

Preventing Food Waste: Opportunities for Behaviour Change and the Expansion of Food Recovery and Donation in Metro Vancouver

by

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Abstract

Food waste is a significant public policy problem. My research focus is on consumer and retail/service industry food waste because these sectors offer the largest opportunity to reduce overall food waste in the supply chain. Two categories of policy interventions are chosen to reduce food waste: food waste prevention and food recovery and donation. Academic and government literature are used to inform the background context of the policy problem and select applicable case studies. Case studies from Europe and the United States identify existing policy and program activities in other jurisdictions. My analysis highlights common elements of successful food waste reduction policies and also discusses their limitations. Policy alternatives to prevent food waste are developed and assessed, as is food recovery and donation program design.

I recommend a sequential combination of optimal food waste prevention policies. The results of my analysis demonstrate that an educational and awareness campaign can target the root causes of food waste in the food service and retail industry as well as in households. I recommend that increased research and consultation should follow the implementation of an awareness campaign for the formulation of voluntary food waste reduction targets that will ultimately evolve into mandatory, legislated targets. The voluntary targets will inform new research, consultation and baseline data that will assist in the development of regulatory food waste reduction targets. I recommend that any efforts to increase food recovery and donation within Vancouver will require a considerable scale of marketing, research, and outreach to build partnerships between food recovery and donation agencies and food businesses and assist in coordinating and developing their activities.

Keywords: food waste; waste management; retail food waste; consumer food waste; food recovery and donation; Metro Vancouver

Dedication

To my loving husband who's unconditional support and encouragement helped me finish this degree. Thank you for being there for me when I needed you and for all of the amazing things you do.

I dedicate this work to my wonderful parents as well. Thank you for always giving me the strength, confidence, and courage to achieve my goals. I could not have done this without your tremendous help, support, and love.

To the rest of my family and friends, you know who you are, thank you for always cheering me on, listening, and helping me strive to do my best.

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List of Acronyms

BCCDC	British Columbia Centre for Disease Control
CFIA	Canadian Food Inspection Agency
DEFRA	Department for Environment, Food & Rural Affairs
EPA	Environmental Protection Agency
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
GCAP	Greenest City Action Plan
GHG	Greenhouse Gases
ISWRMP	Integrated Solid Waste and Resource Management Plan
LFHW	Love Food Hate Waste
OECD	Organization for Economic Co-operation and Development
SFU	Simon Fraser University
UK	United Kingdom
UN	United Nations
USDA	United States Department of Agriculture
WRAP	Waste and Resources Action Programme

Executive Summary

A troubling amount of food that is produced for human consumption does not get consumed because it is discarded by actors in every stage of the food supply chain. The majority of this wasted food ends up in landfills and much of it could be avoided. Food waste includes inedible food items such as egg shells, or fruits and veggie peels; however, this study is concerned only with edible food waste which is food that could have been consumed, but was thrown away instead. Avoidable food waste poses significant negative environmental and economic consequences. Additionally, wasting edible food is socially irresponsible in Vancouver considering the high rates of hunger and poverty. My research indicates that both the buyers and sellers of food need to be engaged and encouraged to change their food waste habits in order to significantly reduce the generation of food waste.

This study focuses on the second half of the food supply chain – retail, food service, and household consumption, which offer the largest opportunity to reduce overall food wastage. While the first half of the chain is important, it is beyond the scope of this project to consider ways food producers and processors can prevent waste and incentivise them to take action.

The policy problem I address is that over half of all edible food waste is generated by consumers and food retailers and this needs to be reduced in order to combat the production of greenhouse gas emissions, the unnecessary waste of resources, and the rise in municipal solid waste generation. Policy intervention is required to change consumer and retail behaviour to waste less food and reduce the overall generation of food waste. When food businesses are unable to sell their surplus edible food, policies need to facilitate the recovery and donation of that food to mitigate food waste.

To address my policy problem, I examine two distinct categories of food waste reduction interventions which are food waste prevention and food recovery and donation. Both strategies are necessary to consider when addressing consumer and food business food waste because even though preventing the generation of food waste is the main priority, it is unreasonable to expect there will be no edible surplus food.

Preventing consumer, food service and retail food waste will take time for actors to alter their behaviour. The food service and food retail industries will continue to have surplus edible food and food recovery and donation can help to mitigate the negative impacts of food waste. Moreover, I focus on food recovery and donation approaches because they address important social justice issues around food.

The same methodology is employed for both policy categories which includes background research, case study analysis, and semi-structured interviews. I focus on policy recommendations for the City of Vancouver to keep the scale of my study manageable. However, the Metro Vancouver regional government is responsible for developing the region's waste management policies. As such, Metro Vancouver plays a considerable role in the background research and analysis of this study. My policy recommendations are applicable to other cities and regional governments across BC due to the similar regulatory and policy contexts of food waste in the province.

My analysis includes an assessment of a sequential combination of optimal food waste prevention policies I recommend. The results of my analysis demonstrate that an educational and awareness campaign can target the root causes of food waste in the food service and retail industry as well as in consumer households. An educational and awareness campaign is a reasonable first step in addressing food waste because, generally, the root cause of food waste habits is a lack of knowledge among food businesses and consumers. An educational and awareness campaign can fill this knowledge gap and educate the public to be conscious of their food waste and take action to prevent it. I recommend that increased research and consultation should follow the implementation of an awareness campaign for the formulation of, firstly, voluntary food waste reduction targets that will ultimately evolve into mandatory, legislated targets. The voluntary targets will inform new research, consultation and data that will assist in the development of regulatory food waste reduction targets.

I identify and analyse food recovery and donation infrastructure grants and a government run program to facilitate an expansion of food recovery and donation. I consider the pros and cons of each and conclude they are both applicable policies to implement in Vancouver, primarily, because they overcome many of the challenges associated with increasing surplus edible food recovery and donation. However, my

analysis shows these options are not entirely feasible at the moment due to current Metro Vancouver directives. I recommend that any efforts to increase food recovery and donation within Vancouver will require a considerable scale of marketing, research, and outreach to build partnerships between food recovery and donation agencies and food businesses and assist in coordinating and developing their activities.

My final conclusion is that Metro Vancouver has in place the regulatory framework that is required for my policy recommendations to succeed. The time is now to take action and reduce our food waste.

Chapter 1. Introduction: The Problem of Food Waste

Food waste includes any food items that were once edible and have been discarded to the landfill or composted rather than consumed. Food waste also includes food scraps which are items such as bones, peelings and egg shells that make up the inedible portion of overall food waste and are also referred to as “unavoidable food waste” because they would not usually be consumed (WRAP “New Estimates for Household Food and Drink Waste”, 2011, p.8). My research is concerned with avoidable food waste which is food that could have been consumed instead of being thrown away.

The United Nations Food and Agriculture Organization (FAO) estimates that 1/3 of all consumable human food is wasted annually (Gustavsson, et al., 2011,). In Canada, we waste approximately 40% of all the food we produce which amounts to a total of \$27 billion of food waste each year (Gooch, Felfel & Marenick, 2010, p. 2). Food waste occurs throughout the food supply chain, but in developed countries, the majority of it occurs at the retail and consumer stages and much of it could be prevented.

The focus of this study is on the second half of the supply chain – retail, food service, and household consumption, which offer the largest opportunity to reduce overall food wastage. While the first half of the chain is important, it is beyond the scope of this project to consider ways food producers and processors can prevent waste and incentivise them to take action.

Consumers are often unaware of the food waste problem and do not realize how their individual behaviour contributes to food waste. Consumer behaviour and the business practices of the food industry are inextricably linked which means in order to reduce food waste, both the buyers and sellers of food need to be engaged and encouraged to change their food waste habits.

Wholesalers, retailers, restaurants, hotels, and caterers make up the commercial food industry and generate vast quantities of food waste. They often have excess edible food they do not sell and it is less costly for them to dispose of this food rather than find a way to reuse it. Food recovery is the process of collecting surplus edible food, that would otherwise be discarded, and donating it to charitable organizations that feed the hungry. I define food donation as the food that is donated from specific commercial food sectors and not from society as a whole to charitable agencies that provide food to food insecure individuals and families. Food recovery and donation programs help to alleviate hunger by repurposing excess edible food and prevent food waste from going into the landfills.

A larger share of the food industry's surplus edible food could be recovered and donated to charitable organizations that feed individuals and families, but barriers to expansion of their programs exist. Some of these challenges are that many agencies require more trained staff, refrigerated trucks, and storage space to accept more recovered food. Smaller agencies require greater assistance in fostering relationships with donors. Those who are willing to donate and those who can distribute donated food need to be matched up and work together. Food recovery and donation could be expanded, but these challenges would need to be addressed.

My policy problem is thus, over half of all edible food waste is generated by consumers and food retailers and this needs to be reduced in order to combat the production of greenhouse gas emissions, the unnecessary waste of resources, and the rise in municipal solid waste generation. Many consumers and retailers continue their wasteful food practices because they are unaware of the large amounts of food they waste and the resulting significant negative consequences. Policy intervention is required to change consumer and retail behaviour to waste less food and reduce the overall generation of food waste. When food retailers are unable to sell their surplus edible food, policies need to facilitate the recovery and donation of that food to mitigate food waste.

