All for naught? A critical study of zero waste to landfill initiatives

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Robert Krausz

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Te Whare Wānaka o Aoraki

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Abstract of a thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy.

All for naught?

A critical study of zero waste to landfill initiatives

by

Robert Krausz

Modern human society operates under a prevailing *waste management paradigm*,that is based upon linear systems which convert resources, through synthesis of problematic materials and disposability-focused manufacturing processes, into largely non-recoverable and poorly-degradable wastes which ultimately require dumping in landfills.

Zero waste is an alternative paradigm based on circular systems thinking, where wastes are fully recovered through the use of appropriate materials only, and design for durability. The global zero waste movement has emerged in response to mounting waste-related problems which include pollution, health impacts, and the loss of land to new landfills. Zero waste initiatives have been launched around the world, primarily at the local government level where responsibility for dealing with waste typically falls. Zero waste goals range from aspirational-only to 100% diversion – the latter meaning *zero waste to landfill*, which is the specific focus of this study.

The initial findings of this study reveal no examples of zero waste to landfill initiative success to date. A grounded approach is used to explore this relatively new phenomenon, with the threefold aim of better understanding the root causes of this chronic failure, how such campaigns might become successful, and how the zero waste to landfill story informs the wider discourse on global sustainability efforts. Four case studies are investigated in depth, using a combination of qualitative analysis from site visits, policy decisions and actions, and open-ended interviews with stakeholders, as well as quantitative analysis of waste generation trends as the limited and inconsistent nature of this available data permits.

Zero waste to landfill is a *supermegaproject*, as it requires massive and unprecedented transformation from all sectors: retooling of industry, behaviour change from the public, and leadership from government. However, proponents consistently fail to openly recognise the

full magnitude of such a goal, and as a result the launch of each campaign is followed notably by the emergence of a *planning void*: the lack of a sufficiently comprehensive blueprint for implementing 100% diversion. Zero waste to landfill initiatives are thus *unacknowledged supermegaprojects*: undertakings which are destined to fail because they lack the depth of planning and effort required to overcome the steep resistance gradient comprising industry resistance, public apathy, and a lack of leadership from government.

Underpinning the consistent failure of zero waste to landfill initiatives is a stubborn preference for *technical solutions*, such as expanded recycling schemes, which are primarily aimed at the end-of-pipe, and have proven to be unequal to the task of achieving 100% diversion. Success in achieving zero waste to landfill appears to require a more fundemental and behaviour change-based *paradigm shift*, requiring top-of-pipe solutions including appropriate materials selection, increased localisation of production, and an overall circular systems approach to the relationship between resources and waste. Such transformation, though, does not appear to be possible under present economic, political and social conditions, and therefore it is not realistic for local governments to be adopting zero waste to landfill goals at this time.

The waste management paradigm, nonetheless, remains an unsustainable human-caused deviation from natural equilibria based upon circular resource-waste-resource systems. As such, a shift to zero waste thinking and action is inevitable – but while it might be possible for human society to initiate this change proactively, it appears more likely that it will take a significant waste-related crisis to force the loop closed.

This situation of chronic failure, leading to likely environmental crisis, appears to be a recurring theme with other global sustainability efforts beyond just zero waste – notably the failure of governments to effect meaningful behaviour change on energy use, with the result that climate change mitigation is an increasingly evident case of the failure of human society to address important ecological issues. This study, it is hoped, offers a new perspective from which the wider set of contemporary challenges to long-term sustainability can be addressed successfully.

Keywords: zero waste to landfill, unacknowledged supermegaproject, planning void, technical solutions, paradigm shift, planning fallacy, strategic misrepresentation, crisis.

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To all of the politicians, government staff, industry representatives, and grassroots group and individual members of the public who offered their time to talk about zero waste initiatives, I offer my gratitude – this research was greatly enhanced by their input.

Lastly, I want to thank my family, who have by far been my greatest source of support and strength. Any of them would make a great expert on zero waste, in my opinion.

This thesis is dedicated to the people of the future, who must reap what we sow.

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Chapter 1: The Problem of Zero Waste to Landfill Failure

1.0 Introduction

This thesis is an endeavour to achieve a deep understanding of why zero waste to landfill initiatives around the world are consistently failing, what would need to change in order for these initiatives to have a realistic chance of success, and what the zero waste to landfill story tells us about the wider set of global sustainability initiatives.

This introductory chapter begins with a discussion of the overall contemporary problem of waste around the world – how waste is defined; the nature and magnitude of the waste stream; the consequences of waste including impacts upon air, water, soil and the health risks these entail; and, how the problem has evolved into the present day, with the emergence of new waste-related threats such as those posed by e-waste, into a *super wicked problem* – similar in nature and scope to the problem of global climate change.

The discussion which follows examines the *zero waste* movement – which involves a philosophical alternative to the prevailing *waste management* paradigm, and proposes a shift from *linear systems* to *circular systems* with respect to how waste is perceived and handled. This includes discussion of how zero waste has emerged from the grassroots to become an official part of the waste policy of governments around the world, particularly at the local level.

The term 'zero waste' has taken on several different popular interpretations which range from a mere aspirational goal of general waste reduction, to the specific and extremely ambitious goal of zero waste to landfill which implies 100% elimination of residual waste. As this latter definition of zero waste is the sole version which aims for 'closing the loop', it is therefore *zero waste to landfill initiatives* which are chosen as the specific focus of this thesis – with the overall research objective being an attempt to understand the key factors which determine the success versus failure of such initiatives.

The initial research phase of this thesis, however, yielded an important and unexpected finding: that no exemplars of zero waste to landfill initiative success could be found anywhere in the world. This chapter discusses how that finding was confirmed, and how it necessitated a shift in the focus from *how* zero waste to landfill initiatives succeed, to *why* they are always failing.

Lastly, this chapter articulates the revised set of research questions, which are aimed at understanding the problem of chronic zero waste to landfill initiative failure to date, how success might be achieved in the future, and how this informs the wider discourse on past, present and future sustainability initiatives around the world.

1.1 The Waste Problem

Waste is defined by the United Nations as:

> "materials that are not prime products (that is products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities" (United Nations Environment Programme, 2011, par. 3).

The general discourse regarding waste reduction refers mainly to notions of *solid* waste. However, other forms of waste are inextricably linked to the solid state; the United Nations (United Nations Environment Programme, 2012a, par. 1) states, for example, that "a primary aim of wastewater treatment is removing solids from the wastewater." Therefore, it is the intention in this thesis to focus on waste reduction from a principally solid waste focus – but bearing in mind other waste forms as well, in the spirit of maintaining an holistic view of the bigger waste picture.

The literature contains many references to the overabundance and dangers of waste. According to Hoornweg and Bhada-Tata (2012), for example, the overall global rate of municipal solid waste generation is estimated to have been 1.2 kg/person/day in 2010, and this is predicted to rise to 1.4 kg/person/day by 2025. Taking population increase into account, the total generation of municipal solid waste is expected to increase from 1.3 billion tonnes/year in 2010, to 2.2 billion tonnes/year in 2025. This is equivalent to a global output of municipal solid waste of 40 tonnes *per second* in 2010, expected to grow to 70 tonnes per second by 2025.

Waste is also commonly cited as a principal driver of worldwide environmental degradation. Danilov-Danil'yan, Losev and Reyf (2009), for example, observe that waste and

environmental pollution might constitute the main threat to modern civilisation. And Meadows, Randers and Meadows (2005) point to the risk and uncertainty posed by the myriad human-synthesised chemicals in the waste stream, which have never before existed on the planet and therefore have no organisms evolved in nature to break them down and render them harmless.

Archaeologists in future centuries or millennia will likely have little difficulty identifying the last century or so of human civilisation, via the enormous amount of non-degraded garbage that will have been buried during this relatively brief era. Plastics will likely be our most visible legacy, as these materials have a longevity estimated to be up to hundreds of thousands of years (Barnes, Galgani, Thompson and Barlaz, 2009). Even what many people consider to be easily biodegradable materials will remain well-preserved in landfills in the absence of air and water, including still-readable newspapers that will stay that way for around 10,000 years (William Rathje, as cited in Weisman, 2007).

What has not stayed buried in landfills has largely accumulated on the surface of the world's oceans, with an estimate of over 13,000 pieces of plastic litter floating per km^2 of ocean surface (United Nations Environment Programme, 2012b). Rios, Moore and Jones (2007) have conducted a study of plastic debris retrieved from various locations in the Pacific Ocean, which confirms that this material is a trap for persistent organic pollutants.

Meadows et al. (2005) note that over 65,000 industrial chemicals are now in regular commercial use, many of which have limited or no toxicology data available for them due to a lack of consistent or thorough testing. Danilov-Danil'yan et al. (2009) similarly describe how there are between 100,000 and 200,000 substances in circulation on the world market, and that for around 80% of them we do not know – and are unlikely to ever know completely – how they act upon living organisms.

Among hazardous wastes, perhaps none are as deeply problematic as those which are by-products of nuclear energy and weapons development. Meadows et al. (2005) refer to this as a problem that neither politics nor science is likely able to mitigate. Beyond the numerous security risks associated with nuclear materials as potential tools of warfare, they cite a multitude of environmental challenges posed by nuclear waste. These include their high toxicity and mutagenicity, a lack of natural processes for rendering them harmless, and the fact that these wastes are accumulating steadily – stored underground or in water pools

within the containment vessels of nuclear reactors – in the hope that someday the technical and institutional creativity of humankind will come up with some place to put them.

E-waste – waste from electronic technologies that produce such things as computers, televisions, and cell phones – is another common source of environmental concern. Carroll (2008) reports that in the United States of America (USA), more than 70% of discarded computers and 80% of discarded TVs end up in landfills – even while an increasing number of states have been passing laws banning the dumping of e-waste. And Royte (2005) cites National Safety Council data which estimated that in the USA alone, nearly 250 million computers would become obsolete in the period 2004-2009. And with computer and other electronic device use continuing to increase, and ongoing technological advances guaranteeing routine obsolescence, the mountain of e-waste shows no sign of anything but continued growth.

This growth in e-waste is spilling over from the developed world where most of it originates, to less developed countries where markets for handling this type of hazardous waste flourish, in spite of international efforts and treaties to prevent it. Puckett et al. (2002) report that millions of pounds of e-waste from obsolete computers and televisions are being generated in the USA alone each year, and an estimated 50-80% of what is collected for recycling is being exported to other countries. They further describe the consequences of the e-waste trade in Asia, where e-waste recycling and disposal operations in China, India, and Pakistan are extremely polluting and likely to be very damaging to human health. Puckett et al. cite examples of practices there which include open burning of plastic waste, exposure to toxic solders, river-dumping of acids, and other widespread general dumping.

E-waste is thus an example of how the dangers of waste flow along a general gradient from wealthy to poor. As Watson (2009) notes, waste-related practices raise serious issues of social justice, with the overarching reality that the rich are disproportionately responsible for waste production, while the poor suffer disproportionately from the negative effects of waste management and disposal. When it comes to waste exporting, however, what goes around may well eventually come around: Carroll (2008) cites the particular case of a chemist at an American university, who in 2006 had cheaply-priced jewellery from a local dollar store analysed, with the results showing high levels of lead, copper, and tin – suggesting that the source might have been leaded solder salvaged overseas from used circuit boards.

Burying rubbish in a hole in the ground – *landfilling* – is the most common modern means of dealing with it. But the dangers posed by this practice are well-documented. Girling (2005) cites the example of a British study which found that babies born within 2 km of a landfill site were statistically more likely to suffer abnormalities than those born further away. However, the risks from landfill sites go beyond mere radius of geographic distance. For example, Watson (2009) reports that waste management processes are a major source of greenhouse gas emissions, via the decomposition of organic matter in landfill sites which produces the greenhouse gas methane.

Another problem with landfills is that their proliferation steadily subtracts from the earth's finite land base – with space for new sites running out in numerous regions around the world. The recent coping strategy of many large cities that have used up their existing landfills, has been to find new and geographically further places to bury their waste. Since 2001, New York City has been shipping its rubbish out-of-state to New Jersey, Pennsylvania, and Virginia, over distances as far away as 500 km. And Toronto, Canada, after its last local landfill filled up in 2002, exported its waste across the border into Michigan, in the USA (Brown, 2008). Also in Canada, the agglomeration of Metro Vancouver has since 1989 trucked much of its waste over 300 km across mountainous roads, to the small community of Cache Creek (Thurgood, 1997).

Incineration is the most commonly-used and cited alternative to landfilling. The notion that burning waste will make it just 'go away', however, is a well-documented misconception. As Danilov-Danil'yan et al. (2009) point out, although incineration does decrease solid waste volume by as much as around 90%, the waste is transformed into a gas whereby every tonne of solid waste creates around 30 kg of airborne ashes and 6,000 m^3 of fume gases containing sulphur dioxide, nitrogen and carbon dioxide, hydrocarbons, heavy metals, and dioxins. And, the smoke plume which carries these substances gains direct access into the atmosphere through industrial smokestacks and is then carried by air currents for hundreds or even thousands of km. Moreover, at 90% reduction of solid waste volume, there is still the 10% residual volume of toxic incinerator ash that requires landfilling – so incineration is ultimately unable to eliminate the dependence on finding new landfill space.

The question of whether either landfilling or incineration is the lesser of two evils is therefore moot. As Connett (2008, p.1) asserts: "Waste is the evidence that we are doing something wrong." He points out that landfills simply bury the evidence, while incinerators

simply burn it. Connett goes on to suggest that humanity needs to face up to the real problem, which is to fight over-consumption and its most visible manifestation: the throwaway ethic. That is to say, instead of trying to become more sophisticated about getting rid of waste, we have to stop buying things we do not need, and industries have to stop making things which cannot be reused in some way.

There are other examples in the literature which point to a consensus that the larger problem is not one of *how* to deal with waste, but rather *why* the very notion of waste is still acceptable. Watson (2009), for example, cites statistics from the United Kingdom (UK) which indicate that after six months, only 2% of input resources by mass are retained in the economy. Put another way, this means that 98% of what is introduced into the economy becomes waste within half a year. Watson suggests that this pattern of consumption and waste runs counter to any understanding of environmental sustainability.

The literature also contains numerous examples of frank, negative assessments of the environmental degradation caused by waste and pollution, such as:

> Danilov-Danil'yan et al. (2009): "the "chemicalization" of the biosphere is a *fait accompli*" (p. 18), and: "natural regulating mechanisms are no longer capable of withstanding the destructive onslaught of civilization. This ecological crisis has developed within only one generation" (pp. 20-21).
>
> Hawken, P. (2004, p. 148): "What we do know today is that in the last fifty years every living system on earth has been in decline, and the rate of decline is speeding up."
>
> Connett (2008, p.1):
> "Since the industrial revolution we have attempted to impose a linear society on a planet that functions in circles. Nature recycles everything; we do not. In four steps we convert virgin materials into waste. It starts with extraction, and then manufacture, then distribution, then consumption and finally waste. The more "developed" a society the faster this transformation takes place."

Girling (2005, p. 230) observes how humanity has thus become alienated from its own ways of living: "It is the deepest of ironies that we find the greatest uplift in places least touched by our own species."

The literature provides a compelling weight of argument that waste is a problem on a significant and global scale, and that left unchecked, the risks to human and overall ecosystem health are serious and pressing. What is also clear, however, is that addressing waste in any comprehensive way would be severely disruptive to human society – as there are many deep and interrelated dependencies on the products and services that generate problematic wastes.

Complex, intertwined problems such as the waste one can be thought of as *wicked problems*. Rittel and Webber (1973) use this term to describe most public policy issues – which they distinguish from 'tame' or 'benign' problems, such as solving mathematical equations or determining the structure of an unknown chemical compound, which have clear objectives and offer a clear sense of knowing if and when the problem has been solved. In contrast, Rittel and Webber note, wicked problems lack these clarifying traits, and instead they have distinguishing characteristics which include: lack of a definitive formulation of the problem; no 'stopping rule' or ultimate test of a solution; 'good-or-bad' outcomes based on 'one-shot' solution opportunities, instead of 'true-or-false' outcomes from repeated trial-and-error opportunities – meaning that every solution attempt counts significantly; and, the fact that each wicked problem can be a symptom of another wicked problem. With respect to the latter characteristic, the literature – as highlighted previously in this section – offers numerous references to the waste problem as a symptom of the more underlying problems of overproduction/consumption, manufacturing based on disposability and rapid obsolescence, and the social inequities of globalisation.

Levin, Cashore, Bernstein and Auld (2012) use the term *super wicked problem* to describe wicked problems of the severest degree – with the issue of global climate change as their exemplar of particular note. They describe super wicked problems as having the following features:

- Time is running out.
- Those who cause the problem also seek to provide a solution.
- The central authority needed to address them is weak or non-existent.
- Irrational discounting occurs that pushes responses into the future.

The overall waste issue seems to fit this description quite closely:

- ✓ While the urgency of health and other impacts might be debatable, it is clear that the continued need for landfill space poses a threat to sustainability, given the earth's finite land base.
- ✓ The waste problem is caused, to some extent, by *everybody* – or, at least, everybody who is a producer or consumer in the global-economy marketplace.
- ✓ There is more or less no central authority with respect to waste – at least not at the higher levels of government which exert the most influence over industry, i.e., at the top of the waste pipe. Responsibility for waste tends to fall at the local government level, which is essentially at the end of the waste pipe.
- ✓ The common practice, among decision-makers, of externalising the costs of waste, is a form of irrational discounting that is off-loading today's waste-related consequences onto future human society.

Levin et al. (2012) argue that the combination of features comprising a super wicked problem creates "a tragedy because our governance institutions, and the policies they generate (or fail to generate), largely respond to short-term time horizons even when the catastrophic implications of doing so are far greater than any real or perceived benefits of inaction" (p. 124).

One oft-mentioned theme which arises from the literature, regarding potential solutions to the problems of waste, is that linear systems which underpin these problems need to be replaced by circular systems, in which the very notion of waste is reconsidered – a concept often referred to by the term *zero waste*. The next section explores the zero waste movement – its history, different interpretations, and how it has been adopted in efforts to address the overall waste problem.

1.2 The Zero Waste Movement

The precise origin of the term *zero waste* is difficult to trace; however, it appears that its first institutional use was in 1973, when American chemist Paul Palmer founded Zero Waste Systems, a company specializing in the reuse of chemical by-products that were otherwise destined for disposal (P. Palmer, pers. comm., January 07, 2012). By the 1990s, the term had become widely-adopted by grassroots activists in English-speaking countries around the

world, with analogous terms such as Zé*ro Déchet* (French), and *Null-Abfall* (German) used in other languages in different countries.

Interpreted literally, zero waste means a complete, 100% elimination/absence of waste. A search of the literature, however, reveals that zero waste is often not interpreted literally. In order to be able to assess zero waste initiatives around the world, then, it is necessary to understand the different meanings imparted to this term.

Kozlowski Russell (2009) conducted a review of prominent zero waste definitions, and observed that the term serves many functions at once: it is a waste reduction goal, a visionary statement, a tool for resource management, and even a solution to pollution and global climate change. Zero waste is thus a multi-faceted topic, bringing in a host of other terminology and intended meanings as well. It is therefore of the utmost importance to understand how all of this language is interrelated (Glavič and Lukman, 2007).

Greyson (2007) observes that terms such as zero waste, which are commonly used to describe societal goals, are not ideal. And Murray (2002, p. 18) suggests that zero waste is a contradiction in terms: "if waste is defined as matter in the wrong place, then eliminating waste would take with it the possibility of matter being in the right place. If waste didn't exist we would have to invent it."

An investigation into the meaning of zero waste reveals that an important part of understanding the term involves what it *does not* mean. For example, Havel et al. (2006) assert that zero waste, meaning a reduction of the production of all waste to zero, is not possible in a society oriented towards consumption. Rather, they define the term as the process of eliminating present methods of waste disposal such as landfilling or incineration. Connett and Sheehan (2001) describe zero waste not as a *technology*, but rather a *strategy* that begins with better industrial design, and ends with source separation of discarded products. And according to the Central Vermont Solid Waste Management District (2009), zero waste is not about eliminating discards; rather, it is about striving to capture the resources in products in such a way that they can be reused and recycled, instead of being buried in a landfill or incinerated.

Snow and Dickinson (2001) compare zero waste to previous manufacturing sector goals such as *zero emissions*, *zero accidents* and *zero defects*, or public sector campaigns such as *smoke-free* and *nuclear-free*. They point out that all of these were adopted as 'impossible' targets

initially, but have since proved their worth by dramatically changing industry and society. They go on to assert that it isn't important to get hung up on the 'zero', and suggest that zero waste would be a success if and when we were still working on how to eliminate the final 1% of the waste stream. This view of zero waste is supported by Edgerly and Borrelli (2007), who note that more modest levels of waste reduction such as 50-60% diversion by some municipalities and regions have been helped by having zero waste goals in place.

Definitions of what zero waste does mean vary from those which are aspirational only, and may resemble little more than ramping up of status quo waste management practices, to those which imply extreme change. As an example of the former case, Karani and Jewasikiewitz (2007) suggest that the most commonly understood definition of zero waste is that it means the minimisation of waste generation, the reuse and recycling of waste, and the diversion of waste away from landfill or incineration.

Many definitions, however, acknowledge that zero waste implies something more than minimisation, reuse, recycling, and diversion. Kinsella and Knapp (as cited in Dinshaw et al., 2006) define zero waste as employing a full-systems view that focuses on recapturing resources from the waste stream, decreasing consumption, and designing products more efficiently and for a full life-cycle. Doppelt and Dowling-Wu (1999) define zero waste as a process whereby materials currently destined for landfills or incinerators are instead returned upstream to be recycled as feedstock for new products or services, or else are naturally decomposed so they can be reintegrated into nature without environmental impacts.

Many examples in the literature refer to zero waste in language suggestive of paradigm shifting. Lehmann (2011) asserts that zero waste directly challenges the common assumptions that waste is unavoidable and has no value, and redefines waste as misallocated resources that must be recovered – similar to how Meadows et al. (2005) point out that pollution is increasingly seen as no longer being a sign of progress, but rather a sign of inefficiency and carelessness. Connett and Sheehan (2001) argue that zero waste requires a mind shift from end waste disposal thinking to a focus on sustainable material practices at the front end of manufacturing processes. And, the Grassroots Recycling Network (2009, par. 3) describes zero waste as a concept that "redesigns the current, one-way industrial system into a circular system modelled on Nature's successful strategies".

The latter example is also one of many that make specific reference to zero waste being a shift from a one-way, or *linear* system, to a closed-loop, or *circular* system. Connett and Sheehan (2001, p. 5) point to the "need to reconfigure our one-way industrial system into a circular, closed-loop system", while Edgerly and Borrelli (2007, p. 4) assert that zero waste "offers a circular resource management system in which discarded materials are looped back into the economy." Kozlowski Russell (2009, pp. 10-11) describes how zero waste "re-imagines the current linear waste system as a closed-loop system", and the Recycling Council of British Columbia (2009, par. 1) likewise argues that "Only by "closing the loop" can we hope to develop a sustainable economy."

While there is considerable variation in terms of what exact meaning is intended from case to case, two recurring themes stand out:

- That zero waste represents a *paradigm shift*, and is beyond merely finding better variations to the same old waste management strategies.
- That zero waste looks at waste as a resource that is part of a *circular* system, rather than an externality that is the end product of a one-way, *linear* system.

However many different ways the concept of 'zero waste' can be articulated, there is a commonly-found view in the literature that zero waste represents at least a partial – and requisite – part of the necessary change required to successfully address the global waste problem. For example, Connett (2008, p. 1) points to the emergence of countries such as China, India, and Indonesia, which are attempting to catch up with western consumption, and suggests that the stresses on finite resources and impacts on global climate change threaten to become far worse than anything we have seen to date. He asserts that it is time that developed countries set a better example, and that the best place to start is with the one non-sustainable daily activity in which nearly every human being is currently involved – making waste. In no uncertain terms, Connett suggests that "A sustainable society must be a zero waste society" (p. 1). A similar message is offered by the Zero Waste International Alliance (2009, par. 5): "Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use."

The next section takes a close look at how zero waste initiatives around the world are varied and can be categorised, and discusses why the focus of the thesis has been narrowed to specifically examine those which have zero waste to landfill goals.

1.3 Emphasis on Zero Waste to Landfill

As discussed in the previous section, the term *zero waste* elicits a multitude of popular interpretations, which encompass a set of significantly different perspectives from which analysis of waste issues can be done. The importance of clarity with regards to utilizing such terminology is emphasised by Glavič and Lukman (2007), who assert that clear usage and better understanding of such language can promote positive sustainability outcomes. It is thus critical to this study that the most meaningful and relevant definition of zero waste is clearly identified and justified.

As a result of the diversity of interpretations, actual goals vary considerably from one zero waste initiative to another. They can be roughly classified, however, into categories corresponding to an increasing level of 'apparent' ambition. Table 1.1 shows these categories, with examples of initiatives in each category.

Table 1.1: Examples of Zero Waste Initiatives by Category.

Zero Waste as an Aspirational Target:	Zero Waste with Relatively Modest Targets:	Zero Waste with Relatively Ambitious Targets:	Zero Waste to Landfill Target:
• **Boulder, USA** (City of Boulder, 2006). • **Irvine, USA** (City of Irvine, 2007). • **Yorkton, Canada** (City of Yorkton, 2012). • **Zero Waste Places Initiative, UK** (Waste and Resources Action Programme, 2012). • **Burlington, Canada** (City of Burlington, 2009). • **Nelson, Canada** (City of Nelson, 2012). • **Annapolis Royal, Canada** (Town of Annapolis Royal 2012). • **New Zealand** (Ministry for the Environment, 2002).	• **Cape Town, South Africa** (City of Cape Town, 2006). 2006: 20% reduction in waste generated, and 30% reduction in waste to landfill, by 2012. • **Vancouver, Canada** (Metro Vancouver, 2011). 2011: 70% diversion of waste from landfill by 2015; an *aspirational* target of 80% diversion of waste from landfill by 2020; 10% reduction in per capita waste generation by 2020. • **South Australia** (Government of South Australia, 2011). 2011: 35% reduction in landfill disposal from 2002-2003 level, by 2020; 5% reduction in per capita waste generation by 2015.	• **Seattle, USA** (Seattle City Council, 2007). 2007: 70% diversion of waste from landfill by 2025. • **Masdar City, Abu Dhabi, United Arab Emirates** (Masdar City, 2008). 2008: 99% diversion of waste from landfill by 2015. • **Wales** (Welsh Assembly Government, 2010). 2010: 65% reduction in waste by 2050. • **Scotland** (The Scottish Government, 2010). 2010: 95% diversion of waste from landfill by 2025.	• **Canberra, Australia** (Australian Capital Territory, 1996). 1996: Zero waste to landfill by 2010. • **Toronto, Canada** (City of Toronto, 2005). 2001: Zero waste to landfill by 2010. • **San Francisco, USA** (SF Environment, 2003). 2003: Zero waste to landfill by 2020. • **Austin, USA** (City of Austin, 2005). 2005: Zero waste to landfill by 2040. • **Christchurch, New Zealand** (Christchurch City Council, 1998). 1998: Zero waste to landfill by 2020. • **Kaikoura, New Zealand** (Kaikoura District Council, 2012). 1998: Zero waste to landfill by 2015. • **Kamikatsu, Japan** (Hill, Hislop, Steel and Shaw, 2006). 2003: Zero waste to landfill by 2020. • **Buenos Aires, Argentina** (Lacunza, 2013). 2006: Zero waste to landfill by 2020.

The above examples, upon close examination, reveal that categorising zero waste initiatives is a challenging task that is subject to interpretation of what the stated goals actually mean. For instance, Vancouver's classification here into the *Relatively Modest* category is based upon the latter goal of just 10% per capita waste reduction, rather than the 80% diversion goal – a choice meant to address how the reporting of high percent diversion can mask the larger problem of absolute waste levels staying high (only 90% of present levels as a target in this case, based on the 10% per capita reduction). In contrast, the classification of South Australia's initiative into the same category could reasonably be challenged: the 5% reduction in per capita waste generation is clearly far from true zero waste, but the additional goal of 35% reduction in waste to landfill is a direct pledge for *reduction* of landfill dependency, compared to Vancouver's less direct goal of reducing per capita waste, rather than *waste to landfill*.

The selection of a specific zero waste interpretation on which to focus, for this thesis, is made based upon a consideration of the larger waste issue, and the set of approaches to potentially addressing it. The obvious central problem which emerges from the literature is that ongoing waste-related approaches are rooted in status quo 'waste management' thinking – which is inherently based on *linear systems*. Hawken, Lovins and Lovins (2001) criticise conventional models of production which relegate waste, with little concern, to externalised 'somewheres', and which ignore the limited nature of earth's planetary resources at the price of steadily eroding its finite natural capital. Braungart, McDonough and Bollinger (2007) cite recycling – in its common present-day form – as an example of an end-of-pipe solution that actually *downcycles* materials until they are eventually sent to the landfill or incinerator. And Greyson (2007) suggests links between linear approaches and anti-social outcomes, such as how the need to compete for scarce resources engenders feelings of insufficient hope for the future.

From the literature emerges, in turn, the alternative notion of *circular systems*, under which the accumulation of waste as seen with linear systems would be eliminated. Fricker (2003) suggests that the earth's biosphere, using the sun's energy, has 'defied' the law of entropy by increasing order through biomimetic processes which are cyclical – but notes that humans have been a lone exception among all species in this regard, overriding nature through their overwhelming use of non-cyclical processes. Palmer (2007) suggests that recycling in its present form is a failed concept that has actually served to maintain the

ongoing waste crisis, and he insists that for zero waste to be a solution it must imply that all products and processes produce no waste at all. Kuehr (2007) likewise argues that the redesign of goods should lead to the eradication of the very concept of waste.

For this thesis, a focus on the *circular system* interpretation of zero waste is adopted, because it clearly focuses the study on the problem of waste in ways that all other zero waste interpretations – tied as they are to some extent to the waste management paradigm – fail to do.

As the last column of Table 1.1 shows, some local governments have forged ahead with zero waste declarations that target nothing short of ending the need for waste landfills. The language behind these declarations is often bold and unequivocal, as demonstrated in the following public release from the City of Toronto in 2001 (City of Toronto, 2001, p. 6):

> "During his re-election campaign, Mayor Mel Lastman promised to create a Waste Diversion Task Force 2010, with a mandate to tap into public opinion and provide a game plan for the City to reach diversion objectives of 30 percent by 2003 (Phase I), 60 percent by 2006 (Phase II) and 80 percent by 2009 (Phase III). City Council approved these objectives with the added goal of 100 percent diversion by 2010. Council raised the bar because it recognized that by 2010 we will have the technology and could have the partnerships to recycle, reuse or compost everything our society produces. We are under no illusion that this will be an easy target to reach. But the reality is a responsible society should aim for nothing less."

In comparing the various interpretations of zero waste and how they form the basis for variations in zero waste initiative goals, it is clear that any zero waste initiative with a less than 100% diversion target falls short of aiming for 'closing the loop'. This suggests the need for a particular focus on *zero waste to landfill* initiatives, because these alone are the ones which must somehow manage to overcome all of the challenges to eliminating waste – or else ultimately fail to reach their stated goals. By contrast, all of the other categories of initiatives allow leeway for some residuals to be landfilled, which contradicts the closed-loop ideal that underlies fundamental zero waste thinking.

Initiatives which aim for less than zero waste to landfill tend to include two features in particular which make them problematic from a zero waste paradigm perspective.

Firstly, these initiatives typically emphasise *percent diversion* from landfill as a primary goal. As discussed above, achieving such a goal can actually co-exist with an *increase* in waste to landfill, because overall rates of raw waste generation can be increasing at the same time that recycling and other recovery rates are going up. This is not just a hypothetical situation: improved rates of recovery coinciding with increased waste generation is actually the *typical* profile in 'zero waste' places such as those listed above.

Secondly, even if an initiative's goals are defined in terms of reductions in the absolute amounts of waste ending up in landfill, the targeted extents of these reductions tend to be significantly more modest than targets for percent waste to landfill reductions. For example, Vancouver's goal of 80% diversion from landfill might appear reasonably 'close' to true zero waste. However, the accompanying goal of 10% per capita waste reduction does not resemble an ambitious attempt to address the larger, underlying problem of overconsumption. And combined together, the two goals translate to a net reduction of 82% in overall per capita waste to landfill (i.e., 90% of previous per capita waste, multiplied by the 20% that is not diverted, equals 18% net residual waste). While 82% reduction is likely impressive by most contemporary achievement standards, the remaining 18% must still be landfilled as before – which means that the prevailing waste management paradigm – with its continued need for fleets of trucks, systems of waste handling/sorting, and new landfill sites – will continue to prevail.

For these reasons, the decision is made to narrow the focus of this thesis to those initiatives which explicitly include a goal of *zero waste to landfill*. It is this group of initiatives which offers the opportunity to study in-depth how a massive attempt at paradigm shifting – from linear waste management thinking, to circular zero waste thinking – is approached and addressed by the various involved stakeholder groups. This choice of a zero waste to landfill framework implies, for the purposes of this study, that any analysis of zero waste initiatives is based upon evaluating how such initiatives accomplish a shift from linear to truly circular systems, in their respective locations.

The criteria for selecting appropriate zero waste initiatives for this study are therefore as follows:

- **Local government-sponsored zero waste to landfill initiatives:** The reason for a focus on local governments is that it is generally at this community level that waste

management responsibility falls – and, accordingly, it is at this level that most zero waste to landfill initiatives presently exist.

- **Zero waste to landfill by some deadline:** The requirement of a specific target date is included to focus the study on those initiatives which are committed to a finite timeline for achieving their goals – unlike those initiatives with an indefinite timeline, which for the purposes of this study are considered to be equivalent to 'aspirational'-only zero waste to landfill initiatives.

This thesis is well-positioned in terms of timing, as the earliest zero waste to landfill initiative deadlines were set at 2010 – in the middle of this study – with numerous other initiatives having deadlines set around the years 2015, 2020, and so on.

The next section discusses this study's initial research on zero waste to landfill initiatives around the world, and how the findings have led to an important and necessary shift in the overall focus of the thesis.

1.4 Initial Research Findings: No Zero Waste to Landfill Success Anywhere

With the focus of this study narrowed down to an investigation of local government-sponsored zero waste to landfill initiatives with specific deadlines, the research centres around the following question: *What are the key factors which distinguish between the success or failure of a zero waste to landfill initiative?*

To begin to address this research question, a thorough canvassing of information about such initiatives worldwide was undertaken. It was anticipated that a subset of successful zero waste to landfill initiatives would be identified – with 'success' meaning that a community had either completely eliminated the need for landfilling waste, or else was on a clear trajectory towards achieving this. Once such a subset of success was identified, then the study could proceed with an analysis of these initiatives, as well as an analysis of initiatives that had not succeeded or were not on a trajectory towards success. Employing a suitable methodology for analysing initiatives within and across the success/failure groups, it was expected that key factors for zero waste to landfill initiative success could be identified, and a theoretical model for such success developed that could then be tested against initiatives

outside the study set – which could include other zero waste to landfill initiatives not sampled, as well as other types of sustainability-related initiatives.

The results of this initial research phase, however, produced an altogether study-altering finding: that *no exemplars of zero waste to landfill initiative success can be found, anywhere in the world*.

One initiative that can be examined post-deadline is Canberra, Australia's NoWaste by 2010 campaign. The Australian capital was the first community to adopt a zero waste to landfill initiative, in 1996 (Katun, 2010). The target year has now passed, and while there has been an increase in the diversion rate over the final 10 years from 30-40% to 75%, the overall net amount of waste going to landfill there has actually *increased* by 10% during the last five years of this period (Allen, 2010). Given that the original stated goal in 1996 included totally eliminating any waste going to landfill by the year 2010, it is clear that this initiative has not succeeded.

New Zealand is well-represented on the global list of zero waste to landfill initiatives, with a majority of local councils adopting such a target – and with most of these communities setting deadlines of 2015 or earlier (Zero Waste New Zealand, 2012). Connett and Sheehan (2001) cite this as one of the key developments in the evolution of the zero waste movement, and note in particular that the New Zealand case exemplifies the practicality of a zero waste strategy for both local authorities and local activists.

While 2015 is still three years away, one might nonetheless expect to find numerous references in the literature to work-in-progress on the zero waste front in New Zealand. Instead, however, there is a conspicuous gap. While zero waste initiatives of various forms have indeed sprung up across the country, overall results indicate little in the way of significant change.

A case in point is Christchurch, New Zealand's second-largest city and the largest conurbation on the country's South Island. The city council there adopted a zero waste to landfill by 2020 goal in 1998 (Christchurch City Council, 1998), only to abandon it just three years later (Brooker and Espiner, 2001). Instead of ending their dependence on landfill, Christchurch has gone in the other direction by commencing, in 2005, with shipments of their waste to a regional landfill in a rural area 70 km away from the city (Z. Potgieter, pers. comm., March 21, 2012). And, a further challenge to Christchurch and other New Zealand

locales is the recent decision by the central government to formally drop its previously-adopted aspirational zero waste goal from the national waste strategy, in favour of less ambitious goals (Ministry for the Environment, 2011).

Similar results have been observed in Europe. Watson (2009) notes that recent years have seen rapid increases in rates of recycling of municipal waste in many countries there, but despite European Union (EU) commitments to reduce waste, there has been little evidence of progress in this regard. And as of 2012, the EU has yet to pass any binding measures which would call for mandatory implementation of zero waste to landfill programmes (Zero Waste Europe, 2012).

Elsewhere, an oft-cited exemplar for waste reduction is the small, remote Japanese town of Kamikatsu. There, in 2000, strict regulations on dioxin emissions forced the closure of two incinerators. In response, the village assembly in 2003 declared a zero waste goal of no landfilling or incineration by 2020. Waste in this village of 2,000 is sorted into no less than 34 different bins (McCurry, 2008), and as Hill et al. (2006) report, by 2005 Kamikatsu had achieved a 90% rate of household recycling. However, closing the loop completely is acknowledged as being "a tough challenge as the remainder represents products and packaging that cannot be recycled by the municipality" (p. 3).

The overall finding from the initial research phase of this thesis – that no true exemplars of zero waste to landfill initiative success can be found, anywhere in the world – rests on the assumption that there is no successful zero waste initiative(s) somewhere in the world that simply eluded detection. While this is a recognised possibility, the following statements can be made with confidence:

- There are numerous zero waste to landfill initiatives around the world: in every continent except Antarctica, and uncountable for the simple reason that new initiatives appear – and disappear – frequently. A rough estimate is that there are over a hundred – perhaps several hundred – such initiatives at the present time.

- One common feature of every single human society with a zero waste to landfill initiative – no matter where in the world – is that there is some extent of ubiquitous presence of manufactured consumer goods which are problematic from a waste perspective. In particular, this includes poorly-biodegradable plastics, electronic devices, and medical wastes. While the extent of presence of these materials may

vary widely from one part of the world to another, no location is without a significant amount of such items. Problematic waste appears to be a universal problem – it is present in both the 'developed' and 'developing' parts of the world. Therefore, all human societies appear to be dependent to some extent on disposing of waste in landfills.

- It is clear that if any counterexample(s) to the above observations existed, it would consist of a human society that lived 100% independently of the myriad problematic consumer goods described above. This would comprise, essentially, a 'primitive', or completely 'off-the-grid' human society. However, while it cannot be ruled out that any such communities exist, detecting them is considered to be a task beyond the scope of this study. Therefore, for the purpose of this thesis, such truly zero waste human societies are considered to be non-existent.

The next section discusses the implications caused by the above finding – how it requires a shift in focus for this thesis study, and what the new research questions should be as a result.

1.5 Research Questions

The finding of no exemplars of zero waste to landfill success, in the early stages of the study, means that the original research question is no longer the most pertinent one to ask. Instead, the primary new question which arises is: *Why are zero waste to landfill initiatives consistently failing?*

The shift in focus is not a total rejection of the original overall question of: *What are the key factors which distinguish between the success or failure of a zero waste to landfill initiative?* Rather, it implies an acknowledgement of the reality that, up to the present time, there has yet to be any identified *success* of zero waste to landfill from which to directly draw key contributing factors of such success. Instead, there is only the existing set of initiatives which have either failed or are on track for failure – and then on the side of 'success' there is but the idealised image of what zero waste to landfill achieved might look like. From this situation arises a second new research question: *What would be necessary for zero waste to landfill initiatives to succeed?*

If it is possible for this thesis to provide answers to the above two questions, then there is an important third question that arises, which seeks to extend the objectives of the study beyond the issue of zero waste to landfill: *How do the study's findings inform the wider set of global sustainability initiatives?*

The overall set of research questions for this thesis, then, is articulated as follows:

1. ***Why are zero waste to landfill initiatives consistently failing to achieve their goals?***
2. ***What needs to happen in order for zero waste to landfill initiatives to succeed?***
3. ***How do this study's findings with respect to zero waste to landfill initiatives inform the wider issue of success/failure of sustainability initiatives worldwide?***

The next section gives an overview of existing theoretical models, and corresponding key sources from the literature, which potentially inform the addressing of these research questions.

1.6 Consideration of Theory to Address the Research Questions

The phenomenon of zero waste to landfill initiative failure is relatively recent, and accordingly there is sparse coverage of this specific issue in the existing literature. For the purposes of this thesis, therefore, consultation of the wider discourse on political ecology is of particular importance.

Based on the initial findings discussed in Chapter 1.4, zero waste to landfill appears to represent an example of *paradigm shifting*, which Kuhn (1970) discusses at length in the wider context of scientific revolution, and which Teague (2004), and Shellenberger and Nordhaus (2004) allude to in reference to the challenges faced by contemporary environmentalism.

Meanwhile, the evolution of each initiative, from bold and optimistic launching, to eventual failure to achieve anywhere near the goal of 100% diversion, appears to be a case of proponents opting for *incremental* over *fundamental* decision-making, with detrimental outcomes – an issue debated at length in the literature by researchers including Lindblom (1959, 1979), Dror (1964), Rosenhead (1980), Hostovsky (2006), and Stremke, Van Kann and Koh (2012).

Another perspective on the situation is offered via the concepts of problem/policy/political streams, and how they converge to open 'policy windows', as articulated by Kingdon (1995),

and later by Larson and Greenwood (2004) in the terminology of 'green doors' for sustainability initiatives. This theoretical angle also raises questions about why policy openings occur under seemingly unfeasible conditions, with the two distinct variants of unintentional *planning fallacy*, as formulated by researchers including Kahneman and Tversky (1977), Buehler, Griffin and Ross (1994), and Lovallo and Kahneman (2003), and intentional *strategic misrepresentation*, as discussed by Kingdon (1995) and Flyvbjerg (2008).

While there is thus evidence of an ample supply of existing models from which a theoretical framework can be constructed, this actual stage of the study is intentionally left for *after* the case study investigations. This grounded approach to an overall theoretical framework is presented and discussed in detail in Chapter 2.1.

The last section of this chapter gives a summary of how this thesis approaches the overall waste problem, focuses on the zero waste movement as a potential solution to the problem, narrows the focus to zero waste to landfill initiatives based on their paradigm-shifting potential, identifies the lack of success to date for any of these initiatives, and formulates the research questions which the rest of the study aims to address.

1.7 Summary

The contemporary problem of waste is a serious environmental issue to which every single human being and every single human system contributes. The well-documented and negative consequences of human waste generation include the contamination of air, water and soil, the immense costs of collecting and processing of waste, and the immense costs of the ultimate disposal of residual waste.

The 'throwaway society' which has emerged in modern times, as the result of technological developments which have produced thousands of new materials and products aimed at meeting growing global consumer demand for cheap and convenient goods, has resulted in unprecedentedly-high levels of waste generation, with estimates in the order of 40 tonnes/second of solid waste which must be managed to minimise the negative effects – a task typically left to local governments to handle.

Among the consequences of modern waste generation is the steady loss of earth's finite land base to landfills – the 'away' where residual waste is dumped, out of the sight and smell of most of the people whose consumption is responsible for it. As typical present-day solid

waste is a complex mixture of different materials, of which many degrade extremely slowly in the ground – much more slowly than the rate at which this waste is continually dumped – landfills essentially represent an ongoing, human-caused, and unsustainable loss of land, which left unchecked would proceed to an eventual point of environmental crisis.

As waste generation is interrelated with human dependence on manufacturing and consumption patterns that lead to it, the overall waste issue can be considered a *wicked problem*, which is linked inextricably to these other underlying problems, and which therefore poses a severe challenge to sustainability. Moreover, waste can be viewed as a *super wicked problem* – as the loss of land to landfilling is impossible to sustain, responsibility for the problem is shared by all humans who participate as producers or consumers in the global-economy marketplace, there is a lack of a central authority to take control of the top-of-pipe where the problem originates, and decisions are being made about waste in the present which irrationally place the burden of consequences on future human society.

While various strategies have been implemented to reduce the impact of this waste toll – notably the '3 Rs' of *reduce, reuse and recycle* – one concept in particular has arisen as a revolutionary approach to rethinking the entire problem: *zero waste*. The zero waste movement arose around 40 years ago, as a philosophical alternative to the prevailing *waste management* paradigm which is based on focusing efforts on dealing with waste at the end-of-pipe. Zero waste philosophy is based on a rejection of the very notion of 'waste' – seeing it as a part of *circular systems* of resource cycling, rather than an end product of *linear systems*.

The zero waste movement is a global one, spreading from the grassroots efforts of waste activists in its early days, to eventually becoming an official part of the waste policies of governments around the world. Today, 'zero waste' in its various translations across languages has become a universally-recognised catchphrase for waste reduction initiatives – covering a wide variety of different intended meanings that range from simple aspiration of general waste reduction, to specific and strict goals of total residual waste elimination.

Of these various interpretations, *zero waste to landfill* stands out as the strictest one – as unlike all other interpretations of zero waste it implies a shift from linear to circular systems – eliminating the idea of residual waste, and with it the need for any future loss of land to

landfills. For this specific reason, this thesis is focused specifically on zero waste to landfill initiatives – as the one version of zero waste that promises to truly 'close the loop'.

The original objective of this thesis was to investigate zero waste to landfill initiatives around the world, with the aim to identify and obtain a deep understanding of the key factors which determine the success versus failure of such initiatives. However, the initial research stage of this study produced a significant and unexpected finding: that *not even a single exemplar of zero waste to landfill initiative success could be found anywhere*. In other words, while there exist in the order of a hundred or more such initiatives in the world, there is no identifiable place anywhere which has achieved the total elimination of dependence on landfilling, or is on a trajectory towards achieving this.

This finding means that the overall focus of this thesis is shifted – from trying to understand *how* zero waste to landfill initiatives succeed, to *why* none of them do. As such, the revised research questions begin with the question: *Why are zero waste to landfill initiatives consistently failing to achieve their goals?*

While the original question about what distinguishes between success and failure of these initiatives is rendered moot by the lack of any exemplars to date, it is possible and important to attempt to conceptualise what is necessary for success: *What needs to happen in order for zero waste to landfill initiatives to succeed?*

And, finally, the last research question attempts to extend the answers from the first two questions to a more universal purpose: *How do this study's findings with respect to zero waste to landfill initiatives inform the wider issue of success/failure of sustainability initiatives worldwide?*

The next chapter discusses in detail how a methodology has been developed for this thesis, in order to address these research questions.

Chapter 2: Methodology

2.0 Introduction

Addressing the thesis research questions requires a deep understanding of the phenomenon of consistent zero waste to landfill initiative failure. This chapter discusses the various methodological approaches that have been considered, explains the rationale for the approaches selected, and gives a detailed description of the overall methodology which has been constructed from these components.

As discussed in the previous chapter, the phenomenon of zero waste to landfill initiative failure is a relatively recent one, with a relative dearth of research on the subject. While there is ample discourse on other topics of environmental policy failure – such as those related to climate change, water resources or forestry – the topic of zero waste, and in particular zero waste to landfill, remains largely unaddressed. This gap in the literature represents an opportunity for this study, but it also poses a challenge due to the lack of any obvious 'default' theoretical framework(s) that can be readily selected based on previous, directly-related research.

In this chapter, the selection of a grounded approach to theory is discussed. This includes an explanation of the sequence employed: initial research into the wider set of zero waste to landfill initiatives worldwide, to inform a canvassing of potentially relevant theoretical models; application of these models to a more in-depth investigation of a subset of zero waste to landfill initiatives, to inform the development of a formal theoretical framework for addressing the research questions; and, a further step which is the development of new theory which emerges from analysis of zero waste to landfill initiatives using the formal framework. This new theory, called the *Unacknowledged Supermegaproject*, is articulated and applied in the Discussion and Conclusions chapters – first with regard to zero waste to landfill initiatives, and then beyond to the wider set of global sustainability initiatives.

There are a number of approaches available to derive conclusions about the wider set of zero waste to landfill initiatives around the world, and choosing a method from them involves consideration of various constraints imposed upon the study. This chapter includes a discussion on why a case study approach has been selected, and how the case study locations have been selected using a set of pertinent criteria.

Selection of appropriate methods for examining each case study is another important stage in the methodology. This chapter discusses possible methods for conducting this critical data collection and analysis part of the study. The rationale for a mixed set of methods – mostly qualitative due to limitations inherent in the zero waste to landfill initiative context – is explained. This is followed by a discussion of how this mixture of methods is applied to the case studies using triangulation to 'see' the zero waste to landfill failure situation from multiple perspectives, in order to gain a better understanding of the phenomenon.

A summary of the study methodology is presented, including key study parameters, a description of how fundamental study quality characteristics are addressed, and a sequential overview of the overall methodology in graphical form.

Finally, this chapter offers an overview of how the four case study 'stories' are presented in the chapters which follow.

2.1 A Grounded Approach to Theory

"Methods are only a means, not an end. Our subjects' worlds and our renderings of them take precedence over methods and measures" (Charmaz and Mitchell, 2001, p. 161).

The principal objective of this study is to arrive at a deep understanding of the underlying causes of chronic failure of zero waste to landfill initiatives around the world. In the spirit of the above quote, this deeper understanding of zero waste to landfill failure is the *end*, and the methodological path is meant to provide an appropriate and sufficient *means* to get there. This includes the approach to theory, which represents a vital yet challenging part of the overall methodology.

The particular challenge arises from the fact that, while the overall topic of zero waste has been given fairly diverse and widespread coverage in the literature, there is very little discourse about *zero waste to landfill initiative failure* per se. Furthermore, as the earliest zero waste to landfill initiatives have only just recently passed their original deadlines – beginning in 2010 with the first such initiative launched in Canberra, Australia – there is scant discussion anywhere in the literature which includes a thorough retrospective analysis of these initiatives. This study is timely in the sense that a cluster of such initiatives have passed their deadlines in the two years since 2010 – and the results form a large component of what is therefore considered here. However, this timing means that zero waste to landfill

initiatives are a relatively new topic of research – and in particular, the consistent failure of these initiatives revealed by this study's initial research represents a relatively novel scenario.

As such, the choice of an optimal theoretical model(s) was not clear at the pre-investigation stage – and it is evident that further investigation would be necessary to inform the formation of an overall theoretical framework for the study. What is necessary, therefore, is an approach to theory which is *grounded* in the data which is extracted from investigation of zero waste to landfill initiatives.

A Grounded Approach to Theory, vs. 'Grounded Theory'

In the literature, discourse about the methodologies which delay the adoption of a theoretical framework almost invariably refer to *Grounded Theory*, which was introduced by co-authors Barney Glaser and Anselm Strauss in 1967 (Warburton, 2005). Warburton describes Grounded Theory as "a popular methodology in qualitative research…founded on an iterative inductive and deductive cycle where theory is allowed to emerge directly from data and is ultimately tested (grounded) against 'the real world'" (p. 1). Or, as Charmaz and Mitchell (2001, p. 160) summarise it: "Grounded theory methods move the research and the researcher toward theory development."

As straightforward as this may seem, however, Grounded Theory is neither a single agreed-upon method, nor are any of the better-known variants necessarily the 'right one' to prescribe for a study such as this thesis. As Warburton (2005) explains, grounded theory is a contentious subject due to differences which arose between the method's two pioneers, Glaser and Strauss. Morse (2009) notes that their collaborative effort was in fact so individualised, that differences became apparent almost immediately.

Kelle (2005) points out that while both Glaser and Strauss acknowledged that researchers always have to draw on existing theory in order to understand empirically observed social phenomena, the earliest version of their Grounded Theory nonetheless contained conflicting concepts regarding the relationship between data and theory. This pivotal difference concerned the concept of *emergence*: while Glaser on the one hand stressed that theory 'emerges' from the data if the researcher approaches the field with no preconceived theories or hypotheses, Strauss on the other hand advised the researcher to use their previous theoretical knowledge to identify relevant theory pertinent to the data observed.

Warburton (2005) notes that after the publication of their collaborative first work on Grounded Theory, Glaser and Strauss worked separately on their differing respective approaches to the method. Their differences became more explicit, with the Glaser-Strauss dichotomy becoming a clear issue of 'Emergence vs. Forcing', respectively.

Warburton (2005) summarises the differences by saying that Glaser's approach to Grounded Theory is 'purist', 'open' and 'professionally naïve', while Strauss' approach – in collaboration with a new partner, Juliet Corbin – advances a more 'pragmatic' and 'structured' approach to theory building, which incorporates other methods. Gurd (2008) describes the Strauss and Corbin method as the more rigid one, and he notes that Glaser (1992, as cited in Gurd, 2008) criticised this variation of Grounded Theory for forcing data into existing models.

Glaser, in a later collaboration with Judith Holton, reiterates his insistence for emergence over forcing in this prescriptive way: "A good GT analysis starts right off with regular daily data collecting, coding and analysis. The start is not blocked by a preconceived problem, a methods chapter or a literature review" (Glaser and Holton, 2004, par. 44). And while Corbin and Strauss, as discussed above, would allow for the incorporation of other methods in their version of Grounded Theory, their insistence on avoiding an initial literature review is no less prescriptive: "many qualitative researchers collect much of their data prior to beginning systematic analysis. While this may work for other modes of qualitative research, it violates the foundations of this method" (Corbin and Strauss, 1990, p. 6).

The evolution of Grounded Theory from its initial unorthodox approach to theory, to its more orthodox later form, is summed up this way by Charmaz and Mitchell (2001, p. 161): "Grounded theory began with gentle guidelines, but now risks being reduced to rigid rules imposed on researchers and on research practice."

Such strictness, however, particularly the preclusion of an initial literature review, would pose a problem for this study. The reason is that an initial literature review is necessary to explore the full spectrum of zero waste meaning – in order to separate out the 'paradigm-shifting' *zero waste to landfill* interpretation which is of great interest – from the other interpretations which imply less ambitious commitment to change or even aspirational-only attitudes towards waste reduction, which are of much less interest.

What is needed for this study, then, is an overall approach to theory that utilises only those aspects of Grounded Theory which serve the overall study goals, while combining other methods alongside it. This raises the question of whether a flexible application of Grounded Theory can represent a valid grounded approach to theory.

The literature provides ample argument in favour of such an approach. Joannidès and Berland (2008) suggest that the set of specified canons for Grounded Theory can be considered as reference marks rather than rules, and as such researchers are free to develop their own techniques and procedures. They argue that none of the founders of the method actually provided a truly normative framework for it, and as such they left room for researchers to use their imagination. Joannidès and Berland sum it up this way (p. 260): "The diversity in the use of grounded theory is due to the plurality of possibilities at each stage of the research process….there are as many ways of doing grounded theory as there are articles."

Morse concurs with this argument (2009, p. 14):

> "the method cannot be used in a "cookbook" or formulaic way. Every application, every time grounded theory is used, it requires adaptation in particular ways as demanded by the research question, situation, and participants for whom the research is being conducted."

And Glaser himself seems to acknowledge that Grounded Theory is meant primarily to fill a particular research function and not more: "All that GT is, is the generation of emergent conceptualizations into integrated patterns" (2002, p. 23).

The above arguments support the use of Grounded Theory in a selective rather than prescriptive way, as a means towards the desired end of addressing the research questions. An example of this approach is the research of Wong and Chen (2008) on the subject of team creativity, in which they depart from traditional Grounded Theory by conducting their literature review before the fieldwork and data analysis stages. Wong and Chen use their literature search to guide them in the stages of collecting and thinking about data during fieldwork. During fieldwork, the concepts extracted from the literature are used as a starting point for brainstorming. In keeping with the spirit of Grounded Theory, however, they make sure that these concepts inform the process, but are not forced upon the data.

For this study, addressing the phenomenon of zero waste to landfill initiative failure appears to be done best via what Gurd (2008, p.128) describes as "an iterative process of data collection and analysis", and where, as Corbin and Strauss describe (1990, p.11): "hypotheses…are constantly revised during the research until they hold true for all of the evidence concerning the phenomena under study".

The resulting approach to theory that is adopted for this study is summarised as follows:

1. At the outset of investigation, a grounded approach to theory means that the initial data collected is examined with as wide a view as possible, i.e., there are no pre-determined or favoured theoretical models through which the data is to be perceived, at this early stage.

2. As data collection proceeds, obvious patterns/outcomes/perspectives emerge as recurring themes. This triggers the beginning of the process of iterative theoretical framework building:

    i. Investigation of zero waste to landfill initiatives generates data which is analysed, yielding emergent recurring themes;

    ii. Literature is canvassed for appropriate theory, with the emergent recurring themes in mind;

    iii. Theoretical models are applied to the various emergent recurring themes;

    iv. An overall theoretical framework is constructed, based upon those theoretical models which best address the emergent recurring themes – particularly with respect to the research questions;

    v. The application of the various theoretical models to the emergent recurring themes might yield new findings or questions, which require further investigation of the zero waste to landfill initiatives (i.e., back to Step i). In this event, it is possible that such further investigation could alter the selection of an appropriate theoretical model(s). This iterative cycling between investigation and selection of theoretical models may be repeated several times, until a final theoretical framework is arrived at with confidence.

3. Once the final theoretical framework is constructed, it is then applied to the overall set of study data collected, and a thorough analysis is conducted to address the research questions.

4. Where any theoretical gap becomes evident upon completion of the above analysis, the literature is canvassed again to identify possible theory which could address that gap. If the theoretical gap remains unfilled, then an additional step in this process is to develop new theory which can fill it. This new theory, once developed and articulated, is then applied to the research questions.

The next section examines the choice of a case study approach to investigating the overall population of zero waste to landfill initiatives worldwide, and explains in detail the process for selecting the set of case study locations.

2.2 Case Studies of Zero Waste to Landfill Initiatives

As discussed in the previous chapter, the zero waste movement is global, and the number of local government-sponsored zero waste to landfill initiatives is in the order of hundreds. An important commonality in *all* of these identified initiatives is that there is no single exemplar where zero waste to landfill has been fully achieved. This includes those initiatives which have passed their target dates without reaching the no-landfill goal, plus those initiatives which have been abandoned before the target date, and also those initiatives which have yet to arrive at their target date. While the latter group of initiatives cannot be described as certain failures in advance of their deadlines, levels of waste to landfill in all these places continue to remain significant, with results to date ranging from outright increases in per capita levels, to examples where levels have decreased but are not trending towards zero residuals. Initiatives exist which are based upon incineration and these do generally entail less landfilling, but not an end to dependence on it, as that process invariably requires landfilling of ash and other residuals. Then there are the remaining examples of jurisdictions which have off-loaded landfilling completely by exporting all of their solid waste to landfill sites out-of-region – and this obviously does not represent an end to landfill dependence either.

What all of the above means is that the entire set of local government-sponsored zero waste to landfill initiatives shares *failure* – or *impending failure* – in common. Therefore, the study population for this thesis, with respect to the research questions, can be defined as the

complete set of local government-sponsored zero waste to landfill initiatives which exist, or have ever existed – with the unit of analysis being an individual zero waste to landfill initiative from this population.

Rationale for a Case Study Approach

While the study population and unit of analysis are clearly identifiable, it is the relative newness and mystery of the phenomenon of zero waste to landfill initiative failure that call for an investigative approach to facilitate the desired development of deeper understanding. Eisenhardt (1989) points to *case study* as a particularly appropriate alternative for such a situation, as theory building from this method does not rely on previous literature or prior empirical evidence. She also argues that a case study approach is likely to generate the kind of novel theory which is desirable when existing theory appears to be inadequate.

This study's research questions on zero waste to landfill initiative failure are in the realm of 'why' and 'how' inquiry, and Rowley (2002) suggests that these types of research questions can be addressed by either experiment or case study approaches. Within the operational constraints of this thesis, however, zero waste to landfill initiatives are only observable from an outside, uninvolved perspective, so it is not possible to manipulate variables/factors or otherwise reproduce the phenomenon in a controlled experimental setting. Rowley argues that for such research, case study is a valuable method because it offers the ability to undertake an investigation into a phenomenon in its natural context.

Yin (1981, p. 59) concurs, and offers this argument which supports the selection of case study over both experimental and historical approaches, for this thesis:

> "As a research strategy, the distinguishing characteristic of the case study is that it attempts to examine: (a) a contemporary phenomenon in its real-life context, especially when (b) the boundaries between phenomenon and context are not clearly evident. Experiments differ from this in that they deliberately divorce a phenomenon from its context. Histories differ in that they are limited to phenomena of the past, where relevant informants may be unavailable for interview and relevant events unavailable for direct observation."

Zero waste to landfill initiative failure can be viewed as a *social science* phenomenon – as is discussed throughout this thesis, and as such further support for a case study approach is offered in the following commentary by Flyvbjerg (2006, p. 223):

> "there does not and probably cannot exist predictive theory in social science. Social science has not succeeded in producing general, context-independent theory and, thus, has in the final instance nothing else to offer than concrete, context-dependent knowledge. And the case study is especially well suited to produce this knowledge."

Eisenhardt (1989) observes that an additional strength of case study is that resultant theory is likely to be empirically valid. She explains that as the theory-building process is so intimately tied with evidence, it is therefore very likely that the resultant theory will be consistent with empirical observation. Eisenhardt also suggests that replication of process from case to case can represent a quasi-experimental method, with each case analogous to an experiment, and multiple cases analogous to multiple experiments.

While the preceding discussion presents a strong case for using a case study approach in this thesis, the method also has some apparent weaknesses that need to be kept in mind and considered carefully as the study is conducted. Eisenhardt (1989) points out that while parsimony is a hallmark of good theory, case study research can yield a staggering volume of rich data, which may lead to the temptation to build theory that 'captures everything' – resulting in theory which is overly complex and lacking the simplicity of overall perspective. She argues that theorists working from case data can lose their sense of proportion in the face of voluminous and vivid data, with the result that in analysing cases they may be unable to make the critical distinction between what is importantly different, versus what is merely idiosyncratic. To address this potential problem in this study, an iterative approach is emphasised, whereby observations of particularly apparent significance in any individual case are constantly compared with analogous inspection in the other cases, and in the literature.

Another potential problem with case study is that it might produce a bias toward confirmation of the researcher's preconceived notions related to the study topic. Greenwald, Lieppe, Pratkanis and Baumgardner (1986) note that confirmation bias generally delays findings which would support opposing beliefs, and they argue that this is problematic in any situation where a superior alternative hypothesis might exist. Bennett (2004) points out that even where cases are selected in such a way that the full ranges of all variables of interest are covered, it is still possible to introduce significant confirmation bias: namely, by selecting only those cases which appear to behave in accordance with how these variables are hypothesised to relate to each other.

Flyvbjerg (2006) acknowledges that confirmation bias is a general tendency in research; however, he dismisses the view that it is more prevalent with case study than with other methods. Flyvbjerg points out that while the case study method is less rigorous in a quantitative sense, it has its own rigor which, while different, is no less strict than more quantitative methods. He argues that the advantage of the case study is that "it can "close in" on real-life situations and test views directly in relation to phenomena as they unfold in practice" (p. 234). Flyvbjerg thus offers a contradictory opinion: that overall, case study actually contains a greater bias toward disconfirmation of preconceived notions than toward confirmation.

This study aims to minimise confirmation bias through careful selection of the case study set, as explained in detail later in this chapter, and also through constant comparison of data against the research questions and pertinent theory – both within and between cases. In addition, ongoing review of the literature and a 'scoping' of the zero waste landscape for previously-unnoticed initiatives are intended to allow for comparison to also extend beyond the case study set.

Also notable is the fact that the earliest stages of this thesis research produced a 'disconfirmation' event that has significantly altered the overall focus of this study. The original intention was to investigate those zero waste to landfill initiatives around the world which had successfully achieved their goals, and attempt to develop a model which could identify the key factors for success (and those leading to failure in other initiatives), and predict or plan for future zero waste to landfill initiatives. The initial research in this regard consisted of a canvassing of the wider set of all known zero waste to landfill initiatives, and although time constraints prohibited in-depth case studies at this stage, these initial investigations nonetheless resembled case studies, even if only cursory ones. The result of this initial stage of research was the realisation that there do not exist any exemplars of zero waste to landfill initiative success anywhere, and this disconfirmation made it necessary for the thesis to be refocused – from the original question about 'how' some of these initiatives succeed, to the new primary question of 'why' they all fail. This study has therefore already proven its in-built capacity to seek out data which would disconfirm previous conceptions about zero waste – and this spirit of rigour is intended to apply to all phases of the study, from beginning to end.

Selecting a Case Study Set

While the preceding discussion provides a detailed rationale for the appropriateness of applying a case study method to this study, that appropriateness is in turn conditional upon selecting a sample of case studies based upon sound research principles.

The study population, as discussed previously in this chapter, is effectively the set of all zero waste to landfill initiatives. And, as also discussed previously, the unit of analysis is a single one of these initiatives. With these parameters thus defined, it is evident that the study can proceed as an analysis of some number of the overall population of zero waste to landfill initiatives, with the following possibilities:

- A *census* of all zero waste to landfill initiatives, which would involve investigation of all of the possibly hundreds of such initiatives.
- A *case study* of a smaller subset of all such initiatives, which would involve investigation at a greater level of detail than for a census.
- A *single case study* of one such initiative, which would involve investigation at the highest possible level of detail.

As Eisenhardt (1989) notes, case study research can involve single or multiple cases. However, as Rowley (2002) suggests, multiple cases are preferred because this offers the feature of replication, which emulates multiple-experiment design, and because robustness of findings is generally increased with more cases – as each case offers increased opportunity to establish or refute theory. Furthermore, the zero waste to landfill initiatives are varied in several respects, including geographic location, structure of government, and how far along they are in their overall timelines from goal adoption to target date. As such, even the most in-depth investigation of a single case would be inappropriate for this study, as it would fail to incorporate much of the diversity that exists among the entire set of initiatives. Therefore, a single case study is ruled out.

A census, meanwhile, would require an investigation of somewhere in the order of hundreds of zero waste to landfill initiatives. Within the time and resource constraints of a PhD thesis study, however, such a study would appear to be unfeasible, as it would enable only the most superficial investigation of each case – such as an email survey, which might not offer a high probability of a sufficient level of response, and which would also lack the depth of

investigation necessary to obtain a fuller understanding of zero waste to landfill initiative failure. It is also certain that with a survey of all initiatives, site visits to each location would simply not be possible. Therefore, a census is ruled out as well, and this means that the study must consist of a smaller subset of case studies from the overall population.

Another important decision to make is how the sample of case studies is to be chosen from the population: randomly versus non-randomly. Eisenhardt (1989) asserts that while cases may be chosen randomly, this is neither necessary nor even preferable – as non-random, theoretical sampling allows for cases to be chosen specifically to produce a diverse sample. Flyvbjerg (2006) similarly observes that when the objective is to provide the greatest possible amount of information on a given phenomenon, random sampling may not be the most appropriate strategy, because the 'typical' or 'average' case is often not the richest in information. He points out that atypical or extreme cases often reveal more information, and stresses that it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur. Flyvbjerg summarises it this way (p. 229): "random samples emphasizing representativeness will seldom be able to produce this kind of insight; it is more appropriate to select some few cases chosen for their validity."

With respect to this thesis, the limited timeframe and budget constitute primary constraints which limit the number of cases that can be selected for study. In consideration of these constraints, the largest possible sample size is deemed to be in the range of 3-5 cases. As the above arguments suggest, random selection of a sample of this size would be very unlikely to produce a set of case studies that represented the diversity of the overall population of zero waste to landfill initiatives. Therefore, a non-random selection of cases is chosen for this study.

In order to select a sample of 3-5 cases which represents well the diversity of the population, the following criteria are applied to selection:

- **Geographic Diversity:** As zero waste to landfill initiatives are located around the world, the case study set should likewise reflect this global distribution.
- **Diversity of Local Government Structure and Intergovernmental Dynamics:** While zero waste to landfill initiatives are generally the responsibility of local governments – and as such the population is exclusively made up of such governments – there is

nonetheless diversity in terms of the overall scope of jurisdiction for these sponsoring governments: some are purely localised to their municipal areas, while some are city/county, city/territory or similar multi-level governments. Additionally, while some of these local governments operate their zero waste to landfill initiatives in relative isolation from neighbouring local governments or higher levels of government, others are operating their initiatives in conjunction with either their neighbouring jurisdictions, or higher levels of government, or both. As such, the case study set should capture as much of these differences as possible.

- **Diversity of Position on the Timeline:** Among the population of zero waste to landfill initiatives, there are those which have already passed their target dates, beginning in 2010. Among these initiatives – all of which have failed to meet their goals – there are those which have failed or have been abandoned very close to the target dates, and there are those which were abandoned much earlier in their timeframes. Then there is the last group of initiatives which are still in advance of their target dates. The case study set should be represented by at least one of each of these three groups of initiatives.

