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Towards zero carbon? Constrained policy action in two New Zealand cities

Ralph Chapman[a], Philippa Howden-Chapman[b], Kate Whitwell[a] and Alyssa Thomas[a]

[a]Environmental Studies Programme, NZ Centre for Sustainable Cities, School of Geography, Environment and Earth Sciences, Victoria University of Wellington, Wellington, New Zealand; [b]NZ Centre for Sustainable Cities, University of Otago Wellington, Wellington, New Zealand

ABSTRACT

Transportation was Aotearoa/New Zealand's fastest-growing sector in terms of carbon emissions over the last two decades. This article investigates mitigation policies for transportation emissions in the two most prosperous cities, Wellington and Auckland. Analysing local government policy documents, we dissect commitments and examine the gap between aspirations and outcomes. Neither city's emissions are falling significantly despite trends towards housing intensification, which can cut emissions via shorter journeys. The mode share of motor vehicles in total commuting trips is only gradually diminishing, while the share of walking and cycling is only marginally increasing. We explore possible explanations for the slow progress in achieving aspirations. Our main findings are: first, there is a significant ambition gap between councils' stated goals, on the one hand, and measures adopted by councils, on the other; and second, 'business as usual' policies of central government are dampening these cities' will and ability to adopt more sustainable policies. We conclude that city mitigation performance will likely be modest until the central government's stance changes, but there is nevertheless a strong case, and clear opportunities, for Auckland and Wellington to strengthen their emission reductions.

KEYWORDS

Climate policy; mitigation; multi-level governance; transport; land use; emissions

Introduction

This article explores the climate goals and policies of two key Aoteaora-New Zealand city regions, and the apparent gap between the need for mitigation recognised by councils in aspirational statements, and council performance. Our premise is that aspirations have little meaning unless robust policy plans are also provided. We illustrate the gap, linking it back to a similar gap at central government level. We focus on transportation emissions.

It is increasingly clear that only a decisive mitigation effort across multiple policy fronts and jurisdictions will keep global warming safely below the 2°C threshold (Geden 2015; Stern 2015; US Council of Economic Advisers 2014) and cities have a critical role to play (The Global Commission on the Economy and Climate 2014). Renewed attention is focusing on the relative roles of local and national governments, and the extent to

CONTACT Ralph Chapman ralph.chapman@vuw.ac.nz
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which these governance levels conflict or complement each other (Betsill & Bulkeley 2006; Bulkeley & Betsill 2005; Harker et al. 2016; Kousky & Schneider 2003). The IPCC notes a 'profusion of [mitigation] activity at sub-national levels, particularly at city level, much of which is only loosely coordinated with national actions' (Somanathan et al. 2014, p. 1155). There is a range of views on cities' roles, from upbeat (C40 Cities 2014), to those underlining tensions between local and national goals (Brown et al. 2008; Bulkeley 2010), or equivocal (Bailey et al. 2012; Bulkeley & Kern 2006).

A neoclassical economic view (Sancton 2006) is that it is inefficient for local government to act given that benefits accrue beyond the local area, so they should be 'policy takers', not 'policy-makers'. Nobel Prize winner Elinor Ostrom advocated a 'polycentric' or multi-level approach with a range of policy experiments to help overcome the free rider problem dogging mitigation action (Ostrom 2009). Other researchers have noted an 'action gap' at the national level as the basis for local government action (Engel 2009; Gore 2010; Kern & Alber 2008). The local level may be an appropriate level for some mitigation policies, as cities normally have high energy consumption and waste production, as well as considerable influence over key areas such as transport (Betsill & Bulkeley 2006; Puppim de Oliveira 2009). Although cities can have influence and may even be highly motivated, factors such as a lack of coordination and/or capacity (Aylett 2014; Puppim de Oliveira 2009) may constrain them. At the least, it makes sense to exploit opportunities from better vertical and horizontal policy integration, (Corfee-Morlot et al. 2009; Newman et al. 2009) and identify concrete areas where cities can effect change (Committee on Climate Change 2012; Kern & Alber 2008). In doing so, city actions should consider (co-)benefits at the local level (Sancton 2006), such as economic or quality-of-life improvements (Chapman et al. 2016; Gore 2010).

Like many cities around the world, Wellington, the capital, and Auckland, the largest city of New Zealand, state commitments to reducing their carbon emissions, while also fostering economic activity and maintaining quality of life. There is unresolved tension between these objectives. The two councils differ in their approaches to environmental goals, but at present appear distinctly more environmentally active than the central government, a neoliberal National-led coalition since 2008 (Chapman 2015; Prince 2015). The effect of central government policies on the mitigation approaches of these two cities is analysed below.

Little has been written on such issues in the New Zealand context. Mees and Dodson (2006) highlighted the process by which Auckland's orientation towards carbon-intensive private transport became entrenched; Harris (2005) traced the origins of this orientation in post-WW2 ideology; Chapman (2008) noted the importance of pro-mitigation reform of government transport and urban policy; and Hickman et al. (2014) modelled alternative transportation scenarios for Auckland. Birchall (2014) found that local government commitment to carbon mitigation via the Cities for Climate Protection program was influenced by a lack of central government support. Legal and other factors influencing local government action have been identified (Harker et al. 2016), but we are not aware of any comparative analyses of the commitments and performance of key cities in reducing transportation emissions. This article addresses that gap, exploring the two cities' mitigation aspirations and policies, and the factors influencing their action, drawing principally on official council documents available to the public, and on statistical reports and other comparative research. The main questions we address are: are the two cities' mitigation

ambitions reflected in priorities and actions on the ground; is dissonance between local and central government acting to stymie urban mitigation policies; and are there key areas where the two cities could strengthen mitigation?

The article is structured as follows. We first place the cities in a context of national and local geographies, public opinion on climate change, and national climate policy. Secondly, we examine the councils' performance, starting with statistical data. We then draw on the extensive resource of official documents produced by councils on strategy and policy, to analyse 'ambition', priorities and measures, concluding with opportunities for more effective mitigation in the two cities.

National and city contexts

New Zealand is a highly (86 per cent) urbanised country of 4.5 million people and low population density (17 people per km^2) (The World Bank 2015). It has relatively high environmental quality and policy performance (The Economist Intelligence Unit 2013; Yale Center for Environmental Law & Policy 2014), strong conservation practices and environmental statutes, and a clean, green reputation. However, there has also been a gradual erosion of commitment to environmental goals (OECD 2007; Yale Center for Environmental Law & Policy 2014). Doubts have also been growing about the extent to which the environment remains clean and green (Hughey et al. 2013), key industries' environmental impacts (Foote et al. 2015), and the quality and transparency of environmental management (Chapman et al. 2013; Pure Advantage 2012). Greenhouse gas (GHG) emissions have risen since 2009 (Figure 1). Central government's targets are now a 5 per cent (unconditional) emissions cut by 2020, and 50 per cent by 2050,[1] but measures to advance these goals are nominal. New Zealand's Nationally Determined Contribution in terms of the 2015 Paris agreement is an 11 per cent cut in emissions against 1990 levels by 2030 (MfE 2015).