This study examines two distinct categories of food waste reduction interventions which are food waste prevention and food recovery and donation. Throughout the capstone, the research and analysis pertaining to each category are divided into

separate chapters. My research focuses on both strategies to address food waste because even though preventing the generation of food waste is the main priority, not all edible surplus food will be reduced. Preventing consumer and retail/food service food waste will require the actors to shift their behaviour to waste less food which will take time to achieve. The food service and food retail industries will continue to have surplus edible food and food recovery and donation can help to mitigate the negative impacts of food waste. I also focus on food recovery and donation approaches because they address important social justice issues around food.

I use the same methodology for both policy categories which includes background research, case study analysis, and semi-structured interviews. I focus on policy recommendations for the City of Vancouver to keep the scale of my study manageable. However, the Metro Vancouver regional government plays a central role in developing policies for the region's waste management. They are an important government stakeholder that is responsible for assisting its member municipalities divert organic waste from the landfills. Consequently, conclusions for Vancouver may be applicable to other cities and regional governments across British Columbia.

My analysis includes an assessment of a sequential combination of optimal food waste prevention policies I recommend. The policies are assessed on how they address consumer and retail behaviours that lead to a significant generation of food waste in addition to relevant government considerations such as implementation complexity, cost, and stakeholder acceptability. My policy recommendations include an education and awareness campaign and increased research and consultation for the formulation and implementation of, firstly, voluntary food waste reduction targets. These voluntary targets will inform new research, consultation and data that will assist in the gradual implementation of regulatory food waste reduction targets.

I identify and analyse food recovery and donation infrastructure grants and a government run program to facilitate an expansion of food recovery and donation. I discuss the pros and cons of each and conclude they are both applicable strategies to implement in Vancouver because they overcome many of the challenges of increasing surplus edible food recovery and donation. However, my analysis shows these options are not entirely feasible at the moment due to current Metro Vancouver directives. I

recommend that any efforts to increase food recovery and donation within Vancouver will require a similar scale of marketing, research, and outreach as the Metro Oregon model to be effective.

The remaining capstone is organised as follows: Chapter 2 focuses on food waste prevention and provides more detail of the quantities and causes of food waste. A discussion of the associated host of negative environmental and social consequences follows. I summarize relevant research on supply chain deficiencies, consumer and retail behaviour and the purpose of prioritizing food waste prevention strategies. Chapter 3 covers pertinent background information on local food recovery and donation and the challenges to increasing food recovery rates. The regulatory context of food recovery and donation highlights a strong basis for further policy development in this category. The description of my methodology is in Chapter 4. I examine food waste prevention policies and programs from the United Kingdom and the United States in Chapter 5. The analysis of these cases provides useful information for designing effective food waste prevention strategies.

Existing case study data of publically funded food recovery and donation programs are extremely limited. There is only one comprehensive case study of a successful government recovery and donation program that I came across in my research. The case study is from Metro Oregon in the United States and it is the only case study I examine in Chapter 6 to assess the policy implications and applicability of government food recovery policies in Metro Vancouver.

My interview results are summarized in Chapter 7 which provides important insights into the benefits and challenges of potential food waste prevention and food recovery and donation policies. Chapter 8 outlines the optimal sequence of policy options for food waste prevention according to my research, case studies and interviews. I analyse how each food waste prevention policy addresses the food waste behaviours of the food service and retail industry and consumers and discuss important considerations of each policy in Chapter 9. Chapter 10 describes the food recovery and donation policy options I establish and Chapter 11 considers the pros and cons of each. I make final recommendations for both policy categories combined in Chapter 12 and provide final conclusions in Chapter 13.

Chapter 2. Food Waste Prevention

This chapter begins with a discussion of the prevalence of food waste in developed countries with a focus on the generation of food waste in Canada and Metro Vancouver. I describe how food waste is a pervasive problem that has both local and global consequences.

I categorize the causes of food waste by intuitional and behavioural factors. Institutional causes of food waste include supply chain inefficiencies and date labelling for food. Consumer and retail behaviours, such as over-purchasing and over-stocking of food lead to substantial food waste. The regulatory context of waste management in BC demonstrates the current policy directive for waste diversion which focuses on primarily on composting. I highlight the lack of specific policies aimed at reducing the generation of food waste at the source and compare this policy directive to the United States Environmental Protection Agency Food Recovery Hierarchy. The chapter ends with a summary of the research which indicates the importance of waste prevention policies in fostering behaviour change to waste less. These conclusions reveal important policy considerations that can be extrapolated to inform effective food waste prevention policies.

2.1. How much food do we waste?

Food waste occurs throughout food supply chains in all countries for differing reasons, but developed countries waste more food per capita than developing countries. The FAO estimates that consumers in North America and Europe waste between 95 to 115 kilograms per year while consumers in Sub-Saharan Africa waste only about 6 to 11 kilograms per year of food (Gustavsson et al., 2011). Developed countries waste approximately 40% of the food they produce primarily because of an over-abundance of food and consumer attitudes which impact how food is manufactured and sold.

Developing countries, on the other hand, generate 40% of their food waste during post-harvest activities and processing (Gustavsson et al., 2011, p. 5). Gooch et al. (2010) estimate that Canadian consumers are responsible for 51% of food waste and a large amount of it could have been avoided. The food service industry and food retailers are the second largest producers of food waste by generating approximately 19% of the food waste in Canada (Gooch et al., 2010, p. 5). Figure 2.1 uses data from Gooch et al. which describes the percentage of food waste generated by each sector in the Canadian food supply chain. The figure shows the consumption and food service and retail stages are the largest contributors to Canada's overall generation of food waste.

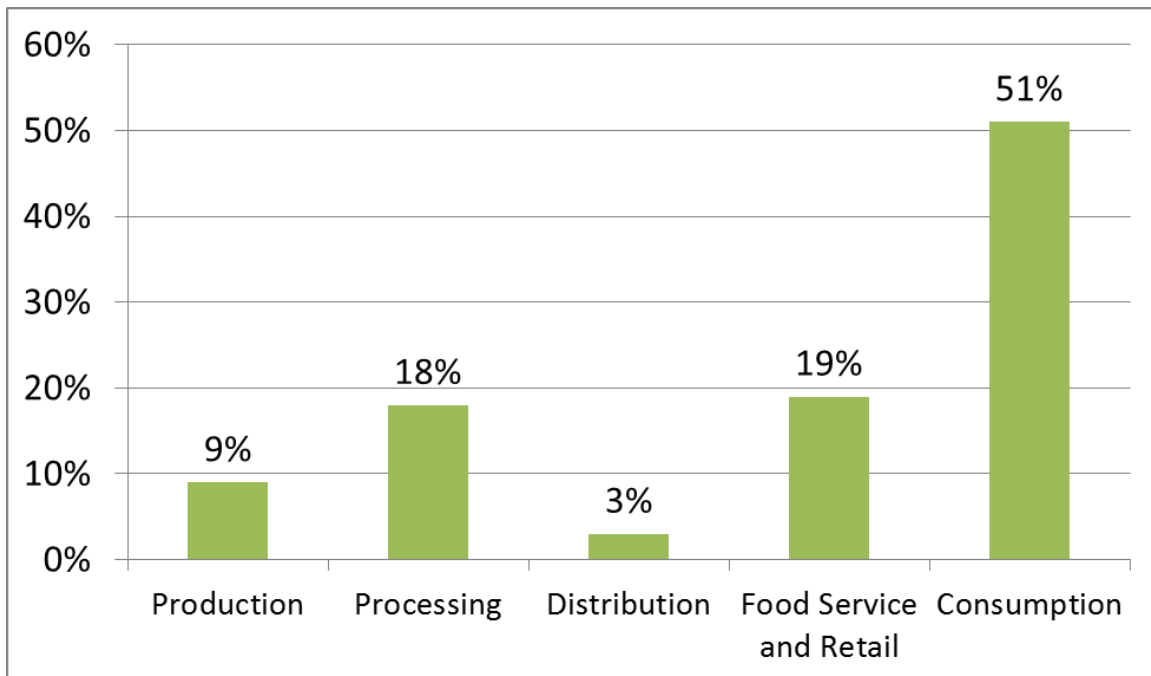


Figure 2.1. Percentage of Food Waste in each stage of the Canadian Food Supply Chain
Data used from Gooch et al., 2010

In 2010, approximately 35% of Metro Vancouver's municipal solid waste stream was made up of compostable organics and the majority of this was made up of food waste (EBA, 2012). Single and multi-family residences in Metro Vancouver have the highest percentage of food waste in their garbage – 39% and 32% respectively (TRI Environmental Consulting, 2011). Businesses and institutions in Metro Vancouver

generate approximately 40% of overall food waste in the region (Metro Vancouver, 2013).

