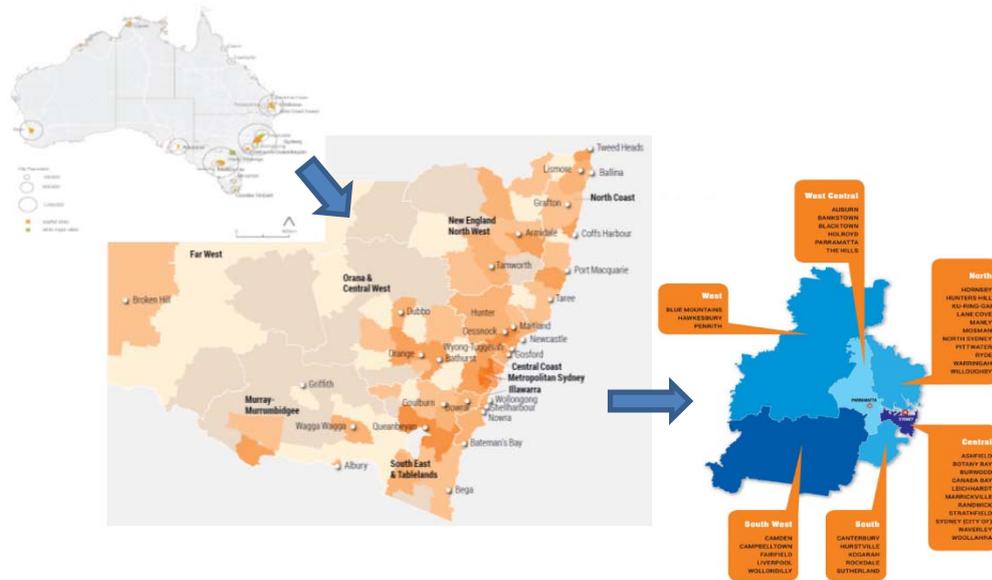
## **2. Methodology**

This research used a combination of qualitative and quantitative methods. Qualitative research encompassed documenting information from a literature review, desktop review and analysis of policy documents publicly available. Quantitative research involved assessment of data from a comprehensive on-line survey.

The geographic area of investigation for this study was *NSW* councils in the Sydney metropolitan area (i.e. the Sydney Greater Metropolitan Region (GMR)) and surrounding local councils (refer Figure 1). The investigation focused primarily upon policy processes at local government level, but the research also looked into the links of

local to state, national and international processes.

Investigation comprised three distinct phases. Phase one and phase two involved a desktop review of NSW councils' web sites and their climate change-related policies. Phase three involved a comprehensive online survey.



Source: Department of Planning & Environment (2014). *A Plan for Growing Sydney*

Fig 1: Geographic Scope: Sydney Greater Metropolitan Region (GMR) and Surrounding Local Governments in NSW

In phase one, a desktop survey of all 152 NSW councils' web sites was undertaken from January to June 2015. The survey was based on a set of carefully designed questions to extract critical information about councils' climate change-related policy measures. The survey identified a wide range of policy documents which included: strategic plans, energy-savings action plans, ecologically sustainable development plans, climate change action plans (both emissions reductions and adaptation plans) and state of the environment reports.

Table 1: Distribution of Participated Councils in On-line Survey

	Sub regions	No of Councils	Respondent	Total	Response Rate (%)
<b>Greater Metropolitan Region (GMR)</b>	Central		10	38	92.68%
	West Central		6		
	West	41	3		
	North		10		
	South West		4		
	South		5		
<b>Beyond GMR</b>	Central Coast		2	37	33.33%
	Illawarra		4		
	North Coast		8		
	New England North West		3		
	Orana & Central West	111	4		
	South East & Tablelands		6		
	Murray-Murrumbidgee		5		
	Far West		1		
Other		4			

In phase two, a qualitative review of the identified policies and plans - specifically policies listed within the *IP&R* framework - was undertaken. The purpose of this review was to assess specific climate change-related and emissions reduction measures and their associated benefits. In phase three, using an electronic questionnaire, a targeted on-line survey of the councils was conducted from July to December 2015. The investigation specifically focused on exploring and understanding the variation in councils' policy responses to climate change across NSW and the range of benefits councils are obtaining through their policies.