An additional constraint is applied: that all case studies be selected from English-speaking countries. It is acknowledged that this limitation reduces the overall representativeness of the study, as a significant proportion of global zero waste to landfill initiatives are in non-English-speaking countries. While it would be ideal to include this diversity in the selected case study set, the extra costs that would be incurred in interpretation and translation of documents and interviews are considered to be prohibitive. On the whole, however, a study including only English-speaking countries is considered to be nonetheless worthwhile, as zero waste to landfill initiatives are widespread in these countries, and among this subset of countries there exists significant diversity with respect to the other criteria defined above.

Based upon these criteria and constraints, the following set of four case studies has been chosen, with prominent reasons for selection given for each location:

- **Australian Capital Territory (ACT) – Canberra and surrounds, Australia:**
    - The ACT is a dual city/territory which governs both the city of Canberra, and the surrounding less-populated areas.

- With the NoWaste by 2010 initiative adopted in 1996, the ACT was the first municipal jurisdiction in the world to adopt a zero waste to landfill goal.
- The NoWaste by 2010 initiative was abandoned in 2009, after 13 years and just one year shy of its target date. The initial initiative has since been replaced by a new zero waste to landfill initiative with no specified deadline.

- **Christchurch, New Zealand:**
  - This case study is of particular interest because the zero waste to landfill goal has been driven not only at the local level, but also at the regional level, and additionally at the national level – as in 2002 New Zealand became the first country to formally adopt a zero waste policy.
  - The original zero waste to landfill by 2020 initiative was declared in 1998, but was largely abandoned only three years later, and formally replaced with a 65% diversion by 2020 goal, in 2006. The relatively short duration of this local government initiative is of particular interest, as is the similarly short period of the national zero waste policy – which itself was abandoned in 2010.

- **Toronto, Canada:**
  - The City of Toronto is a major metropolitan government formed from the amalgamation of Toronto and its neighbouring cities. Its zero waste to landfill initiative ran largely in isolation, although solid waste issues affecting the City are largely the responsibility of the provincial Ontario government.
  - The original zero waste to landfill by 2010 goal was adopted in 2001, and abandoned in 2007 and replaced by a 70% diversion goal with no specific target date.
  - Of additional interest in this case is that an impending lack of local landfill space was a significant driver of the original zero waste initiative – due to uncertainty over the City's then-recent shift to exporting their waste over large distances and across the border into the USA.

- **San Francisco, USA:**
    - San Francisco is a dual city/county, and the local zero waste to landfill initiative operates in relative isolation from other governments, although solid waste regulation which applies is mainly legislated from the California state level.
    - This is an example of a still-existing zero waste to landfill initiative – set in 2003 with a target date of 2020.

These case studies thus comprise a set that meets the diversity criteria in the following ways:

- **Diverse in Geography:** They cover four different countries, on two different continents (Oceania and North America), in both the northern and southern hemispheres.
- **Diverse in Local Government Structure and Intergovernmental Dynamics:** The four cases include three local governments (two cities and one city/county) and one dual city/territory government. In addition, one of the local government cases is also a case where the local initiative has operated simultaneously under a national government zero waste policy.
- **Diverse in Position on the Timeline:** One case (Canberra) abandoned its original zero waste to landfill goal just one year before the target date, and has since renewed the same goal but with no specific deadline. Two cases (Christchurch and Toronto) abandoned their original goals years in advance of their target dates, and replaced them with less ambitious percent diversion goals. And, one case (San Francisco) is still before its target date and is continuing along with its original overall goal unchanged.

Consideration of the Wider Set of Zero Waste to Landfill Initiatives

The limiting of case studies to English-speaking countries precludes the inclusion of places such as Kamikatsu, Japan (Hill, Hislop, Steel and Shaw, 2006). That community, as discussed in Chapter 1.4, has achieved a reported 90% diversion rate with its ongoing campaign of zero waste to landfill by 2020 – yet, as elsewhere, Kamikatsu struggles with the unresolved problem of what to do with the remaining residuals. Another non-English-speaking country

case of note is Buenos Aires, Argentina, where the campaign there for 100% diversion by 2020 has been beset with failure to reach interim waste reduction targets (Lacunza, 2013).

Other notable cases include Kaikoura, New Zealand, a small town located in the same Canterbury region as Christchurch, which in 1998 chose to adopt a zero waste to landfill by 2015 goal instead of developing a new landfill site on their own or with their neighbouring councils (Kaikoura District Council, 2012). Choosing two cases in very close relative proximity to each other, however, would undermine the geographic diversity of the case study set, and in the end Christchurch has been selected for this study, as it offers a look into a short-lived and already-abandoned campaign, and also an interesting example of a 100% diversion initiative operating simultaneously with extensive efforts to develop a new landfill site.

One other case considered for inclusion is Austin, USA, which in 2005 adopted a zero waste to landfill by 2040 goal (City of Austin, 2005) – making for an initiative remarkable for its rather long 35-year timeframe. Considering Austin's significant distance from San Francisco, coupled with the USA's relatively large size and population, it is deemed that including two cases from this country would not pose any serious detriment to the overall diversity of the sample. However, time and budget constraints in the end limited the sample size to four cases instead of five, and San Francisco was the preferred choice because of its public image as an exemplar ongoing campaign – with associated high expectations of success – and also because it is an ongoing initiative much closer to its deadline, and therefore expected to yield a more informative investigation at this time.

The above discussion highlights how it is possible for this study to be conducted with many different possible combinations of selected cases, beyond just the set of four that has been chosen. While the actual four cases selected are considered to be a very appropriate sample, it is nonetheless acknowledged that the overall validity and reliability of the study improves generally, the more that other cases are considered. To this end, this study aims to allocate additional attention to other initiatives, in the spirit of constant comparison on a broad scale, and for the purpose of achieving a clearer and wider view of the bigger picture of zero waste to landfill initiatives.

The next section discusses the overall set of methods used to collect data for this study's evaluation of zero waste to landfill initiatives.

2.3 Mixed Qualitative/Quantitative Approach

Addressing this study's research questions requires an investigation of all stakeholder groups linked to zero waste to landfill initiatives. Government stakeholders include both elected officials and staff, at the local government level and where necessary at higher levels. Industry stakeholders include both the producers of waste – the manufacturers, distributors and sellers of consumer goods – as well as the handlers of waste, which include private companies that collect, process and landfill waste. Public stakeholders include individual citizens, as well as grassroots organisations including residents' associations and environmental groups.

This study includes provisions for collecting information from each of the above stakeholder groups, for each case study, and it is understood that the overall strength of this study's findings and conclusions is generally enhanced as the breadth and depth of investigation of each of these groups is increased. Therefore, as large a sample as possible from each group has been included as an element of the study methodology, within the thesis' time and resource constraints.

Of particular interest, however, is the role of *government*, because the specific unit of analysis in this study is the *government-sponsored zero waste to landfill initiative*. It is from governments – and at the local/city/municipal level in particular – that zero waste initiatives are typically formalised in such a way that they affect all sectors, including industry and the public. There is a significant and growing number of industry-led zero waste initiatives that have been launched; however, these are generally voluntary initiatives whose reach is limited only to the companies behind the programmes, and extending no further than supply-chain trading partners and the like – and certainly not extending to the imposition of everyday behaviour change on the government or the public. Similarly, any subset of the public may undertake a zero waste to landfill initiative, but such efforts would not bind any significant behaviour changes upon either the government or industry sectors.

In other words, it is primarily from the government sector – with its invested powers to legislate and enforce the implied and required behaviour changes across all other sectors – that any zero waste to landfill initiative could be adopted with authoritative legitimacy. What is required, then, is a method(s) of investigation that facilitates an in-depth collection

and analysis of data pertaining to each case study government's overall role in adopting, planning for, and implementing their zero waste to landfill initiative.

Rowley (2002) notes that in case study research in general, a variety of evidence from different sources is gathered, including documents, artefacts, interviews and observation, and analysis can comprise any mix of quantitative and qualitative approaches. Yin (1981) concurs with this view, saying that instead of case study implying the use of a particular type of evidence, data can be either quantitative or qualitative, and can come from fieldwork, archival records, verbal reports, observations, or any combination thereof.

Eisenhardt (1989) argues that the combination of data types can be highly synergistic. She notes that quantitative data can indicate relationships which are important but not necessarily evident via qualitative methods, and they can also prevent researchers from being carried away by vivid yet false impressions yielded from qualitative data. Conversely, Eisenhardt points out that qualitative data is useful for understanding the theory which underlies the relationships revealed by the quantitative data, or for directly suggesting theory which might then be reinforced by further quantitative analysis.

What is intended for this study, then, is a mixture of quantitative and qualitative methods that serves the overall purpose of assessing and evaluating the performance of each case's zero waste to landfill initiative. The specific methods employed in this mixture are discussed in the parts of this section which follow.

Quantitative Methods

A zero waste to landfill initiative can be viewed in simple terms as an endeavour to decrease the generation of waste residuals from existing levels down to absolute zero. As such, the performance of such an initiative should be straightforward to measure and analyse quantitatively, provided that data in this regard is sufficiently available.

As Bennear and Coglianese (2010) point out, a proper programme evaluation requires that reliable measures of outcomes are obtained. In the case of a zero waste to landfill initiative, this is accomplished via collection of waste to landfill data spanning a period of time going back at least to the adoption of the zero waste goal. In the specific case of a zero waste to landfill objective, any evidence of continued landfilling after the deadline date represents a simple and clear indication of programme failure – and this test has been applied during the initial research stage of this study, yielding the observation of consistent failure – to date, at

least – of *all* such zero waste initiatives that are known, which forms the basis of the study's research questions.

One element of the original planned methodology is an analysis of each case study's waste stream, whereby for each segment a measure is made of the proportion thereof that has been directly targeted for reduction through one or more specific components of the zero waste initiative's official plan. Such a *waste stream – zero waste plan articulation* analysis was envisaged for this study, as it would have allowed for the calculation of amounts – both absolute and percentage – of each case study location's waste stream that were actively addressed by their zero waste plan.

While each of the case study governments have completed detailed quantitative waste inventories that could serve as a basis for conducting the articulation analysis described above, none of the governments have drafted anything resembling the other required piece: a detailed, comprehensive plan for achieving zero waste to landfill. This remarkable finding has two significant implications for the study:

1. It reveals a *planning void* which exists in all of the case study zero waste to landfill initiatives.
2. It means that it is not possible, as originally proposed, to conduct a waste stream – zero waste plan articulation analysis.

The former implication is not a methodological issue but rather an important study finding in itself, and it is discussed in detail in later chapters. The latter implication, on the other hand, is of methodological consequence, as it limits the amount of pertinent quantitative analysis that can be performed in this study.

The quantitative analysis that remains possible in this study consists of a consideration of the waste data that is provided for each study location. This generally consists of yearly data for each jurisdiction – including the total amount of waste generation, and how these totals are broken down into diverted waste and waste to landfill. This body of data allows for general discussion of trends over time, which can inform the identification of significant patterns and conclusions about the overall performance of the zero waste to landfill initiatives. However, the extent of quantitative analysis which can be done with this data is

itself limited to basic trend identification, and it precludes any more complex numerical or statistical analysis, because:

- The definitions for various wastes and methods for measuring them are not consistent across case studies, as each jurisdiction applies its own policies regarding waste data collection and reporting.
- Even within individual case studies, there are inconsistencies in waste data collection and reporting, due to changes in policy over time, and also due to operational limitations such as the incompleteness or absence of waste data where private companies are contracted to handle waste.

It is evident that in the realm of zero waste to landfill initiatives – and municipal waste in general – the quality and comparability of waste data is insufficient to allow for any sort of complex numerical analysis. In spite of this, however, meaningful trend identification as discussed above can be feasibly elicited from the available data, and this indeed forms an important part of the study's overall findings, as well as the Analysis/Discussion and Conclusions chapters. Furthermore, some of the problems with waste data discussed above represent in themselves significant study findings – an example being the misleading nature of percent diversion statistics which reflect partial success at the end-of-pipe, yet mask significant failure at the top-of-pipe.

Most importantly, it can be said that the overall consistency of failure of zero waste to landfill initiatives, which is identified in the early stages of this study, makes unnecessary the use in general of complex quantitative analysis. The following commentary by Flyvbjerg (2006, p. 224) thus appears to apply well to the phenomenon of zero waste to landfill initiative failure: "Predictive theories and universals cannot be found in the study of human affairs. Concrete, context-dependent knowledge is, therefore, more valuable than the vain search for predictive theories and universals."

In this spirit, the more basic quantitative results obtained regarding waste trends appear to suffice, as they serve to direct the study towards its central research questions about *why* this failure is occurring. The qualitative methods employed to address this are discussed as follows.

Qualitative Methods

As discussed previously, each case study is to include an assessment and evaluation of its zero waste to landfill initiative, and this is to be done using the following combination of methods:

- **Site visit to the case study location:** This provides an opportunity to experience and collect data about the case first-hand and in person, and includes the following opportunities that are not possible from a distance:
    - **Tours of waste-handling facilities:** This provides the opportunity to see what really comes in and goes out of the 'waste pipe' at transfer stations, resource recovery centres, and landfill sites. In particular, inefficiencies in resource recovery can be identified from witnessing recycling and other such processes, and these can be confirmed from witnessing first-hand what recyclable materials are evident in the landfill.
    - **In-person interviews with various local stakeholders:** While practical and logistical considerations require that some stakeholder interviews be conducted by distance, a site visit to each case study location offers the opportunity to meet face-to-face with a significant number of these people – particularly government staff and elected officials, who in the case of this thesis tend to offer more time and detailed feedback in person versus by distance.
    - **First-hand observation of how the issue of waste is manifested in the area:** This is simply the opportunity to observe the city in its various different settings – residential, commercial, and institutional – and observe general patterns of behaviour with respect to waste. In particular, supermarkets and other shopping locations serve as nexi where the public intersects with industry – and, where waste reduction policies are in effect, government as well. It is expected, based on initial research and direct experience in other locations, that among the most obvious and instant indicators of zero waste to landfill initiative success or failure are the visual impressions of everyday behaviour of people in the case study location: Are there rubbish bins in public? Are there disposable products in the shops? Is there a lot of non-recoverable product packaging? Do shoppers use plastic shopping bags?

- **Chronological study of policy decisions and actions related to the zero waste to landfill initiative:** This begins with preceding policy from which the zero waste initiative may have followed, and extends over the lifetime of the initiative until the present day:
    - Previous waste reduction policy that the zero waste to landfill initiative either replaced, or to which it was added.
    - Stakeholder consultation-type processes which might have preceded and/or led to the adoption of the initiative.
    - Terms of reference for the official zero waste to landfill resolution/bylaw.
    - Official zero waste planning documents, and subsequent reviews/updates.
    - Relevant waste-reduction legislation which relates to the initiative.
    - Initiative implementation details, including waste-reduction programmes, public outreach, and development of waste-related infrastructure.
    - Debate and new legislation related to the initiative, including those which are related to zero waste to landfill goal revision or abandonment.
- **Study of the overall discourse surrounding the zero waste to landfill initiative:** This includes various types and sources of information exchange related to the initiative outside of direct government activity, including:
    - Academic literature regarding the particular case study's zero waste to landfill initiative.
    - Media reporting surrounding the initiative.

One of the qualitative methods included in the previous discussion is the conducting of stakeholder interviews in each case study location, among the various government/industry/public groups. In order to facilitate a grounded investigation, as discussed earlier in the chapter, the interviews are in a simple format consisting of prepared, open-ended questions, as well as the opportunity for follow-up questions and additional comments.

The interviews are as follows:

- One-on-one format, between myself and the interview subject.
- Interviews are conducted in person during case study site visits or, via telephone or email where an interview is not possible. Telephone/email is used for all follow-up interviews.
- The set of prepared questions is designed to elicit information regarding all pertinent aspects of each zero waste to landfill initiative, including:
    - Origin of / motivation for the launching of the initiative.
    - Perspectives on stakeholders' roles, including perceptions of how other stakeholders have influenced the initiative.
    - Evaluation of the performance of the initiative, including assessment of the likelihood of achieving stated goals.
    - Challenges to achieving zero waste to landfill goals.
    - Perceived necessary elements for achieving zero waste to landfill goals.

These stakeholder interviews, with their open-ended style, are meant to elicit qualitative data, in respect of the limitations to experimental data collection that are inherent in a small-sample case study, as discussed earlier in this chapter.

If it were possible to conduct this study with a much larger sample of case studies – such as in the order of 70 or more (see, for example Bartlett, Kotrlik and Higgins, 2001), and the cases were selected randomly instead of strategically, then it would be feasible to include scaled survey-type questions, to include a quantitative analysis of such things as stakeholder perceptions or attitudes regarding zero waste. However, as discussed previously, the thesis constraints on time and resources limit the case study sample to a size well below this minimum. Therefore, interview questions for this study are limited to only those which can elicit qualitative data.

The chronological study of policy decisions and actions represents a particularly important qualitative method for this thesis. The reason for this is that this part of the study, for all cases, is based upon a consideration of the *entire* body of such official outputs from the governments sponsoring the zero waste to landfill initiatives, and the completeness of the data set used is limited only by whatever elements are not made available – either publicly

via official government sources, or directly to this study in response to requests for further official information.

The stakeholder interviews, on the other hand, represent only a partial sample of perspectives from the various stakeholder groups which are linked to the zero waste to landfill initiatives. Government offices generally only offer a small number of their staff members for interviews, and many elected officials are unwilling to be interviewed for such a study. Industry stakeholders are often large corporate entities, and they will typically provide a single spokesperson for an interview, or none at all, while grassroots organisations may typically offer only a fraction of their membership rolls for comment as well.

Nonetheless, the interviews serve an important role in this study, namely that they provide additional insight including opinions, anecdotes, and even allegations that would not typically be included in the 'official' body of transcripts, legislation and reports that form the bulk of material considered in the initiative analysis. The interviews are cited throughout this thesis – primarily in the respective case chapters as part of within-case analysis, and also later, where they form an important part of the across-case and wider analysis and discussion of zero waste to landfill initiatives.

In this study, raw interview data is recorded directly: in writing in the case of email responses; and, for in-person interviews, via digital audio recorder. In the case of phone interviews and some in-person interviews where an audio recorder is not available or where the interview subject does not wish to be taped, written notes are taken. Interviews are then transcribed manually, and coded for the purpose of identifying themes or patterns and organising them into coherent categories relevant to the research questions – a process that Taylor-Powell and Renner (2003, p. 2) describe as "the crux of qualitative analysis."

Borgatti (1996) notes that coding can be done in a manner that ranges between approaches that are quite informal, to those which are very formal and systematic. He points out, however, that in grounded theory coding is normally done quite informally. In keeping with an overall grounded approach, as discussed earlier in this chapter – and also mindful of the secondary role which the interview data serves in this study, an informal approach to coding of interviews is used which focuses on identifying emergent themes and patterns, rather than applying a strict and conformist coding rubric.

Narrative data can be categorised using either pre-set or emergent categories, and Taylor-Powell and Renner (2003) note that a mixture of both approaches is possible – starting with some pre-set categories, and adding others as they become apparent. In alignment with the overall grounded approach of this study, coding is done with an emphasis on emergent category identification – with the process an iterative one whereby the list of categories evolves as interview data is collected and analysed – and as other sources of data including the policy decisions and actions, and literature, are also considered.

Taylor-Powell and Renner (2003) stress the importance of using data from different sources to decrease bias and increase credibility of findings. This is addressed in this study via the comparing of interview data with other perspectives, such as the discourse on zero waste to landfill initiatives – within-case and more general as well – that is found in academic research and media sources.

Taylor-Powell and Renner (2003) also note that seeking input and feedback from others can help with data interpretation and analysis, as incorporating additional viewpoints can resolve uncertainty about the meaning of responses, and help to identify additional themes/categories that the researcher alone might miss. In this study, one important step in the overall analysis of stakeholder interviews has been the drafting of an interview data summary, which has then been submitted to the thesis supervisors for review and discussion. This process has yielded significant additional perspectives and an overall dialogue with the supervision team, which has helped to narrow down the focus to a pertinent set of emergent findings, which form the basis of the later stages of this study's theoretical analysis and discussion.

The overall iterative nature of this study's analysis of various data sources has also meant that interview responses have in some instances raised new questions and issues, which in turn have led to the discovery of previously unnoticed policy decisions or actions. The same is true for the overall discourse regarding the initiatives, as both published academic research and the journalistic record – particularly the latter for its rapid coverage of recent events – provide historical and factual references, opinions, and analysis that fill in gaps left by the incompleteness of the interview sample. As such, the interviews together with material extracted from the overall discourse serve a vital function in the overall methodology of this study.

The overall mixed set of different quantitative and qualitative methods described in this section provides an opportunity to 'see' the phenomenon of zero waste to landfill initiative failure from several different angles at once – a triangulation approach to methodology, which Arts and Verschuren (1999) describe as a strategy with the aim of improving the overall validity of research, and which Eisenhardt (1989) argues can strengthen the grounding of theory.

The next section describes the sequence of activities which take place after the selection of the case study set, up until the completion of the study.

2.4 Completing the Study

Once the case study set has been selected, preparation for site visits consists of planning for travel to each location, and arranging for waste facility tours and in-person stakeholder interviews.

The site visits are generally of a four-day to one week duration, which allows for sufficient time to: tour various waste facilities including transfer stations, resource recovery centres and landfill sites; conduct in-person stakeholder interviews; and, observe the case study area to see how waste reduction policy is manifested in a general everyday sense.

Upon the completion of the site visits, case study analysis can begin with the chronological analysis of policy decisions and actions, transcription and coding of stakeholder interviews, and analysis of these interviews as well as the relevant literature from both academic and media sources. As this work progresses, identification of emergent themes/patterns and pertinent theory can result from within-case and across-case analysis, comparison between observed case data and theory, and follow-up investigation, interviews and research of literature as necessary.

As the above iterative approach proceeds, a final theoretical framework is constructed, against which the overall data can be analysed. The additional final step, in accordance with the overall grounded approach to the study, is the development and application of new emergent theory, which is formulated, tested against the study data pertaining to zero waste to landfill initiative failure, and applied further to the wider subject of global sustainability initiatives. Iteration can also take place between this latter phase of the

analysis and follow-up investigation, interviews and research of literature and existing theory.

The final phase of the study consists of the formulation of the Discussion and Conclusions, and completion of the final thesis document.

The next section gives a detailed summary of the overall methodology for this study.

2.5 Summary of Study Methodology

The following summary of this thesis' overall methodology includes the key study parameters, how the methodology addresses the need for fulfilling various study quality characteristics, and a sequential overview of how the study methodology is to be executed.

Key Study Parameters

Research Questions:

1. Why are zero waste to landfill initiatives consistently failing to achieve their goals?
2. What needs to happen in order for zero waste to landfill initiatives to succeed?
3. How do this study's findings with respect to zero waste to landfill initiatives inform the wider issue of success/failure of environmental protection initiatives worldwide?

Unit of Analysis: A single zero waste to landfill initiative at the local government level.

Study Population: The global set of all zero waste to landfill initiatives at the local government level.

Case Study Sample:

- ACT (Canberra), Australia
- Christchurch, New Zealand
- Toronto, Canada
- San Francisco, USA

Study Quality Characteristics

Rowley (2002) refers to the following four fundamental qualities of empirical research, against which a study can be 'tested':

Construct validity: Does the study establish correct operational measures for the concepts being studied? A study with construct validity can expose and reduce subjectivity, by linking data collection methods to research questions and propositions.

Internal validity: Does the study include methods that allow for the identification of causal relationships, whereby certain conditions are shown to lead to other conditions – as distinguished from spurious relationships?

External validity: Can the study's findings be generalised outside of the domain of the case study set?

Reliability: Could the study be repeated with the same overall findings obtained?

Table 2.1 shows, for each study quality characteristic, the question that applies to this particular thesis study, and how the various methodological elements discussed in this chapter answer these questions in the affirmative:

Table 2.1: Study Quality Characteristics and How This Study Addresses Them.

Study Quality Characteristic	Question Pertaining to Thesis Study	Elements of Study Methodology Which Address It
Construct Validity	Can zero waste to landfill initiative failure, and any potential contributing factors, be detected and measured?	• Multiple methods allow for key study variables to be measured in different ways – triangulation approach. • Multiple cases allows for comparison across cases to verify if questions are measuring the same thing.
Internal Validity	Is the study able to identify the factors which are actually contributing to zero waste to landfill initiative failure?	• Basic quantitative analysis of waste data which compares trends for total, diverted, and landfilled waste. • Comparison between cases of waste trends, and of the evolution of initiative performance along timelines – using chronological analysis of policy decisions and actions. • Constant comparison of observed data with existing theory applicable to the zero waste to landfill failure phenomenon.
External Validity	Can the study's findings be applied outside the realm of zero waste to landfill initiatives to date?	• Constant comparison of observed data with existing theory that addresses the wider problem of global sustainability initiative failure. • Open-ended nature of interview questioning, to allow for perspectives that apply beyond zero waste and broadly to wider sustainability issues.
Reliability	Would different combinations of selected case studies lead to the same study findings?	• Strategic selection of case study set to optimise diversity, within thesis constraints. • Constant comparison of observed case data with secondary data from literature, which pertains to zero waste to landfill initiatives outside of the case study set.

Sequential Overview of Study Methodology

The overall methodology for this study, including the key decisions regarding the study design, and the sequence of execution of study stages, is shown in Figure 2.1:

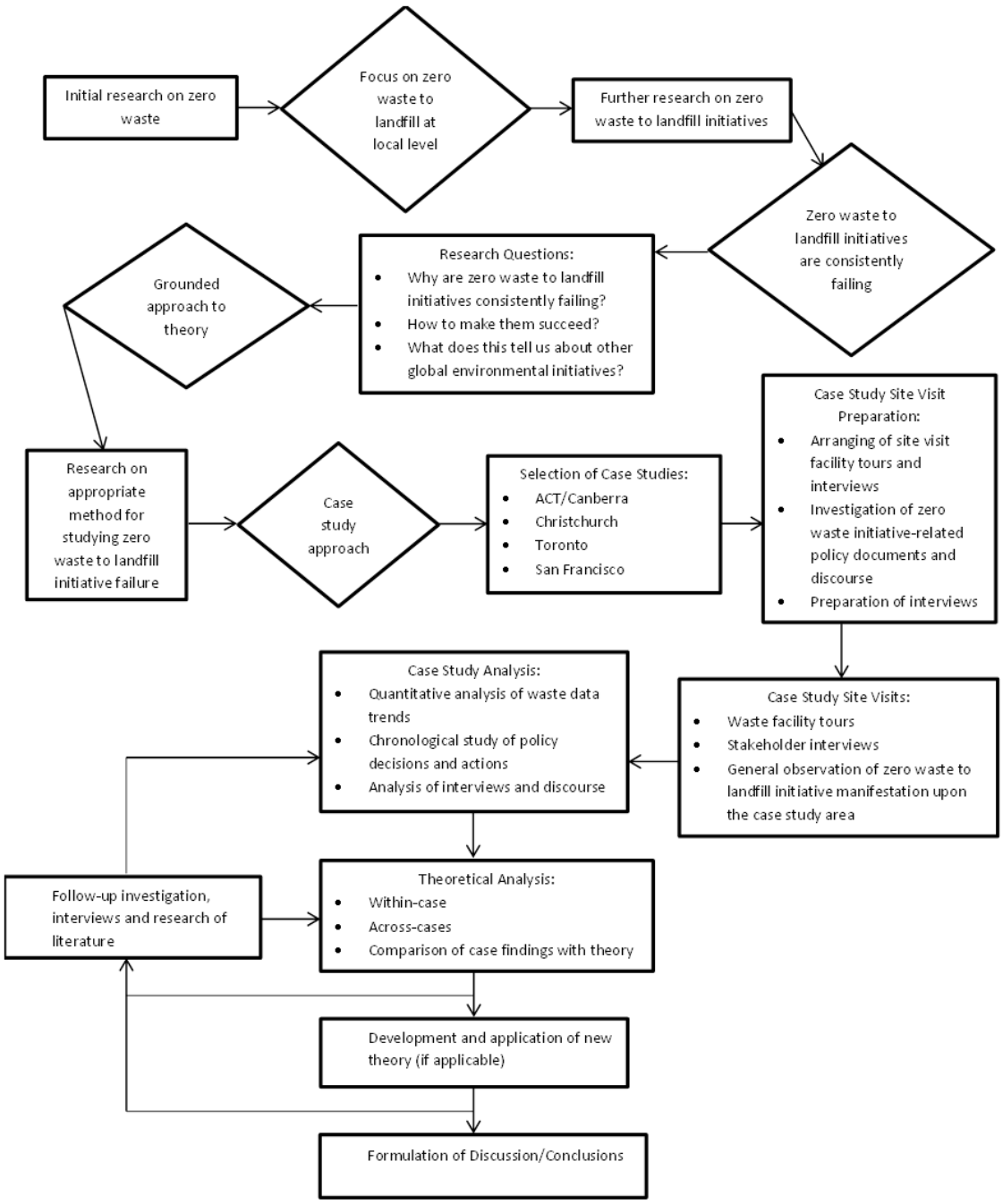

Figure 2.1: Sequential Overview of Study Methodology.

The last section of this chapter presents of an overview of the four case study chapters which follow this one.

2.6 Overview of Case Study Chapters

The chapters which follow this one consist of detailed discussion and within-case analysis of each of the four case studies. The purpose of these chapters is to 'tell the story', in such a way that the reader gains an understanding of what has transpired over time in each case, and how these events help to address the overall research questions regarding zero waste to landfill initiative failure and beyond.

Flyvbjerg (2006) observes that summarizing case studies is often difficult, due to the complicated nature of the phenomena being investigated. As such, he suggests that case studies should be read as narratives in their entirety. Yin (1981), on the other hand, argues that a lengthy case study narrative with no predictable structure is difficult both to write and to read. He suggests that this problem can be avoided by using a more structured approach, reporting the case as a series of answers to a set of open-ended questions, as such a format is easier to produce, and allows the reader to usually find desired information or skim the entire text without difficulty.

The case reporting format employed in this thesis is a combination of the styles suggested above: an overall narrative approach to telling each case story, with a common overall structure for all four cases to optimise reliability in using these chapters as a platform upon which to build consistent analyses within and across the cases, and upon which the final discussion and conclusions can be built.

The format for each case chapter is as follows:

- **Introduction:** Consists of an overview of the case, including a brief summary of the history of the zero waste to landfill initiative, and the key within-case findings.
- **Introduction to Case Study Location:** Consists of basic background history and information about the location.
- **Timeline of Events:** This is an overview of the chronological sequence of main events around the zero waste to landfill initiative, starting with significant pre-initiative events and carrying on to the present.
- **Launch of the Zero Waste to Landfill Initiative:** This section describes the events that occurred leading up to and including the official launch of the initiative.

- **Zero Waste to Landfill Initiative 'Era' Sections:** These are several consecutive sections which break the overall life of the initiative into distinct periods of time, separated by events of particular 'before/after' significance. Each of these sections contains a detailed narrative description of key events, in chronological order.
- **Stakeholder Perspectives:** This section contains the bulk of the data collected from stakeholder interviews, and also contains perspectives gleaned from the overall discourse related to each case. The perspectives are divided into the following sub-sections:
    - Motivation for Launching a Zero waste to Landfill Initiative
    - The Role of Government
    - The Role of Industry
    - The Role of the Public
    - Fundamental Challenges to Achieving Zero Waste to Landfill
    - How Zero Waste to Landfill Might Be Achieved
- **Summary of Case Study:** This last section of each case study chapter includes a graphical summary of waste generation trends over time, and an overall discussion of the results of the zero waste to landfill initiative, including within-case findings.

Chapter 3: Canberra

3.0 Introduction

The ACT NoWaste by 2010 initiative, launched in 1996, represented the world's first local government adoption of a zero waste to landfill goal with a finite deadline. As a result, the city of Canberra – which with its surrounds forms the Australian Capital Territory (ACT) – gained instant global notoriety as a sustainability exemplar, with other cities launching their own similar initiatives in the years which followed.

After the campaign was launched, the ACT reported a steady increase in their percent diversion from landfill rate, from 42% in 1996 to 73% in 2009. However, the resulting decrease in per capita waste to landfill was comparably modest: a reduction of less than one-third by 2006, which has since been followed by a levelling off and even slight increase in this rate. The key statistic which can explain this poor achievement is the overall per capita rate of waste generation, which *increased* steadily during this time, rising by over one-third between 1996 and 2009.

A number of ACT government assessments of the NoWaste programme, during this period, raised significant concerns and warnings that the Territory was not on track to achieve the zero waste to landfill by 2010 goal. Among the principal concerns raised was the obvious lack of a coherent plan for achieving zero waste to landfill. The warnings of likely failure of the initiative grew increasingly acute as the deadline of 2010 approached, culminating in the abandonment of the zero waste to landfill initiative in 2009. A new ACT Waste Strategy was formally adopted in 2011, which replaced the zero waste to landfill by 2010 goal with a more modest long-term goal of 90% or greater resource recovery by 2025 – and as of 2012, the ACT is planning to expand its existing landfill site to extend capacity beyond 2015 to at least 2035.

The sections of this chapter which follow give a detailed account and analysis of the events surrounding the ACT NoWaste by 2010 initiative.

3.1 Canberra: Australian Capital and Territorial Centre

The city of Canberra serves a dual role as Australia's capital city, and seat of the Australian Capital Territory (ACT). Canberra is the only city in the ACT, a region with an estimated population of around 347,000 residents (ACT Government, 2012).

The Australian Commonwealth parliament voted to site its capital at the present-day location of Canberra, in 1908. The Federal Capital Territory came into being in 1911, with construction of the planned city beginning in 1913, and the first meeting of the Federal Cabinet taking place in the new capital in 1924. The territory was renamed the Australian Capital Territory in 1938, and the ACT achieved self-government status in 1989 (Australian Government National Capital Territory, 2012).

The events surrounding the ACT NoWaste by 2010 initiative, which are discussed in detail in this chapter, are summarised in chronological order in the next section.

3.2 Timeline: ACT NoWaste by 2010 Initiative

- 1992: Commonwealth of Australia sets nationwide goal of 50% diversion from landfill by 2000.
- 1993: ACT's neighbouring state, New South Wales, sets its own higher goal of 60% diversion by 2000.
- 1995-1996: Stakeholder and public consultation on a new waste reduction strategy for the ACT takes place.
- December 1996: NoWaste by 2010 initiative is launched by the ACT Liberal Party government, led by Chief Minister Kate Carnell and Minister for Urban Services Tony De Domenico. The ACT thus becomes the first government in the world to officially declare a zero waste to landfill goal.
- 2000: *Progress towards No Waste by 2010* report released by ACT Commissioner for Sustainability and the Environment Joe Baker, in which concerns raised include uncertainty about the specific meaning of the initiative's goals, a lack of comprehensive planning to back up the initiative, and the need for significant whole-of-community effort and leadership from government.

- 2000: Release by the ACT government of *The Next Step in the No Waste Strategy*, which includes a reiteration of the zero waste to landfill by 2010 goal, a three-year plan for the years 2000-2002 which includes interim waste reduction targets, development of a No Waste Education Centre, and a commitment to drafting and enacting legislation to support the NoWaste programme.

- 2001: Labor Party government elected in the ACT, replacing the Liberal Party government which had been in power since 1995 and had brought in the NoWaste by 2010 initiative.

- 2004: Release of the *Action Plan 2004-2007*, which includes an acknowledgement that the initiative was more than half over and not on track to achieve zero waste to landfill, a call for the establishment of an ACT Government Leadership Committee with the purpose of ensuring that agencies were working towards the NoWaste by 2010 goals, and a plan for research and development into problematic materials.

- 2008: *ACT State of the Environment 2007* report released by ACT Commissioner for Sustainability and the Environment Maxine Cooper, which highlights the lack of sufficient progress made by the NoWaste by 2010 programme, asserts that the target of zero waste to landfill is impossible without reduced consumption and changes in behaviour in the ACT, and calls for the initiative to be dropped and replaced with a more realistic overall waste minimisation policy.

- 2008: Release of *ACT No Waste Strategy and Targets – Review & Assessment of Options*, a consultant's report which largely concurs with the Commissioner's criticism of the NoWaste by 2010 initiative, and likewise recommends that the policy be scrapped in favour of more realistic waste reduction goals.

- January 2009: ACT Labor Party government Chief Minister and Territory and Municipal Services Minister, Jon Stanhope, publicly renounces the goal of zero waste to landfill, signalling the abandonment of the NoWaste by 2010 initiative.

- 2011: Release of the *ACT Waste Management Strategy 2011-2025*, which officially replaces the zero waste to landfill by 2010 goal with a new long-term target of over 90% resource recovery by 2025.

The next section discusses the events surrounding the launch of the ACT NoWaste by 2010 initiative.

3.3 Launch of ACT NoWaste by 2010

"We are the first Government anywhere to embrace such a bold target – of becoming a waste free society. This will be a most rewarding challenge for our community to adopt and I commend this strategy for its vision." – Tony De Domenico, ACT Minister for Urban Services, 1996 (Australian Capital Territory, 1996, p. 1).

The ACT government was the first in the world to declare a zero waste to landfill goal, in 1996 (ACT Government Territory and Municipal Services, 2012a). The timeframe set was of 14 years' length, with the target date explicit in the title *ACT NoWaste by 2010* (Australian Capital Territory, 1996). There is no specific mention of 'zero waste' anywhere in the original 1996 *No Waste by 2010* strategy document – instead, there is repeated use of the equivalent phrases 'no waste' and 'waste free society'.

The zero waste to landfill declaration arose based on feedback gathered from a series of community workshops and stakeholder meetings in 1995 and 1996, after which the ACT government articulated the specific goal of "a waste free society by 2010" (Australian Capital Territory, 1996, p. 1). The initiative was launched on 19 December 1996 (G. Gillespie, pers. comm., January 18, 2012), by the ACT's Liberal Party government of the day, led by Chief Minister Kate Carnell and Minister for Urban Services Tony De Domenico (Australian Capital Territory, 1996).

ACT NoWaste by 2010 followed similar waste-related legislation that was passed in Australia in the preceding years: in 1992, the Commonwealth of Australia government set a nationwide goal of 50% diversion from landfill by 2000; and, in 1993, the neighbouring state of New South Wales set its own higher goal of 60% diversion by the same deadline of 2000 (Planet Ark Environmental Foundation, 2005).

The sections which follow examine the events which unfolded during the course of the Act NoWaste by 2010 initiative.

3.4 1996-2000: Early Mixed Results

The 1996 ACT NoWaste Strategy document included a comprehensive list of action items, (see Australian Capital Territory, 1996), which generally fell into the three main categories of *Public Education, Building/Improving Waste Management Infrastructure, and Ongoing Performance Assessment of the Initiative*.

The period from 1996-2000 saw steady increases in resource recovery rates; however, overall waste generation more than kept pace – meaning that waste to landfill actually increased slightly over the period (see ACT Government Territory and Municipal Services, 2012b).

In 1999, the ACT's Commissioner for Sustainability and the Environment, Joe Baker, conducted a study of ACT NoWaste by 2010's progress to date, and released a report in 2000 titled *Progress towards No Waste by 2010* (Office of the Commissioner for Sustainability and the Environment, ACT, 2000). Overall, the Commissioner commended ACT NoWaste by 2010 for "some good work done to date", but stressed that "there is a very challenging task ahead" (*Executive Summary and Recommendations,* par. 1). The following significant concerns were raised in the report:

- The Commissioner indicated that he had sought out clarification about the initiative's goals from the NoWaste team, and had received confirmation from Environment ACT and ACT Waste staff that the ultimate goal was indeed no waste to landfill by 2010. However, he expressed concern about consistency across the ACT: "I have received inconsistent messages about the goals and targets of the No Waste by 2010 strategy. I therefore believe there needs to be a clear statement about the ACT Government's goals for the strategy" (*Initial Findings,* par. 2).

- A lack of comprehensive planning to back up the initiative was also cited: "I believe there is a demonstrable need for a more coherent program for implementing the strategy over the remaining timeframe than currently exists" (*Recommendation 3*, par. 3).

- Of particular concern to the Commissioner was a lack of any apparent plan to address the wider issue of consumer behaviour:

> "I am concerned that the "Avoidance and Reduction" aspect of the strategy may not progress adequately. There is nothing evident in current planning to address Smart Buying – developing programs that will allow consumers and resource users to make well-informed choices for minimising waste in their purchasing and production decisions, or Reduction Agreements and Cleaner Production – establishing waste reduction agreements with key industries operating in the ACT and region" (*Recommendation 4*, par. 4).

In the report, the Commissioner expressed his belief that the initiative could not be successfully implemented without the significant and combined support of government, businesses and residents of the ACT, and that this support needed to have a formal structure. He also observed that the success of the NoWaste by 2010 initiative would also depend upon national strategies beyond the ACT's sole jurisdiction, particularly with regards to production and packaging issues.

It was noted in the report that while the amount of waste to landfill had decreased since the introduction of kerbside recycling in 1994, the initial drop in total waste volumes had been reversed – with 1997-1998 levels equalling those for 1993-1994. The Commissioner cited the need for "significant whole-of-community effort and leadership from Government", in order to minimise domestic waste (*Recommendation 4*, par. 2).

One month after the Commissioner's report was tabled in the ACT Legislative Assembly, the territorial government released *The Next Step in the No Waste Strategy* (Australian Capital Territory, 2000). In this document, ACT NoWaste reported a doubling of resource recovery and a 40% reduction of waste to landfill over the previous five years. As well, the initiative's overall goal was re-iterated in clear language: "The goal of the No Waste by 2010 Strategy is a waste free society. An indicator of the success of the strategy will be no waste going to landfill by the year 2010" (p. i).

This document was also largely a response to the points and concerns raised in the then-recently-tabled Commissioner's Report. A three-year plan for the years 2000-2002 was outlined, which included interim waste reduction targets in advance of 2010, and a mixture of top-of-pipe and end-of-pipe strategies for meeting these targets. Other commitments listed included increased public awareness and education – including the development of a No Waste Education Centre, a revised waste pricing policy based on actual disposal costs of

various types of waste, development of a Resource Recovery Estate at the present landfill site, a shift to single-stream kerbside recycling, and trialling of kerbside organics pickup.

Also included was a commitment to drafting and enacting legislation to support the NoWaste programme. Notably, the focus of such legislation was on the encouragement of voluntary measures only – with an allowance to impose regulations as a backup measure where voluntary measures failed to meet the initiative's goals.

The next section examines the performance of the NoWaste by 2010 initiative over the subsequent four-year period.

3.5 2000-2004: Progress And Doubt

The period from 2000-2004 saw overall gains made on both resource recovery (up) and per capita waste to landfill (down) (see ACT Government Territory and Municipal Services, 2012b). ACT NoWaste by 2010's *2001 Progress Report* cited a 61% diversion from landfill rate (Australian Capital Territory, 2001), and this improved to 64% in the *2002 Progress Report* (ACT NOWaste, 2002), and again to 69% in the *2003 Progress Report* (ACT NOWaste, 2003). However, overall waste generation continued to increase, and with 2010 looming ever closer, doubts about the initiative's ultimate success grew as well.

The period 2000-2004 also saw a change of territorial government in the ACT. The Liberal Party government that had been in power since 1995 – and which brought in the ACT NoWaste initiative in 1996 – was replaced in 2001 by a Labor Party government.

2004 saw the release of the *Action Plan 2004-2007* (Australian Capital Territory, 2004). In this report, the 69% diversion from landfill rate was cited as a positive achievement to date; however, also noted was an increase in per capita total waste generated, from 1.3 tonnes/year in 1995-1996, to 1.95 tonnes/year in 2002-2003 (see Figures 2 and 3 on p. 2). The report raised the concern that while the timeframe of the NoWaste by 2010 initiative was more than half over, the required reduction in per capita waste to landfill was significantly less than halfway towards zero. A two-pronged approach was called for to address this: strategies to influence industry to change inputs at the top-of-pipe, as well as end-of-pipe strategies to manage outputs.

Action items for 2004-2007 that were outlined in this plan included the establishment of an ACT Government Leadership Committee with senior officer representation from all

government agencies, with the purpose of ensuring that agencies were working towards the NoWaste by 2010 goals. As well, continued work on the national level was proposed, including the National Packaging Covenant and participation in the National Waste Working Group. Also planned for the coming years was continued development of the Resource Recovery Estate, and addressing problematic materials via research/development and targeted pricing strategies.

Later in 2004 saw the release of the public document *Your Guide to Becoming a No Waste Household* (ACT NOWaste, 2004), in which a diversion from landfill rate of 70% was reported. Also outlined in this document was an overview of how zero waste to landfill was to be approached in the period 2004-2010 (see graph on p. 3):

- From 30% residuals to less than 15% via No Waste programs, by 2007.
- From less than 15% to less than 5% once a specialist treatment plant was operational, sometime between 2007 and 2010.
- No firm target for residuals was set beyond 'less than 5%' – and this is notably the earliest identified official indication from ACT NoWaste by 2010 that the final result of the initiative might be something other than zero waste to landfill. There was the following additional statement, however: "The remaining 5% can be further reduced by encouraging manufacturers to take greater responsibility for the lifecycle of their products. The ACT government is contributing to this work at a national level."

The above sequence of events leading to zero waste to landfill, however, did not eventuate, as is explained in the next section.

3.6 2004-2009: Demise and Abandonment of ACT NoWaste by 2010

During the period 2004-2008, funding for the initiative was scaled back by the ACT government, and no further progress reports were released after 2004 – though core components of the programme, particularly operational ones related to resource recovery, continued to function and evolve.

In 2008, the ACT Commissioner for Sustainability and the Environment, Maxine Cooper, released the *ACT State of the Environment 2007* report. This included a section titled *Indicator: Solid Waste* (Office of the Commissioner for Sustainability and the Environment,

ACT, 2007), which directly addressed the performance and future viability of the ACT NoWaste by 2010 initiative. The Commissioner noted that a maximum diversion from landfill rate of 75% was achieved in 2005-2006, and that waste to landfill was reduced by 27% during the period of 1994-1995 to 2006-2007. However, she pointed out that during this same period, while population growth was around 10%, total waste increased by 87%.

The Commissioner also noted that while considerable progress was made on action items from the 2004-07 strategy plan, some action items remained only partially implemented, or not implemented at all. And most crucially, she offered the following critical assessment regarding the feasibility of continuing the ACT NoWaste by 2010 initiative (*No Waste target to become No Waste Goal*, par. 1):

> "Despite achievements in diverting waste to landfill and considerable government investment in recovery and disposal infrastructure, the visionary target of No Waste to landfill by 2010 is unlikely to be achieved. It is unlikely that the target was ever achievable and budget allocations alone will never be able to fully achieve a 100% reduction in waste as this would require a significant reduction in consumption and thereby affect people's lifestyles. Accordingly there will always be a shortfall in being able to achieve the No Waste target."

The Commissioner added the following suggestion for how to move forward in the absence of a continuation of the NoWaste by 2010 initiative (*Moving forward*, par. 5):

> "The government should progress a waste minimisation policy approach to build on the successes of No Waste by 2010 strategy, with a [sic] clear, transparent and measurable performance measures that increase resource recovery, and reduce waste to landfill and total waste generation."

Later in 2008, a consultant's report titled *ACT No Waste Strategy and Targets – Review & Assessment of Options* was released (Wright Corporate Strategy, 2008) which largely concurred with the findings in the Commissioner's report. In this document, the consultant noted that earlier good progress on reducing waste to landfill was being eroded, and waste to landfill was now actually increasing. It was also pointed out that that the current landfill gate fee revenue structure represented a disincentive to minimizing the landfilling of waste. Further criticism included an assessment that the current level of budget funding of the ACT

waste programme was insufficiently low, and that the ACT's current system of mixed-waste collection and processing was inadequate and in need of replacement.

The consultant's overall assessment echoed the Commissioner's then-recent recommendation to abandon the NoWaste by 2010 initiative: ""No Waste by 2010" needs to be replaced by a more contemporary strategy and associated policy that does not rely on mixed waste processing as the underpinning technology to deliver the objectives" (p. 111).

As 2010 loomed larger on the time horizon and failure to achieve zero waste to landfill became ever clearer, crucial support for the NoWaste programme eroded. While the ACT's website continued to state that the goal of no waste by 2010 was achievable, the Territory's Labor Party Chief Minister and Territory and Municipal Services Minister, Jon Stanhope, made the following statement on 21 January 2009: "I can say now we will never achieve a situation where no waste is reduced to landfill. It will never, ever, be achieved. For the purpose of a slogan, for an aspiration, I think it was appropriate" (The Canberra Times, 2009). With this public declaration of abandonment, the ACT NoWaste by 2010 initiative was effectively finished.

The next section looks at what has happened with the ACT NoWaste programme since the zero waste to landfill by 2010 goal was dropped.

3.7 2009-Present: ACT NoWaste – No Deadline

Since the NoWaste by 2010 programme was abandoned in 2009, the diversion from landfill rate has remained around its peak of 75%. However, overall waste generation has continued to grow, which means that waste to landfill has also continued to rise (see ACT Government Territory and Municipal Services, 2012b).

The public face of the ACT's waste policy was to a large degree absent for a period of several months from around the end of 2009 until mid-2010, while the Territory came to terms with its NoWaste by 2010 failure, and sought a replacement waste strategy. Most ACT webpages related to the NoWaste by 2010 programme had disappeared from the internet, leaving behind numerous links from other ACT Government webpages that led to nowhere.

2010 eventually saw the release of the *ACT Sustainable Waste Strategy 2010-2025 Draft* (Act Department of the Environment, Climate Change, Energy and Water, 2010). This draft document was issued by the ACT Minister for the Environment, Climate Change and Water,

Simon Corbell, and it invited public submissions towards the preparation of a final strategy document for 2010-2025.

Subsequently, in 2011, The *ACT Waste Management Strategy 2011-2025* was released (Australian Capital Territory, 2011), and this officially replaced the ACT NoWaste by 2010 initiative as the ACT's overall waste policy. In this document, the Minister emphasised the ACT's successes in waste diversion, and articulated the new overall waste reduction goal (p. i):

> "The ACT is one of the leading jurisdictions in waste management in Australia with over 70% of waste generated in the ACT reused or recycled. Nevertheless, the Government remains committed to doing more and progressing towards its goal of zero recoverable waste sent to landfill."

The wording in the above statement is almost the same as in the 2010 draft version, with the notable exception that the "zero waste to landfill goal" from the draft (Act Department of the Environment, Climate Change, Energy and Water, 201, p. iii) was replaced with the "goal of zero recoverable waste sent to landfill" in the final document (Australian Capital Territory, 2011, p. i). This change in wording, while subtle, reflects a significant concession by the ACT government: that there remain unrecoverable wastes, and that the need to landfill these wastes will therefore continue indefinitely.

The new Strategy replaced the original goal of zero waste to landfill by 2010 with the following four overall outcome goals (p. 4):

1. Less waste generated:
    - The growth in ACT waste generation is less than the rate of population growth.
    - Reuse of goods expands in the ACT.
2. Full resource recovery: The rate of resource recovery increases:
    - over 80% by 2015.
    - over 85% by 2020.
    - over 90% by 2025.

3. A clean environment:

    - ACT leads Australia in low littering and incidents of illegal dumping.
    - ACT's natural resources are protected and, where feasible, enhanced through waste management.

4. Carbon Neutral Waste Sector: The ACT Waste Sector is carbon neutral by 2020:

    – energy generated from waste doubling by 2020;
    – waste resources are recovered for carbon sequestration by 2020.

As of 2012, the ACT has shifted its position further away from zero waste to landfill, with a present effort underway to expand the Mugga Lane landfill to extend its capacity – currently estimated to run out in 2015 – until at least 2035 (ACT Government Territory and Municipal Services, 2012d).

The next section examines perspectives from various stakeholders, regarding the ACT NoWaste by 2010 initiative.

3.8 Stakeholder Perspectives on the ACT NoWaste Initiative

Table 3.1 provides a summary of the stakeholder interviews associated with the Canberra zero waste to landfill initiative case study, including name, affiliation/role, and date(s) of interview for each interviewee.

Table 3.1: Canberra Case Study Interview Summary
(Listed by Government (Elected/Staff), Industry (Local/National), and Public, and in chronological order).

Interviewee Name	Affiliation/Role	Date(s) of Interview
Caroline LeCouteur	ACT Green Party MLA and Spokesperson for Territory and Municipal Services	25 May 2011
Alistair Coe	ACT Liberal Party MLA and Shadow Minister for Urban Services	25 May 2011
Graham Mannall	Operations and Contracts Manager, ACT NoWaste	24 May 2011
Michael McGee	Resource Recovery Industry Development Officer, ACT NoWaste	24 May 2011
Bruce Edgerton	Senior Policy Officer, ACT Department of the Environment, Climate Change, Energy and Water	24 May 2011
Gerry Gillespie	Chair, Zero Waste Australia, and Former Senior Project Officer, ACT NoWaste by 2010	18 January 2012
Vaughan Levitzke	CEO, Zero Waste South Australia	19 January 2012
Richard Iles	Canberra District Manager, Thiess Services	30 July 2012
Jon Smith	Compliance and Operations Supervisor, SITA Australia	09 August 2012
Gavin Williams	CEO, Packaging Council of Australia	31 July 2012
Robin Tennant-Wood	Assistant Professor, Faculty of Business and Government, University of Canberra	26 May 2011

Motivation for Launching a Zero Waste to Landfill Initiative

The idea of setting the higher aim of zero waste to landfill emerged from community member feedback, during a period of public consultation in 1995-1996, notes ACT NoWaste by 2010 Senior Project Officer at the time, Gerry Gillespie (pers. comm., January 18, 2012). According to Graham Mannall (pers. comm., May 24, 2011), who at the time was the project's Waste Reduction Manager and is currently NoWaste's Operations and Contracts Manager, ACT's waste staff were further encouraged by private companies such as DuPont, which were likewise seen to be aiming for zero emissions. Other factors contributing to Canberra's apparent willingness and suitability for taking such a pioneering step included the city's high proportion of educated people and local tertiary institutions, a relatively small industrial base, and relative isolation from larger urban centres.

Mannall (pers. comm., May 24, 2011) recalls that the name 'NoWaste' was chosen deliberately as a conceptual alternative that emphasised the resource value of waste, as opposed to emphasizing the numerical 'zero' which assigned no such value. A deadline of 2020 was initially considered for its 'vision' connotation, but the closer date of 2010 was chosen instead as a more ideal timeframe, based on the 1996 launch of the initiative.

Reaction to the initiative's launch in 1996 was widespread, and characterised by global surprise and interest that a government anywhere had committed to zero waste to landfill (G. Mannall, pers. comm., May 24, 2011). Gillespie (pers. comm., January 18, 2012) notes that the novelty of the initiative prompted staff to be positive and excited about the work they were undertaking.

Packaging Council of Australia Chief Executive Officer (CEO) Gavin Williams (pers. comm., July 31, 2012) argues that politicians in the ACT – and elsewhere in Australia – have never truly seen zero waste to landfill as anything but an aspirational-only goal. He adds the view that zero waste is little more than a prop for political parties to use against each other, depending on who is in power at the time, and on the opportunities to be gained by either promoting or criticising the latest initiative.

Jon Smith, Compliance and Operations Supervisor for SITA Australia, which provides commercial waste collection services in the ACT (pers. comm., August 09, 2012), sums up the NoWaste outcome this way:

> "Zero Waste to landfill is an admirable target, and with well designed policies and systems can be more or less achieved, however I think the ACT was rather ambitious attempting to reach zero waste to landfill while constrained by its place in the wider context of Australian legislation and the National Import, Recycling and Manufacturing markets."

Mannall (pers. comm., May 24, 2011) points out that the ACT achieved a 75% diversion rate, which was a first for Australia and among the best outcomes anywhere in the world – yet the NoWaste initiative was still largely viewed as a failure because of its stated goal of zero waste to landfill. He states that setting a finite deadline was a mistake that initiatives elsewhere have avoided. 2010, he says, was a great timeline in the beginning, as it generated commitment and helped to make early gains. However, once it was realised that the ACT wasn't going to get to zero waste, maintaining political support and funding became difficult. At that point, '2010' became "almost a millstone around our necks… government was saying "Why would we want to do this when we know you're going to end up failing?""

Mannall (pers. comm., May 24, 2011) points to other states in Australia such as South Australia, Western Australia and Victoria, which have not set specific timelines and are actually doing better than the ACT. University of Canberra Assistant Professor Robin

Tennant-Wood (pers. comm., May 26, 2011) similarly cites South Australia as an example of a place that has been very quiet about their zero waste efforts but has performed very well. Zero Waste South Australia's CEO, Vaughan Levitzke (pers. comm., January 19, 2012), explains that their relatively modest stated goals have been very consciously selected, to deliberately aim for reachable targets that generate short-term success, rather than long-term failure as has been attributed to the ACT's NoWaste by 2010 programme. Mannall (pers. comm., May 24, 2011), meanwhile, wonders if the ACT community would have viewed NoWaste as a success if their stated goal had been 70% diversion, given that they achieved a 75% rate.

The Role of Government

Mannall (pers. comm., May 24, 2011) reports that there was a large amount of buy-in from local elected officials when the initiative was launched – but points out that in 1996 the deadline year of 2010 was a long way off, and beyond politicians' election cycles. Current ACT Liberal Party Member of the Legislative Assembly (MLA) Alistair Coe (pers. comm., May 25, 2011) maintains that the original zero waste to landfill goal was a real one; however, current ACT Green Party MLA Caroline LeCouteur (pers. comm., May 25, 2011) suggests otherwise, adding that the Liberal government of the day knew well that they would not be there at the deadline time, so it would not be their problem in the end if it failed.

Tennant-Wood (pers. comm., May 26, 2011) observes that the Chief Minister of the day in 1996, Kate Carnell, was supportive of the NoWaste initiative, as was Brendan Smyth, who Carnell appointed Minister for Urban Services in 1998. Carnell stepped down in 2000, before the 2001 elections, and Tennant-Wood notes that her successor, Gary Humphries, was much less interested in the NoWaste programme.

The ACT Green Party currently holds the balance of power in a minority government Legislative Assembly, and as such it might appear that this could provide some leverage for advancing legislation that would support NoWaste or similar initiatives. However, wider political objectives may be too much of an obstacle, as suggested by Green MLA LeCouteur (pers. comm., May 25, 2011), who notes for example that while the Opposition Liberals and Greens agree on introducing a third organics bin that the Labor government does not want, the Greens would not choose to defeat the government over this issue alone.

Aside from elected officials, appointed government officials have also played a pivotal role at times, with regard to the NoWaste initiative. As discussed previously in this chapter, two different appointed Commissioners for Sustainability and the Environment authored key reports on the programme – one in 2000, and the other in 2008. As Mannall (pers. comm., May 24, 2011) notes, the former report was supportive of NoWaste by 2010, but raised concerns about performance, commitment, and progressive implementation. The latter report went far beyond raising concerns, and recommended in no uncertain terms that the entire programme should be dropped in favour of new and less ambitious goals.

Tennant-Wood (pers. comm., May 26, 2011) suggests that the Australian federal government is in a position to be more effective than the ACT territorial government with an initiative like NoWaste, because it can apply fixed guidelines across all states and territories, with no cross-border discrepancies. She also notes that it is more feasible to implement Extended Producer Responsibility (EPR) at the national level. However, she points out that the performance of federal governments on environmental issues has ranged from very good to absolutely appalling, over successive reigns. She describes the current federal government as one that knows what it has to do address the environment, but is in a tenuous hung parliament situation and is afraid of doing anything that appears 'radical', for fear of upsetting conservatives. Meanwhile, The Packaging Council of Australia's Williams (pers. comm., July 31, 2012) sees this as a global trend, arguing that in the current economic climate of worldwide recession, the larger issue of sustainability – including zero waste – has simply dropped down on the list of priorities for governments.

The Role of Industry

The Packaging Council of Australia's Williams (pers. comm., July 31, 2012) insists that "zero waste is not a goal" for the packaging industry in that country, noting that the overall environmental impact of packaging is about 10-15% of the total impact of the products they contain. He defends the overall performance of the industry, and points out that all over the world, packaging is singled out by governments as an easy but unfair target for special legislative treatment.

On the issue of replacing waste-problematic materials such as plastics with alternative materials, Williams (pers. comm., July 31, 2012) states that the Packaging Council's position is neutral: they are neither for nor against development of such alternative materials. He stresses, however, that it is not the government's role to decide which materials are better

than others – for that, he insists that it is best left for the marketplace to decide. Williams acknowledges that plastics have steadily replaced other materials such as glass for milk and soda, and tin for canned goods, and he has "absolutely no problem" with the idea of biodegradable alternatives for these. However, he points to feedback from the food distribution sector which indicates that what are claimed as advantages of such alternative packaging materials are seldom delivered reliably in practice.

Williams (pers. comm., July 31, 2012) notes that the Australian Packaging Covenant, which was first signed in 1999 and renewed in 2005 and again in 2010, is a "co-regulatory" voluntary agreement between industry and government. He recalls that the motivation among industry for such an accord was the emergence, in the 1990s, of momentum building in Europe and New Zealand for government-imposed measures, which he refers to as "draconian government legislation".

Richard Iles, the Canberra District Manager of Thiess Services, the company contracted to manage the ACT's main landfill at Mugga Lane, and the owner and operator of the Materials Recovery Facility (MRF) at the same site, admits that generally "we do a pathetic job at zero waste" in Australia. He adds that "this part of the world is in the dark ages compared to…Europe" (R. Iles, pers. comm., July 30, 2012).

SITA Australia's Smith (pers. comm., August 09, 2012), likewise is critical of waste reduction performance in Australia, but offers this explanation and ultimatum:

> "Without access to alternative manufacturing processes and the support of legislation to favour recyclable over non-recyclable stock materials for manufacturing processes, or even for recyclable imported goods themselves, the complex industrial ecology that is really required to generate no waste to landfill will not evolve."

Smith (pers. comm., August 09, 2012) adds that his company is planning to construct an "Advanced Resource Recovery Facility (Dirty MRF)" in the ACT before 2019, and he envisions that with work like this they will play a large and leadership role in the future of the ACT's waste management initiatives, with the company's overall workload increasing.

Green Party MLA LeCouteur (pers. comm., May 25, 2011), however, offers this sceptical overall assessment of the waste industry's potential for working towards zero waste: "They

are not committed to reducing waste. They are committed to greater management of the waste that we're getting."

The Role of the Public

Tennant-Wood (pers. comm., May 26, 2011) points out that there was always a significant element of the ACT population who were against the initiative, and yet against this opposition the programme managed to achieve a 75% waste diversion rate. The Commissioner for the Environment and Sustainability cited this statistic in her State of the Environment 2007 report (Office of the Commissioner for Sustainability and the Environment, ACT, 2007), and noted that this made the ACT a leader and unprecedented achiever in recycling in Australia.

Meanwhile, Mannall (pers. comm., May 24, 2011) observes that, overall, Canberrans are relatively affluent, and this translates into a severely high level of material consumption that sees around one-third of all purchases end up in the landfill before they are ever used. He suggests that the central government's involvement in waste reduction efforts would be welcome because a top-down approach at this point would be much easier than one from the bottom up, as the grassroots in Australia has become very quiet in recent years.

Fundamental Challenges to Achieving Zero Waste to Landfill

The NoWaste by 2010 initiative was a legislative product of a Liberal Party ACT government, which had been in power since 1995. The elections of 2001 brought in a new Labor Party government, which has held power ever since. The elections of 2001 and change in government appear to have been a significant turning point in ACT NoWaste by 2010's fortunes. Tennant-Wood (pers. comm., May 26, 2011) asserts that the new Labor Chief Minister, Jon Stanhope, approached the waste issue from a more disposal-minded perspective and as such never fully supported the NoWaste initiative, and systematically cut the budget until he finally cancelled the programme in 2009. Mannall (pers. comm., May 24, 2011) notes that in the last NoWaste progress report in 2004, staff indicated that with appropriate funding they could get down to 5% residual waste, but the government declined to provide this support.

Gillespie (pers. comm., January 18, 2012) argues that it is actually less costly at present for the ACT to landfill waste than divert it, and this disincentive situation prevents more support

from going towards initiatives such as NoWaste – as was pointed out to the ACT government in their consultant's 2008 report discussed previously in this chapter.

Tennant-Wood (pers. comm., May 26, 2011) explains that the relative lack of top-of-pipe strategies in the ACT is a result of social ecology being a missing piece in Australia when it comes to working on waste issues – as most people in the field operate in the 'waste management' paradigm. LeCouteur (pers. comm., May 25, 2011) stresses that people need to acknowledge that the earth is finite, and this means that if attitudes don't change we will eventually be living in our own waste. She adds that it is possible that the human race will need to see this happen to them before they properly realise this is a problem.

Mannall (pers. comm., May 24, 2011) similarly argues that economic growth has to be decoupled from waste generation before any further progress can be made towards zero waste. Green MLA LeCouteur (pers. comm., May 25, 2011) suggests that the present obsession among governments for Gross Domestic Product (GDP) growth can only be sustained if such growth is measured in terms of services only; however, she notes that at present the prevailing model incorporates resource exploitation growth as well. Liberal MLA Coe (pers. comm., May 25, 2011), on the other hand, agrees with the present focus on GDP growth, as it is positively correlated with increased prosperity, and he doesn't see any problem whatsoever with present levels of consumption in the ACT. He cites technological improvements such as improved recycling sorting as the key to further progress towards zero waste.

In assessing what has been done in the ACT since the launch of NoWaste by 2010, it is evident that significant work was done in improving the end-of-pipe infrastructure: examples include expansion of kerbside recycling pickup, as well as the development of more sophisticated materials sorting and a widening of the range of materials that can be accepted into the recycling stream. However, the continued widespread presence of problematic materials, which defy efforts at resource recovery, leaves the ACT with no option but to continue landfilling indefinitely. According to Bruce Edgerton, Senior Policy Officer in the ACT's Department of the Environment, Climate Change, Energy and Water (pers. comm., May 24, 2001), these materials include asbestos, nuclear medical wastes, and e-waste.

Plastics represent another significant type of waste which end-of-pipe technology has so far largely failed to divert from the landfill. LeCouteur (pers. comm., May 25, 2011) points out that packaging waste is a big part of the problem affecting progress towards zero waste, but Tennant-Wood (pers. comm., May 26, 2011) argues that the ACT on its own is not big enough to go to food manufacturers and grocers and say that they won't accept this packaging, because the manufacturers and grocers would likely just stop shipping to Canberra – and this sort of reaction would not go over well among local residents.

Regarding recycling's potential role in reducing waste in the country, the Packaging Council of Australia's Williams (pers. comm., July 31, 2012) observes that the problem in Australia is that you need to get collected materials to somewhere they can be processed, which in certain cases may be over huge distances. He cites the example of glass recyclables, for which processing facilities only presently exist in the south and east of the country – which makes glass recycling in Western Australia highly unfeasible.

Williams (pers. comm., July 31, 2012) expresses concern that container deposit legislation (CDL) which already exists in South Australia will soon be legislated across the entire country. He argues that the problem with CDL is twofold: (1) that it is commonly misperceived as a 'recycling' system, when in reality is merely a 'collection' system – with uncertainties regarding what actually happens to the materials once they are collected; and, (2) that over 90% of households in Australia already receive kerbside recycling service – so CDL will actually mean that there are two competing resource recovery systems, with CDL weakening the existing kerbside system.

Thiess Services' Iles (pers. comm., July 30, 2012) cites incineration as a potential alternative to landfilling, but he points out that almost no incineration presently takes place in Australia, and introducing it as a common waste management practice would be a highly controversial issue across the country.

SITA Australia's Smith (pers. comm., August 09, 2012) sums up the problems faced by any zero waste to landfill initiative in the ACT and elsewhere in Australia this way: "the nexus between the design of a product, available source materials, innovative manufacturing processes, legislative and community support is such a complex target that the total success of any initiative is highly unlikely at this stage."

How Zero Waste Might Be Achieved

Thiess Services' Iles (pers. comm., July 30, 2012) believes that attaining zero waste to landfill requires "a seismic shift" in thinking on waste. SITA Australia's Smith (pers. comm., August 09, 2012), meanwhile, stresses that rather than being focused on source separation of waste by members of the public,

> "No Waste is about industrial ecology, where the wastes from one process are the feedstock for the next. Governments need to regulate to ensure that the only products that are available for consumption are those that can be recycled and then provide incentives for industries to grow around recycling and re-manufacturing of the recycled products."

Tennant-Wood (pers. comm., May 26, 2011) proposes EPR as a feasible strategy for achieving zero waste. And Mannall (pers. comm., May 24, 2011) envisions EPR working in such a way that there is a shift from buying products to buying functions or services. He also believes that there needs to be a way to control the materials that go into products, with regulations to control problematic materials. However, Mannall points out that governments will not be able to do this on their own, so they will need to facilitate industry's role in innovating to this end.

ACT NoWaste's Resource Recovery Industry Development Officer, Michael McGee (pers. comm., May 24, 2011), also sees hope in technological advances – particularly the potential to mine old landfill sites in the future. He points out that concentrations of such materials as precious metals and steel are higher in landfills than in ore. And Mannall (pers. comm., May 24, 2011) suggests that in the next century, landfill mining could surpass new landfilling as these resource recovery opportunities are exploited.