2.2. Consequences of Generating Food Waste

2.2.1. Food Waste Harms the Environment

Most of BC food waste goes into landfills where it decomposes and produces methane gas which is a greenhouse gas 21 times more potent than carbon dioxide (Environment Canada, 2013). The estimated carbon footprint of global food waste is about 3.3 billion tonnes of carbon dioxide equivalent which makes food waste the third top GHG emitter in the world, after the country emitters – China and the United States (FAO, 2013, p.6). Food that is produced and then wasted occupies about 30% of the world's viable agriculture land space and uses up a vast amount of water that is equivalent to the yearly water discharge of the Volga River in Russia (FAO, 2013, p. 6). Agriculture's environmental footprint also contributes to negative environmental externalities such as methane emissions, soil erosion, ground water contamination, and air pollution (Buzby and Hyman, 2012 as cited in Value Chain Management, 2012). Food waste increases GHG emissions and the unnecessary waste of water and resources which could be avoided by reducing the generation of food waste.

2.2.2. Food Waste and Food Banks

Disposing of edible food is socially unjust when there are high rates of food insecurity locally. There is no good reason to throw away perfectly edible food when people are suffering from hunger. Income data from Statistics Canada shows that BC, in 2011, was home to highest percentage of low income people and children in Canada (CANISM, 2011Table 202-0802). BC food banks help approximately 94,000 people per month and 30% are children (Food Banks Canada, 2013). Due to the number of individuals and families facing poverty, charitable organizations in our region face challenges meeting the demand for quality, nutritious food. Only 10% of surplus food is recovered and donated in the United States and while I cannot get specific figures for

Canada, I expect similarly low rates of food recovery and donation in our region (Gunders, 2012, p. 14).

2.2.3. Food Waste is a Waste of Money

Food waste means consumers and businesses spend more money on food purchases and disposal costs than would be the case if less waste occurred. The global economic cost of food waste in 2007 was estimated to be approximately 750 billion US dollars (FAO, 2013, p.8). Canada alone wastes \$27 billion annually on food that is produced but not consumed (Gooch, et al, 2010). It is estimated that individual Canadians could save approximately \$400 a year and an average household of four could save about \$1600 a year by reducing their food waste (FarmFolk CityFolk).

2.3. Causes of Food Waste

2.3.1. Institutional Factors

The food supply chain includes five main stages: production, processing, distribution, food service and retail and consumption. Food waste in the food supply chain arises from over-production, over-purchasing, inefficient and problematic technology, improper handling, storage, and transportation, as well as a general lack of coordination and communication between businesses in all of the stages (Value Chain Management Centre, 2012). Weather fluctuations as well as other factors can cause variations in consumer demand which processors, distributors, and retailers inadequately consider or communicate. The result is an excess supply of food that becomes wasted because the necessary supply adjustments are not made (Value Chain Management Centre, 2012, p.7). Small food retailers experience even higher variability of demand because customers usually visit them for quick, “top-up shopping” (Parfitt et al., 2012 as cited in Value Chain Management Centre, 2012, p.7). This type of demand is much more difficult to predict and is a significant cause of food waste among small retailers.

Best before and expiry dates are also a main cause of food waste. There is a common lack of understanding among consumers on just what those dates mean and a fear of eating something after the date causes much edible food to be discarded. Contrary to popular belief, date labelling is not a reliable indicator of food safety or quality. If properly stored, most food is still fresh and safe to eat after the best before date has expired (Broad Leib and Gunders, 2013, p. 22). Health Canada and the Canadian Food Inspection Agency (CFIA) require all pre-packaged foods that will keep fresh for 90 days or less to have a “best before” date label and reiterate that these labels “do not guarantee product safety”, but instead let the consumer know about the freshness/taste, nutritional quality and potential shelf life of the product (Canadian Food Inspection Agency, 2013). Those products that the manufacturer has confirmed will keep fresh longer than 90 days do not require a best before label. The problem is the consumer does not know how long individual foods with best before dates can be safely kept, and hence are apt to discard safe food. Knowing this, retailers will discard food not sold by its best before date (Broad Leib and Gunders, 2013).

Expiry date labels are different than best before date labels. CFIA states that food with expiry date labels that have passed should not be eaten (Canadian Food Inspection Agency, 2013). It is legal to sell and purchase food products that have expired best before dates, but it is illegal to sell food products that are passed their expiry dates. CFIA also makes very clear that it is best not to eat something you are unsure about and state “If in doubt, throw it out!” (Canadian Food Inspection Agency, 2013). Many consumers are unaware of the differences between best before and expiry date labels and the “if in doubt” attitude may be leading to unnecessary food waste due to a lack of education (Broad Leib and Gunders, 2013, p. 20). Date labelling on food also impacts food recovery and donation. The donation of food with an expiry date of any kind cannot be provided to food bank clients because of strict food safety standards that mistakenly rely on date labelling to determine the safety and quality of food (Broad Leib and Gunders, 2013, p. 22). Food retailers are unable to sell or donate food and drinks that have past due best before dates even though the food may be perfectly fine to consume.

2.3.2. Behavioural Factors

Causes of food waste in the home relate to over-purchasing food, lack of meal planning and preparation, not eating left-overs, and a fear of eating food past its date label. Consumers are also unaware of the large amounts of food they are continually wasting. In a survey conducted in the United Kingdom, in 2007, 90% of people answered they only wasted “some”, “a small amount”, “hardly any” or “none” of their food (WRAP, 2007, p. 7). WRAP explains this could not possibly be accurate because:

“...the figures don’t stack up. If that’s true, the other 10% of us must be wasting almost all the food we buy, given the 6.7 million tonnes that we collectively generate” (WRAP, 2007, p. 7).

Most people do not keep track of the amount of food they waste. WRAP had 300 people keep a diary of the food they wasted for one week and because they started to pay attention to how much they wasted, 2/3 of those people found they wasted more food than they originally thought (WRAP, 2007, p. 7).

Consumer behaviour also impacts how the food industry does business. Large food retailers purposely over-order to ensure their shelves and food displays look very full because they have found that doing so is more appealing to customers. The food that is not sold is viewed as a small cost of doing business (Gunders, 2012). Consumers have high quality standards and often base the purchase of fruits and vegetables on their appearance so it is only the perfect looking food that goes to market. The fruits and vegetables that are edible, but less attractive are not sold and often are discarded. The food service sector, which constitutes restaurants, hotels and caterers, wastes food because of their quality standards and in some instances a strict menu that cannot be changed to include left over food (Gunders, 2012, p. 11). Additionally, over-preparing and over-serving by caterers and restaurants that have buffets contribute to the waste of perfectly good food.

2.4. Regulatory Framework of Waste Management

The regulatory context of waste management in British Columbia highlights the current regional policy directives regarding food waste. Waste management strategies

that have been successful in fostering pro-environmental behaviour, such as recycling, offer insights into what types of policies would be effective in changing food waste behaviour.

2.4.1. British Columbia

The British Columbia Ministry of Environment delegates authority of waste management operations to regional districts in the province under the *Environmental Management Act*. Each regional district is required to develop a provincially mandated sustainable waste management plan which becomes the region's regulatory document for long term solid waste management planning and operations (Metro Vancouver, 2010, p. 11). Municipal governments are required to work collaboratively with their respective regional district to fulfil the solid waste management plan and are responsible for regulating solid waste collection, recycling, and composting programs in their communities.

Composting organic waste has increased in municipalities across BC because it is an effective way to divert organics from the landfills and reduce GHG emissions. Food waste makes up the largest portion of compostable organic material in the waste stream and is a more sustainable way to process the food waste that is generated than putting it in landfills.

2.4.2. Metro Vancouver

Metro Vancouver's most recent waste management plan was approved in 2011 and is called the *Integrated Solid Waste and Resource Management Plan* (ISWRMP). Two important objectives of the ISWRMP are to reduce the overall amount of solid waste generated within Metro Vancouver and to increase the region's diversion rate of compostable and recyclable materials. Outlined in the plan is a diversion target which requires Metro Vancouver to increase its average diversion rate from 55% to 70% by 2015 (Metro Vancouver, 2010, p. 5). To help achieve this target, ISWRMP specifies the implementation of a regional landfill ban on compostable organic material by 2015. The regional government has already begun to collaborate with businesses and member municipalities in the region to set up compost programs and infrastructure. Once the

ban is fully implemented, Metro Vancouver municipalities will be required to report on their tonnage of diverted organics every year. Everyone within Metro Vancouver will have to comply with the ban.

The ban may also impact food waste reduction as well as diversion. Source separation of waste has been shown to have an impact on reducing waste because it forces people to pay attention to the amount they are wasting. Businesses will have an incentive to reduce their food waste to save money. Food recovery and donation could offer an additional solution that will cut costs by avoiding disposal fees. However, there is a concern that the ban could create a scenario where food recovery agencies become a dumping ground for surplus food that is not good quality and then these agencies are left with the disposal costs.

2.4.3. City of Vancouver

The City of Vancouver's Greenest City Action Plan (GCAP) also includes sustainable waste management goals. Specifically, the GCAP aims to reduce solid waste to the landfill or incinerator by 50% from 2008 levels by 2020 (City of Vancouver, 2012, p. 35). Increasing organics waste diversion through composting is the main strategy in the GCAP to increase overall solid waste diversion. Similar to Metro Vancouver's policy directive, processing food waste is the focus rather than reducing the generation of food waste.