Each council was subsequently approached requesting identification of the appropriate officer responsible

for climate change action. Upon receiving a positive response, the nominated officer was contacted with a request to participate in the online survey. To pick up more councils to survey, a news item was published in the *NSW Office of Local Government (OLG) newsletter – Sustainability Snippets* - in July 2015 inviting all councils in NSW to complete the online survey.

Out of the 152 NSW councils, 75 councils undertook the survey. Among the 75 councils: 38 councils are from the GMR of Sydney (out of a total of 41 GMR councils) and the remaining 37 councils are from across the surrounding areas (refer Table 1).

From the survey a data-driven set of five indicators was developed to assess the extent of councils' policy responses to climate change and targeted policy benefits. These indicators are: i) policy responses; ii) targeted areas; iii) mitigation measures; iv) targeted benefits; and v) policy integration. This information was then used in two ways in analysing the findings.

First, the total number and percentage of councils undertaking measures under each indicator were calculated. This information is collectively presented to give an overall picture of the extent of adoption of a 'co-benefits approach' by councils in their climate change-related policy responses. This tally is used to get a broad quantitative picture rather than to assess the quality of each measure undertaken under the five indicators (refer Table 2).

Second, the data was categorised by being grouped by location and population size for each local government area. Based on a council's location within or outside the GMR, the data were grouped into two broad categories: i) GMR councils and ii) beyond GMR councils. To categorise the data by population size, the councils were grouped into three more categories: i) large councils (over 50,000 inhabitants), ii) medium councils (over 15,000 but less than 50,000) and iii) small councils (less than 15,000 inhabitants) (refer Table 2).

### 3. Findings

In this section, overall findings are presented in terms of data generated by the survey for the five indicators: i) policy responses; ii) targeted areas; iii) mitigation measures; iv) targeted benefits; and v) policy integration.

#### 3.1. Policy responses (respondents n=64)

In terms of policy responses, the overwhelming majority (i.e. 87.5% or 56) of the respondent councils (n=64) reported having some form of policy in place to address climate change. Only 12.5% (8 councils) reported they have neither a policy nor any action plan to address climate change. Only 28.12% (18 councils) reported having a 'dedicated or specific climate change policy' (refer Table 2, row A).

When comparing the responses between GMR and Beyond GMR councils, both categories are equally represented (i.e. 43.75% or 28) with some form of policy in place to address climate change. Three (4.68%) GMR and five (7.81%) Beyond GMR councils reported that they have neither a policy nor any action plan to address climate change.

When location and size are considered together, it is observed that of the councils with a 'dedicated or specific climate change policy' (n=18), both large GMR and large Beyond GMR councils are equally represented (i.e. 38.88% or 7), compared to none from small GMR and small Beyond GMR councils (refer Table 2, row A.3).

#### 3.2. Targeted Areas (n=73)

In terms of targeted areas, among the respondent councils (n=73), 'Council's emissions' (71.23%, 52 councils) is the most utilised GHG emission reduction component compared to 'Community's emissions' (35.61%, 26 councils). While equal number of councils (35.61%, 26) either targeted 'Council's emissions' or 'both Council's and Community's emissions', 21 of the councils (28.76%) reported that they have no specific target area (refer Table 2, row B).

When location and size are considered together, it is found large GMR councils are overrepresented (42.30%, 11) among those councils whose emission reduction measures cover both 'Council's emissions and Community's emissions' (n=26), while this is the case for only 7.69% (2) of the small Beyond GMR councils (refer Table 2, row B.3).

#### 3.3. Mitigation Measures (n=71)

In response to 'Mitigation measures', all the respondent councils (n=71) utilised 'energy-related measures' (such as energy efficiency, renewable energy, water efficiency). This is followed by 'multiple measures including active transport' (i.e. energy-related measures, waste management and active transport - 59.15% or 42 councils) and 'multiple measures excluding active transport' (i.e. energy-related measures, waste management, and life style and behaviour change - 35.21% or 25 councils) (refer Table 2, row C).

The larger councils (61.19%, 41) target 'Multiple measures' (n=67) more in their action plan than smaller

councils (10.44%, 7). When location and size are considered together, it is found that large GMR councils (43.28%, 29) target ‘Multiple measures’ more than small Beyond GMR councils (8.95%, 6) (refer Table 2. row C.2, C.3).