However, LeCouteur (pers. comm., May 25, 2011) asserts that achieving zero waste is not going to be possible via such technological solutions. And Tennant-Wood (pers. comm., May 26, 2011) observes that these technological fixes are end-of-pipe, and can only solve things up to a limited point before failing, because they do not address root waste generation.

SITA Australia's Smith, meanwhile (pers. comm., August 09, 2012), describes the following necessary ingredients for zero waste success: "Serious legislation, forced industrial ecology, re-imagining of the way manufacturing currently works both in Australia and around the world."

Tennant-Wood (pers. comm., May 26, 2011) observes that "Until you add humans, there's no waste. Once you add humans, there is waste, and you have a problem." Gillespie (pers. comm., January 18, 2012), however, maintains that there is ultimately no alternative option to zero waste, but this requires somehow shifting from the linear systems that continue to prevail, to circular ones found elsewhere in nature.

The last section of this chapter gives a summary of the ACT NoWaste by 2010 initiative.

3.9 Summary of the ACT NoWaste Initiative

Figure 3.1 summarises the waste picture in the ACT, around the timeline of the NoWaste by 2010 initiative:

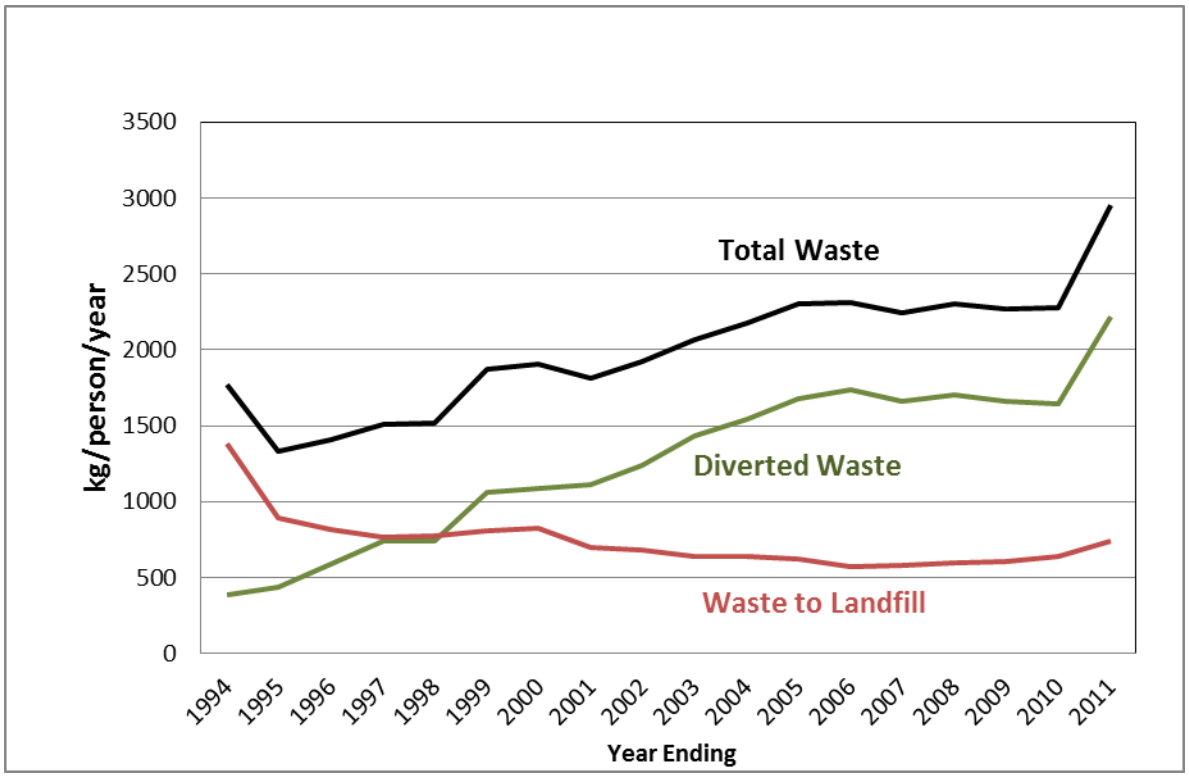

Figure 3.1: Waste Generation Trends in the ACT
(based on waste data from ACT Government Territory and Municipal Services (2012c) and population data and estimates from the ACT Government Chief Minister and Cabinet (2012)).

It can be seen in Figure 3.1 that the two years leading up to the ACT NoWaste by 2010 launch in 1996 were when the most significant gains in per capita waste reduction took place. This coincides with the introduction of commercial charges in 1993 (Australian Capital Territory, 2000) and the introduction of kerbside recycling collection in 1994 (Office of the Commissioner for Sustainability and the Environment, ACT, 2000).

The three superimposed graphs of Figure 3.1 illustrate the overall problem observed in the ACT – namely, that while resource recovery rates have been climbing steadily due to improved infrastructure and behaviours at the end of the waste pipe, total per capita waste generation has continued to grow at the top of the pipe, resulting in waste to landfill levels that have dropped only slightly – and have even started to grow again in recent years.

The ACT NoWaste by 2010 initiative had a clearly articulated goal of zero waste to landfill by 2010. Against this target, the initiative was a failure because the ACT continues to send waste to landfill – and there is no indication that this situation is going to change at any point in the foreseeable future.

The initiative's proponents could logically point – as they have done – to their attainment of 75% diversion from landfill as a significant achievement in its own right. This level of waste diversion was indeed precedent-setting in Australia, and is among the highest such rates achieved anywhere in the developed world. However, as has been pointed out in various places previously in this chapter, progress towards reducing waste to landfill has been undermined by the continued increase in overall waste generation. As such, the ACT can be described as a place where increased consumption and the associated increase in waste generation have coincided with significant improvements in recycling and other diversion technologies and processes, with the overall result being that these opposing forces have kept waste going to landfill at a more or less steady rate.

Examination of the policy decisions and actions around the NoWaste by 2010 initiative reveals that while waste going into the top-of-pipe has continued to increase, the ACT has responded at the end-of-pipe, by developing new and better ways to divert the increases in waste towards recycling, composting and other diversion programmes. The net result is that the per capita flow of waste to the landfill dropped at a lesser rate than the much-publicised high diversion rates might suggest – and even these modest decreases in waste to landfill have levelled off in recent years and have even increased slightly again, to levels near where the ACT was in 1996.

As discussed previously in this thesis, zero waste is a concept that implies a radical change in the way that one views waste, and significant behaviour change is a necessary component of this. In reviewing the ACT NoWaste by 2010 case, one comes across a significant amount of achievement in addressing waste at the end-of-pipe, particularly with regards to expanded

kerbside recycling pickup and expanded materials sorting infrastructure. However, there is very little in the way of tangible results in addressing waste at the top of the pipe – where behaviour change would have the greatest impact.

ACT NoWaste by 2010 did include some top-of-pipe elements in its overall strategy, as highlighted previously in this chapter. This included public awareness and education, waste pricing policies targeting problem wastes, and work on joint efforts with the federal and other state governments. However, as Environment Commissioners in both 2000 and 2008 warned, more effort in these areas was going to be critical to success – and the ACT was ultimately unable to effect significant action in response.

A lack of sufficient funding support for the NoWaste by 2010 initiative from the ACT government was cited by several stakeholders, including Mannall (pers. comm., May 24, 2011), Gillespie (pers. comm., January 18, 2012), and Tennant-Wood (pers. comm., May 26, 2011), and also by the ACT's consultant in their 2008 report (Wright Corporate Strategy, 2008). However, there is a lack of compelling evidence to suggest that increased funding for ACT NoWaste by 2010 could have led to achieving the ultimate goal of zero waste to landfill. As Zero Waste South Australia's Levitzke suggests (pers. comm., January 19, 2012), getting to around 70% diversion from landfill is relatively easy, and from this point onwards it becomes increasingly difficult to increase diversion towards 100%. This appears to be the critical range at which ACT NoWaste by 2010 has been halted in its progress.

What appears to have been left out of the planning for the NoWaste by 2010 initiative, is any clear strategy for dealing with the myriad disposable and non-divertible consumer products which originate from points elsewhere and end up in ACT landfills: plastic packaging, synthetic fabrics, plastic tools and building materials, computer parts, cell phones, used syringes and dressings and other medical wastes, and non-recyclable components from defunct automobiles – to name but a few from a long list. Items such as these continually escape the ACT's diversion capabilities, after the 75% or so of diverted material is removed. These are the products of industrial and commercial systems over which the ACT government has essentially no control. As Mannall (pers. comm., May 24, 2011) describes it, the main problem is that the ACT's job is still waste management, and they are stuck dealing with downstream issues while key solutions lie at addressing what is happening upstream. In other words, the ACT is unable to assert any meaningful influence over what goes into the top of the waste pipe, and for this reason achieving zero waste to

landfill is simply an impossible goal, in the absence of fundamental and massive economic transformation.

Such a transformation might take the form of a local paradigm shift in consumption, whereby the residents of the ACT limited their use of products to only those which were aligned with zero waste principles. Or, an even more radical shift to localisation of consumption could take place, where consumers in the ACT bypassed external industries entirely, and replaced externally-sourced products with appropriate locally-sourced ones. Such drastic measures, set against the contemporary global-market realities in which the ACT currently functions, seem hopelessly unrealistic. However, they may provide necessary food for thought, as the ACT presently searches for new landfill capacity beyond 2015 to at least 2035. Tennant-Wood (pers. comm., May 26, 2011) suggests that the ACT should be showing people what is wrong with landfilling in the first place. She asserts that people need to see the consequences of their waste, and to this end she argues that it would be good to get people out to the existing landfill and, standing there, ask them what they want to do when it is all filled up. In her opinion, a return to the days of localised waste management where residents all lived near smaller rubbish tips and were confronted with the sight of their own waste on a daily basis, might force people into consuming in a more sustainable way.

One thing that is clear is that the ACT, without a coherent plan in its NoWaste by 2010 initiative for addressing the contemporary realities of waste it faced, was never in a realistic position to achieve its zero waste to landfill goal.

The next chapter examines the zero waste to landfill initiative undertaken in Christchurch, New Zealand.

Chapter 4: Christchurch

4.0 Introduction

In 1998, Christchurch City Council (CCC) became the second local government and first major urban one in New Zealand to declare a zero waste to landfill goal, with a deadline for achieving this set at 2020. The launch of this initiative arose in response to growing public interest in the concept of zero waste, and followed from Canberra's pioneering launch of ACT NoWaste by 2010 just two years earlier. Christchurch's adoption of a zero waste to landfill goal also came at a time when the privately-funded Zero Waste New Zealand Trust (ZWNZT) was offering financial incentives to local councils around the country – and while the CCC campaign operated independently of this programme, it nonetheless represented an important part of the overall zero waste movement that was growing in prominence at this time.

Christchurch's zero waste to landfill by 2020 initiative, however, was remarkably short-lived, with the goal officially dropped three years later in 2001, in favour of a 65% diversion by 2020 goal. In 2006, the CCC revised the waste reduction goal again, to a target of 320 kg/person/year to landfill by 2020, which would represent a 60% reduction from the 1994 baseline rate.

The failure of the initiative – a case of abandonment, mainly – appears to be traceable to two principal findings: (1) that there simply did not exist any tangible plan for addressing the waste stream with a view to achieving zero residuals or even close to it; and (2) that CCC's coincidental, concerted efforts to develop a new regional landfill site, as part of a public-private joint venture, placed them in a conflicted situation whereby the profit motives to landfill inherent in the joint venture business model ultimately and irreconcilably compromised the zero waste to landfill campaign.

Also notable in this case is the pivotal role that a single City Councillor managed to assume, by taking on a virtual monopoly of waste-related committee Chairmanship roles, and subsequently championing both the adoption and soon-after abandonment of the zero waste to landfill initiative.

This case study also examines Christchurch's waste reduction policy beyond the 2001 abandonment of zero waste to landfill by 2020, following it to the present day, and covering developments that brought CCC's overall policy closer or further from zero waste.

One external series of developments which has had some impact on CCC's own waste strategy is the evolution of the central New Zealand government's national Waste Strategy. Beginning in 2002 with an aspirational goal of zero waste for the country, this policy swung away from and then back towards identifying with 'zero waste', and was ultimately dropped completely in 2010 by the National Party government which replaced the Labour Party government in 2008. Overall, the influence from central government has been insufficient to encourage CCC to return to a zero waste to landfill goal, as change in government has only meant a shift from ineffectiveness to indifference in terms of zero waste thinking.

The destructive earthquakes of 2010-2011 have only pushed waste reduction further back on the list of CCC's priorities, as the rebuilding process is set to last and dominate the City's overall agenda for several years to come – with zero waste not a particularly evident part of the renewal plan.

The sections of this chapter which follow give a detailed account and analysis of the events surrounding the Christchurch zero waste to landfill by 2020 initiative.

4.1 Christchurch: Rebuilding Hub of New Zealand's South Island

The City of Christchurch, with approximately 370,000 residents, is New Zealand's second most populous city. It is also the most populous city and the economic and cultural centre of the country's South Island (Christchurch City Council, 2010).

Christchurch is presently in the midst of an extensive process of rebuilding, after a series of significant earthquakes and aftershocks which have shaken the region since a first large tremor struck in September 2010, followed in February 2011 by a single catastrophic quake which caused widespread destruction of property and loss of life. The rebuilding of the city is expected to take at least a decade and cost billions of dollars, and exert a far-reaching impact that will continue to be felt not just locally, but throughout New Zealand as well (Stevenson et al., 2011).

The events surrounding the Christchurch zero waste to landfill initiative, which are discussed in detail in this chapter, are summarised in chronological order in the next section.

4.2 Timeline: Christchurch Zero Waste to Landfill by 2020 Initiative

- 1992: CCC applies for consent to extend closure of Burwood landfill beyond 1998.
- 1994: CCC granted consent to operate the Burwood landfill until 2004.
- 1996: Canterbury Waste Joint Standing Committee (CWJSC) is formed, comprising the CCC and neighbouring local councils, and charged with the task of establishing a new regional landfill.
- December 1997: CWJSC makes recommendation to councils to offer a joint venture partnership to Waste Management NZ and Envirowaste Services at 25% each – for 50% total private partner ownership. Recommendation is approved and negotiations begin with these companies.
- May 1998: Formation of Canterbury Waste Services (CWS), a partnership of Waste Management NZ and Envirowaste Services.
- August 1998: CCC passes its 1998 Waste Management Plan, which includes adoption of a goal of zero waste to landfill 'by the year 2020 or by time the new regional landfill is filled'.
- November 1998: Completion of joint venture approval process, and agreement between six local councils including CCC to form the public half of the joint venture.
- March 1999: Inaugural meeting of Transwaste Canterbury – the public-private joint venture formed to develop a new regional landfill for the Canterbury region.
- February 2000: Malvern Hills site in Selwyn District ruled out as a possible landfill site when an earthquake fault is discovered to run directly underneath it.
- June 2001: CCC votes to replace the zero waste to landfill 'by the year 2020 or by time the new regional landfill is filled' goal from the 1998 Waste Plan, with a revised goal of diversion of '65% minimum, 100% maximum, of the waste stream overall, by 2020'.
- March 2002: Release by the Ministry for the Environment and Local Government New Zealand, of *The New Zealand Waste Strategy: Towards zero waste and a sustainable New Zealand*, featuring an aspirational-only zero waste goal.

- April 2003: Transwaste receives approval for resource consent for the Kate Valley landfill site.
- February 2004: Release by the Ministry for the Environment of *Review of Targets in the New Zealand Waste Strategy* – a revision Waste Strategy document which – unlike the original 2002 version – includes no reference to 'zero waste'.
- June 2005: CCC closes the Burwood landfill, and Transwaste's Kate Valley regional landfill site opens.
- 2006: CCC releases its 2006 Waste Management Plan, titled *Toward Zero Waste*. The revised principal waste reduction goal is 320 kg/person/year to landfill by 2020, which would represent a 60% reduction from the 1994 baseline rate.
- April 2007: Ministry for the Environment releases *Targets in the New Zealand Waste Strategy – 2006 Review of Progress*. Reference to 'zero waste' – which had disappeared in the 2004 Waste Strategy document – returns, with a similar zero waste aspirational goal as in the original 2002 Strategy.
- September 2007: A series of corporate acquisitions beginning in 2006 ends with Transpacific Industries (TPI) as the sole owner of Canterbury Waste Services. This leaves TPI, as the sole private stakeholder with 50% ownership of Transwaste, the largest single stakeholder in the public-private company – compared with CCC and the other participating councils which share the other 50% of the joint venture's ownership.
- September 2008: Parliament passes the *Waste Minimisation Act 2008*, which contains no explicit reference to 'zero waste', but which includes a nationwide mandatory waste levy, and a *Priority Products* clause which gives the central government unprecedented powers to impose regulations ranging from mandatory product stewardship schemes to outright bans.
- November 2008: National Party government is elected, replacing the Labour Party government which had governed New Zealand since 1999.
- 10 September 2010: Christchurch is struck by the first of a series of large earthquakes. This first quake results in no loss of life and few serious injuries, but a large amount of building destruction/demolition and soil liquefaction material is

generated, and the old Burwood landfill is immediately brought back into use under emergency response measures.

- October 2010: Ministry for the Environment releases *The New Zealand Waste Strategy: Reducing harm, improving efficiency*, the latest update to the national Waste Strategy series, in which the original 2002 Strategy aspirational goal of zero waste is replaced with the dual goals of 'reducing the harmful effects of waste', and 'improving the efficiency of resource use'.
- 11 February 2011: Another major earthquake strikes Christchurch, this time resulting in widespread loss of life and injury, and further large-scale damage to buildings, infrastructure, and land. An unprecedented amount of waste is generated in the process of recovery and rebuilding, which will take many years to complete.
- April 2012: Transwaste private partner TPI successfully lobbies to have the Burwood landfill reinstated as a permanent dump for earthquake-related debris.
- Expected in 2012: CCC due to release its 2012 Waste Management Plan – the first revision since the 2006 Plan.

The next section discusses the events surrounding the launch of Christchurch's zero waste to landfill by 2020 initiative.

4.3 Zero Waste to Landfill Initiatives in Christchurch and Across New Zealand

"In 1994 Christchurch was one of the first councils to develop a formal waste plan, reviewed in 1998. I proposed and the Council accepted, the goal of 'Zero waste to landfill', and a target – the year 2020." – Denis O'Rourke, Christchurch City Councillor, 2001. (Christchurch City Council, 2001b, p. 1).

Concerted efforts on waste reduction in New Zealand grew around the time that the first zero waste to landfill initiative was launched in Canberra, Australia, in 1996. Canberra's Mannall (pers. comm., May 24, 2011) notes that several of the key players at the start of the ACT NoWaste by 2010 initiative were New Zealanders, and these same people were meanwhile working to advance the movement back at home.

An early breakthrough for zero waste in New Zealand came in 1997, when private funding from the Tindall Foundation was secured to help create the Zero Waste New Zealand Trust (ZWNZT) (J. Knight, pers. comm., February 28, 2011). Grassroots groups were already active on the zero waste front by then, but they had very limited funds until the Tindall Foundation support materialised, later followed by funding support from the New Zealand Ministry for the Environment (MfE) (J. Dickinson, pers. comm., March 08, 2011).

ZWNZT in turn launched a programme that offered a $25,000 funding incentive to councils that adopted a formal zero waste to landfill policy with a specific deadline. Beginning in 1998, 10 councils quickly signed up (J. Dickinson, pers. comm., March 08, 2011). By 2000 there were 25 councils receiving funding from ZWNZT, and although no further funding was available afterwards, the total number with zero waste targets rose to 38 of 74 councils, or just over half (Snow and Dickinson, 2003) (see Figure 4.1). Connett and Sheehan (2001) cited this development among New Zealand local councils as one of the key developments around the world that had contributed to the growth of the global zero waste movement at that time.

Figure 4.1: New Zealand Zero Waste Councils – May 2003
(Snow and Dickinson, 2003, p. 9).

Christchurch's own zero waste initiative emerged at a time when the city's future landfill capacity was becoming an issue of increasing urgency. In 1992, CCC had applied to the Canterbury Regional Council for an extension of the consent for use of the existing Burwood landfill, which was located within the city limits. This extension, granted in 1994, postponed the closure of the landfill from 1998 to 2004 (C. Whatman, pers. comm., April 24, 2012).

In 1996, the Canterbury Waste Joint Standing Committee (CWJSC) was formed, comprising the CCC and neighbouring local councils. The Committee was charged with the task of developing a regional approach to waste disposal, with the development of a single regional landfill as the principal goal (Perriam, 2002).

The extension of the Burwood landfill's consents was vigorously opposed by some private waste companies who were looking to develop their own landfills in the region, according to then-CCC Councillor and later Mayor, Garry Moore (pers. comm., April 17, 2012). Moore

and then-Community Board Member Chrissie Williams (pers. comm., April 16, 2012) both note that the CCC was concerned that the private operators effectively controlled the bulk of the waste stream, mainly through commercial disposal contracts, and that any Council-owned landfill would be in a difficult position of having to compete with privately-owned landfills. In response to these threats, the CCC pledged in its 1997 Annual Plan to work with the CWJSC to find a suitable private joint venture partner, for a new regional landfill to replace Burwood and other landfills in the Canterbury region (Christchurch City Council, 1997b).

The search for a new landfill for Christchurch's waste coincided with the spread of the zero waste movement across New Zealand and overseas. Canberra, Australia had already become the first city to declare a zero waste to landfill goal, in 1996, with its ACT NoWaste by 2010 initiative. And, the Zero Waste New Zealand Trust had mobilised with its own programme for getting local councils in the country to adopt similar initiatives. The stage was thus set for Christchurch to officially join the movement.

The seeds for joining the movement were sown in large part during the 1995 municipal elections, when a group of candidates under the 'Christchurch 2021' coalition banner – many of whom were elected that year – had included in their campaign vision statement a promise to adopt a zero waste to landfill goal (The People's Choice, 2012). The zero waste to landfill initiative which eventually came to pass was a fulfilment of that promise, according to then-Christchurch 2021 City Councillor and later Mayor of Christchurch Garry Moore (pers. comm., April 17, 2012).

A 1996 amendment to New Zealand's Local Government Act more clearly defined the responsibilities of local councils to manage their waste, and provided councils with expanded powers to fulfil these responsibilities. One specific new requirement for councils was that they were required to prepare formal waste management plans (Ministry for the Environment, 2005). Christchurch City Council, which had previously released Solid and Hazardous Waste Management Strategy documents in 1994 and 1996, commenced a process to deliver a formal waste management plan to meet the new requirement. In 1998, a draft Waste Management Plan was produced by City staff, and the public was invited to submit feedback. Later that year, the Plan was formally approved by Council (Christchurch City Council, 2001d).

The resulting *Waste Management Plan for Solid and Hazardous Waste 1998* (Christchurch City Council, 1998c) contained the following waste reduction goals (p. 2):

- by 14% by the year 2000
- by 30% by the year 2005, and
- by 100% by the year 2020 or by time the new regional landfill is filled.

The latter goal represented Christchurch's official adoption of a zero waste to landfill goal. CCC was the second local council in New Zealand to adopt such a goal, after Opotiki District Council just several months earlier (J. Dickinson, pers. comm., March 08, 2011). However, unlike Opotiki and other local councils which followed, the Christchurch initiative was launched outside of the ZWNZT's funded programme (G. Moore, pers. comm., April 17, 2012).

Notably, the term 'zero waste' does not appear anywhere in the 1998 Plan – the CCC opting instead for the inverse description of '100%' reduction of waste to landfill. However, it appears to have been the CCC's practice to use the terms interchangeably – a notable example being a reference to the Council's "objective of zero waste to landfill by the year 2020", in the following year's Annual Report (Christchurch City Council, 1999b, p. 6).

Figure 4.2 shows a graph included in the 1998 Plan (Christchurch City Council, 1998c, p.2) that illustrated how the goal of zero waste to landfill by 2020 would compare with waste reduction trends as of 1998, the latter requiring 30 more years – until 2050 – to reach the same zero waste goal.

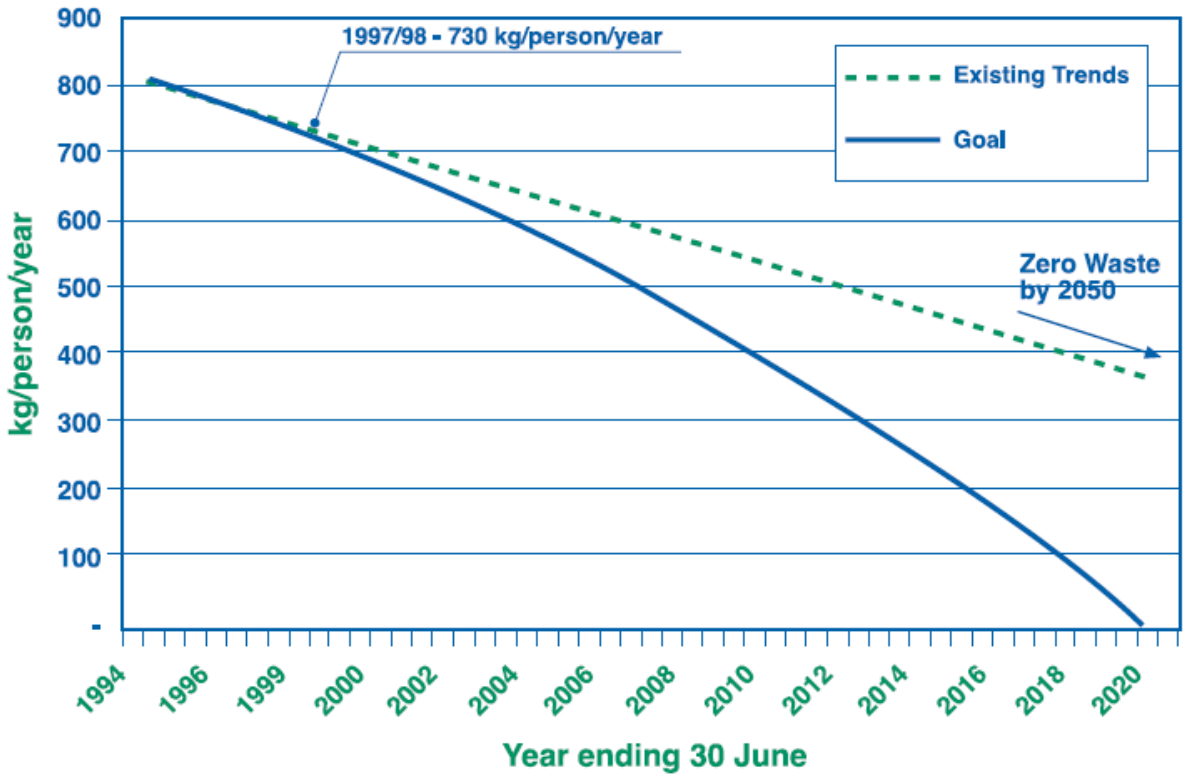

Figure 4.2: Christchurch's 1998 Zero Waste to Landfill Goal, vs. Existing Trend (Christchurch City Council, 1998c, p. 2).

Also notable in the above wording of the zero waste to landfill goal is that the deadline was not simply the year 2020, as was typical of other local councils' goals such as Canberra's 2010, or many New Zealand councils' 2015 target dates. Rather, the qualifier *'or by the time the new regional landfill is filled'* was added on – and as a new landfill had not been found at this time, this effectively gave CCC an as-yet unknown deadline extension beyond 2020, to achieve its zero waste to landfill goal.

The direct reference within the zero waste to landfill goal statement, to a new regional landfill, is important in the overall context of events which were transpiring concurrently, and which unfolded in the years which immediately followed – as the next section discusses in further detail.

4.4 1998-2001: The 'Zero Waste to Landfill' Years

As Christchurch embarked upon its zero waste to landfill campaign, significant steps towards waste reduction had already been taken. In 1998, kerbside pickup of recycling was introduced (Christchurch City Council, 2009). The business sector, meanwhile, had already seen the launch in 1997 of *Target Zero*, a project funded through the MfE's Sustainable

Management Fund, and geared towards encouraging local businesses to increase environmental awareness and performance through waste reduction (C. Byrch, pers. comm., March 19, 2012).

The ZWNZT offered funding support to the Target Zero project (Christchurch City Council, 1998b); however, the Council's overall zero waste to landfill initiative remained outside of the Trust's programme of funding for local councils (D. O'Rourke, pers. comm., April 18, 2012). 1997 also saw the formation by the City and various business partners of a charitable trust called the Recovered Materials Foundation, whose purpose was to collect, process, and develop markets for recovered materials, as well as provide education and information services to the public (Cavanagh, 2002).

In 1998, CCC became the first local council in New Zealand to introduce a waste levy, charging $4 per tonne for waste to landfill (Z. Potgieter, pers. comm., April 18, 2012). This preceded by 10 years the central government's introduction of a mandatory waste to landfill levy for all local councils (Ministry for the Environment, 2008).

The Council's 1998 Annual Report notably made no mention of the zero waste to landfill goal, whereas there was repeated reference in the document to the search for a new regional landfill to replace the Burwood site (Christchurch City Council, 1998a). This reflected the fact that CCC had already been working in conjunction with other councils in the region, and progressing along a planned series of steps towards securing an arrangement and site for this new landfill (see Perriam, 2002, pp. 16-20).

In early 1995, the City's Solid Waste Manager proposed to Council a joint venture with a private waste operator, to address future landfilling needs for the region. The company in question, Waste Management NZ, had previously launched an appeal against the granting to CCC of a consent extension for landfilling at the Burwood site, and they had indicated to the Council that they might be prepared to withdraw their appeal in return for securing a joint venture landfill deal. While several Councillors publicly criticised the proposal as an inappropriate threat, and noted that the needs of the Council were different from those of the company, the Solid Waste Manager stressed that such a joint venture would eliminate competition from other private waste operators, provide a partner that could share in development and operations costs, and allow for co-operation on waste minimisation initiatives (Mathias, 1995).

1996 saw the formation of the Canterbury Waste Joint Standing Committee (CWJSC), made up of the 10 Canterbury region councils, and by the end of that year private waste companies were invited through national advertisements to register their interest in providing services as part of a regional waste disposal joint venture (O'Rourke, 2007). In 1997, the CWJSC made a recommendation to the councils to offer a joint venture partnership to two of the bidders: Waste Management NZ and Envirowaste Services, with the councils owning 50% of the joint venture, and the companies sharing the other half with 25% each. The two private companies proceeded to form the joint venture company Canterbury Waste Services (CWS), and the CWJSC entered into a process of negotiations with CWS. This led to the drafting of a Memorandum of Understanding (MOU) between the public and private partners, which was approved by the participating councils in August 1998 – notably the same month that CCC's zero waste to landfill initiative was approved as part of the 1998 Waste Management Plan.

The negotiating process culminated on 31 March 1999, with the creation of the joint venture company Transwaste Canterbury, with six councils including CCC forming the public half, and CWS with its two companies making up the private half (Perriam, 2002). On this day, the MOU – which served as Transwaste's legal agreement – was signed (Transwaste, 1999); however, the contents of this document were not made publicly available until the following year. Key aspects of the agreement included the following (Perriam, 2002, pp. 7-8):

1. The landfill will operate as a commercial business with a fair rate of return.
2. The host Council, i.e. the area where the landfill was to be sited, cannot object to the landfill.
3. Each council is committed to paying for disposal of a certain tonnage of waste whether it was placed in the landfill or not.
4. The M.O.U. binds all partnership councils for a significant period of time. This binds councils and their elected representatives whether or not individuals oppose the landfill.

Perriam notes that the reason offered by Transwaste for these provisions in the MOU, was that the councils had made the decision to set up the joint venture as a commercial entity, and so a commercial model was the best way to ensure operating efficiency (Perriam, 2002).

The third item in the list above refers to each participating Council's commitment to paying for disposal of "Controlled Volumes to the Landfill for a fixed period (at least 20 years from the date upon which the Landfill becomes operational)" (Transwaste, 1999, Sec. 5.7). This

type of contractual arrangement between a local council and private waste operator is similar to what is commonly known as a 'put-or-pay' deal (Press Democrat, 2009). Considering that the commitment was for a minimum of 20 years, and that the MOU included a target date of 2002 for the start of the new regional landfill, this meant that councils were committed to pay for landfilling of controlled volumes until at least 2022. By comparison, the CCC's zero waste to landfill deadline was "by the year 2020 or by time the new regional landfill is filled" (Christchurch City Council, 1998c).

In July of 1999, CCC released its Annual Plan (Christchurch City Council, 1999a), which included stated objectives of planning and development of a regional landfill to replace the Burwood site. While there was also mention in the Plan of ongoing development and funding for the commercial Target Zero programme, there was no direct reference to the zero waste to landfill initiative. Rather, there was the following stated objective for the coming year: "Commence implementation of strategies identified in the new Solid and Hazardous Waste Management Plan" (p. 59). This is of particular note because the 1998 Waste Management Plan (Christchurch City Council, 1998c, p. 15) stated this: "The Plan is not a detailed action plan. The Annual Plan process of the Christchurch City Council provides for that, and users of this Plan are advised to consult the Annual Plan in addition to this document where required." In other words, the 1998 Waste Management Plan directed the reader to the subsequent 1999 Annual Plan for details of how it was to be implemented – while the 1999 Annual Plan directed the reader in the reverse direction back to the 1998 Waste Management Plan, for this same information. This circular referencing to nothing is indicative of a general absence of planning for the zero waste to landfill initiative – as is confirmed by the absence of any such planning materials in any of CCC's archived documents from before or after the release of the 1998 Waste Management Plan.

Nonetheless, the CCC Annual Report which followed in December 1999 (Christchurch City Council, 1999b, p. 6) included the following unambiguous declaration:

> "Following a public consultation process carried out in the 1997/98 year, Council adopted a Solid and Hazardous Waste Management Plan on 31 August 1998. The document contains a target – a 30% reduction in waste volumes by 2005 within the context of a strategic objective of zero waste to landfill by the year 2020. Strategies to achieve this goal are now being implemented."

The City's zero waste to landfill goal thus remained officially ongoing, as Transwaste meanwhile proceeded with its own goal of securing a new long-term regional landfill. The parallel existence of these overtly cross-purposed projects did not prevent the Zero Waste New Zealand Trust from providing support at this time for a media/education campaign in the Canterbury region; however, their concern in this regard was implicit in the fact that they provided this funding "on the condition that it is used to promote recycling or waste reduction and is kept completely separate from any involvement in the landfill issue" (Christchurch City Council, 2000).

The risk of impending abandonment of CCC's zero waste to landfill initiative was signalled in March of 2001, when the following recommendation was made to the Canterbury Waste Subcommittee (CWS), calling for the following common goals to be adopted across the region (Christchurch City Council, 2001e):

- An overall goal of "zero waste to landfill as soon as possible, taking into account social, legal and economic constraints" (par. 8).
- A minimum 50% reduction of waste to landfill from 2000 to 2020.

The authors of the recommendation were the CCC's Waste Manager, and Councillor O'Rourke – who was also Chairman of the CWS, CWJSC, and Transwaste at the time.

The notable difference between this proposal and CCC's own existing zero waste to landfill goal was that the deadline of 'by the year 2020 or by time the new regional landfill is filled' was to be replaced by the indefinite target of 'as soon as possible'.

At CCC's subsequent March 2001 meeting, the Council voted to notify Christchurch residents of its intention to make the above revisions to the zero waste to landfill goal, with the additional goal of zero organics to landfill by 2010. A subcommittee of three Councillors, including Councillor O'Rourke, was appointed to consider public submissions on the proposed revisions and then report back to the Council with its findings (Christchurch City Council, 2001a).

Two months later, in May 2001, the City Waste Manager issued a report (Christchurch City Council, 2001b) on the progress of the subcommittee, most of which consisted of comments from the Chairman of the City Services Committee, Councillor O'Rourke. In his commentary, O'Rourke presented a detailed argument in support of Council passing the suggested revisions to the zero waste to landfill goal. He noted that back in 1998 he had "proposed

and the Council accepted, the goal of 'Zero waste to landfill', and a target – the year 2020", but added that "we had little idea whether this rather idealistic target was feasible, or how it would be achieved in practice" (p. 1).

O'Rourke also noted that against the baseline year of 1994, CCC had already achieved a reduction in waste to landfill of about 13%, but based on current trends the furthest additional reduction by 2020 would be about 50%, for a total reduction of around 63%, or roughly two-thirds – compared to the 100% reduction goal. He suggested that even this reduction level would require additional commitment from both the public and business sectors to embrace very stringent waste avoidance measures. Going beyond this to zero waste to landfill, O'Rourke added, would require economic incentives and disincentives, and other tough measures such as bans on certain materials, and that the social and economic constraints involved "must not be underestimated" (p. 2). He summed up the need for revising the goal in this way (p. 3):

> "the target date of 2020 for zero waste to landfill was optimistic in the extreme. Idealism was fine in the context of our knowledge in 1994, but in the context of experience gained since then, persistence with a zero waste target by 2020 would now simply be dishonest. This does not mean, however, that I or the Council are resiling in any way from the zero waste goal. Indeed, we have determined to increase our efforts, as proposals published in the council's draft annual plan for increased expenditure on composting and recycling clearly show. But the zero waste goal must be pursued in the context of a waste plan which has credibility. This requires realistic targets rather than pie-in-the-sky idealism….
>
> The zero waste goal therefore remains intact, while the constraints in achieving zero waste are openly and honestly acknowledged."

O'Rourke pointed to information from international sources which suggested that a diversion rate in the 30% to 35% range was towards the very top of current international best practice. He notably, however, did not cite the example of Canberra, which at this time was reporting a 61% rate of diversion from landfill (Australian Capital Territory, 2001). He did, however, note that Copenhagen had achieved a 66% diversion rate, but pointed out that the principal drivers of diversion in countries such as Denmark were a lack of landfill space and groundwater pollution – and he commented that "None of this applies in New Zealand,

and this is unlikely to change in the foreseeable future" (Christchurch City Council, 2001b, p. 3).

O'Rourke also made reference to accusations of a "farfetched conspiracy between the participating Canterbury councils and their commercial joint venture partners in Transwaste Canterbury Ltd to make as much money as possible out of the project by maximising the volume of waste going to the landfill" (p. 4), and he refuted this allegation, arguing that (p. 4):

> "if the objective was to mislead the public, we would not have suggested any change to the waste minimisation targets at all, and would have instead quietly left them as they are, rather than to openly and honestly propose a 50% additional reduction in waste to landfill over the next 20 years."

He also defended the commitment of the private joint venture partners towards waste minimisation, by saying, with regards to the 50% reduction goal, that the fact they (p. 4):

> "have openly committed themselves to such a demanding target (as a minimum) is actually a quantum leap forward for waste minimisation unparalleled anywhere else in New Zealand. But this is no magnanimous gesture on the part of our joint venture partners. It is a binding contractual obligation written into the memorandum of understanding (MOU) between them and the councils that they will fully co-operate with the waste minimisation goals being pursued."

As for the ultimate goal of zero waste to landfill, O'Rourke added (p. 4):

> "They also recognise that as landfilling is managed towards zero, more of their business will have to be conducted in recycling activities. In addition, the MOU only lasts for 20 years, after which there is no agreement to continue landfilling at all – therefore there can be no secret agenda to perpetuate this."

O'Rourke reiterated that the proposed revision was not about the overall goal, but rather the timeline, and he acknowledged that the initiative in its current form had not been adequately planned and budgeted (p. 4):

> "In the end, the current issue comes down not to whether there is still a zero waste goal (that has never been in question) but only what the appropriate targets are. There is no problem arising from retaining a zero waste goal, but a zero waste target

> within 20 years means we must plan and budget for it (otherwise the plan is dishonest and would become irrelevant for all practical purposes)."

The proposed revision was framed as one that would not preclude attainment of the original goal (p. 4):

> "despite the proposed target change, we would still have a zero waste goal to be implemented as soon as possible; and if the constraints are somehow removed fast enough, this goal could still be achieved within the 'desireline' of zero by 2020."

O'Rourke acknowledged that the public submissions to the proposed revision included considerable opposition, but he pointed to the various factors that he had outlined in his previous comments, and commented that "some members of the public will not understand these factors, but we must take account of them in making our decision" (p. 4).

At the May 2001 Council meeting, a Notice of Motion for the following June 2001 meeting was submitted by a group of 9 (out of 24) Councillors who were opposed to the proposed changes (Christchurch City Council, 2001f). This countermotion to the zero waste goal revision motion called for the CCC to reaffirm its original zero waste to landfill goal from the 1998 Waste Management Plan, and asked that the Waste Reduction Goal Subcommittee appointed at the March Council meeting be discharged.

At the June 2001 Council meeting which followed (Christchurch City Council, 2001c), the Waste Reduction Goal Subcommittee presented its written report, which recommended a modified revision to the zero waste to landfill goal, compared to its recommendation a month earlier. The new recommended waste reduction goals were as follows (p. 10):

- ✓ 90% of green waste and kitchen putrescibles received by the Council, by 2010
- ✓ 80% of kerbside waste collected by the Council, by 2010
- ✓ 65% minimum, 100% maximum, of the waste stream overall, by 2020.

The report's arguments in favour of the above revision included the following remarkable assertion that CCC had never actually declared a zero waste to landfill goal (p. 2):

> "Contrary to common perception, there is currently no "zero waste" goal in the plan, although one of the targets is to promote reduction "by 100% by the year 2020 or by the time the new landfill is filled". Therefore if the new landfill is not filled by the

> year 2020 then the target is extended indefinitely until landfill space is exhausted. The belief by virtually all of the submitters that Christchurch has had a 'Zero Waste Goal' is a misconception. Accordingly the suggestion made by several submitters that the Council is resiling from, or as some stated "reneging on the zero waste by 2020 goal", is incorrect."

The report noted the Subcommittee's agreement with several submitters "that the current goal is inadequate and that it is not appropriate for it to refer to the time the new regional landfill is filled, nor indeed for it to refer to any landfill at all" (p. 2), and went on, remarkably, to assert the Subcommittee's view that "The current waste management plan does not contain" a zero waste goal, and based on "strong support from some sectors of the community for a zero waste goal", "we now recommend its insertion" (p. 9). In other words, the Subcommittee was claiming to be *introducing* a zero waste to landfill goal, with the very same motion that they were putting forward to effectively *remove* it.

The Subcommittee offered no explanation about how their assertion of a lack of a zero waste goal was consistent with references to such an initiative in various previous CCC documents, including the 1999 Annual Report (Christchurch City Council, 1999b, p. 6), and the previous month's written comments from the City Services Committee Chairman, Councillor O'Rourke, which included numerous references to the history and details of the CCC's zero waste initiative, from his own perspective (Christchurch City Council, 2001b).

The report noted that only 16% of the waste stream was currently controlled by the CCC, with the remaining 84% collected under direct arrangements with private operators. The Subcommittee argued that the legislative change necessary to increase Council control of the waste stream fell outside of the scope of the Waste Management Plan – and it was pointed out that CCC's participation in Transwaste, on the other hand, allowed it to have greater influence over the commercial waste stream (Christchurch City Council, 2001c).

The report acknowledged that a local grassroots group had conducted a poll in which 57% of respondents indicated that zero waste by 2020 was achievable. The Subcommittee's response to this, remarkably, was: **"**Without a proper understanding of the constraints set out in this report such opinions are of little value. Furthermore 57% is hardly a large majority in support" (p. 7).

It was also acknowledged that a number of submitters had expressed concern about a perceived conflict of interest, based on Councillor O'Rourke's concurrent chairing of CCC waste-related committees as well as the 50% privately-owned Transwaste venture. In particular, submitters questioned why CCC was on the one hand encouraging waste minimisation, while also running Transwaste as a profit-motivated business that benefited from maximizing the amount of waste sent to landfill. The Subcommittee – with Councillor O'Rourke notably the lead author – responded by pointing out that Council Directors on the Transwaste Board are nominees who must vote in accordance with instructions issued through the Canterbury Waste Subcommittee, and as such control always resides with the participant councils, and not with any individual. The question around Councillor O'Rourke's concurrent holding of various key Chairmanships was addressed with this response (p. 8):

> "It is common for Councillors to develop areas of expertise around various Council matters. An overall understanding of the issues assists in the integration of knowledge which a number of submitters have suggested as being desirable. The Subcommittee sees no conflict of interest as was suggested but does see considerable benefit in the Chair of City Services having direct involvement in the Council's recycling and waste disposal initiatives."

In the end, the Council voted 21 to 1, with 1 abstention, in support of the Subcommittee's recommendation, and this effectively replaced the zero waste to landfill by 2020 target with a new target of 65% diversion of waste to landfill by 2020 (Brooker and Espiner, 2001). Meanwhile, the countermotion filed the previous month which would have ensured continuation of the original zero waste to landfill goal (Christchurch City Council, 2001f) did not succeed, with eight of the countermotion's nine signees opting to support the Subcommittee's recommended motion in the final vote.

The decision to pull back from the original zero waste to landfill goal attracted criticism from various sectors of the community (Brooker and Espiner, 2001). Canterbury Regional Councillor Kerry Burke described it as "a weak retreat from a noble vision" (p. 6), while Christchurch-area Lincoln University professor and nature conservation expert Ian Spellerberg described the decision as "weak-kneed" (p. 7), and accused the council of resiling from its previous good work on the waste issue. Local Green Party activist Rex Verity noted that the revised waste reduction goal was not just an abandonment of a zero waste goal, but also meant that Christchurch had moved from being a leader among New Zealand

cities, to now being a follower of other cities such as Auckland. Another grassroots representative, Sustainable Cities Trust spokesman Paul Honeybone, suggested that Christchurch voters needed to consider the question of whether or not the Council was constructing a business – in Transwaste – that ran counter to the city's waste minimisation objectives.

(Note: A present-day visitor to the CCC website who searches for the 1998 Waste Management Plan will instead find a link to a revised version titled "*Waste Management Plan for Solid and Hazardous Waste 1998"*, with a note below that says "*Partially revised: June 2001*" (Christchurch City Council, 2001d). The actual 1998 document (Christchurch City Council, 1998), which preserves the record of Christchurch's original zero waste to landfill goal for posterity, can be accessed by those who manage to click on the 'Background' tab in the 'Contents' list, on the left-hand side of the screen (as per search conducted on 15 September 2012).)

With the passing of the Waste Reduction Goal Subcommittee's recommendations by CCC in June 2001, Christchurch's zero waste to landfill initiative effectively came to an end. Nevertheless, the Council pressed on with its waste management programme, which included all of the revised commitments to waste reduction, as well as the parallel Transwaste public-private venture, with its focus on securing a new and long-term regional landfill site. In the meantime, while Christchurch City Council had just taken its step back from zero waste, the central New Zealand government was getting ready to take its own step forward. The next section examines the events which transpired over the next five years, and how they affected the waste situation in Christchurch.

4.5 2001-2005: On the Road Towards a Vision of Zero Waste

With its zero waste to landfill goal abandoned, CCC continued to landfill its waste at the Burwood site, and was meanwhile working through Transwaste to secure a new regional landfill – with a number of potential sites under consideration during the search process (C. Williams, pers. comm., April 16, 2012).

The first proposed site, at Malvern Hills in the Selwyn District which neighboured Christchurch, met with vocal local opposition from a local residents' group (Bruce, 1999), as well as the country's National Party Prime Minister of the day, Jenny Shipley, in whose own electoral district the site was located (Crean, 1999). Malvern Hills was ultimately ruled out

as a possible landfill site in February 2000, when an earthquake fault was discovered to run directly underneath it (Crean, 2000).

After the Malvern Hills site proposal was rejected, attention shifted north to the Hurunui District, where Kate Valley emerged as the next site proposed by Transwaste. The Kate Valley site eventually did become the new regional landfill for the Canterbury region, but not without significant public opposition, which included the raising of numerous concerns and questions about the overall joint venture process which had brought the councils and private waste partners together to form Transwaste.

New Zealand's central Labour Party government, in power since 1999, was meanwhile taking its own small steps towards zero waste. In March 2002, the MfE and Local Government New Zealand jointly released *The New Zealand Waste Strategy: Towards zero waste and a sustainable New Zealand* (Ministry for the Environment, 2002). 'Zero waste' was notably included in the title, but the goal was clearly an aspirational-only one, with no specific directive towards zero waste to landfill.

The national Strategy document included an acknowledgement that guidance and support from central government to local councils on the waste issue had been lacking, and that more commitment was necessary. Also mentioned was that while voluntary agreements with industry had produced some positive outcomes, overall waste generation was still increasing.

Another admission was that more was known about waste disposal than about waste generation, and that a better understanding of production and consumption trends was necessary. It was recognised that many people were enthusiastically promoting and practicing waste minimisation in their communities, but others knew little about the problem, and this meant that there was a need for increased awareness and support on local waste issues.

Concern was also expressed that some local councils and businesses had arranged long-term contracts with private waste operators, which locked them into paying for disposal of set amounts of waste whether they generated it or not – thus providing a disincentive to address the top-of-pipe.

Also acknowledged was the fact that the waste problem in New Zealand could have widespread economic implications (p. 17):

> "Our clean green image is useful in promoting tourism and exports. Poor waste management would damage both the reality and the image. Our record on waste has important implications for trade and tourism, and the sustainability of all New Zealand businesses."

The national Strategy document committed to a multi-faceted approach to waste, which would include financial encouragement of innovation, waste levies, Extended Producer Responsibility (EPR), and continued pursuit of voluntary agreements with industry. Notably, the Strategy document did not include any specific overall diversion of waste to landfill targets with deadlines. And, as far as how this might impact zero waste in Christchurch, there was nothing specific that would have required CCC to reconsider its decision in 2001 to pull back from its original zero waste to landfill by 2020 goal.

Efforts to secure a new regional landfill site at Kate Valley, meanwhile, were encountering mounting resistance by residents who were opposed to having CCC's waste shipped from Christchurch to their rural location 70 km away. In July 2002, a full-page advertisement was placed in Christchurch's daily newspaper by the Pegasus Bay Beach Users Association (PBBUA), a local group representing residents opposed to the Kate Valley landfill proposal (Pegasus Bay Beach Users Association, 2002). The advertisement included petitions to the Regional Council and Parliament, and also included a detailed list of allegations against the Transwaste partners.

In addition to opposing the granting of consent for the Kate Valley landfill proposal, the PBBUA demanded the dissolution of Transwaste, a return to arm's length dealings with private companies by the local councils, and the development of alternatives to landfilling so that the Burwood site could be the last landfill in the region.

The group alleged that CCC originally preferred for the local Councils to develop the new regional landfill themselves, while the other Councils preferred working with a private company. Subsequently, it was alleged, Waste Management NZ applied pressure directly on CCC and other councils, in order to create a monopolistic arrangement for the new landfill. The group also alleged that a second company, Envirowaste Services, was invited into the

joint venture upon the insistence of CCC, as a means of mitigating the influence that Waste Management NZ could exert within the joint venture.

Another allegation was that the price paid for the Kate Valley site had increased in value by several millions of dollars within a period of just a few days, and while ratepayers had a right to know why they were paying a much higher price, Transwaste had vigorously resisted attempts to have the matter investigated publicly.

Concern was also raised regarding remuneration for Councillors serving as Directors on the Transwaste Board. The advertisement indicated that Councillors received payments of around $16,000 per year for attending meetings, and the PBBAU suggested that such payments could be interpreted as "double dipping...or, worse, some sort of inducement condoned by the Joint Venture"(par. 18).

Concern was also expressed over the MOU's provision for commitment of controlled waste volumes, stating that it was "difficult to imagine that any council would be willing to commit to this, assuming elected representatives were properly informed at the time of making such a momentous decision" (par. 27). The dissonance between this part of the MOU and ongoing waste reduction efforts by councils was described this way (par. 27):

> "the commitment of controlled waste volumes flies in the face of the hierarchy of waste (reduce, reuse, recycle, recover and manage the residual) enshrined in New Zealand law, and seriously conflict [sic] with grass roots community lead [sic] waste reduction and recycling schemes highly valued in our society."

The PBBUA added the assertion that "a conflict of interest exists between the private sector partners' responsibility to their shareholders and what is in the best public interest" (par. 32).

Regarding the question of who would control the flows of waste, the PBBUA cited the clause from the MOU that states that "All waste transported by JVCo to the Landfill shall become JVCo's property" (Transwaste, 1999, p. 15), and pointed out that "the private sector partners did not 'own' any rubbish prior to the MOU" (Pegasus Bay Beach Users Association, 2002, par. 29).

Allegations were also made in the advertisement about delayed and/or withheld consultation and disclosure, regarding the establishment of the joint venture. It was noted

that the initial public consultation was not announced until several months after the specifications for registering interest as a joint venture private partner were drawn up. The PBBUA also pointed out that while the Transwaste MOU was signed by all parties in September 1998, it was not released to the public until February 2000 – and what was actually released was not the full original text, but rather a heavily censored version. It was further alleged that newly-elected Councillors were kept in the dark about key aspects of the proposed landfill.

A week after the PBBUA advertisement was published, CCC released a detailed written response (Christchurch City Council, 2002a), authored by Councillor and Canterbury Waste Subcommittee Chairman O'Rourke, which asserted that the advertisement contained "a large number of conjectures, opinions and assertions" (p. 1).

Regarding alternative options to landfilling, Councillor O'Rourke stated that the CWJSC had reviewed such technologies on several occasions over recent years, and concluded that none of these were suitable for Canterbury or New Zealand at the present time.

To allegations that the CCC had entered into a binding and largely secret agreement in the Transwaste MOU, Councillor O'Rourke responded by citing that a total of 61 council-level meetings were held over a 40-month period leading up to the formation of Transwaste, and that all Councillors of all 10 Canterbury councils were involved in the decision-making process. No explanation was offered for why the MOU was not released to the public until 18 months after it was signed; rather, it was noted that the MOU was released in February 2000, "with only a few sentences kept confidential for commercial sensitivity reasons" (p. 2), and with approval from the Chief Ombudsman to withhold this part of the text.

Councillor O'Rourke defended the process followed for selecting the joint venture's private partners, citing that it included an evaluation panel made up of Mayors, senior Councillors, senior staff, and external consultants. The reason offered for not considering overseas bidders was "advice from its various consultants that sufficient expertise existed within New Zealand companies to find a suitably skilled joint venture partner" (p. 2).

In response to allegations that the Kate Valley site had been bought by a third party and then immediately resold to Transwaste at a price higher by several millions of dollars, Councillor O'Rourke confirmed that three consecutive sales of the property took place, with closing dates between 30 June and 14 July 2000. The original sale price was around $4

million, the second price $4.5 million, and the third price was $7 million, which Transwaste paid to secure the site. Councillor O'Rourke noted that the specific details of the final sale agreement were confidential, as per the requirement of the intermediate buyer-seller, who though selling the land to Transwaste retained the option to purchase back a portion of it "for an agreed price that reflects the wine-growing potential of the block, within a specific period from commencement of landfilling operations at Kate Valley" (pp. 3-4).

The remuneration of Councillors who served as Transwaste Directors was confirmed by Councillor O'Rourke, and he clarified the precise amount, noting that two of the Transwaste Directors were Councillors from the participating councils, and they received fees of $12,000 per year.

Regarding the councils' preference for creating a public-private joint venture instead of a councils-only one, Councillor O'Rourke explained that the decision to set up Transwaste as a commercial entity was based on prior experience with similar mixed-ownership of local enterprises, and he added: "It is a matter of public record that the Councils seriously considered the option of a joint regional approach without private sector partners, but rejected that option on the basis that it was less likely to achieve the overall Councils [sic] goals" (p. 7).

As for the provision in the MOU for 'controlled waste volumes' to the joint venture landfill, Councillor O'Rourke responded that the contractual obligation was for just 20 years, and that it only referred to *residual waste* which resulted after waste minimisation efforts were first applied. He also pointed out that "The MOU secures the commitment of all joint venture parties to waste minimisation policies and activities undertaken by the parties, and encourages waste minimisation initiatives by the partners" (p. 7).

Regarding the concerns raised about councils transferring control of waste to private companies via the joint venture arrangement, Councillor O'Rourke pointed out that the councils presently only controlled the residential waste picked up at the kerbside, and that this only represented around 17% of the total waste stream – with the remainder collected via direct arrangements with private contractors. He did note that at the time there were not yet any privately operated landfills in the Canterbury region, which meant that as far as waste at the landfill was concerned the councils did have 100% control – and this would reduce to 50% control under the Transwaste deal. Councillor O'Rourke added, however,

that there was nothing the councils could do legally to stop private companies from opening landfills in the region, and it was "only a matter of time" before that happened (p. 7).

In response to the assertion that a conflict existed between the private partners' interests and those of the public, Councillor O'Rourke argued that the MOU secured the commitment of all parties to supporting waste minimisation policies and activities, and this provision removed the potential for conflict of interest. He also pointed out that the private sector parties were significant players in the recycling industry in Canterbury, and noted that the private sector as a whole recycled a much larger volume of waste than did the councils. It was furthermore suggested that waste minimisation activity was increasing in New Zealand, and private waste companies viewed this as an opportunity worthy of pursuit, as the necessary know-how associated with large-scale waste reduction was something they were experienced and skilled at providing.

In April 2003, CCC released its updated Solid & Hazardous Waste Management Plan (see Christchurch City Council, 2002b, 2003). This was the follow-up to the 1998 plan which had its zero waste to landfill goal scaled back in 2001, and in this new Plan, the Council noted that it was not reviewing the revised overall waste reduction targets. Also, CCC reiterated its commitment to the 2002 New Zealand Waste Strategy, with its aspirational zero waste goal.

Meanwhile, in that same month of April 2003, Transwaste received approval for its resource consent applications for the Kate Valley landfill site (Hurunui District Council, 2003). In their decision, the independent Commissioners acknowledged that there was a significant amount of opposition to the application, which included 'not in my backyard' (NIMBY)-type opposition from local residents, as well as opposition based upon environmental concerns – including increased traffic, leachate contamination, toxic gas emissions, odours, and threats to local flora and fauna.

The Commissioners also acknowledged that alternatives to landfilling existed, and as such the Kate Valley landfill proposal was not necessary per se. However, they noted their acceptance of the argument by Transwaste's representative (Sec. 17.9):

> "that we must resist the temptation to impose conditions for the purpose of encouraging waste minimisation. We accept, that it is not our role to try and influence the political decisions which must be made within Canterbury about further waste minimisation and recovery measures."

With regard to zero waste initiatives, the Commissioners noted their agreement with Transwaste's representative (Sec. 17.8):

> "that the contents of the New Zealand Waste Strategy with its zero waste targets and the waste minimisation policies of the contributing councils are not a matter we can put any great weight on. These are matters of policy for central government and local government to determine. We can not predict how successful those policies will be. Nor can we, or should we try to influence how (or how quickly) those policies are implemented."

Regardless, the Commissioners subsequently did proceed to offer such assessments later in their decision document:

- "we are somewhat sceptical about the feasibility of zero waste as an achievable medium term goal for Canterbury" (Sec. 17.16).
- "we have concluded that it is inevitable that Canterbury will have a considerable quantity of residual waste for some years to come and that zero residual waste is unlikely within the term of the resource consent" (Sec. 17.17).
- "We agree with the applicant's submissions, that in the absence of an alternative disposal method such as incineration, "*the hard fact remains that there is the need for a landfill with capacity to take the residual waste stream arising from the Canterbury region*". Waste minimisation may well extend the life of the regional landfill (whether at Kate Valley, Burwood or elsewhere) but will not avoid the need for a regional landfill for the foreseeable future" (Sec. 17.18).

The granting of consent was appealed by the PBBUA and another local group opposed to the landfill – while on the other side an appeal was also lodged by Transwaste, challenging some of the conditions imposed in the Commissioners' decision. The appeals were heard before the Environment Court, with the decision announced in March 2004 (Hurunui District Council, 2004a). This decision upheld the resource consents granted to Transwaste for the development of the Kate Valley Landfill, with several modifications but no overall change to the scope or nature of the project.

Of note was the presiding judge's response to the arguments put forth by the opposing local groups, that alternatives to landfilling were possible and should preclude the development of this new landfill (pp. 76-77):

> "We consider that exhaustive appropriate investigation of alternatives has been undertaken and are satisfied that a landfill is going to be necessary whatever minimisation steps are taken by Councils. The only ensuing issue is the rate at which it may be utilised."

Notable among the public reaction to this decision was that from the host Hurunui District Council – the home of Kate Valley. In that Council's announcement following the Environment Court decision (Hurunui District Council, 2004b), Hurunui District Mayor Tony Arps welcomed the outcome, which assured the establishment of the Kate Valley landfill, and commented that "While this decision will be disappointing for some people in our community, it has to be accepted that the process has been thorough, proper and fair. It is now time to move forward" (par. 5). He also noted his concurrent support for landfilling and waste reduction in this way (par. 10):

> "I want to thank and praise all those who contributed to the regional landfill process in a constructive manner and those who continue to support waste minimisation initiatives. We must work together so as to get closer to our goal of zero-waste to landfill by 2015."

Later in 2004, Mayor Arps lost his bid for re-election to challenger Garry Jackson, who ran on a campaign opposed to the Kate Valley Landfill (C. Williams, pers. comm., April 16, 2012).

While the Kate Valley landfill project progressed towards implementation in Canterbury, the central government was revising its own nationwide waste plan. Released in February 2004, the *Review of Targets in the New Zealand Waste Strategy* (Ministry for the Environment, 2004b) was notable in that it contained no reference to 'zero waste' – an about-face from the previous document which featured the term in its title. Also absent from the new version were any references to similar ideas such as 'closing the loop' or 'circular vs. linear systems', which were a feature of the original text.

No changes were recommended to the various waste reduction targets in the original 2002 Strategy. The MfE acknowledged, however, that some targets would not likely be met

nationally, as it was recognised that councils exerted limited control over some waste streams. It was also noted that the increasing role of the private sector in the provision of waste services presented difficulties for councils in setting targets and measuring progress towards these targets. A recurring theme among feedback from councils was the difficulty in accessing reliable waste data from private waste companies, with the frequent excuse from these companies that this information was commercially sensitive. The MfE also acknowledged that while some EPR schemes had been established voluntarily by the private sector, their success was often limited by the lack of regulatory back-up that might otherwise ensure a greater degree of participation.

With the revised national Waste Strategy now devoid of any direct reference to zero waste, and CCC moving forward in its partnership with Transwaste in developing the Kate valley site, Christchurch was by 2004 far removed from its 1998 vision of zero waste to landfill by 2020. The next section documents the events that have transpired from 2005 to the present day, as the Burwood site closed and gave way to the Kate Valley era.

4.6 2005-Present: The Kate Valley Landfill Era Begins in Canterbury

In June 2005, CCC closed the Burwood landfill and commenced the transporting of its waste 70 km down the road to Kate Valley (Z. Potgieter, pers. comm., March 21, 2012). The Transwaste joint venture was locked in for a minimum of 20 years, but the Kate Valley landfill was consented for 35 years, and it is estimated that at current disposal rates there is ample capacity at the site for over 100 years (D. O'Rourke, pers. comm., March 08, 2012).

The following year, CCC released its 2006 Solid and Hazardous Waste Management Plan (Christchurch City Council, 2006). Titled *Toward Zero Waste*, this is the most recent version of the City's Waste Plan, with a further updated Plan due to be released in 2012 (Christchurch City Council, 2011c). Prominent in this latest version of the Waste Plan was the notion of zero waste as an aspirational goal, in contrast to the more specific zero waste to landfill by 2020 goal from the 1998 Plan. This was articulated in the document's Vision statement: "A prosperous City, where each person and business takes responsibility for waste minimisation and actively works toward zero waste" (Christchurch City Council, 2006, p. i).

In the document it was reported that Christchurch on the whole was still sending enormous amounts of waste to landfill: an average of 746 kg per capita per year, in spite of the wide

and growing array of waste reduction programmes in the city. The new Plan's principal waste reduction target was of no more than 320 kg/person/year to landfill by 2020, which represented a 60% reduction from the 1994 level of 800 kg/person/year.

CCC's waste reduction efforts experienced another setback In April 2006, when the High Court ruled in favour of a challenge by two private waste companies – one of them Transwaste partner Waste Management NZ – against New Zealand local councils' rights to impose waste levies in the Auckland region (Waitakere City Council, 2007). While this case stemmed from waste levies imposed outside of the Christchurch region, the court decision also meant that CCC had to stop charging its own landfill levy, which it had introduced in 1998 (Z. Potgieter, pers. comm., April 18, 2012). This meant that CCC lost a source of funding for many of its waste reduction activities, and would have to rely on rates-funding for such programmes as a result (Christchurch City Council, 2006).

Also in 2006, Australia-based Transpacific Industries Group (TPI) purchased Onyx Group, and in the process acquired Onyx's contract with CCC for kerbside rubbish and recycling pickup in the city (Commerce Commission of New Zealand, 2007). In that same year, TPI purchased Transwaste's CWS private partner Waste Management NZ, in the process becoming the biggest waste disposal company in Australasia (McBeth, 2011). Meanwhile, later that same year the other Transwaste CWS private partner Envirowaste NZ was purchased by Ironbridge Capital, another Australian company (New Zealand Herald, 2006). Subsequently, in 2007, TPI purchased Ironbridge's stake in CWS (RWE Business News, 2007), leaving TPI as the sole owner of CWS, and as such the sole private and 50% stakeholder in Transwaste – making it a bigger shareholder than Christchurch, as CCC is only one of five councils sharing the public 50% of the joint venture company.

Meanwhile on the central government level, in 2007, the MfE released *Targets in the New Zealand Waste Strategy – 2006 Review of Progress* (Ministry for the Environment, 2007). Notable in this latest update to the Waste Strategy was the reappearance of references to 'zero waste', which had disappeared in the 2004 revision. As in the original 2002 Strategy, however, the zero waste goal was aspirational only. The document called for greater leadership by local governments and central government, further work to build on existing guidelines and standards, and increased public awareness. Of particular stated concern was the problem of non-participation around voluntary product stewardship schemes, with the

suggestion made that where overall goals were not going to be reached, a more regulated approach would be worth investigating.

The tools for increasing regulatory power were delivered by Parliament the following year, with the passing of the *Waste Minimisation Act 2008* (WMA) (Ministry for the Environment, 2008). The result of a ballot-drawn private member's bill from neither the governing Labour Party nor the official opposition National Party, but rather from the minor-status Green Party, the WMA contained no reference to zero waste per se, but it did include two clauses that gave the central government unprecedented powers to address the waste problem.

One instrument was the introduction of a waste disposal levy of $10/tonne, to be collected by each local council and forwarded to the central government. One half of the total money collected across the country would be distributed back to local councils based on population, with councils allowed to spend the money only on waste minimisation activities in accordance with their waste management plans. This national waste levy would, for CCC, serve as a reinstatement of sorts of their own previous local levy, which was introduced in 1998 and discontinued in 2006 due to the successful legal challenge by private waste operators.

While the waste levy provided a tool for discouraging waste generation, the other instrument created via the WMA – declaration of *Priority Products* – was a tool for preventing waste. This clause gave the Minister the authority to declare any product to be a priority product if it was deemed to cause significant environmental harm once it was disposed. The process of declaring a priority product would include consideration of advice from a Waste Advisory Board, and public consultation. Once something was declared to be a priority product, the Minister would then have the power to impose a mandatory product stewardship scheme to regulate it, or else ban it outright.

The WMA was passed in September 2008, two months before general elections which replaced the Labour Party government with a new National Party one. Two years later, in 2010, the MfE released *The New Zealand Waste Strategy: Reducing harm, improving efficiency* (Ministry for the Environment, 2010), the latest update to the national Waste Strategy series, and the first one since the change in government.

The revised Strategy replaced the aspirational 'towards zero waste' with the two principal goals of "reducing the harmful effects of waste" and "improving the efficiency of resource

use" (p. 2). The lack of any mention of 'zero waste' in these overall goals was intentional, as explained this way (p. 3):

> "While the 'zero waste' vision of the 2002 Strategy was ambitious, many of its targets were unable to be measured or achieved. The revised Strategy enables a more flexible approach to waste management and minimisation through two high level goals: reducing harm and improving efficiency."

With the release of this new Strategy, New Zealand's national zero waste policy officially came to an end.

Four years after the passing of the Waste Minimisation Act with its provision for declaring priority products, no single product has yet been given this designation. The present policy in this regard is as follows: "Currently no products are designated 'priority products' or considered for designation. The current approach is to encourage the development of industry-led voluntary product stewardship schemes" (N. Lewis, pers. comm., March 14, 2011).

Meanwhile, CCC has moved to a three-bin waste collection system, with weekly kerbside organics pickup beginning in 2009 (Christchurch City Council, 2011a). The collected organic waste is processed at a central facility within the city, which is run by a private company, and turned into compost which is sold commercially to Canterbury area farmers (Living Earth, 2012).