2.5. Preventing Food Waste at the Source

The objective of food waste prevention policies is to prevent food waste at the source which will fulfill the ultimate goal of reducing the overall quantity (usually measured in tonnes) of food waste generated. Reducing waste is more sustainable than reusing it or recycling it. Food waste prevention policies and programs are increasingly common throughout Europe and the United States and are nearly non-existent in Canada. However, the existence of government waste prevention activities is still very recent and, as a result, data is limited (BIO Intelligence Service, 2010, p. 112).

The BIO Intelligence Service is an environmental research agency that was formed in 1989 and provides consultant services to a range of government authorities, institutions and companies throughout Europe. The organization has much expertise and experience in analysing environmental policy impacts. Notably, the BIO Intelligence Service conducted a large study on food waste in the European Union. Their report provided an analysis of the main causes of food waste and suggested policy alternatives to address them. In this report, The BIO Intelligence Service (2010) maintains that recycling waste policy, focused on the treatment of waste to divert food waste from the landfill, will not be effective in reducing the generation of food waste. Instead, they suggest the European Commission should focus on developing food waste prevention policies. Their research demonstrates the negative environmental consequences from food waste will continue to increase with population growth. As such, they argue it is vital to develop, "...successful long-term pan-EU waste prevention activities securing notable behaviour change in the way people buy and use food..." (BIO Intelligence Service, 2010, p. 121).

Most policy directives aimed at sustainable waste management begin with overarching principles which specify waste reduction as an important priority. Food waste reduction could easily be included in these general goals or in Metro Vancouver's "Zero Waste" initiative for example. However, general principles to reduce all waste are not nearly as direct in addressing the specific problem of food waste as evidenced by the US Environmental Protection Agency's Food Recovery Hierarchy pictured below.



Figure 2.2. Food Recovery Hierarchy

Source: United States Environmental Protection Agency (EPA)

Reducing food waste at the source is clearly described in the diagram as the most desired policy option with food donation as the second most important option. The US EPA has created a specific policy direction for sustainably dealing with the food waste problem which this study uses as the basis for concentrating on food waste prevention and food donation.

The most common types of food waste prevention policies are: awareness campaigns which could include informational tools such as websites, handbooks, and guidelines; training programs to teach food industry staff food waste prevention best practices; research to standardize food waste measurements and prevention methodologies; standardized date labelling for food; and regulated food waste reduction targets (BIO Intelligence Service, 2010, p. 91-92). European countries that have a strong policy directive for food waste reduction, such as the UK, have implemented a number of these policies in a portfolio of food waste prevention initiatives.

2.6. Waste Management Strategies to Foster Behaviour Change

In this sub-section, I examine research that demonstrates a connection between consumers' awareness of environmental issues and their choice to participate in pro-environmental behaviours, such as recycling. This research is relevant to my analysis because reducing food waste will require an increase in pro-environmental behaviour among consumers and retailers to waste less food.

The Organization for Economic Co-operation and Development (OECD) is concerned about the high rate of growth of municipal solid waste generation in OECD countries and argue it is a difficult issue that needs to be addressed (OECD, 2011). Municipal solid waste generation continues to increase in municipalities across BC, including Vancouver, and is estimated to increase by 17.5 percent by 2025 (British Columbia, Ministry of Environment, 2013). The BC Ministry of Environment (2013) shares a similar concern to the OECD that this will undoubtedly increase disposal costs for municipal governments because more infrastructure will be required to handle the additional waste. These costs are unnecessary because much of municipal solid waste generation could be reduced by diversion strategies such as individuals reducing their waste at the source, or recycling (British Columbia, Ministry of Environment, 2013). Understanding how individual behaviours impact waste generation is imperative when designing effective policies to increase the prevention and recycling of waste.

In 2008, the OECD conducted a survey of over 10,000 households in Australia, Canada, Czech Republic, France, Italy, Korea, Mexico, Netherlands, Norway and Sweden (OECD, 2011). The purpose of the survey was to assess the impacts of environmentally friendly policy measures on household behaviour and provides a useful contribution to government policy. Household decision making regarding energy and water use, organic food consumption, transportation choice, and waste prevention, recycling, and generation were the five policy areas included in the study. The OECD's findings pertaining to waste prevention, recycling, and generation highlight key strategies that are important to consider when developing policies to reduce food waste.

The OECD survey found the higher respondents ranked their concern of environmental issues by selecting “fairly concerned” or “very concerned” the lower their waste generation was (OECD, 2011). The OECD study (2011) concludes that governments should develop targeted educational campaigns to increase people’s environmental awareness and educate them about the environmental impacts of consumption choices. Not only will this improve the political acceptability of policies because people will view them as being warranted, but the OECD (2011) argues information and awareness campaigns will ease implementation and cut down on enforcement costs. Although the OECD study did not address food waste prevention directly, we can infer that individuals will be more likely to minimize their generation of food waste if they are made aware of the large amounts being wasted and the significant negative consequences of food waste.

Chapter 3. Food Recovery and Donation

This chapter covers the context of local food recovery and donation programs as well as the regulatory framework that impacts them. Available research shows there is an opportunity to expand recovery and donation programs in Vancouver. Additional food recovery and donation programs could capitalize on the quantity of edible surplus food that exists to feed the hungry and divert food waste from the landfills. However, a number of challenges would need to be overcome in order to expand the food recovery infrastructure. I provide a discussion of these challenges at the end of the chapter.

3.1. Local Food Recovery and Donation Activity

The following organizations run successful food recovery and donation programs within Metro Vancouver and the Fraser Valley. They are evidence of the positive impact such programs can have on reducing food waste and feeding the hungry. Also, Quest Food Exchange and the Greater Vancouver Food Bank have the largest food recovery and donation programs in Vancouver and are important stakeholders to consider when designing food recovery and donation policies.

Quest Food Exchange

Quest Food Exchange is a non-profit food recovery and donation organization in Vancouver, Surrey, and Burnaby. Their mandate is to “Reduce Hunger with Dignity”. Its volunteers recover food from food businesses across the Lower Mainland and distribute it to local agencies who feed the hungry. In 2012, they donated \$5 million worth of food and prevented 4.4 tonnes of carbon emissions. Their program requires extensive volunteer hours to facilitate. In 2012, they had almost 19,000 volunteer hours donated (Quest Food Exchange, 2013).

Greater Vancouver Food Bank Angel Food Runners

The Angel Food Runners of the Greater Vancouver Food Bank Society recover perishable food from restaurants, caterers, grocers and wholesalers in Vancouver and then deliver it to agencies that feed the hungry. Pick-up times and agreements are pre-arranged with food bank staff and the donors. The food runners use refrigerated trucks and drop off the food they recover in the same day and the program runs every day of the week. Annually, the Angel Food Runners recover 870,000 pounds of food that would otherwise be discarded and uses that food to provide meals to 1.25 million people (Greater Vancouver Food Bank, 2012).

Fraser Valley Gleaners Society

The Fraser Valley Gleaners Society is a non-profit, non-denominational Christian organization that recovers local surplus vegetables and apples from greenhouses, growers and frozen food processors in the Lower Mainland. Volunteers pick up unsold vegetables and apples that would otherwise be discarded due to being undersized and having small blemishes. Volunteers dehydrate the vegetables and apples to make dried soup mixes and dried apple snacks which are donated to people who suffer from hunger in 40 countries around the world. The Fraser Valley Gleaners do not donate in North America. Each bag of soup mix provides 100 servings of soup and they donate a total of ten million soup servings each year (Fraser Valley Gleaners, 2013).

3.2. Opportunity for the Expansion of Food Recovery and Donation

Unfortunately, empirical evidence regarding the total quantity of surplus food that exists and the resulting gap between the quantity that could be recovered and what currently is, has not yet been quantified. Additionally, data regarding the total number of Vancouver food businesses that currently donate their surplus food is also not available. However, preliminary research conducted by EBA (2012) consultants for Metro Vancouver estimates the food recovery and donation programs in Vancouver only recover a small portion of the total amount of surplus commercial food that is generated (EBA, 2012, p. 42). Their Recycling Market Study (2012) highlights food recovery and

donation as a way to divert food from the landfills and argue there is an opportunity to increase the quantity of food that is currently being recovered (p. 42). EBA notes that a lack of cold storage and limited resources are significant barriers to expanding food recovery and donation (EBA, p.42). A more fulsome discussion of the challenges of increasing food recovery and donation in the region is provided in the following section.

3.3. Regulatory Framework

This section describes BC's strong regulatory foundation for food recovery and donation. The literature demonstrates this framework is essential for the expansion of food recovery and donation policies; especially, BC's creation of a law that officially promotes and legalizes food donation and protects food donors from potential liability. The following regulatory measures assist in making food recovery and donation a safe and beneficial activity for all parties involved.