Table 2: Variations in Councils’ Policy Responses to Climate Change and Targeted Benefits

COUNCILS’ RESPONSES TO CLIMATE CHANGE		GMR Councils (n=38)	Beyond GMR Councils (n=37)	DISTRIBUTION BASED ON LOCATION & POPULATION						TOTAL (N=75)
				GMR			BEYOND GMR			
				L	M	S	L	M	S	
A. POLICY RESPONSES (n=64)	A.1. No Climate Change-related policy measure	03	05	02	00	01	00	00	05	08
	A.2. Climate Change addressed broadly under ‘sustainability’ (but no specific policy for Climate Change)	20	18	16	04	00	06	08	04	38
	A.3. Dedicated or Specific Climate Change Policy	08	10	07	01	00	07	03	00	18
B. TARGETED AREAS (n=73)	B.1. No Specific Target Area	09	12	07	02	00	04	02	06	21
	B.2. Only Council’s Emissions	17	09	12	04	01	03	04	02	26
	B.3. Council’s Emissions + Community Emissions	12	14	11	01	00	06	06	02	26
C. MITIGATION MEASURES (n=71)	C.1. Only ‘energy-related’ measures	00	04	00	00	00	01	00	03	04
	C.2. Multiple measures including ‘active transport’	25	17	19	05	01	08	07	02	42
	C.3. Multiple measures excluding ‘active transport’	12	13	10	02	00	04	05	04	25
D. TARGETED BENEFITS (n=64)	D.1. Only ‘financial savings’ (in addition to GHG reduction)	10	10	08	02	00	04	03	03	20
	D.2. Multiple benefits (in addition to GHG reduction & ‘financial savings’)	18	15	14	03	01	05	06	04	33
	D.3. Multiple benefits which include ‘Health Benefits’ (in addition to GHG reduction & ‘financial savings’)	07	04	06	01	00	01	02	01	11
E. POLICY INTEGRATION (n=75)	E.1. Climate change-related measures aligned and integrated with other policies	13	09	10	03	00	05	03	01	22
	E.2. Organisational change occurred to accommodate Climate Change-related policy measures	19	08	15	04	00	05	03	00	27

### 3.4. Targeted Benefits (n=64)

In regard to ‘Targeted Benefits’ while all the respondent councils (n=64) targeted ‘financial savings’, only 17.18% (11) councils targeted ‘health benefits’ along with other benefits (i.e. GHG emissions reduction, financial savings, clean environment, improved quality of life, increased productivity and employment growth) in their

climate change-related measures (refer Table 2, row D).

When location and size are considered together, it is observed that among the councils who targeted ‘Multiple benefits’ (in addition to GHG reduction and financial savings) (n=44), large GMR councils (i.e. 45.45%, 20) targeted ‘Multiple benefits’ more than small Beyond GMR councils (i.e. 11.36%, 5).

Among the councils which target ‘health benefits’ with other benefits (n=11), 54.54% (6) are large GMR councils and only 9% (1) is small Beyond GMR council (refer Table 2, row D.3).

### 3.5. Policy Integration (n=75)

In regard to ‘Policy Integration’ among the respondent councils (n=75), while 29.33% (22) councils undertook specific measures to align and integrate their climate change-related measures with other policies, 36% (27) councils have undergone some organisational change to accommodate their climate change-related policy measures (refer Table 2, row E).

When location is considered it is observed that GMR councils (65.30%, 32) are over-represented compared to Beyond GMR councils (34.69%, 17) who either undertook measures to integrate their climate change-related measures with other policies or have undergone some organisational change to accommodate their climate change-related policy measures.

## 4. Discussion

The data presented above for the five indicators suggest that the majority of NSW councils recognise and respond to climate change through their policy measures. Irrespective of whether councils have any specific climate change policy or not, most of them undertake measures that relate to climate change. Many of these measures relate to climate change mitigation. While these measures are not always ‘explicitly intended’ to reduce GHG emissions, their adoption generally results in emissions reduction as a ‘co-benefit’, along with the specific benefits targeted.