The recent large earthquakes of 2010 and 2011 have resulted in an unprecedented amount of construction and demolition waste in Christchurch: from the most devastating February 2011 quake alone, it is estimated that a total of 8.5 million tonnes of demolition waste was generated, which compares with an average of 0.25 million tonnes per year of waste that normally goes to the Kate Valley landfill. After the February 2011 quake, CCC reopened the Burwood landfill site and designated it as a temporary sorting and recycling site for the purposes of the earthquake clean-up (Christchurch City Council, 2011b). Then in April 2012, the Transwaste private operator TPI, which was operating the temporary Burwood site, successfully lobbied to have Burwood reinstated as a permanent dump for earthquake-related debris, on the grounds that this would make the site a profitable venture (Heather, 2012). The earthquake debris will be dumped into an empty last cell at Burwood, which

during the landfill's previous years was left unfilled due to concerns around leachate affecting the nearby coastline (C. Williams, pers. comm., April 16, 2012).

The next section investigates the perspectives of various stakeholders, regarding Christchurch's zero waste to landfill initiative.

4.7 Stakeholder Perspectives on the Christchurch Zero Waste to Landfill Initiative

Table 4.1 provides a summary of the stakeholder interviews associated with the Christchurch zero waste to landfill initiative case study, including name, affiliation/role, and date(s) of interview for each interviewee.

Table 4.1: Christchurch Case Study Interview Summary
(Listed by Government (Elected/Staff, Local/Regional/National), Industry (Regional/National), and Public (Local/National), and in chronological order).

Interviewee Name	Affiliation/Role	Date(s) of Interview
Denis O'Rourke	Former City Councillor, CCC	08 March 2012, 18 April 2012
Chrissie Williams	Former City Councillor and Community Board Member, CCC	16 April 2012
Garry Moore	Former Mayor and City Councillor, CCC	17 April 2012
Anna Crighton	Former City Councillor, CCC	22 April 2012
Tony Moore	Sustainability Advisor, Strategy and Planning, CCC	01 February 2012
Zefanja Potgieter	Senior Resource Planner, CCC	21 March 2012, 18 April 2012
Robert Gerrie	General Manager, Eco Central, Christchurch	13 April 2012
Charles Whatman	Advisory Officer, Environment Canterbury	24 April 2012
Charles Chauvel	New Zealand Labour Party MP and Spokesperson on the Environment	11 March 2011
Nandor Tanczos	Former New Zealand Green Party MP and Spokesperson on Waste	27 April 2011
David Clendon	New Zealand Green Party MP and Spokesperson on Waste	05 May 2011
Natasha Lewis	Senior Analyst, Waste and Resources, New Zealand Ministry for the Environment	14 March 2011
Martin Pinkham	General Manager, Canterbury Waste Services	02 May 2012
Richard Morley-Hall	Former Environmental Manager, The Warehouse	11 March 2011
Peter Darbyshire	Merchandise and Marketing Manager, Bunnings New Zealand	14 March 2011
Sharon Jereb	Environment Manager, Packaging Council of New Zealand	03 August 2012
Rex Verity	Environmental Manager and Sustainability Advocate, Christchurch Polytechnic, and former Executive Director of Christchurch Sustainable Cities Trust	04 April 2012
Jo Knight	Former Director, Zero Waste New Zealand Trust	28 February 2011, 02 March 2011
Sue Coutts	General Manager, Wanaka Wastebusters	08 March 2011
Julie Dickinson	Former Director, Zero Waste New Zealand Trust	08 March 2011
Warren Snow	Former Director, Zero Waste New Zealand Trust	19 April 2011, 21 April 2011
Angus Ho	Campaigner, Wanaka Wastebusters	26 April 2011

Motivation for Launching a Zero Waste to Landfill Initiative

Christchurch's zero waste to landfill initiative arose in 1998, at the same time that CCC was looking to secure a new site to replace the soon-to-close Burwood landfill. Chrissie Williams, who was a Community Board Member at the time, notes that this search for a new landfill was the main driving factor behind waste-related initiatives in Christchurch during this period (C. Williams, pers. comm., April 16, 2012).

Christchurch was the second community in New Zealand to adopt a zero waste to landfill goal, after the North Island town of Opitiki launched their initiative earlier in 1998, and former Zero Waste New Zealand Trust (ZWNZT) Director Jo Knight (pers. comm., February 28, 2011) points out that Opitiki was similarly motivated by the prohibitive cost of a new landfill for their own district. While the smaller community was an official participant in the ZWNZT programme to support councils with zero waste to landfill goals, Christchurch's initiative operated independently of this scheme. According to then-Councillor Garry Moore (pers. comm., April 17, 2012), CCC opted to forego the grant money which was relatively small at $25,000 and more geared towards smaller local authorities, and in return retained the autonomy to run their initiative in their own preferred way without being bound to the ZWNZT's particular criteria.

While Opitiki's zero waste to landfill initiative was championed by a very keen Mayor (J. Knight, pers. comm., February 28, 2011), in Christchurch it was a City Councillor – Denis O'Rourke – who assumed the pivotal support role (R. Verity, pers. comm., April 04, 2012; C. Williams, pers. comm., April 16, 2012; G. Moore, pers. comm., April 16, 2012). Williams (pers. comm., April 16, 2012) suggests that back then Councillor O'Rourke was probably looking to emulate other councils, such as Waitakere near Auckland, which were models for sustainability-related initiatives similar to zero waste.

As O'Rourke himself recounts, (pers. comm., March 08, 2012), the zero waste to landfill goal was driven by the Christchurch 2021 coalition to which he belonged, whose overall political objective was the achievement of environmental, social and economic sustainability by 2021. The coalition members had campaigned on a published vision statement in which zero waste to landfill was a target. After a majority of Christchurch 2021 members were elected to Council in 1995, the zero waste initiative was eventually passed in 1998.

Over a decade has passed since the zero waste to landfill by 2020 goal was dropped by CCC, and opinions differ regarding what the actual intention was at the time.

Denis O'Rourke, who was a Councillor and concurrently chaired all of the relevant committees of the day related to the waste portfolio, insists presently (pers. comm., March 08, 2012) that the goal was to end the reliance on landfills outright, consistent with his own perspective on the matter in May 2001 (Christchurch City Council, 2001b), yet opposite to his view on the same question a month later in June 2001 (Christchurch City Council, 2001c).

Meanwhile, the present perspective offered by Zefanja Potgieter, the CCC's Waste Planner who authored the 1998 Waste Plan containing the original zero waste to landfill goal, and who is now a Senior Resource Planner there, is that the goal was not zero waste to landfill but "Towards Zero Waste" – which was aspirational and not intended to mean the end of landfilling (Z. Potgieter, pers. comm., March 21, 2012).

The absence of any significant planning to back up the zero waste goal, meanwhile, had already been identified by Boyle (1999) regarding the initiative in Christchurch and other cities, just one year into CCC's own campaign: "there is little indication as to the final form that these plans will take and the effectiveness of the implementation of those plans" (p. 62).

The CCC record shows that it was Councillor O'Rourke who aggressively led the push to drop the zero waste to landfill goal, just three years after he played a pivotal role in getting the Council to adopt the target. O'Rourke (pers. comm., April 18, 2012) explains that the specific goal of zero waste to landfill 'by the year 2020 or by time the new regional landfill is filled' was virtually impossible to achieve because the new landfill "could never really be "filled" because its capacity (assuming consent extensions after 35 years) was virtually unlimited – enough for 100 years or more if all suitable parts of the various Kate Valley areas were retained." He also asserts that zero waste to landfill was not removed as a goal in 2001, and notes that there has been a lot of public confusion about this. He points out that the actual change to the zero waste to landfill goal was that the deadline was replaced with 'as soon as possible', which was a realistic target.

Anna Crighton, who was the sole CCC Councillor to vote against dropping the zero waste to landfill goal in 2001, suggests that even if the goal was considered too lofty to fully achieve, it still represented "a line drawn in the sand to focus on and work toward", and she observes that "once the zero goal is abandoned there is a de facto 'out' for non-achievement." Crighton notes that the Council's near-unanimous decision to go along with abandoning the zero waste to landfill goal was attributable to Councillor O'Rourke's strong, persuasive style and formidable debating skills, and she summarises that he "was a very strong and powerful Councillor who drove the agenda for the Council's infrastructure" (A. Crighton, pers. comm., April 22, 2012).

Meanwhile, Williams (pers. comm., April 16, 2012) suggests that the abandonment of the zero waste to landfill goal in 2001 might also have been partially attributable to the business boom of the early 2000s, which resulted in increased consumption – and drove waste generation up accordingly.

New Zealand's central government, as discussed earlier in this chapter, only went as far as declaring an 'aspirational' zero waste goal, with no specific target for eliminating landfill reliance completely, and now even this more modest zero waste target has been removed completely from the national Waste Strategy since 2010. The grassroots ZWNZT managed to help get most local councils in the country to adopt formal zero waste to landfill goals back around the same time CCC did likewise – however, according to three of the group's former Directors, these are in hindsight now viewed as having been merely aspirational goals (J. Knight, pers. comm., February 28, 2011; J. Dickinson, pers. comm., March 08, 2011; W. Snow, pers. comm., April 19, 2011).

The failures of CCC and across New Zealand over the past decade or so notwithstanding, zero waste to landfill is still viewed across stakeholder groups as a worthy and/or necessary goal. Former CCC Councillor O'Rourke (pers. comm., March 08, 2012), who led both the adoption and abandonment of the initiative in Christchurch, believes that zero waste to landfill is ultimately necessary, and achievable "or very close to it". Former Green Party Member of Parliament (MP) and Spokesperson on Waste, Nandor Tanczos, who shepherded the Waste Minimisation Act (WMA) through its final passage in 2008, also sees zero waste to landfill as something "we have to become", and he further points out that a more ambitious goal – as opposed to something merely aspirational – can justify the allocation of more resources and implementation of levers for change (N. Tanczos, pers. comm., April 27, 2011). And David Clendon, a Green Party MP and Spokesperson on Waste, notes that the party has a clear goal of achieving a waste-free country by 2020 (D. Clendon, pers. comm., May 05, 2011) – since updated to a goal of "achieving a Waste Free Aotearoa New Zealand by 2030, with clear and significant progress by 2020" (Green Party of Aotearoa New Zealand, 2011).

The Role of Government

CCC's Potgieter (pers. comm., March 21, 2012) notes that it was Councillors who championed the zero waste to landfill issue. Rex Verity, a former Executive Director of the grassroots Sustainable Cities Trust in Christchurch, identifies Councillor O'Rourke as the key person driving the initiative, but suggests that his agenda seemed to change from zero waste towards business-as-usual, over time (R. Verity, pers. comm., April 04, 2012).

Tanczos (pers. comm., April 27, 2011) observes that some local councils made early gains towards zero waste, as when CCC introduced its own landfill levies in 1998. However, he notes, the movement eventually slowed and new gains came more slowly. And ZWNZT founder Warren Snow (pers. comm., April 21, 2011) points out that councils across the country generally "sucked our funding until the money ran out, then dropped zero waste altogether."

CCC Sustainability Advisor Tony Moore (pers. comm., February 01, 2012) concurs that Christchurch's setting and then dropping of a zero waste to landfill target is part of a New Zealand-wide trend, and he adds that he cannot think of any single still-existing credible initiative among all local councils in the country. Moore points to the central government's shift away from setting any targets in its latest Waste Strategy, and notes that the CCC has shifted in this sort of policy direction as well. He adds that in the end, "Actions speak louder than words" on such issues, and it is therefore performance rather than the specifics of official goals that matters most.

Williams (pers. comm., April 16, 2012) suggests that CCC exerted a lot of influence on the central government's 2002 National Waste Strategy with its vision of zero waste. O'Rourke (pers. comm., March 08, 2012) concurs, adding that other councils across the country with similar initiatives at the time also had significant influence on central government waste policy. But he adds that the reverse does not seem to be the case – that is, CCC has not been influenced much by the central government's policies, as they "are widely known as a toothless tiger."

The MfE was the principal author of the 2002 and subsequent national Waste Strategies, but as former ZWNZT Director Julie Dickinson notes (pers. comm., March 08, 2011), the MfE fought against the inclusion of 'zero waste' from the beginning. Her successor, Jo Knight (pers. comm., February 28, 2011), observes that whether or not reference to zero waste was

included in successive Strategy documents depended on who was writing documents for the MfE at the time.

Knight (pers. comm., March 02, 2011) argues that zero waste was never really adopted as a New Zealand-wide policy. While she notes that the central government did include reference to zero waste-type goals in its 2002 Waste Strategy, subsequent changes in government were major catalysts for variation in the degree of adoption – up and down with new Labour Party government ministers which can be seen with the 2004 and 2007 revisions to the document, and most negatively with the 2008 change to a National Party government, which led to the 2010 revised Strategy that dropped zero waste entirely.

Browne (2000) argues that central government attention to the issue of waste has generally oscillated between a *waste management* focus from National Party governments, to a *waste minimisation* focus from Labour Party governments. Dickinson (pers. comm., March 08, 2011) stresses, however, that while the previous Labour government was not as anti-zero waste as the current National government, it was not pro-zero waste either. Labour MP and Spokesperson on the Environment, Charles Chauvel (pers. comm., March 11, 2011), concedes that a legitimate criticism of the previous Labour government was that it was too slow to implement its national waste strategy, and he admits that on the whole the Labour government was too timid on environmental issues, preferring to be more sensitive to the demands of the business sector.

Dickinson (pers. comm., March 08, 2011) notes that unlike the present and previous governing parties, the Green Party has been very supportive and active on the zero waste issue, and was essential to the passing of the WMA.

Nandor Tanczos was the Green Party MP and Waste Spokesperson who ushered the WMA through to its passage, taking over for predecessor Green MP Mike Ward who had initiated the private member's bill that was randomly drawn from a ballot of such bills in Parliament. Tanczos recalls that the Waste Minimisation bill was initially criticised in Parliament for being too prescriptive towards industry, with its calls for EPR and product stewardship. He notes that once in the Select Committee phase where Green MPs were joined by their Labour and National counterparts, the bill was almost entirely rewritten before consensus was reached on its final form (N. Tanczos, pers. comm., April 27, 2011).

Tanczos (pers. comm., April 27, 2011) recalls that the Priority Products (PP) clause in the WMA was based upon similar items from overseas legislation, including European countries in particular. The PP clause, he notes, survived the Select Committee process with its intended strength largely intact, and as such it can be used to create strict regulations. In this sense, Tanczos summarises, the PP clause therefore has the power to "change the game" in terms of attaining zero waste goals.

Tanczos (pers. comm., April 27, 2011) adds that the PP clause was something that no other political parties wanted to touch at first. In particular, the governing Labour Party was initially quite hostile to the idea of it, but their interest increased during the Select Committee process, as public support for waste minimisation became evident. In the end, the WMA was attached to an omnibus local government bill, in order to 'piggyback' it through Parliament and into law.

Former ZWNZT Director Knight (pers. comm., March 02, 2011) notes that the previous Labour government had consulted with them and other stakeholders about what items to include as PPs, starting in 2007, a year before the WMA was passed. Suggested items for PPs included e-waste, batteries, tyres, pharmaceutical products, and agricultural sprays. The new National government concluded this consultative process in 2009, announcing that no PPs would be declared. Tanczos (pers. comm., April 27, 2011) believes that if the Labour government had been re-elected in 2008, there would likely be around one or two PPs declared by now, including e-waste. Labour's Chauvel (pers. comm., March 11, 2011) concurs that his party would invoke the PP clause if returned to government, and he cites e-waste as a personal preference for such a designation. And the Greens' Clendon (pers. comm., May 05, 2011) confirms his party's support for the PP concept, and stresses that the current government should be invoking the WMA's powers and designating PPs now.

The official response from the MfE regarding PPs makes clear the government's preference for voluntary over regulatory action: "Currently no products are designated 'priority products' or considered for designation. The current approach is to encourage the development of industry-led voluntary product stewardship schemes" (N. Lewis, pers. comm., March 14, 2011).

A prominent example of the present government's approach to waste is the issue of single-use plastic shopping bags (PSBs). As Wanaka Wastebusters' campaigner Angus Ho recalls

(pers. comm., April 26, 2011), in 2009 then-Minister for the Environment Nick Smith made a public announcement indicating a possible nationwide PSB levy. By the end of that same day, however, the idea was publicly vetoed by his Prime Minister, John Key. Green Party Spokesperson Clendon (pers. comm., May 05, 2011) asserts that the government should introduce mandatory product stewardship for PSBs, while Labour's Chauvel (pers. comm., March 11, 2011) concurs, and concedes that while the National Party Minister of the day was someone largely "motivated to do the 'right thing'", he was unable to do so as he would be routinely overruled by his Cabinet. The official comment from the MfE, regarding the same-day floating/sinking of the PSB levy idea, is: "The Minister for the Environment encourages the use of reusable bags, but is aware plastic bags can have important uses in some instances" (N. Lewis, pers. comm., March 14, 2011).

Knight (pers. comm., March 02, 2011) notes that the National government's distaste for zero waste was signalled by the fact that funding from the central government to the ZWNZT dried up after the 2008 election. She adds that the eventual dumping of zero waste from the national Waste Strategy in 2010 was disappointing, and a case of "'economic recovery' over zero waste due to recession pressures", and a matter of "zero waste vs. business". Clendon (pers. comm., May 05, 2011) adds that the Green Party opposes the dropping of the zero waste goal from the Waste Strategy, noting that this is an unacceptable approach for a national waste reduction strategy.

In response to these criticisms, the MfE's Senior Analyst, Waste and Resources, Natasha Lewis (pers. comm., March 14, 2011) points out that under the WMA and the revised Waste Strategy, "Territorial authorities are able to develop their own specific targets appropriate to their local communities" – which leaves the door open to local councils such as CCC to opt back into a zero waste to landfill goal if they so wished. On this note, Snow (pers. comm., April 19, 2011) points to Auckland as a city where zero waste is returning to the forefront as an overall local council strategy.

The Role of Industry

While Snow (pers. comm., April 19, 2011) recalls that private companies embraced zero waste ideas early on, Knight (pers. comm., March 02, 2011) notes that industry was eventually resistant to change, and Tanczos (pers. comm., April 27, 2011) asserts that there was significant pushback from the waste industry in particular, as they labelled zero waste a "crazy concept", and "Big Waste" tried to cut the movement "at its feet".

With regard to events that unfolded in Christchurch around CCC's zero waste to landfill initiative, there is a considerable weight of testimony that industry represented a formidable and ultimately irresistible opposing force.

As Verity (pers. comm., April 04, 2012) suggests, then-Councillor and later Mayor Garry Moore was incensed about Waste Management NZ threatening CCC in 1995 over extending the use of the existing Burwood landfill, but nonetheless the Council succumbed to their threats. Verity notes that the local grassroots group he led, the Sustainable Cities Trust, was advocating for the creation of a new resource recovery centre while the private company was pushing for a regional landfill – with the Kate Valley landfill ultimately prevailing.

For his part, Moore recalls that CCC was being threatened with litigation in order to gain commercial advantage, and he suggested then that anyone who did this "could go to hell". However, Moore notes that he soon after reflected on the opportunities offered by the proposed joint venture, and eventually supported the idea and lobbied his fellow Councillors to support it (G. Moore, pers. comm., April 17, 2012).

Williams (pers. comm., April 16, 2012) believes that the CCC entered into the joint venture with the private operators to eliminate the threat of competition from them regarding waste disposal. Moore (pers. comm., April 17, 2012) concurs that City Councillors became convinced that this was the best option available to them to deal with the threat from the private players.

Meanwhile, then-Councillor and multiple-waste-related Chairman O'Rourke (pers. comm., April 18, 2012) disagrees that Waste Management NZ was applying undue pressure. He acknowledges their practice of "making veiled threats of legal action against CCC if we tried to extend Burwood", but suggests that this did not make a "practical difference" to their ultimately successful bid to become one of two private partners in the Transwaste joint venture.

Snow (pers. comm., April 19, 2011) notes that it was through funding from the private-source Tindall Foundation – associated with the country's largest big box discount goods retailer, The Warehouse – that the ZWNZT was able to provide early support to local councils' zero waste to landfill initiatives. While the pairing of a mass-consumption goods corporate giant and a grassroots waste-elimination group appears a dissonant match, Snow notes that the Foundation, under his guidance, made attempts to change the company's

practices. Snow observes, however, that in the end the exercise proved to be more about public relations for the corporation than a sincere attempt to bring about genuine sustainability-focused change.

An oft-cited example of industry-led voluntary measures to address waste in New Zealand is the Packaging Accord, which has had two versions introduced in 1996 and 2004 (Ministry for the Environment, 2004a). Tanczos (pers. comm., April 27, 2011) recalls that the Green Party was critical of the Accord's modest goals and overall "business-as-usual" approach to packaging waste, and he cites the Packaging Accord as a classic example of industry "staving off government" while failing to achieve necessary environmental outcomes.

Sharon Jereb, Environment Manager at the Packaging Council of New Zealand (pers. comm., August 03, 2012) points out that packaging in itself plays a key role with regards to waste reduction because it prevents more waste than it creates, and she adds that her organisation has taken a leadership role on the issue since their inception in 1992. However, Richard Morley-Hall, a former Environmental Manager for The Warehouse, argues that both the Packaging Council and Retailers Association – whose activities represent a significant proportion of business in New Zealand – "have long been able to hold off legislation by promising voluntary accords. None of these voluntary accords really achieve a thing other than smoke-screens and business as usual" (R. Morley-Hall, pers. comm., March 11, 2011).

Wanaka Wastebusters' Ho (pers. comm., April 26, 2011) argues that the goals of the Packaging Accord are very modest compared with the action needed on packaging waste, and asserts that this is because the industry's priority regarding the Accord has been to protect their businesses first. Meanwhile, Knight (pers. comm., March 02, 2011) suggests that there has been a lack of sufficient follow-through by some of the Accord's signees, and points to the example of food companies who have replaced cans with less easily recyclable foil packaging – yet argue that this is more sustainable. And Snow (pers. comm., April 21, 2011) notes that while the New Zealand Packaging Council says that food packaging decreases food waste due to its preserving qualities, the reverse is actually the case as use-by dates on the packaging result in consumers simply throwing away products that they have purchased at supermarkets and have not been able to eat in time.

Snow also notes that the proliferation of packaging waste has resulted from industry practices that have encouraged mass and centralised production, and concentrated power in

fewer supermarket chains. He cites the failure of two successive versions of the voluntary Packaging Accord, and points out that the costs of packaging waste are being paid for by the public, instead of the industries where it originates (W. Snow, pers. comm., April 21, 2011). Tanczos (pers. comm., April 27, 2011) cites the recent disappearance of reusable glass milk bottles in New Zealand as an example of how public subsidisation of waste results in the emergence of less-sustainable materials such as plastics in the marketplace.

The central government's failure to address plastic shopping bag (PSB) consumption is largely attributed to pushback from the private sector. Morley-Hall (pers. comm., March 11, 2011) asserts that industry's efforts have mainly consisted of "talk to retain the status quo" on PSBs, and he suggests that where voluntary action on PSBs has occurred – such as The Warehouse's 10 cent fee per bag introduced in 2009 – the motives were to "to fend off legislation and to glean great PR." He also refers to the short-lived attempt in 2009 by one of the two major New Zealand supermarket chains to charge a levy on PSBs, arguing that they introduced it "for PR reasons not because of some greater Environmental management plan", and explaining that the abandonment of the levy soon after was in response to "the slightest ripple of dissatisfaction from customers".

Bunnings New Zealand is one chain of stores that has managed to phase out the use of PSBs through a voluntary scheme. As Merchandise and Marketing Manager Peter Darbyshire (pers. comm., March 14, 2011) explains, a staged approach was used which started in 2007 with a 10 cent per bag levy, and by the end of the year PSBs were eliminated completely – with shoppers having the choice between free cardboard boxes and using reusable bags or containers. Wanaka Wastebusters General Manager Sue Coutts (pers. comm., March 08, 2011) notes that both Bunnings and The Warehouse have managed their respective PSB reduction schemes with no significant problems. By contrast, as Ho (pers. comm., April 26, 2011) asserts, the large New Zealand supermarket chains have not made any similar effort on PSBs, and he notes that these companies have been generally unresponsive to grassroots calls for waste reduction.

With respect to the landfilling of Christchurch's waste, the situation has evolved to where today one private company, TPI, now controls 50% of the business through its ownership of 100% of CWS – the private half of Transwaste. CWS General Manager Martin Pinkham (pers. comm., May 02, 2012) notes that the joint venture arrangement to send the City's waste to the Transwaste landfill is technically indefinite: "There is no end date to the MOU. It will end

when the parties agree that it is no longer required." He also suggests that the present monopolistic arrangement may well outlast the current regional landfill site: "CWS envisages that the JV will continue to at least the end of the life of the Kate Valley Landfill, and any subsequent residual waste disposal or treatment facility."

Regarding CWS's apparently conflicted role as a landfill contractor in the midst of zero waste to landfill and other waste minimisation initiatives in Christchurch and the surrounding region, Pinkham responds this way (pers. comm., May 02, 2012):

> "Transwaste's job is to safely and economically dispose of the regions [sic] residual waste. At this stage this is to landfill. CWS is simply Transwaste's contractor. Transpacific, which owns CWS, is a major provider of recycling and organic processing across Australasia and sees that landfill is just one solution for our residual waste.
>
> My personal view is that there will be waste to energy technologies developed in the next 20 years that will result in landfills not being the current choice in most of the world. However there is likely to be a need for sites for the disposal of the residue from waste to energy plants.
>
> Under the MOU Transwaste is required to actively review alternatives, and when appropriate come back to its shareholders with its recommendations on the way forward."

Former Councillor and Mayor Garry Moore (pers. comm., April 17, 2012) suggests that public-private ventures such as Transwaste are good models for initiatives like zero waste to landfill, because private operators bring systems thinking and technical skills that Council staff tend not to have. However, he stresses that government regulation is absolutely necessary to drive industry players towards the zero waste to landfill ends, because they will never do this voluntary. Christine Byrch, former CCC Waste Minimisation Officer and Target Zero programme manager (pers. comm., March 19, 2012), believes that it is possible for local councils to influence industry behaviour toward these ends via appropriate pricing for waste disposal, and by providing infrastructure to facilitate waste reduction.

Former Councillor and Transwaste Chairman O'Rourke (pers. comm., March 08, 2012), who was instrumental in creating the joint venture, holds a radically different view now than he did before his departure from Council in 2004. He argues today that "industry will do

nothing effective for waste minimisation unless and until the government regulates to require the producers of commercial and industrial waste to send it to a waste sorting facility…before any part of their waste goes to landfill." O'Rourke alleges that the current practice of CCC is to allow their waste collectors – working for the same TPI company that operates the Kate Valley landfill – to take all material directly to the landfill, or else to a Council transfer station which sends virtually all of the waste to landfill. He believes that it would be easy for regulations to be established which could divert at least 60% and up to 85% of commercial and industrial waste away from landfill, which is significant as this part of the waste stream represents about 95% of the total in Christchurch. O'Rourke – incidentally now an opposition New Zealand First Party MP in Parliament – lays blame for much of CCC's underperformance regarding waste on the central government:

> "the cause of the failure to divert the commercial and industrial waste stream away from landfill is directly the fault of central government for not establishing the necessary regulatory regime. The government is a zero action government, not a zero waste one."

Former Councillor Williams (pers. comm., April 16, 2012) asserts that as soon as private interests get involved in something like waste management, costs actually increase because there is an additional profit motive that does not exist when the public sector is in charge. This, she notes, is in addition to the resulting negative environmental outcomes – which result because for these private operators waste management is all about throughput of waste, rather than working towards zero waste to landfill.

The Role of the Public

Former CCC Councillor O'Rourke (pers. comm., March 08, 2012) and Waste Planner Potgieter (pers. comm., March 21, 2012) both observe that public input was significant during the Waste Plan consultation processes, and O'Rourke (pers. comm., March 08, 2012) notes that public awareness was very high at the time that CCC brought in the zero waste to landfill initiative, but has since dropped as a result of failed Council leadership on the issue.

O'Rourke (pers. comm., March 08, 2012) and Potgieter (pers. comm., March 21, 2012) both also observe that grassroots groups played a very minor role in the zero waste to landfill initiative, but former Sustainable Cities Trust Executive Director Rex Verity (pers. comm., April 04, 2012) insists that his group led a significant grassroots presence around the issue,

and this work included bringing in zero waste activists from elsewhere, such as ZWZNT founder Warren Snow, who came to Christchurch several times during the zero waste to landfill goal era.

Potgieter (pers. comm., March 21, 2012) acknowledges that local opposition to the development of the Kate Valley landfill existed "prior to consenting", and Verity (pers. comm., April 04, 2012) concurs and adds that similar opposition existed before Kate Valley, when the Malvern Hills site was being considered for the regional landfill.

On the nationwide front, former ZWNZT Director Julie Dickinson (pers. comm., March 08, 2011) points out that while support for the cause has been strong, the movement has suffered from a lack of proper handover from person to person. Her successor at the Trust, Jo Knight (pers. comm., February 28, 2011), agrees that succession has been a big problem – with key people leaving and not taking an interest in the success of those who followed them.

The 'golden era' for zero waste awareness and support from the public appears to have been the years around the central government's 2002 release of its 'Towards zero waste' Strategy document. Dickinson (pers. comm., March 08, 2011) recalls that there were around 200 submissions made in the response to the MfE's call for input into the drawing up of the document, and as a result the Ministry "reluctantly included zero waste in the strategy." And Tanczos (pers. comm., April 27, 2011) notes that his predecessor Green Party Waste Spokesperson Mike Ward had a lot of support on this issue from the grassroots around that time.

Knight (pers. comm., March 02, 2011) believes that public support for zero waste dropped after 2002, and Snow (pers. comm., April 21, 2011) likewise estimates that the movement in New Zealand peaked around 2002-2003. Dickinson (pers. comm., March 08, 2011) describes the zero waste movement in New Zealand as non-existent right now, and suggests it has been that way for a while.

Fundamental Challenges to Achieving Zero Waste to Landfill

Snow (pers. comm., April 21, 2011) argues that zero waste to landfill is impossible to achieve the way we are living now, and Tanczos (pers. comm., April 27, 2011) stresses that the current economic system cannot continue as limits to resources such as oil and other cheap energy choices are approached or reached. Meanwhile, Dickinson (pers. comm., March 08,

2011) sees the zero waste issue as being more about 'consumption' than 'waste', while Knight (pers. comm., March 02, 2011) views zero waste as a concept that poses a fundamental cognitive problem to people, citing the example of how zero waste work has increased employment for otherwise unemployable people – yet it is often not recorded as a positive statistic because it is 'non-GDP'-type work.

Snow (pers. comm., April 19, 2011) points out that while local councils such as CCC are positioned at the receiving end of the waste stream and are left with the job of dealing with it, they tend to have little idea or control of what is coming. Even so, he notes, councils could still be diverting around 85% of their waste from landfill right now, if they were properly resourced and equipped.

Recycling efforts by local councils in New Zealand have gained a generally positive image, and the New Zealand Packaging Council's Jereb (pers. comm., August 03, 2012) argues that for zero waste to landfill to become a reality, "the economics of recycling and re-use" need "to be part of any economic growth agenda." However, as Hughey, Kerr and Cullen (2006, p. 71) ask about recycling: "is it really reducing the growth in waste production?"

Byrch (pers. comm., March 19, 2012) notes that research carried out for CCC came up with this finding:

> "the only thing that Christchurch residents had learnt from the kerbside recycling initiative (which was accompanied with a whole lot of 'educational material' about what happened to the materials collected and why it was such a good thing) was what they could put in their bins."

Snow (pers. comm., April 21, 2011) stresses that zero waste is not supposed to be about recycling more and more stuff, yet that is often how the movement is interpreted. He views zero waste as a total-system approach which includes recycling as a component – however he describes recycling in its present mainstream form as not a pro-zero waste thing. Meanwhile, former CCC Councillor Williams (pers. comm., April 16, 2012) sees not just recycling, but all kerbside collection, including rubbish and organics pickup, as "an enemy of behaviour change", and a deterrent to achieving zero waste to landfill.

An often-cited fundamental problem faced by waste minimisation efforts in Christchurch is that they have had to co-exist with CCC's increased involvement with private waste

companies and their profit-motivated interests. Robert Gerrie, General Manager of CCC-owned ECO Central which handles the processing of the City's collected recycling and rubbish before it is sent off to either markets or the landfill, notes that diversion from landfill rates in Christchurch are not improving, and cites the problem of the nature of the landfill partnership agreement, which is based upon a return on investment that decreases when residual wastes are decreased (R. Gerrie, pers. comm., April 13, 2012).

Knight (pers. comm., February 28, 2011) concurs that the situation is one where the Transwaste contract means that there are incentives to actually increase waste amounts going to the Kate Valley landfill from Christchurch. And both Williams (pers. comm., April 16, 2012), and Moore (pers. comm., April 17, 2012) acknowledge that having the same Councillor as Chair of both the Council waste committees and Transwaste, at the time that both the zero waste to landfill initiative and the public-private joint venture negotiations were happening, represented a conflict of interest that served to undermine the zero waste programme.

O'Rourke, the former CCC Councillor and Transwaste Chairman in question who largely oversaw the creation of the joint venture arrangement, points out that the Mission Statement of the company includes commitments to the environment and Resource Management Act requirements, health and safety, and the welfare of local residents (O'Rourke, 2007). However, he also acknowledges that Transwaste is above all in the landfilling business to make a profit: "The joint venture constitution includes important provisions to ensure that the respective interests of the different parties are protected, but TCL is managed commercially, with its prime objective being to operate as a successful business" (p. 13).

Snow (pers. comm., April 19, 2011) argues that zero waste becomes an attainable goal once a community gains access to its waste stream. He notes however that nowadays control of waste is locked up by international waste management companies – which describes to a large extent the current situation in Christchurch, where Transwaste's 50% private stake is now 100% in the hands of one multinational waste company, TPI.

Another recurring problem faced by zero waste to landfill and other similar initiatives is their lack of resilience to change of and within government. Former ZWNZT Director Knight (pers. comm., March 02, 2011) observes that the progress made on zero waste goals depended on

how the Minister of the day ranked against other Cabinet members, and also on changes in key Ministry staff which often resulted from high turnover. Former Green Party MP and Waste Spokesperson Tanczos (pers. comm., April 27, 2011) notes that when a pro-business government takes power, as was the case in the 2008 central government elections, their zero waste-unfriendly agenda takes over, and such initiatives stand little chance of continued progress. In the local case of CCC, Verity (pers. comm., April 04, 2012) argues that despite all of the public support for zero waste to landfill, it happened only because it suited one Councillor in particular – Denis O'Rourke – who abruptly dropped it once he lost interest.

O'Rourke, meanwhile, argues in hindsight that the zero waste to landfill by 2020 goal was unrealistic because CCC was never in a position to control all or even a significant proportion of the overall waste stream. He explains that while councils such as CCC controlled the domestic waste stream, this represented less than 20% of the total, and in the absence of the central government legislating flow control to councils for other waste sources such as commercial and construction/demolition, it simply was not feasible to achieve zero waste to landfill within the set timeframe. O'Rourke points out furthermore that with CCC's own pioneering waste levy struck down by the courts, Christchurch actually went backwards on waste reduction rather than forwards (D. O'Rourke, pers. comm., April 18, 2012).

Dickinson (pers. comm., March 08, 2011) further argues that there are no examples of deep zero waste success anywhere in New Zealand, with the typical pattern having been initial success, followed by eventual failure or abandonment. Snow (pers. comm., April 21, 2011), meanwhile, suggests that zero waste initiatives have failed because vision has not been properly followed-up with planning and structure. In summary, he sees the zero waste movement in New Zealand as "a complete and utter failure….All that effort came to nothing", and he believes that any remaining zero waste advocates should gather "to de-brief what happened."

How Zero Waste Might Be Achieved

Dickinson (pers. comm., March 08, 2011) believes that zero waste success requires passionate people to be in key positions within local authorities and perhaps industry as well, to provide avenues for progressive approaches to grow up from the grassroots. She adds that zero waste achievement will not likely come from within government, and this argument is concurred by Tanczos (pers. comm., April 27, 2011), who suggests that "a

different kind of game" is needed on the political scene, and change is more likely to come "from all over the place."

Dickinson notes, however, that it is not impossible for necessary influence to come from government channels, and she predicts that a stronger presence in Parliament by the Green Party would translate to better zero waste results. Dickinson stresses that what is needed is to have people in government who are passionate about zero waste, and who would champion the issue – such people, she notes, do not presently exist in Parliament (J. Dickinson, pers. comm., March 08, 2011). Snow (pers. comm., April 21, 2011) agrees that such champions are non-existent in New Zealand government ranks today, and present-day Green opposition MP Clendon (pers. comm., May 05, 2011) concurs, and suggests that what is needed from government on zero waste is "to adopt this goal in its waste strategy and provide a timeline with goals for achieving it." Former Green MP Tanczos (pers. comm., April 27, 2011) suggests that what is needed is a proactive Minister for the Environment who was willing to make hard decisions, and a legislative framework to work with that would facilitate progressive work on the zero waste file.

Dickinson (pers. comm., March 08, 2011) points to a need for better economic instruments in New Zealand such as true costing and further waste levies, while Snow (pers. comm., April 21, 2011) concurs that price signals are necessary. Morley-Hall (pers. comm., March 11, 2011), meanwhile, argues that government needs to take a leadership role and introduce "Tough, visionary, meaningful measures… that reward good behaviour and right choices", and that "make landfill choices hard and expensive", and Snow (pers. comm., April 19, 2011) suggests outright landfill bans for certain products such as tyres.

Morley-Hall (pers. comm., March 11, 2011) argues that the government needs to take a firmer stance with producers, and he suggests that a national vision for waste minimisation is needed which imbues a sense of "the 'WHY' into the psyche of industry." Green MP Clendon (pers. comm., May 05, 2011) similarly calls for increased "encouragement and regulation" for industry, and he recommends establishing a legislative framework which would include EPR, triple bottom line reporting, a levy on non-biodegradable and non-recyclable packaging, and incentives to encourage the design, production and purchase of durable, easily repaired, reusable and recyclable goods. O'Rourke (pers. comm., March 08, 2012), meanwhile, stresses that industry needs to do a better job of complying with regulations once they are passed into law.

O'Rourke (pers. comm., March 08, 2012) also believes that the public must improve their compliance with regulations related to waste minimisation, in order for zero waste goals to become attainable. Clendon (pers. comm., May 05, 2011) suggests that the public needs to support the zero waste goal, and that requires information and education led by government – including strict labelling standards, strategies for household waste reduction, and promotion and facilitation of alternative technologies such as grey water recycling and composting toilets. And Snow (pers. comm., April 21, 2011) points to the current prevalence of retail sprawl which promotes huge and less frequent purchases, and he argues that people would make smaller daily purchases and save overall if centrally-located commercial areas were revitalised. Snow also suggests that reuse of products could be significantly improved if repair departments reclaimed the prominent place they once had in shops.

While CCC managed to make zero waste to landfill an official policy, that initiative was essentially ended just three years later, and waste reduction results are widely considered to be below expectations to date. Snow (pers. comm., April 21, 2011) downplays the importance of official declarations of zero waste goals such as the one adopted in Christchurch, and he argues that it is obviously better to have a community with no zero waste policy that is nonetheless making a lot of effort to reduce waste, than a community with an official zero waste policy that is actually doing very little. Dickinson (pers. comm., March 08, 2011) cites the state of South Australia as a good example of the latter case of a 'quiet achiever' around waste minimisation issues.

As to whether some sort of paradigm change is necessary for zero waste to landfill to be achieved, O'Rourke (pers. comm., March 08, 2012) argues that such a shift is not what is necessary, but rather just a genuine implementation plan, and regulation and leadership from government. He suggests that "Zero waste or near enough is not difficult to achieve given political will and adequate investment."

Tanczos, on the other hand, asserts that radical economic transformation is necessary before zero waste goals can be attained. He argues that this sort of change could be implemented by government, but stresses that no government that continues to rely on the 'economic growth' model could successfully bring about such transformation (N. Tanczos, pers. comm., April 27, 2011).

While larger cities such as Christchurch have struggled to implement their zero waste to landfill initiatives, Snow (pers. comm., April 21, 2011) suggests that smaller communities might have a better chance, provided that they can secure access/control over their waste streams. Ho (pers. comm., April 26, 2011) cites the case of the small and remote South Island village of Collingwood, which on its own collective initiative instituted a ban on plastic shopping bags and introduced their own cotton reusable alternatives, in 2005 – bucking the trend in the rest of New Zealand, which has seen little successful action regarding PSBs.

Snow (pers. comm., April 21, 2011) believes that if it were possible to get diversion rates up to 95%, then total achievement of zero waste to landfill would just be a matter of identifying the sources of that last 5%, and then focusing on how to eliminate it. In the meantime, he suggests, incineration might evolve to become the universally preferred default method of waste disposal, although this method produces residuals which would still require some landfilling. Snow argues that what are needed alongside recycling are such programmes as container deposit and/or reusable container legislation, and more EPR programmes. And while Snow is a former manager of Auckland's original kerbside recycling programme, he believes that residences should not even have a recycling bin – or should at least have less frequent recycling collection.

Meanwhile, Dickinson (pers. comm., March 08, 2011) suggests that zero waste might ultimately be achieved only in the aftermath of some catastrophe like a major oil supply crisis, or some similar crisis scenario unrelated to waste minimisation initiatives.

The last section of this chapter gives a summary of the Christchurch zero waste to landfill initiative.

4.8 Summary of Christchurch's Zero Waste to Landfill Initiative

Figure 4.3 shows per capita waste generation in Christchurch for the years ending 1999-2011, with the breakdown of the total into amounts diverted from and sent to landfill.

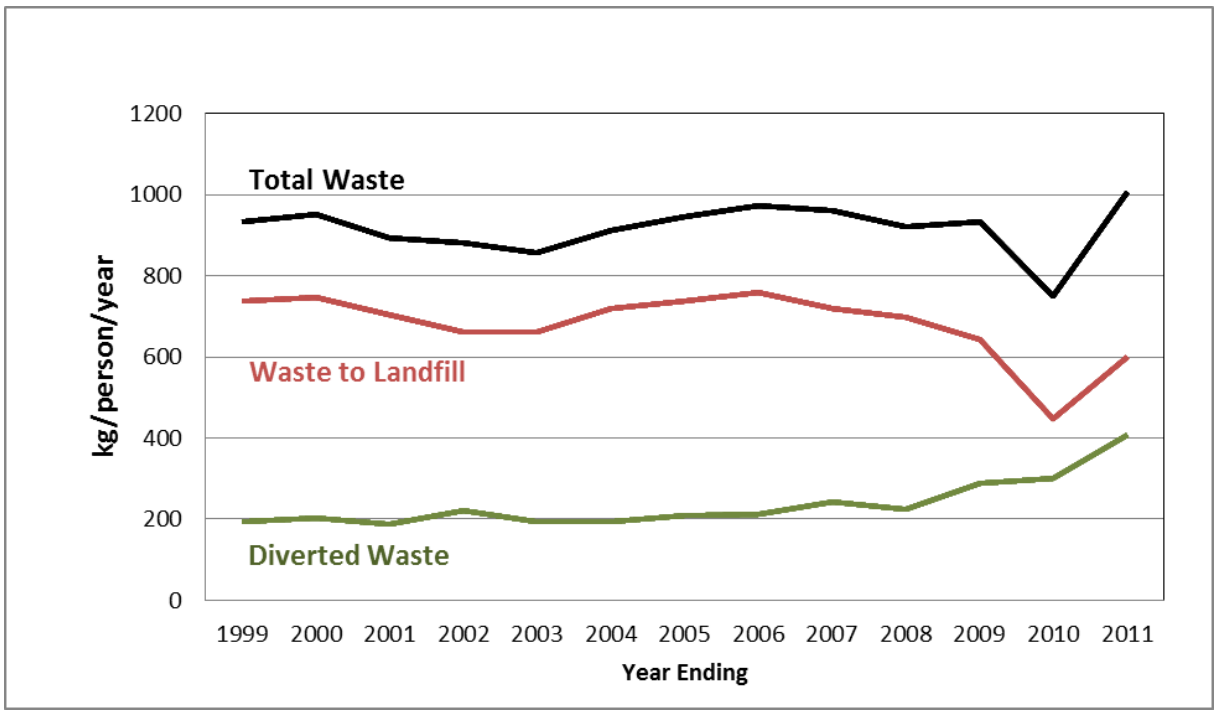

Figure 4.3: Waste Generation Trends in Christchurch
(based on Keeling, 2012a,b and Environment Canterbury, 2008).

As Figure 4.3 shows, the amount of waste going to landfill has been consistently far higher than the amount of waste diverted from landfill – in other words, CCC has yet to achieve even a 50% rate of diversion from landfill. The diversion rate has, however, nearly doubled during the period of 1999-2011, from 21% to 40%.

Figure 4.3 also shows that while total waste has fluctuated around 900 kg/person/year and waste to landfill has fluctuated around 700 kg/person/year up until 2006, there was a noticeable positive trend afterwards and until 2010, with total waste and waste to landfill down below 800 kg/person/year and 500 kg/person/year, respectively, and most of the doubling of the diversion rate happening during this period as well.

In Figure 4.3 it can also be seen that during the three years that followed the adoption of the zero waste to landfill target, waste to landfill decreased to just above 650 kg/person/year. However, from 2001 – when the 'by 2020' deadline was dropped – waste to landfill levelled off at this rate, before increasing again to a maximum of around 750 kg/person/year in 2006.

From then, waste to landfill resumed a downwards trend to a minimum of around 450 kg/person/year in 2010.

The impact of the earthquakes of 2010-2011 can be seen clearly in Figure 4.3 as well, with sharp upswings in both total waste and waste to landfill per capita. As the post-earthquake clean-up and rebuilding continues over the next several years, it is expected that waste volumes will remain abnormally high as a result, and therefore any analysis of waste data trends will remain obscured to some extent by the superposition of the earthquake-attributable effects upon the underlying baseline trends.

Overall, the zero waste to landfill initiative in Christchurch was a failure, as it never achieved waste reduction results anywhere near the stated goal. Furthermore, the initiative was abandoned only three years after its launch, and as such the campaign never really had time to gain any significant traction in the community.

Analysis of the history surrounding the Christchurch zero waste to landfill initiative reveals that it was conceived at a time when local councils around New Zealand were declaring similar goals, with financial incentive offered by the privately-funded Zero Waste New Zealand Trust (ZWNZT). While CCC's own initiative was launched officially outside of this nationwide programme, the influence from the ZWNZT and other grassroots activists nonetheless had an impact in encouraging Christchurch to embark on its own zero waste to landfill programme.

It is also very clear that, within CCC, there emerged a single Councillor who not only championed the zero waste to landfill idea at the time of its inception, but also assumed several available committee Chairmanships that were relevant to the waste file. While this focusing of responsibility on one elected official might have helped to facilitate the adoption of the zero waste initiative, it also created the possibility that the initiative could be just as easily and quickly abandoned, if that same person were to shift their position on the issue. And that appears to be exactly what eventually transpired, as in 2001 it was that very same Councillor who assertively and almost single-handedly argued – successfully – for the zero waste to landfill by 2020 initiative to be dropped after it had barely begun.

One obvious shortcoming of the CCC zero waste to landfill initiative was the lack of any substantial plan for addressing the waste stream, in order to progress towards no residuals. While a number of end-of-pipe measures were adopted subsequent to the launch of the

initiative, primarily around expansion of recycling programmes, the top-of-pipe remained largely unaddressed and this has continued to the present day.

The most obvious obstacle to the zero waste to landfill by 2020 initiative, however, is the fact that at the very time it was being rolled out, CCC was involved in an intense process of negotiations with other councils and with private waste operators, to develop a new regional landfill site. It is hard to reconcile such a concerted effort to acquire new landfill capacity happening at the exact same time that a commitment to eliminating all dependence on landfilling was being approved by Council. And yet, this is exactly what transpired, in 1998.

The events which led to the formation of the joint venture company Transwaste, with its 50% private company stake, represents a very well-documented example of the transfer of control of the waste stream from local government to the private sector. While the governance of Transwaste includes some formalised, symbolic commitments to striving towards the various councils' waste minimisation goals, it is nonetheless clear that the business goals of the private CWS half of the company – which started as a two-company partnership and is now a consolidated monopoly – largely dictate the overall approach to waste management followed by the participating councils, including CCC. In particular, it is a generally accepted fact that, on the whole, it is more profitable for Transwaste to send waste to landfill, than it is to divert it through resource recovery systems. This economic incentive to landfill, together with the lack of any thorough planning for addressing problematic wastes, provides an obvious explanation for the poor performance by CCC on reducing waste to landfill.

CCC abandoned its zero waste to landfill initiative a year before the central government introduced their aspirational zero waste policy in 2002. While it is conceivable that increased support on the national level might have reignited the ambitions of Christchurch's own initiative and even prompted a re-adoption of a zero waste to landfill goal, this clearly did not happen. This is not difficult to comprehend, however, as the central government's aspirational-only approach to the idea of zero waste offered no bar-raising example for CCC to follow. The national policy oscillated away completely from the notion of 'zero waste', and then back again to embracing it, with its 2004 and 2007 revisions. By the time the central government passed the WMA in 2008, with its potentially transforming 'Priority Products' clause, seven years had already passed since CCC abandoned its zero waste to

landfill goal. While the declaration of waste-problematic materials as Priority Products could have provided local councils such as CCC with unprecedented 'teeth' in directly addressing components of the overall waste stream, the stark reality is that four years onwards from the passage of the WMA the number of Priority Products remains at zero. The Labour Party government of 1999-2008, which largely failed to follow up on its own waste legislation and that of its allied parties, has since been replaced by a National Party government which is overtly opposed to the concept of zero waste, favouring voluntary and industry-led approaches only – in spite of such measures' record of failure to effect waste reduction – and formally dropping the zero waste policy in 2010 and replacing it with the overall goals of 'reducing the harmful effects of waste', and 'improving the efficiency of resource use'.

While paradigm shifting appears to be necessary for zero waste to landfill to be achieved anywhere, in the case of Christchurch this degree of change does not appear to be something that will happen soon. Any movement towards zero waste thinking at CCC is going to be challenged by the prevailing Transwaste joint venture, locked as it is into what may be decades of further waste shipments to the Kate Valley landfill. Central government, as discussed above, has failed to empower local councils such as CCC, varying only between ineffectiveness and indifference. And, in the aftermath of the recent earthquakes, the rebuilding of the city has introduced new and immediate waste disposal pressures that are very likely to keep zero waste to landfill well down on the list of priorities for some time to come.

The next chapter examines the zero waste to landfill initiative undertaken in Toronto, Canada.

Chapter 5: Toronto

5.0 Introduction

In 2001, the City of Toronto launched *Task Force 2010*, a waste reduction initiative with a zero waste to landfill by 2010 goal. This goal was adopted amid ongoing challenges regarding the siting of a new landfill site for the City's solid waste, in anticipation of the impending closure of the last local site at Keele Valley at the end of 2002.

Prior to the decision to undertake a zero waste to landfill initiative, the City had actively considered the option of shipping its waste 500 km by rail, to the decommissioned Adams Mine site, in northern Ontario. However, amid extensive opposition from both the Toronto and northern Ontario regions, City Council rejected this option in 2000.

Meanwhile, the City had already in 1996 signed its first contract to ship its waste, by truck, 400 km away and across the Canada-USA border, to private landfills in the State of Michigan. These rubbish exports began in 1998, and continued with a peak rate of shipments reaching over 140 trucks/day in 2003.

Toronto began its zero waste to landfill initiative with a reported residential diversion from landfill rate of 27% in 2001, and surpassed the Phase I goal of 30% diversion by recording a 32% rate in 2003. Without a comprehensive plan for addressing the remaining waste stream, however, the Phase II target of 60% diversion by 2006 appeared increasingly out of reach, and in 2005 the deadline for this intermediate target was pushed back to 2008 – and the ultimate zero waste to landfill deadline of 2010 was likewise postponed to 2012.

The City achieved a reported diversion rate of 42% in 2006 – a far cry from its original Phase II goal – and around this time resistance was mounting from the State of Michigan against allowing further importing of Toronto's rubbish. The resulting threat of an imminent waste crisis was alleviated with the City's purchase, negotiated in 2006 and finalised in 2007, of the Green Lane Landfill, located 200 km from Toronto in southwestern Ontario.

The purchase of the Green Lane site, which offered Toronto up to more than 20 years of further landfill capacity, coincided with a policy shift from the City regarding its waste reduction goals. In 2007, City Council voted to replace the zero waste to landfill initiative with *Target 70*, a new programme with an overall goal of 70% diversion from landfill by

2010. By 2010, however, even this scaled-back initiative had fallen short, with the City reporting a diversion rate of only 47%. Meanwhile, Toronto's waste shipments to Michigan came to a close at the end of 2010, with the Green Lane Landfill opening at the start of 2011.

Toronto's zero waste to landfill by 2010 initiative has failed – by falling far short of the goal, as well as by being abandoned three years before the original deadline. While the City of Toronto has managed to achieve a steady decrease in the per capita rate of waste to landfill since 2001, the rate of decrease has been very modest, and as of 2011 the estimated per capita rate remains at over 550 kg/person/year, and more than three-quarters of the 2000 waste to landfill level remains between the status quo and the ultimate target of zero waste to landfill. If the second half of getting to zero waste is the much harder part, then it can be reasonably said of Toronto that it has only made it halfway through its easiest stage.

The fate of Toronto's zero waste to landfill initiative appears to be linked closely to the City's perceived availability of future landfill capacity – starting with the initiative's launch amid an acute imminent inability to find a new site, and ending with the securing of the Green Lane site which was followed shortly thereafter by the outright abandonment of the zero waste programme. Another evident obstacle faced by the Target 2010 initiative was its stated need for 'new and emerging technologies' to address the remaining problematic waste components that the City's existing waste reduction strategies could not mitigate. Ultimately, these hoped-for technological advancements simply did not materialise, and as this outcome became increasingly evident, the initial optimism expressed regarding achieving zero waste gave way to increasing doubt that the initiative could succeed.

The sections of this chapter which follow give a detailed account and analysis of the events surrounding Toronto's zero waste to landfill by 2010 initiative.

5.1 Toronto: Economic and Provincial Capital

The City of Toronto has a population of 2.7 million, making it the largest city in Canada and the fifth largest in North America (City of Toronto, 2012c). It is an amalgamated city, resulting from the merger of seven municipalities in 1998 (City of Toronto, 2012d). In addition to being Canada's principal financial and corporate centre, it is also a seat of government, being the capital of Ontario – the country's largest province by population and second largest by area. Toronto is located in the Great Lakes region of North America, along the northwest shore of Lake Ontario (City of Toronto, 2012e).

The events surrounding Toronto's zero waste to landfill initiative, which are discussed in detail in this chapter, are summarised in chronological order in the next section.

5.2 Timeline: Toronto's Zero Waste to Landfill by 2010 Initiative

- 1996: With the local Keele Valley Landfill scheduled to close at the end of 2002, the City of Toronto negotiates the first of a series of contracts to ship its solid waste across the border to privately-owned landfill sites in Michigan, USA – 400 km from Toronto.
- 1998: First shipments of City of Toronto waste to Michigan landfills.
- 2000: A proposal to ship Toronto's waste to the Adams Mine site in northern Ontario, 500 km from the city, is rejected by City Council.
- January 2001: City of Toronto announces the formation of *Waste Diversion Task Force 2010*, pledges targets of 30% by 2003 (Phase I), 60% by 2006 (Phase II), and 100% by 2010 (Phase III), and invites public input for the purpose of shaping the final strategy.
- June 2001: City releases the *Waste Diversion Task Force 2010 Report* which confirms the Phases I-III targets including 100% diversion by 2010 – thereby launching Toronto's zero waste to landfill initiative.
- 2002: Commencement of Optimization Environmental Assessment of the privately-owned Green Lane Landfill in southwestern Ontario, 200 km from Toronto.
- December 2002: The City of Toronto's shipments of solid waste to the local Keele Valley Landfill site come to an end.
- 2003: Waste shipments to Michigan peak at 142 trucks/day; City reports a diversion rate of 32% by the end of the year, surpassing the Phase I goal of 30%.
- March 2004: Michigan passes a series of solid waste legislation bills into law, giving the State new powers to restrict waste imports from Toronto.
- June 2004: Ontario government passes the *Adams Mine Lake Act*, which prohibits the disposal of any waste into the Adams Mine site.

- December 2004: The City's New and Emerging Technologies, Policies and Practices Advisory Group releases their *Final Report* to the Works Committee, in which they conclude that the zero waste to landfill by 2010 goal is not achievable.
- 2005: With the City's reported diversion rate at 40% – 20 percentage points short of the Phase II target – the deadline for reaching 60% diversion is pushed back from 2006 to 2008, and the deadline for achieving zero waste to landfill is extended from 2010 to 2012.
- September 2006: Toronto City Council approves the purchase of the Green Lane Landfill site, to take effect in April 2007.
- June 2007: Toronto City Council votes to adopt the revised *Target 70* goal of 70% diversion of waste from landfill by 2010, effectively ending the Task Force 2010 zero waste to landfill by 2010 initiative that was launched in 2001.
- December 2010: Last shipments of waste from City of Toronto to Michigan landfills.
- 2010: City reports a diversion rate of 47%, falling far short of the Target 70 goal.
- January 2011: City of Toronto commences shipments of waste to the Green Lane Landfill.
- October 2011: City Council votes to privatise the contracting of residential solid waste collection in the western half of Toronto, with private service commencing in August 2012.
- 2012: City's overall waste reduction goal remains at 70% diversion from landfill with no new deadline, and with the Target 70 programme currently under review by the City's Solid Waste department.

The next section discusses the events surrounding the launch of Toronto's zero waste to landfill by 2010 initiative.

5.3 Landfill Availability Pressures and the Launch of Task Force 2010

The principal impetus for Toronto's adoption of a zero waste to landfill initiative appears to have been a looming shortage of landfill capacity (G. De Baeremaeker, pers. comm., May 18,

2011; G. Perks, pers. comm., May 19, 2011; M. Kane, pers. comm., May 19, 2011). The Keele Valley Landfill, situated 9 km north of Toronto's city limits in neighbouring York Region, was the City's last locally-sited landfill site, with waste from Toronto sent there between 1983 and 2002 (City of Toronto, 2002). In the years leading up to the filling to capacity of the Keele Valley site, the Municipality of Metropolitan Toronto (Metro Toronto) – the precursor to the present-day City of Toronto – investigated numerous options for a replacement landfill site. Possible sites that were investigated included three elsewhere in Ontario, and two across the Canada-USA border in the state of Michigan (City of Toronto, 2006). However, the only options under serious consideration at the time were transporting by rail to the decommissioned Adams Mine in Northern Ontario, and trucking to existing private landfills in Michigan (Flynn, 2011). No alternative to the transporting of waste out of the city and over great distances was on the table: the Michigan landfills were over 400 km from Toronto, while the Adams Lake Mine was over 500 km away.

In 1996, as an attempt to gain approval for the Adams Mine landfill met with formidable opposition, Metro Toronto negotiated the first in a series of contracts to send waste to Michigan. The contract covered only a portion of the city's waste, and was a short-term contract meant to prolong the life of the local Keele Valley site until the Adams Lake Mine or some other Ontario site could be secured for the long term (Heins, 2007). These first waste shipments, to the Arbor Hills Landfill, took place in 1998 (City of Toronto, 2006). In the meantime, the Adams Mine Landfill proposal was eventually rejected by Toronto City Council in 2000 (Wroe, 2000), and a further contract to ship waste to the Carleton Farms Landfill in Michigan was signed, with waste shipments there beginning in 2001 (City of Toronto, 2006). By the beginning of 2003, all of Toronto's waste was being transported to Michigan.

The ongoing challenges faced by Toronto in finding new and acceptable landfill sites prompted the city to search for an alternative to landfill dependency. This led to the creation of the *Waste Diversion Task Force 2010*, which is discussed in the next section.

5.4 2001: Task Force 2010

"We need a plan which everyone can buy into so that by 2010 all our waste will be recycled, reused or composted. Task Force 2010 must find a made-in-Toronto solution that demonstrates leadership in waste diversion strategies and new solutions for the 21st century that move beyond the landfilling of garbage." – Mel Lastman, City of Toronto Mayor, 2001 (City of Toronto, 2001b, p. 1).

In January of 2001, in the wake of the failed attempts to send waste to the Adams Lake Mine and at the same time that shipments to Michigan began, the City of Toronto announced the formation of the *Waste Diversion Task Force 2010* (City of Toronto, 2012f). This group comprised all Toronto City Councillors, and was co-chaired by Mayor Mel Lastman and the Chair of the Works Committee, Councillor Betty Disero. The public announcement noted that Toronto's current diversion from landfill rate was 24%, and pledged targets of 30% by 2003 (Phase I), 60% by 2006 (Phase II), and 100% by 2010 (Phase III) (City of Toronto, 2001a). In the months that followed, consultation meetings were held across the city, with councillors and staff seeking input from the general public for the purpose of shaping the final strategy (M. Kane, pers. comm., May 19, 2011).

In June of 2001, the City released the *Waste Diversion Task Force 2010 Report* (City of Toronto, 2001b), which noted that disposal costs were increasing from $12/tonne for landfilling waste locally at Keele Valley, to $52/tonne for sending it to Michigan, confirmed Toronto's target of zero waste to landfill by 2010, and outlined the plan for getting there. The situation was summarised this way (p. 3): "the option of dumping our garbage into landfill is no longer a practical option. That window of opportunity has opened and closed."

The report contained numerous other rhetorical references to the importance of the zero waste to landfill goal, such as (p. 3):

> "It's a visionary plan — a great city needs to dream great dreams. It's an ambitious plan — a great city must have a big reach. And it's a practical plan — affordable, realistic and doable.
>
> Most of all it's a necessary plan. We simply can't afford to keep burying so many precious resources in landfills. Garbage is a terrible thing to waste."

The following statement from the report acknowledged that success would, however, require significant follow-through (p. 4): “If the City is to succeed in reaching its targets, we must have careful and determined implementation of our policy decisions.”

The report also offered a clear position from the City that the zero waste to landfill initiative was something that the public was ready and willing to undertake (p. 4):

> “We believe that Torontonians are ready for the changes that we propose. Our existing programs have been enormously successful. And people have told us time and again that they're eager to move on to the next step. In fact, we found a lot of anger over the way our society produces and discards items in a manner that is totally unsustainable.”

The report also emphasised the need to focus efforts on the top-of-pipe, and strong language suggestive of paradigm-shifting was used to express this (p. 4):

> “Changing habits is important. But so is changing minds. We have to encourage the people of Toronto to see leftover household material not as "waste" but as a valuable resource that can be used again and again. Indeed, we shouldn't even be talking about "municipal solid waste (MSW)" but rather "municipal solid resources (MSR)." Public information and education must be a large part of our effort.”

While the rhetoric was largely focused on rethinking the very meaning of waste, the actual commitments to action offered in the report – built around a comprehensive set of 47 recommendations (see pp. 29-32 for a summary of these) – mostly included a range of end-of-pipe measures. These included the introduction of a third bin for kerbside organics collection, development of an anaerobic digestion facility for processing organic waste, expansion of residential recycling with an emphasis on improving multi-residential dwelling service, and the creation of a voluntary ‘Take it Back’ programme which would allow residents to return hazardous household substances such as paints, cleaners, batteries, and medications to retailers.

The emphasis on end-of-pipe strategies was explained this way (p. 4): “This report focuses mainly on meeting our targets for the first two phases. It is based on what we now know and what we now have the capacity to do.”

To tackle the Phase III goal of no residuals, it was recommended that "Staff be directed to enter into partnership with other GTA [Greater Toronto Area] regions for the purpose of exploring new and emerging technologies" (p. 30). The report also called for the creation of a Resource Diversion Implementation Working Group, which would be given a mandate to "shape a more detailed strategy for ensuring that Council's target of 100 percent diversion by 2010 is met" (p. 32).

With the Waste Diversion Task Force 2010 thus officially launched, the City of Toronto embarked on its zero waste to landfill initiative. The sections which follow examine the events which subsequently unfolded, and how they impacted upon the initiative.

5.5 2001-2003: Phase I

At the time that the zero waste to landfill by 2010 goal was rolled out in June 2001, Toronto was already sending some of its waste across the border to Michigan, and the local Keele Valley Landfill was scheduled to close by the end of the following year. With that deadline looming, the search for new landfill capacity ran parallel to the official Task Force 2010 initiative.

Although the northern Ontario Adams Mine landfill proposal had previously been rejected by the City in 2000, the developers and Mayor of Kirkland Lake responded to Toronto's new zero waste initiative by rebranding the scheme as an environmentally-friendly one, with the new addition of a composting plant adjacent to the landfill (Johnston, 2001). However, in December 2001, the City voted to continue sending its garbage to Michigan (Wroe, 2001).

Toronto's landfill capacity situation, however, remained highly uncertain. On 27 December 2002, three days before the local Keele Valley Landfill site was to close, and with all of the City's rubbish now about to be sent across the border to Michigan, the Works and Emergency Services department acknowledged that "the City's disposal plans are vulnerable to Canada/U.S. border security issues and potential new state/federal legislation and surcharges" (City of Toronto, 2002, par. 4).

As such – and while operating officially under a zero waste to landfill by 2010 initiative – the City of Toronto continued to explore their options regarding a long-term landfill site within Ontario. The provincial Conservative Party government of the day was still pursuing the Adams Mine site, amid ongoing controversy over allegations of questionable lobbying on the

proponents' behalf, including accusations that it was helping the Governor of Michigan in his attempts to block further waste shipments from Toronto. The City, however, repeatedly affirmed its unwillingness to further consider the Adams Mine site (Straight Goods, 2001).

The City of Toronto's focus by then had shifted to another potential site: the Green Lane Landfill, a privately-owned facility near the city of London in southwestern Ontario, that had been in operation since 1978 (Conestoga-Rovers & Associates, 2002), and was located 200 km from Toronto (City of Toronto, 2011). The City of Toronto had been scouting rural areas of this part of the province since the 1980s, when local landfill availability started to become a pressing issue, and communities in southwestern Ontario began fending off big-city waste (Belanger and Peat, 2010).

Commencing in 2002, an environmental assessment and related technical studies and approvals under provincial legislation were conducted (City of Toronto, 2012i), which paved the way for the City to be able to purchase the Green Lane site and use it as a landfill for Toronto's rubbish.

In 2002, the Province passed the Waste Diversion Act (WDA), with its stated purpose "to promote the reduction, reuse and recycling of waste and to provide for the development, implementation and operation of waste diversion programs" (Government of Ontario, 2002, Sec. 1). One of the principal provisions in the Act was the establishment of Waste Diversion Ontario (WDO), which is charged with developing, implementing and operating waste diversion programmes in the province.

In 2003, the year when the number of truckloads of waste going to Michigan peaked at 142/day (City of Toronto, 2010), City Council created the New and Emerging Technologies, Policies and Practices Advisory Group, comprising a mix of Council-appointed expert and non-expert citizens. The overall mandate of this committee included providing guidance on whether or not 100% diversion from landfill was an achievable objective, and assessing and developing opportunities to apply new technologies aimed at going beyond 60% diversion and towards zero waste to landfill (City of Toronto, 2003).

Early in their tenure, the group expressed concerns that the overall timelines for diversion were too short, and suggested that this pointed to a City staff preference for incinerating waste in the long term. Also raised was the concern that the shipments of all of Toronto's waste to Michigan were at an ongoing risk of being blocked, in spite of assurances that the

North America Free Trade agreement (NAFTA) protected it from cross-border issues. As well, it was noted that there was a lack of contingency planning by the City in the event that shipments were prevented for more than 21 consecutive days (Keenan, 2003).

Meanwhile, with a reported diversion from landfill rate of 32% for 2003, the Phase I target of 30% was surpassed (City of Toronto, 2004a). During this phase, the introduction of the Green Bins to single-family residences began, with the goal of extending this service to all such residences by 2005, and then extending this to multi-family residences. As Kane (pers. comm., May 19, 2011) notes, the increase in the overall diversion rate during this period was largely due to the introduction of the Green Bins, as the organics component represents approximately 30% of Toronto's overall waste stream.

However, while the City reported that Phase I was an overall success, it offered a pessimistic warning that the Phase II goal might be much more difficult to achieve (City of Toronto, 2004a, p. 2):

> "Although we now have some momentum toward our 2006 goal, the initiatives currently underway are not, by themselves, enough to allow us to reach the 60 percent target. Toronto is looking ahead at some difficult decisions if it is to reach its next milestone"

The City offered an even less confident view regarding the ultimate Phase III goal of zero waste to landfill, and suggested that as-yet-undeveloped technology was needed to address the last 40% of the waste stream (City of Toronto, 2004a, p. 2):

> "Similarly, it is unrealistic to believe we can recycle, reuse and compost our way to 100 percent diversion from Michigan landfill by 2010. The City will need to continue to explore new and emerging technologies that will allow us to manage the estimated 40 percent residual waste that will remain after recycling and green bin participation is maximized."

The next section discusses the outcomes of the next phase of Toronto's zero waste to landfill initiative, as 60% diversion became the new target.

5.6 2004-2006: Phase II

When the City of Toronto announced the results of Phase I to the public in early 2004 (City of Toronto, 2004a), the goals of Task Force 2010 were reiterated, with one subtle difference in wording being that the Phase III goal was now described as "a vision of 100% by 2010" (p. 1), as compared with the less ambiguous '100 percent by 2010' pledged in 2001.