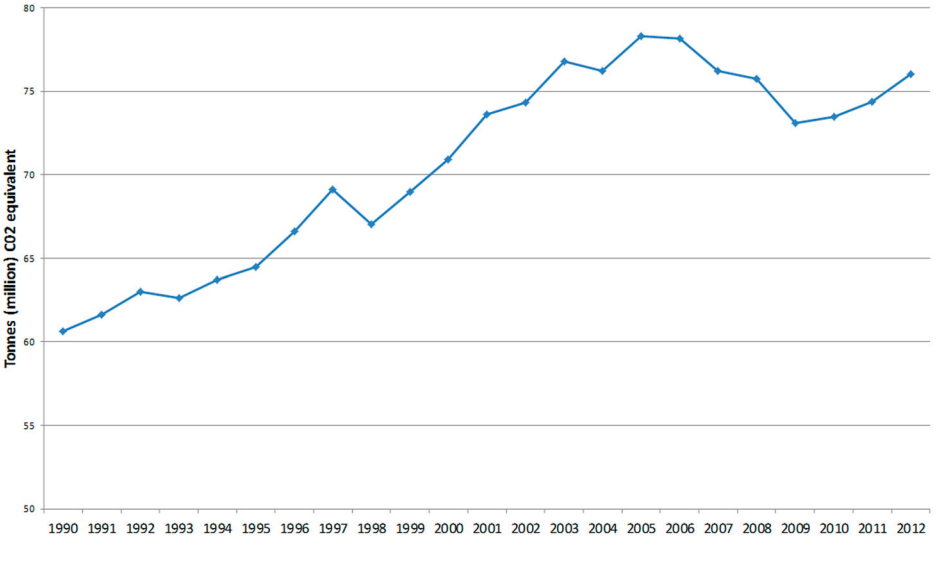

Figure 1. New Zealand's trajectory of total (gross) emissions, 1990–2012 ('total emissions' excludes carbon removals from land use, land use change, and forestry). Source: MfE (2014b): Figure ES 2.1.1.

While New Zealanders see climate change as the key *international* environmental issue, fewer than 10 per cent see it as the most important environmental issue (Hughey et al. 2013). Nevertheless, many are concerned or very concerned about its societal effects (63 per cent) or personal effects (58 per cent) (Leining & White 2015, p. 5). The commons dilemma perception is affecting people's views on mitigation – that is, they are more willing to take action if they know others are doing so or will do (Aitken et al. 2011; Milfont 2012). Support for government-level mitigation action is influenced by multiple factors, including whether policies involve financial support (Leining & White 2015; Milfont et al. 2014). The Government's recent climate change policies have been notable in giving priority to economic goals (Macey 2014), downplaying the strong longer term connection between prosperity and the environment (Boven et al. 2012; Oram 2014; Wilson et al. 2011). Internationally, the OECD remarked in its 2015 *Economic Survey of New Zealand* that the GHG intensity of output is the second highest in the OECD after Estonia (OECD 2015). New Zealand's targets have been compared unfavourably with Australia's (Wannan 2015), called 'inadequate' and the country accused of not doing its 'fair share' (Climate Action Tracker 2015a).

Wellington and Auckland (Figure 2) together contribute 49 per cent of GDP and house 45 per cent of the population (Statistics New Zealand 2014). In key economic respects, they are also distinct, with significantly higher levels of human capital, economic complexity and knowledge-intensity, and thus civic capacity (Eaqub 2014, p. 14). Some U.S. evidence suggests that cities with higher civic capacity are more likely to commit to mitigation actions (Zahran et al. 2008).

Wellington City's population is about 200,000, set within the Greater Wellington region of 500,000 people, in 8000 km^2. Almost all the region's population and economic activity are in the five cities in the region's west. Wellington City itself has a moderate population density (weighted) of 38 persons/hectare (Nunns 2014). Wellington's economic growth averaged 1.6 per cent/year, 2005–2015, compared with the country's average of 1.9 per cent; its strong human capital suggests that continuing growth is likely (Infometrics 2015b). The region's population growth (0.9 per cent/year, 2001–2013) is similar to the country's as a whole (1.1 per cent/year); prospects are for ongoing population increase, to around 600,000 in 2043 in a high-growth scenario (Statistics New Zealand 2016). Greater Wellington Regional Council (GWRC) has responsibility for regional transport

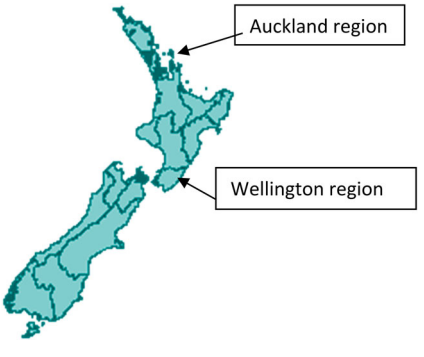

Figure 2. Location of Auckland and Wellington regions.

management, while city and district councils have responsibility for land use planning (urban form), local roads, and active travel facilities.

Auckland City accommodates 1.4 million people in an area of 5000 km^2. Population density has increased 33 per cent since 2001 and at 43 people per hectare (weighted) is now the third densest Australasian city (Nunns 2014). The City was created in 2010 from the amalgamation of one regional council and seven city/district councils (Early et al. 2015). Auckland's economy has grown 2.3 per cent/year, 2005–2015 (Infometrics 2015a). Population growth, at 1.7 per cent per year, remains rapid; a high-growth scenario projects 2.4 million by 2043 (Statistics New Zealand 2016).

Performance

Transport patterns and emissions

New Zealand's carbon emissions from fossil fuel combustion per capita (7.3 tonnes/year in 2012) are below the OECD average (9.7 tonnes) (OECD 2015). However, road transportation (generating 40 per cent of energy sector emissions in 2014) presents a major challenge as the fastest-growing sector, with a 71 per cent increase in emissions over 1990–2014 (MfE 2016, p. 41).

The Wellington region's emissions per capita[2] are moderate by national standards: in 2013, gross carbon emissions in the region were 5.3 tonnes per capita, down from 5.9 tonnes per capita in 2001 (URS 2014) (Figure 3). The region's largest contributor to emissions was 'mobile sources' (36 per cent), followed by 'stationary energy' (21 per cent). Mobile sources were largely petrol- and diesel-powered transportation. Transportation carbon emissions by 2013 were marginally *higher* than their 1999 level; on the other hand, *per capita* emissions declined (by over 10 per cent) since their 2005 peak (GWRC 2016, p. 30).

Wellington region's commuting patterns are not particularly car-intensive. In 2013, 66 per cent of trips to work were by motor vehicle, down from 70 per cent in 2001; 33 per cent of commute trips were by public or active transport (up from 29 per cent in 2001) (Statistics New Zealand 2015a). If *all* trips are considered, and the focus is on Wellington *City* over the 2010–13 period, walking constituted 27 per cent of all trips (Shaw et al. 2016). The region has several environmental and economic features facilitating active travel. These include the core city's relatively compact form (McKim 2014) and two important travel corridors converging on the CBD, concentrating regional activity. Most of the public

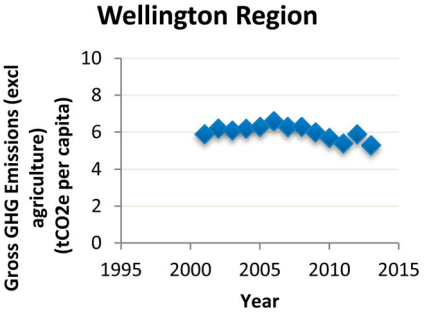

Figure 3. Gross greenhouse gas emissions per capita for Wellington (URS 2014).

transport 'spine' is served by electric suburban rail or trolley buses. The region's active travel share of commuting trips is, at 15 per cent, significantly above both the nation's average 10 per cent, and Auckland's six per cent (Table 1). Wellington region's active travel share of *all* trips, at 24 per cent, is also significantly greater than Auckland's (17 per cent) (Statistics New Zealand 2014).

However, Wellington trends are not entirely reassuring. The occupancy of vehicles entering the Wellington CBD has been steady in recent years at around 1.38 persons (GWRC 2014), and public transport's share of peak hour trips has recently dropped marginally (GWRC 2015a, p. 12). Transport-generated carbon emissions increased in the last two years, by two per cent (GWRC 2015a, p. 33).

Auckland's growth in higher density housing may have outpaced Wellington's over the past decade. Census figures show rates of growth in 'joined' occupied private dwellings (e.g. apartments; non-stand-alone townhouses) between 2001 and 2013 as highest in Auckland (33 per cent growth vs. Wellington's 27 per cent). By contrast, the rest of the country saw only three per cent growth (Statistics New Zealand 2015b).