3.3.1. Food Donor Encouragement Act

In 1997, the government of BC enacted the *Food Donor Encouragement Act* to increase food donation in the province and divert food waste from the landfill (Hartley, Hansard 1997). Food banks were very supportive of the legislation and had been lobbying for it for some time (Hartley, Hansard, 1997). The government and food banks were hopeful that the act would significantly increase food donation to local food banks because it reduced the liability to food donors and to those who distributed donated food to the public.

The *Food Donor Encouragement Act* has three sections. The first two sections are entitled "Liability of Donor" and "Liability of director, agent, etc." and are aimed at specifically protecting volunteers, directors, employees of a corporation, or any person who donates or distributes donated food. The legislation stipulates these people cannot be held liable for damages, if someone gets injured or dies from consuming their donated food, unless:

“(a) the food was adulterated, rotten or otherwise unfit for human consumption, and

(b) in donating or distributing the food, the person intended to injure or to cause the death of any person who consumed the food or acted in reckless disregard for the safety of others” (British Columbia, 1997, Section 1)

The third section of the Act stipulates the legislation does not protect those people from liability who distribute donated food for a profit. There are businesses which take surplus food from the food industry and then sell it at a reduced price.

When this Act was debated in the legislature, the Attorney General explained the purpose of the policy was not to lower the protections for those who consume donated food, but to make those who could donate and provide donated food feel more comfortable in doing so (Dosanjh, Hansard, 1997). Due to this Act food donors and charitable agencies in BC do not need to worry about being held liable for any damages as long as the food they donate or distribute is not done with malicious or reckless intent and is safe to eat.

There is a lack of data on whether the Act has increased food donations since its implementation. Informal discussions at a food waste conference and community meeting suggest the Act may not be well known by many in the restaurant and retail industry.¹ The US has a similar law protecting from liability those who donate food to a non-profit agency. It is called the *Bill Emerson Food Donation Act* which became law in 1996. Research shows that business awareness of the law is still quite low and some businesses remain skeptical of the depth of its protections (Gunders, 2012, p. 14).

The BC *Food Donor Encouragement Act* opens the door legally to more food recovery and donation in the province. However, the Act is not enough to substantially increase food recovery and donation because there are other challenges to food donation beyond liability (Gunders, 2012, p. 12).

¹ I had the opportunity to discuss food waste issues with various stakeholders when I attended the Metro Vancouver’s Zero Waste Conference on October 16, 2013, which had a focus on food waste, as well as the Metro Vancouver Sustainability Community Breakfast, “Managing Food Waste from Food Businesses” on November 13, 2013.

3.3.2. BC Food Premises Regulation

According to the *BC Food Premises Regulation* in the *Public Health Act*, local health authorities are responsible for the regulation of food banks and soup kitchens and monitor food donation activities. Health inspectors ensure food safety requirements are met by both donors and food recovery agencies that prepare donated food for their clients. The regulations make clear that previously served food cannot be donated (British Columbia Ministry of Health, 1999, Section 15). The correct temperatures for various types of potentially hazardous food and the proper storage and transportation of this food are outlined in Section 14 of the regulations (British Columbia, Ministry of Health, 1999, Section 15). Those recovering food and serving it would need to ensure these regulations are strictly adhered to.

3.3.3. Food Safety Guidelines for Food Banks and Soup Kitchens

Additionally, the BC Centre for Disease Control (BCCDC) has developed *Food Safety Guidelines for Food Banks and Soup Kitchens* as a tool to help food recovery agencies train staff on how to properly manage food safety issues related to donated food.

The *BC Food Premises Regulations* and the *Food Safety Guidelines for Food Banks and Soup Kitchens* help to ensure that people who receive donated food are receiving the same protections as the rest of the public when being served food. Food donors who have built relationships with food banks and soup kitchens will be aware of their responsibilities when donating food, but new food donors may require additional education and information on what they can donate and how to do it responsibly. For example, new donors may not be aware of their ability to donate perishable food to recovery agencies as long as food safety protocols have been followed. Or new donors may not realize that food banks are currently moving away from accepting junk food.

3.4. Challenges of Food Recovery and Donation

As previously mentioned, a variety of barriers would need to be overcome so food recovery and donation could evolve into a typical business practice of the food

industry. Agencies that recover food are often staffed by volunteers and lack adequate staffing capacity, proper refrigerated transportation with enough space to pick up flats of food, and enough onsite storage space (Gunders, 2012, p. 14).

Businesses do not want to be responsible for managing food recovery operations and want surplus food picked up right away because they also lack the space to store it (Sherman, 2003). Since food recovery agencies are primarily run by volunteers, their schedules are often flexible and cannot always be relied on to pick up surplus food when businesses call to donate. Businesses are also concerned about whether they would be held liable if someone suffered damages from eating the food they donated. As discussed, many businesses are still unaware of the *BC Food Donor Encouragement Act*. Or, they are not convinced that even if there was no negative legal outcome involving their donated food, their business could be adversely affected. For example, consumers may remember the negative publicity and decide not to buy from that store. Businesses are thus often more concerned about bad press than being held liable (Gunders, 2012, p.14). Businesses also may be willing to donate their surplus food, but are unaware of the number or whereabouts of agencies ready to accept recovered food. Currently, there is not enough coordination and communication between those who are in need of more donated food and those who consistently have quality surplus edible food.

Local food banks and soup kitchens in Vancouver have identified challenges with providing nutritious, quality food for their clients and often have to purchase fruits and vegetables because these are items that are not often donated. This issue is exacerbated in the Downtown Eastside where 77% of food retailers do not sell fresh produce (Quest Food Exchange, 2013). Increasing food recovery could address this issue because fruits and vegetables make up the largest percentage of retail food waste. In 2009, Canadian consumers and retailers wasted about 172 kg of food per capita and about 70% of that was fruits and vegetables (Value Chain Management Centre, 2012, p. 4). There is a lack of data on just how much surplus edible food Vancouver's commercial food industry could donate, but given the large amount of waste of fruits and vegetables, the amounts could be significant.

Food Banks in Vancouver have begun a process to reject certain types of unhealthy junk food. This is a barrier to food recovery as there are restaurants and retailers that may want to donate all of their surplus edible food, whether deemed junk food or not. As previously noted, food recovery agencies find it difficult to obtain nutritious and healthy foods for their clients. However, by rejecting specific food, they are opening a door to more healthy food and closing one that will reduce more food waste.

Chapter 4. Methodology

My methodology consists of background research, case study analysis, and semi structured interviews that I employ for both categories of my research that address food waste – food waste prevention and food recovery and donation. This study builds on previous research I conducted as the Food Waste Policy Research Intern for the Society Promoting Environmental Conservation (SPEC) and the Vancouver Food Policy Council (VFPC) during my summer co-op in 2013. I researched the problem of food waste, food waste prevention, food recovery and donation, and neighbourhood composting. The background knowledge I obtained from the experience and the contacts I made contributed to the research in this study.

4.1. Case Studies

Policy on food waste prevention and food recovery and donation is very new. There are only a small number of comprehensive case study examples to choose from and I selected my cases according to which ones had the most relevant, thorough and available public data. The purpose of the case studies is to identify existing policy and program activities in other jurisdictions that have been successful in reducing food waste.

4.2. Interviews

I conducted four semi-structured interviews to collect primary data from knowledgeable individuals in Metro Vancouver. The interviews were guided by topics of discussion that are listed in the interview results section. I use the data to gain insights on food waste prevention and food recovery/donation policies that were identified in my research. The interviews complement my secondary data and fill in any information

gaps on the local context of consumer and food service and retail sector food waste and the practicality and/or challenges of potential policy options.

4.3. Limitations

Food waste prevention policies are a recent development so data is limited and very new. Some programs have only been implemented in the last year and progress has not yet been tracked. Measuring avoidable food waste is also a difficult task which many governments have not undertaken. Most food waste data comes from the Waste and Resources Action Programme in the UK, the European Commission, and the US Environmental Protection Agency. Estimates from these jurisdictions are used to infer similar quantities of food waste and food recovery and donation here. It is a limitation there is only one study from Canada that has attempted to quantify our overall food waste. This study was conducted by the Value Chain Management Centre and the George Morris Centre (2010).

Existing case study data of publically funded food recovery and donation programs is extremely limited. There is only one comprehensive case study of a successful government recovery and donation program that I came across in my research which was Metro Oregon. It is a limit of my study that Metro Oregon is the only case study I can assess to determine the policy implications and applicability of government food recovery policies in Metro Vancouver.

Chapter 5. Case Study Analysis: Food Waste Prevention

This chapter covers case studies of successful food waste prevention policies from the United Kingdom (UK) and the United States (US). The cases provide insights into the root causes of retail and consumer food waste in these countries and provide evidence of successful policy interventions to address them. They also highlight the benefits and challenges of the policies and the administrative and political processes that enabled their implementation. Evidence from these case studies informs the development and evaluation of potential policy options to reduce food waste.

5.1. United Kingdom

5.1.1. Regulatory Background

As a Member State of the European Union (EU), the UK is required to follow waste management policies outlined in the EU Waste Framework Directive. EU Member States must develop their own waste plans in accordance with the directive's waste management hierarchy which prioritizes waste prevention. The waste plans must also ensure waste is recycled or disposed of in a way that does not pose any threats to human health or the environment (Department for Environment, Food & Rural Affairs, 2013, para. 1).