In March 2004, the State of Michigan passed a series of solid waste legislation bills into law which gave itself new powers to restrict waste imports, including the right to close its border to waste for periods between 30-60 days, where threats to health, safety or the environment were identified (City of Toronto, 2004c).

In 2003, the Ontario General Election saw a new Liberal Party government replace the Conservative Party government that had ruled the province since 1995. In June 2004, the Liberal government passed the *Adams Mine Lake Act* (Government of Ontario, 2004), which prohibited the disposal of any waste in the Adams Mine site, and revoked, with financial compensation, all of the permits which had been granted to the private developer by the previous Conservative Party government, between 1998 and 2001.

With the ongoing pressures against waste shipments across the USA border, and the Adams Mine landfill proposal now off the table, Toronto was under increased pressure to secure new long-term landfill capacity – or else make good on its goal of zero waste to landfill by 2010.

In December 2004, the New and Emerging Technologies, Policies and Practices Advisory Group released their *Final Report* to the City's Works Committee (City of Toronto, 2004b), in which they concluded that "The goal of 100% diversion from landfill by 2010 is not achievable" (p. 4). Rather, it was suggested that a diversion rate of between 86% and 96% could potentially be achieved, using some combination of mechanical, biological and advanced thermal technologies. With the diversion rate expected to reach just 40% by 2006 under currently-approved programmes, the group also concluded that this rate could be raised to 50%-60% or higher by 2010, if new policies and practices that they were recommending were implemented. The report also indicated that City Council had specified that incineration should not be considered as a means of diverting waste from landfill, partly because the contract with the landfill operator in Michigan contained a clause which precluded the City from incinerating its waste.

At the start of 2005, the Grey Box for paper and cardboard, and Blue Box for other recyclables, were merged into one Blue Box, as the City moved to single-stream recycling. The City also acknowledged that many residents' recycling boxes were overflowing, and in response a pilot project was being undertaken to trial the use of a larger cart (City of Toronto, 2005c). In July of 2005, City Council passed a mandatory waste diversion bylaw for single-family residences, scheduled to take effect in April 2006, which would allow the City to discontinue rubbish collection for residences that did not participate in recycling (City of Toronto, 2005b).

With the City's reported diversion rate at around 40% in 2005 – 20 percentage points short of the Phase II target, the deadline for reaching 60% diversion was pushed back from 2006 to 2008 (M. Kane, pers. comm., May 19, 2011), and the deadline for achieving 100% diversion was revised from 2010 to 2012 (City of Toronto, 2005a).

In February 2006, Toronto City Council established a new citizen advisory group, the *Community Environmental Assessment Team* (CEAT), which was charged with guiding the City's environmental assessment process for managing residual waste (City of Toronto, 2012g).

Meanwhile, in June of 2006 the Green Lane Landfill's Optimization Environmental Assessment was given approval by the Ontario Minister of the Environment (City of Toronto, 2012j), and this paved the way for City Council to approve the purchase of the site – which it did in September 2006 (CityNews Toronto, 2006). The Green Lane site's location 200 km from Toronto meant that the City now had a landfilling alternative available at half the distance to Michigan (M. Kane, pers. comm., May 19, 2011), and as it was within Ontario this also meant that cross-border shipping of waste would no longer be an issue. Green Lane offered Toronto approximately 13 million tonnes of further landfill capacity, and with its purchase approved, City Council resolved that their previous position calling for 100% diversion from landfill be reconsidered (City of Toronto, 2007a).

2006 saw Toronto reach a reported diversion from landfill rate of 42% (M. Kane, pers. comm., May 19, 2011), far shy of the original target of 60%. With this degree of underperformance, coupled with the City's recent securing of decades' worth of further landfill capacity, the zero waste to landfill goal appeared to be on the verge of abandonment. When the City's incumbent Mayor, David Miller, was re-elected near the end

of the year with a campaign platform that included a revised target of 70% diversion (Spears, 2008a), the abandonment of zero waste became a near certainty – and the section which follows explains what happened next.

5.7 2007-Present: From 100% Diversion to Target 70

The City's purchase of the Green Lane Landfill was finalised in April 2007 (Spears, 2007). Two months later, Toronto City Council voted to adopt the revised goal of 70% diversion of waste from landfill by 2010 (City of Toronto, 2007c), effectively bringing to an end the zero waste initiative that was launched in 2001 with Task Force 2010. The revised initiative was given the name *Target 70*. Its principal goal was to increase diversion from 42% to 70% by 2010, which would thereby extend the useful life of the newly-acquired Green Lane Landfill until 2034 (City of Toronto, 2009c).

Meanwhile, Toronto has over the past few years taken direct action on several specific problematic waste items. In 2008, City Council voted to ban the sale of bottled water in all City offices and facilities (Spears, 2008b), and also voted to require retailers to charge a 5 cent fee on plastic shopping bags (PSBs), commencing in 2009 (City of Toronto, 2009d). While the measure has led to significant reductions in their rate of consumption (Draaisma, 2010), the bylaw itself exempted a wide array of PSBs from the fee, including bags for bulk foods, produce, meat and fish, hardware items, baked goods, prescription drugs, newspapers, and dry-cleaning (City of Toronto, 2009b).

One year after the introduction of the PSB fee, a further bylaw went into effect that prohibited Toronto retailers from offering biodegradable or compostable plastic bags, with the reason given that such bags were not compatible with the City's recycling processing system (City of Toronto, 2009a).

The latest development regarding the Toronto PSB bylaw occurred in June 2012, when City Council, under the urging of new Mayor Rob Ford, voted to rescind the bag fee. However, a subsequent motion at the same meeting, to ban the bags outright, was passed as well. The 5 cent fee disappeared effective July 2012, and the superseding ban will take effect in January 2013 (Church and Grant, 2012).

Another recent trend with regard to waste management in Toronto is that of privatisation. Residential rubbish collection in the city has historically been carried out by municipal

workers, but in October 2011 City Council voted to contract out this work for the western half of Toronto to private companies (Solid Waste & Recycling, 2012). The shift to private collection service, based on an election campaign promise of Mayor Ford "to contract out appropriate services and to save the City money" (City of Toronto, 2012b, par. 3), began on 07 August 2012, with the Mayor proclaiming that "This is a great day for the City of Toronto" (par. 3). This move towards privatisation of waste handling in Toronto follows the previous awarding of contracts to private companies, for the trucking of waste from the city to the Michigan landfills (City of Toronto, 2000).

The end of 2010 saw the final shipments of waste across the border into Michigan, and the start of 2011 marked the beginning of the landfilling of Toronto's waste at Green Lane (Belanger and Peat, 2010).

A sense of just how far Toronto has shifted away from its zero waste policy of 2001 can be gleaned from the following comment made by the Public Works and Infrastructure Committee Chair Denzil Minnan-Wong, upon the commencement of waste shipments to the Green Lane Landfill 200 km away from the city (City of Toronto, 2010, par. 4):

> "I'm pleased that, from this day forward, Toronto will be fully self-reliant to meet its landfill needs for the long term. It makes good business and environmental sense for a city the size of Toronto to have its own disposal facility."

The City of Toronto reported a residential diversion rate of 47% for 2010: 60% for single-family residences, and 20% for multi-family residences (Rathbone, 2011). This represents a more than 20 percentage point shortfall from the Target 70 goal, meaning that the Target 70 by 2010 initiative, which replaced the abandoned zero waste to landfill by 2010 goal, has also been a failure.

While both the Task Force 2010 and Target 70 initiatives have fallen short of their goals, the latter's 70% diversion rate is still mentioned as the City's official target. However, the Target 70 programme is currently under review by the City's Solid Waste department (City of Toronto, 2011).

The next section investigates the perspectives of various stakeholders, regarding Toronto's zero waste to landfill initiative.

5.8 Stakeholder Perspectives on Toronto's Zero Waste to Landfill Initiative

Table 5.1 provides a summary of the stakeholder interviews associated with the Toronto zero waste to landfill initiative case study, including name, affiliation/role, and date(s) of interview for each interviewee.

Table 5.1: Toronto Case Study Interview Summary
(Listed by Government (Elected/Staff), Industry (Regional/National), and Public (Local/Provincial), and in chronological order).

Interviewee Name	Affiliation/Role	Date(s) of Interview
Glenn De Baeremaeker	City Councillor, Toronto City Council	18 May 2011
Gord Perks	City Councillor, Toronto City Council	19 May 2011
Michelle Kane	Research Analyst, Waste Diversion Planning, City of Toronto	19 May 2011, 10 January 2012
Mike DiMaso	Senior Facility Coordinator, Exhibition Place, Toronto	19 May 2011
Charlotte Ueta	Research Analyst, Solid Waste Management Services, City of Toronto	17 July 2012
Peter Hargreave	Director, Policy & Strategy, Ontario Waste Management Association	24 July 2012
James Downham	President and CEO, Packaging Association of Canada	07 August 2012
Emily Alfred	Campaigner, Toronto Environmental Alliance	18 May 2011
Heather Marshall	Campaigner, Toronto Environmental Alliance	18 May 2011
Jo-Anne St. Godard	Executive Director, Recycling Council of Ontario	17 May 2011

Motivation for Launching a Zero Waste to Landfill Initiative

Growing concern about a possible lack of landfill space for Toronto's waste, leading up to the closure of the last local site at Keele Valley, is a common response to the question of why the City chose to embark on the zero waste to landfill initiative in 2001. According to Michelle Kane, Research Analyst with the City's Waste Diversion Planning department (pers. comm., May 19, 2011), it is extremely difficult to site a new landfill in Ontario, as much of the available land is in the remote northern regions, and there and elsewhere in the province local NIMBY resistance is strong. The 100% diversion goal was initiated by politicians, once the difficulty of siting new landfills in the province became apparent.

Toronto City Councillor Glenn De Baeremaeker (pers. comm., May 18, 2011) points to the political debate around the failed Adams Mine landfill proposal and commencement of shipments to Michigan, as the trigger for the zero waste declaration. City Councillor Gord Perks, meanwhile, notes that it was the Adams Mine proposal in particular that prompted

then-Mayor Mel Lastman to put forward the zero waste idea (G. Perks, pers. comm., May 19, 2011).

While the Phase III goal of 100% diversion from landfill was articulated in no uncertain terms by Toronto's leaders at the time of the programme launch in 2001, scepticism about this target is typical among stakeholders, in assessing the initiative in hindsight. Councillor Perks, who was an environmental campaigner with the Toronto Environmental Alliance (TEA) at the time of the Task Force 2010 launch, asserts that staff never had a plan for zero waste (G. Perks, pers. comm., May 19, 2011). This is concurred by City waste staffer Kane, who explains that the 100% diversion from landfill goal was always a strategic target and that it "wasn't something we fully anticipated meeting" (M. Kane, pers. comm., May 19, 2011).

Jo-Anne St. Godard, the Executive Director of the Recycling Council of Ontario (pers. comm., May 17, 2011), asserts that targets like zero waste are set and then not met time and time again, and as such they do not resonate well with the public. In her view, it would be better if governments chose to set more modest goals that they had a realistic chance of attaining – and then attained them.

Packaging Association of Canada President and CEO James Downham (pers. comm., August 07, 2012), however, argues that zero waste to landfill is ultimately a legitimate target:

> "It is certainly a worthwhile goal for Toronto and all other municipalities. It is the right thing to do and also from waste comes resources. There is "gold" in garbage dumps and we need to realize that as a fact and take the necessary actions to either mine it or not put it there in the first place."

The Role of Government

St. Godard (pers. comm., May 17, 2011), suggests that aspirational goals such as Task Force 2010's 100% diversion from landfill target are usually political in nature – typically driven by the personal leaning of political leaders of the day, such as a Mayor who is particularly interested in waste issues. She also notes that ambitious environmental targets like zero waste are seldom pushed at the bureaucracy level. Rather, these sorts of proclamations are typically the domain of politicians, who are notorious for making and breaking promises. St. Godard describes the adoption of zero waste goals as largely just political announcements that provide convenient media sound bites, but lack commitment to the policy, operational or leadership changes that have to happen to actually achieve results. She suggests that an

appropriate response to any politician who makes a declaration of an ambitious goal such as zero waste to landfill would be “can we see the plan?”

Perks (pers. comm., May 19, 2011) believes that environmental legislation such as that which brought in Task Force 2010 is generally resilient to a change in government. St. Godard (pers. comm., May 17, 2011), however, asserts that when change occurs in municipal government it is easy to repeal laws regarding waste, and this can happen as new city leaders may actually seek out previous laws or declarations to find weaknesses that can be justified as an excuse to change direction.

There were two municipal elections and one mayoral change between the launch of the zero waste to landfill goal in 2001, and its abandonment in 2007. Mayor Mel Lastman, who brought in and championed the zero waste goal, retired in 2003 and was replaced by David Miller, who won both the 2003 and 2006 mayoral elections. Kane (pers. comm., May 19, 2011) notes that it was under Mayor Miller’s administration that new powers to enforce waste diversion measures were enacted, such as the Mandatory Diversion Bylaw of 2006. However, it was this same Mayor who went on to make the revised 70% diversion goal a part of his successful 2006 re-election platform.

By 2007, zero waste to landfill was officially replaced with Target 70, but Kane (pers. comm., May 19, 2011) notes that even with the less ambitious target now before the City, the Mayor left it up to staff to figure out how they were going to get there. The most recent municipal elections took place in 2010, with David Miller stepping down and Rob Ford elected as the new Mayor. Ford is well-known in Toronto as a politician with little interest in environmental activism (see Soper, 2011, for example), and St. Godard (pers. comm., May 17, 2011) describes Ford’s new administration as a complete retrograde change on waste issues.

Kane (pers. comm., May 19, 2011) states that there has been no indication yet of a change of direction from the new City Council, regarding waste diversion issues. She notes, however, that the previous Mayor was keen on waste diversion, while the new Mayor and administration have not yet shown a similar level of interest. Kane points out, however, that the present staff and their departmental leadership are very keen on waste diversion and are pushing for this, and while it is ultimately the Mayor and 44 Councillors who make final

decisions, they seek out the advice from staff first and as such direction tends to work both ways.

On the provincial level, the work of Waste Diversion Ontario (WDO) to date has included diversion programmes for Blue Box recycling, used tyres, e-waste, and hazardous waste, and the introduction of Industry Stewardship Plans – a form of EPR programme which assigns a portion of waste diversion costs to producers (Waste Diversion Ontario, 2012a). However, criticism has been directed at the WDO and the Province in general, regarding the lack of progress on waste reduction. In January 2012, the Ontario Zero Waste Coalition, of which several Toronto-based grassroots organisations are members, issued a media release (Toronto Environmental Alliance, 2012) which stated that Ontario was moving in the wrong direction on waste. Among the reasons cited were: that the provincial government was encouraging incineration via taxpayer-funded subsidies to large multinational companies; that diversion from landfill was stagnating at around 23%, which is unchanged from a decade ago; and, that the Province was generally giving up on the zero waste ambitions it had previously embraced.

TEA campaigner Emily Alfred (pers. comm., May 18, 2011) points out that the City has limited jurisdiction on what consumers purchase, as they rely on provincial legislation for this. She notes that the City has been pushing on the provincial front, and waiting for results there before going ahead with their own local measures. Kane (pers. comm., May 19, 2011) offers a similar view that the Ontario government holds a huge amount of power over what Toronto can do about its waste, as they set the laws at the provincial level and the City has to abide by them. She acknowledges that diversion has been helped significantly by provincial programmes addressing product stewardship, e-waste, municipal hazardous waste, and packaging. Kane points out that even though Toronto is the biggest city in Ontario, final say on waste legislation rests with the Province – so if they are not interested in doing something around waste, it simply won't happen. She does note, however, that through membership in the Association of Municipalities of Ontario, and the Regional Public Works Commissioners of Ontario, Toronto manages to have a voice in both the political and senior bureaucratic arenas, at the provincial level.

Kane (pers. comm., May 19, 2011) observes that waste management issues in Toronto are not significantly influenced at the national level by the Canadian federal government, although she notes that international agreements such the Basel Convention on trans-

boundary shipments of hazardous waste will ultimately have a significant effect on the City's waste situation.

The Role of Industry

The Packaging Association of Canada's Downham (pers. comm., August 07, 2012) states that under a zero waste scenario, there would be a net positive gain in business for his industry, with green resource recovery jobs replacing packaging manufacturing jobs, and he sees organisations such as his leading the overall effort in this regard.

The Recycling Council of Ontario's St. Godard (pers. comm., May 17, 2011), however, asserts that while industry wants to be perceived as leading on environmental issues, they do not tend to do anything in this regard just for the sake of it. Rather, they tend to react either to shifts in consumer demand or government legislation. She suggests that governments need to take the lead in protecting the public good, and to do this they have to start introducing some blunt instruments and muster up the courage to regulate industry. In her view, relatively weak instruments such as minimal levels or thresholds, and vaguely-worded policy, are simply not good enough. Instead, what is needed is an holistic approach where policies are outcomes-based. St. Godard believes that the public needs to take responsibility for their own part, insofar as they are consumers with buying and voting power. However, she sees it as the responsibility of governments to rally the public in this regard.

Councillor Perks (pers. comm., May 19, 2011) asserts that the industry lobby has been increasingly intense in opposing waste and other environmental initiatives in Toronto. And Councillor De Baeremaeker (pers. comm., May 18, 2011) suggests that big corporations do not want to change, as they see change as equivalent to risk, to which they tend to be averse. He notes, however, that corporations know that changes around waste issues are inevitable, and as such they are preparing for change even while they resist it.

Industry is positioned at the very source of the waste stream, but TEA campaigner Heather Marshall (pers. comm., May 18, 2011) claims that very little action has been made to date at the top-of-pipe in Toronto, other than an in-store packaging initiative that was passed in 2008 and included a plastic bag fee that has been implemented, as well as a single-use beverage cup ban/fee proposal that did not succeed. Kane (pers. comm., May 19, 2011), meanwhile, notes that there has been considerable pushback from industry on initiatives such as these.

The Role of the Public

De Baeremaeker (pers. comm., May 18, 2011) argues that Toronto residents are aware of the waste problem, and notes that where recycling was once non-existent just a few decades ago, today a non-recycler would be widely seen in the community as being crass, narrow-minded, and even anti-social – and this applied across demographic categories such as ethnicity and income.

However, Mike DiMaso, Senior Facility Coordinator at Toronto's Exhibition Place convention complex (pers. comm., May 19, 2011), suggests that this does not translate to a buy-in from the public to the higher principles of zero waste. In his view, public co-operation is the hardest part of achieving zero waste goals, and the key to success in this area lies in giving people no choice, via mandatory legislation.

On packaging waste in particular, Downham (pers. comm., August 07, 2012) concurs: "Generally globally consumers first of all are not educated nor engaged about packaging recycling or recovery specifically. And there will also be that select group of people that don't care. That's the way life is unfortunately."

Downham (pers. comm., August 07, 2012) cites the additional problem in Toronto that with the enormous growth of condominium and other multiple-residential dwellings, and the City's relative ineffectiveness in achieving waste reduction in this sector of the community, overall public participation has been very poor.

Marshall (pers. comm., May 19, 2011) acknowledges that the City of Toronto has undertaken a number of initiatives around encouraging public awareness and action on waste, but points out that these are mainly end-of-pipe efforts that are not changing consumer behaviour. She suggests that the city has not offered much education on avoiding waste because they are still trying to get people informed about how to sort their waste for recycling – including the work of translating this information into 26 languages.

Fundamental Challenges to Achieving Zero Waste to Landfill

The last comment in the previous section hints at a recurring theme of recycling assuming a dual role: on the one hand, recycling is often featured as a point of pride in Toronto's efforts to date on achieving zero waste; on the other hand, recycling often appears to be a distraction from – or even a hindrance to – sincere efforts to attain zero waste.

The Recycling Council of Ontario's St. Godard (pers. comm., May 17, 2011) cites Toronto's current recycling participation rate of around 90%, and states that what was thought impossible 25 years ago is now the norm, adding: "Give us another couple of decades, we will hit very close to zero garbage."

De Baeremaeker, however, suggests a need for scepticism about the accuracy of such recycling data, and notes the example of clear plastic egg cartons, which were thought to be recyclable but in reality were not (pers. comm., May 18, 2011). Kane (pers. comm., May 19, 2011) confirms that clear clamshell packaging is not being recycled in Toronto at present, and as with other problem materials the City is working on establishing markets for them, and then developing the necessary sorting infrastructure. De Baeremaeker (pers. comm., May 18, 2011) adds that one of the biggest problems Toronto has with recycling is that the City cannot handle the myriad different products in the marketplace, and gives as another example the variety of different single-use bags in circulation: "They're all different. As soon as you think you can recycle plastic bags, somebody comes out with one you can't recycle." Even biodegradable plastic bags – which are seen as an exemplar zero waste solution in cities elsewhere – are a recycling no-go in Toronto. The City does not want these bags in the Blue Boxes, says Kane (pers. comm., May 19, 2011), because there is no visual way to distinguish between them and other plastic bags, which means that the biodegradable bags end up as a contaminant in the recyclable stream.

De Baeremaeker (pers. comm., May 18, 2011) points out that when the City said that all recyclables had to go into the Blue Box by a certain date, residents were generally compliant, as long as they knew that these materials – like the rubbish – were all going to continue to be taken away. However, Kane (pers. comm., May 19, 2011) notes that diversion rates are lower than what they could potentially be, because the City is telling people that they can put some things in the Blue Box, but not others, and it is confusing to the public.

TEA's Alfred (pers. comm., May 18, 2011) observes that the Province of Ontario requires every municipality to offer blue box recycling to their residents, but not much else is required. Fellow campaigner Marshall (pers. comm., May 18, 2011) points out that many people are choosing the biggest possible recycling bins, and this act is often viewed as a positive thing – even though a lot of this 'recycled' material ends up as waste in the landfill. In her view, the City is not doing enough at the top-of-pipe.

Incineration has been an often-considered and highly debated alternative form of waste disposal for Toronto, especially amidst the challenges to find new landfill capacity (see Sheppard, 2006 and Gombu, 2007, for example).

Alfred (pers. comm., May 18, 2011) suggests that the controversy around the Adams Mine landfill proposal, followed by efforts from Michigan to restrict what could be sent there, plus the difficulty of finding any other landfill sites, has increased public awareness for the need to reduce waste. But unfortunately, it has also fuelled renewed public support for the incineration option. *Energy-from-waste* (EFW) is a potential spinoff benefit from incineration, but as Marshall (pers. comm., May 18, 2011) points out, EFW processes require minimum constant flows of waste, and as such they essentially run counter to zero waste principles.

De Baeremaeker (pers. comm., May 18, 2011) suggests that Toronto's abandonment of the 100% diversion goal was actually a good idea, because it was unrealistic in the absence of the incineration option which the City was not prepared to pursue. Kane (pers. comm., May 19, 2011) concurs that previous City Councils have rejected the idea of waste incineration, but adds that this position might change with Toronto's new administration.

St. Godard (pers. comm., May 17, 2011) observes that zero waste has become "a very tired…a very overused term". And a senior waste manager at the provincial level in Ontario, who did not wish to be identified, sees zero waste as "a notional objective", and "not achievable in an urban centre, at least not with the society we presently have" (Anonymous, pers. comm., May 16, 2011).

Marshall (pers. comm., May 18, 2011) views efforts to address the top of the waste pipe as being very challenging for municipalities, because they have very little influence over what types of products businesses offer to consumers. This is concurred by Kane (pers. comm., May 19, 2011), who says that the City of Toronto is largely unable to control the resulting waste that comes in. But while this suggests that the ability to achieve zero waste goals lies more in the hands of industry, there is little evidence to suggest that industry is willing to act accordingly – or that government at any level is willing to use their powers to force them to do so.

De Baeremaeker (pers. comm., May 18, 2011) asserts that industry would be willing to put better products into the marketplace if there existed economies of scale to make these

products more affordable. He believes that this scenario will come later as consumer demand for less wasteful products increases, but in the meantime government is needed to intervene and regulate what industry is doing. De Baeremaeker cites the example of chemicals in everyday products, and suggests that a disconnect exists between consumer demand and industry supply: "We're producing more of these than ever before, but the public wants less." As a Councillor himself, he acknowledges that there is power in City Council to enact legislation at the municipal level to address the waste problem, but he observes that the City's legislative process is skewed against the public interest because decision-making power is concentrated in just 44 Councillors, and if industry interests can "smother us all with lots and lots of money", enough votes can be won. De Baeremaeker does not see this as a matter of outright corruption or bribery, but he acknowledges that to a sufficient enough extent at City Hall, "money talks".

Extended Producer Responsibility (EPR) is often touted as a means for industry to carry its rightful share of the waste load, and at the provincial level in Ontario a number of such initiatives have been implemented (see Waste Diversion Ontario, 2012b). However, there is evidence that industry has on the whole managed to avoid bearing their share of the load. Marshall (pers. comm., May 18, 2011) points to the example of the City's collection of bulky items such as refrigerators and mattresses, where the costs of this programme are taxpayer-subsidised instead of being paid for by producers under an EPR-type scheme. Alfred (pers. comm., May 18, 2011) notes that when the provincial government brought in 'eco-fees' in 2010, in order to pay for recycling of hazardous materials such as batteries and paint, there was a widespread backlash from the public against having to bear costs that should have been borne by industry. The government responded by scrapping the eco-fees within several weeks, but no equivalent EPR scheme was introduced to replace them. Alfred adds, however, that while consumers typically demand that more products be accepted into the Blue Box recycling bin, they also typically show concern that if EPR was imposed to pay for this, it might lead producers to remove their products from the local market.

Downham, meanwhile (pers. comm., August 07, 2012), suggests that Canadian EPR legislation is flawed with respect to lack of harmonisation of policy across and even within provinces. This lack of consistency, he observes, creates problems for industry as it creates cost uncertainty and a lack of control in general.

De Baeremaeker (pers. comm., May 18, 2011) observes that European governments are well ahead of Toronto in terms of implementing EPR, and he believes that future solutions are going to come from that part of the world. In his view, government legislation is needed to address the waste problem, as without it responsible producers are at a competitive disadvantage against producers making problematic products.

Where Toronto City Council has taken direct action on the waste reduction front, efforts have often only been partial, with results that do not lend themselves to the achievement of a zero waste to landfill goal. A prominent example is the City's PSB fee – now set to become a ban in 2013 – which includes a significant amount of exceptions which, in the end, will mean a significant rate of PSB consumption will remain. As for the ban on biodegradable or compostable plastic bags – which distinguishes Toronto from many other cities which have embraced this alternative option – Councillor Perks (pers. comm., May 19, 2011) explains that the rationale for this ban is that there is not really such a thing as biodegradable plastic, and he gives the example of corn starch bags which are essentially plastic polymers mixed with some corn.

With respect to the ban on selling bottled water at City facilities, Marshall (pers. comm., May 19, 2011) notes that while this particular bylaw allows Toronto to promote its tap water supply as a healthy and less wasteful alternative, this is only a partial solution as people can still buy bottled water elsewhere in the city.

Marshall (pers. comm., May 19, 2011) notes that top-of-pipe innovations are mainly coming from smaller companies, and she does not see a lot of investment going into areas like biomimicry or green chemistry. Rather, Marshall observes that most investing is concentrated at the end-of-pipe, and into things like EFW. She argues that cities tend to shy away from newer, more innovative technologies, because they are less proven, and need more time to prove themselves – which is too long for the short timeframes upon which municipal administrators are making decisions. In Marshall's view, this is why incineration – even using older technologies – still gets a close look from cities like Toronto.

Perhaps the greatest challenge of all to the attainment of a zero waste to landfill goal is widespread apathy about the issue, or even the belief that there is no problem in the first place. De Baeremaeker (pers. comm., May 18, 2011) notes that there are experts who assure us that filling one landfill site after another is fine, because the available land base is

very large, and we will not run out of space for a very long time. He adds that as long as garbage continues to just 'go away', people will continue to not care about it.

How Zero Waste Might Be Achieved

Downham (pers. comm., August 07, 2012) sees EFW as a part of the solution to the waste problem, but he notes that many politicians are afraid to consider this option as it carries a NIMBYist threat to their prospects with local voters. Downham cites Europe and the USA as regions where EFW is commonly embraced, but observes that most Canadian jurisdictions are apprehensive about this option, and he stresses that "EFW is verboten in Toronto."

Perks (pers. comm., May 19, 2011) believes that to achieve zero waste, there is a need to completely rethink solid waste services, shift the focus from end-of-pipe to top-of-pipe, and be willing to make a complete change in the nature of the economy. In the meantime, he argues for the banning of problematic materials and products. Perks cites the case of the use of pesticides, and how this is an example of an environmentally harmful product that has been regulated to a higher standard based upon precautionary principles.

Marshall (pers. comm., May 18, 2011) stresses the need for change in material selection and product design. She cites the overseas example of using banana leaves as food packaging, and wonders why analogous solutions cannot be found that would work in Toronto. De Baeremaeker (pers. comm., May 18, 2011) points out that such solutions already exist, and simply need commitment to behaviour change among both producers and consumers. He suggests that EPR is critical for zero waste to become a reality, and that global standards are necessary in this regard because individual consumers do not wield enough power on their own to influence industry. De Baeremaeker believes that industry standards need to be tough, but also suggests that government must support industry through these changes.

St. Godard (pers. comm., May 17, 2011) points to communities in the Maritimes region of eastern Canada as exemplars for waste reduction, and suggests that it is a relative shortage of land there that drives their efforts to reduce waste. She cites the particular example of the province of Prince Edward Island, where land is scarce and there is a strong preference to keep it available for tourism, rather than use it up for landfills. St. Godard adds that other exemplars can be found by looking out particularly for cities with landfill bans or levies. She notes that places like these often make no public announcements about their waste initiatives the way Toronto has done, yet they seem to be making the most progress on

landfill alternatives. Alfred (pers. comm., May 18, 2011) cites Adelaide in South Australia as a similar exemplar of a city that has gone very far with their waste initiatives.

While De Baeremaeker (pers. comm., May 18, 2011) is confident that positive change will come on the waste front, he is concerned about whether it will happen soon enough. St. Godard (pers. comm., May 17, 2011) believes that waste reduction may ride on the coattails of the more high-profile climate change issue, because both are essentially about consumption. Meanwhile, Marshall (pers. comm., May 18, 2011) suggests that an oil crisis might serve as the trigger for meaningful change around waste.

Alfred (pers. comm., May 18, 2011) doubts that 100% diversion from landfill is possible, because things like medical wastes – which include complex or hazardous materials – are considered so essential. She suggests that if zero waste could somehow be achieved, it would not likely happen first in a big city like Toronto, with its constant influx of people and products. Alfred believes that in a place like Toronto, legislation at higher levels of government is necessary, as is innovation in waste processing. Marshall (pers. comm., May 18, 2011) likewise does not think that Toronto would be among the first places to realise zero waste. She believes that this would be more likely to occur in rural, isolated areas, or else on an island with a strong controlling government. She sees the need for a complete societal shift before zero waste could be achieved anywhere, but believes it is possible and hopes it can happen in her lifetime.

Downham (pers. comm., August 07, 2012) suggests that free market systems and the companies functioning within them can drive zero waste to landfill success, if these systems are sustainable themselves. Marshall (pers. comm., May 18, 2011), however, argues that the ideal route to zero waste is to localise waste much more than it is at present, to make waste management a personal habit for people. This should include local sites for re-use, and education to teach people how to repair things. Also essential would be more EPR, and better urban planning for easy access to facilities via walking/cycling/transit. She sees local disposal as a possibility, if it could be done in such a way that it did not end up disproportionately in low-income areas, as has been the historical precedent. Marshall believes that such a localised system would place a lot of social pressure on people at the local level, to minimise waste impacts. Alfred (pers. comm., May 18, 2011) concurs, asserting that if you had to see your discarded waste in your own neighbourhood instead of having it just taken away, it would have a huge positive influence on behaviour.

The last section of this chapter gives a summary of the Toronto zero waste to landfill initiative.

5.9 Summary of Toronto's Zero Waste to Landfill Initiative

Figure 5.1 summarises the waste picture in the City of Toronto, surrounding the time of the zero waste to landfill initiative.

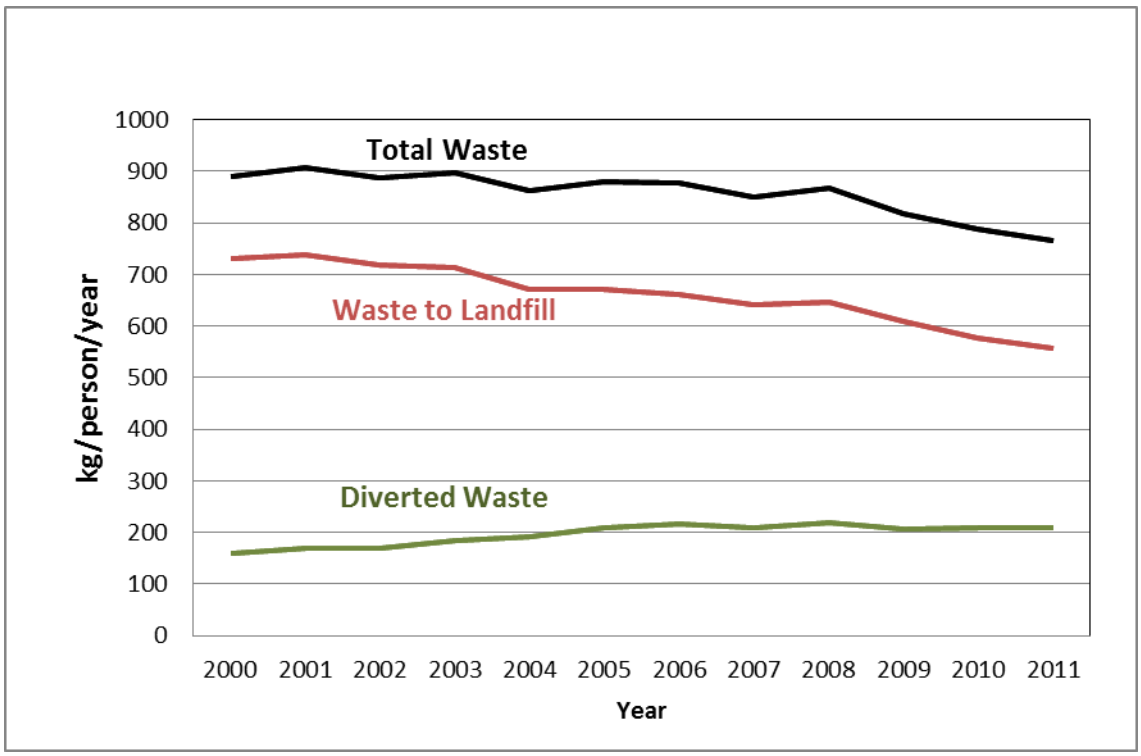

Figure 5.1: Waste Generation Trends in Toronto
(based on data from Kane (pers. comm., January 10, 2012), Hargreave (pers. comm., July 24, 2012), and Canada Census figures for 2001 and 2006 (City of Toronto, 2012h), and 2011 (City of Toronto, 2012a).

Unlike the other case study locations where waste data is measured across all contributing sectors, the City of Toronto only measures its residential waste stream amounts – the non-residential sector's waste is collected by private haulers, and the City does not track these amounts (C. Ueta, pers. comm., July 17, 2012). Therefore, estimates of the non-residential waste stream amounts are based upon Ontario Waste Management Association statistics for the entire province, which estimate a 40%-60% split between residential and non-residential sectors respectively, and an average non-residential sector diversion from landfill rate of 13% (P. Hargreave, pers. comm., July 24, 2012).

The graphs in Figure 5.1 show an overall increasing trend in the amount of waste diverted from landfill, and a corresponding overall decreasing trend in the amount of waste to landfill. In particular, per capita waste to landfill in Toronto has decreased by around 24% between 2000 and 2011.

While these key waste statistics have been trending in the positive direction, the rate of progress has simply been too slow to come close to the targets set over the initiative timeframe.

The original Task Force initiative was launched in 2001 when the residential diversion from landfill rate was 27%, with a final goal of 100% diversion by 2010. The Phase I target of 30% was exceeded, as a rate of 32% was reached by 2003.

The next target of 60% by 2006 was a considerably more ambitious one, and the City only managed to get to 42% – and although the deadline for Phase II was pushed back two years, the diversion rate only rose to 44% by 2008.

By then, however, the zero waste to landfill goal was already abandoned, and replaced by the 70% diversion by 2010 target. As of 2010, the diversion from landfill rate was at 47%, which is 23 percentage points below the Target 70 goal. With the target date for 70% having come and gone, the City of Toronto continues forward with the same diversion goal, but with no specific target date for getting there – and with the overall waste reduction policy and targets currently under review.

It is clear, based on the City's performance against their own targets, that Toronto's zero waste to landfill initiative was a failure – failing to meet its Phase II target by a wide margin, and then being abandoned three years ahead of a looming failure with respect to the ultimate Phase III zero waste to landfill goal. Furthermore, the revised and less ambitious Target 70 by 2010 initiative has failed to meet its mark as well.

The underperformance of Toronto's waste reduction initiatives seem even more marked when the non-residential sector is included in the estimates – as illustrated by the graphs of Figure 5.1. The per capita waste to landfill rate in 2000 was over 700 kg/person/year, and after dropping by around 24% by 2011, the resulting rate of just over 550 kg/person/year is still quite high in both relative and absolute terms. Considering that the first 50% of waste

reduction tends to be much easier than the final 50%, Toronto has only managed to complete around half of the easy part of its road to zero waste to landfill.

Even if the percent diversion from landfill measure is used, the results for Toronto are not very impressive once the non-residential component is incorporated into the estimates. Due to the relatively low levels of diversion in the non-residential versus residential sectors, the overall diversion rate estimates are significantly lower than the residential-only figures reported by the City. For example, the latest residential diversion rate, for 2011, is 49%; meanwhile, for the overall waste stream the figure is only 27%. Over the period 2000-2011, the overall diversion rate has increased steadily – but only from 18% to 27%. Whichever way one views Toronto's performance on waste reduction, the obvious conclusion is that progress is being made, but much more slowly than their prescribed deadlines require.

The City of Toronto's commitment to its zero waste initiative appears to have been strongly influenced by the issue that gave rise to it: *landfill availability*. In 2001, the City was confronted with the inability to successfully site a new landfill, to replace the Keele Valley site that was scheduled to close in two years' time. For a city of over 2 million people, having no assured plan for waste disposal in that short a timeframe is tantamount to risking a waste crisis – with implications ranging from initial inconvenience for residents if their rubbish collection is disrupted, to serious health risks that can escalate over time, if rubbish piles up in the city because there is nowhere to dispose of it. This was the potential scenario that Toronto staff and politicians were forced to consider, as the Adams Mine landfill proposal was rejected, and the backup plan of shipments to Michigan was increasingly threatened by protest and legal challenge.

With new landfill capacity proving to be extremely elusive to the City, the idea of zero waste became highly attractive to the Mayor and Councillors, because it offered a model for Toronto that promised – in theory – freedom from the need for future landfill capacity. Task Force 2010 was created as a waste-aware avatar of the existing City Council, and it offered the public a series of opportunities to provide input into the final waste strategy. It is important to note, however, that the Phase III goal of 100% diversion was already outlined in the Task Force's initial media release (City of Toronto, 2001), *before* the period of public consultation. It is reasonable to argue, therefore, that zero waste to landfill was something that the Mayor and other Councillors had decided to pursue, regardless of public opinion, by 2001. Positive feedback from the public – particularly from environmental activists in the

city – simply offered validation of this agenda, and from there City Council was able to sell the concept to its more sceptical waste management staff.

As has been noted in the previous section of this chapter, no comprehensive plan was ever drawn up for reaching 100% diversion for landfill, as City staff generally did not see this as anything more than an aspirational goal. And, as the Phase I goal of 30% diversion was a modest one based on a starting point of 27% and two years to achieve it, it is clear that at this early stage, concerns about how to get to the final goal were not pressing.

Phase II saw the City faced with the task of getting from 32% diversion to 60% in three years, and at this stage the zero waste initiative appears to have entered into a period of doubt and pessimism. The change in tone was hinted at early in 2004, when the City revised the wording of its Phase III goal to be a mere *vision* of 100% diversion (City of Toronto, 2004a). Later that same year, the City's New and Emerging Technologies, Policies and Practices Advisory Group delivered a less subtle message with their *Final Report*, in which they concluded that the 100% diversion goal – still six years away from the deadline – was "not achievable" (City of Toronto, 2004b, p. 4).

The decrease in optimism between Phases I and II can be attributed largely to the fact that the much-hoped-for 'new and emerging technologies' had simply not materialised. The first Task Force 2010 report, in 2001, spoke of "a time of unprecedented explosions of knowledge and technology", and looked nine years into the future and predicted that "many of the technologies that will exist in the year 2010 haven't even been invented yet" (City of Toronto, 2001b, p. 28). By 2005, however, with Toronto sitting at a diversion from landfill rate of 40%, a Phase II target of 60% approaching by the end of the following year, and the ultimate 100% diversion deadline just five years away, the City could not yet offer specific details about what any of the new and emerging technologies might be (City of Toronto, 2005a, p. 24).

While all of these events of Phases I and II were unfolding, the City continued to actively pursue and defend its future landfill options. From the commencement of shipments of waste to Michigan in 1998, Toronto was under continual pressure from opposition to the practice of cross-border waste disposal. Meanwhile, the last available local site at Keele Valley was closed by 2003, and with the Adams Mine no longer an option, the City had located a possible Ontario alternative in the Green Lane Landfill. By 2005, the feasibility of

achieving 100% diversion from landfill was widely in doubt, and by 2006, Toronto's existing arrangement of shipping all of its waste across the border was in serious jeopardy, with legislative bills before both the Michigan State Legislature and United States Congress that would limit, restrict or ban the exporting of waste from Canada (City of Toronto, 2007b). In this context, it is evident that the successful negotiation in 2006 to purchase the Green Lane Landfill, and the finalisation of its acquisition in 2007, represented a fortuitous escape from an impending waste crisis. Set against this near-miss, and with the alternative strategy of Target 70 offering landfill availability until 2034, it is also clear to see how City Council quickly lost interest in the zero waste to landfill initiative which it had enthusiastically embraced just a few years earlier.

Addressing waste at the top-of-pipe would require that the City tackle production and consumption behaviours, yet there has been little evidence of comprehensive efforts to this end. Even those initiatives which have been touted widely as examples of success, have generally not been genuine successes against the ultimate goal of zero waste to landfill. One prominent example is Toronto's PSB fee, which still allowed people the option of buying plastic bags – and will still allow for continued consumption to a significant extent even once the new ban is in effect, due to all of the exceptions in the bylaw. Another similar example is the bottled water ban, which prohibits bottled water sales in all city buildings and facilities – but still gives Torontonians the continued option of obtaining this product anywhere else in the city.

The latter example also illustrates the pressure that industry continues to exert over Toronto's decision-makers, regarding the implementation of legislation to reduce waste. When City Council debated the bottled water ban, representatives from bottled water companies lobbied Councillors right up until the final vote, pressing their case from the public gallery, with one Councillor acting as a go-between between the lobbyists in the gallery and Councillors on the chamber floor (Spears, 2008b). The bottled water ban went ahead despite lobbying efforts, but it seems reasonable to argue that the limited scope of the bylaw can be traced back to the tenacity of the industry lobby, and its ability to moderate City Council's ability to legislate change.

A final observation of the Toronto case is that the interest in zero waste to landfill at City Hall began with a perceived landfill crisis, and ended abruptly with the purchase of a new landfill site that ended the crisis threat. There is a lack of evidence to suggest that zero

waste was on the City's agenda before, and a further lack of evidence to suggest that it will reappear on the agenda in the foreseeable future.

The next chapter examines the zero waste to landfill initiative undertaken in San Francisco, USA.

Chapter 6: San Francisco

6.0 Introduction

Following from a State of California law that required cities to divert a minimum of 50% of waste from landfill by 2000, in 2002 the City and County of San Francisco launched its own further initiative to reach a diversion rate of 75% by 2010, and a 100% diversion rate – zero waste to landfill – by a time to be determined once the 50% diversion rate was confirmed.

San Francisco confirmed its surpassing of the State goal of 50% diversion in 2003, and in that year set a deadline of 2020 for achieving zero waste to landfill. The City thereby gave itself 17 years to reduce the per capita waste to landfill rate from over 800 kg/person/year, down to nothing.

Since the 2003 adoption of the goal, the programme has been run from the Zero Waste department of SF Environment, under the authority of the City's Mayor and Board of Supervisors (BoS), and their appointed Commission on the Environment (CoE).

In the nine years since 2003, the City has passed a significant number of ordinances which legislate change with respect to waste generation in San Francisco. Among these has been the high-profile plastic shopping bag (PSB) ban of 2007 – which has since become a model for similar bans around the world. Other problem wastes targeted through legislation include Construction and Demolition (C&D) debris, Styrofoam food ware, phone books, drinking water bottles, and cigarette litter.

The City has also rolled out a three-bin collection system across San Francisco, which includes composting in addition to recycling and rubbish kerbside pickup. The Mandatory Recycling and Composting Ordinance was passed in 2009, to enforce the implementation of this system across the city.

Since 2003, the reported percent diversion from landfill rate has risen from 63% to 77% – and this statistic has been widely promoted by the City as evidence that San Francisco is an exemplar for waste reduction among cities across the USA and around the world.

Other statistics, however, suggest that San Francisco's performance on waste reduction has been less impressive. During the period since 2003, absolute amounts of waste to landfill have dropped from 800 to 500 kg/person/year – which is a positive reduction trend but one

that has not matched the increase in the diversion rate. The reason for this is that the overall generation of waste in San Francisco has actually *increased* over this same period, from 1900 to 2200 kg/person/year. So, while the City has achieved success at managing waste at the end-of-pipe, it has thus far failed to address the fundamental problem of consumption which is driving waste generation at the top-of-pipe.

Examination of the San Francisco zero waste to landfill by 2020 initiative reveals a *planning void* – an absence of any comprehensive plan by the City to address the full range of waste stream components which are problematic and therefore confound attempts to wean San Francisco from landfill dependency. What exists in terms of zero waste to landfill planning in San Francisco is a disjointed set of actions in the form of ordinances and recycling and composting programmes, which in isolation are producing noticeable results, but which in the bigger waste reduction picture are not having a significant enough impact on reducing waste to landfill down towards zero.

While there remains eight years between now and the 2020 deadline, and much could change in San Francisco regarding waste reduction during this coming period, there is little indication that fundamental changes necessary to achieve zero waste to landfill are going to happen. In particular, the city remains very much a place of conspicuously high levels of material consumption, with convenience-based throwaway products made from problematic materials a ubiquitous part of the consumer landscape. Even with the high-profile bans on items such as PSBs and Styrofoam food ware, there are many exceptions to these bans, plus the sheer number of other problematic items that have not been addressed, thus it is difficult to detect any significant impact that these few measures have had on the overall waste situation in the city.

The City and their waste contractor Recology both affirm officially that they remain committed to San Francisco's stated goal of zero waste to landfill by 2020. However, recent changes have increased the strength of Recology's monopoly over waste services in the city, most notably with the landfill contract shifting from a closer site owned by another operator, to a much further site owned by Recology. That new landfilling contract, which begins in 2014-2015, will pose a potential conflict for both the City and Recology – as market forces may provide an incentive to recover less and landfill more. And with the new landfill contract extending to 2025 – five years beyond the zero waste to landfill date – both parties appear to be hedging their bets regarding the initiative's success.

In the face of these prevailing circumstances, it appears that San Francisco's zero waste to landfill by 2020 initiative is headed for failure.

The sections of this chapter which follow give a detailed account and analysis of the events to date surrounding San Francisco's zero waste to landfill by 2020 initiative.

6.1 San Francisco: City, County and Bay on the Cutting Edge

San Francisco is a consolidated city-county on the northern half of the west coast of the State of California in the USA. There are around 800,000 residents living within the city-county jurisdiction (United States Census Bureau, 2012a), while the San Francisco–Oakland–Fremont Metropolitan Area has a population of around 4.3 million, making it the 2nd-largest urban centre in California, and the 11th-largest in the USA (United States Census Bureau, 2012b). San Francisco is also a central part of the larger 'Bay Area', which includes the eight other counties that surround the San Francisco Bay, and is home to over 7 million residents (Bay Area Census, 2012).

San Francisco sits on the hilly northern end of a peninsula, surrounded on three sides by water: the San Francisco Bay to the east, the open Pacific Ocean to the west, and the Golden Gate Strait– the narrow entrance between Bay and Ocean – to the north (City-Data, 2012).

San Francisco's proximity to the San Andreas Fault has meant that its history has been marked significantly by earthquakes, including two very destructive ones which struck in the 20th century. The Great Earthquake of 1906 and massive fire which it triggered devastated much of the city, killing hundreds or even thousands of people and leaving nearly half of the city's population homeless (Virtual Museum of the City of San Francisco, 2012a). San Francisco was subsequently rebuilt and grew to become one of the USA's important urban centres. The second major seismic event of the century, the Loma Prieta earthquake of 1989, caused further significant damage and loss of life, and once again the city was thrust into a recovery and rebuilding period (Virtual Museum of the City of San Francisco, 2012b). 23 years later, San Francisco is one of America's most important political, economic and cultural centres, and it has become a widely-recognised global tourist destination that ranks among the most-visited cities in the world.

From its explosive early growth as a gold rush boomtown in the mid-19th century, San Francisco has been renowned among American cities as a centre of pioneering spirit,

iconoclastic thinking and progressive urban policy. Uppenkamp (2011) notes that San Francisco has played an unusually prominent role in the development of 'counterculture' in the United States. Following on the Beat Generation movement which made its mark on the city in the 1950s, in the 1960s San Francisco became the focal point for the American 'hippie' movement, which encompassed a rainbow coalition of movements which included those in favour of peace and opposed to the war in Vietnam, and culminated in the 'Summer of Love' of 1967, when thousands of 'flower children' converged on the city and its Haight-Ashbury district in particular (Ashbolt, 2007).

The City and County of San Francisco has its own department committed exclusively to environmental/sustainability issues: SF Environment (SF Environment, 2012a). The department administers programmes in the following distinct areas: Energy, Transportation, Toxics and Health, Buildings and Environments, Education and Equity, Climate Change, and Zero Waste.

The next section gives an overview of the history of waste management in San Francisco, from the early years of the city's history until the time surrounding the launch of the zero waste to landfill by 2020 initiative.

6.2 Waste Disposal in San Francisco: From Scavengers to Recology

As recently as a century ago, San Francisco did not have municipal sanitation services per se, but rather a haphazard distribution of independent or loosely affiliated 'scavengers', who collected waste door-to-door and competed fiercely over turf rights to do so. Profits were made from collection fees, as well as from the resale of items such as bottles, rags and broken furniture, and food waste which could be sold to pig farmers. In 1918, a special committee of the City was charged with investigating problems with the waste situation – including not just the chaotic nature of scavenger competition, but also problems associated with pollution from an old incinerator that was being used to process residual waste. Meanwhile, the scavengers soon organised themselves into two co-operative groups: the Sunset Scavenger Company in 1920, and the Scavengers' Protective Association in 1921. The latter group dominated coverage of the central city area, while the former covered the outlying neighbourhoods. In 1921, the City announced that it would invite tender bids for contracts in defined collection districts. However, neither co-operative bothered to submit

bids – an early indication of the high level of control that the scavengers held in San Francisco's waste market (Perry, 1998).

In 1932, the City passed the *Refuse Collection and Disposal Ordinance*, which divided San Francisco into 97 separate districts for waste collection/disposal purposes, and required that only a contractor holding the permit for a particular district had the right to service that area (San Francisco Department of Public Works, 2012). The two scavenger co-operatives eventually accumulated all of these permits via either acquisition or takeover (B. Besso, pers. comm., May 04, 2011).

In 1965 the Scavengers' Protective Association became the Golden Gate Disposal Company, and in 1973 Sunset Scavenger became Envirocal. Golden Gate Disposal then became Norcal Solid Waste Systems in 1983, and in in 1987 Norcal became an employee-owned company. Later that year, Norcal purchased Envirocal, and in the process became the fourth-largest garbage company in America (Funding Universe, 2012). With this final transaction, San Francisco's waste collection business became a monopoly with an indefinite timeframe, under the terms of the 1932 Ordinance. In 2009, Norcal changed its name to Recology (Eskenazi, 2009), a 100% employee-owned company whose new name is intended to convey their overall goal of 'resource recovery' (Recology, 2012).

The existing monopoly situation with indefinite timeframe means that the City is not able to demand a franchise fee from Recology. Such a fee is a standard practice in many other municipalities, and all Bay Area cities except San Francisco have such franchise agreements with their waste disposal providers. Another consequence of the wording of the 1932 ordinance is that Recology is the only company permitted to operate the City's transfer station, and the only company that can transport waste to the landfill, because they have exclusive rights to convey rubbish through the streets of San Francisco. The existing transfer station is located on land privately owned by Recology (Schwartz, 2012).

The events surrounding San Francisco's zero waste to landfill initiative, which are discussed in detail in this chapter, are summarised in chronological order in the next section.

6.3 Timeline: San Francisco's Zero Waste to Landfill by 2020 Initiative

- 1989: California State Legislature passes AB 939, the *Integrated Waste Management Act*, requiring all cities and counties in California to achieve 25% diversion of waste to landfill by 1995, and 50% by 2000.
- 1989: San Francisco introduces its blue-bucket residential recycling programme.
- 1993: San Francisco voters reject a ballot measure that would have ended Norcal's monopoly on waste handling in the city.
- 1994: San Francisco voters again reject a ballot measure that would have ended Norcal's monopoly on waste handling in the city.
- 1995: San Francisco surpasses the 25% diversion by 1995 target, reaching a 36% rate that year.
- 1999: Composting programme offered city-wide.
- 2000: City falls short of 50% diversion by 2000 target, instead reaching a rate of 46% by the deadline; extension granted by State of California until 2002.
- 2002: City achieves a 64% diversion rate.
- October 2002: San Francisco adopts a goal of 75% diversion by 2010, and a long-term goal of zero waste to landfill – with the deadline to be set once the 50% diversion target is met.
- March 2003: City sets 2020 as the deadline for achieving zero waste to landfill.
- 2004: Three-bin system is in place city-wide.
- June 2005: Passage of the *Environmentally Preferable Purchasing for Commodities* Ordinance, based on the 'Precautionary Principle', and introducing *Targeted Product Categories* and *Approved Alternatives Lists.*
- February 2006: Passage of the *Construction and Demolition Debris Recovery Ordinance*, which prohibits the disposal of construction and demolition (C&D) debris with the general rubbish stream, and requires certification for C&D waste haulers and processors.

- November 2006: Passage of the *Food Service Waste Reduction Ordinance*, which prohibits food vendors across the city from using polystyrene foam food service ware, and requires that other disposable food service ware must be compostable or recyclable.
- April 2007: Passage of the *Plastic Bag Reduction Ordinance*, which bans the common single-use plastic checkout bag from large supermarkets, and allows as alternatives only compostable plastic, recyclable paper, and reusable bags.
- June 2007: Mayor issues *Executive Directive on Bottled Water*, which prohibits the consumption of single-serving bottles of drinking water on City premises.
- 2008: City reports that its interim goal of 75% diversion from landfill by 2010 has been surpassed two years ahead of schedule, with a 77% rate for 2008.
- June 2009: Passage of the *Mandatory Recycling and Composting Ordinance*, which makes the sorting of waste into the three-bin system a legal requirement for all persons living, working or doing any other activities in the city.
- February 2011: Bill AB 1178 introduced in the California State Legislature, which would prohibit a city, county, or local agency from restricting or limiting in any way the importation of solid waste into its jurisdiction based on place of origin. The bill is supported by several private waste haulers including Recology, and opposed by various local governments and grassroots groups.
- July 2011: City votes to award Recology a 10-year contract to have all waste shipped to the company's landfill site 200 km from the city, commencing around 2015 and lasting until 2025 – five years past the zero waste to landfill deadline.
- February 2012: *Expanded Plastic Bag Reduction Ordinance* is passed, which widens the ban to include checkout bags in all retail shops and restaurants.
- June 2012, San Francisco residents reject Local Measure A, which if passed would have ended Recology's monopoly on waste handling in the city.
- August 2012: Stalled AB 1178 is reincarnated into AB 845 which passes the State Senate and goes to the Governor for final approval.

The next section discusses the events surrounding the launch of San Francisco's zero waste to landfill by 2020 initiative.

6.4 Zero Waste to Landfill by 2020

"RESOLVED, That the Commission on the Environment adopts a date for achieving zero waste to landfill by 2020 and directs the Department of the Environment to develop policies and programs to achieve zero waste, including increasing producer and consumer responsibility, in order that all discarded materials be diverted from landfill through recycling, composting or other means." – San Francisco Commission on the Environment, 2003 (SF Environment, 2003).

San Francisco's zero waste to landfill initiative has roots which can be traced back to a state government law passed in 1989, which sought to address the proliferation of waste by imposing minimum rates of diversion from landfill. AB 939, the *Integrated Waste Management Act* (CalRecycle, 1997) required all cities and counties in California to achieve 25% diversion by 1995, and 50% by 2000.

At the time of AB 939's introduction in 1989, San Francisco's waste diversion rate was sitting at around 25% (Sullivan, 2011). That same year, the City launched its residential blue-bucket recycling programme. While other California counties targeted landscape waste to reach their AB 939 goals, San Francisco – the city with the second-highest population density (after New York City) in the USA – has a relative lack of yard space and therefore a lack of comparable landscape waste. Waste characterisation studies were done which found that food scraps represented the bulk of the City's waste, so this was targeted to get to 50% diversion (A. Kielty, pers. com., May 02, 2011). San Francisco was the first city in the state to launch large-scale food composting, beginning with commercial service in 1996 and moving into the residential sector in 1997, with citywide service commencing in 1999 (Macy, as cited in Baume, 2010b). The City's system of three bins – green for compostables, blue for co-mingled recyclables, and black for rubbish, was introduced in 2000, and by 2004 was fully in place (Sullivan, 2011).

San Francisco surpassed the 25% diversion by 1995 target, reaching a State-defined 36% rate that year. However, the City came up short of the 50% diversion by 2000 target, instead reaching a rate of only 46% by the deadline (CalRecycle, 2012a). An extension was granted

to the City until 2003, when its 2002 results showed it had achieved a 64% rate of diversion (T. Rudy, pers. com., June 14, 2012).

In October 2002, the Board of Supervisors (BoS) passed Resolution No. 679-02 (SF Environment, 2002), which included the adoption of a goal of 75% diversion by 2010, and a long-term goal of zero waste to landfill – with the deadline to be set by the Mayor-appointed Commission on the Environment (CoE) once the 50% diversion target was met.

In the Resolution document it was pointed out that while San Francisco's diversion rate increased from 35% to 46% in the period from 1990 to 2000, waste to landfill amounts actually *increased* by 30%. It was also noted that for every tonne of municipal waste landfilled, 71 tonnes of manufacturing and production waste were disposed of in other ways.

The stated motivation for adopting the zero waste goal included that "several jurisdictions have adopted zero waste as a long term goal, including Santa Cruz and Del Norte Counties in California; Seattle, Washington; Toronto, Canada; Canberra, Australia; New South Wales, Australia and 45% of New Zealand's local governments" (p. 2).

Also included in the Resolution was a call for the State Legislature to adopt a similar zero waste goal with interim target of 75% diversion by 2010.

The Resolution also made reference to State law AB 1647, passed in 1996, which allows communities to include as diverted waste an unlimited amount of 'alternative daily cover' (ADC), which is defined by the California Department of Resources Recycling and Recovery (CalRecycle) as waste material used in the place of soil to cover the active face of the landfill at the end of each day, for the purpose of controlling vectors, fires, odours, blowing litter, and scavenging. Acceptable waste materials that can be used as ADC and thereby counted as diverted rather than landfilled waste, include: ash and cement kiln dust, treated auto shredder waste, construction and demolition waste, compost, green material, contaminated sediment, sludge, and shredded tyres (CalRecycle, 2010).

It was also noted that the State's granting of diversion credit for ADC use had resulted in a quadrupling of its use at some landfills, with as much as 45% of material in the landfill consisting of ADC. In response to this situation, it was further resolved by the BoS that a policy be adopted whereby the highest and best use of any discarded material would be

promoted, and whereby in each case ADC could only be counted towards diversion credit if no higher and better use was available (SF Environment, 2002).

The promised fixing of a target date for zero waste to landfill was delivered five months later, in March 2003, after SF Environment had determined that the diversion rate for 2001 had reached 52%. The CoE's Resolution No. 002-03-COE (SF Environment, 2003) set 2020 as the deadline for achieving zero waste to landfill, included the acknowledgement that the goal was "ambitious and will require product manufacturers and consumers to take responsibility to ensure that all discarded materials are diverted from landfill" (par. 4), and added a directive to SF Environment "to develop policies and programs to achieve zero waste, including increasing producer and consumer responsibility, in order that all discarded materials be diverted from landfill through recycling, composting or other means" (par. 5).

The next sections of this chapter examine how San Francisco's zero waste to landfill by 2020 initiative has unfolded from its launch until the present day.

6.5 2003-2010: 75% Diversion by 2010

The City did not create a specific plan for achieving the zero waste to landfill goal. However, it did pass a number of resolutions and ordinances that directly addressed reduction of various waste stream components.

In May 2004, the *Resource Efficiency Requirements and Green Building Standards Ordinance* was passed (San Francisco Board of Supervisors, 2004), which introduced stricter benchmarks for new building construction. The legislation cited justification for the new stricter measures which included the acknowledgement that building construction, operation and demolition accounted for 40% of global energy and 65% of global electricity consumption, and 35% of municipal solid waste in the USA. Another key driver for regulation in the area of construction and demolition (C&D) waste is the fact that unlike residential, commercial and city government waste which falls under Recology's monopoly, C&D waste is an exception and has historically been open to wider competition with numerous players.

The City's addressing of C&D waste expanded in February 2006, with the passage of the *Construction and Demolition Debris Recovery Ordinance* (San Francisco Board of Supervisors, 2006a), with the overall objective of maximizing the recycling of mixed C&D debris. The

legislation prohibited the disposal of C&D debris with the general rubbish stream, and required C&D waste haulers to be registered transporters, and to take this waste only to registered facilities that were able to divert a minimum of 65% of this waste from landfill disposal. Exceptions to the registered transporter requirement included property owners removing mixed C&D material with their own vehicles, and haulers with vehicles the size of a pickup truck or smaller. Also exempted were vehicles of any size carrying on-site, source-separated clean materials for reuse or recycling – and C&D disposal facilities that accepted only such clean and sorted materials were themselves exempt from the registration requirement (SF Environment, 2006).

The following year, in March 2007, the *Public Works Construction – Use of Recycled Content Materials Ordinance* was passed (San Francisco Board of Supervisors, 2007b), which required that City public works projects be put out for bidding with specifications for recycled content to the maximum extent feasible, within California Building Code and other applicable standards, and where such materials were comparable in price to virgin materials, and available within project timelines.

San Francisco government's role in leading the zero waste initiative by example had already been enhanced in June 2005, with the passage of the *Environmentally Preferable Purchasing for Commodities Ordinance* (San Francisco Board of Supervisors, 2005). This legislation aimed to limit City purchases to only those products which "do not harm human health or the environment….lead to a reduction in greenhouse gas emissions….improve the air quality….protect the quality of San Francisco's ground and surface waters" (pp. 3-4) and "preserve resources locally and globally" (p. 4). The Ordinance cited the 'Precautionary Principle' (see O'Riordan and Jordan, 1995 for discussion on the meaning of this term) as a guiding principle for determining whether or not something is deemed 'environmentally preferable'. The legislation gave SF Environment the authority to declare as a *Targeted Product Category* any "broad category of products routinely purchased by the City which have been identified by the Commission as having undesirable environmental health impacts for which alternative products should be identified and substituted" (San Francisco Board of Supervisors, 2005, p. 5). For each Targeted Product Category, the Department would develop, in consultation with City staff and relevant experts, an *Approved Alternatives List* of products which "will have a lesser impact on human health and the environment compared to other similar products, consistent with the Precautionary Principle" (p. 4). The next

month, in July 2005, the Department of the Environment released its follow-up *Regulation Adopting an Approved Alternatives List* (SF Environment, 2005), which included Approved Alternatives Lists for items already covered in the United States Environmental Protection Agency's existing Comprehensive Procurement Guideline programme (United States Environmental Protection Agency, 2012), as well as other items including batteries, and vehicle fuel containing methyl-tertiary-butyl ether.

Leadership from City Hall was further advanced in June 2007 with the Mayor's *Executive Directive on Bottled Water* (SF Environment, 2007). This order from the Mayor cited the environmental problems caused by the proliferation of plastic water bottles, highlighted the superior quality of San Francisco's snowmelt-sourced water supply, and noted that the cost of this local water was 1/1000th the cost of bottled water. The Directive prohibited, starting the following month of July, the purchase of any single-serving bottles of water – with no exception except where an employee contract specified its usage. The Mayor further ordered that, by December of that year, all City departments and agencies using bottled water dispensers had to switch to bottle-less dispensers utilizing the City's water supply – with exceptions granted only in cases of "legitimate engineering, health and fiscal concerns" (p. 2).

The general population of San Francisco was also targeted, with measures introduced to address several specific waste elements that it had targeted across the city. In November 2006, the *Food Service Waste Reduction Ordinance* was passed (San Francisco Board of Supervisors, 2006b), which banned food vendors across the city from using polystyrene foam – Styrofoam – food service ware, with no exceptions. Also included in the legislation was a requirement that any other disposable food service ware used in San Francisco must be compostable or recyclable, with an exemption from this requirement granted in cases where no suitable product existed that was within 15% of the cost of non-compostable or non-recyclable alternatives (SF Environment, 2012b).

The ban on Styrofoam was followed in April 2007 with what is perhaps San Francisco's most highly-publicised incremental step towards zero waste: the *Plastic Bag Reduction Ordinance* (San Francisco Board of Supervisors, 2007a). The Ordinance effectively banned the common single-use plastic shopping bag (PSB), and allowed shops to provide as alternatives only compostable plastic, recyclable paper, and reusable bags.

The PSB ban, however, only applied only to a shop if it was "a full-line, self-service retail store supermarket with gross annual sales of two million dollars ($2,000,000) or more, and which sells a line of dry grocery, canned goods, or nonfood items and some perishable items" (p. 5). This excluded many smaller grocery shops, and retail shops which did not sell food. The ban on PSBs also only applied to checkout bags, which meant that other plastic bags typically used in supermarkets for produce, bulk items, and for wrapping meat or frozen items, were all exempted. Also exempted from the ban were single-use plastic bags typically sold by supermarkets – such as for bin liners, sandwich wrapping, or pet waste. Compostable plastic bags and bags made of durable plastic at least 2.25 mm thick – which were included in the definition of a 'reusable bag' – were likewise exempted from the ban.

The initial proposal from City Hall was to charge a fee for PSBs, but this was met with intense opposition from the plastics industry. In response, the Mayor opted for a voluntary reduction scheme in coordination with local grocers. During the period of this scheme, however, the State of California passed legislation which rendered the fee option unfeasible. The voluntary reduction scheme, meanwhile, failed due to non-participation by most grocers, and eventually the City revised its fee measure to make it a ban instead (Romer, 2007).

Two years later, in July 2009, the City turned its attention to the problem of solid waste caused by smoking, with its *Cigarette Litter Abatement Ordinance* (San Francisco Board of Supervisors, 2009a). This legislation imposed a fee of $0.20 per pack of cigarettes sold in San Francisco, to recover the cost of removing cigarette litter from City streets, sidewalks, and other public property. The BoS cited the finding that cigarette butts and associated packaging litter accounted for 25% of the City's annual litter removal costs, and the filters and leftover tobacco from butts contained a variety of toxic chemicals that were harmful to the marine environment. Under the new legislation, cigarette retailers were required to collect and remit the fee to the City, which in turn would transfer 100% of the money received into an Environment Cigarette Litter Abatement Fund which would pay for the administration of the fee, cover the costs of cleaning up cigarette litter, and also provide outreach and education to address the cigarette litter problem.

In 2009, San Francisco was six years into its zero waste to landfill by 2020 goal, with 11 years left to meet the target. During this period, the City's reported per capita waste to landfill amount decreased from 871 kg/year to 538 kg/year. Meanwhile, the reported overall per

capita waste generation rate actually increased slightly from 2194 kg/year to 2243 kg/year, over the same period.

While the above results suggest that San Francisco had been performing better at the end-of-pipe than at the top, it was the lower end of the waste stream that was targeted in June 2009, with the passing of the *Mandatory Recycling and Composting Ordinance* (San Francisco Board of Supervisors, 2009b). This legislation made the sorting of waste into the three-bin system a legal requirement for all persons living, working or doing any other activities in the city.

In the Ordinance document the BoS cited that the City had achieved an overall diversion from landfill rate of 70% by 2006, but noted that this rate had levelled off in recent years, so reaching the 75% diversion by 2010 goal would likely require more than the existing voluntary-only participation system. It was also noted that of the waste currently being sent to the landfill, 36% was compostable and 31% was recyclable – meaning that two-thirds of the existing residual waste stream could be immediately diverted from the landfill under full compliance. Superimposed on the existing diversion rate, such full compliance would result in an improved diversion from landfill rate of around 90% (Coté, 2009).