Auckland's emissions profile is influenced by its high dependence on car transport (Auckland Council 2012). Auckland Council's Low Carbon strategy noted that transportation plus electricity accounts for about two-thirds of its emissions (Auckland Council 2014, p. 4). Excluding land use change and forestry, Auckland's (gross) carbon emissions increased 17 per cent between 1990 and 2009. One recent estimate of *per capita* emissions is 6.7 tonnes in 2009, unchanged from 1990 (ARUP 2012) (Figure 4), although Auckland Council itself estimates recent levels to be around seven tonnes per capita (Auckland Council 2014, p. 14)

While motor vehicles[3] remain dominant in Auckland's commuting mode distribution (Table 1), a higher share than Wellington's, their share in commuting fell slightly over the last decade, from 86 per cent (2001) to 84 per cent (2013) (Statistics New Zealand 2015a). Auckland's public transport mode share is much lower, at eight per cent, than Wellington's. Accordingly, a major Council goal is to double public transport trips from 70 to 140 million (2012 to 2022) (Auckland Council 2012) and, although there was a small decline in 2013, trip numbers were up 20 per cent over April 2011–April 2015 (Auckland Transport 2015). However, active transport encouragement has lagged, despite recent cycleway construction; and cycling mode share is not on track to its five per cent 2020 goal (latest figures, for 2013, were 1.1 per cent) (Auckland Council 2015, p. 5). In short, the Auckland picture suggests gradual change from a 'low' base, but in the right direction. The level of monitoring is encouraging, but there is a long way to go in transforming Auckland Transport.

Table 1. Main means of travel to work, from NZ Census 2013 for Wellington and Auckland Regions; and all-trip mode shares (share of trip legs), from NZ Household Travel Survey data, 2010–2013.

	Car/ motorcycles	Walking/ cycling	Public transport (Bus/Train)	Other (incl ferry)	Total
Wellington: share of work commute trips (main mode) (%)	66	15	17	1	100
Auckland: share of work commute trips (main mode) (%)	84	6	8	2	100
Wellington: share of all trips (%)	71	24	4	1	100
Auckland: share of all trips (%)	78	17	4	1	100

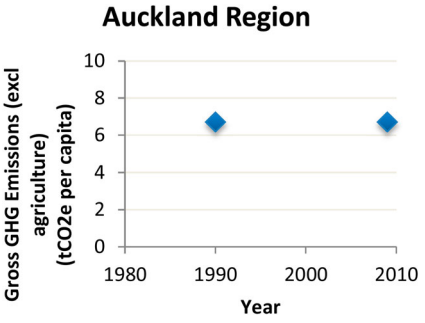

Figure 4. Gross greenhouse gas emissions per capita for Auckland (ARUP 2012).

Method: analysing policy ambition

To better understand the councils' ambitions, priorities and measures, we undertook qualitative interpretative document analysis, a method frequently used in policy and urban studies (Gurran & Phibbs 2013; Jacobs 2006; Murphy 2015). Such analysis can assist in understanding the context in which policies are implemented (Bowen 2009), policy conflicts (Murphy 2015) and policy nuances. To examine the commitment of Wellington and Auckland to mitigation, we assessed the councils' planning and policy documents dating from 2010 to the end of 2015. We searched council websites for documents on climate mitigation and/or emissions reduction, including in relation to transportation and land use. Documents included strategic policy texts from councils, such as long-term plans, annual reports and specific strategies on climate change and transportation. In line with Bowen (2009), we aimed to analyse a 'wide array of documents providing a preponderance of evidence' (p. 33). As well as strategic and policy document evidence, we examined evidence (mainly statistical) on outcomes from various sources including the councils and Statistics New Zealand. Table 2 lists official documents analysed. We did not code the documents, but analysed references to climate change, mitigation, and emissions reduction. An element of interpretation and judgement was involved in the ratings (Table 2) with discussion among authors, and independent ratings made by two authors. Each policy document's rating was based on the quantity and quality of references to climate mitigation, emission reductions, and relevant transportation and land use policies, in terms of an expressed or implicit commitment to climate change mitigation. Document ratings were: zero; 'low' for minimal reference to (or minimal substance on) mitigation, or no sense of urgency; 'medium' for attention to some aspects of, or the setting of a target for, mitigation, but no urgent time frame; and 'high' for serious and committed attention to mitigation, with a sense of urgency and ambition and with a strategy and targets.

Findings

Wellington

In line with aspirations for a high-quality of life, Wellington City Council (WCC) and, less ambitiously, GWRC policy-makers, have espoused clear carbon mitigation goals. However, below the high-level aspirations, specific targets and policy measures have

Table 2. Council documents analysed, and rating of commitment to climate change mitigation.

Council	Document	Date	Rating
Auckland Council	Low Carbon Auckland: Auckland's energy resilience and low carbon action plan	Jul 2014	√√√
	Auckland Plan	Jun 2012	√√
	Auckland Council Long Term Plan 2012–2022	Jun 2012	√
	Auckland Council 10-Year Budget/Long-Term Plan 2015–2025	Jun 2015	√
	Auckland Regional Land Transport Strategy 2010–2040	Apr 2010	√
	Auckland Regional Land Transport Plan 2015–2025	Jul 2015	√
	Auckland Regional Land Transport Program 2012–2015	Apr 2012	√
	Auckland Council Annual Report 2014/2015 (summary)	Sep 2015	√
Greater Wellington Regional Council	Climate Change Strategy: A strategy to guide the Wellington Regional Council's climate change response	Oct 2015	√√
	Greater Wellington Regional Council: 10 Year Plan, 2015–25	Oct 2015	√
	Greater Wellington Regional Council: Long Term Plan 2012–22	Jun 2012	√
	Wellington Regional Strategy 2012: Growing a sustainable economy	n.d. 2012	0
	Wellington Regional Land Transport Strategy 2010–2040	Sep 2010	√
	Regional Land Transport Program 2012–2015	Jul 2012	√
	Wellington Regional Land Transport Plan 2015 (draft)	n.d. 2015	√√
	Regional Policy Statement for the Wellington Region	Apr 2013	√
	GWRC Annual Report 2014/15	Oct 2015	√
Wellington City Council	Wellington City's 2013 Climate Change Action Plan	Oct 2013	√√√
	Wellington Towards 2040: Smart capital	Aug 2012	√√
	Wellington City Council Long Term Plan 2015–25	Jun 2015	√√√
	Wellington City Council Long Term Plan 2012–22	Jun 2012	√
	Wellington City Council Annual Report 2013–2014	Sep 2014	√
Upper Hutt City Council	Upper Hutt City Sustainability Strategy 2015–2025	n.d. 2015	√
	Upper Hutt City Council Long Term Plan 2015–2025	Jun 2015	√
	Upper Hutt City Long Term Plan 2012–2022	n.d. 2012	0
	Upper Hutt City Annual Report 2013–2014	Oct. 2014	√
Hutt City Council	Hutt City Environmental Sustainability Strategy 2015–2045	Dec 2014	√√
	Hutt City: Shaping Our City. Long Term Plan for Hutt City 2015–2025	n.d. 2015	0
	Hutt City Long Term Plan 2012–2022	n.d. 2012	0
	Hutt City Annual Report to 30 June 2014	n.d. 2014	0
Porirua City Council	Porirua City Council Long Term Plan 2015–2025	Jun 2015	√
	Porirua City Council Long Term Plan 2012–2022	Jun 2012	√
	Porirua City Council Annual Report 2013–2014	Sep 2014	0
Kapiti Coast Dist. Council	Kapiti Coast District Council Long Term Plan 2015–2035	Jun 2015	√√
	Kapiti Coast District Council Long Term Plan 2012–2032	n.d. 2012	√√
	Kapiti Coast District Council Annual Report 2013–2014	n.d. 2014	√

Notes: Documents ordered by level, from strategic to annual reports. *Basis of document rating*: 0: Zero: Document does not refer to climate change mitigation/emissions reduction; √: Low: Minimal reference or substance, no sense of urgency; √√: Medium: Attention to some aspects/target set, but not urgent time frame; √√√: High: Serious and committed attention, sense of urgency and ambition, with strategy and targets.

been unambitious, and recent documents focused on climate change do not find their ambition reflected in other plans (Chapman et al. 2015).