In addition, for a majority of councils, these measures generate other co-benefits. While councils in NSW generally do not purposively adopt a ‘co-benefits approach’ in existing policies, adoption of a ‘co-benefits approach’ is clearly evident in the wide range of benefits resulting from these measures. As the degree, form and nature of councils’ climate change-related responses vary widely across NSW, so too does the extent of adoption of a ‘co-benefits approach’. It is observed that councils who perceive climate change as a major policy issue by adopting a specific or dedicated climate change policy, enhance their climate change actions by targeting more considerations. This is evident from the data for both indicators: ‘Policy responses’ and ‘Policy integration’ (refer Table 2, rows A, E). These show that councils with a dedicated climate change policy more effectively integrate climate change actions across different sectors in a consistent manner and achieve maximum policy benefits compared to councils that do not have a dedicated climate change policy.

Councils which do not have either a dedicated policy or strategy for climate change, generally address ‘climate change’ under the term ‘sustainability’ as one of the many components in their CSP (refer Table 2, row A.2). This often results in lack of focus and points to an absence of a whole-of-council approach to climate change. It limits councils’ ability to effectively co-ordinate the different climate change measures across different sectors to capitalise on potential policy ‘synergies’ thereby denying them from achieving maximum policy benefits.

In understanding the variations of the participating councils’ climate change responses and the benefits achieved through these responses, first, we look at the importance of ‘structural factors’ (i.e. council’s location and size; existing policy and governance framework; relationships with other levels of government, existing resources and institutional capacity etc.) and then we look at the ‘actor-level’ factors (i.e. dedicated climate change personnel/team in administration, presence of local ‘green’ councillors, citizens’ groups and organisations, active role of the community and active participation of the council in national or international climate networks etc.). This analysis identified some distinctive patterns in the variations of the participating councils’ overall climate change-related policy responses and their associated benefits.

It is observed that councils in the GMR with higher populations are undertaking more climate change-related activities which result in more benefits than councils located outside the GMR with smaller populations. This is clearly reflected in the ‘Targeted benefits’ showing large GMR councils benefitting more through their climate change-related policy measures compared to councils located outside the GMR (refer Table 2, row D). This illustrates a distinct urban bias.

The distinct urban bias is in part due to the limited ability of small councils, but is also related to policy pressures from the NSW state government on the large GMR councils. Councils located outside the GMR with low population size, poor revenue base and a large geographical area, generally have inadequate resources to address policies and actions on climate change in depth. This conforms to the OLG’s observation that a council’s ability to

achieve its goals (capacity) is related to its population density [31]. In terms of policy pressures, the NSW State government engages more with the large GMR councils through a range of policies such as the *Sydney Metropolitan Plan*, the *Waste and Sustainability Improvement Program (WASIP)*, and *Energy and Water Savings Action Plans*. All of these policies and programs require participating councils to adopt various energy-related saving measures which result in reduction of GHG emissions as a ‘co-benefit’ along with the specific energy-related benefits targeted.

It should be pointed out here that legislation and policy are key mechanisms for driving climate change actions in local government. While legislation is compulsory for targeted councils, strategies and plans are more discretionary in their implementation [32]. The current study has found that not all legislation, policy and funding uniformly targets all councils. For example, local government authorities in Australia are required to report GHG emissions over a threshold of 25,000tCO<sub>2</sub>-e under the *National Greenhouse and Energy Reporting (NGER) Act 2007* and, from 1 July 2012, under the *Clean Energy Act 2011*. However, *Energy Savings Action Plans (ESAPs)* are only required from councils with populations greater than 50,000 people [33, 34].

Existing regulatory frameworks, within which councils currently operate, also determine the level of authority and control the council can exercise over certain areas or sectors within their administrative boundaries [28, 30]. This different level of control leads to different outcome for the two emissions reduction components in the survey: ‘Councils’ emissions’ and ‘Community’s emissions’ (refer Table 2, row B). Whereas councils have effective control over their buildings, vehicle fleet, other assets and facilities, and therefore achieve significant GHG abatement in ‘Councils’ emissions’, the same is not the case for ‘Community’s emissions’. Councils generally have relatively little control over its citizen’s energy consumption patterns and thus, limited ability to control community GHG emissions. Aside from this, a host of other factors are outside councils’ sphere of control. These include transport provision, energy supply and addressing the demand for energy. This limits a council’s ability to influence ‘Community’s emissions’. Aside from the above structural factors, poor performance in reducing ‘Community’s emissions’ can also be attributed to poor level of community engagement and lack of capacity to undertake this task by some councils.