Under the new legislation, homeowners, landlords, businesses and event-holders were all required to provide colour-coded bins for sorted disposal, throughout the city. Enforcement included requirements for waste collectors to leave warning tags on improperly-sorted bins, with continued infraction warranting a written notice to the client, followed by notification by the collector to the Department of the Environment, and the option for the collector to refuse collection. Fines administered by the Department could be up to $100 for residents and $500 for businesses, with the additional cost of inspection fees for non-compliance charged at the rate of $167/hour (San Francisco Board of Supervisors, 2009b).

Meanwhile, the City announced that its interim goal of 75% diversion from landfill by 2010 had been surpassed ahead of schedule, as the figure for 2008 was reported at 77% (Sullivan, 2011).

The next section examines how San Francisco has begun its final decade approach to the ultimate goal of zero waste to landfill.

6.6 2011-Present: Road to Zero?

San Francisco has continued with its introduction of incremental measures to address problematic wastes, beginning in May 2011 with the passage of the *Yellow Pages Distribution Ordinance* (San Francisco Board of Supervisors, 2011a). This legislation introduced a three-year pilot programme to distribute Yellow Pages books on an 'opt-in' only basis, to those who wished to have a copy. The Ordinance cited that the number of copies of the Yellow Pages distributed annually in the city was around 1.6 million – twice the population – and the huge number of unwanted and unused copies posed a set of problems including wastage of materials and energy, and significant blight caused by the litter of these large and bulky items. City staff estimated that these phone books, piled on top of each other, would reach nearly 8.5 times the height of Mount Everest; and, the hidden costs of these phone books in the waste stream might exceed $1 million (SF Environment, 2012d).

In February 2012, the *Expanded Plastic Bag Reduction Ordinance* was passed (San Francisco Board of Supervisors, 2012). The main change to the legislation was that the ban was expanded to include all retail shops and restaurants. As well, shops were now required to charge and keep a minimum $0.10 fee on allowable checkout bags, with takeaway bags for leftover restaurant food exempted from the fee. And, the plastic bags exempted from the ban were now clarified to include: "Bags used for bulk items, produce, nuts, grains, candy, meat, fish, small hardware, or bags used to separate items to avoid damage….Bags from pharmacists to contain prescription drugs….Newspaper bags" and "Laundry or dry cleaning bags" (SF Environment, 2012c).

While the City was passing and implementing these incremental waste reduction measures, other changes were taking place which had the potential to influence San Francisco's performance on zero waste. In July 2011, the BoS voted to award Recology a 10-year contract to have all of the City's waste shipped to the company's landfill site. The contract would commence around 2014-2015, when the City would exhaust its existing capacity at the present landfill site owned by Waste Management. The new contract would make the Recology site the exclusive destination for San Francisco's waste, and would be in effect until the end of 2025 or when 5 million tons of waste was sent there, whichever came first (San Francisco Board of Supervisors, 2011b).

The new landfill contract will see the City's waste transported to Recology's landfill site 200 km from San Francisco, in Yuba County, which compares to the 90 km distance to the present Waste Management site in Altamont. Offsetting the impact of this increased distance is a clause in the new agreement that will see the existing truck-only shipping replaced by a road-rail shipping system, which will involve Recology trucking the waste in containers across the Bay to Oakland, from where the containers will be transferred to trains which will deliver the waste to the new landfill (D. Assmann, pers. com., June 13, 2012).

The contract decision was challenged by Waste Management via a lawsuit which cited a violation of San Francisco's competitive-bidding ordinance. Central to the dispute was the question of whether Recology's monopoly on waste collection and transport within the city meant that only they could be awarded a contract to haul waste from the transfer station – located inside the city limits – to the landfill site located outside of the city. Waste Management bid only on the disposal of waste, and claimed that they did this because the 1932 ordinance precluded them from hauling waste from within the city. Meanwhile, Recology bid on both the disposal and transportation of the City's garbage, and was awarded both (Begin, 2011).

The decision by the BoS to award the landfill contract to Recology was delayed by two months, after the City's budget analyst suggested that the entire 1932 ordinance-driven waste contracting process be overhauled (Sankin, 2012). The BoS finally voted 9-2 in favour of awarding the $112 million contract, with the two dissenting Supervisors both recommending that the City eliminate the 1932 ordinance and submit all components of the waste-handling process to a competitive bidding process (Sabatini, 2011). Sankin (2012) notes that with the awarding of the landfill contract, Recology will soon assume total control over all aspects of San Francisco's trash.

Several months before San Francisco's landfill contract was awarded to Recology, a development favourable to out-of-city exportation of waste unfolded in the State Capitol in Sacramento, in February 2011. Assembly Member Fiona Ma, from San Francisco, introduced AB 1178 (Phelan, 2011), a bill which would prohibit a city, county, or local agency from restricting or limiting in any way the importation of solid waste into its jurisdiction based on place of origin. The bill is supported by several private waste haulers including Recology, and opposed by various local governments (Californians Against Waste, 2012) and grassroots groups including the Yuba Group Against Garbage, which represents residents of Yuba

County – the location of the Recology-owned landfill which will begin to accept San Francisco's waste around 2015 (Phelan, 2011). Financial support for the bill has outweighed that for its opposition by a more than 5:1 ratio, and Assembly Members including Ma herself have received contributions from interest groups in support of the bill (MapLight, 2012). In May 2011, AB 1178 was approved by the State Assembly by a 46-15 vote (aroundthecapitol, 2012); however, the bill was held up in the Senate Environmental Quality Committee, at the request of Assemblywoman Ma who noted that the bill did not have the necessary votes to pass the committee stage (Daysog, 2011). Ma subsequently circumvented the process by inserting the contents of AB 1178 into an active bill, AB 845, which did not require a Committee hearing and could go straight to the State Senate floor. That bill was passed on 28 August 2012, and presently awaits California Governor Jerry Brown's decision on whether or not to sign it into law (Murphy, 2012).

While Recology may eventually see its landfill contract undermined by community opposition if AB 845 ultimately fails, its long-time monopoly on waste handling within the City's limits appears to be assured for some time to come. In June 2012, San Francisco residents voted on Local Measure A (San Francisco Department of Elections, 2012), which asked the following:

> "Shall the City use a competitive bidding process to award five separate agreements for trash and recycling services; require that garbage processing and transfer facilities be owned by the City and located in San Francisco; require the Board of Supervisors to approve maximum rates for garbage services; and allow the Board of Supervisors to make future amendments that advance the purposes of this ordinance without further voter approval?"

The measure, referred to locally as 'Proposition A', was rejected by 77% of voters (with 23% in support). The lopsided result echoes those from two previous similar referenda held in San Francisco, in 1993 and 1994 (Smith, M., 2011).

Proposition A would have divided San Francisco's rubbish work into separate 10-year contracts for residential collection, commercial collection, recycling and compostable processing, transportation to disposal sites, and disposal of residual waste. It also would have required that the City own the waste processing and transfer stations, which are presently owned by Recology (Wildermuth, 2012a). In addition, the measure would have

prohibited any one company from providing both the recycling and residual disposal services (Smart Voter, 2012).

Another feature of the rejected Proposal was the introduction of a franchise fee that could have netted San Francisco up to $50 million per year. Under the terms of the 1932 ordinance, Recology is technically without an official contract with the City, and as such it is the only one of more than 70 municipalities in the Bay Area without a franchise agreement (Sankin, 2012).

Support for the Proposal was led by a small group of proponents whose main argument was that San Francisco should not allow a single private company to have monopoly control over its waste management system in perpetuity, based on an outdated ordinance. Opposition to the Proposal, on the other hand, featured a more widespread base of institutional support that included both the local Democratic and Republican parties, business and labour organisations, environmental groups, and Recology itself. Opposition arguments tended to argue that, despite the lack of competitive bidding, Recology has done a remarkably good job of managing the city's waste, and cited San Francisco's 77% diversion rate as being the highest in the country (Sankin, 2012).

The nearly 3:1 ballot victory for Proposition A opponents was convincing; however, even more lopsided was the campaign spending ratio, with those against the measure outspending those in support by around 25:1 (Wildermuth, 2012b), and with Recology pouring more than $1.5 million into the 'No on A' campaign (Schreiber, 2012).

The next section investigates the perspectives of various stakeholders, regarding San Francisco's zero waste to landfill by 2020 initiative.

6.7 Stakeholder Perspectives on San Francisco's Zero Waste to Landfill Initiative

Table 6.1 provides a summary of the stakeholder interviews associated with the San Francisco zero waste to landfill initiative case study, including name, affiliation/role, and date(s) of interview for each interviewee.

Table 6.1: San Francisco Case Study Interview Summary
(Listed by Government (Elected/Staff, Local/State), Industry, and Public, and in chronological order).

Interviewee Name	Affiliation/Role	Date(s) of Interview
Alex Dmitriew	Commercial Zero Waste Assistant Coordinator, SF Environment	02 May 2011
Alexa Kielty	Residential Recycling and Special Projects Assistant, SF Environment	02 May 2011
Mary Williams	Construction and Demolition Zero Waste Coordinator, SF Environment	02 May 2011
Julie Bryant	City and Government Zero Waste Coordinator, SF Environment	02 May 2011
David Assmann	Deputy Director, SF Environment	13 June 2012
Kevin Drew	Residential Zero Waste Coordinator, SF Environment	18 June 2012, 02 July 2012
Julie Gallagher	Assistant to Assemblywoman Julia Brownley, State of California	03 May 2011
Thomas Rudy	Integrated Waste Management Specialist, CalRecycle	12 June 2012, 14 June 2012
Bob Besso	Recycling and Waste Reduction Manager, Recology	04 May 2011
Robert Reed	Public Relations Manager, Recology	08 July 2012
David Tam	Research and Development Director, Sustainability, Parks, Recycling And Wildlife Legal Defense Fund (SPRAWLDEF)	05 April 2012

Motivation for Launching a Zero Waste to Landfill Initiative

Baume (2010a) notes that San Francisco's zero-waste quest was inspired by State law AB 939, which required California cities to achieve a minimum 50% diversion from landfill rate. He suggests that the zero waste to landfill goal was a result of the City's view that it could do even better than what the State of California was prescribing. AB 939's sponsor, California Assemblyman Byron Sher (as cited in Baume, 2010a, par. 5), recalls that when that legislation was passed there was a perceived shortage of landfill space across the state, and "San Francisco was a poster city for the problems….had to transport its solid waste over the Altamont Pass at considerable expense to the city". Randy Hayes, then president of San Francisco's Commission on the Environment (as cited in Baume, 2010a), saw this situation as a unique opportunity for the City to work with its waste contractor (Recology) to launch several experimental waste reduction pilot programmes.

According to Jack Macy, SF Environment Commercial Zero Waste Coordinator (as cited in Baume, 2010b, par. 10), the idea of zero waste to landfill came out of their department, with support from elected officials:

> "We were looking at the larger picture of why recycle and compost, and there's so much more than just saving landfill space, it's about conserving resources. In our case, our department, we were the activists promoting it. We've had the political support to push the envelope — both the mayor and the [board of supervisors] and visionary people in our department have helped us do that."

Macy (as cited in Baume, 2010b) recalls that when the zero waste policy went to the Board of Supervisors, they adopted the 75% by 2010 goal, but decided not to pick a date for zero waste. Rather, they sent it back to the CoE, and advised them that once the City certified that a 50% diversion rate had been reached, they could choose a deadline for zero waste. He adds (par. 14): "[Randy Hayes] said we had to pick a date, and we're like, well we don't know when we can get there. And he said let's do it in 2020 and we said okay."

SF Environment Commercial Zero Waste Assistant Coordinator Alex Dmitriew (pers. comm., May 02, 2011) notes that the City's Zero Waste Program Manager Robert Haley views 'percent diversion' as a statistic that is now past its usefulness to justify measuring and marketing it. Dmitriew adds: "We really just want to get to zero to landfill and that's the number we need to track." Recology's Recycling and Waste Reduction Manager Bob Besso (pers. comm., May 04, 2011) sums it up this way: "The ultimate goal is to have no black bin."

Regarding whether or not the City still sees itself reaching the zero waste to landfill goal, SF Environment Residential Zero Waste Coordinator Kevin Drew (pers. comm., July 02, 2012) maintains that this remains the intention. As for getting there by the original deadline, he adds: "We're shooting for 2020, but until we get closer it is rather unnecessary to speculate. The task at hand is to keep working on diversion, product redesign and bans and an overall reduction in generation". SF Environment's City and Government Zero Waste Coordinator Julie Bryant (pers. comm., May 02, 2011) suggests that if the City doesn't actually achieve zero waste to landfill it can get "really close" – and she believes that this is how people throughout the zero waste movement view the goal as well. As for San Francisco's long-time waste contractor, Recology's Public Relations Manager Robert Reed (pers. comm., July 08, 2012) asserts that the zero waste to landfill goal will ultimately be achieved, although he acknowledges that this won't happen until all necessary solutions are brought to the challenge.

The Role of Government

SF Environment's Residential Zero Waste Assistant Alexa Kielty and colleague Dmitriew (pers. comm., May 02, 2011) note that the City has never managed its waste at the government level – rather, rubbish handling in San Francisco has emerged from "wild west" roots. They point out that the 1932 ordinance came about as a way of instilling some control over a multitude of routes covered by "ragpickers" and "scavengers".

While the actual hands-on waste work is left to the private sector, leadership on the zero waste initiative has often come from City Hall. As Bryant (pers. comm., May 02, 2011) notes, previous Mayor Gavin Newsom, who served from 2004-2011, was extremely supportive of environmental initiatives such as the zero waste campaign, and took a leadership role on these issues. She recalls that Mayor Newsom held one-on-one meetings with department heads, wrote numerous executive directives regarding waste, and championed the bottled water bill and the shift to 100% post-consumer recycled paper purchasing at City Hall. Bryant adds that Newsom's successor, present Mayor Ed Lee, is less committed on environmental matters, as his attention is focused more on budget-related issues. However, she notes, many of the present Supervisors are interested in environmental issues, and supportive of the zero waste to landfill initiative.

Bryant (pers. comm., May 02, 2011) notes that the zero waste programme's City and Government (C&G) section includes San Francisco civic employees and City-owned/occupied facilities, and makes up around 14% of San Francisco's overall waste stream – including illegal dumping which falls under the City's responsibility. She explains that the reason for having a separate C&G section in the zero waste programme is that they want to be "leading by example." Bryant points out that purchasing is a part of this leadership role, as the City is the largest purchaser in San Francisco. She argues that C&G is different than the other zero waste sections because they can much more directly control their own waste stream, compared to residential, commercial, and C&D streams. Bryant cites the example of the bottled water ordinance, which banned the use of this product in City premises, and sums up C&G's approach this way: "We think of ourselves as…transforming the marketplace."

Dmitriew (pers. comm., May 02, 2011) notes that the 2009 Mandatory Composting/Recycling Ordinance has had a profound positive impact on waste diversion in San Francisco. Among the results that he cites is that it is "forcing businesses to save money." Dmitriew believes that the City's pay-as-you-tow scheme for commercial waste is

the first of its kind in the USA, and he points out that while commercial rates in San Francisco are relatively high, there are diversion incentives that can reduce this rate.

SF Environment Commercial Zero Waste Coordinator Jack Macy (as cited in Baume, 2010b) argues that San Francisco has taken a lead on waste diversion, and Kielty (pers. comm., May 02, 2011) notes that other cities in the USA want to replicate their overall waste system. And Dmitriew (pers. comm., May 02, 2011) suggests that the State of California is on the same general track as the City, but with less effectiveness so far.

Environmental justice advocate Eric Smith (2011) points out that San Francisco is the only Bay Area city that does not have a contract with its collection hauler and is not able to collect franchise fees, due to the 1932 ordinance which he considers to be obsolete. Smith stresses that the problem is not about Recology's performance, nor its competitors' desire to vie for a piece of the waste collection pie. Rather, he insists, repealing the 1932 ordinance

> "is about doing what's best for San Francisco ratepayers, ensuring that the City exercises its right to determine where its waste goes, how it will be transported, perhaps by barge or rail, and collecting its fair share of revenue to be used to fund desperately needed services in these most troubling and fiscally challenging of times" (par. 5).

Local activist Tony Kelly, one of the sponsors of 2012's failed Proposition A, points out that there is no actual contract with Recology for what they do, and as a result the City pays too much for their services – $220 million per year, compared with nearby San Jose which pays less than half of that with a higher population and a bigger land area (as cited in Sankin, 2012). Another sponsor of Proposition A, former Supervisor, California Senator and judge Quentin Kopp, has warned that San Franciscans can expect a further waste rate hike after the 2012 elections (as cited in Buel, 2012). Kopp (as cited in Thomas, 2012) also notes that current Mayor Ed Lee, while Director of Public Works under the administration of former Mayor Willie Brown, overruled a staff-recommended rate increase of 22% in 1999, and instead awarded the company a 44% increase, which was eventually appealed and reduced to 40%.

The Role of Industry

While the City and Government sector has endeavoured to lead by example in the drive for zero waste to landfill, industry has often pushed backwards – particularly in resisting the City's and State's attempts to address specific elements of the waste stream.

This resistance was demonstrated in a high-profile way when San Francisco tried to pass legislation to address the use of plastic shopping bags (PSBs). As SF Environment's Dmitriew (pers. comm., May 02, 2011) notes, industry fought the City "tooth and nail" on this issue. He recalls that when the initial bag fee idea was proposed, there was a lack of political will to approve it, in response to opposing arguments that poor people would suffer as a result. Instead, a voluntary agreement was reached with grocers to reduce PSB consumption by 10% within a year – with the proviso that if this failed the City would revisit the fee option. During that year, grocers and the American Plastics Council went to the State Legislature and managed to get Proposition 2449 passed, which pre-empted local charges such as the proposed bag fee. Dmitriew recalls that City Hall took this as a "really bad-faith move" by industry – counter to the negotiations that had been done before. When the year ended, grocers did not bother to provide the City with data on bag consumption – as the new State law pre-empted asking the industry for this information, on the grounds that it was considered a trade secret. The response from the City's lawyers was advice that they could not be stopped from banning PSBs outright, so this is how the City proceeded.

Industry's resistance to legislated waste reduction has not been limited to lobbying at the municipal level. Julie Gallagher, Assistant to Julia Brownley – the California Assemblywoman who has championed efforts to ban PSBs at the State level, points out that strong opposition was applied in Sacramento as well. This included lobbying from the American Chemistry Council – whose advocacy role includes fighting on behalf of the plastics industry, and Hilex Poly – one of the largest manufacturers of PSBs in the USA. This included money spent on radio, television and full-page print media advertisements, and the hiring of several lobbyists. Gallagher argues that all this effort from the industry lobby led to the eventual narrow defeat in 2010 of State Bill AB 1998, which if passed would have meant a state-wide PSB ban that would have resembled and superseded San Francisco's similar ban. She adds that the paper industry also lobbied strongly in opposition to the state-wide ban, because they were opposed to a 40% recycled content requirement for paper checkout bags that would have accompanied the PSB ban (J. Gallagher, pers. comm., May 03, 2011).

Gallagher (pers. comm., May 03, 2011) cites the oft-repeated argument from plastic industry lobbyists that a PSB ban would mean lost jobs, but refutes this by giving the example of a company in California which makes plastic bags – yet whose owner is ready to retool his plant to make reusable bags.

Recology's Besso (pers. comm., May 04, 2011) believes that the San Francisco PSB ban is a good thing, and adds that ideally people will use reusable bags instead. He adds that plastic bags that inadvertently get into the blue cart recycling system "wreak havoc" at the processing facility – and this problem of bag-clogging of equipment has been reduced by around 15-20% since the ban took effect. Besso also reports a noticeable reduction in bag litter across the city, resulting from the ban.

The State Capitol's Gallagher (pers. comm., May 03, 2011) describes San Francisco's municipal ban on PSBs as largely successful, but argues that broadening the scope of product bans in order to move closer to the City's ultimate zero waste by 2020 goal will be challenging. She notes that new targets would attract significant new opposition from industry lobbyists, and for that reason the focus on such efforts at the State level is limited to going for "what we can get", and therefore campaigns are chosen and bills drafted accordingly, based on the probability of passing them.

As for how other efforts to target specific waste elements have fared within San Francisco, SF Environment's Bryant (pers. comm., May 02, 2011) notes that there was little industry resistance to the ban on bottled water on City premises, but the phone book opt-in campaign did meet with a large amount of resistance. Opposition to the cigarette litter ordinance was even fiercer, she notes, with the tobacco industry giant Philip Morris suing the City over the legislation – with the City ultimately prevailing in the case (Coté, 2011).

While lobbying by waste-producers has been persistent and formidable, the most significant amount of contention related to waste in San Francisco has arguably been connected to the City's monopolistic waste handler, Recology – with legal and political challenges dating back to the company's earliest incarnations and fallout from the 1932 ordinance.

Recology's Besso (pers. comm., May 04, 2011) concedes that his company's tenure in San Francisco is essentially a regulated monopoly, but he points out that the 1932 ordinance was a necessary result of problems caused by fierce competition among and between factions within family organisations. SF Environment's Kielty and Dmitriew (pers. comm., May 02,

2011), meanwhile, note that the City does not even have a contract per se with Recology, with the result that the company has established a de facto monopoly for themselves – an ongoing contentious issue among San Franciscans.

Besso (pers. comm., May 04, 2011) acknowledges that Recology's monopoly attracts ongoing opposition, but he argues that these challenges are unfair, because San Francisco has the nation's leading recycling and waste diversion programme, and this is being achieved at a price that is similar to those charged in other communities. SF Environment's Kielty (pers. comm., May 02, 2011) attributes this success to the fact that the present arrangement allows the City to have a long-term relationship with the same waste contractor.

Besso (pers. comm., May 04, 2011) notes that Recology's monopoly status has been challenged several times, but he points out that the company has always been able to convince voters that the status quo is reasonable, and convincingly so. He argues that Recology's ability to withstand successive challenges is the result of the fact that San Francisco has a distinct advantage with the present system, in spite of it being a regulated monopoly. He notes that the city is a very progressive place, with a very progressive and ecologically-minded waste department in SF Environment. Besso explains that the prevailing system is one where SF Environment "essentially tells us what it wants – and we figure out how to make it work." He cites the example of the City's food waste collection programme which started back in 1996: "The City told us what they wanted, we told them what we thought it would cost, they said we could go ahead and charge for it, and so we did it – almost a decade before anybody else."

Recology's monopoly on waste collection has been extended controversially to include the landfilling contract, which the company will take away from rival Waste Management around 2015. SF Environment's Dmitriew (pers. comm., May 02, 2011) notes that in municipal operations, normally one of the rules of thumb is to avoid vertical integration. However, he argues, in this case of Recology becoming both hauler and disposer, they deserved to get the latter contract because they had the best bid both environmentally and economically, compared with the incumbent landfill contractor. And as for the dual hauler/disposer role posing a potential conflict of interest for the company – in the sense that cheaper costs of landfilling versus resource recovery would represent a disincentive to reducing residual waste – Recology's Reed (pers. comm., July 08, 2012) responds this way: "The city regulates us. And the city incentivizes us to recycle."

Opponents argue, however, that Recology's bid to dump San Francisco's rubbish 200 km away in their Yuba County landfill should not have been successful. A broad contingent of local residents, elected officials, and organisations have come out against receiving the City's waste in their backyard, and there are specific fears that air and groundwater contamination would hurt the area's estimated $2 billion agricultural industry (Higa, 2011). Yuba County supervisor and board president Roger Abe (as cited in Higa, 2011, par. 6) opposes the importation of San Francisco rubbish, and accuses the City and Recology of "forcing it down our throats."

According to David Tam, Research and Development Director of the Bay Area grassroots Sustainability, Parks, Recycling And Wildlife Legal Defense Fund (SPRAWLDEF) (pers. comm., April 05, 2012), grassroots opposition to the Recology landfill deal is focused on the notion of San Francisco shifting towards long-distance disposal of its rubbish. He notes (as cited in Higa, 2011) that there are better landfill options for the city than Recology's Yuba County site. Tam observes that the Bay Area has 15 existing landfills with only one-third of their capacity used up, and suggests that six of those sites would make more sense for disposing of San Francisco's waste. Meanwhile, David Tucker, Government Affairs Director with existing City landfill contractor Waste Management (as cited in Higa, 2011), argues that the Yuba County landfill proposal contains a host of unknown costs, and points out that the rail transport component – touted as one of the key environmental strong points in Recology's bid – lacks the necessary infrastructure in place to make it work. Tam (as cited in Higa, 2011, par.7) concurs on the latter point, describing the rail haul component as "a long shot".

As for the widespread support for Recology that resulted in an overwhelming defeat of Proposition A, the apparent dissonance between supporting a private company's assured monopoly, and suggesting that this will deliver the best results for residents of San Francisco, is rationalised in the following way in a pre-vote editorial from the city's Chamber of Commerce (San Francisco Chamber of Commerce, 2012, par. 1):

> "This measure stands to undermine the city's successful efforts to reduce waste and has the potential to increase costs to ratepayers and the city's budget. By requiring the city to break its garbage collection and disposal contract into five distinct categories and purchase its own processing and transfer facilities, this measure could replace today's fairly priced, environmentally sound garbage collection system with a

> hodge-podge of programs operated by up to five separate companies, with a new city bureaucracy, all under the control of the Board of Supervisors."

Retired former Supervisor, State Senator and judge Kopp (2012) sees it differently, though, citing in particular the large amounts of money spent by Recology to support the Vote No on Prop A campaign, and warning that after a successful defeat of the measure, waste rate increases will follow.

Both the City and Recology publicly report increasing waste diversion rates, presently cited at around 78%, which give San Francisco an apparent lead over other American cities. Meanwhile, Recology's Besso (pers. comm., May 04, 2011) observes that overall amounts of waste have dropped in recent years because of the economic recession. He admits that this trend is bad for the company from a business perspective, but he adds that from both an environmental and personal perspective, it is a good development.

The reported waste diversion rates such as 78%, however, have not gone completely unchallenged. Kopp (2012) cites the case of alleged inflated reporting of recyclables which led to invalidly excessive reimbursement and redemption payments from the State of California. He notes that the former Recology manager who reported these alleged acts of cheating to his supervisors was subsequently fired from the company. Kopp argues that this case, which has resulted in a lawsuit against the company, "partially explains the fictitiously-claimed 78% recycling percentage by both City Hall and Recology" (par. 8), adding that another former Recology employee has stated that sand removed from the highway is also included in what the City counts as 'recycling'.

Asked what Recology's role would consist of if and when San Francisco achieved its zero waste to landfill goal, Public Relations Manager Reed (pers. comm., July 08, 2012) responds that the company would still provide collection, transport, sorting, recycling, composting, anaerobic digestion, outreach, education, and ongoing work to continually identify and bring forward best management practices. Regarding whether a zero waste to landfill scenario would increase, decrease or have no net effect on Recology's overall amount of work for the City, Reed suggested that it could "be any of those three depending on many factors."

As for Recology's publicly-stated position in favour of AB 1178 (since replaced by AB 845), which would prevent Yuba County from restricting the amount of San Francisco waste that the company could bring in to its landfill, Reed (pers. comm., July 08, 2012) defends this on

legal rather than ethical grounds: "The transport of waste is a regional issue. The Supreme Court has ruled it is interstate commerce."

The Role of the Public

Smith (2011b) suggests that with the Proposition A results, and also the similar results from the two previous ballot votes, San Francisco residents are largely content with the status quo arrangement for waste handling in their city. And Recology's Reed (pers. comm., 08 July, 2012) points out that a lot of work has been done in San Francisco to increase waste diversion, and he argues that residents and businesses alike have embraced the recycling and composting collection programs introduced in the city. Reed notes that together with the City and the public, great progress on waste reduction has been made, although "The steepest part of the hill remains."

SF Environment's Bryant (pers. comm., May 02, 2011) observes that it is much easier to provide outreach on zero waste to City staff versus businesses – and it is even tougher with the residential sector. She notes as well that waste reduction campaigns such as reduction of bottled water consumption are much more difficult when tried with the public. Her colleague Dmitriew (pers. comm., May 02, 2011), however, points out that with the recent passing of the mandatory recycling and composting ordinance, the City can move beyond educating/cajoling to enforcing compliance.

The State of California's Gallagher (pers. comm., May 03, 2011) suggests that campaigns such as zero waste tend to emerge at the grassroots level, and then make their way to the political arena. She states that industry lobbyists will often use the argument that a ban, fee or other waste reduction measure will impose hardship on people, particularly poor people – but she dismisses this as a manipulative tactic, and cites the example of PSBs, where lower-income people were more likely to use reusable bags because they walk or use transit, and these bags carried more and were more durable.

SF Environment's Bryant (pers. comm., May 02, 2011) notes that most public waste in San Francisco is compostable, because of scavenging of dry recyclables. She also points out that there is demand for more public recycling containers in the city – but suggests that while this is good in an educational sense because it normalises recycling and composting in public minds, it is operationally problematic because recycling is often not done correctly. Bryant notes that the Recreation and Parks Department wants more of these public recycling

containers nonetheless, so they are working with Recology on new technology to improve post-consumer recycling sorting.

Fundamental Challenges to Achieving Zero Waste to Landfill

While San Francisco has had a zero waste to landfill goal since 2002, and an official deadline of 2020 for it since 2003, the City has never drafted a specific plan for achieving zero waste, as SF Environment's Drew confirms (pers. comm., July 02, 2012).

Drew (pers. comm., July 02, 2012) notes that the City instead goes "after products one after the other on a case by case basis." One such item is PSBs, which San Francisco targeted with its 2007 ordinance that banned them, with a number of exceptions. The incompleteness resulting from these exceptions is suggested by the observation of SF Environment's Bryant (pers. comm., May 02, 2011), who notes that the ban reduced litter by around 15-20% only, from 2007 to 2009. She adds that studies on the impact of the PSB ban have been very costly and time-consuming, so further studies on this have not been done. Recology's Besso (pers. comm., May 04, 2011) lists the following items in the city's waste stream that still have no alternative to going into the landfill-destined black bins: baby diapers, pet waste, pantyhose, food wrapping, and plastic film – and he adds that these items make up the majority of what goes into the black bins at present.

The State-permitted disposal of waste that is diversion-credited as alternative daily cover (ADC) has been criticised as both undermining the City's zero waste efforts, and compromising the integrity of the diversion rates that San Francisco actively publicises as proof of its exemplary waste reduction programme. SF Environment's Drew (pers. comm., June 18, 2012) reports that the City's ADC content consists mainly of a mixture of loose fine materials from the recycling of construction and demolition waste. He notes that in California there is no limit on how much waste can be used as ADC, and as a result many cities use this as a means for landfilling large quantities of waste that do not get counted as such. Drew cites the volatility of market demand for other uses of ADC materials, which when low means that there are technically no higher or better uses for them and so they end up as ADC. He acknowledges that San Francisco is guilty of this practice as well, and adds that the City is working with Recology to eliminate ADC use, and urging the State to pass legislation that would ban it outright.

The nature of the waste stream today versus in years gone by is clearly identified as an underlying issue affecting progress towards the zero waste to landfill goal. As SF Environment's Kielty and Dmitriew (pers. comm., May 02, 2011) note, waste management in the early days of San Francisco was much different, because there were far fewer disposable items in the rubbish. As Recology's Besso puts it (pers. comm., May 04, 2011): "There wasn't as many nasty things in the garbage as there is nowadays. There's a lot more chemicals and potentially hazardous materials…in the waste stream now."

Besso (pers. comm., May 04, 2011) elaborates on the waste profile back then, pointing out that bottles were refillable, and clothing was not thrown away for frivolous reasons such as fashion shifts, but rather was discarded only once it was worn out. He also notes that in those days there were systems for such things as bottle washing, rag sorting, and paper baling, and food waste regularly went to pig farms. Besso points out that this was essentially 'recycling' – before the practice had this name. He adds, however, that all was not idyllic, as in those early days a lot of residual rubbish ended up dumped in the Bay.

While San Francisco's recycling and composting programmes garner a positive public image as a result of its nation-leading diversion rate, there are persistent problems that affect the ability of these systems to bring the City anywhere near to zero waste to landfill. Recology's Besso (pers. comm., May 04, 2011) observes, for example, that a good system for recycling plastic film has yet to be found. He expresses a company-wide frustration with plastics in general, and notes that the City and Recology simply don't have a good way yet to deal with these materials, adding the view that "As we get closer to zero waste we're going to have to find a way…[I] would rather just have it not be there."

As SF Environment's Bryant (pers. comm., May 02, 2011) notes, the recycling and compostable streams get contaminated significantly from outdoor public bins in particular. She says that even if 90% of the people do it right, the other 10% ruin it for the rest. Bryant gives examples which include full cans of soft drinks, or dog faeces, which end up in the bins. She points out that under these typical circumstances, the City's collection people have to make quick decisions on the spot: if anything in a bag looks questionable, it goes into the rubbish side instead of the recycling side of the truck. Bryant stresses that with respect to faecal material in particular, these materials are totally unacceptable in the recycling stream. She notes that such materials placed in plastic bags, as is typically done by dog-walkers, shouldn't even be allowed in the rubbish stream as it would probably violate health

regulations – but she notes that as with disposable diapers, the City turns a blind eye simply due to the sheer numbers of people doing it.

While incineration has been considered in a number of cities with zero waste goals, San Francisco appears unlikely to embrace this option any time soon. Recology's Besso (pers. comm., May 04, 2011) notes that back in the 1930s the City tried several attempts at incineration, but they ultimately failed. SF Environment's Kielty (pers. comm., May 02, 2011) argues that high-temperature incineration eliminates jobs, counter to the City's goal of creating more jobs with the zero waste initiative. And colleague Dmitriew (pers. comm., May 02, 2011) notes that high-temperature incineration consumes a lot of energy and the City does not want to use a waste management system that did this.

Kielty and Dmitriew (pers. comm., May 02, 2011) confirm that San Francisco does not presently incinerate waste – and a policy of no incineration at high temperature forms a part of the City's zero waste initiative. Colleague Drew (pers. comm., July 02, 2012) concurs: "We oppose incineration and its many aliases such as transformation, gasification."

The misleading nature of the use of percent diversion statistics is acknowledged by City waste staff. SF Environment's Zero Waste Program Manager, Robert Haley, intends to have the programme shift more towards focusing on absolute levels of waste to landfill, instead of percent diversion, because they know that increased waste generation can be 'hidden' in percent diversion statistics (as cited by A. Kielty, pers. comm., May 02, 2011). Kielty (pers. comm., May 02, 2011) points out that the State of California uses a formula to estimate official total waste numbers for the City, from sales statistics. She argues that State politicians have been fixated on percent diversion for a long time, and this is a statistic that politicians prefer to talk about. Kielty stresses that her department genuinely wants to decrease actual waste generation – and their plan is to focus more on this internally.

SF Environment's Bryant (pers. comm., May 02, 2011) concurs that absolute waste versus percent diversion is a problematic misconception, and she mentions that one of the slides she often likes to show people in presentations is one where percent recycling and overall waste go up together – which leads to waste to landfill staying at high levels. She notes that residual waste amounts appear to have declined slightly in recent years – due in part to the slowing economy – with 2008 levels notably the lowest in recorded history.

Bryant (pers. comm., May 02, 2011) would personally like to see rubbish bins removed from public spaces in the city, "to promote a sort of pack-it-in pack-it-out mentality." But while she says that she has been pushing the Recreation and Parks Department for years to get them to remove the bins, "there is a fear from Rec & Parks that if they remove garbage bins from parks, litter will increase – but actually it's the opposite."

SF Environment's Macy (as cited in Baume, 2010b) makes the claim that the City could reach a diversion rate of around 90% if everybody recycled or composted what they could. This claim, however, implies that unless the nature of the waste stream changes significantly, around 10% of total waste would continue to require landfilling – and therefore the attainment of the zero waste to landfill goal would be precluded, counter to the ongoing insistence among SF Environment and Recology staff that the goal will indeed be reached.

Recology's continuing and expanding monopoly is cited by various stakeholders as a reason for San Francisco's underperformance on waste management. Proposition A sponsor Kelly (as cited in Sankin, 2012, par. 23) insists that the purpose of the measure was not to push the company out of the market, but rather make the City's relationship with them work better:

> "Under the measure, Recology is still going to win virtually every contract that they seek.…If we wanted to write this in a way that would push Recology out of town, we would have done that. Instead, the measure has a number of provisions regarding zero waste and worker protection that only Recology can produce."

Kelly (as cited in Sankin, 2012) points to one section of the Proposition which would have barred any one company from securing both the transfer station contract and the landfilling contract, and argues that this would ensure that the holder of the former contract would have an incentive to maximise the diversion of waste. He notes that the present situation in San Francisco follows this model, as Recology has to pay a fee to send waste to rival Waste Management's landfill facility. Kelly points out that this situation will end with Recology taking over the landfill contract in 2015, as the company will no longer have the same economic incentive to keep waste out of the landfill.

SF Environment's Drew (pers. comm., July 02, 2012), however, asserts that the new "landfill contract includes incentives for reducing landfill and collection of a per ton fee that can only be used for expanding diversion activities." Recology's Besso (pers. comm., May 04, 2011)

concurs, pointing out that the company does not have a put-or-pay contract with San Francisco, as is the case in other cities.

While Recology has withstood by wide margins several ballot initiatives to end its monopoly, Sankin (2012, par. 35) attributes this in part to the fact that "Recology is about as politically connected a company as exists in San Francisco." He notes (par. 36) that the company has maintained an "exceptionally close relationship not only to former San Francisco Mayor Willie Brown and current Mayor Ed Lee, but also their electoral campaigns." Sankin also cites that Recology has come under heavy criticism for connections with influence peddling, implications in bribery scandals including a case where a company executive was sentenced to prison, and accusations of threats and harassment against Proposition A campaigners by people hired by the company.

As for the fact that the new landfill agreement between the City and Recology will last until 2025 – five years beyond the date that San Francisco is supposed to no longer require a landfill, SF Environment's Drew (pers. comm., July 02, 2012) argues that the City is required by State law to have five years of identified capacity at any given time. However, he adds this caveat: "zero waste is a goal that no one has achieved yet, so being a tad bit cautious is not unreasonable." While this represents a degree of admission that the City may not necessarily be on track for zero waste to landfill by 2020, Drew points out that having access to a landfill site does not mean that the City has to use it or pay for it – and he stresses the fact that San Francisco does not have a put-or-pay contract that would lock them into paying for landfilling that they might no longer require. Recology's Besso (pers. comm., May 04, 2011), however, offers a view that would render these arguments somewhat moot: based on the current nature of the waste stream and the City's existing limited capability to deal with problematic components of it, he states that he does not believe that the goal of zero waste to landfill by 2020 will be achieved.

How Zero Waste Might Be Achieved

SF Environment's Bryant (pers. comm., May 02, 2011) cites the need for reducing consumption as a key necessary step towards achieving zero waste to landfill. And colleague Dmitriew (pers. comm., May 02, 2011) stresses that such change is going to require compulsory measures: "We're past voluntary."

However, actual suggestions for how the City can move towards achieving zero waste are largely focused on technological solutions. Dmitriew (pers. comm., May 02, 2011) sees a state-of-the-art processing facility as a key part of future waste management in San Francisco, and he identifies anaerobic digestion as a specific technological option – a view shared by Recology's Besso (pers. comm., May 04, 2011).

Extended producer responsibility (EPR) is widely viewed as a key component of a successful zero waste to landfill strategy. SF Environment's Kielty (pers. comm., May 02, 2011) sees EPR as an ideal way to deal with problematic items such as textiles, carpets, diapers and rooftop shingles, though both Kielty and Dmitriew (pers. comm., May 02, 2011) note that consumers still need to take some responsibility for such waste.

SF Environment's Bryant agrees that EPR is a key component for achieving zero waste, as does colleague and Construction and Demolition Zero Waste Coordinator Mary Williams (pers. comm., May 02, 2011). However, Williams suggests that a significant level of EPR implementation is not likely to be seen for 25 or more years.

Recology's Besso (pers. comm., May 04, 2011) sees EPR as necessary for zero waste to landfill achievement, as does the State of California's Gallagher (pers. comm., May 03, 2011). Gallagher notes that EPR has been discussed at the state level, but she warns that a fight against this would be expected from industry, and the state of the economy would likely be used as an excuse for putting off EPR implementation.

Beyond technological solutions, education and an overall philosophical shift are cited as missing links between the status quo and achieving zero waste to landfill. SF Environment's Drew (pers. comm., July 02, 2012) sees it this way:

> "[What is needed is] Continued education on how much consumption is really enough and what makes a life worth living. If the answer to that question is "stuff" and that stuff cannot be designed with reuse and repurpose integral to it, then we'll not make it."

SF Environment's Bryant (pers. comm., May 02, 2011) believes that there are many champions in San Francisco who can spread the word about reduced consumption and how it is a necessary precursor for achieving zero waste. She adds that the efforts of the C&G group are already inspiring others in the community.

Drew (pers. comm., July 02, 2012) warns, however, that the City cannot do this alone: "Obviously SF cannot control all the forces at play here. The whole world needs to get on board and make a zero waste world just like all the other organisms on the planet do."

The last section of this chapter gives a summary to date of the San Francisco zero waste to landfill by 2020 initiative.

6.8 Summary to Date of San Francisco's Zero Waste to Landfill Initiative

Figure 6.1 shows per capita waste generation in San Francisco for the years ending 2000-2010, with the breakdown of the total into amounts diverted from and sent to landfill.

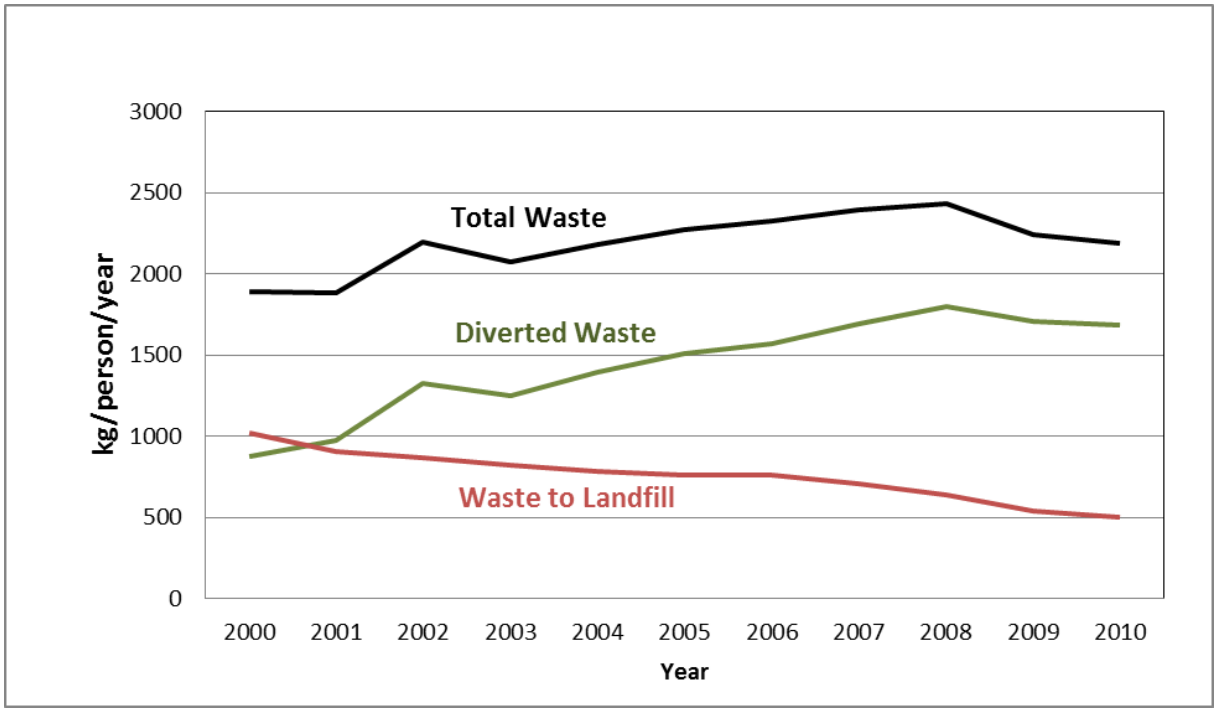

Figure 6.1: Waste Generation Trends in San Francisco
(based on data from Drew (pers. comm., July 18, 2012), Rudy (pers. comm., July 12, 2012), and United States Census data for 2000 and 2010 (United States Census Bureau, 2012c)).

As Figure 6.1 shows, per capita waste to landfill has roughly halved over the period, from around 1000 kg/year to 500 kg/year. However, this drop in absolute amounts of waste to landfill is disproportionally low compared to the decrease in the landfill rate – from 54% to 23%, because total per capita waste generation has increased during this period. In other words, San Francisco is achieving significant waste reduction success at the end-of-pipe, but is generally failing to mitigate waste flows into the top-of-pipe.

The City's often-publicised diversion from landfill rate, which has increased from 46% to 77% over the period 2000-2010, does not reflect the general lack of success in reducing total waste generation, as the percent diversion statistic only incorporates what is happening at the end-of-pipe. If, as cited by SF Environment staff in the previous sections of this chapter, there is an intention to focus more on absolute waste data versus percent diversion data, then the City will inevitably have to start reporting their less successful top-of-pipe situation, and this will reveal that San Francisco is considerably further from their goal of zero waste to landfill than their percent diversion numbers suggest.

The results discussed from Figure 6.1 do not take into account the fact that diversion is exaggerated as a result of the State of California's alternative daily cover (ADC) provisions. In the case of San Francisco, the amount of ADC included in the total actual waste in the landfill has fluctuated considerably between 1995 and 2011 (CalRecycle, 2012b), jumping in a haphazard fashion between minimum and maximum values of 3% and 19%, as Figure 6.2 shows.

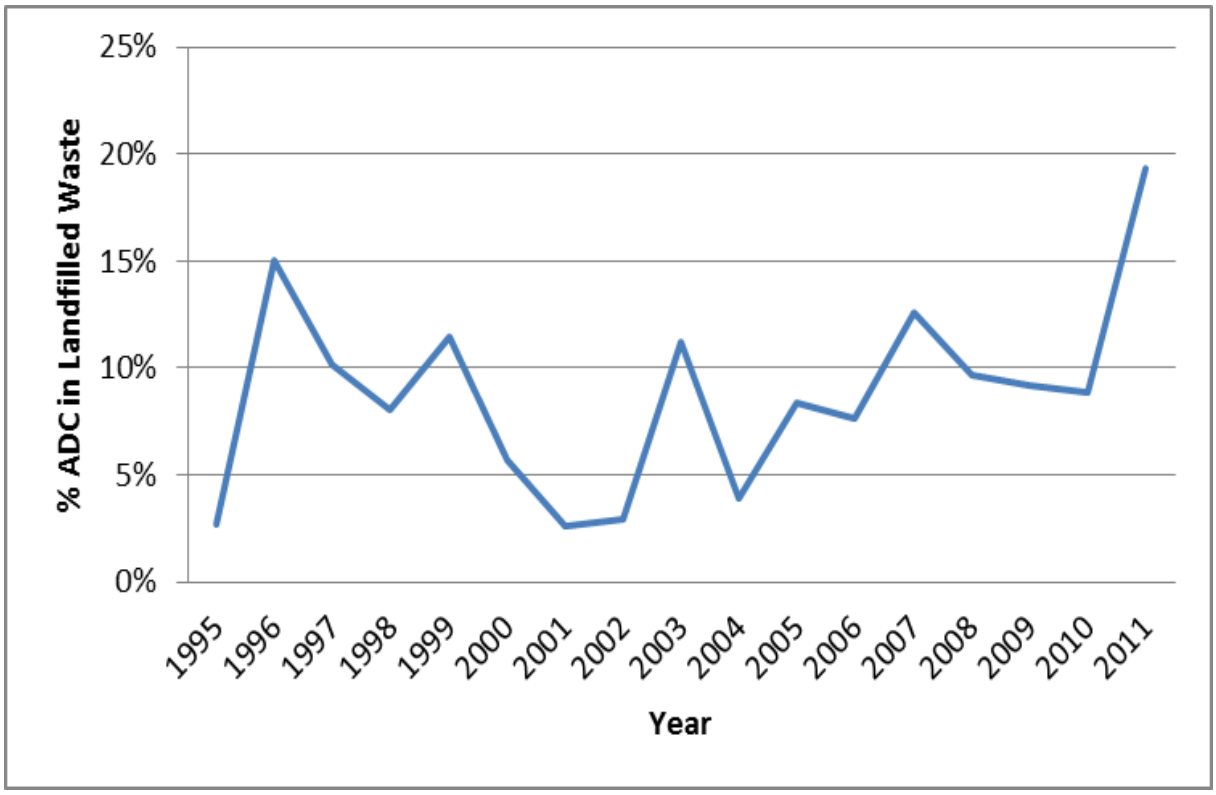

Figure 6.2: Alternative Daily Cover (ADC) Use in San Francisco, 1995-2011
(based on data from CalRecycle (2012b)).

The range of proportions of ADC used in the City's landfill represents a more than six-fold difference between the lower 3% and upper 19% levels. While SF Environment, as discussed in the previous section of the chapter, has explained that these sorts of fluctuations can result from volatility in the market demand for some recyclable materials, no explanation has been offered by either SF Environment or CalRecycle for how ADC could come to represent as much as nearly one-fifth of total landfilled waste, in any year.

The practice of crediting ADC waste into the 'diverted waste' column also serves to skew various waste statistics in a falsely positive direction, such that the diversion rate is reported as several percentage points higher than the actual rate – and the skewing is even stronger for absolute waste to landfill values, which are underreported by a percentage equal to the percent ADC. Examples of this are:

- With 9% ADC in the landfilled waste (as in 2010):
    - Actual diversion = 75%, instead of reported 77%.
    - Per capita waste to landfill underreported by 9% – i.e., Actual = 550 kg/person/year, instead of reported 501 kg/person/year.
- If the 19% ADC for 2011 is superimposed on 2010 data (as there is no complete waste data yet for 2011):
    - Actual diversion = 72%, instead of reported 77%.
    - Per capita waste to landfill underreported by 19% – i.e., Actual = 618 kg/person/year, instead of reported 501 kg/person/year.

The above examples illustrate that while present ADC accounting practice has only a moderate effect on the reported diversion rate, the underreporting on per capita waste to landfill – the more important statistic in regard to the zero waste to landfill goal – becomes difficult to ignore as the ADC level increases. Further overestimation of diversion – and therefore underestimation of waste going to landfill – comes from the fact that once recycled materials are handed over or sold to whomever takes them, there is little or no accounting for whether these materials actually get reused or simply dumped somewhere else – and this is especially difficult to track when recyclables are shipped overseas. And wherever further resource recovery does take place, once the materials leave the City's

jurisdiction there is no accounting for the waste that will eventually be landfilled at the end of the process.

Unlike the other case study locations, the zero waste to landfill initiative in San Francisco has neither reached its deadline, nor has it been abandoned. There remains eight years before the zero waste to landfill deadline, and much could conceivably change in the city before then. In this respect, any overall assessment of the initiative's ultimate success is speculative. However, what can be assessed is the trajectory that the initiative has followed since its launch in 2003, and how this would appear to set up San Francisco for the remaining years until the 2020 deadline is reached.

While San Francisco might be leading the USA in terms of percent diversion, it actually lags well behind most of the country in terms of how much waste it actually generates per capita. The 2010 figure of 501 kg/person/year to landfill for the City translates to a daily generation rate of 1.4 kg/person/day, which is well above the national average of 1.1 kg/person/day for disposed waste. Even if the national average of 12% of waste that is incinerated with energy recovery is factored into the total (most of which would not end up as residual landfill waste), the national disposal average would only rise to 1.3 kg/person/day, still shy of San Francisco's per capita landfill level (average waste statistics for the USA from United States Environmental Protection Agency, 2011).

How does San Francisco perform below the rest of the country on *waste to landfill*, when it supposedly leads on *diversion from landfill*? The answer, as for many other puzzling questions about the City's waste performance, lies in the *total waste generation* numbers. While the average per capita total waste output in America is 2.0 kg/person/day, in San Francisco the number is 6.0 kg/person/day – or *three times the national average*. So even by America's relatively poor standards on waste reduction, compared with other nations (see OECD, 2010), San Francisco is underperforming – especially at the top of the waste pipe, but even at the end-of-pipe as well. And although in the latter case San Francisco is only somewhat above the USA average with its 1.4 kg/person/day waste to landfill output, comparing it, for example, with the Eurozone average of 0.5 kg/person/day to landfill (European Commission, 2012) serves as a reality check against the City's popular image as a zero waste leader.

Nonetheless, the City has reduced the per capita waste to landfill rate by roughly half, from 1019 kg/year to 501 kg/year, and this halving of waste to landfill in a decade is a notable achievement about which few other cities can boast. It also means that during the period of 2000-2010, the City has progressed roughly halfway towards zero waste to landfill – and with 2020 as the deadline, this means that it would get there right about on time if the overall trend continued. However, as even SF Environment and Recology staff acknowledge, the first 50% of waste reduction is much easier than the last, and based on this it becomes evident that the City is not likely to reach its original goal of zero waste to landfill by 2020.

One compelling body of evidence to suggest that San Francisco is not heading for zero waste is what is plainly visible to any visitor to the city: the very high level of materialistic consumption. While the City promotes itself as being a leader in waste reduction, the evidence of a plethora of the very consumer products which lead to problematic waste abounds in San Francisco. And while the USA in general has experienced a well-documented economic downturn during the time of this study, this simply does not translate into any noticeable restraint among San Franciscans towards the convenience-based, throwaway consumer behaviours that preceded the recession.

This can be seen easily by observing supermarkets in the city. The image that one sees upon entering any such shop is a multitude of packaging, and it is only a very few food items that are not wrapped in some form of plastic food packaging – much of which is neither recyclable nor sufficiently degradable to not be considered problematic from a waste standpoint. One particular aspect of supermarket shopping where the City has taken a lead on waste reduction – the PSB ban – can be seen in the use of either reusable or paper bags. However, the tokenism and ultimate ineffectiveness of the PSB ban is clear to see in the overall context of the supermarket, where the huge volumes of exempted bags – either handed out free or purchasable – as well as all of the packaging and other problematic waste, reveal just how small a segment of the waste stream is actually being addressed in any meaningful way by the City.

What such evidence points to is the City's lack of any comprehensive plan for directly tackling the waste stream – the *planning void*. As the previous sections of this chapter confirm, the City's Zero Waste department has rolled out a significant number of individual ordinances which target specific problem waste items such as PSBs, drinking water bottles, and Styrofoam containers. However, between the exceptions that some of these ordinances

allow for – as with PSBs – and the fact that huge segments of the waste stream such as the majority of food packaging materials have been completely unaddressed to date, the net result is that problem waste continues to enter the top-of-pipe largely unchecked. And even though the items that have been dealt with might represent some discernible percentage of the waste stream, any significant reductions in waste to landfill are being cancelled out by the fact that overall consumption rates are not coming down – so the partial successes of the zero waste programme are being drowned out by the overconsumption of everything else.

San Francisco's peculiar relationship with its sole waste contractor, Recology, also appears to be an obstacle to achieving zero waste to landfill success. While there is much mutual admiration expressed between SF Environment and Recology about their partnership and how it is advancing zero waste goals, there is a large body of compelling evidence from outside this partnership that suggests that the Recology monopoly might be stalling or even setting the City backwards on waste reduction.

Recology's popularity within City Hall and among the public has been proven by their withstanding three referenda on their monopoly status since 1993 – the latest in 2012. However, it is also well-documented that the company has spent millions of dollars in advertising and donations to politicians, during these campaigns. There is therefore a significant amount of cynicism among some members of the public, as well as several decision-makers at City Hall, regarding Recology's worthiness to hold such a privileged grip on San Francisco's waste work.

While the City and Recology both claim that their relationship translates into zero waste progress for San Francisco, recent developments would suggest otherwise. The fact that Recology has had to transport residual waste to a landfill site owned by another company, means that there has been a natural incentive for Recology to recover as much as possible and minimise waste to landfill. That seemingly healthy situation, however, will cease to exist as of 2014-2015, when the City begins to send its residual waste to Recology's landfill site in Yuba County. By awarding the new landfill contract to Recology, the City has not only further deepened the company's controversial monopoly over San Francisco's waste-related work, but it has now created an inherent disincentive for Recology to pursue the City's zero waste to landfill goals. Both the City and Recology claim that no such disincentive actually exists, thanks to ongoing commitments between the two partners. However, market

evidence showing that landfilling continues to be a more profitable option for waste companies tends to disprove these claims. And furthermore, the fact that the City's new landfilling contract extends to 2025 – five years beyond the target date for zero waste to landfill, suggests that both the City and Recology believe that San Francisco will still be landfilling waste beyond 2020.

The next chapter examines the results of all four case study locations together, investigates differences and commonalities, discusses emergent patterns that apply to zero waste to landfill initiatives in general, and applies a theoretical analysis to identify the key underlying factors which drive the chronic lack of success of these initiatives.

Chapter 7: Analysis and Discussion

7.0 Introduction

This chapter includes a detailed analysis of the data obtained from the in-depth investigation of the case study zero waste to landfill initiatives, as well as data obtained from general observation of the wider set of such initiatives. This is followed by a detailed discussion of the results, and how they inform the addressing of the overall thesis research questions.

The chapter begins with an overview of results across the four cases, with an analysis of key across-case similarities and differences. Waste data is examined across all cases together, with a detailed discussion of emergent trends and patterns relevant to the research questions around consistent zero waste to landfill initiative failure.

Next, the chapter sharpens its focus upon the *common trajectory*, which is the recurring overall chronological pattern of events that each zero waste to landfill initiative appears to closely follow. Critical points along this trajectory are identified: the period of reckoning for initiative proponents, abandonment versus perseverance once reckoning has taken place, the choice between technical solutions versus paradigm shifting for proponents who persevere, and the particularly striking *planning void* that appears to drive the occurrence of the other abovementioned critical points, which follow it in the sequence.

Sections that follow include analysis and discussion of the empirical results through the lenses of several theoretical frameworks, which include: fundamental decision-making versus incrementalism; planning fallacy and strategic misrepresentation; and, technical solutions versus paradigm shifting.

Finally, a theoretical model is proposed by this study to address the apparent 'missing piece' needed to explain why zero waste to landfill initiatives are undertaken in the first place, hopelessly unrealistic as they seem to be in the face of the stark realities which work against them: the *unacknowledged supermegaproject*. This theory is articulated, examined in the context of the zero waste to landfill failure problem, and given some consideration in the wider context of global sustainability initiatives – a discussion which is expanded upon further in the final Conclusions chapter which follows this one.

7.1 Overview of Results/Observations Across Cases

Table 7.1 gives a summary of results for each case location's zero waste to landfill initiative, with reported per capita waste to landfill and percent diversion statistics corresponding to the initiative's launch, abandonment (where applicable), and the most recent reporting year (with data timing exceptions noted and explained).

Table 7.1: Zero Waste to Landfill Initiative Results Across Cases.

	Canberra	Christchurch	Toronto	San Francisco
Year Launched **Target Year**	1996 2010	1998 2020	2001 2010	2003 2020
Per Capita Waste to Landfill, Year of Launch	820 kg/person/year	740 kg/person/year (1999 – earliest available data)	740 kg/person/year	820 kg/person/year
Percent Diversion, Year of Launch	42%	21% (1999 – earliest available data)	19%	60%
Year Abandoned	2009	2001	2007	Ongoing
Per Capita Waste to Landfill, Year Abandoned	610 kg/person/year	700 kg/person/year	640 kg/person/year	N/A
Percent Diversion, Year Abandoned	73%	21%	25%	N/A
Per Capita Waste to Landfill, Most Recent Year	740 kg/person/year (2011)	450 kg/person/year (2010 – last year pre-earthquake)	560 kg/person/year (2011)	500 kg/person/year (2010)
Percent Diversion, Most Recent Year	75% (2011)	40% (2010 – last year pre-earthquake)	27% (2011)	77% (2010)
Replacement Goal	Zero Waste to Landfill	320 kg/person/year Waste to Landfill	70% Diversion	N/A
Target Year	None	2020	2010 (currently under review)	N/A

As can be seen in Table 7.1, there are examples of both similarity and difference across the four cases, depending on which results are examined. The highlights of these are summarised as follows:

Similarities Across Cases

- **Each zero waste to landfill has either failed, or is on track for failure:** Canberra, Christchurch and Toronto all abandoned their initiatives in advance of their target dates. San Francisco is in advance of its target date and is still officially committed to its original zero waste to landfill goal; however, as discussed in Chapter 6.8, within-case analysis of results there indicates that achieving the goal is highly unlikely under present trends and circumstances.
- **In each case, reported per capita waste to landfill amounts decreased between the initiative's launch and abandonment:** This was the case for all three initiatives which were abandoned; in the case of San Francisco, the initiative is ongoing but has also seen a decrease in per capita waste to landfill since its launch.
- **Reported per capita waste to landfill amounts across cases are similar, at key timeline points:**
    - At initiative launch, this ranges from 740 kg/person/year (Christchurch and Toronto) to 820 kg/person/year (Canberra and San Francisco).
    - At initiative abandonment, this ranges from 610 kg/person/year (Canberra) to 700 kg/person/year (Christchurch).

Differences Across Cases

- **The length of time between adoption and target date, as well as between adoption and abandonment, varies widely:**
    - Original initiative timeline duration ranges from 9 years for Toronto (2001-2010) to 22 years for Christchurch (1998-2020).
    - Time between adoption and abandonment ranges from 3 years for Christchurch (1998-2001) to 13 years for Canberra (1996-2009). San

Francisco's initiative is ongoing, 9 years into its original timeline of 17 years (2003-2020).

- **Reported percent diversion from landfill rates and their changes over time vary widely across cases:**
    - Reported diversion rates at launch of initiative range from 19% for Toronto to 60% for San Francisco.
    - Reported diversion rates at initiative abandonment range from 21% for Christchurch to 73% for Canberra.
    - Most recent reported diversion rates range from 27% for Toronto (2011) to 77% for San Francisco (2010).

The above points are based upon comparing waste data reported separately by each case study's respective governments. The reliability of such comparisons is generally low, based on the general lack of reliability of each reporting government's waste data – as discussed previously in Chapter 4.5 (see New Zealand Ministry for the Environment, 2004b), Chapter 5.9 (see C. Ueta, pers. comm., July 17, 2012), Chapter 6.7 (see K. Drew, pers. comm., June 18, 2012), and Chapter 6.8 (see CalRecycle, 2012b). It is therefore important to acknowledge that direct across-case comparisons based upon this data can only be done very broadly – with emphasis more on identifying overall patterns/trends than on ranking performance.

Figures 7.1-7.4 show reported per capita overall/diverted/landfilled waste data, as well as reported diversion rates, for each case, over the period 2000-2010 which is the common timeline over which data are available for all cases.

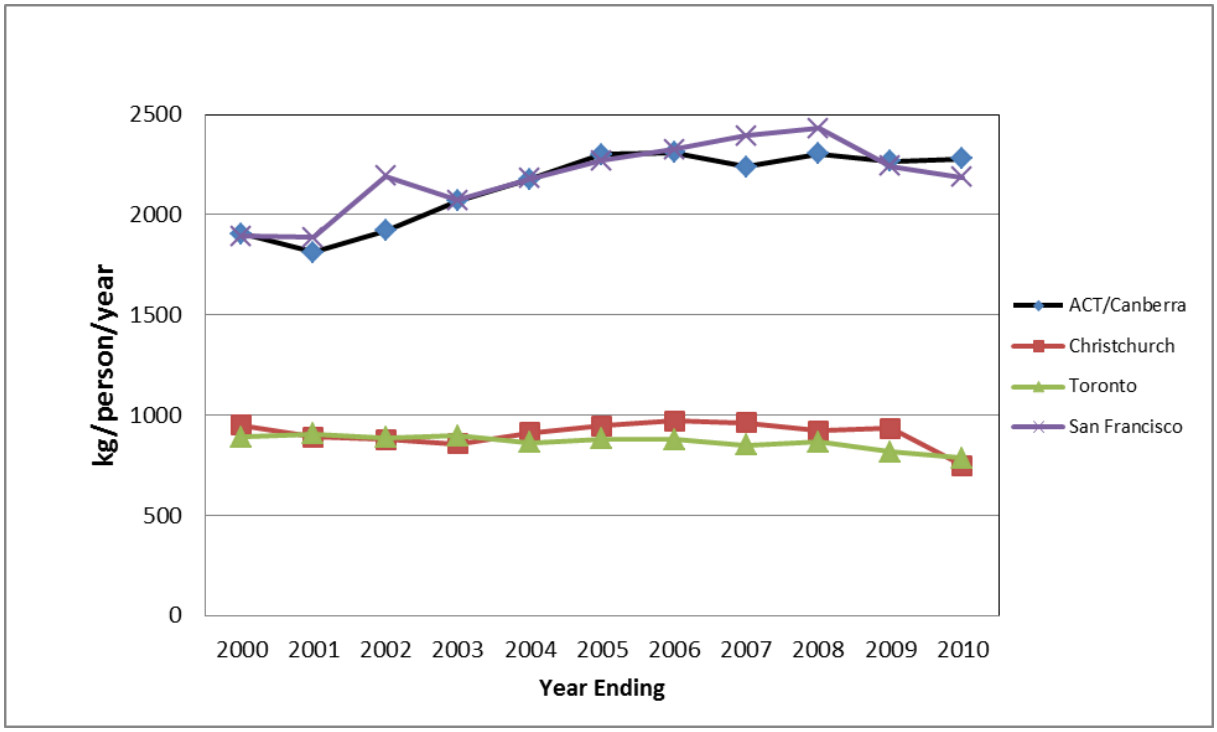

Figure 7.1: Per Capita Overall Waste Across Cases, 2000-2010.

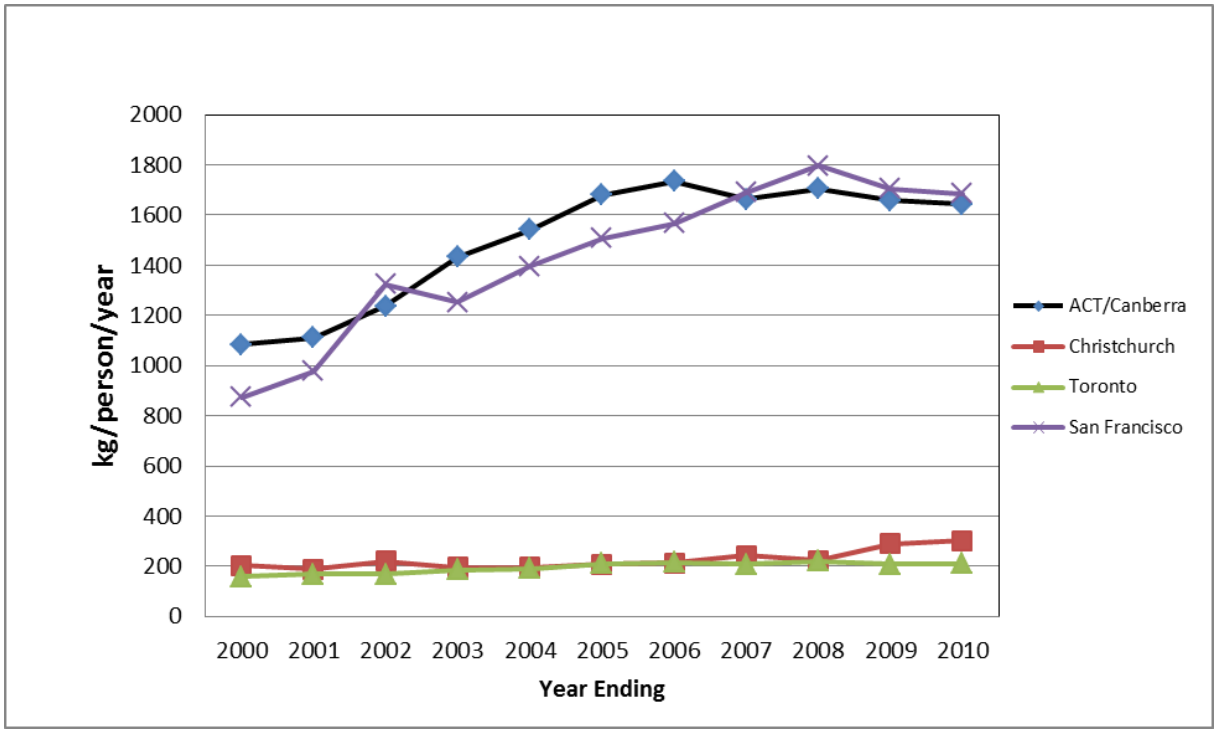

Figure 7.2: Per Capita Diverted Waste Across Cases, 2000-2010.