At a strategic level, GWRC ignored climate change mitigation in its 2012 Wellington Regional Strategy (GWRC 2012). This Strategy mentioned growth 29 times, sustainable or sustainability only twice, and climate change not at all. This was surprising, as the *Local Government Act 2002* requires consideration of a broad range of interests, including environmental, social, and cultural matters. In the Wellington Regional Land Transport Plan 2015, mitigating transport emissions remains merely a sub-issue under 'Liveability'. Until recently, moreover, GWRC did not monitor trends in total regional carbon emissions. The first regional Greenhouse Gas Inventory Report (URS 2014) underlined that

GWRC has been slow to recognise the issue of carbon mitigation, despite noting in a 2005 State of the Environment report that carbon emissions were a 'must improve' matter (GWRC 2005). However, attention to mitigation is improving. GWRC's climate change strategy of late 2015 stated a vision that 'GWRC strengthens the long-term resilience and sustainability of the Wellington region through climate change action and awareness' (GWRC 2015b). The Regional Council now has a dual target for carbon emissions, namely, that by 2025, the region's transport-related per capita carbon emissions will be 15 per cent below 2013 levels and absolute emissions will be 10 per cent down (GWRC 2015a). This target is arguably more ambitious than central government's,[4] but still falls markedly short of the action needed to achieve developed world carbon reduction goals of around 80–95 per cent by 2050 (UNFCCC 2007), or the 1.5–2°C goal of the Paris Agreement (Climate Action Tracker 2015b). By the end of 2015, other than these transport targets, there were no specific measurable targets to accompany the GWRC's climate strategy.

A positive contribution to effective mitigation has been made by GWRC through investment in bus and train upgrades and promotion of public transport alongside alternatives such as walking and cycling.[5] However, there are risks that current opportunities such as regional bus fleet upgrades will not be seized (Sobiecki & Chapman 2016) and GWRC's strategic approach to public and active transport can be seen as at best gradualist and at worst 'deficient' (Generation Zero 2013). For example, in the 10 Year Plan, there is a stated target that travel program participants will increase their use of sustainable transport modes, but no targets are set (GWRC 2015c, p.105). More generally, the combined effect of GWRC's policies is not explicitly evaluated in CO_2 terms,[6] and funding for carbon reduction policies is not yet explicitly allocated.

WCC has an ambitious goal of reducing emissions to 30 per cent below 2001 levels by 2020, a commitment it renewed in 2013 (Wellington City Council 2010, 2013), but will now not achieve: the actual reduction in city-wide emissions by 2013 was 0.7 per cent (URS 2014, p. 33). WCC has focused mainly on a limited set of policy levers, including financing of housing energy efficiency retrofits, encouraging cycling, minimising waste, capturing methane from landfills, and improving efficiency in its own operations. At end-2015, its plans were being reconsidered (Wellington City Council 2016).

A concerning feature of WCC's thinking is that its transport and land use policies appear only weakly connected to its mitigation goals. In its 2014 annual transport report, for example, there was no mention of climate change or mitigation, and low carbon emissions were only briefly mentioned (Wellington City Council 2014a). Analysis of WCC spending priorities also demonstrates that there is still a significant emphasis on road transport, with the majority of both operating and capital expenditure being allocated to the vehicle network, with the cycling and pedestrian networks combined representing only about one-fifth of the total[7] (Wellington City Council 2014a). This matters, as transport is the city's second largest source of carbon emissions (35 per cent excluding aviation) (Wellington City Council 2013).

Analysis of some recent important land use planning decisions by WCC suggests that 'road-related' interests, supported by the national New Zealand Transport Agency, tend to trump city-level 'sustainable redevelopment' interests (Topham 2012). This is despite evidence of a public appetite in Wellington city for a quality, compact city vision, and increasing interest in mixed-use urban development (Howden-Chapman et al. 2015). Wellington has seen more rapid growth in CBD and medium-density housing areas than expected by

the City Council. Further growth is expected, with 35 per cent of new housing expected to be medium-density and by 2043, the number of dwellings in the CBD growing by 88 per cent (Wellington City Council 2014b). Even 35 per cent medium-density may be conservative (Dodge 2017).

The ongoing realisation of such changes, in Wellington city and elsewhere in the region, partly turns on political feasibility. Our evaluation of the local authority documents in the region suggests that there are varying interpretations of local communities' willingness to alter the shape of their cities, and cut transportation emissions. Some documents report citizens' desires for more environmentally sustainable communities (e.g. Hutt City Council n.d., p. 5), but council policies may not reflect this (Hutt City Council 2015). WCC and Kapiti Coast appear to have constituencies favouring ambitious mitigation goals, but other cities and district councils in the region are less committed to mitigation (Table 2) to judge by the content of key policy documents. Several councils have yet to set mitigation goals. Porirua City's only substantive reference in its Long-Term Plan 2015–2025 to transport and climate change is that 'the added cost to energy prices (transport fuels and stationary energy) is minimal and unlikely to increase'.

In short, in analysing mitigation ambitions, priorities, and concrete plans for the Wellington region, we conclude first that Wellington councils' ambitions vary greatly, from the WCC's clear ambition through to the smaller councils' focus on adaptation rather than mitigation. Second, there is a major gap between the ambition of strategic visions, and the reality of lower level plans and delivery of emission reductions through concrete policies adopted. This is despite scope for city/district councils to choose policies that make a difference in public and active transport, and land use planning.

Auckland

With Auckland's amalgamation into one integrated 'super-city' council in 2010 and a new focus on strategic planning for the region, Auckland Council adopted a vision to be 'the world's "most livable city": a quality, compact city' (Auckland Council 2012). Auckland policy-makers are aiming for substantial, if not ambitious, emissions reduction and associated improvements in regional urban and transport planning.

The 2012 Auckland Plan set out Auckland Council's mitigation strategy, an emissions reduction of 10–20 per cent by 2020, 40 per cent by 2040 and 50 per cent by 2050 (all targets relative to 1990 levels). These targets were all aligned with central government targets, but as the central government has now watered down its 10–20 per cent target for 2020 to 5 per cent, Auckland's short-term target now appears *comparatively* ambitious. At the strategic level, Auckland Council appears serious, and joined the C40 Cities Climate Leadership Group at Paris in December 2015. However, some official Auckland targets are looser than they seem. The Auckland Regional Land Transport Strategy targets are *per capita* targets – for example, to reduce GHG emissions per capita from transport by 50 per cent by 2040 relative to 2007 levels (Auckland Regional Council 2010). These targets will be substantially offset by projected population growth, as noted by the climate NGO 'Generation Zero' (2012). As the atmosphere 'sees' only absolute reductions, per capita reductions have limited environmental meaning. The recent Low Carbon Auckland Plan details substantive policies planned to reduce future emissions (Auckland Council 2014), but at the practical level, Auckland Council's most recent scorecard on

emissions performance has shown progress on only two out of four transport emission indicators (Auckland Council 2015, p. 5).

In the last few years, Auckland Transport's focus on public transport enhancements has led to several actions supporting long-term emission reductions, including progressively electrifying the urban train network, integrating ticketing systems and supporting travel demand reduction programs to encourage mode shift (Auckland Transport 2014). Emission reductions gained by these improvements are estimated, although we found no publicly documented link to the Council's overall transport targets. In the short term, significant transportation policy measures include expansion of the bus lane network, completion of the City Rail Link, improving travel information, and consolidation of freight networks.

Strategically, the most significant of these measures is the City Rail Link, first proposed in the 1920s to join up the city's currently disjointed urban rail network with the aim of doubling capacity, and halving some public transport journey times into the CBD. Plans to begin building the link were delayed due to lack of central government funding support (Orsman 2014), but Auckland Council pushed ahead in 2015. In 2016, central government changed its position and now supports this critical project (Wade 2016). Despite this project's significance, the Low Carbon Auckland plan (Auckland Council 2014) does not quantify its likely carbon yield.