The European Commission is reviewing its European Waste Management Targets and conducting large scale consultation with all member states. The EU is looking at implementing legally-binding food waste reduction targets which all member states would be required to meet. The target is to reduce food waste by 50% by 2020 (European Commission, "5.1 Addressing Food", 2011). The UK does not support the legally-binding targets because they do not feel there is sufficient evidence to support Europe-wide targets (UK Government, 2013, p. 1). They argue member states are all at

differing levels of success in reducing waste and some are not even on track to meet previous targets.

The UK is also much more supportive of voluntary targets rather than regulatory targets. They argue their voluntary approach to reducing food waste has been as, or more effective than a regulatory target and has helped improve business productivity and success. They state they would need to see evidence which demonstrated that “voluntary action would not deliver the required outcomes” before they supported mandatory targets (UK Government, 2013, p. 15). The UK’s current approach to reducing food waste includes a campaign called “Love Food Hate Waste” that is discussed in more detail below and voluntary agreements with the food industry that sets food waste reduction targets. These initiatives do not force behaviour change, but promote it through education with a focus on financial and environmental benefits.

The Department for Environment, Food & Rural Affairs (DEFRA) is the department responsible for managing waste in the UK and their waste prevention objectives align with the EU directives. DEFRA’s waste policy is to first and foremost minimize the generation of waste and become zero waste by 2020. Food waste is the key waste stream that DEFRA aims to reduce and is a significant priority outlined in their *Review of Waste Policy for England (2011)* and *The Waste Prevention Programme for England (2013)* (Department for Environment, Food & Rural Affairs, “Policy: Reducing and Managing Waste”, 2014). Reducing food waste will also help the UK meet its greenhouse gas reduction targets – 34% by 2020 and 80% by 2050 which is outlined in their Climate Change Act.

5.1.2. Partnerships

Waste and Resources Action Programme

The Waste and Resources Action Programme (WRAP) is a non-profit organization that works closely with DEFRA. It is funded by all of the governments in the UK to conduct research and develop policies on reducing waste. WRAP was initially developed in 2000 to combat the lack of recycling in the UK and create a market for recycled materials (WRAP, “About WRAP”, 2014). Since 2000, WRAP has expanded its mandate to tackle all waste streams and assist the UK in meeting its zero waste goals.

The organization focuses on “four strategic areas” which are: “1) food waste reduction, 2) resource efficient built environment, 3) sustainable products, and 4) waste as a resource” (WRAP, “Four Strategic Goals”, 2014).

WRAP partners with businesses, associations, communities, local authorities, and governments to involve them in the development of food waste prevention policies and programs. They also provide individuals with sustainable waste management advice and tools. The organization works with businesses along the food supply chain to establish voluntary commitments and best practices that will help them achieve waste reductions.

5.1.3. Research

In 2007, WRAP conducted a seminal study on food waste which revealed the vast amounts of food the UK was wasting. Approximately 8.3 million tonnes of food was discarded by households each year and 60% of it was avoidable (WRAP, “Information Sheet”, 2013). Their report also discussed the negative implications of food waste, the significant lack of awareness of the issue, and who the major generators of food waste were and why. WRAP estimated the UK’s total food waste per year was about 15 million tonnes which amounted to the equivalent carbon dioxide emissions of 1 in 4 UK cars on the road (WRAP, “Information Sheet”, 2013).

WRAP continues to research food waste and track their progress in reducing it. Their food waste research is used by the UN, organizations, governments, and researchers throughout the world. WRAP believes in evidence based policy making and that is why they continually work to make their food waste data as robust and up to date as possible.

5.1.4. Initiatives

Love Food Hate Waste

Shortly after WRAP’s initial study on food waste, it developed Love Food Hate Waste in 2007. Love Food Hate Waste is an educational and awareness campaign targeting households. The campaign’s strategy is to inform consumers of the large

quantities of avoidable food waste and provide them with useful ways they can combat it individually to their own financial benefit and to help the environment. The campaign highlights the money households will save when they reduce their food waste because they have found this to be one of the most effective incentives for consumers (BIO Intelligence Service, 2010, p.153).

The Love Food Hate Waste campaign has an impressive website targeted at households to help them with meal planning, portion control, grocery shopping tips, food storage and date labelling information, and creative recipes to use left-over food. The campaign website provides the public with the latest WRAP figures on how much food the UK is wasting and shares improvements that have been made. There is also a Love Food Hate Waste app, the campaign is on social media, and advertised on UK radio and television.

Love Food Hate Waste also sells the licence to their brand for £15,000 (about \$27,800 Canadian) to any non-profit or government organization in the world. Purchasing the licence will entitle the organization to use Love Food Hate Waste's website content, logos, materials, and artwork while enabling the purchaser to customize the campaign to their unique region's needs. Two territories in Australia have licenced the Love Food Hate Waste brand.

Consumers are not the only target of Love Food Hate Waste. WRAP argues, "Retailers are extremely influential in our purchasing decisions and will be a key stakeholder in solving the problem of unnecessary food waste" (WRAP, 2007, p. 16). WRAP works with the retail and hospitality food industry to provide them with the necessary tools, tips, and messaging to help them promote food waste reduction to their clientele. WRAP also assists businesses to develop their own food waste reduction initiatives that can utilize the Love Food Hate Waste brand.

Table 5.1. Love Food Hate Waste Campaign Costs

Annual Costs	In Pounds (£)	In Canadian Dollars (\$)
Research	600,000	1,100,000
Annual Running Costs		
Advertising	1,000,000 – 1,500,000	1,800,000 – 2,700,000
Public Relations/Events	200,000 – 400,000	370,000 – 740,000
Website/Related Material	200,000	370,000
Total Annual Operating Costs	2,000,000	3,700,000

Source: BIO Intelligence Service, 2010

Since Love Food Hate Waste’s implementation in 2007, the UK has reduced about 1.1 million tonnes of avoidable food waste (21% reduction from 2007), saved UK households about £3.3 billion, saved UK waste management authorities about £85 million, reduced greenhouse gas emissions by 4.4 million tonnes of CO2 equivalents, and prevented the waste of a billion tonnes of water (WRAP, 2012, p. 5-6). The campaign’s success is noted internationally and has become the premier model for a food waste awareness campaign. Love Food Hate Waste has effectively changed consumer behaviour to waste less food in a relatively short amount of time.

Courtauld Commitments

Courtauld Commitment 1 (2005-2009)

The campaign’s success can also be contributed to the large buy-in from the retail industry to voluntarily participate in the campaign and do their part to make it easy for consumers to reduce their waste. In 2005, WRAP partnered with the UK grocery sector to reduce overall grocery and household food and packaging waste. Over 40 grocery retailers, manufacturers, brand owners and suppliers, signed a voluntary agreement with WRAP to achieve a food waste reduction target. The commitment’s name “Courtauld” was given because the agreement took place in the Courtauld Gallery in London during a Ministerial event. The purpose of the parties agreeing to a reduction target was to help meet the UK’s zero waste and climate action objectives. Also, the commitment is pivotal for providing businesses with a plan to cut waste and costs, reduce their carbon emissions, and improve their overall corporate environmental performance, resource efficiency and competitiveness (WRAP, “Courtauld Commitment

3”, 2014). WRAP is responsible for the agreement and it is funded by the Westminster, Welsh, Northern Ireland, and Scottish governments. The signatories are responsible for measuring and reporting their food waste with support from WRAP.

The negotiated and agreed upon target was, “To help reduce the amount of food the nation's householders throw away by 155,000 tonnes by 2010, against a 2008 baseline” (WRAP, “Evaluation of Food Waste Target”, 2010, p. 1). The target was surpassed. Between 2005 and 2009, 670,000 tonnes of food waste was avoided because of the coordinated efforts of the retailers, local authorities and Love Food Hate Waste (WRAP, “Courtauld Commitment 1”, 2014). WRAP states, “Courtauld Commitment 1 was a powerful vehicle for change and resulted in real reductions in packaging and food waste, and realised significant commercial savings” (WRAP, “Courtauld Commitment 1”, 2014, para. 9).

Since the successful implementation of the first Courtauld Commitment, there have been two more phases that built upon the first one.

Courtauld Commitment 2 (2009-2012)

Courtauld Commitment 2 garnered more support from the food industry and obtained 53 signatories. The new target was to reduce food waste by 4%, below the 2009 baseline, reducing 270,000 tonnes of food waste each year. The target was very close to being achieved. In 2012, food waste was reduced by 3.7% (WRAP, “Courtauld Commitment 2”, 2014).

Courtauld Commitment 3 (2012-2015)

The third phase of the agreement has set an even more ambitious food and drink waste reduction target. The 52 signatories agree to reduce food and drink waste by 5%, by 2015, from a 2012 baseline. Once this target is achieved, the UK will have successfully reduced UK household food waste by 20% over the course of a decade due to the three phases of the agreement (WRAP, “Courtauld Commitment 3”, 2014).