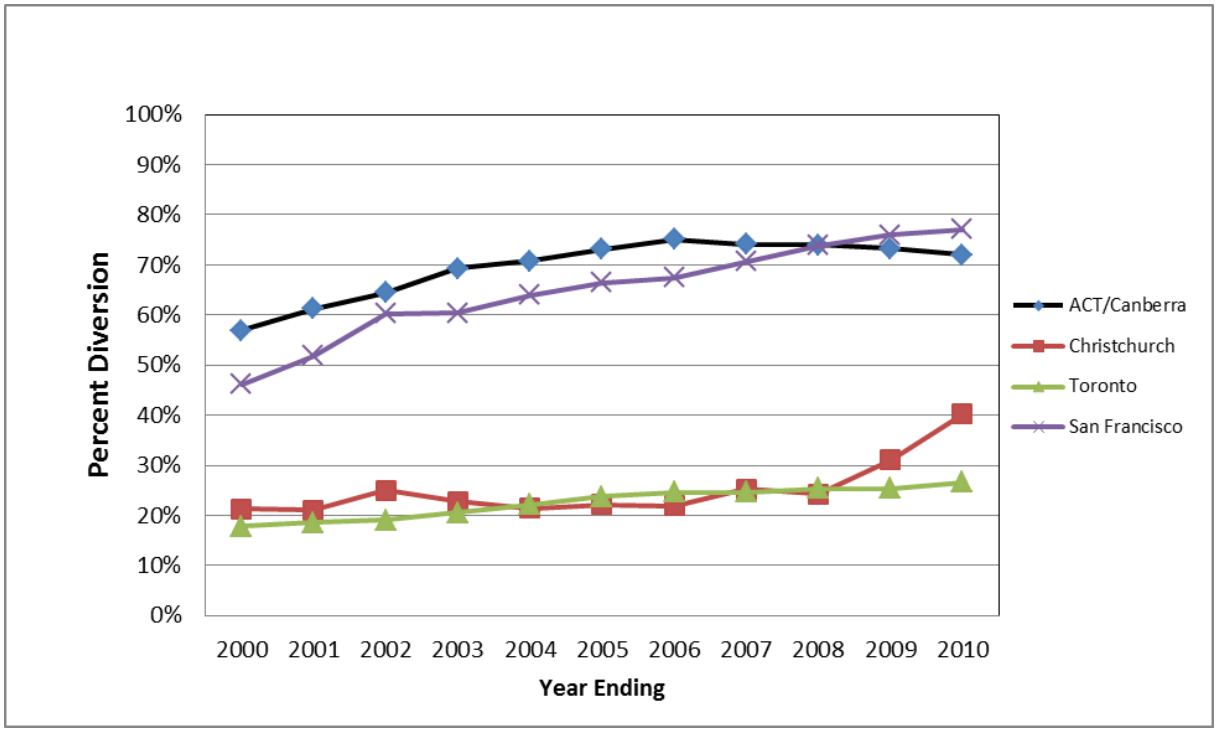

Figure 7.3: Percent Diversion from Landfill Across Cases, 2000-2010.

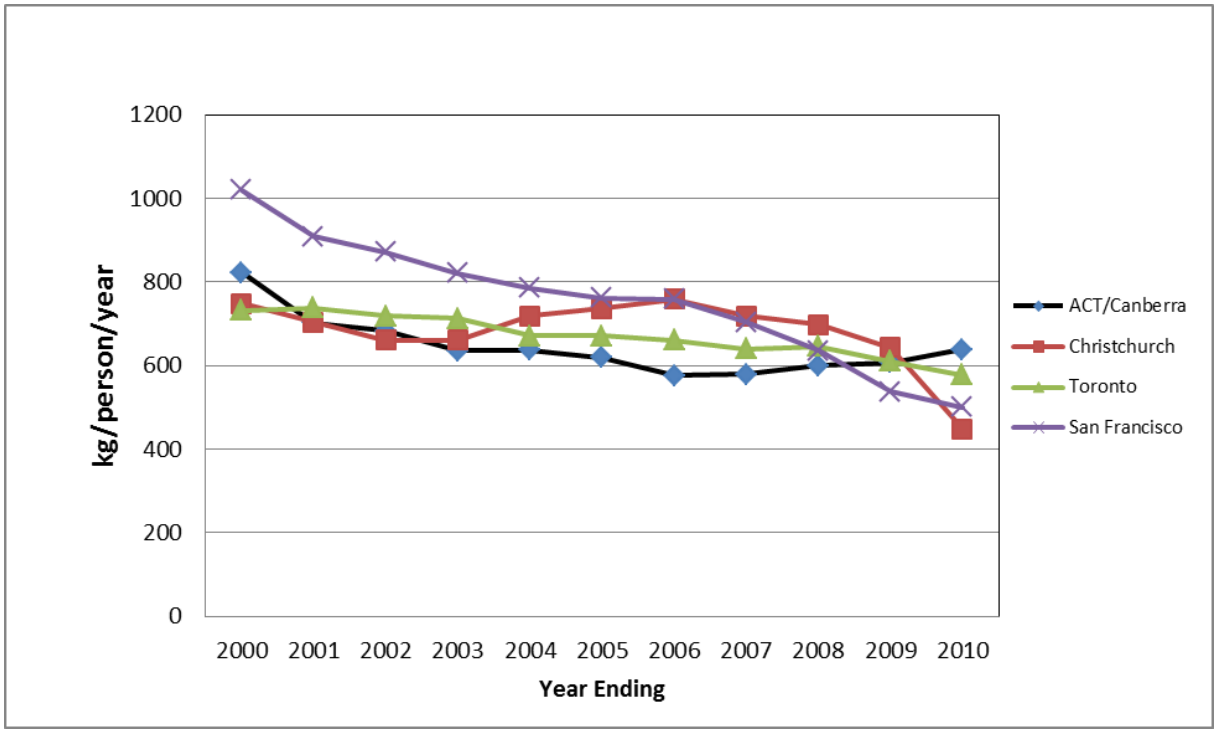

Figure 7.4: Per Capita Waste to Landfill Across Cases, 2000-2010.

Figures 7.1-7.3 show a very noticeable split among the four cases. In Figure 7.1, Canberra and San Francisco show reported rates of per capita overall waste that are much higher than those for Christchurch and Toronto. The difference is even more pronounced in Figure 7.2,

with Canberra and San Francisco showing reported rates of per capita diverted waste several times greater than that for Christchurch and Toronto. The combination of these results is reflected in Figure 7.3, where the reported percent diversion from landfill rates for Canberra and San Francisco are noticeably higher than for Christchurch and Toronto.

The marked differences in the graphs of Figures 7.1-7.3 raise serious doubts as to the accuracy and comparability across cases of the overall waste and diverted waste figures – and therefore of the percent diversion rates as well. One of the observations noted from the site visits to all four cases, is that in general there is very little difference in the overall waste-related behaviour from one place to another. While marginal differences exist across cases as a result of specific bans or restrictions regarding such things as plastic bags or Styrofoam food ware, which are applied in some places but not others, these differences represent token measures which affect only small proportions of the overall waste streams in all locations, and as a result it is simply hard to see any evidence of significant differences in circumstances which would translate to significant differences in overall waste generation. As such, the more than two-fold difference between Canberra and San Francisco (at the higher end) and Christchurch and Toronto (at the lower end) is somewhat unexpected.

Figure 7.4, meanwhile, tells a very different story with respect to per capita waste to landfill – the statistic most directly corresponding to the zero waste to landfill goal. In contrast to Figures 7.1-7.3 which show a noticeable division among the four cases, Figure 7.4 shows all of the cases performing similarly – both in terms of the relative amounts of waste to landfill, as well as the overall downward trend over time.

The general lack of tightness and consistency of the waste data – both within and across cases – severely limits the scope of analysis and conclusions that can be drawn from it. However, the patterns which are revealed are nonetheless useful in addressing the more obvious and central question of why all of these zero waste to landfill initiatives are falling far short of success. The following are the two principal observations that are made in this regard:

- Given that all four cases seem to be achieving similar results in terms of per capita waste to landfill, the significantly higher percent diversion rates reported by Canberra and San Francisco are evidently the result of these locations having significantly higher per capita overall waste, relative to Christchurch and Toronto –

and even more significantly higher per capita diversion rates. In other words, if the relative positions across cases suggested by the graphs of Figures 7.1-7.4 are true, then it is a case of Canberra and San Francisco doing a worse job of managing the top-of-pipe, and then roughly making up for this by outperforming Christchurch and Toronto at the end-of-pipe. The fact that Canberra and San Francisco are high-profile diversion 'exemplars' among cities, is a direct reflection of this.

- More importantly, with respect to the ultimate goal of zero waste to landfill, all four case study locations are achieving approximately the same level of success – which is more a lack thereof. Over time, each location has managed to reduce the per capita waste to landfill rate from around 700-800 kg/person/year, to around 400-700 kg/person/year. However, as has been discussed in each of the case chapters, the first half or so of the waste reduction from present levels towards zero is far easier to achieve than the remaining half. The former is achieved from simple decisions and actions such as those related to shifting waste from the rubbish bin to the recycling or compost bins. The actual behaviour change involved is trivial, compared with the kinds of sacrifices that would be involved with eliminating the last residuals – such as doing without all of the poorly-degradable food packaging used today, or the many contemporary electronic devices that become problematic waste.

This critical similarity among all of the cases – poor performance in addressing the top-of-pipe where problem wastes continue to enter unaddressed – is also a recurring theme with regard to zero waste to landfill initiatives outside the case study set, as discussed in Chapter 1.4.

Uncovering the root cause(s) of this consistent failure requires a thorough consideration of recurring patterns which are evident across all of the zero waste to landfill initiatives that have been observed – inside and outside of the case study set. One such recurring theme in particular, which is revealed through the chronological study of each initiative, is that all of the initiatives appear to follow a similar sequence of key events/decisions, which include common features and alternative options which seem to lead to predictable outcomes.

This 'common trajectory' is investigated and discussed in detail, in the next section.

7.2 The Common Trajectory of Zero Waste to Landfill Initiatives

While the previous section discussed ways in which the case study zero waste to landfill initiatives are both different from and similar to one another, there is one overall pattern of unfolding of events that all such initiatives seem to follow, as shown in Figure 7.5.

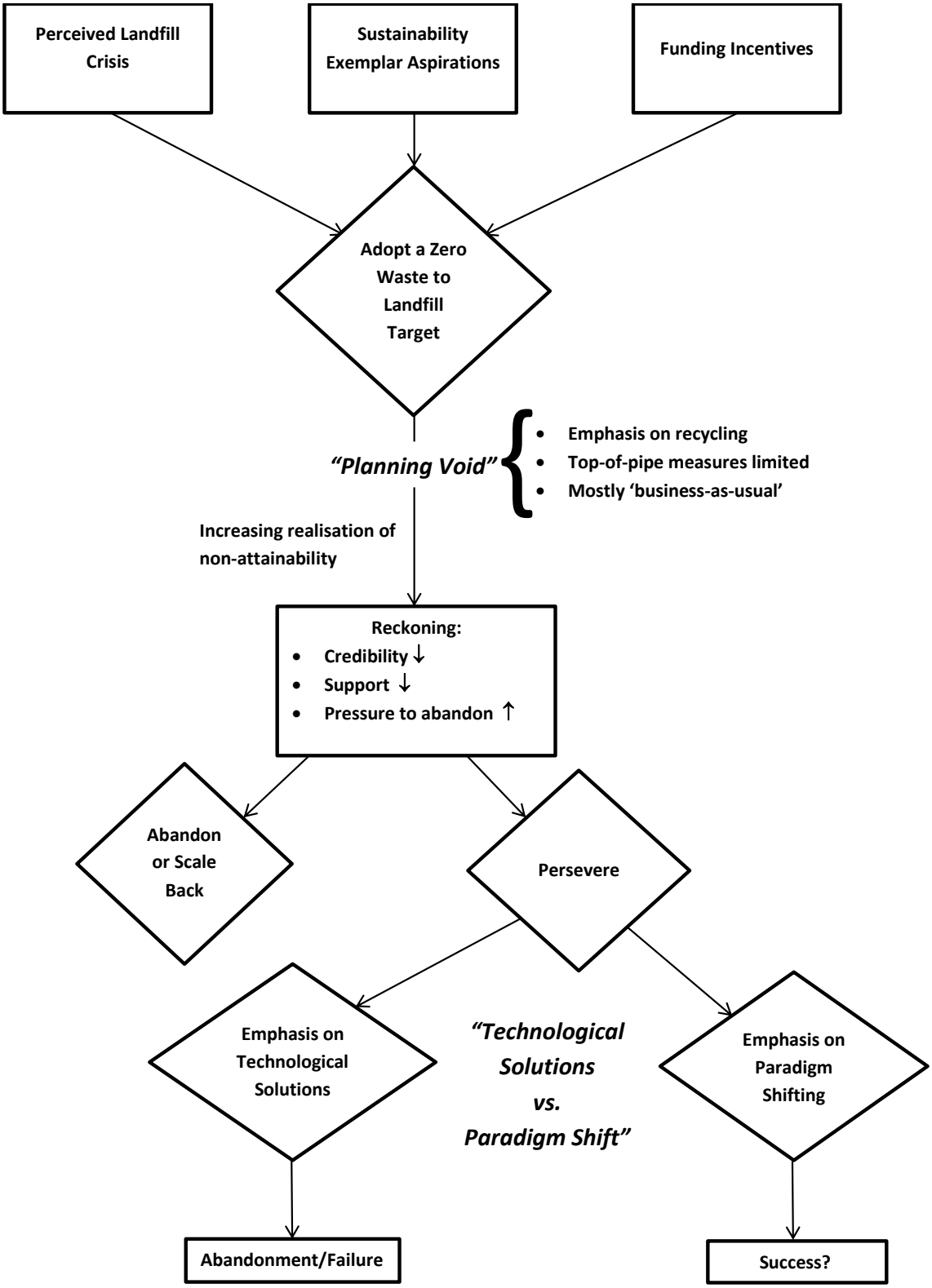

Figure 7.5: Common Trajectory of Zero Waste to Landfill Initiatives.

The 'common trajectory' described in Figure 7.5 consists of a sequence of *situations* (in rectangular boxes) and *decisions* (in diamond boxes), along which all observed zero waste to landfill initiatives appear to proceed, from beginning (top of diagram) to end (bottom of diagram). The overall sequence is explained as follows:

1. **Decision to Adopt a Zero Waste to Landfill Initiative:** In all initiatives observed, the motivation to adopt a zero waste to landfill goal appears to have been one of the following:

    - **Perceived Landfill Crisis**: This motive includes cases where some threat to future landfill capacity has been identified – typically based upon either a shortage of available land near the community, or else difficulties to gain public/political/environmental approval for a new landfill site. The Christchurch and Toronto cases are examples where zero waste to landfill initiatives were launched largely in response to challenges faced in securing new landfill space.

    - **Sustainability Exemplar Aspirations:** This motive includes cases where a local government appears to be aiming for enhancement of its public profile as a leader on sustainability-type issues. Canberra and San Francisco are examples of this: the former having promoted itself as the world's first local government to declare a zero waste goal, and the latter featuring zero waste to landfill as part of a larger public image as a global exemplar city with regard to environmental leadership.

    - **Funding Incentives:** This refers to cases where local governments receive funding in return for launching a zero waste to landfill initiative – and where there would otherwise be little likelihood of adopting such a goal. None of the case study locations fall into this category; however, the majority of local zero waste to landfill initiatives launched across New Zealand around the time of Christchurch's initiative are examples of this, as they were mostly smaller communities which received grants of around $25,000 (significant for their relatively small overall budgets) in exchange for adopting their zero waste to landfill goals.

2. **The '*Planning Void*':** Every single zero waste to landfill initiative that has been examined in this study – within and beyond the case study set – has been found to have this feature. The planning void is not a complete lack of planning for implementation per se, but rather it is a deep insufficiency of planning elements to address the waste stream in a comprehensive way that would bring residual waste levels down to anywhere close to zero. Common features of the planning void include:

    - A tendency for any zero waste to landfill initiative's initial planning to emphasise end-of-pipe strategies – particularly enhanced infrastructure development and public education around recycling.

    - Very little in the way of top-of-pipe strategies, such as comprehensive product or material bans. Where measures such as bans are implemented, they tend to be token ones such as plastic shopping bag bans, which target a very small proportion of the overall waste stream and typically include many exceptions.

    - An overall 'business-as-usual' feel to the initiative, with minimal expectations of behaviour change or sacrifice communicated to either industry or the public. Messages around fundamental change are mixed or inconsistent: expectations of significant waste reduction are communicated prominently, but with very little overt connection to required changes in behaviour/practice explicitly conveyed.

3. **Increasing Realisation of Non-Attainability, Culminating in a Period of 'Reckoning':** Zero waste to landfill initiatives generally have an initial post-launch period during which there is little or no record of questioning or second-guessing of the goal, and during which time the focus is squarely on the implementation of the mainly end-of-pipe strategies discussed above. Since the emphasis during this time is mainly on expanding recycling and similar programmes, these early years are typically marked by increases in the reported percent diversion rate – and as this tends to be the statistic of preference during this phase, these early results have a tendency to reinforce a positive image of the initiative's progression.

Eventually, though, the more pertinent absolute waste to landfill data – which will typically show much less progress towards zero waste – emerges to belie the story portrayed by percent diversion. Once it becomes evident that actual per capita waste to landfill is either decreasing too slowly, or even staying level or increasing, there begins a period of increasing realisation that the zero waste to landfill initiative might ultimately fail. During this period, the initiative faces new challenges of escalating seriousness, including losses in credibility and support from various stakeholder groups, and increasing pressure to abandon the zero waste to landfill goal. Additional external factors, such as newfound additional landfill capacity, only serve to increase the pressure to drop the initiative – as is notably observed in the cases of Christchurch and Toronto.

At this stage, there might be a decision made to officially abandon the initiative, or else scale back the goal in some way such as by extending the deadline. In the case of Christchurch, the decision to abandon was made just three years after adoption, while in Toronto the deadline was first pushed back by two years, before the zero waste to landfill goal was fully replaced.

If, instead, the decision is made to persevere with the initiative, then some revision to the overall strategy needs to be made, in order to improve the per capita waste to landfill numbers so that they start to trend towards zero. Based on the investigation of the case studies and other initiatives as well, this entails a choice that roughly falls across two possible options: emphasis on *technical solutions* versus *paradigm shifting*.

4. ***Technical Solutions versus Paradigm Shift:*** It has been observed in all of the zero waste to landfill initiatives studied, including the four cases and others as well, that once the period of 'reckoning' has taken place, the need for a shift in overall strategy is typically acknowledged – if the intention is to persevere with the zero waste to landfill goal. The following results have been noted across all cases:

    - **The choice between pursuing mostly technological solutions versus paradigm shifting is not explicitly considered:** No single zero waste to landfill initiative has been identified where the proponent local government has openly indicated that a choice had to be made between focusing on new

technological approaches versus making fundamental behaviour changes. On the contrary, the official rhetoric surrounding these initiatives tends to include a considerable combination of calls for both types of approaches to achieve the zero waste to landfill goal.

- **Generally speaking, *technical solutions = end-of-pipe measures*, while *paradigm shifting = top-of-pipe transformation*. As such, the decision is made implicitly, by choosing between end-of-pipe versus top-of-pipe strategies:** Each zero waste initiative, faced with the need to improve performance in order to get on track towards the goal, takes discrete steps which are each, ultimately, either focused at the end-of-pipe or top-of-pipe. The resulting set of steps taken determines how much each initiative has shifted towards either technical solutions or paradigm shifting.

- **Every single zero waste to landfill initiative observed has chosen to follow a path with an emphasis on technological solutions, over paradigm shifting:** One of the most consistent and remarkable findings of this study is that, when faced with the increasing realisation that success is unlikely under existing strategies, proponents in every single case eventually choose to pursue technological solutions to the problem. This is manifested generally in two ways: (1) further expansion of recycling/composting infrastructure and services, or (2) pledges for the use of 'new and emerging technologies'.

  The former option is essentially a ramping up of existing recycling/composting programmes, via such things as addition of a third composting bin to kerbside collection, or expansion of allowed materials for either recycling or composting.

  The latter option of new and emerging technologies is the more often-cited choice, noted in every single case study location and other initiatives as well. What is actually specified – typically in most detail by waste management staff who are the resident experts – is a combination of existing newer technologies such as anaerobic digestion or energy-from-waste (EFW) incineration processes, and as-yet undeveloped technological methods which are based on speculation of further advances to come.

By contrast, no single initiative has been identified anywhere which has chosen an overall emphasis on top-of-pipe strategies. This type of approach would entail such things as comprehensive bans on a wide range of everyday consumer products, large-scale disappearance of disposable-design and problematic-material products and their replacement with altogether different products, and the accompanying wholesale retooling of industry. In other words, a paradigm shift in thinking and behaviour among the public and industry, under the leadership of government implementing a paradigm shift in waste policy.

5. ***Final Outcome of Zero Waste to Landfill Initiative:***

   - ***Technical Solutions = Failure:*** As mentioned above, all zero waste to landfill initiatives which persevere past their period of reckoning appear to choose a path with an emphasis on technical solutions. And, as discussed previously throughout this thesis, no examples of zero waste to landfill success have been found. It is clear, therefore, that the technical solutions route is a pathway to failure for zero waste to landfill initiatives.

   - ***Paradigm Shift = Success?:*** There are no examples to be found yet of zero waste to landfill initiatives which have chosen a path of paradigm shifting, as all such initiatives to date have either been abandoned or scaled back, or else have persisted with a focus on technological solutions – to eventual failure or on track towards failure. Without existing exemplars of zero waste to landfill initiative success, the suggestion that paradigm shifting will lead to success is only hypothetical. However, if a new prevailing paradigm is based upon the purist zero waste principles of truly circular systems – instead of the overwhelmingly linear systems of the current 'waste management' paradigm – then the elimination of the need for landfill is a clear and logical result. For proof, one need only remind oneself of the fact that the rest of the natural world is operating more or less under such a 'zero waste' paradigm, and failure to achieve this state is, essentially, a failing unique to *Homo sapiens*.

Why has the concept of *zero waste to landfill* proven to be so elusive to modern human civilisation? The fact that numerous communities have gone so far as to officially declare

such a goal suggests that there is at least some degree of desire for the achievement of zero waste to landfill. So, why have all of these efforts led to failure? And what would have to change in order for this failure to be replaced by success?

The next three sections of this chapter discuss in detail how existing theoretical models offer frameworks from which the empirical results of this study can be analysed, to address these questions.

7.3 Fundamental Decision-Making versus 'Muddling Through', and Policy Windows

"When we try to pick out anything by itself, we find it hitched to everything else in the Universe" – John Muir, 1911 (Sierra Club, 2012).

This section examines the following question about the beginning part of the 'common trajectory': *How do zero waste to landfill initiatives become adopted in the first place?*

Lindblom (1959) distinguishes between two distinctly different overall approaches to policy-making: the *rational-comprehensive* (*'root'*) approach, and the *successive limited comparisons* (*'branch'*) approach. While the root method starts from fundamentals anew each time, building on the past only as it is embodied in theory, and always prepared to start from scratch, the branch method continually builds out from the current situation, step-by-step and by small degrees. Lindblom refers to the branch method as an *incremental* approach, and also uses the alternative term *'muddling through'*, and it is by these two descriptors that this approach is often described in the literature. Lindblom observes that while the literature heavily emphasises a rational approach to policy-making, it is in fact the 'muddling through' approach that dominates in actual practice.

Lindblom (1959) argues that the tendency for public administrators to prefer incremental policy change is not merely based on simplicity, but also on the fact that it allows them to operate within the limits of their knowledge and prior experience. Such is the obvious case with local government waste management, where policy tends to be focused on the end-of-pipe because this is what policymakers know from previous experience. The corollary is that if and when greater steps are taken – at the top-of-pipe, such as zero waste to landfill – these same policymakers are acting out of their ranges of expertise and confidence, and are

therefore much more likely to encounter unexpected consequences and unlikelihood of achieving goals.

Dror (1964) acknowledges that the 'muddling through' approach is realistic and adjusted well to human nature, but he questions whether incrementalism does not in some respects constitute a dangerous overreaction to the challenges of a more rational approach to policy-making. Dror suggests that when the results of past policies are undesirable, the risks involved in radical new departures may be worth taking. He cites the examples of newly-independent states, where following incrementally from policies followed by the former colonial masters would clearly not be acceptable.

Dror (1964) further argues that where no past policies exist with respect to a particular issue, incremental change is in fact impossible. He cites the example of the 'New Deal' reforms enacted in the USA in the 1930s, which comprised novel changes in policy that were a radical departure from existing and recent policy. It is easy to see how this argument can be applied to the zero waste to landfill problem: the underlying circular systems approach is so far removed from the linear waste management practices of the past century or so, that it is difficult to extract the necessary policy elements for the former, from the latter.

Lindblom (1959), however, argues that an incremental approach can often bring together stakeholders who are normally far apart ideologically. He cites the example of how the United States Congress approved the extension of old age insurance: liberals wanted to strengthen the welfare programmes of the federal government, while conservatives wanted to reduce union demands for private pension plans. The two sides were able to agree on the policy change without having a common objective, because the policy change was agreeable to the two differing objectives.

More generally, Lindblom (1959) observes that labour mediators typically cannot get negotiating sides to agree on criteria for settling their disputes but can agree on specific proposals. He summarises the effect this way (pp. 83-84): "when one administrator's objective turns out to be another's means, they often can agree on policy." This argument offers an explanation for how it is that zero waste to landfill goals have been chosen by local governments. As has been discussed in each of the case studies and with respect to other such initiatives elsewhere, the reasons given for why a zero waste target was adopted vary widely across stakeholder groups: for some it represented an escape route from a perceived

looming landfill capacity crisis; for others it presented an opportunity to develop enhanced recycling infrastructure; and for yet others, a zero waste to landfill goal represented a shift towards a more sustainable and holistic approach to consumption and waste. In other words, while there was no consensus across stakeholder groups about what the objectives were, they nonetheless found the policy to be agreeable – for different reasons – and that is why the idea made it to becoming official policy.

Dror (1964), however, challenges Lindblom's view that agreement on policy is a sufficient measure of the policy's quality. Dror agrees that under conditions of stability, an agreed-upon policy will ordinarily involve little risk of catastrophe – and he also notes that it is in fact much easier to agree on discrete policy than on abstract goals. However, Dror asserts that under conditions of high-rate change, ignorance can lead to agreement on selecting a catastrophic policy – and he further argues that under such conditions it may be much easier to agree on abstract goals than on policies, as there is no background of shared experience to serve as a basis for consensus on policy. Dror concludes (p. 155): "It is, therefore, highly necessary to emphasise that agreement should follow examination of the consequences of policy and not be substituted for it, in all save the most familiar and stable policy areas."

The latter caveat appears to be one which has been unheeded in the case of zero waste to landfill initiatives to date: while various stakeholders managed to agree on adopting the goal, there has clearly not been enough analysis of the implications of adopting such a target, as evidenced in every single initiative by the existence of a significant 'planning void'.

Lindblom (1959) observes that policy-making is a very rough process, with chosen policies likely to produce only partial results as well as unexpected consequences. As such, he argues, if policy is implemented through a succession of incremental changes, serious lasting mistakes are avoided in several ways: (1) Past sequences of policy steps give knowledge about the probable consequences of further similar steps; (2) Big jumps toward overall goals that would require predictions beyond existing knowledge are not necessary, because the selected policy will not likely be the final resolution of the problem – rather, each policy decision can be a small step, which if successful can quickly be followed by another; (3) It is possible to 'test' previous predictions as policy changes progress across to each further step; (4) Errors can be remedied much more quickly and easily than if policy change proceeds through more distinct steps which are more widely spaced in time.

Lindblom (1979) refers to *incremental politics*, which he suggests need neither be conservative nor slow-moving – in fact, he suggests it might be the fastest method of change available under ordinary circumstances (p. 520): "Incremental steps can be made quickly because they are only incremental. They do not rock the boat, do not stir up the great antagonisms and paralyzing schisms as do proposals for more drastic change." This argument is supported in this study by the recurring observations among case study stakeholders that South Australia – with its much more modest goals than zero waste to landfill – have accomplished far greater progress in their waste reduction efforts.

Stremke, Van Kann and Koh (2012), on the other hand, advocate for long-term thinking and strategic decision-making, and they note that an advantage of a rational approach to planning is that there is clarity about how decisions are made. They argue that as this method requires that problems are identified, goals established and alternatives carefully weighed, a rational approach to problem analysis and goal definition is beneficial to long-term planning. Stremke et al. caution, however, that an advanced approach to long-term visions must be flexible enough to operate within the constraints of available resources.

Hostovsky (2006, p. 382) offers a similarly mixed view, describing the objectivity and complexity of the rational approach as

> "its greatest strength and its greatest weakness. Theoretically, it results in the "best" solution because it has taken into account the widest variety of variables. In practice, the processes it engenders can be overly complex, redundant, time-consuming, and expensive."

Dror (1964), however, argues that the 'rational-comprehensive' opposite to 'muddling through' is not often seen in practice, as the actual tendency of most organisations is to limit the search for alternatives to a minimum. As such, he suggests that there is little risk in the real world that decision-makers will become bogged down in exhaustive searches for all alternatives and full evaluation of consequences, in the course of policy-making. Dror notes, though, that where it is applied, a rational-comprehensive approach "has at least the advantage of stimulating administrators to get a little outside their regular routine," while a muddling through approach "justifies a policy of "no effort"" (p. 155).

Lindblom (1959) acknowledges that an important limitation of incrementalism is that there is no assurance that all relevant values will be considered, which may lead the decision-

maker to overlook excellent policy alternatives for no other reason than that they are not suggested by the chain of successive policy steps leading to the present day. Dror (1964, p. 156) argues that this is a fundamental problem with the method's popular appeal:

> "Its favorable acceptance, the result in part of its many merits, reflects the widespread disposition of administrators and students of public administration to accept the present as a guide to the future, and to regard contemporary practice as a norm for the future."

Rosenhead (1980) suggests that under an incrementalist approach, existing priorities are effectively insulated from fundamental change, as the generation of information and of solutions is in the hands of agencies with vested interests in the status quo or close to it. This pattern can be seen in all zero waste to landfill initiatives observed in this study: industry's interrelations with local government – including lobbying from and partnerships with both waste production and waste processing companies – ensure that necessary measures such as material or product bans, or Extended Producer Responsibility, are minimised, and the focus stays primarily on end-of-pipe efforts such as expanded recycling.

Lindblom (1979) suggests that in addressing issues such as environmental protection, big solution ideas are impossible except in rare circumstances, because conflicting interests pull them apart, or else vetoes are cast against them. He argues that stakeholders tend to view such large-scale initiatives as prone to be mistaken or destined for failure, or even for worsening of the situation, and they prefer to see action taken one step at a time – not necessarily because errors will be avoided, but because each step will receive greater attention and will be more carefully evaluated and corrected where necessary.

The incremental approach to planning, then, is as Lindblom (1959, p. 80) describes it, "the art of sub-optimizing", with the inherent limitation "that difficulties increase and our special competence diminishes by an order of magnitude with every level of decision making we attempt to ascend." Rosenhead (1980) suggests not altogether differently that planning should be from the bottom-up and facilitate participation, not based on optimising but rather on establishing a set of feasible solutions which acknowledge the uncertainty of future states, and are accordingly flexible and aiming for loose-fit. And Simon (1978) defines a decision-making model called *satisficing* that is similar to optimisation, except that whereas optimisation seeks the best possible solution, satisficing proceeds until a solution is

found that reaches some pre-determined threshold. Simon argues that the rationale for such a sub-optimal method is that "information gathering is not a free activity, and…unlimited amounts of it are not available" (p. 10).

While these various models of sub-optimal decision-making seem reasonable, however, they are all problematic with respect to the special case of zero waste to landfill, because the goal in this case – 100% elimination of residuals – requires nothing less than a *fully optimal* outcome. The elusiveness of a truly rational-comprehensive approach in planning, therefore, can be viewed as a signal that such an initiative is not positioned to ultimately succeed.

While the rational versus 'muddling through' approaches describe a continuum of sorts along which policy-makers conduct their work, there remains the question of how any particular policy idea actually finds its way onto the decision-makers' agenda.

Kingdon (1995, p. 1) poses just such a fundamental question: "How Does an Idea's Time Come?" He describes the existence of three evolving and largely independent process streams which influence how agendas are set and alternatives are specified:

- The *problem stream*, which consists of identified problems brought to the attention of decision-makers by events, crises, disasters, or feedback from stakeholders.
- The *policy stream*, which emerges from ideas and proposals which exist in "a "policy primeval soup"….are floated, come into contact with one another, are revised and combined with one another, and floated again", with the policy field narrowed to those "that survive to the status of serious consideration" in a manner that "resembles the process of biological natural selection" (p. 19).
- The *political stream*, which is composed of factors such as public opinion, change of or within government, and pressure from special interest groups.

Set amidst these streams, Kingdon (1995) describes the appearances of what he calls the *policy window* in this way (p. 165):

> "The policy window is an opportunity for advocates of proposals to push their pet solutions, or push attention to their special problems. Indeed…advocates lie in wait in and around government with their solutions at hand, waiting for problems to float

> by to which they can attach their solutions, waiting for a development in the political stream they can use to their advantage."

Kingdon (1995, p. 165) describes the opening of the policy window as the result of the problem/policy/political streams converging at critical moments: "A problem is recognized, a solution is developed and available…a political change makes it the right time for policy change, and potential constraints are not severe."

The policy window can sometimes open predictably, a notable example being how the widely-expected USA Democratic Party's election victories in 2008 cleared the way for a universal health insurance initiative. Otherwise, the policy window can open unexpectedly, such as with the earthquake and tsunami which caused the Fukushima nuclear reactor meltdown, and led to the scaling back of nuclear energy programmes in Japan and Germany.

Larson and Greenwood (2004) argue that non-sustainability-focused initiatives, such as lean production, can open a window of opportunity – which they refer to as the 'green door', through which more sustainability-focused but less readily-accepted initiatives can enter and piggyback upon the more readily-accepted programmes. Larson and Greenwood note that sustainability initiatives often explicitly promote themselves as 'green' or "with a prominent green patina", which "can translate into a requirement for some form of "conversion" on the part of company senior management if the initiative is to be embraced and implemented" (p. 33), and this can lead to the 'green door' being a very indirect route to meaningful and timely change.

Bührs (2003) describes how, in this sort of manner, environmental innovation in New Zealand has been taken as a sign of progressive leadership – while in fact "the driving force was, predominantly, of a political-ideological nature, in particular the 'wholesale' adoption of 'New Right' ideas and beliefs by strategically placed politicians and government officials" (p.97). Bührs refers to this as a process of 'ideological diffusion', which he describes as an important factor in triggering environmental innovation.

Lindblom (1979, p. 521) suggests similarly that incremental politics can be like a 'Trojan Horse' for getting change implemented that might not otherwise be possible:

> "Incremental politics is also a way of "smuggling" changes into the political system. Important changes in policy and in the political system often come about quite

> indirectly and as a surprise to many participants in the system…. a skilled reformer may learn paths of indirection and surprise, thus reaching objectives that would be successfully resisted were his program more fully revealed."

Kingdon (1995) notes that the policy window may open because a problem becomes serious enough – perhaps to the point of crisis – but can quickly close if there are no acceptable alternatives available. In the Toronto case, for example, the City's inability to locate a new landfill site created a potential looming crisis as the closure of the existing local site approached, and this prompted the declaration of the zero waste to landfill by 2010 goal in 2001. While the City was shipping waste across the border to Michigan, the window remained open – but once a new landfill was secured within Ontario in 2007, the zero waste to landfill initiative was dropped within the year. This study has observed that Toronto had no feasible plan for achieving the zero waste goal back in 2001 – and never developed one – and therefore it was only a matter of time before the open policy window closed, with the purchase of the new landfill.

Boyle (1999) observed, at the time that zero waste to landfill initiatives were spreading around New Zealand, that the situation provided an excellent opportunity for local councils to take significant steps towards zero waste. She warned, however, that "without a concerted effort from central and local governments, the success of such programmes are questionable" (p. 65). This turned out to be an accurate foreshadowing of the closing of the 'policy window' for the zero waste movement across New Zealand, in the years that followed.

Boyle's observation of the situation in New Zealand – which has been discussed in particular detail in the case of Christchurch's abandoned zero waste to landfill initiative – repeats itself in the similar failures in Canberra and Toronto – with a similar warning applicable to the ongoing San Francisco initiative as well.

It is not difficult to see how each of this study's case locations managed to get a zero waste to landfill goal officially adopted by their respective local governments. Whether it was a perceived impending landfill crisis (Christchurch, Toronto), or else an aspiration to achieve a sustainability exemplar status among world cities (Canberra, San Francisco), each place experienced an opening of the 'policy window' through which zero waste to landfill could be made an official goal. In all cases, the decision to adopt a zero waste to landfill goal

resembles a 'fundamental decision'– and yet, in all cases, what transpired in the years which followed clearly looks like 'muddling through' on waste reduction.

It is perhaps appropriate, therefore, to modify the model of the policy window by renaming it as a 'policy *tunnel*', in the case of zero waste to landfill initiatives: there is an opening that appears in each case, yet there is a great distance of required work to get through to get out the other side; however, the project gets lost in the darkness of the 'planning void', and the policy tunnel closes before success can be achieved. Canberra, Christchurch and Toronto have seen the exit close already; San Francisco's initiative is presently somewhere in that void, and between now and 2020, unless some significant change occurs, their exit will close as well.

The next section looks at the question of how a goal as ambitious as zero waste to landfill, with a near-certain likelihood of failure to an independent observer given prevailing conditions, can nonetheless be declared so unequivocally and confidently by its proponent.

7.4 Planning Fallacy and Strategic Misrepresentation

"The Olympics can no more lose money than a man can have a baby" – Montreal Mayor Jean Drapeau, 1970 (Saunders, 2012). (The 1976 Montreal Games debt reportedly reached $1 billion, and allegedly took 30 years to be paid off by taxpayers (Lewis, 2010).)

This section examines the following question about the proponents of zero waste to landfill initiatives – all of which have either failed or are on track for failure: *What made them so sure – publicly, at least – that they could achieve the stated goal?*

Kahneman and Tversky (1977) use the term *planning fallacy* to define the tendency for people to underestimate the time required to complete their own projects, even where there is considerable experience with their own – or knowledge of others' – previous failures to live up to planned schedules.

Lovallo and Kahneman (2003) extend the concept of planning fallacy beyond completion time, to cover more generally the optimism bias inherent in forecasting overall project success. They observe that decision-makers tend to attribute favourable outcomes to factors under their control, while unfavourable outcomes are more likely to be attributed to uncontrollable external factors. Lovallo and Kahneman also observe that decision-makers are prone to the illusion that they are in control – sometimes explicitly denying the role of

chance in the outcome of their plans. They argue that risk is typically seen by decision-makers as a challenge to be met by the exercise of skill, and as such they tend to ignore or downplay the possibility of random or uncontrollable occurrences that may impede their progress towards a goal.

Lovallo and Kahneman (2003, p. 3) describe the planning fallacy as a situation where

> "managers make decisions based on delusional optimism rather than on a rational weighting of gains, losses, and probabilities. They overestimate benefits and underestimate costs. They spin scenarios of success while overlooking the potential for mistakes and miscalculations. As a result, managers pursue initiatives that are unlikely to come in on budget or on time—or to ever deliver the expected returns."

Kahneman and Tversky (1977) explain that such errors of judgment are often systematic rather than random, and based upon personal bias rather than simple confusion. They argue that this bias towards underestimating completion time resembles visual illusions in the crucial respect that a person will repeat these underestimating errors even when they are fully aware of the historical pattern of doing so. Buehler, Griffin and Ross (1994, p. 366) describe this tendency as

> "the ability of people to hold two seemingly contradictory beliefs: Although aware that most of their previous predictions were overly optimistic, they believe that their current forecasts are realistic. It seems that people can know the past and yet still be doomed to repeat it."

Kahneman and Tversky (1977) explain that the planning fallacy is a consequence of the tendency to neglect distributional data – information about the wider set of previous and similar projects – in favour of an internal approach to prediction where the focus is on the constituents of the specific problem in question. They cite the example of the construction of a building, where an internal approach to predicting completion time considers a number of possible delays such as lateness in the delivery of materials, labour disruption, or extreme weather conditions. Each of these disruptions, in isolation, has a relatively low probability of occurring, but with all possible occurrences considered in combination there is a considerable risk of some significant disruption. Kahneman and Tversky argue that there is a tendency in this situation to underestimate this aggregate likelihood and extent of disruption – thereby producing consistent underestimations of completion times. They

point out that by comparison, the adoption of an external approach, which looks at the project in question as one of many similar ones, and focuses on the probability distribution for completion times for such previous projects – which incorporates the entire set of possible delaying factors – would lead to more realistic estimation of completion times that was not biased towards underestimation. Kahneman and Tversky (pp. 2-3) suggest

> "that more reasonable estimates are likely to be obtained by asking the external question "how long do such projects usually last?", and not merely the internal question "what are the specific factors and difficulties that operate in the particular problem?"

Lovallo and Kahneman (2003) use the terms *inside view* and *outside view* to describe respectively the internally and externally-focused forecasting methods. They also employ the term *reference class* to describe the historical project outcomes which form the distributive data set used to forecast with an outside view. In the case of zero waste to landfill initiatives, this would imply looking at similar zero waste initiatives, as well as other similarly ambitious sustainability initiatives such as those related to energy or conservation.

Flyvbjerg (2008) observes that taking the 'outside view' is a way to successfully mitigate the effects of the planning fallacy, and he uses the term *reference class forecasting* to describe the general method of using a statistical distribution of outcomes from a relevant class of reference projects, to generate forecasts. Flyvbjerg notes, however, that a serious challenge in doing a reference class forecast lies in assembling a valid dataset that will allow a reliable forecast, and he argues that such datasets are rare in real-life policy-making and planning. This difficulty is evident with respect to forecasting for a zero waste to landfill initiative, as one clear criterion for selecting a reference class would be that it only included initiatives with a similar *absoluteness of goal* as that of 100% reduction of residual waste. This means, for example, that even something like a target with a deadline of 80% reduction in greenhouse gas emissions by a municipality – as highly ambitious as this might be in a relative sense – would be inappropriate for a zero waste to landfill-related reference class forecast, since the 20% residual greenhouse gas emissions implies a continuation of certain contributing behaviours that the 100% reduction of waste to landfill totally precludes.

Buehler et al. (1994) concur that an external approach to forecasting is less biased, noting that the planning fallacy vanishes when individuals forecast other people's task completions.

They explain that in an observer role, people may be less motivated than as actors to discount previous prediction failures by attributing them to external, transitory, or unstable causes. When explaining failures to meet previous predictions, Buehler et al. note, observers tend to see actors as procrastinators or as simply slow, while as actors they tend to see themselves as the victims of circumstances. Another possible reason they cite is that observers may be relatively unaware of the activities and commitments of those they are observing – and with this information missing they may consequently rely on available sources of external, distributional information about their previous performance.

Kahneman and Tversky (1977) suggest that the tendency to rely mainly on singular over distributional data is enhanced by any factor which increases the perceived uniqueness of the problem, and they point out that the relevance of distributional data can be masked by detailed acquaintance or intense involvement with the project in question. This is of interest with respect to zero waste to landfill initiatives, because in recent years the successive failures of similar initiatives have provided a sizeable and increasingly large external data set – against which it would be straightforward for anybody considering their own new initiative to infer that reaching their own zero waste to landfill goal might be highly unrealistic.

While Canberra might be excused in this sense as they were the first city to launch such an initiative, back in 1996, this becomes a decreasingly plausible excuse over time – not much less so perhaps for Christchurch in 1998, but less so for Toronto in 2001, and even less so for San Francisco in 2003. With the failures of all three of these initiatives plus others around the world mounting, it is therefore hard to accept that San Francisco can continue on its current trajectory towards 2020 without some significant doubts arising. Indeed, as noted in the San Francisco case chapter, some City and waste contractor staff there, when asked to comment on this issue, already concede that the final outcome by the deadline may very well resemble something far from zero waste to landfill.

Kahneman and Tversky (1977) note that there is some evidence that the degree of overconfidence about a project increases with ignorance. Conversely, when there is a high level of expertise on the subject in question by the estimators, estimates tend to be more on-target. This helps to explain how it is that local government waste departments and their traditional contractors, which may have very good overall track records on managing the usual end-of-pipe systems such as rubbish and recycling collection, or landfilling, perform so

poorly in comparison with regard to their zero waste to landfill programmes – as these are end-of-pipe systems which are novel and therefore much less familiar to them.

Kahneman and Tversky (1977) point out that although the planning fallacy is sometimes attributable to motivational factors such as wishful thinking, it is also frequently observed when there is disincentive for underestimating duration or cost.

Lovallo and Kahneman (2003) observe that within organisations, competition among various proposed projects can be intense due to constraints on time and money. As a result, they note, there is great incentive for proponents to accentuate the positive in laying out prospective outcomes. Lovallo and Kahneman point out that this has two negative effects: (1) it ensures that the forecasts used for planning are overoptimistic; and, (2) it increases the likelihood that the projects chosen for investment will be those with the most overoptimistic forecasts – thereby maximising the probability of eventual failure. Buehler et al. (1994), for example, observe that very large construction projects are often undertaken by governments, and proponents may deliberately provide overly optimistic assessments of cost and time to win political approval for them.

Flyvbjerg (2008) observes that whereas the planning fallacy accounts for inaccuracy in terms of optimism bias, other forecasting inaccuracy can be the result of what he terms *strategic misrepresentation* – which occurs when proponents deliberately and strategically overestimate benefits and underestimate costs in order to increase the likelihood that their projects gain approval, funding, or some other advantageous status.

Flyvbjerg (2008) points out that strategic misrepresentation can be traced to political and organisational pressures – such as competition for scarce agenda space or funding. Lovallo and Kahneman (2003) suggest that another way in which organisations tend towards over-optimism is by actively discouraging pessimism – which is often interpreted as disloyalty. They observe that pessimistic opinions will tend to be suppressed, while optimistic opinions will tend to be rewarded – a situation of mutual reinforcement of an over-optimism bias which ultimately undermines an organisation's ability to think critically, and leads to group validation of unrealistic views of projects' overall prospects.

Kingdon (1995) uses the term *policy entrepreneur* to describe people who advocate for the increased prominence of certain ideas or issues. He argues that such people may come from various locations within or outside of government, in elected or appointed positions, in

grassroots groups, or from private-sector sources. Kingdon defines their common defining characteristic to be

> "their willingness to invest their resources – time, energy, reputation, and sometimes money – in the hope of a future return. That return might come to them in the form of policies of which they approve, satisfaction from participation, or even personal aggrandizement in the form of job security or career promotion" (pp. 122-123).

Kingdon (1995) describes three typical qualities of successful policy entrepreneurs: (1) *claim to a hearing* – which can come from expertise, ability to speak for others, or the holding of a position of responsibility or authority; (2) *political connections or negotiating skills*; and, (3) *sheer persistence*. Kingdon also describes successful policy entrepreneurs as those who "lie in wait – for a window to open" (p. 181), and he compares them to surfers waiting for a 'big wave' to ride. He observes how their selfish interests can often drive the policy agenda (p. 182):

> "During the pursuit of their personal purposes, entrepreneurs perform the function for the system of coupling the previously separate streams. They hook solutions to problems, proposals to political momentum, and political events to policy problems….Without the presence of an entrepreneur, the linking of the streams may not take place. Good ideas lie fallow for lack of an advocate. Problems are unresolved for lack of a solution. Political events are not capitalized for lack of incentive and developed proposals."

Kingdon notes, however, that policy entrepreneurs may also act as *brokers* in addition to being advocates – and this may lead to mutation of solutions that may include significant compromises. This appears to have been the outcome in the case of Christchurch's short-lived zero waste to landfill initiative – as one City Councillor managed to play a nearly single-handed role in both the adoption and sudden abandonment of the programme just three years later.

Councillor Denis O'Rourke, who as Chairman of the CCC's City Services Committee was the most active and vocal proponent of the adoption of the zero waste to landfill goal in 1998, was the same person who quite forcefully pushed for its scaling back in 2001 (Christchurch City Council, 2001b). Of further note is that this same Councillor, later in 2001, became a

Council-appointed Director of the public-private Transwaste joint venture, eventually becoming the Chairman of that landfilling-focused company.

Former CCC Councillor Chrissie Williams (pers. comm., April 16, 2012) observes that this scenario was attributable to O'Rourke's charisma, ability to convince people, and his interest in setting up complex legal deals such as the Transwate joint venture. In other words, he was a quintessential policy entrepreneur.

Flyvbjerg (2008) points out that while reference class forecasting is generally effective in cases where forecasting error is due to honest mistakes such as those explained by the planning fallacy, the method will not generally work where strategic misrepresentation is occurring — as in the latter case there is deliberately-placed bias whose motives are not addressed by an outside view approach. In such a scenario, Flyvbjerg argues, incentives must be aligned to reward accurate forecasts and punish inaccurate ones. He stresses that the higher the stakes, and the higher the level of political and organisational pressures, the more pronounced will be the need for such measures.

This thesis' examination of each zero waste to landfill initiative case study does not allow for the full extent of forensic investigation that would be necessary to uncover and thoroughly characterise all perpetrators of strategic misrepresentation – and furthermore it is even not possible within the scope of this study to make a clear distinction in all instances between what was the result of honest versus deliberate forecasting errors. That said, there is ample evidence of *incentives* to strategically misrepresent the prospects of each of the zero waste to landfill initiatives considered in this study. Among government officials, this includes the notoriety and prestige associated with one's city being a sustainability-related exemplar, or else the potential to take credit for rescuing one's city from a potential landfill-shortage crisis.

It has been discussed throughout this thesis that industry in general is largely opposed to and even threatened by the changes to 'business-as-usual' that a zero waste to landfill goal entails. However, for many industry players involved in the initiative-specific infrastructure and services developments – particularly around recycling and other 'resource recovery' schemes, the business boom resulting from a city's declaration of a zero waste to landfill goal is tantalising – regardless of what these industry people actually think of the chance of the initiative's success. Indeed, as discussed in many places in this thesis, industry

stakeholders generally think little of the feasibility of any zero waste to landfill initiative – yet those with a vested interest in such initiatives have every pecuniary reason to promote their launch and continuance.

Another type of 'industry' that relates to this issue is the work of the *zero waste advocate* – which generally comprises the volunteer activists – consisting of individuals and grassroots organisations from the public – and the paid consultants/experts. Anderson (2011, par. 4) observes that among zero waste believers in general

> "There is a moral imperative… that separates them from mainstream solid waste professionals. The mainstream primarily focuses on the delivery of solid waste services, whereas the zero waste proponents desire to transform cultures by moving them from consumerism to sustainability."

However, while the zero waste volunteer's incentive to advance the cause of zero waste to landfill is a logical and essentially innocent extension of core personal beliefs, the professional advocate's motives may be a matter of basic livelihood. In the course of this study, a number of such professional zero waste advocates' names appear recurrently – in the literature, and also in the consultant's reports and plans of local governments who have decided to launch their own initiatives. The fees these people have earned in return for their work on these campaigns is an obvious incentive to promote an overly-optimistic view of zero waste to landfill feasibility – in spite of the eventual failure/abandonment that each of their client cities have experienced.

One of these zero waste professionals is New Zealand's Warren Snow, who points out in hindsight that New Zealand had the opportunity to be world's first 'zero waste' country, with thousands of jobs created in the process. He attributes much of the failure of this happening to the fact that the movement became colonised by people who didn't really want to see zero waste happen – but rather were seeking personal gain through accessing zero waste funding, or else public relations boosts for other campaigns that were not directly related to the cause. He cites the example of the Zero Waste New Zealand Trust, which went from being a grassroots organisation to being a 'professional group' – destroyed from within due to money coming from private-sector-based sources like the Tindall Foundation (W. Snow, pers. comm., April 19, 2011). Snow's former colleague, Julie Dickinson (pers. comm., March 08, 2011) concurs that initial success attracted people that one would not necessarily want

within the movement, and meanwhile there was a lack of genuine 'champions' to push the zero waste goals continuously.

Zero waste initiatives may even be pitched to client cities – whether innocently or otherwise – on the basis of factors other than those directly related to waste reduction. An example of this can be seen from MJ Waste Solutions and Gary Liss & Associates (2003, p. 7), in their consultant's report for the City of Nelson in Canada, where the key motivation for launching a zero waste initiative is based on tourism, rather than sustainability:

> "Zero Waste offers an opportunity for Nelson to become a focus for eco-tourism. In fact, one of the driving forces for the adoption of Zero Waste in New Zealand was that country's desire to strengthen tourists' perception of New Zealand as dedicated to maintaining the highest environmental standards."

Strategic misrepresentation aside, Lovallo and Kahneman (2003) suggest that optimism has its proper place in the execution of projects, as it generates much more enthusiasm than do realism or pessimism, engenders resilience in the face of difficult situations or challenging goals, and generally keeps employees motivated and focused. They argue, however, that realistic forecasting, especially when much is at stake between success and failure, requires a balance between optimism and realism – i.e., between goals and forecasts. Lovallo and Kahneman sum it up this way (p. 7): "Aggressive goals can motivate the troops and improve the chances of success, but outside-view forecasts should be used to decide whether or not to make a commitment in the first place."

One particularly promising finding in the literature is that from Buehler et al. (1994), who observe that while people generally fail to meet their predicted completion times, they do in fact typically meet important *deadlines*. Thus, while people tend to take longer to complete various tasks than they predict, most tend to submit their income tax returns on time, and the rate of people arriving at the airport in time to make their flights is widely known to be near 100%. This notable deviation from the general tendency towards optimism bias offers a ray of hope for future zero waste to landfill initiatives: it suggests that strict enforcement of binding deadlines, with severe enough penalties to back them up, could make the difference between failure and success.

The common trajectory shows that each zero waste to landfill initiative, with its overly optimistic beginning and subsequent emergence of a 'planning void', proceeds to a period of

'reckoning', from which the only alternative to abandonment or certain failure is to drastically revise the overall strategy – which comes down to a choice between an emphasis on as-yet unproven technological solutions, or else a more fundamental paradigm shift. The next section asks the question of why the former option is always chosen over the latter – with consistently negative results.

7.5 Technological Solutions versus Paradigm Shifting

"What the environmental movement needs more than anything else right now is to take a collective step back to rethink everything. We will never be able to turn things around as long as we understand our failures as essentially tactical, and make proposals that are essentially technical" (Shellenberger and Nordhaus, 2004, p. 7).

As discussed previously in this chapter, all zero waste to landfill initiatives appear to follow a common trajectory, which leads from adoption and its inherent optimism, gradually towards a period when it becomes increasingly apparent that the goal will be unattainable unless something significant changes. During this period of reckoning, credibility and support for the initiative diminish, and pressure mounts to abandon the goal. Broadly speaking, the decision made at this point is either to abandon or scale back the zero waste to landfill goal, or else persevere with the initiative.

This section is focused particularly on what happens next when the decision is made to persevere. Observation of the zero waste to landfill initiatives examined in this study indicates that what happens next is that proponents are generally faced with a choice between two divergent options, in deciding how to shift their initiatives towards success. These are: (1) an emphasis on applying *technological solutions* to achieving zero waste to landfill, versus (2) an emphasis on fundamental behaviour change – i.e., a *paradigm shift*.

One important finding of this study is that in every single initiative that has been observed, the proponent has clearly chosen the technological solutions route – even though there is significant and growing evidence that this choice leads to failure in every single instance. This section therefore considers the following question: *Why do zero waste to landfill initiative proponents consistently choose to pursue an overall strategy emphasizing technological solutions, instead of a paradigm shift?*

Waste Management versus Zero Waste Paradigms

L'Abate (2011, p. v) defines a *paradigm* as "one way to look at reality", or "a systematic system of values", while according to Ehrenfeld (1997, p. 88) "a paradigm is a framing set of concepts, beliefs, and standard practices that guide human action."

If a paradigm can be applied to a community of people – i.e., a society – then a *paradigm shift* can be defined as a fundamental change in how a society views the reality of the world, or the set of values which are applied by people within the society, or the set of concepts, beliefs and standards which guide human behaviour within that society.

In the context of the waste issue, there is, as discussed previously in this thesis, a prevailing *waste management paradigm*, similar across developed parts of the world, that involves a linear systems view of waste as an eventual end product – of which at least some component is not recovered and therefore ends up landfilled. Different locations operating under this paradigm may use differing approaches to handling waste – such as direct landfilling versus incineration – and circular components may be added on in the form of various resource recovery programmes such as recycling or composting, but in all cases the ongoing landfilling of residuals is considered a normal and acceptable feature of the overall waste system.

By contrast, the *zero waste paradigm* is based on a circular systems view, where resource recovery of all waste – meaning no residuals and therefore no landfilling – is the ultimate objective.

Kuhn (1970) writes about paradigms and paradigm shifts using the language of a scientific context, with frequent use of terms such as *normal science* to refer to the prevailing scientific paradigm, and *scientific community* to refer to the practitioners whose work both supports and is supported by that established paradigm. He also uses the term *scientific revolution* to describe a significant, fundamental shift in what the community accepts to be 'normal science' – in other words, a paradigm shift in the field of science.

Kuhn (1970) frequently cites the case of the shift from a predominantly earth-centred view of the universe to the sun-centred model which eventually replaced it, as an exemplar scientific revolution. Although this series of events was the result of the work of various astronomers, it had a fundamental impact well beyond the scientific community –

particularly with how it challenged long-standing and deeply-held philosophical and religious beliefs which prevailed in that era.

Similarly, the discourse around contemporary waste problems and how they challenge the prevailing waste management paradigm has more at stake than just the science or engineering of municipal waste. The debate touches on societal issues of global economic systems, consumerism, the 'throwaway society', and general sustainability. For these reasons, what is at stake with any zero waste to landfill initiative is no less than a wide-reaching paradigm shift for the society that undertakes it.

In the context of zero waste to landfill initiatives, Kuhn's 'scientists' can be taken to mean any of the stakeholders who wield any influence or decision-making power regarding waste policy or waste handling: government elected officials and staff, the industry players who control both production and processing of what ultimately comes out of the end-of-pipe, and also the individuals and groups from the public who advocate on waste-related issues.

It is not difficult to see widespread evidence that the waste management paradigm currently prevails in the developed world. Danilov-Danil'yan et al. (2009) observe that the volume of waste generated by economic activity is daunting and defies imagination, and they explain in quantitative terms how as consumers we are only seeing the tip of the 'wasteberg': for every inhabitant of the earth, 50 tons of raw materials are extracted from the earth every year – but only 2 tons of that amount is turned into finished products.

van der Werf and Cant (2012, p. 10) note that two decades ago, the term "consumer society" was commonly used to describe the situation, amid calls for a shift to a "conserver" society. However, they observe, a focus since then on such things as planned obsolescence in products has created the even worse situation of a "hyper consumer" society.

Bauman (2008, p. 157) explains how prevailing ideologies of consumption and economic growth drive the relentless waste machine:

> "The consumerist economy lives by the turnover of commodities and is booming when more money changes hands. Money changes hands whenever consumer products are hauled to the dump. Accordingly, in a society of consumers the pursuit of happiness tends to be refocused from *making* things or *acquiring* them to

> *disposing* of them – just as it should if one wants the gross national product to keep growing."

Crocker (2012, p. 13) suggests that the dominant message to the public is that current waste-related practices are convenient and beneficial, with consequences not worthy of worry:

> "The environmental costs of over-extraction, over-consumption and excessive pollution and waste, like the real costs of our road toll, for example, are never made transparent to us, but can only be made visible with considerable effort, against a prevailing culture of 'use and enjoy, dispose and forget'."

Watson (2009, p. 198) describes this as a problem "related to the institutional, political, and cultural framing of waste under the disposal paradigm" – whereby waste is seen as matter to be rid of in the most cost-effective way, and from which starting point waste management then progresses to an eventual linear and end-of-pipe form. Danilov-Danil'yan et al. (2009, p. 57) sum it up this way: "Why would someone encouraged to buy, consume, and discard worry about the piles of non-biodegradable waste piling up on the outskirts of our cities?"

Against this body of evidence that the waste management paradigm is unable to reconcile the mounting waste problems of our time, the zero waste paradigm emerges as an obvious alternative approach. Jessen (2003) articulates this paradigm as a future in which the very notion of waste is discarded: everything is made from resources, and waste is viewed as resources going in the wrong direction – a sign of inefficiency and non-competitiveness. Energy, water, natural resources, and landfill space are conserved, he notes, while pollution of air, land, and water are reduced. Jessen stresses that new job opportunities are created in the process, which benefit those who face the greatest barriers to employment. And best of all, he adds, this all happens within local communities, where livelihoods are created instead of new landfills.

Spiegelman (as cited in Nagel, 2010) asserts that engineers need new instructions to stop making our rubbish disappear – i.e., that it is up to local governments to block the option of cheap, easy disposal that subsidises over-consumption. She also comments that waste-preventing practices such as growing, baking, and sewing "are practices in the home that people aren't doing because they're so busy making money so they can buy more stuff" (par. 61).

Embedded in zero waste thinking is the notion that *local* economies are more conducive to general sustainability than are *global* ones. Watson (2009) remarks that in pre-industrialisation economies which typically operated on a much more local scale, overall throughput of materials was infinitesimal, in comparison to what is seen in developed countries today. He notes that local economies with smaller ranges of materials circulating in their economies were able to keep a higher proportion of these materials in productive circulation. Watson proposes the forging of a sustainable materials economy which could transcend from the global scale of production and of trade, to the micro-social scale of domestic and commercial practices.

Clapp (2002) uses the term *distancing* to describe the differences between local and global markets, and how this influences sustainability outcomes. She cites a growing geographical and mental distance in the contemporary world, between consumers and their waste. Clapp observes that people have little knowledge of the ecological and social impacts of the wastes associated with goods they produce or purchase, and as a result they have little incentive or ability – as producers or consumers – to change their habits based on waste considerations.

Royte (2005) describes how a lack of connection between those who make goods and those who use them contributes to the ease with which people discard their possessions. And, Puckett et al. (2002) implicate distancing as a source of the problem of the exporting of hazardous e-waste from the developed to developing world, explaining that this kind of waste exporting stifles the innovation needed to solve the problem at its source – i.e., upstream, at the point of design and manufacture.

Watson (2009) invokes the idea of distancing, with a focus on *internalizing externalities*: he defines a *proximity principle* for waste whereby waste should be managed as close to possible to its source, and also a *self-sufficiency principle* whereby a local geographic area should be self-sufficient in its waste management.

Producer responsibility is often cited as a key element in zero waste achievement strategies. Kuehr (2007) suggests that in a zero emissions society, consumers would preferentially purchase *functions* instead of material goods, and thus be actively involved in the creation of a new service economy where products are sent back to producers once they no longer provide that function.

Benyus (2004) uses the term *biomimicry* to describe the study of the emulation of natural processes, and how they can be applied to solving contemporary human problems. She argues that modern problem-solving tends to get hung up on how to tweak conventional solutions, while more useful answers lie outside the box and in the realm of the natural world. Benyus cites the example of people who might mull over the least toxic detergent or lowest-energy sandblasting technique to use to clean a surface; meanwhile, there are organisms in nature which manage to stay clean – when their survival may depend on it – without the need for any of these problematic 'solutions'.

Benyus (1997) points out that a critical advantage of natural processes is that they are precisely 'zero waste' in their nature. She explains (p. 104):

> "Whereas we muddle by in our industrial chemistry with final products that are a mish-mash of polymer-chain sizes, with most too long or too short to be of ideal use, nature makes only what she wants, where she wants, and when she wants. No waste on the cutting-room floor."

Fricker (2003) observes similarly that all organisms generate waste, but notes that these wastes are all necessary inputs for other organisms – in sharp contrast to the unwanted rubbish that humans constantly generate. He points out that organisms within rich and stable environments draw only the energy and nutrients they need from available resources – while humans routinely take more than they need from their environment.

While the arguments for a shift to zero waste thinking appear to be many and compelling, the waste management paradigm appears to be barely dented – and as the next part of this section discusses, the promise of technology seems to be a significant reason for this.

Technical Solutions: Alternative to a Zero Waste Paradigm Shift

As discussed previously in this chapter, the common trajectory of zero waste to landfill initiatives sees all persevering campaigns arrive at a point where the proponents are faced with the realisation that something has to change in a significant way, if there is to be any hope of achieving the zero waste to landfill goal. This is the moment of opportunity for the paradigm shift from 'waste management' to 'zero waste' to happen; yet, as has been observed in every single case, this is rejected in favour of the promise of technological solutions. One of the most important questions to answer, then, in trying to understand the

eventual failure or abandonment that consistently follows, is why this same choice is made every time by zero waste to landfill proponents.

A logical place to begin addressing this question is with the one high-profile, high-investment activity that forms a major component of all zero waste to landfill initiatives: *recycling*.

Recycling programmes have become so ubiquitous a part of the waste management landscape, that for many members of the public it has become essentially *equivalent* to the idea of zero waste. That is, if a person knows nothing else about a zero waste to landfill initiative that is happening where they live, they will almost certainly know that it involves recycling. And, as has been discussed throughout the case studies, the widespread successes to date of increasing the amounts of waste put into recycling bins has led to the 'percent diversion' statistic becoming the yardstick of choice – misleading as it is – over the more pertinent measure of per capita waste to landfill which directly addresses zero waste to landfill initiative performance.

However, recycling's positive and 'feel-good' image among the public is sharply contrasted by much more critical assessments found throughout the literature – where it is frequently cited as being overrated, and even an outright force against achieving zero waste goals. Royte (2005, p. 281), for example, quotes Samantha McBride, a former staff member at the Department of Sanitation for New York City's Bureau of Waste Prevention, Reuse and Recycling: "Recycling isn't saving the earth. Just so you know that. There are very few environmental benefits to recycling." Royte (2005) argues that recycling programmes redirect the focus of environmental concern away from the material unsustainability of the current economic system, and instead turn it inward onto the self. She cites Adam I. Davis, who in 1998 wrote that each tonne of municipal solid waste was connected to 61 tonnes of waste from primary extractive industry and manufacturing. This statistic implies that individual recycling is not just only marginally helpful – as it only addresses a small percentage of the waste stream – but also that household recyclers are simultaneously uninformed and concerned about larger ecological problems, while enthusiastic and active in largely meaningless solutions.

Kumar et al. (2005) cite the example of the automobile industry, where in the USA around 95% of end-of-life vehicles enter the recycling stream, and about 75% of the mass of these vehicles is recovered. In spite of these impressive-looking numbers, the net result is that the

equivalent of around one-quarter of all of these cars still ends up in the landfill. Considering the millions upon millions of cars which are manufactured in America – and elsewhere – each year, this represents a huge amount of net waste to landfill, on an ongoing basis.

Reports on the performance of zero waste initiatives often cite percent recycling or percent diversion rates. But, as Nagel (2010) explains, these percentage rates typically get chipped away at various stages of the process. For example, the process of grinding plastic into pellets for recycling can produce 20% residue that goes to rubbish. So even in an optimistic scenario where 90% of people recycle 90% of their waste, this means that at best 81% of waste goes to recycling – and then once other inefficiencies in the overall process are taken into account, it becomes difficult to reach even as high as a 70% diversion rate.

While true net rates of recycling may vary from place to place, the overriding problem seems to be that recycling and other end-of-pipe efforts simply cannot keep up with the overall sums of new waste being generated. Watson (2009) describes this as a problem whereby continued growth in total amounts of waste often outbalances advances in waste management – meaning that even while the *percentage* of waste going to landfill may decrease, the increasing total volume can still translate to an *increase* in absolute amounts of waste going to landfill. Watson laments the reality that it is often easier to increase proportions of waste going to recycling, than it is to reduce the overall amount of materials becoming waste in the first place.

In some cases the very wording of prominent waste-reduction messages seems to send a confusing message – that rather than generating less waste in the first place – it is even more important to *recycle as much as possible*, as suggested in this comment by SF Environment Commercial Zero Waste Coordinator Jack Macy: “We have policies to push us all the way toward a future of sending zero waste to landfill. Those general policies came out of developing programs to divert as much material that can be recycled or composted as possible” (as cited in Baume, 2010b, par. 4). Another example with a similar effect is this: “Mayor Gavin Newsom (now California’s lieutenant governor) remarked that the 1.6 million tons of refuse recycled, composted or reused over the span of one year (2008) was double the weight of the Golden Gate Bridge” (Sullivan, 2011, par. 15).

Savings in resources and reductions in waste from recycling are well-documented; however, counterintuitive negative results are also known to occur. For example, a report by the Environmental Defense Fund (as cited in Royte, 2005) noted that, for every extra tonne of plastic recycled in the USA during the period 1995-1996, there was a 14 tonne *increase* in new plastic production.

One of recycling's most common process streams – glass bottles – is also a prime exemplar of its tendency towards the counterintuitive, as the following scenario demonstrates (Grinning Planet, 2012):

> "Imagine the following: You go to the kitchen, pull a glass out of the cabinet, and pour a delicious glassful of…whatever drink suits your fancy. You drink it down….Then you put the glass in the recycle bin. Every time you or someone else in your household uses a glass for a drink, into the recycle bin it goes. Every week when you go to the grocery store, you buy new glasses….Restaurants do the same thing—every glass of wine, beer, water or whiskey they serve requires a new glass, rather than being served in a glass that gets washed and reused."

Packaging Council of Australia CEO Gavin Williams (pers. comm., July 31, 2012) offers a typical industry explanation for the logic behind glass bottle recycling: he cites the costs associated with reuse, particularly around washing bottles to health and safety standards – an analysis which ignores and thereby externalises many of the costs associated with recycling such as sorting infrastructure, and the disposal of residuals the recycling system is not able to recover.