Despite various differences between Wellington region and Auckland, document analysis reveals similarities in the cities' approaches to mitigation. Firstly, mitigation and its co-benefits are being given increasing prominence by both Auckland and the bigger councils in the Wellington region, if barely mentioned by a number of small councils (Table 2). Second, mitigation is often linked with climate impacts, a connection widely found in other countries (Gore 2010; Qi et al. 2008), revealing that the (expected) local impacts of climate change can raise citizen engagement, and that linking mitigation to local issues can motivate policy action (Puppim de Oliveira 2009; Schreurs 2008).

However, while climate change is discussed in council documents, mitigation still takes second place to 'efficiency' and 'economic growth'. In transport-related documents, mitigation targets are included, but not 'front and centre', evidently because councils remain preoccupied with shorter term costs and growth. As mitigation and economic success are not mutually exclusive (Gustavsson et al. 2009), the two cities in this study could send a message to the government by highlighting complementarities between mitigation and prosperity (Schreurs 2008).

In the councils' long-term plans, climate change most often appears under 'infrastructure' – ensuring that infrastructure is able to handle climate change effects such as rising seas and flood/storm intensity. Importantly, a clear link between mitigation goals and concrete long-term plan actions is generally lacking from the cities' policy documents. If Wellington and Auckland are to take a greater leadership role, a greater focus on the extent to which policies can materially contribute to stated targets, and the factors impeding or supporting progress, is necessary.

Constraining local ambition: central government and the cities

In evaluating targets and progress, we have reviewed Wellington and Auckland cities' policy stances and performance against a multi-level governance framing, looking for alignment or conflicts between central and local governments. Central government has, since the change of administration at the end of 2008, largely abandoned meaningful

carbon mitigation policies, focusing instead on economic growth (DPMC 2014). Its hollowing out of the Emissions Trading Scheme has been widely criticised (Hopkins et al. 2015). The Parliamentary Commissioner for the Environment described this as making climate change policy 'a farce' (Wright 2012). Even before this, mitigation policy was weakened in 2004 by a Resource Management Act amendment removing councils' ability to consider adverse climatic effects when consenting land use activities (Baillie 2012; Harker et al. 2016). Given the subsequent extended weakness of national-level policy, this change was significant.

In terms of transportation, environmental sustainability was removed from the Transport Strategy following the 2008 change of incoming government (Ministry of Transport 2009), with an explicit reorientation away from transport sector mitigation, given the incoming government's preference to rely on the emissions trading scheme:

> [M]oving too quickly on modal shift will have a negative impact on environmental [sic] and economic efficiency' and … 'government expects carbon mitigation primarily to occur via new fuels (e.g. biofuels and electric cars) encouraged via an emission trading scheme, plus some modal shift actions. (Ministry of Transport 2009, p. 11)

After extended quiescence and loss of opportunities for 'transformative' action (Knight-Lenihan 2015), even the government's own advisers recommended action by 2014. The Environment ministry noted tersely that 'The current settings and weak price signal neither incentivise behaviour change nor prepare us for a transition to rising future carbon prices' (MfE 2014a, p. 23), and that 'current settings are not driving meaningful emission reductions' (MfE 2014a, p. 5), while the Transport ministry stated:

> Measures to reduce transport emissions have had a limited impact, and more will need to be done if we are to make a meaningful contribution towards the government's wider targets and international obligations on climate change. (Ministry of Transport 2014, p. 14)

Missed mitigation opportunities have been apparent in recent government urban development policy. A key plank of this is to increase housing supply in greenfield areas and other areas of demand, for example by creating 'special housing areas' (SHAs) for rapid housing development (Murphy 2015). This involved Auckland Council adopting a 2013 Auckland Housing Accord, entailing streamlined planning of SHAs within the framework of Auckland's proposed Unitary Plan. However, the SHAs policy did not prioritise compact development, so that travel associated with SHA development is unlikely to be less carbon-intensive than normal Auckland travel, according to a modelling analysis, at a time when emission reduction from smarter land use is needed (Preval et al. 2016).

Against this backdrop, can we expect meaningful mitigation actions from Auckland and Wellington councils? A pessimistic response might be that the land use, transport patterns, and energy use of city regions is largely locked in after decades of development, and that accordingly, it is a painfully slow process to reduce (urban) carbon emissions. This view emphasises 'path dependence' (Arthur 1988), and the economic and social difficulty of changing fuel using behaviour (Smil 2008). Once urban infrastructure is built, and social behaviour developed around it, the socio-technical pattern is embedded. Such a view might be supported by readings of some of Auckland's motor vehicle commuting and emission numbers: for example, Auckland's increased public transport travel to the CBD over 2006–2013 was offset by increases in private transport travel in outer areas where public transport shares are low (Paling 2014, p. 14).

A more optimistic view is that transport and land use policies of councils can succeed in altering emission paths over time, if the ambition is there, and policies are not impeded at a higher level (Aylett 2014; Chapman et al. 2014; Hickman et al. 2014; Keall et al. 2015). Effective actions are easier in a rapidly growing city, suggesting that Auckland's potential for change is high.

Nevertheless, major investments in compact development and connected infrastructure are needed (Floater et al. 2014a). Both Auckland and Wellington's steady land use intensification, concentrated around amenities, indicates that investment is occurring. This intensification could be accelerated in both Wellington and Auckland, with an important long-term effect on emissions. Swift growth in multi-unit housing is already favoured by both Auckland and Wellington City councils (Early et al. 2015), although the outcome of the Independent Hearings Panel process on the Auckland Unitary Plan, which reported in August 2016, will influence the pace in Auckland. An emphasis on the rapid development of the more centrally located SHAs in both cities, with appropriate transport facilities, would help increase public transport and active travel mode shares.

Road pricing policies could also be introduced for congested road arterials – but these are not yet legal in New Zealand, to the frustration of some councils (GWRC 2016, p. 130). However, there are hints of a change in central government policy on this. Similarly, accelerating the removal of minimum parking requirements; increasing car parking prices; and increasing the frequency of bus services on the basis of community service supporting an ageing population, would all help shift mode choices away from private motor vehicles.

In short, policies being planned or considered for Auckland and Wellington do have the potential, if accelerated, to make significant changes in urban form and transportation patterns, and significantly cut transport emissions over a timeframe of 20–30 years. They would, in particular, be consistent with the goal of the Low Carbon Auckland plan, to 'ensure the Auckland Unitary plan enables intensification in areas with access to good public transport, encourages walkable and cycleable communities and zoning patterns support efficient transport networks and reduced reliance on car travel' (Auckland Council 2014). They would also be consistent with the goals of Wellington City Council's draft Low Carbon Capital Plan of 2016, to support mitigation through intensification, among other means.

Conclusion

This article was motivated by an appreciation of the need to cut carbon emissions sharply if unmanageable climate change is to be minimised, and by the reality that many cities internationally have begun to take effective mitigation actions irrespective of the stance of central governments. Cities such as Portland and Copenhagen have shown the potential of creative policy experimentation (Floater et al. 2014b; Slavin 2011). Our policy analysis concludes that Auckland Council and some of the councils in the Wellington region clearly state the case for ambitious mitigation action and are starting to take some effective steps to reduce emissions. Progress on the ground is, however, slow. While Wellington City mitigation goals, in particular, represent a significant level of ambition, they have been undermined by slow progress in policy implementation, and hindered until recently by GWRC's low profile on climate change. However, some policy actions, such as improving public transport in both Auckland and Wellington regions, are bearing fruit.