The indicator for adopted ‘Mitigation measures’ illustrates an overwhelming preference for ‘energy-related mitigation measures’. This compares with low adoption of other mitigation measures such as ‘active transport’ and ‘life style and behaviour change’ (refer Table 2, row C). The potential for reducing consumption of energy and therefore GHGs, as well as making significant monetary savings, predominantly motivates the adoption of ‘energy-related mitigation measures’. A further important consideration for prioritising different measures is the capacity of a council’s existing budget.

As councils predominantly consider ‘financial savings’ as the main criterion for the selection of measures to reduce emissions, when considering the benefits from these measures councils’ emphasis is overwhelmingly on ‘financial benefits’ (refer Table 2, row D). This can be linked to local government policy discourse which stresses the need for quantification of results and concrete outcomes. In such a context, policy measures are negotiated mainly within an economic frame of reference.

The above preference for certain (quantifiable) monetary benefits only reflects GHG abatement and monetary savings as the main benefits resulted from reduced energy use. The non-climate benefits, which include ‘non-energy-related benefits’ such as health benefits from better air quality, active transport, improved ‘liveability’ and creating local jobs, also result from these measures. Nevertheless, they are not explicitly considered in the decision making process.

Apart from the monetary consideration of benefits, the existing regulatory statutory framework within which councils operate, also curtails their ability to undertake ‘non-energy related measures’ such as active transport, nor consider potential significant health benefits which would result from such measures. Given that local councils operate with limited resources and there is no perceived immediate return from prioritising limited expenditure to undertake such measures, the majority of councils lack incentives to pursue these health benefits.

The over reliance on readily quantifiable ‘monetary considerations’, together with limited authority and lack of incentive, influence the majority of councils in NSW to target only certain (quantifiable) monetary benefits from ‘energy-related mitigation measures’. Limitations in targeting multiple benefits excludes a wide range of environmental, social and health considerations from incorporation in the local government policy process. These ‘non-climatic and non-energy-related benefits’ include the most important and significant category of health-related benefits (such those from better air quality, active transport, improved ‘liveability’ and creating local jobs). Exclusion of these benefits from incorporation in the policy process undermines the potential for councils to achieve maximum policy benefits from climate change-related policy measures.

It is imperative to point out here that since the area of investigation for this study did not cover all states and territories of Australia and was limited to NSW councils in the Sydney metropolitan area and surrounding local councils which may limit the generalisability of the findings. However, given the absence of any prior study covering such retrospective co-benefits analysis of local governments' climate change policies in Australia, this study provides a clearer understanding of the local governments' current practice of utilising co-benefits approach in tackling climate change. The findings of this study also identify valuable lessons for other levels of government in developing future climate change strategies with co-benefits approach. This will help to purposively consider, plan, generate and promote co-benefits in planning for climate change in Australia by the decision making community. In addition, this study will provide direction for future co-benefits research in Australia.

#### 4.1 Conclusion

This paper demonstrates that while councils in NSW do not purposively utilise a 'co-benefits approach' in their climate change-related policy measures, these measures do result in multiple benefits. This investigation has identified three critical issues which have significant bearing on the adoption of a co-benefits framework in the local government context.

First, NSW local government's policy response to climate change is currently guided by single-sectoral policy development. It suffers from the absence of an integrated and co-ordinated whole-of-government approach to climate change.

Second, councils over rely on monetary considerations and quantification in targeting benefits from climate change-related policy measures. This is excluding potentially significant health-related co-benefits from incorporation in policies, thereby limiting the potential to achieve maximum benefits.

Finally, as local government's policy measures are negotiated mainly within an economic frame of reference, there is an urgent need to develop tools and methods such as calculators, indicators and indices, to assist policy makers incorporate and quantify health related co-benefits. These can then be included alongside other quantifiable monetary benefits in climate change-related policies resulting in a much more efficient process.

If these issues are addressed appropriately the envisaged benefits from adopting a co-benefits framework for local government could be significant. This would enable the extension of a co-benefits approach beyond energy efficiency and monetary savings to one of incorporating broader co-benefits including non-climatic and non-energy focused benefits of low carbon measures. These include health benefits from better air quality and provision of active transport, improved 'liveability' and the creation of local jobs. Incorporating broader perspectives in local government policy processes can substantially optimise policy outcomes, including improved human health and productivity. This, in turn, will increase the uptake of low carbon policies and programs by the decision-making community.

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