Another significant limitation to recycling's effectiveness at closing the loop is the frequent difficulty to find markets for recovered materials. Carroll (2012) cites the example of old televisions and computer monitors. Recycled glass from their cathode ray tubes (CRTs) was in high demand at one time, he notes, but since the advent of new screen technologies that demand has shrunk to virtually zero. Carroll notes that in California alone, in 2011, around 40 million kg of this glass, which contains lead and other hazardous materials, was stockpiled and may be sent to a hazardous waste landfill under emergency State measures, if no suitable market can be found for it. While this particular problem will eventually fade away with the obsolescence of CRTs, there is no assurance that the present flat screens will not

take their place as a challenge to recycling, once the next innovation renders them obsolete as well.

Hoornweg and Bhada-Tata (2012) observe that over the past couple of decades, the marketplace for recycled materials has evolved from mainly local to now being largely global. They note, for example, that the price paid per tonne of recovered paper in New York City is often based on what the purchase price is in China – which is also where most recycled waste from Buenos Aires ends up. What actually happens to these materials once they are sent offshore is largely unknown – much of it may simply wind up in a landfill.

van der Werf and Cant (2012, pp. 12-13) argue that when it comes to recycling, the well-publicised diversion rates in the residential, commercial, and public institution sectors obscure much poorer recycling performance in the industrial sector: "We see the "front of the house" but not the "back of the house."" They note that while the more visible sectors' recycling is often highly subsidised, industry generally has little incentive to divert wastes – as for them the bottom line is often that it is less expensive to dispose of waste than to divert it. van der Werf and Cant suggest that around 90% of diversion efforts go into trying to divert 35% of the total waste stream – with most energy focused on the 25% or so coming from single family homes.

While recycling's successes, therefore, have proven to fall short of delivering zero waste to landfill achievement, other technologies have been advanced as potential solutions to the problem.

Incineration is an established complement to both recycling and landfilling. As Snow (pers. comm., April 21, 2011) observes, incineration might eventually become the preferred method by default, in places such as New Zealand where the burning of waste is not common at present. However, former Christchurch City Council Waste Manager Mike Stockwell notes that in countries such as New Zealand, where land is still plentiful, incineration is more costly than landfilling. He also points out that people are opposed to incineration because of pollution including dioxin emissions, and because it tends to be a process that demands large inputs – which is a disincentive to recycle. Most importantly, Stockwell, points out, incineration is a process which produces ash and other residues that require landfill disposal (Christchurch City Council, 1997a).

The latter point about incineration is a recurring theme among all of the various technological innovations which are applied to the zero waste problem: they all fail to address the one basic requirement of any zero waste to landfill initiative – *total elimination of the need for any landfilling*. And yet, in the face of this overwhelming evidence, zero waste to landfill initiative proponents continue to pin their hopes of success upon the promise of technological solutions.

Former Zero Waste New Zealand Trust (ZWNZT) Director Julie Dickinson (pers. comm., March 08, 2011) argues that facilities for resource recovery are crucial to the attainment of zero waste goals. SF Environment's Julie Bryant (pers. comm., May 02, 2011), meanwhile, insists that her city is on track to achieve the zero waste to landfill goal by 2020, with the proviso that the 'missing piece' is technology to improve processing of materials – with autoclaving suggested as one particular method for drying out and sterilizing public waste before sorting.

Bryant's colleague Alex Dmitriew (pers. comm., May 02, 2011) concurs, however noting vaguely that beyond moving into anaerobic digestion, "at the end of the day we're going to have to have some sort of processing for the black bin." Meanwhile, another former ZWNZT Director, Warren Snow (pers. comm., April 21, 2011), suggests that getting to around 85% diversion might be close to enough – though he adds with uncertainty and vagueness that it might then be possible to develop processing technology to deal with the leftover residuals.

This tendency to place much hope for zero waste to landfill success into largely unspecified future technological solutions is demonstrated in Figures 7.6 and 7.7.

Figure 7.6 shows what the City of Toronto was officially saying their plan for achieving zero waste by 2012 was, seven years before this date in 2005. Sitting at 41% diversion, various specified waste reduction strategies are shown that would bring the diversion rate up to 60%. To get the rest of the way to 100% diversion, the entire strategy is listed under 'New and Emerging Technologies'. In other words, roughly two-thirds of the City's plan for closing the zero waste loop over the seven-year period to follow is described in terms of unspecified and/or as-yet-unproven technological solutions. No mention of top-of-pipe strategies, nor anything else that could be remotely interpreted as involving a paradigm shift on waste thinking.

Figure 7.6: 'New & Emerging Technologies' – Toronto's Zero Waste to Landfill Initiative (City of Toronto, 2005a, p. 24).

Figure 7.7 shows how Christchurch City Council (CCC) was planning its waste reduction future in 2003 – two years after abandoning zero waste to landfill in favour of a 65% reduction target. Even though CCC had already scaled back their overall goal to a less ambitious one, and even though a range of specific measures are shown to get most of the way to 65% by 2016, the remaining portion until 2020 is listed only as 'Future technology and opportunities'.

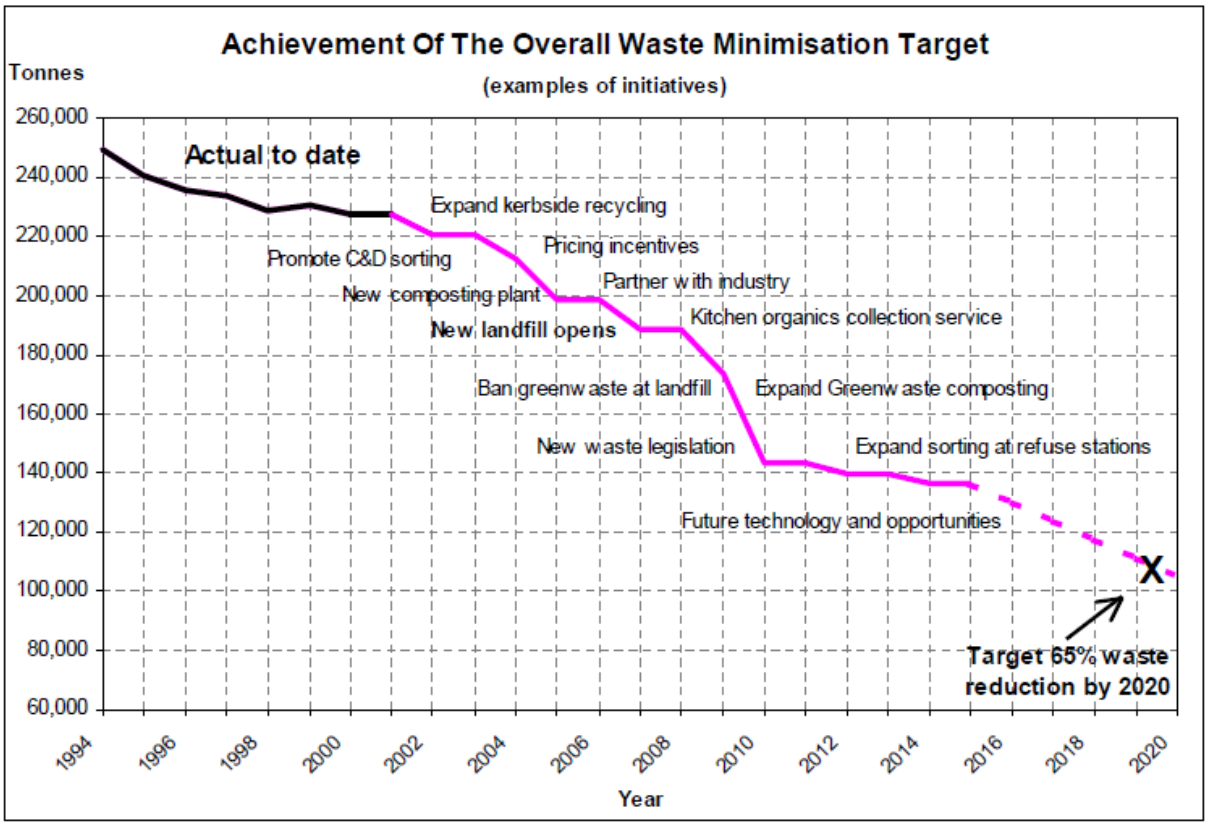

Figure 7.7: 'Future technology and opportunities' – Christchurch's Waste Reduction Plan (Christchurch City Council, 2002b, p. 20).

Paradigm Crisis View of the Zero Waste to Landfill Initiative Problem

To better understand why zero waste to landfill initiative proponents consistently choose the path of technical solutions over fundamental behaviour change – even though the preferred path is a well-worn route to failure – it is helpful to examine the situation in terms of the competing paradigms: the current prevailing *waste management* view, versus the contender *zero waste* one.

Kuhn (1970) observes that the activities of established practitioners operating under a prevailing paradigm are based on the assumption that they have a correct view of the world – and their successful enterprise derives from the community's willingness to defend that assumption, at considerable cost if necessary. This means that fundamental challenges will tend to be suppressed, for the obvious reason that such challenges, if proven correct, may subvert the interests of the establishment – whose credibility and standing rely on the continued acceptance of the prevailing paradigm.

The unwavering pinning of hopes on technical solutions, and how this protects not only the waste management paradigm but also the prevailing consumption-driven economy paradigm, is summarised by Crocker and Lehmann this way (2012, p. 388):

> "Most attempts to legislate controls on the serious environmental issues associated with new technological devices and systems, with few exceptions (such as tobacco products), tend to accept the relationship between technological innovation and consumer desire as a fixed and almost sacrosanct phenomenon, and something that – with few exceptions – should not be interfered with for the sake of the 'market'."

Crocker and Lehmann (2012) assert that science and technology are not to blame for contemporary environmental problems, because they are capable of solving most of them. Rather, they argue that the core issue is that prevailing "systems and infrastructures…have, over time, locked us into extremely wasteful and environmentally destructive behaviours that cannot be easily reversed" (pp. 387-388). Danilov-Danil'yan et al. (2009), meanwhile, describe a political atmosphere which appears to be inhospitable to zero waste thinking (p. 175):

> "In virtually the entire developed world, sustainable development is still viewed in terms of a strategy familiar to us from the past three decades. The environment is taken into account to be sure (especially with respect to waste and pollution). However, no serious limitations are placed on economic growth. No rigid ecological boundaries are set for the sphere of production – which in the final analysis suggests that references to a global collision between humanity and its environment are merely empty words. As we continue to produce more TV sets, cars, and airplanes, very few political leaders are willing to admit that the economic pufferfish can puff itself up only so much before it bursts."

Shellenberger and Nordhaus (2004) implicate no less than the wider environmental movement, as sharing the blame for the ongoing failure to successfully address sustainability issues. They describe a prevailing three-part strategic framework for environmental policy-making that they say has not changed in 40 years: (1) define a problem (e.g., global warming) as 'environmental'; (2) next, craft a technical remedy for it (e.g., cap-and-trade); then, (3) sell the technical proposal to legislators through a variety of tactics including lobbying, dissemination of research reports, and public campaigning. Teague (2004, p. 4)

similarly argues that many environmental activists have adopted a soft, pragmatic approach: "the conventional wisdom among environmentalists is that we mustn't frighten the public but rather must focus its gaze on technical solutions, like hybrid cars and fluorescent light bulbs."

Kuhn (1970) attributes such widespread resistance to fundamental change to the way in which prevailing paradigms become rigid. He observes that in the development of any particular field, the established paradigm is usually believed to account quite successfully for most of the phenomena observed by practitioners. As a result, Kuhn argues, further development in the field will be based tightly around that which agrees with the established paradigm, and this results in the construction of infrastructure, practice and language which all serve that paradigm. This significant investment, Kuhn points out, leads to an immense restriction of practitioners' vision, and considerable resistance to paradigm change.

Kuhn (1970) observes that when confronted by some anomaly, defenders of a paradigm will devise numerous articulations and ad hoc modifications of their theory in order to eliminate any apparent conflict. When such observed anomalies are relatively few and infrequent, he notes, the field will generally proceed with confidence, using the established tools of the profession, to define these problems in the paradigm's terms and then solve them in accordance with the paradigm's basic assumptions. Kuhn adds that during this period, any wholesale 'retooling' is considered counterproductive and an unnecessary extravagance.

Such is the way that, in the broader field that deals with the problems of waste, it is seen that almost all ideas promoted as solutions – including recycling by many self-described zero waste advocates – are of the 'end-of-pipe' variety. For example, many professional conferences which are promoted as 'zero waste'-focused events are in fact organised by government or industry players who are heavily invested in waste management paradigm staples such as waste hauling, recycling infrastructure development, and landfilling. Top-of-pipe solutions, such as design for reuse, or exclusive use of appropriately-degradable materials, are rarely put forward as preferred solutions, because top-of-pipe thinking does not fit well with the existing setup of the prevailing waste paradigm.

When further and increasing numbers of anomalies appear, Kuhn (1970) argues, the established paradigm's hegemony can be eroded to the point where a new paradigm could potentially replace it – a *crisis*. He points out, however, that a crisis arises only when the observed anomalies become so acute and irreconcilable that they force the establishment's practitioners to question their most fundamental assumptions.

The consistent failure of zero waste to landfill initiatives, then, might be the result of the absence of any such crisis – or, at least, none that has yet been perceived to be imminent. The waste management paradigm has certainly been challenged to some extent by the fact that local governments have been willing to adopt official zero waste to landfill targets, but it has for the time being resisted such challenges. The technical solutions option that initiative proponents choose each time, over fundamental behaviour change, might be considered as a possible means for achieving zero waste to landfill by sincere proponents who are truly pursuing the goal. However, the consistent failure of 'new and emerging technologies' to deliver on their promises of 100% diversion is increasingly difficult to ignore, and the truth that is emerging is that technical solutions are essentially just another part of the same old waste management paradigm – whose one proven function to date is to extend this prevailing paradigm's reign, staving off challengers such as zero waste thinking as long as they can convince waste practitioners to do so. In the meantime, depending on where one is and how much more land can be consumed by new landfill space, the true waste crisis lies in wait.

In the case of global warming, Shellenberger and Nordhaus (2004, p. 9) suggest that crisis is already upon us, and yet there is still failure to act. They argue that getting to the necessary paradigm shift could be achieved by cutting to the very heart of the issue and acknowledging the really deep, root causes of the problem, of which their list includes radical neo-conservative control of all branches of government, trade policies that undermine environmental protections, poverty, and the ongoing failure to articulate an inspiring and positive vision for the future.

The next section applies this notion of acknowledging the heretofore unacknowledged, in the context of answering the remaining puzzle of zero waste to landfill initiative failure: What leads local governments to adopt zero waste to landfill goals which seem so clearly destined for failure?

7.6 Filling in the Theoretical Gap: The Unacknowledged Supermegaproject

"Imagine a world in which nothing goes to landfills or to incinerators. We think it is achievable, and SF Environment is doing everything we can to make it happen. – SF Environment (2012e).

The previous sections of this chapter provide a discussion of the 'common trajectory' of zero waste to landfill initiatives, with the aim of explaining why these initiatives consistently fail and how they might succeed in the future.

It is evident that zero waste to landfill initiatives become official local government policy when circumstances create an opening in the 'policy window' – which takes on more of the appearance of a 'policy *tunnel*' as the fundamental decision to declare the goal gives way to a more 'muddling through' approach, which slows the initiative down to the extent that the window of opportunity eventually closes before success can be achieved.

Also clear is that each initiative's proponents tend to overestimate their own ability to achieve their targets, and tend to underestimate how similar previous initiatives' failures elsewhere might be an indicator of their own likely failure. These errors in forecasting might be the result of unintentional systematic bias (the planning fallacy), as well as intentional bias in the form of strategic misrepresentation by 'policy entrepreneurs' who are pursuing zero waste to landfill goals for the sake of ulterior motives.

Also evident is the fact that zero waste to landfill initiative proponents consistently choose to pursue an emphasis on technical solutions over fundamental behaviour change – as in the absence of a perceived 'crisis' there is insufficient impetus to make the paradigm shift from waste management to zero waste thinking.

While the above findings provide a fairly comprehensive set of answers to the research questions, there remains one important, unanswered question: *Why do local governments choose to embark upon official zero waste to landfill initiatives, when they are so clearly destined for failure?*

Zero Waste to Landfill Initiatives and the 'Planning Void'

As discussed previously in this thesis, one of the most remarkable findings in this study is that every single zero waste to landfill initiative investigated shared in common a glaring lack

of any significant planning for specifically addressing the waste stream destined for landfilling. In particular, while each case study's local government had done some form or other of detailed waste audit, which showed the various distinct components of their overall waste stream, and which thereby allowed them to identify problematic components with respect to requiring landfilling, there was no comprehensive action plan for addressing each of these problematic wastes. In other words: there was no comprehensive plan for achieving zero waste to landfill.

This begs the obvious question: what were the proponents thinking when they launched their initiatives?

According to the ACT's Senior Project Officer at the time, Gerry Gillespie (pers. comm., January 18, 2012), there was an overall attitude among ACT NoWaste staff that the goal of zero waste to landfill was achievable, when it was launched in 1996. However, as the initiative's then-Waste Reduction Manager and current Operations and Contracts Manager Graham Mannall (pers. comm., May 24, 2011) describes it, how this was going to happen was less clear: "We didn't know how we were going to do it. We had some general ideas of the key things which were in the original strategy".

Former Christchurch City Councillor Chrissie Williams, who was a Community Board Member when that city launched its zero waste to landfill initiative in 1998, suggests that it was naïvety that led CCC to be launching a zero waste to landfill goal by 2020 goal at the exact same time that it was negotiating a public-private joint venture deal for a new regional landfill site (C. Williams, pers. comm., April 16, 2012). Meanwhile, then-Councillor Garry Moore, who was Mayor when the initiative was abandoned after just three years, explains that the main reason for that decision was the eventual realisation, after declaring the goal, of "just how bloody difficult" it was going to be (G. Moore, pers. comm., April 17, 2012).

The City of Toronto's Waste Research Analyst Michelle Kane (pers. comm., May 19, 2011) says, in hindsight about her city's abandoned initiative, that "The 100% diversion from landfill goal was always a strategic target. It wasn't something we fully anticipated meeting."

Meanwhile, SF Environment's Residential Zero Waste Coordinator Kevin Drew (pers. comm., July 02, 2012), when asked about his city's overall zero waste to landfill plan, offers this

reply: “We did not have a specific plan associated with the policy, rather our annual…plan addresses very specific areas and goals. We update each year.”

The ‘planning void’ is thus the dearth of any overall strategy for attaining the zero waste to landfill goal. It is not an utter void of activity per se, as each initiative does feature a variety of end-of-pipe measures such as the usual expanded recycling programmes and collection or drop-off programmes for special/hazardous items, and some top-of-pipe measures – though not as consistently across cases – including fees for or bans on specific waste-problematic items such as plastic shopping bags, Styrofoam food ware, or plastic-bottled water.

The overall problem with this level of planning is that it simply fails to address existing waste-to-landfill streams in any way that would remotely result in significant reductions in landfilling, let alone achieve the official 100% reduction goal. The end-of-pipe measures such as recycling, as highlighted previously, do result in significant increases in diversion rates, but as the data clearly shows recycling’s advance has been accompanied by overall increases in waste generation – supporting the argument that emphasizing efforts on recycling, with its ‘feel-good’ factor, may simply be reinforcing overconsumption behaviour. As for the top-of-pipe measures that do exist – exemplified in places such as San Francisco with their various product bans – these in sum only target a tiny portion of the overall problematic waste stream, and the legislation contains so many exceptions that it may be sending confusing mixed messages to people that their needs/wants might still take precedence over the targeted behaviour change. The net result is that these zero waste to landfill initiatives, when examined closely, reveal themselves to be hopelessly bereft of any chance of success. The next part of this section explains in detail why that is the case.

Reality Check for Zero Waste to Landfill Initiatives

The previous part of this section explains how every single zero waste to landfill initiative examined shares the common feature of having a ‘planning void’, where there might/should otherwise be a comprehensive plan for achieving the stated goal of 100% reduction of waste to landfill. While this situation raises serious doubts about the feasibility of any of these initiatives, by itself it is not a recipe for certain failure – that depends on the environment within which these initiatives must operate; or, put another way, it depends upon just how challenging the waste problem is which confronts these initiatives.

Unfortunately, though, the present-day reality of waste – which, as discussed in Chapter 1, can be described as a *super wicked problem* – appears to offer little or no leniency to any zero waste to landfill initiative – let alone one that is woefully under-planned.

Hoornweg and Bhada-Tata (2012, p. 6) summarise the reality of the present day this way:

> "The average city's municipal waste stream is made up of millions of separate waste items….In many cases, items in a city's waste stream originated from other countries that have countless factories and independent producers. Some of the larger waste fractions, such as organics (food and horticultural waste) and paper are easier to manage, but wastes such as multi-laminates, hazardous (e.g. syringes), and e-waste, pose disproportionately large problems. Industry programs, such as voluntary plastic-type labeling, are largely ineffective (no facilities exist to differentiate containers by numbers, either mechanically or by waste-worker) and deposit-return systems often meet industry and consumer resistance. Hybrid, ad hoc, and voluntary take-back programs are emerging, however they are generally inefficient and municipalities are often forced to subsidize the disposal costs of these items."

van der Werf and Cant (2012) cite the example of Canada – a typical developed and high-consumption and high-waste-generating country, and one of the countries featured in this thesis via the Toronto case. They observe that Canada's estimated waste generation rate was about 300 kg/capita in 1940, and this has since grown to around 1,000 kg/capita. They describe the trend this way (pp. 9-10): "Even when discounting for evolving and improved methods for quantifying waste generation, a more than threefold increase in just 70 years is staggering." van der Werf and Cant point out that the rise in waste generation has closely followed the country's increase in the Gross National Product (GNP), as Figure 7.8 shows. While the GNP figures cited are not per capita, correcting for Canada's population growth does not change the overall pattern significantly – there is an obvious correlation between economic growth as measured by instruments such as GNP, and the generation of waste.

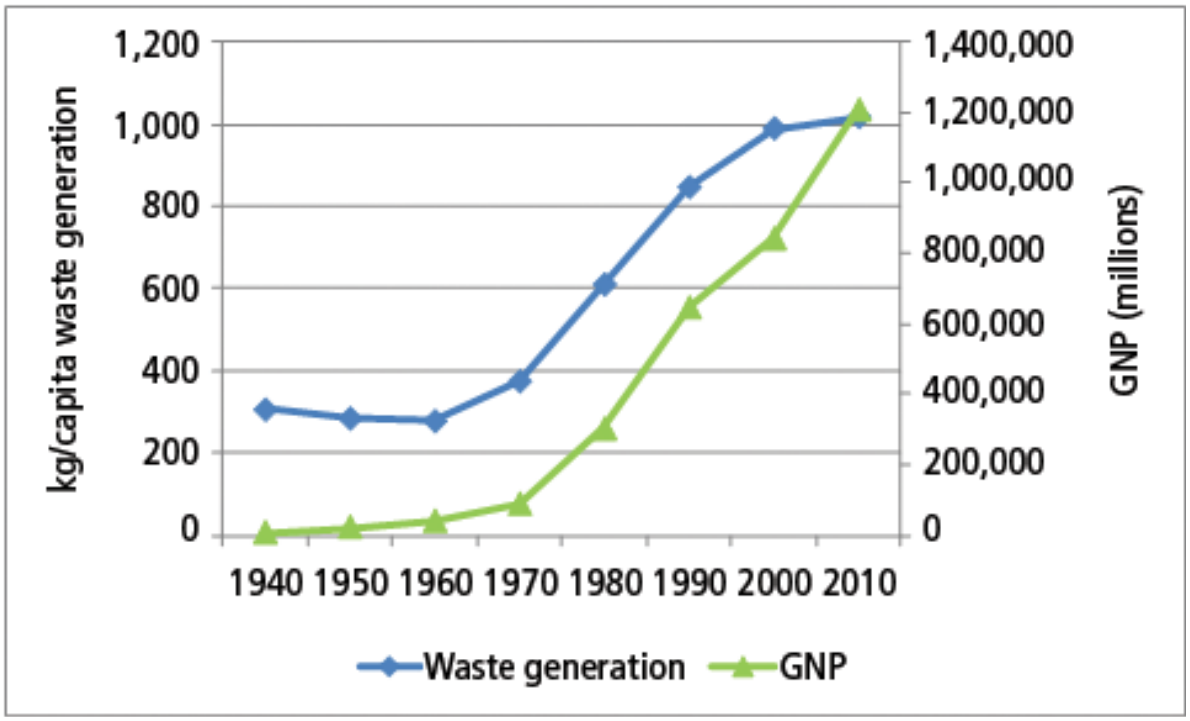

Figure 7.8: Waste Generation vs. Gross National Product (GNP) in Canada, 1940-2010 (from van der Werf and Cant, 2012, p. 10).

The above pattern is not unique to Canada, but rather is repeated around the world. One of the most straightforward and obvious observations from visiting the four case study locations and their countries in general (and other developed countries), is that there is a common look to consumer behaviour – both in terms of what is available and how people readily consume it all. While each city/country may manifest its own cultural uniqueness in an obvious fashion in their respective souvenir or airport shops, the mainstream marketplace in each location is pretty much the same: myriad products which range from 'needs', far into the 'wants' category – with many and increasing numbers of these things made in the same overseas manufacturing powerhouse countries, from which mass-production of largely disposable and landfill-destined consumer goods spreads the problem of zero waste-confounding all around the globalised-economy world.

Kingdon (1995, p. 143) notes that two of the criteria for a policy proposal to have an enhanced chance of survival are:

1. They are technically feasible – worked out and capable of being implemented.

2. They are acceptable in the light of values held by members of the policy community.

By the above criteria, it is easy to see how zero waste to landfill initiatives have thus far failed to gain traction – as this study has found over and over again that (1) such initiatives were neither remotely worked out, nor were they (2) in line with the prevailing contemporary values which embrace high-level consumption, and dependence on 'throwaway' goods which are made from problematic materials.

The latter point above summarises the disconnect between what the zero waste paradigm calls for and what society appears to be willing to accept. Arguments supporting a shift from linear to circular thinking may seem self-evident to zero waste advocates, but as Princen (1999) explains, such arguments can end up being discounted or neglected in the course of public debate (p. 360):

> "On first mention, consumption is readily seen by analysts, policymakers, and others as an important topic, one probably deserving of considerable research and action. People seem to know at least intuitively that most individuals of the North and most elites of the South are consuming too much. But my experience in the classroom, with colleagues, and with funders is that pursuing the issue much further, whether conceptually, empirically or normatively, makes people uneasy. They prefer to shift to questions of overpopulation, inefficient production, or skewed governmental policies."

Meanwhile, industry continues to cater to, and benefit from, the waste management paradigm's ongoing hegemony – while it may be the stakeholder group most able to facilitate the paradigm shift to zero waste. Paul Palmer, the chemist who pioneered the use of the term 'zero waste' four decades ago, argues that waste occurs not at the point of disposal, but rather at the design and manufacturing stages – whenever and wherever products are created that are substandard and meant for disposal rather than reuse. In his view, local governments therefore cannot control the waste stream – rather, it is up to industry to prevent waste through design and manufacturing practices that honour zero waste principles (P. Palmer, pers. comm., January 07, 2012). This opinion is concurred by the ACT's Mannall (pers. comm., May 24, 2011), who sees controlling inputs as the key to zero waste, and notes that end-of-life is given very little consideration in present-day product design.

That industry can be relied upon to initiate a transformation to zero waste design and manufacturing on its own, however, is highly doubtful. Of primary importance is the simple fact that industry in general prospers in positive correlation with waste generation – most directly in the case of the waste management industry. An example is seen in this sector's response to recently-seen declines in waste volumes attributed to the economic recession – and how they have led to a credit-ratings downgrade of the industry (Waste & Recycling News, 2012, pars. 1-3):

> ""The slow economic improvement has failed to generate meaningful growth in waste volumes, and the pricing discipline maintained by waste operators during the recession is beginning to fade," said Moody´s analyst Bruce Herskovics in a statement. "We're hearing that customers, particularly cash-strapped municipalities, are pushing back when contracts come up for renewal and we believe that operators are bidding more defensively to maintain accounts.""

While the end-of-pipe side of industry is thus discouraged by real waste reduction outcomes, the top-of-pipe manufacturing sectors appear to be no less welcoming of the notion of zero waste.

The following excerpt from the Packaging Council of New Zealand's submission to the Auckland Waste Management and Minimisation Plan (S. Jereb, pers. comm., August 03, 2012) not only exemplifies this open disdain, but it manages to turn the consistent failure of zero waste to landfill initiatives into an argument against even an aspirational-only zero waste goal:

> "The Packaging Council does not support the long term aspirational goal of zero waste as we concur with the 2007 Auditor General's report that '…a target should express what a council expects to achieve'. The Packaging Council recommends all reference to zero waste is removed from the Waste Management and Minimisation Plan (WMMP) and, in line with the 2007 Auditor General's report, be replaced with 'achievable intermediary targets which will help the council assess its progress in diverting waste over the short or medium term'."

And even where zero waste appears to have been overtly advocated by industry, appearances are typically more impressive than reality. Mervis (2012, p. 671) cites the example of General Motors as one of the "many Fortune 500 companies that have

embraced the concept of zero waste", and which in 2008 "announced a goal of achieving "zero waste to landfill" at half of its 145 plants" – yet which "includes sending some of the company's waste to incinerators but that doesn't count the burial of ash residue."

Given the overwhelming number and formidability of the forces opposing the reification of zero waste thinking, it seems incredible that any local government would risk its time, energy, and above all their credibility, on a zero waste to landfill target. And yet, since Canberra's 1996 pioneering foray, other cities have followed, and one after another they have either abandoned or failed, or else are headed in that direction. This pattern of counterintuitive goal-setting against futility is explained in detail in the next part of this section.

Zero Waste to Landfill: an 'Unacknowledged Supermegaproject'

Extensive study of zero waste to landfill initiatives around the world, as discussed throughout this thesis, yields two very straightforward and obvious observations that apply to all cases:

- Achieving a complete shift from the status quo waste management paradigm to a zero waste paradigm – particularly with the 100% elimination of the need for landfilling of residual waste – would require a massive, cross-sector, concerted, and unprecedented amount of transformational change to society, which would entail enormous amounts of public sacrifice, industrial retooling, and government leadership and enforcement. In other words, zero waste to landfill is a *supermegaproject*.

- In every single zero waste to landfill initiative observed – both within and outside of this thesis' case study set – the planning and implementation steps made, while in some cases adding up to a considerable total effort, do not come anywhere remotely close to the total level of effort required, as described in the point above. And, in none of these initiatives is there any explicit articulation from the proponent that would serve to indicate that their self-declared initiatives were recognised fully as a supermegaproject, as described above. In other words, for each of these proponents, their zero waste to landfill initiative is an *unacknowledged supermegaproject*.

Generally speaking, an unacknowledged supermegaproject is any project/initiative which involves an extraordinarily large amount and/or challenging/unprecedented nature of required outcomes in order to achieve success – yet whose proponents have failed to acknowledge these extraordinary requisite outcomes.

Zero waste to landfill is a supermegaproject, because it requires deep behavioural change across all stakeholder groups:

- Government, working with scientists and engineers, must be willing and able to identify and take action on all factors contributing to landfill dependence, which includes problematic materials and product design for obsolescence and disposability.
- Industry must be willing to retool, in order to align processes with zero waste-compatible product and service delivery.
- The public must be willing to make the necessary behaviour changes – including sacrifices to current standards of convenience and utility – that a new zero waste economy would require.

The zero waste to landfill initiatives observed have all been launched with bold rhetorical statements alluding in specific terms to the goal of 100% elimination of landfilling. However, there is universally incomplete mention of how each initiative plans to address all specific components of the waste stream that have no known means for avoiding residual disposal. As discussed throughout the thesis, this includes items such as:

- Plastics in general – which are found in almost every category of human-made items, including the other listed items below;
- E-waste from items including computers, cell phones and televisions – which include plastics as well as other problem materials such as heavy metals;
- Medical wastes;
- Food packaging;
- Automobiles;
- Appliances;

- Nuclear waste.

Any endeavour that involved the elimination of even a few of the above items would be widely viewed as being highly unrealistic. Certainly, based on the fundamental assumptions of the prevailing paradigms concerning not just waste, but also those concerning economics, politics and popular culture, the notion of giving up items as ubiquitous and widely-embraced as cars, computers, and medical products does appear extremely unlikely.

And yet, many of those who might consider what is described above as absurd, are the very same people who have promoted or supported the adoption of a zero waste to landfill goal in the first place. This paradox is a manifestation of the *unacknowledged supermegaproject*.

Supermegaprojects such as zero waste to landfill operate against a very steep *resistance gradient*, which consists of (1) public apathy, (2) industry resistance to change, and (3) government unwillingness to use their powers to force compliance from the public and industry.

Against such a steep resistance gradient, supermegaprojects cannot succeed by accident. For a supermegaproject to succeed, enormous effort is required – which calls for fundamental and not just incremental, 'muddling through' approaches. Any unacknowledged supermegaproject, lacking the impetus to rally such necessary extreme effort to overcome the steep resistance gradient, is therefore destined to fail.

The 'planning void' is an overt indicator of an unacknowledged supermegaproject – but only to an observer who recognises that the endeavour in question *is* a supermegaproject.

The various greenhouse gas / climate change accords and protocols of the past several decades have had their own obvious planning voids, which comprised a lack of deep targeted commitment to curbing the behaviour that leads to the dependence on fossil fuel consumption. To an observer who is unaware of the full size and scope of what the Kyoto Protocol and its associated commitments entail, the token measures from the existing energy paradigm – such as 'zero-sum game'-type emissions trading schemes – might look like a reasonable effort of planning and implementation. On the other hand, for those who recognise that meeting the actual treaty targets calls for enormous, unprecedented actions from the world's countries – a supermegaproject – the resulting failure of the Kyoto Accord and all of its subsequent reworkings appears a logical outcome.

Canada's withdrawal from the Kyoto treaty in 2011 was explained in this way, by that country's Environment Minister Peter Kent (as cited in Kennedy, 2011, par. 10):

> "To meet the target under 2012 would be the equivalent of either removing every car, truck, ATV, tractor, ambulance, police car and vehicle of every kind from Canadian roads, or closing down the entire farming and agricultural sector and cutting heat to every home, office, hospital, factory and building in Canada."

While the Minister's statement is arguably exaggerated, its overall message nonetheless serves as a clear example of the public acknowledgement of what to many people was a previously-unacknowledged supermegaproject.

In the case of zero waste to landfill initiatives, the planning void typically consists of a patchwork of mostly end-of-pipe measures such as recycling, with possibly a few product bans, or other token and disjointed/isolated top-of-pipe schemes. To an observer who sees zero waste to landfill as a mere project of normal proportions, this would not appear as a planning void at all – indeed, as this study has found, 'zero waste = recycling' is about as far as thinking about the subject might extend to such a person. However, to an observer who has a deeper awareness of the connection between what goes into the waste stream, and how certain components of it are by their nature destined for landfilling, the sum total of planning for the zero waste to landfill initiative looks very clearly like a planning void, and it serves as a signal that the initiative is headed for failure.

Unacknowledged can mean either not understood, or else understood but not recognised. This implies that an unacknowledged supermegaproject can exist either because (1) the proponent does not realise that the initiative is the monumental task that it is; or, (2) the proponent realises this but for some reason does not want to admit it. The latter would represent a case of strategic misrepresentation – deliberate misleading by the proponent, while the former represents an innocent naïvety about how big the project really is.

While it is beyond the scope of this thesis study to indict specific people for either specific type of this failure to acknowledge the magnitude of zero waste to landfill initiatives, it is nonetheless worth considering here the general nature of the situation. On the one hand, there does not appear to be much incentive for a local government to officially and publicly declare a goal such as zero waste to landfill, if failure appears certain – as the expected loss of credibility is in itself a disincentive to embark on such an initiative. In this sense, the

unacknowledged supermegaproject appears to be largely the result of basic underestimation of the task.

On the other hand, and as discussed previously in this chapter, there are 'policy entrepreneurs' in various capacities of government and industry, who stand to benefit from the launch of each zero waste to landfill initiative, even if they are quite cognisant of the certainty of eventual failure. This includes elected officials who use 'zero waste' as a brand to attract voter support in the short-term – knowing well that their political cycle will expire before the deadline for 100% diversion from landfill. Similarly, government staff could use the zero waste declaration to gain promotion within their bureaucracy, confident that the eventual failure will not jeopardise their status once it is confirmed. Likewise, industry players could gain lucrative new contracts that served the initiative – which as has been discussed amounts mostly to building up and running recycling infrastructure. Among the public as well, it is reasonable to suggest that some waste reduction advocates might view even an ill-fated zero waste to landfill initiative as a catalyst for opening the 'policy window' for new or improved programmes in areas such as reuse, recycling or composting. In the extreme case, it is even not difficult to imagine how a purist zero waste believer might keep their scepticism quiet as the supermegaproject they recognise goes along unacknowledged by others – for reasons including the mere satisfaction of seeing *any* sanctioned efforts that promote some of their beliefs in ways not seen before.

While intentional non-acknowledgement from various sources thus appears likely, the question remains as to whether any local government would be so naïve as to officially launch a zero waste to landfill initiative, without realising it is so hopelessly unattainable under current prevailing realities. There is, however, one very compelling argument in favour of the idea that these initiatives have been taken on with some sincere belief in possible success: *technical solutions*. As discussed in the previous section, many key stakeholders hold strong beliefs that the elimination of landfill dependency, while not feasible today, can be accomplished in the future via 'new and emerging technologies'. While strategic misrepresentation may play a large role in the selling of such technological promises, it generally takes a naïve customer to facilitate such transactions, and that latter role appears to be filled readily by those zero waste to landfill proponents who, each time, forego the chance to choose the paradigm shifting path. Therefore, it is considered here

that zero waste to landfill initiatives are, at least to some extent, unacknowledged supermegaprojects because of a prior misunderstanding of their extremeness.

It is also evident that misunderstanding of the task posed by a zero waste to landfill goal is widespread, taking in all stakeholder groups including the grassroots from which the idea has emerged. Fricker (2003) attributes the inevitable failure of zero waste initiatives to the unrealistic nature of the movement itself, describing the emphasis on zero waste as well-intentioned but raising false expectations. Lakhani (2005, p. 63), meanwhile, articulates the misunderstanding about zero waste this way:

> "There is a generic information gap regarding the fact that ZW is a philosophy, and is a robust solution to current pollution problems, wherever one may wish to apply the principles. The holistic picture of what ZW is, the approaches and applications, are poorly understood by most people. It is most often seen as a simplistic target."

Zero waste to landfill initiatives' status as unacknowledged supermegaprojects, and the inherent oversimplification of the concept that underlies it, are exemplified in Figure 7.9, which is from SF Environment's public promotion of its own campaign.

Figure 7.9: Public Promotion of the San Francisco Zero Waste to Landfill Initiative (SF Environment, 2011, p. 65).

The images in Figure 7.9 are presumably intended to present images of what compliance with the zero waste to landfill initiative there would typically look like. While the poster includes an image encouraging the truly zero waste practice of composting, the remainder of the images are of purely end-of-pipe practices, including recycling – which, with its numerous inefficiencies, is a process which has proven itself a failure in terms of 100% residuals elimination. Even more counterintuitive to zero waste to landfill, however, are the images of supposedly zero waste-compliant residents of San Francisco eating meals with disposable foodware – some of it resembling the very sort of plastic materials that confound all attempts to avoid landfilling. The message from the local government to its citizens does not appear to be that zero waste to landfill will require a monumentous, concerted effort involving personal sacrifice; rather, the message seems to be that zero waste can be achieved with the same everyday behaviour as always, so long as one puts each piece of rubbish into the correct bin.

Brandon (2012, pp. xxix-xxx) summarises how human society, under its present prevailing paradigms, is fundamentally ill-equipped to successfully take on the challenge of zero waste:

> "Zero waste is not always prescribed by national or other physical boundaries. It is not dealt with by one profession's repository of knowledge. It should engage both user and provider in an understanding of mutual benefit. It requires government to be ahead of public opinion and not to respond reactively. It involves highly specialized research and yet also requires those who can bring these specializations together in a holistic way (and these 'bridge builders' are hard to find). It requires an understanding of values and a communication system that allows for democratic processes. In fact, it needs a full and thorough understanding of human behaviour that is not yet available in any readily accessible form."

The last section which follows gives a summary of this Analysis and Discussion chapter.

7.7 Summary of Analysis and Discussion

Detailed analysis of each case study zero waste to landfill initiative, as well as a more general survey of other such initiatives, reveals some variation in results, such as the length of time that each initiative lasted before abandonment or failure, and the reported rates of percent diversion of waste from landfill. In terms of the overall outcomes of these initiatives, however, there is a greater sense of similarity, with one commonality of particular interest: the fact that every single zero waste to landfill initiative has either been abandoned or has failed, or else is ongoing ahead of its deadline but on a clear trajectory towards ultimate failure to meet the no landfill goal.

To address the research questions regarding consistent failure of these initiatives, and how this trend might be reversed in the future, it is therefore important to seek out and identify what factor(s) might be the root cause(s) of this failure. Analysis of the observed zero waste to landfill initiatives turns up a very noticeable recurring pattern: each initiative appears to follow a similar chronological sequence of stages – the *common trajectory*. This sequence begins with the launch of the initiative, and is followed by an initial period during which there becomes evident a distinct lack of detailed and comprehensive planning for specifically addressing problematic elements of the waste stream, as one might expect to see articulated for a goal as ambitious as zero waste to landfill. This *planning void* is not a

vacuum of initiative planning per se, but rather a dearth of top-of-pipe strategies to go alongside the end-of-pipe strategies which typically feature expanded recycling.

The existence of the planning void leads each initiative, over time, to see the initial optimism and support give way gradually to increased doubt about eventual success, and erosion of support for the programme. The tendency to focus on *percent diversion* instead of the more pertinent *per capita waste to landfill* statistic serves to allow increases in recycled waste to mask the fact that absolute waste volumes are not being significantly reduced, or are stable or even increasing. Overall, the tendency is for per capita waste to landfill to decrease somewhat from the start of the initiative, but the decrease is relatively modest and tends to level off as the 'low-hanging fruit' of waste reduction are dealt with and the initiative comes up against the problematic wastes that have been left unaddressed due to the planning void.

Once this period of reckoning has revealed the impending failure to achieve the zero waste to landfill goal, a decision is made in each case to either abandon or scale back the initiative, or else persevere. In the latter case, it is clear that continuing in the same manner is unfeasible, so a significant change in strategy is seen as necessary. The next, pivotal decision, tends in each case to be a choice between placing an emphasis on technological solutions, versus an emphasis on fundamental behaviour change – a *paradigm shift* from *waste management* to *zero waste* thinking. In every single case observed, the proponents implicitly choose the technological solutions option.

The launch of a zero waste to landfill initiative occurs as the result of the convergence of favourable circumstances. In some cases, a perceived looming shortage of landfill availability may provide the main impetus; in other cases, it might be the ambition to promote the city as a sustainability exemplar. Coinciding with amenable political conditions, a 'policy window' opens through which zero waste to landfill becomes official policy. However, this moment of fundamental decision-making tends to give way to a more incremental, or 'muddling through' approach to planning for the implementation of the zero waste policy – which leads to the development of the aforementioned 'planning void'. In the case of zero waste to landfill initiatives, the policy window can be thought of more precisely as a 'policy *tunnel*', in which each initiative gets bogged down amidst the planning void, and fails to emerge through the other side before the period of opportunity ends.

The consistent failure of zero waste to landfill initiatives can also be attributed to a systematic tendency to underestimate the challenges it must overcome, and to overestimate the effectiveness of planning and implementation. This systematic bias comes from both unintentional and intentional sources: the former a manifestation of the *planning fallacy*, and the latter the result of *strategic misrepresentation*. Under the influence of the planning fallacy, zero waste to landfill proponents tend to focus more on an 'inside view' of their own initiative's characteristics – with the resulting inherent under/overestimation biases – rather than focus on an 'outside view' of other/previous similar initiatives and their outcomes, which form a more distributive and objective data set from which to base forecasts. While the planning fallacy can be mitigated through a conscious effort to adopt a more external approach, strategic misrepresentation poses more of an insidious risk to objective forecasting. This type of systematic bias is used by 'policy entrepreneurs', who may come from any stakeholder group, and who share in common incentives to see the zero waste to landfill initiative officially adopted.

The choice to pursue an emphasis on technical solutions over fundamental behaviour change, which zero waste to landfill initiative proponents consistently make when they decide to persevere with their goals, is essentially a choice to remain wedded to the prevailing *waste management* paradigm – rather than to take the leap to *zero waste* thinking. This choice appears to be based upon a fallacious belief that 'new and emerging technologies' will, in the near future, be able to remove the landfill-dependent nature of problem wastes that previous and present technologies have failed to address. In this sense, placing faith in as-yet unproven technologies represents a de facto enabler of the existing, prevailing waste management paradigm, allowing the linear systems approach to waste to stave off challenges from circular systems thinking for several more years at a time, by offering society the appealing delusion that zero waste might yet be achievable without the need for any significant change to how people live. It appears that for a shift away from the waste management to the zero waste paradigm to happen, would require the arrival of a *crisis* related to the contemporary waste problem.

While the paradigm shift/crisis model offers an explanation for why zero waste to landfill initiatives consistently fail, the question which lingers is: *If these campaigns are so certainly destined for failure, why are they undertaken in the first place?* The answer is provided via a two-fold analysis of observations of these initiatives. Firstly, it is clear, upon examination of

the situation, that problematic wastes which defy attempts to divert them from landfilling are ubiquitous, myriad in form, and – perhaps most importantly – the stuff of products which society feels it strongly needs or wants, and is highly resistant to giving up. Getting to 100% diversion would require massive retooling from a largely reluctant industry, enormous sacrifice from a largely apathetic public, and unusually strong leadership and enforcement from a largely unwilling government. In other words, zero waste to landfill is a *supermegaproject*. Meanwhile, there is no clearly articulated recognition from the proponents of these initiatives that the 100% diversion goal represents much more than a need for expanded recycling – let alone the gigantic and unprecedented projects that they really are. This means that zero waste to landfill is an *unacknowledged supermegaproject*.

Supermegaprojects such as zero waste to landfill, with all of their inherent challenges from various sectors, must overcome a steep *resistance gradient* if they are to succeed. If the magnitudes of these initiatives are not properly acknowledged by their proponents, however, then the incentive needed for the required level of effort will not eventuate, leading inevitably to the development of the 'planning void'. Thusly underequipped to overcome all of the challenges along the resistance gradient, the unacknowledged supermegaproject is destined for failure. Zero waste to landfill, in the face of industry pushback, public apathy, and government impotence, cannot be achieved by mere happenstance. It is a certain failure under present conditions.

The extent to which a supermegaproject is unacknowledged unintentionally as an extreme manifestation of the planning fallacy, versus intentionally due to the strategic misrepresentation efforts of policy entrepreneurs, is difficult to measure precisely and it is not within the scope of this thesis to attempt that measurement. However, the causes/incentives for both types of non-acknowledgement are evident, and it is clear that without a paradigm shift from *waste management* to *zero waste* thinking taking place – which itself may first require the arrival of some sort of *waste crisis* – zero waste to landfill is not going to be realised anytime soon.

The next and final chapter presents the conclusions from this thesis study.

Chapter 8: Conclusions

8.0 Introduction

This closing chapter of the thesis provides a final set of conclusions regarding chronic zero waste to landfill initiative failure, what would have to happen for this failure to be turned into success, and how these conclusions inform the wider issue of global sustainability.

The first three sections of this chapter present the answers to the research questions, which follow from the analysis and discussion of the previous chapter.

Next, a set of recommendations for local governments is presented, for how zero waste can be addressed in a feasible way at that level. This is followed by a discussion of residual issues/questions that emerge from this study, which form the basis of further research opportunities.

Finally, this chapter and thesis close with final thoughts about how the overall waste problem, and zero waste as a solution to it, fit into the larger picture of global sustainability – particularly how crisis due to waste interrelates with the wider set of human-caused crises.

8.1 Research Question 1: *Why are zero waste to landfill initiatives consistently failing to achieve their goals?*

Zero waste to landfill initiatives are consistently failing because there continues to be a steady stream of problematic wastes which require landfilling. This is the basic situation, which if left unaddressed, will preclude the successful achievement of zero waste to landfill.

This is a *super wicked problem* of a situation, because problematic wastes are found in innumerable items which are widely considered as essential and/or convenient, including the following partial list:

- Computers, phones, televisions, and other electronic devices, which contain poorly-degradable plastics and toxic heavy metals.
- Most food packaging, which is made from poorly-degradable plastics.
- Medical products made from poorly degradable plastics, including disposable dressings, syringes, monitoring equipment, and prosthetics.

- Automobiles, trains, airplanes, ships, and most other transportation vehicles in their present design forms – including bicycles – because of poorly-degradable materials such as plastics in their construction.
- Homes, offices, and other buildings based upon modern design and construction.
- Other synthetic materials such as those used in clothing, tools, and household goods.
- Radioactive products, including those which produce nuclear waste.

Zero waste to landfill cannot be achieved as long as these items continue to be made in their present forms. However, the reality is that under the prevailing *waste management paradigm* – which supports other prevailing economic, political and cultural paradigms – these items *will* continue to be made. In short: industry will fight to retain the business-as-usual manufacturing of these products, the public is extremely dependent on the continued availability of these products, and government is unwilling to take decisive action that would force any behaviour change in this regard.

These potential opposing forces represent an extremely steep *resistance gradient* which a zero waste to landfill initiative would have to overcome – making any such initiative a *supermegaproject*.

Each of the zero waste to landfill initiatives observed in this study, however, exhibits a common lack of public recognition/articulation of their endeavour's supermegaproject status. This is indicated clearly by the existence of a *planning void*, where instead of the necessary comprehensive plan for addressing 100% of problematic wastes at the top-of-pipe, there is usually little more than mainly end-of-pipe measures, typically consisting of expanded recycling programmes which provide a 'feel-good' distraction from the fundamental behaviour changes – *paradigm shifts* – which are truly needed. Zero waste to landfill initiatives are therefore *unacknowledged supermegaprojects* – devoid of the necessary extreme levels of planning, effort, and commitment necessary to overcome their extremely steep resistance gradients – and therefore destined for failure from their outsets.

8.2 Research Question 2: *What needs to happen in order for zero waste to landfill initiatives to succeed?*

Zero waste to landfill requires that there are no longer any materials produced which require landfilling – including the landfilling of residues from alternative treatments such as incineration.

This means that for all items such as those listed in the previous section, their production must either be stopped completely, or else revised to use alternative materials that are not problematic and therefore do not require landfill disposal.

For this to happen on a global scale, there would need to be a complete overhauling of industry – which, as has been discussed at length in this thesis, would be met with extreme resistance. While the research and development of appropriate materials and product development could represent a huge opportunity for economic development and livelihood-creation, the severe disruption of 'business-as-usual' practices would likely only be possible with strong intervention from government – i.e., it is not likely to be something that would come voluntarily from within industry.

Government intervention would probably have to come in the form of widespread material and product bans, which would not only disrupt the status quo of industry, but also pose significant inconvenience to the public who consumes – and is highly dependent upon – these goods. As such, governments would need to lead the zero waste charge against very extreme forces of industry and public resistance.

Multilateral agreements on the discontinued use of problematic materials would be essential. Without such accords, problem goods made in non-compliant countries could still enter the waste top-of-pipe of compliant countries – unless the latter took action to seal their borders to products from the former. In the absence of any higher-level government commitment to discontinue the use of problem materials, local governments would need to isolate their communities from outside trade completely, in order to have any hope of pursuing a zero waste to landfill goal.

The evidence before us in the present day, however, suggests that it is highly unlikely that human society will make the required paradigm shift from *waste management* to *zero waste* voluntarily. Prevailing attitudes, for example, would overwhelmingly reject the notion of giving up the life-saving utility of medical products which also happen to require landfilling.

The immediate benefits, in contemporary society, hold a far greater importance than the possible life-jeopardising consequences that present-day waste accumulation may impose upon future society. Worse, there is abundant evidence, in all of the more frivolous examples of 'throwaway society' wastes, that contemporary society is not giving much thought at all to what its actions today are leaving as a legacy of burdens on the people of tomorrow.

Zero waste to landfill appears a loser of an idea, against such prevailing values. This does not mean, however, that one of the conclusions of this study is that zero waste to landfill cannot be achieved. On the contrary, the feasibility of zero waste is an *axiom* upon which this thesis is based.

Nature, on the whole, is a zero waste system. The overall waste problem that this study addresses is, essentially, a deviation of human society from this stable, equilibrium state. The waste management paradigm which prevails today is doomed to collapse, as all unstable systems inevitably do. Nature will not support the status quo of linear systems of waste generation forever – zero waste will ultimately prevail.

What is unknown is *how* this will happen. The least destructive way, to human society, would be for its members to seize the initiative, and reconfigure the way that life is lived in accordance with zero waste principles. The alternative is an eventual crisis of some sort – the restoring force of nature which will return civilisation to zero waste one way or another.

As discussed previously, zero waste to landfill is an *unacknowledged supermegaproject*, and as such human society is not capable of achieving it under present prevailing conditions. A paradigm shift to zero waste thinking is required to achieve success, and the evidence clearly indicates that this is not going to happen without a crisis provoking it. The remaining variable, then, is whether the eventual crisis will be one that helps restore human society, or else helps to destroy it.

8.3 Research Question 3: *How do this study's findings with respect to zero waste to landfill initiatives inform the wider issue of success/failure of sustainability initiatives worldwide?*

The concept of the *unacknowledged supermegaproject* can be applied to understanding the failure of other sustainability initiatives – most notably the global efforts to address human-

caused climate change, which have largely fallen short of meeting targets deemed necessary to stave off widespread environmental disaster.

The parallels between zero waste to landfill and climate change mitigation failure are obvious. Bold and ambitious goals have been set by governments for greenhouse gas emissions reductions, via the Kyoto series of treaties, yet very little clear articulation of the fundamental changes necessary to bring about these reductions has followed. Paradigm shifting has been overlooked in favour of technical solutions like hybrid cars and compact fluorescent lightbulbs, with the overall result that the forewarned human-caused climate change crisis may already be upon us.

Extending the common threads between zero waste and climate change further, it appears that *sustainability in general* is an unacknowledged supermegaproject of our time: problems exist and are identified, and goals are set for solving them – yet the hard required steps of paradigm change are not being fully recognised as necessary means to achieving these goals. Rather, the easier option of pinning hopes upon technical solutions keeps diverting human society away from making the tougher yet necessary choices that will lead it to success. Getting on with the job of building a sustainable society, it would seem, requires first admitting out loud what has to be done, and how big and involved a task it really is.

The next section presents recommendations on how to address zero waste to landfill more feasibly, at the local government level.

8.4 Recommendations for Addressing Zero Waste to Landfill at the Local Government Level

"You can't get what you want
Till you know what you want"
– Joe Jackson (1984).

The previous sections of this chapter, as well as discussion throughout this thesis, make it clear that achieving zero waste to landfill requires action at the highest possible levels – particularly with respect to stemming the global flow of problematic materials. However, as also discussed throughout this thesis, responsibility for dealing with waste at the end-of-pipe generally falls to local governments. It is at the local level, then, that the incentive to

achieve zero waste to landfill success should be the greatest – as this is where the consequences are most acutely felt in the present.

The following recommendations, based upon the discussion and conclusions of this study, are offered to local governments everywhere:

1. **Zero waste to landfill is really about *materials:***

   As this study reveals, the ongoing dependence of human society on landfilling is a direct consequence of the continued manufacture of products which are made with materials that defy all resource recovery efforts. In other words, it is less a question of *how much* waste there is, and more a matter of *what* the waste is – i.e., whether it contains plastics or other problem materials.

   Therefore, any efforts made towards achieving zero waste to landfill at the local level must be focused on eliminating the entry of such materials into the community's waste stream. This leads to the next recommendation, which is to...

2. **Take control of the top-of-pipe – by *localising production:***

   The present situation for all local governments whose communities are connected to the rest of the globalised-economy world, is that there is very little they can do to stop problem wastes from entering their waste streams. This helplessness to significantly influence the top of the waste pipe precludes any hope of achieving zero waste at the local level.

   A direct way to take control of the top-of-pipe is by developing a diverse local production economy, which provides much of the products that are consumed in the community. Local governments can exercise far more influence and control over the outputs of what is produced in their own communities – therefore, the more diverse the available supply of locally-made goods is, the more conducive conditions are to achieving zero waste to landfill.

   In addition to increasing control of the waste stream, the development of a diversified local production base brings the additional benefits of creating a more resilient local economy, as well as reducing the externalisation of environmental impacts and labour exploitation that results from present day globalised manufacturing.

3. **De-emphasise recycling*:***

As discussed at length in this thesis, in its present forms recycling's drawbacks far outweigh its benefits. While it is true that a measurable amount of resources are recovered from recycling that would otherwise be lost to landfills, there are two very significant disadvantages that pose severe obstacles to zero waste to landfill aspirations.

One problem is that the 'feel-good' aspect to recycling serves to distract all stakeholder groups from taking the steps that would actually bring about zero waste – such as changing behaviours based upon dependence on products with problematic materials.

The other, and even worse problem, is that recycling programmes are huge investments for any community, and as such they are draining local governments of the resources that could otherwise be put towards significant efforts which directly address zero waste to landfill attainment.

This study, therefore, recommends that local communities which are serious about achieving zero waste to landfill should abandon their recycling programmes, and…

4. **Invest in a *zero waste to landfill economy:***

Achieving zero waste to landfill globally, without it arriving via unwanted crisis, will require an enormous amount of research and development – into materials, as well as the design of new products to replace some of the many ones whose use will need to be discontinued.

Local governments have the opportunity to further increase the resilience of their communities, by investing in this research and development within their communities – instead of pouring resources into less sustainable industries which offer limited returns in the long-term.

5. **Ignore percent diversion, and focus instead on *per capita waste to landfill:***

As has been discussed throughout this thesis, the percent diversion statistic is a misleading figure that masks the problem of increased overall consumption and waste generation – it is, in essence, the statistical manifestation of the overall problem with recycling programmes in their typical present forms. The only unambiguous percent diversion value is *100%*.

The per capita waste to landfill statistic, on the other hand, is a direct measure of how a community is doing against a goal of zero waste to landfill. If this number increases/decreases, then it is clear that performance is trending poorly/well, and by how much is clear as well – with *0 kg/person/year* the ultimate target.

6. **In the meantime, work to *broaden support for zero waste to landfill:***

The above recommendations are all oriented toward achieving zero waste to landfill at the local level. However, unless a community is prepared to remove itself completely from the globalised-economy grid, the continuation of non-zero waste practices in the rest of the world will continue to be an obstacle to local success.

A more practical, long-view approach to achieving zero waste to landfill, is for local governments to build wider coalitions with other communities, and to lobby higher levels of government to adopt the agreements on restrictions of problem materials, as discussed in the previous section. Without such accords being passed and implemented, it is extremely difficult to see how any community could remain a participant in a global consumer society, and also have any chance of achieving zero waste to landfill.

7. **Conduct research that critically investigates claims of zero waste 'exemplars':**

Zero waste to landfill, as illustrated throughout this study, is an extremely challenging goal – a *supermegaproject*. In spite of this fact, and the lack to date of any initiative that has successfully achieved 100% reduction, the literature can often mislead with its over-reaching descriptions of places as zero waste exemplars – particularly when this contributes to creating or reinforcing 'faraway utopia' myths that are not helpful to the overall integrity of discourse. An example of this is offered by Hill, Shaw and Hislop (2006), in the Foreword of their paper on zero waste in the UK (p. 5):

> "In the UK today's product – be it a fridge, battery or drink carton – is tomorrow's waste. But does New Zealand's approach – that today's waste is tomorrow's raw material – provide a better way? While we struggle to reconcile our throwaway culture with the requirements of the EU Landfill Directive, New Zealand and many other countries and cities around the world have embraced the concept of a zero waste society."

As discussed in detail previously in this thesis, in 2006 the true situation in New Zealand was that Christchurch had already abandoned its zero waste to landfill goal, and at the national level, the aspirational zero waste policy was failing to deliver action to back up the policy rhetoric. In reality, the UK in 2006 would have been served better by using the New Zealand case as an exemplar of *how not* to embrace the concept of a zero waste society.

By encouraging research that applies a sceptical approach and tests rigorously for veracity of claims, myths can be separated from facts, and keys to zero waste to landfill success can therefore be distilled from the wider maelstrom of mostly-insufficient waste strategies.

8. For exemplars, look around at the rest of *nature:*

Zero waste to landfill is not an unsolvable riddle, and examples of it in practice abound – as long as one looks at the *non-human* world. Nature is a source of solutions with respect to *materials*, as well as *design*. Any local government in need of inspiration for how to address the waste problem needs only to examine the ingenuity of other species – and put aside any *Homo sapiens*-oriented hubris that might get in the way.

9. Think of the *future:*

The essence of the zero waste to landfill failure problem is an inability to see past present benefits of prevailing paradigms, to grasp their resulting future consequences. The oft-stated argument that landfilling is appropriate today because there is enough space to last hundreds or thousands of years, must seem patently illogical to those people who would inhabit the earth at such a later time.

Continued landfilling is a convenience of present human society that comes at a direct cost to the land base and well-being of future societies. In this sense, zero waste to landfill is a *necessary* approach to the waste issue, which any local government aspiring to sustainability must somehow achieve.

The next section of this chapter considers how this thesis might offer a meaningful contribution to the overall discourse, on zero waste to landfill and beyond.

8.5 Contribution to the Sum of Knowledge

One of the goals of this thesis is to provide new and worthwhile insight to the global discourse, on the issue of waste as well as the wider subject of global political ecology. There are two areas in particular where it is hoped this study will offer a meaningful contribution.

Firstly, this thesis has coincided with the period just following the passing of the first zero waste to landfill initiative deadlines, in 2010. As such, this study represents one of the first opportunities for a critical, retrospective review of these campaigns.

The existing literature contains plentiful discourse about zero waste that focuses on the positive aspects of this alternative approach to the waste problem, with an emphasis primarily on how zero waste thinking could be applied in practice. With the chronic failure of zero waste to landfill initiatives a dawning reality, however, there is an emerging need for research that seeks to better understand the roots of this failure, and how the keys for success can be derived from studying it. I am hopeful that this thesis can serve as a catalyst for further debate and work in this regard.

A second way in which this thesis will make a meaningful contribution, it is hoped, is by offering a new way of articulating phenomena related to the wider set of global environmental/sustainability efforts, and the challenges they face under prevailing economic, political and social conditions.

Existing theoretical frameworks such as incrementalism versus fundamental change, planning fallacy and strategic misrepresentation, and paradigm shifting each provide a useful means for analysing such problems, and accordingly these analytical models form an important part of this thesis. In the case of zero waste to landfill initiative failure, the 'missing piece' in understanding this phenomenon of chronic failure was found first by conceptualising the recurring absence of comprehensive strategies for goal-achieving as a *planning void* – and this led to the formulation of the larger concept of an *unacknowledged supermegaproject*, which serves to fill in the remaining gap towards addressing the research questions.

As put forth in addressing the third research question in particular, it appears that the concepts of *planning void* and *unacknowledged supermegaproject* can be applied usefully to

the broader subject of environmental/sustainability initiatives. The ongoing failures of efforts to shift energy policy from fossil to renewable fuels, and the associated setbacks to Kyoto-type attempts to mitigate human-caused climate change, are high-profile contemporary issues with which the ideas of planning void and unacknowledged supermegaproject resonate strongly. It is therefore hoped that this thesis will provide a valuable set of new tools for analysis and problem-solving, for practitioners ranging from environmental policy and planning decision-makers, to frontline activists advocating for sustainability and resilience in their communities and around the world.

The next section discusses further research work of relevance which remains to be done, following on from this thesis.

8.6 Further Research Opportunities

A number of important new issues and questions have arisen in the course of this research, which lie beyond the overall scope of the study, and therefore must be left to further research to address more fully. These include the following:

- **The materials science of zero waste to landfill:**

  As discussed throughout this chapter, this is perhaps the single most critical area of necessary further research in the realm of zero waste, because it is ultimately the nature of materials in products which determines their destiny when they are no longer of utility – i.e., whether they can be recovered fully, or require residual disposal.

  Much needs to be better understood about the most pertinent material qualities in this regard, such as bio- and other forms of degradability, the nature of residuals from alternative waste treatment processes such as incineration ash, and the fundamental differences between 'natural' and 'synthetic' materials – and how this distinguishes the zero waste systems of nature from human systems which are more linear.

- **Perceptions of stakeholders regarding zero waste:**

  Some residual questions from this study concern the perceptions that exist and prevail among stakeholder groups.

  Of particular interest are the general public's impressions about the overall waste problem, zero waste goals, and the role of recycling.

Also of interest would be research that generated deeper understanding of the interplay between the planning fallacy and strategic misrepresentation in sustainability-related initiatives such as zero waste to landfill.

- **Investigating the Zero Waste to Landfill Success Claims of Industry:**

  This study has yielded the finding that no local government anywhere has managed to achieve zero waste to landfill. However, there are several private companies that have made recent claims to be operating 100% diversion facilities. Cursory inspection of these reports, though, raises many doubts about these claims – particularly with respect to recovered materials which have been off-loaded to other parties, from which point the whereabouts and fate of these materials become unclear.

  It would be interesting, therefore, to see research which investigated these zero waste to landfill success claims, and tested their veracity by tracing diverted waste streams beyond company gates.

There are also several evident opportunities for further research, in areas covered directly by this thesis – but where there remains more work to be done to more fully develop concepts, and to apply them to a wider set of relevant problems. These include:

- **Further case investigation of zero waste to landfill initiatives:**

  As discussed in Chapter 2.2, this study was ultimately limited to the set of four selected cases, which limited the consideration of the majority of zero waste to landfill campaigns around the world to only cursory examination. Especially significant was the practical constraint of only including English-speaking countries, as this precluded what is likely the majority of all initiatives around the world, and in the process limited considerably the cultural diversity that would otherwise have been built into the sample set. While even the cursory evidence of these other cases appears to be enough to verify that no zero waste to landfill success exemplars exist in the modern world, the loss of potentially unique and valuable insights from these other locations is acknowledged, including the possibility that the so-far elusive success exemplar(s) might possibly come from one or more of these places.

- **Wider formulation and application of the concepts of *planning void* and *unacknowledged supermegaproject*:**

As discussed in the previous section, it is hoped that the theoretical concepts introduced in this study can be used constructively in further work on global environmental initiatives beyond just zero waste.

If the *planning void* and *unacknowledged supermegaproject* are ideas worthy of extended use in the overall discourse, then it is expected that they would be subject to some extent of critical scrutiny, which in turn might generate debate and/or further similar research. In particular, there appears to be much scope for applying these ideas towards the issue of climate change mitigation failure, or even more widely to critically examining the performance of contemporary movements related to environmental protection, sustainability, and resilience.

The final section of this chapter offers a closing commentary concerning zero waste to landfill and its role in the larger picture of sustainability, equilibrium and crisis.

8.7 Final Thoughts: Waste versus Other Crises

Much of the discussion and conclusions in this thesis revolves around the notion that human society may be under the threat of a *waste crisis* if present approaches are not replaced with new ones. This might come across to the reader as a reductionist view of the wider sustainability issue, which overemphasises the role of waste in the bigger picture. In closing, therefore, I would like to include a brief discussion about crisis in general, and what role the waste problem might play in any future crisis scenarios.

The list of potential crises facing humanity is not only long but highly interrelated as well, including: climate change, with its potential impacts on weather, sea level rise, agriculture, and resulting forced migration; food insecurity, which is linked with climate change; poverty, which is linked with food insecurity and climate change; and, fossil fuel use, which is linked with climate change, food insecurity, and through globalism to poverty. Then there is the worst crisis of all – *war* – which is both caused by and the cause of all of these other human-made crises, and is tragically ongoing where the military-industrial complex has managed to prevail over peace.

The waste problem co-exists and is intertwined with the abovementioned and other similar potentially crisis-generating issues. Waste crises are not merely hypothetical – they have previously occurred and notably persist today in places where the waste management

paradigm has already become dysfunctional, as Figure 8.1 clearly illustrates in the case of Naples, Italy.

Figure 8.1: Waste Crisis in Naples, Italy
(Messere, 2008. Published with permission).

And so where such crises do unfold, it is likely that the toxic and other effects will be felt most by, for example, the poorest areas of a community – a manifestation of the pre-existing poverty crisis, caused by failing economic paradigms. If a city resorts to incineration when new landfill space becomes hard to find, it is similarly likely that the toxic fallout – as well as the unavoidable landfilled residues – will aggravate existing or trigger new air/water/soil pollution crises, with the effects most acutely affecting the economically disadvantaged neighbourhoods which are nearly certain to be closest to the incinerators and landfills. And in the event of war, the problems of waste become just another of many collateral tragedies inflicted on those caught in its path.

Addressing the waste problem in isolation, therefore, is not suggested here as *the* solution to achieving a sustainable human society. Zero waste is but one of several necessary outcomes to this end. That said, however, it *is* a necessary outcome, without which sustainability cannot be achieved. As such, it is clear that the consistent failure of zero waste to landfill we see today must be converted into success – and it is my wish that this thesis makes a contribution to this end.

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