The critical level of government for influencing carbon emissions in the Wellington region, GWRC, has only just begun to take mitigation seriously, as indicated by a recent statement by its chair, on the release of a new climate change strategy: 'We have realised that, in the absence of meaningful commitment from the Government, it is up to councils to take the lead in reducing emissions … ' (GWRC 2015d). GWRC's most positive actions to date have been around improving public transport after decades of underinvestment, and *per capita* transportation emissions are falling. It is difficult for *city* councils in the Wellington region to make substantial emissions cuts given their limited policy levers. Nevertheless, Wellington and Kapiti Coast are developing ambitious approaches. These two councils, not to mention other councils in the Wellington region, will need to significantly lift their record on policy implementation (Wellington's cycleways are a case in point). There remain serious gaps across the region in policy on active and public transport infrastructure investment and promotion, and land use planning to implement compact city development aims.

Auckland Council has adopted a progressive vision for its region, and comparatively ambitious shorter term carbon emission reduction targets, but its out-year targets are not strong, and need to be strengthened to align with the 2015 Paris agreement. However, its plans are, so far, more concrete than those of Greater Wellington and, if successfully implemented, could generate significant reductions. If Auckland and GWRC coordinated in stepping beyond central government constraints, actively raised public awareness, and analysed and monitored more clearly the effects of their policies, their positive actions could beneficially influence other cities' approaches.

A further conclusion is that councils seem increasingly aware that land use policies (e.g. rules governing intensification; minimum parking requirements) matter greatly for encouraging more sustainable transport and environmental outcomes. Auckland Council is leading on minimum parking requirements (Auckland Council 2015, p. 4), and Wellington City is also considering reform (both cities have already removed such requirements in the CBD). Policy changes in these domains could significantly alter travel behaviour over time, yielding valuable mitigation.

City goals and developing actions contrast with mitigation inaction by central government. Tension between levels of government has been evident in areas such as the delay in central government assistance for the Auckland central rail link. More positively, such tension represents democratic resistance to central government inertia, a resistance underpinned by widespread concern about climate change's incipient effects. It appears that central government inertia hinders but does not stymie local council action: councils are acting to reduce emissions, and building a constituency for doing so.

Coordination between levels of government on transportation has elsewhere been seen to be desirable for successful mitigation action at the city level (e.g. Gore 2010; Jones 2013). Councils in New Zealand have had to respond to central government's orientation to economic growth and conventional vehicle transport, but are also recognising an emerging constituency for mitigation. Following COP21 in Paris, there are also early indications that the central government is starting to better appreciate the case for active mitigation. The two cities on which this study has focused are likely to miss their mitigation targets unless a more multi-level coordinated and progressive approach to carbon mitigation is implemented. Coordination, a more progressive central government policy approach, and more effective city-level policy actions, could together enable urban mitigation

potential to be realised. The importance of this is underlined by the renewed global ambition spelt out in the Paris agreement.

Notes

1. Targets expressed vis-à-vis 1990 (Groser 2013).
2. This analysis excludes agricultural emissions. Including them would misleadingly portray Wellington's emissions as much higher than Auckland's, simply because Wellington has a larger region.
3. This category includes motorcyclists, which are also included in Table 1 figures.
4. GWRC's reduction rate (2013–2025) is 0.9 per cent/year; central government's target implies a gross reduction rate of 0.3 per cent/year (1990–2030), but the net reduction rate is unclear as land use change and forestry data are not publicly available. Starting points and responsibilities are, of course, contested.
5. See, for example, the Active a2b programme.
6. GWRC does have an *internal* emissions mitigation plan ('Climate Change Mitigation Corporate Action Plan').
7. Public transport network expenditure is primarily the responsibility of the Regional Council.

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References

Aitken, C, Chapman, R & McClure, J 2011, 'Climate change, powerlessness and the commons dilemma', *Global Environmental Change*, vol. 21, no. 2, pp. 752–760.

Arthur, WB 1988, *Urban systems and historical path-dependence*, The Stanford Institute for Population and Resource Studies, Palo Alto.

ARUP 2012, *Auckland Council: potential policy options to reduce greenhouse gas emissions: technical report*, ARUP Pty Ltd, Sydney, Australia.

Auckland Council 2012, *The Auckland plan*, Auckland Council, Auckland.

Auckland Council 2014, *Low carbon Auckland: Auckland's energy resilience and low carbon action plan (Toitū te whenua, toitū te tangata)*, Auckland Council, Auckland.

Auckland Council 2015, *Low carbon Auckland: a year in action*, Auckland Council, Auckland.

Auckland Regional Council 2010, *Auckland regional land transport strategy 2010–2040*, Auckland Regional Council, Auckland.

Auckland Transport 2014, *Auckland Transport: annual report 2014*, Auckland Transport, Auckland.

Auckland Transport 2015, *Auckland Transport monthly indicators report 2015/16: November 2015*, Auckland Transport, Auckland.

Aylett, A 2014, 'Progress and challenges in the urban governance of climate change: results of a global survey', MIT – Department of Urban Studies and Planning, Cambridge, MA.

Bailey, R, Longhurst, JWS, Hayes, ET, Hudson, L, Ragnarsdottir, KV & Thumim, J 2012, 'Exploring a city's potential low carbon futures using Delphi methods: some preliminary findings', *Journal of Environmental Planning and Management*, vol. 55, no. 8, pp. 1022–1046.

Baillie, S 2012, *The consideration and regulation of climate change effects under the Resource Management Act 1991*, University of Otago, Dunedin, New Zealand.
Betsill, MM & Bulkeley, H 2006, 'Cities and the multilevel governance of global climate change', *Global Governance*, vol. 12, no. 2, pp. 141–159.
Birchall, SJ 2014, 'Carbon management in New Zealand local government: co-benefits of action and organisational resolve in the absence of government support', *Australasian Journal of Environmental Management*, vol. 21, no. 3, pp. 253–267.
Boven, R, Harland, C & Grace, L 2012, *Navigating an uncertain future: Environmental foundations for long-term success*, Stakeholder Strategies, Auckland.
Bowen, GA 2009, 'Document analysis as a qualitative research method', *Qualitative Research Journal*, vol. 9, no. 2, pp. 27–40.
Brown, MA, Southworth, F & Sarzynski, A 2008, *Shrinking the carbon footprint of metropolitan America*, Brookings Institution, Washington, DC.
Bulkeley, H 2010, 'Cities and the governing of climate change', *Annual Review of Environment and Resources*, vol. 35, no. 1, pp. 229–253.
Bulkeley, H & Betsill, MM 2005, 'Rethinking sustainable cities: multilevel governance and the "Urban" politics of climate change', *Environmental Politics*, vol. 14, no. 1, pp. 42–63.
Bulkeley, H & Kern, K 2006, 'Local government and the governing of climate change in Germany and the UK', *Urban Studies*, vol. 43, no. 12, pp. 2237–2259.
C40 Cities 2014, *Climate action in megacities: C40 cities baseline and opportunities volume 2.0*, C40 Cities Climate Leadership Group and Arup, New York.
Chapman, R 2008, 'Transitioning to low-carbon urban form and transport in New Zealand', *Political Science*, vol. 60, no. June, pp. 89–98.
Chapman, R 2015, *Time of useful consciousness: acting urgently on climate change*, Bridget Williams Books, Wellington.
Chapman, R, Howden-Chapman, P & Capon, A 2016, 'Understanding the systemic nature of cities to improve health and climate change mitigation', *Environment International*, vol. 94, September, pp. 380–387.
Chapman, R, Howden-Chapman, P, Keall, M, Witten, K, Abrahamse, W, Woodward, A, Muggeridge, D, Beetham, J & Grams, M 2014, 'Increasing active travel: aims, methods and baseline measures of a quasi-experimental study', *BMC Public Health*, vol. 14, no. 1, pp. 935–947.
Chapman, R, Thomas, A, Bond, S, Goldberg, E & Livesey, C 2013, 'Environmental governance: a report on New Zealand environmental governance for the transparency international New Zealand (TINZ) project (supplementary paper)', Transparency International New Zealand, Wellington.
Chapman, R, Whitwell, K & Dodge, N 2015, 'Submission to the Greater Wellington Regional Council on the draft regional land transport plan', NZ Centre for Sustainable Cities, Wellington.
Climate Action Tracker 2015a, *New Zealand deploys creative accounting to allow emissions to rise*, Climate Analytics, PIK, Ecofys and New Climate Institute, Berlin.
Climate Action Tracker 2015b, *Paris agreement: near-term actions do not match long term purpose – but stage is set to ramp up climate action*, Climate Analytics, Ecofys, PIK and NewClimate Institute, Berlin.
Committee on Climate Change 2012, *How local authorities can reduce emissions and manage climate risk*, Committee on Climate Change, London.
Corfee-Morlot, J, Kamal-Chaoui, L, Donovan, M, Cochran, I, Robert, A & Teasdale, P 2009, *Cities, climate change and multilevel governance*, OECD Environmental Working Papers, OECD, Paris.
Dodge, N 2017, *A quarter acre pavlova paradise lost? The role of preferences and planning in achieving urban sustainability in Wellington, New Zealand (PhD thesis)*, Victoria University of Wellington, Wellington.
DPMC 2014, Statement of intent 2014-2018, Department of Prime Minister and Cabinet, Wellington.
Eaqub, S 2014, *Growing apart: regional prosperity in New Zealand*, Bridget Williams Books, Wellington.