WRAP points out there is still more work to be done because UK households still waste 7 million tonnes of food waste annually and they want to reduce that further. WRAP is continually expanding its relationships with businesses along the food supply

chain in phase three of the Courtauld Commitment. It has recently developed a similar voluntary agreement to reduce food waste in the hospitality and service sector.

5.2. United States

5.2.1. Regulatory Background

As previously noted, the United States Environmental Protection Agency (EPA) developed a Food Recovery Hierarchy which they use as their policy directive for best practices in managing food waste. Food waste prevention is the highest priority. The US has followed a similar approach to the UK in targeting consumer food waste through educational and awareness campaigns. Their approach has also been to promote behaviour change through voluntary actions rather than legislated mandates. US efforts have not been as large scale as those in the UK and are much more recent, but still offer insights on the success such initiatives can have on reducing food waste.

5.2.2. Partnerships

The EPA has played a significant role in raising awareness of food waste in the US and has partnered with a number of communities to implement small scale pilot projects to reduce household generation of food waste. In June 2013, the EPA teamed up with the United States Department of Agriculture (USDA) to create a national food waste awareness campaign called the US Food Waste Challenge. Unlike previous EPA challenges, the US Food Waste Challenge is targeting all businesses in the US food chain, such as producers, processors, distributors, retailers, NGO's, all levels of government, and other food industry groups (USDA, "Frequently Asked Questions", n.d.). The main goal is to have 400 participants in the challenge by 2015 and 1,000 by 2020. Participants join the challenge by listing the activities they plan to take to reduce, recover or recycle food waste. The challenge is about sharing information regarding food waste best practices and guidelines. It does not set agreed upon food waste reduction targets or track quantities of food waste reduced. Notably, the challenge's activities are not just focused on reducing food waste at the source and also do not include consumers.

5.2.3. EPA Initiatives

Food: Too Good to Waste Challenge

Food Too Good to Waste was developed in 2011 at the West Coast Climate and Materials Management Forum. There were over 25 state, city, county, and government partners in attendance and they worked together for the purpose of creating a residential food waste prevention program. The pilot project used the “Community Based Social Marketing Framework” as their main approach to foster individual consumer behaviour change. The framework included the following principles: remove any barriers to participation; target specific populations; make new norms noticeable and connect them to community values; and provide personal, consistent contact for more effective engagement (West Coast Climate and Materials Management Forum, 2013, p. 4-5). The forum found the pilot served double duty. It supported behaviour change to waste less food and was used as a measurement tool for data on the quantities and types of food waste in communities (West Coast Climate and Materials Management Forum, 2013, p. 7).

The targeted households were required to track their food waste generation for about two weeks. The pilots that provided households with scales to weigh their food waste had higher participation rates (West Coast Climate and Materials Management Forum, 2013, p. 8). Other tools provided to participants included a shopping list template to promote more efficient meal planning, produce storage guide, and “eat me first” prompt materials for the fridge (West Coast Climate and Materials Management Forum, 2013, p. 9). Food Too Good Too Waste has a website which includes similar messaging to the UK Love Food Hate Waste campaign although it is not as visually appealing, user friendly, or comprehensive. However, it does outline the basics of the food waste problem, highlights practical meal planning and storage tips, and promotes financial savings and environmental benefits from reducing food waste.

King County, Washington participated in the Food: Too Good Too Waste pilot. Their challenge targeted 110 families whose children were enrolled in grade 4 in a local elementary school in Fall City. The challenge was designed to raise awareness about food waste and get families to track how much food they waste in an effort to reduce that amount. The pilot was a success; on average families who kept up with the challenge

for the entire five week duration reduced their generation of food waste by 28% (“Food: Too Good Too Waste Pilot Descriptions and Findings”, n.d., p. 2). The families and students were surprised by how much food they wasted in the base weeks. They were equally surprised at the vast improvement they made in reducing their food waste and saving money once they started to use the simple tools and tips provided by the program (“Food: Too Good Too Waste Pilot Descriptions and Findings”, n.d., p. 2). However, a key observation from the pilot was that tracking and weighing food waste was burdensome for some families. Additional incentives might be needed along with more robust messaging on why reducing food waste is important (Food: Too Good Too Waste Pilot Descriptions and Findings”, n.d., p. 2).

EPA Food Recovery Challenge

Participants in the EPA Food Recovery Challenge include businesses and organizations of all types such as stadiums, schools, universities, and retailers that want to set goals to reduce their food waste and quantify the results. These organizations automatically become members in the new US Food Waste Challenge. However, members of the US Food Waste Challenge would need to track their food waste and progress if they wanted to participate in the EPA Food Recovery Challenge. The Food Recovery Challenge requires participants to track and weigh their food waste using the latest measuring techniques and enter the data into the EPA’s data management system (USDA, “Frequently Asked Questions”, n.d.). Participants in the EPA Food Recovery Challenge obtain free technical assistance from the EPA to set baseline measurements for their food waste and assist in tracking their progress (EPA, “Food Recovery Challenge”, 2014). The EPA Food Recovery Challenge promotes participating in the challenge will save the organization money, will reduce their environmental footprint, and will support their community “by using food to feed people, not landfills” (EPA, “Food Recovery Challenge”, 2014).

Two Intel Corporation Cafés participated in the challenge and used LeanPath to measure their food waste and track their progress. Their experience demonstrates the effectiveness of this type of food waste intervention.

Intel Corporation Cafés and LeanPath

In April 2009, staff at Intel's Jones Farm Café 5 and Ronler Acres Café 3 in Hillsboro, Oregon began tracking their food waste for one year. The goal was to reduce their generation of food waste by 50%, raise awareness among staff and foster behaviour change, and to figure out the main causes of waste in their business (Oregon Department of Environmental Quality and City of Hillsboro, 2010). The project was funded by the Oregon Department of Environmental Quality Solid Waste Program grant, the City of Hillsboro, LeanPath and Bon Appetit.

Pre-consumer food waste was measured by using a computerized food waste tracking software system called LeanPath. Pre-consumer food waste is the avoidable food waste that can occur before food is served to the consumer. It is estimated that pre-consumer food waste accounts for 4-10% of food purchases in high-volume food service businesses (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 1). The main reasons for pre-consumer food waste are fluctuations of the number of customers and menu selections which causes overproduction, over-purchasing and food spoilage (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 2). By tracking the pre-consumer food waste, the businesses hoped the data could be used to "target intervention and improvement practices" (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 3). The Oregon Department of Environmental Quality and the City of Hillsboro were partners because they wanted to test out this type of food waste tracking technology and share the results with other restaurants to assist them in reducing their food waste too.

Staff members were responsible for weighing food waste items before donation or disposal/composting. The LeanPath system provided a touch screen interface which allowed staff to record the type of food, type of container the food was in, reason for the loss, staff member's name and work station. The software would take care of the weight of the food waste minus the container, the date, time, and the estimated value of the loss (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 4). The cafés did not have to add additional staff to assist with the waste tracking and measuring. It only took each employee about 4 minutes per week to weigh the waste

and was estimated to cost less than \$30 a week in labour lost due to the tracking (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 4).

The waste data was used to inform weekly reports on what food was being wasted and why. LeanPath provided a coach to help staff interpret the data and develop best practices. The data allowed the café teams to set new goals for improvement such as “reduce soup waste by 50%” (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 5).

Using LeanPath was a success for the two cafés. Comparing the baseline of pre-consumer food waste in the cafés’, in April 2009 with the new measurement the same week in April 2010, showed they had a combined food waste reduction of 47% (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p. 6). This reduction in food waste resulted in a 13% savings per meal served, or for every \$1 million in food purchases, the cafes gained \$132,000 in savings (Oregon Department of Environmental Quality and City of Hillsboro, 2010, p.7).

5.3. Lessons Drawn from Food Waste Prevention Case Study

The UK and US initiatives highlight the most prevalent food waste prevention policies and programs being used today. The success of their initiatives in reducing food waste demonstrates the ability of “softer” policy approaches (voluntary food waste monitoring and reduction agreements and awareness campaigns) to yield positive results. US research and policy development on food waste prevention is newer, more fragmented than, and not as robust as it is in the UK or the EU. That being said, the US example does confirm findings from the UK and waste management literature that once people start to be aware of how much food they are wasting, they can successfully take steps to reduce it. Therefore, education is vital to food waste prevention. Consumer messaging needs to reinforce the importance of reducing food waste to mitigate the negative environmental and social impacts. Importantly, the UK and the US found cost savings to be the main driver for consumers and businesses to reduce their food waste. Thus, saving money needs to be another key message in food waste prevention

campaigns. The US example also highlighted a unique food waste tracking technology that is important to consider when discussing food waste reduction implementation tools. Having accurate food waste data will be necessary in developing any sort of quantified food waste reduction goal. Additionally, both the US and UK examples demonstrate the need for strong government leadership and support in making food waste prevention initiatives successful.

Although no data or specific case studies could be found on the success of legally binding food waste reduction targets or best practices, they cannot be ruled out as a policy option. Similar environmental targets have been legislated such as greenhouse gas reduction targets and they could be used to inform the effectiveness of regulatory food waste reduction targets. The fact the EU is considering a legally-binding food waste reduction target also lends credibility to such a policy option.