Early, L, Howden-Chapman, P & Russell, M 2015, *Drivers of urban change*, Steele Roberts Aotearoa, Wellington.
Engel, K 2009, 'Whither subnational climate change initiatives in the wake of federal climate legislation', *Publius: Journal of Federalism*, vol. 39, no. 3, pp. 432–454.
Floater, G, Rode, P, Robert, A, Kennedy, C, Hoornweg, D, Slavcheva, R & Godfrey, N 2014a, *Cities and the new climate economy: the transformative role of global urban growth*, LSE Cities, London School of Economics and Political Science, London.
Floater, G, Rode, P & Zenghelis, D 2014b, *Copenhagen: green economy leader report*, LSE Cities, London School of Economics and Political Science, LSE Library, London.
Foote, K, Joy, M & Death, R 2015, 'New Zealand dairy farming: milking our environment for all its worth', *Environmental Management*, vol. 56, no. 3, pp. 709–720.
Geden, O 2015, *Ensuring the quality of scientific climate policy advice*, SWP: German Institute for International and Security Affairs, Berlin.
Generation Zero 2012, *Submission on the draft Auckland regional land transport programme*, Generatioin Zero, Auckland.
Generation Zero 2013, *Fast forward Wellington*, Generation Zero, Wellington.
Gore, CD 2010, 'The limits and opportunities of networks: municipalities and Canadian climate change policy', *Review of Policy Research*, vol. 27, no. 1, pp. 27–46.
Groser, T 2013, *New Zealand commits to 2020 climate change target*, viewed <http://www.beehive.govt.nz/release/new-zealand-commits-2020-climate-change-target>.
Gurran, N & Phibbs, P 2013, 'Housing supply and urban planning reform: the recent Australian experience', *International Journal of Housing Policy*, vol. 13, no. 4, pp. 381–407.
Gustavsson, E, Elander, I & Lundmark, M 2009, 'Multilevel governance, networking cities, and the geography of climate-change mitigation: two Swedish examples', *Environment and Planning C: Government and Policy*, vol. 27, pp. 59–74.
GWRC 2005, *Measuring up – the state of the environment report for the Wellington region 2005*, Greater Wellington Regional Council, Wellington.
GWRC 2012, *Wellington regional strategy 2012 – growing a sustainable economy*, Greater Wellington Regional Council, Wellington.
GWRC 2014, 2013/14 Annual monitoring report on the regional land transport strategy, Greater Wellington Regional Council, Wellington.
GWRC 2015a, 2014/15 Annual monitoring report on the regional land transport plan November 2015, Greater Wellington Regional Council, Wellington.
GWRC 2015b, *Climate change strategy; A strategy to guide the Wellington regional council's climate change response, October 2015*, Greater Wellington Regional Strategy, Wellington.
GWRC 2015c, *Greater Wellington regional council 10 year plan, 2015-25*, Greater Wellington Regional Council, Wellington.
GWRC 2015d, *Regional council takes action on climate change (media release)*, Greater Wellington Regional Council, Wellington.
GWRC 2016, *Wellington regional land transport plan 2015*, Greater Wellington Regional Council, Wellington.
Harker, J, Taylor, P & Knight-Lenihan, S 2016, 'Multi-level governance and climate change mitigation in New Zealand: lost opportunities', *Climate Policy*, pp. 1–16.
Harris, C 2005, 'Slow train coming: the New Zealand state changes its mind about Auckland transit, 1949-56', *Urban Policy and Research*, vol. 23, no. 1, pp. 37–55.
Hickman, R, Austin, P & Banister, D 2014, 'Hyperautomobility and governmentality in Auckland', *Journal of Environmental Policy & Planning*, vol. 16, no. 3, pp. 419–435.
Hopkins, D, Campbell-Hunt, C, Carter, L, Higham, JES & Rosin, C 2015, 'Climate change and Aotearoa New Zealand', *Wiley Interdisciplinary Reviews: Climate Change*, vol. 6, no. 6, pp. 559–583.
Howden-Chapman, P, Hamer-Adams, A, Randal, E, Chapman, R & Salmon, G 2015, 'A survey of sentiments about cities', in L Early, P Howden-Chapman & M Russell (eds.), *Drivers of urban change*, Steele Roberts Aotearoa, Wellington, pp. 209–227.

Hughey, K, Kerr, G & Cullen, R 2013, *Public perceptions of New Zealand's environment: 2013*, EOS Ecology, Christchurch.
Hutt City Council 2015, *Shaping our city. Long term plan for Hutt City 2015-2025*, Hutt City Council, Lower Hutt.
Hutt City Council n.d., *Hutt City council environmental sustainability strategy 2009-2014*, Hutt City Council, Lower Hutt.
Infometrics 2015a, *Auckland annual economic profile 2015*, Infometrics, Wellington.
Infometrics 2015b, *Wellington region annual economic profile 2015*, New Zealand Institute of Economic Research, Wellington.
Jacobs, K 2006, 'Discourse analysis and its utility for urban policy research', *Urban Policy and Research*, vol. 24, no. 1, pp. 39–52.
Jones, S 2013, 'Climate change policies of city governments in federal systems: an analysis of Vancouver, Melbourne and New York', *Regional Studies*, vol. 47, no. 6, pp. 974–992.
Keall, M, Chapman, R, Howden-Chapman, P, Witten, K, Abrahamse, W & Woodward, A 2015, 'Increasing active travel: results of a quasi-experimental study of an intervention to encourage walking and cycling', *Journal of Epidemiology and Community Health*, vol. 69, no. 12, pp. 1184–1190.
Kern, K & Alber, G 2008, *Governing climate change in cities: modes of urban climate governance in multi-level systems (Chapter 8), Competitive Cities and Climate Change,* OECD Conference Proceedings, OECD, Paris, pp. 171–192.
Knight-Lenihan, S 2015, 'Benefit cost analysis, resilience and climate change', *Climate Policy*, vol. 16, no. 7, pp. 909–923.
Kousky, C & Schneider, SH 2003, 'Global climate policy: will cities lead the way?', *Climate Policy*, vol. 3, no. 4, pp. 359–372.
Leining, C & White, S 2015, *From fact to act: New Zealanders' beliefs and actions on climate change*, Motu Economic and Public Policy Research, Wellington, New Zealand.
Macey, A 2014, 'Climate change: towards policy coherence', *Policy Quarterly*, vol. 10, no. 2, pp. 49–56.
McKim, L 2014, 'The economic geography of active commuting: regional insights from Wellington, New Zealand', *Regional Studies, Regional Science*, vol. 1, no. 1, pp. 88–95.
Mees, P & Dodson, J 2006, *Backtracking Auckland: Bureaucratic rationality and public preferences in transport planning*, Griffith University Urban Research Program, Griffith University, Brisbane.
MfE 2014a, *Environmental Stewarship for a prosperous New Zealand: briefing to the incoming ministers*, Ministry for the Environment, Wellington.
MfE 2014b, *New Zealand's greenhouse gas inventory 1990-2012*, Ministry for the Environment, Wellington.
MfE 2015, *New Zealand's post-2020 climate change target*, Ministry for the Environment, Wellington.
MfE 2016, *New Zealand's greenhouse gas inventory 1990–2014*, Ministry for the Environment, Wellington.
Milfont, TL 2012, 'The interplay between knowledge, perceived efficacy, and concern about global warming and climate change: a one – year longitudinal study', *Risk Analysis*, vol. 32, no. 6, pp. 1003–1020.
Milfont, T, Evans, L, Sibley, C, Ries, J & Cunningham, A 2014, 'Proximity to coast is linked to climate change belief', *PloS ONE*, vol. 9, no. 7, p. e103180.
Ministry of Transport 2009, *Government policy statement on land transport funding 2009/10–2018/19*, Ministry of Transport, Wellington.
Ministry of Transport 2014, *Briefing to the incoming minister: ensuring our transport system helps New Zealand thrive*, Ministry of Transport, Wellington.
Murphy, L 2015, 'The politics of land supply and affordable housing: Auckland's housing accord and special housing areas', *Urban Studies*, doi:10.1177/0042098015594574.
Newman, P, Beatley, T & Boyer, H 2009, *Resilient cities: responding to peak oil and climate change*, Island Press, Washington, DC.

Nunns, P 2014, *Population-weighted densities in New Zealand and Australian cities: a new comparative dataset*, MRCagney Working Paper, Auckland.
OECD 2007, *OECD environmental performance reviews: New Zealand*, Orgainization for Economic Cooperation and Development, Paris.
OECD 2015, *OECD economic surveys: New Zealand*, OECD, Paris.
Oram, R 2014, *ETS is a scam, greens' carbon tax would fix it – Rod Oram's column for June 8th, 2014*, Facebook, Wellington.
Orsman, B 2014, *City rail link: main works delayed until 2018*, review of, NZ Herald, 9th December.
Ostrom, E 2009, *A polycentric approach for coping with climate change*, World Bank, Washington, DC.
Paling, R 2014, *Journey to work patterns in the Auckland region: analysis of census data for 2001-2013, Executive summary*, Richard Paling Consulting, Auckland.
Preval, N, Randal, E, Chapman, R, Moores, J & Howden-Chapman, P 2016, 'Special housing areas and sustainability: evaluating impacts of a policy designed to address housing shortages and affordability in a New Zealand City', *Cities*, vol. 55, pp. 101–112.
Prince, R 2015, 'Is Neoliberalism still a useful term?' eSocSci blog, viewed <http://www.esocsci.org.nz/is-neoliberalism-still-a-useful-term/>
Puppim de Oliveira, J 2009, 'The implementation of climate change related policies at the subnational level: an analysis of three countries', *Habitat International*, vol. 33, pp. 253–259.
Pure Advantage 2012, *New Zealand's position in the green race*, Pure Advantage, Auckland.
Qi, Y, Ma, L, Zhang, H & Li, H 2008, 'Translating a global issue into local priority: China's local government response to climate change', *The Journal of Environment & Development*, vol. 17, no. 4, pp. 379–400.
Sancton, A 2006, 'Cities and climate change: policy-takers, not policy-makers', *Policy Options*, vol. 27, no. 8, pp. 32–34.
Schreurs, MA 2008, 'From the bottom up: local and subnational climate change politics', *The Journal of Environment & Development*, vol. 17, no. 4, pp. 343–355.
Shaw, C, Russell, M, van Sparrentak, K, Merrett, A & Clegg, H 2016, *Benchmarking cycling and walking in six New Zealand cities. Pilot study 2015*, New Zealand Centre for Sustainable Cities, University of Otago, Wellington.
Slavin, M 2011, *Sustainability in America's cities: creating the green metropolis*, Island Press, Washington, DC.
Smil, V 2008, 'Long-range energy forecasts are no more than fairy tales', *Nature*, vol. 453, no. 7192, p. 154.
Sobiecki, L & Chapman, R 2016, *The future of Wellington's bus fleet: the environmental and health implications of different upgrade options for Wellington bus fleet*, Victoria University of Wellington and the NZ Centre for Sustainable Cities, Wellington.
Somanathan, E, Sterner, T, Sugiyama, T, Chimanikire, D, Dubash, NK, Essandoh-Yeddu, JK, Fifita, S, Goulder, L, Jaffe, A & Labandeira, X 2014, 'National and sub-national policies and institutions', in Thomas Stener (ed.), *Climate change 2014: mitigation of climate change. Contribution of working group iii to the fifth assessment report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, MA.
Statistics New Zealand 2014, *NZ household travel survey: regional results (3-year moving average)*, Statistics New Zealand, Wellington.
Statistics New Zealand 2015a, *2013 census quickstats about transport and communications*, Statistics New Zealand, Wellington.
Statistics New Zealand 2015b, *Occupied dwelling type, for occupied private dwellings: 2001, 2006, and 2013 censuses*, Website of Statistics New Zealand, Wellington.
Statistics New Zealand 2016, *Subnational population projections: 2013(base)–2043: projected population of regional council areas*, Statistics New Zealand, Wellington.
Stern, N 2015, *Why are we waiting?*, MIT Press, Cambridge, MA, USA.
The Economist Intelligence Unit 2013, *Australia and New Zealand green city index / results for Wellington*, Siemens AG, Munich, Germany.

The Global Commission on the Economy and Climate 2014, *Better growth, better climate: the new climate economy report*, World Resources Institute, Washington, DC.
The World Bank 2015, *Population density*, Website viewed January 2016.
Topham, H 2012, *More than just a road': a case study exploring implementation challenges in sustainable city redevelopment*, Master of Public Health, University of Otago, Wellington.
UNFCCC 2007, *Synthesis of information relevant to the determination of the mitigation potential and to the identification of possible ranges of emission reduction objectives of Annex I Parties: FCCC/TP/2007/1*, UNFCCC, Bonn.
URS 2014, *Greenhouse gas inventory for the Wellington region*, URS NZ Ltd., Wellington, New Zealand.
US Council of Economic Advisers 2014, *The cost of delaying action to stem climate change*, The White House, Washington, DC.
Wade, V 2016, *Rail link 100 years in the making*, New Zealand Herald, Auckland.
Wannan, O 2015, *Clean, green NZ falls behind Australia on climate change*, Stuff.co.nz, Wellington.
Wellington City Council 2010, *Wellington city's 2010 climate change action plan*, WCC, Wellington.
Wellington City Council 2013, *Wellington city's 2013 climate change action plan*, WCC, Wellington.
Wellington City Council 2014a, *2013/2014 annual report (transport: waka)*, Wellington City Council, Wellington.
Wellington City Council 2014b, *Wellington urban growth plan: urban development and transport strategy 2014-2023*, Wellington City Council, Wellington, New Zealand.
Wellington City Council 2016, *Draft low carbon capital plan*, Wellington City Council, Wellington.
Wilson, N, Chapman, R & Howden-Chapman, P 2011, 'End-of-term review of the New Zealand Government's response to climate change: a public health perspective', *New Zealand Medical Journal*, vol. 124, no. 1345, pp. 90–95.
Wright, J 2012, 'Submission on the climate change response (emissions trading and other matters) amendment bill [September]', Parliamentary Commissioner for the Environment, Wellington.
Yale Center for Environmental Law & Policy 2014, *2014 environmental performance index*, Yale Center for Environmental Law & Policy, New Haven, CT.
Zahran, S, Grover, H, Brody, SD & Vedlitz, A 2008, 'Risk, stress, and capacity: explaining metropolitan commitment to climate protection', *Urban Affairs Review*, vol. 43, pp. 447–474.