Chapter 6. Case Study Analysis: Food Recovery and Donation

Throughout the literature on food recovery and donation, Metro Oregon's food recovery and donation programs stand out as being one of kind. I could not find comprehensive case data for any other entirely government developed, managed, and publically funded food recovery and donation programs that are still in existence today.

6.1. Portland, Oregon, US

6.1.1. Regulatory Background

Metro Oregon is the regional government in Portland, Oregon in the US and is responsible for the region's waste management. Metro Oregon's *Regional Solid Waste Management Plan* stipulates the region must recover 52,000 tons of organic waste to meet its objectives. To help facilitate greater organics recovery, the *Regional Commercial Organics Work Plan (1999-2002)* was developed by the Regional Organics Work Team. The team consisted of staff from the Oregon Department of Environmental Quality, Metro Oregon, and local governments. The *Regional Commercial Organics Work Plan (1999-2002)* concentrates on food waste prevention, recovery and donation, and diversion because,

“Donation is considered to be the least-cost approach as preventing the generation of the material in the first place removes the need to manage it as a waste product. Not only is donation the highest end-use of food produced, but provides the opportunity to address both waste and hunger issues.” (McGuire, 2002, p. v).

Not only is food donation an effective approach to reducing avoidable food waste, Metro Oregon views it as an effective tactic for tackling their large food insecurity problem. At

the time of their assessment for the need to increase food recovery and donation in the region, Oregon had the highest hunger rates in the US (McGuire, 2002, p. v).

6.1.2. Research

Between 2000 and 2003, Metro Oregon conducted much research on their food recovery and donation infrastructure and investigated the barriers to increasing food recovery and donation in the region. They interviewed and built relationships with numerous food recovery agencies and food businesses to obtain a greater understanding of their needs and issues. Metro Oregon's 2003 study, *Food Waste Prevention And Donation By Businesses And Institutions: Identifying The Barriers And Benefits*, was key in identifying barriers to food recovery and donation and determining the needs of the stakeholders. The study was conducted by Applied Compost Consulting and their contract cost \$40,000 (Tools of Change, n.d., p. 8). The study included a survey of 72 commercial food retailers, food service businesses, and universities. Interviews were conducted with food bank managers and staff, business and trade groups, and food handling regulators.

The study concluded there were five main barriers which prevented greater food business participation in food recovery and donation programs: 1) businesses were concerned about an increased risk of liability by donating food; 2) businesses wanted prompt, efficient collection of their surplus food and perceived donation programs to be inconvenient; 3) some food recovery agencies lacked the capacity to obtain more food donations through relationship building, and/or efficiently collect more food and store it properly; 4) the details of the food recovery and donation program involving end use of the donated food, who's in charge of the program, and collection logistics were uncertain; and 5) the large problem of hunger and food insecurity in the region had a "low public profile" (Sherman, 2003, p. xii). The findings of the study led to Metro Oregon spearheading its infamous food recovery and donation program called *Fork it Over! To Reduce Hunger and Waste* which will be described in detail in the next section.

6.1.3. Initiatives

Food Donation Infrastructure Grants

Metro Oregon began distributing Food Donation Infrastructure Grants in 1999 and found the benefits obtained from the grants far outweighed the costs of the grant program. The purpose of the grants was to build up the capacity of current food recovery and donation activities to enable agencies to collect and store more perishable donated food (McGuire, 2002, p. v). The grants were used to purchase “4 walk-in coolers, 18 reach-in refrigerators, 19 reach-in freezers, 10 outdoor shelter canopies, 2 collection trucks, and 9 months driver salary and volunteer driver gasoline allowances” (McGuire, 2002, p. v). Between 1999 and 2002, \$580,000 in grants was given to food recovery agencies. Approximately 5000 tonnes of additional donated food was estimated to be recovered because of the grants which Metro Oregon estimated would avoid \$650,000 in waste disposal costs (McGuire, 2002, p. vi). Moreover, the recovered food was worth an additional \$17 million to the recipient food banks (McGuire, 2002, p. vi). For every dollar spent by Metro Oregon on food donation, \$31 in benefits was estimated to be produced (McGuire, 2002, p. vi).

Food Donation Awareness

Metro Oregon also found education and outreach efforts assisted in increasing food donation and recovery. They promoted food donation on their website and distributed materials including donation guidelines for businesses on the benefits of food donation, how easy it is to donate, and where to donate. Metro Oregon’s materials reached over 200,000 people, increased 30,000 pounds of recovered food, created partnerships with 28 restaurants, food service business and food recovery agencies, and spurred ten businesses to build relationships with food banks and establish their own food recovery and donation programs (McGuire, 2002, p. vi). The total cost of the outreach materials was about \$8,700 (McGuire, 2002, p. 2).

Fork it Over! To Reduce Hunger and Waste

Fork it Over! To Reduce Hunger and Waste was implemented in 2004 by Metro Oregon and is still active today. The purpose of the program is to connect businesses with surplus food with food recovery agencies, such as food banks. Fork it Over! would

also provide the groups with the resources and assistance to help them implement an efficient food recovery and donation relationship.

To create Fork it Over!, Metro Oregon convened a team of specialists which included the former Director of the Oregon Food Bank, well known food industry personalities, a media outlet and a public relations firm to provide expertise (Tools of Change, n.d., p. 7). The media outlet sponsored public service TV spots which expanded previous food recovery and donation outreach efforts by helping to advertise the program to a larger audience. Metro Oregon also personally consulted with restaurants, cooking schools, and commercial food businesses to obtain “pioneer donors” (Tools of Change, n.d., p. 7). All Fork it Over! donors would sign commitments to donate food on a regular basis and sign testimonials and letters to others in the food industry to promote further participation (Tools of Change, n.d., p. 7). The commitments were voluntary and heavily publicized. They were a way to make the program legitimate and appeal to social norms by expressing that food donation was “safe, simple and the right thing to do” (Tools of Change, n.d., p. 7).

Metro Oregon also got County Food Inspectors to take Fork it Over! promotional materials with them on their site visits to places that served/sold food (Tools of Change, n.d., p. 7). Along with TV advertisements, Fork it Over! developed a website that would help make the connections between businesses and food recovery agencies. Numerous posters, newspaper advertisements and mail outs helped to raise awareness of Fork it Over! as well. Metro Oregon knew from their research that awareness of the opportunity to donate surplus food and awareness of the social benefits of doing so was low. Their program focused a lot on outreach efforts initially and Metro Oregon wanted food donation to be a very easy task for business. They created a Fork it Over! hotline which businesses could phone for information or to sign up. Metro Oregon staff would help businesses with waste audits; and would introduce them to potential recipients of donated food and helped the partners set up a customized food recovery program (Tools of Change, n.d., p. 7).

The cost breakdown for the development and initial implementation of Fork it Over! were as follows:

Table 6.1. Initial Costs of Fork it Over!

Items	Costs in \$
Research	40,000
Marketing firm contract	20,000
Outreach and Media advertisements	10,000
Printing of materials	7,150
Technical assistance from government and sponsors	0 (In-kind)
Total	\$77,150

Source: Tools of Change (n.d). "Case Study Series: Fork it Over!".

Metro Oregon measured its results of the program by annually phoning the food recovery agencies to find out how much food they had been donated. They also monitored how many hits to their website, how many calls to the hotline, and how many businesses were signing up to participate (Tools of Change, n.d., p. 8). Unfortunately, data on the total tonnes of food waste the program has reduced is not available. It would appear that once Metro Oregon determined that for every dollar spent on food recovery and donation, they produced \$31 in net benefits, they have not done more updated assessments. The consensus in the literature, however, is that Fork it Over! has been very successful and increased food recovery and donation in the region significantly.

In 2012, the program was adopted and updated by the Community Environmental Services at Portland State University. In 2011, Metro Oregon was still focused on how they could expand the Fork it Over! program and increase food recovery even more. Their recommendations included:

- Provide funding to help food recovery agencies increase staffing to improve their relationship with food donors and improve their pick-up service
(Annual Cost - \$75,000 to \$150,000 or more)
- Funding a volunteer and transportation coordinator for recovery agencies
(Annual Cost - \$75,000 to \$100,000)
- Update Fork it Over! materials and tools more frequently
(Initial cost \$50,000 and Annually \$30,000) (Metro Solid Waste Advisory Committee, 2011).

However, the Metro Solid Waste Advisory Committee decided not to invest further money into the food donation infrastructure in 2011. Nonetheless, the project costs to expand the program are useful to consider because they address some of the issues that all food recovery programs will most likely encounter. Fork it Over! remains a premier example of a regional government initiative to coordinate and increase food recovery and donation as an effective waste management strategy and a way to combat hunger.

Chapter 7. Interviews

Participants in the semi-structured interviews included staff members from Metro Vancouver and the Greater Vancouver Food Bank and a restaurant professional who has had much experience as a chef, bartender and caterer.² Their comments provide useful insights into the roles of key stakeholders and highlight advantages and drawbacks of food waste prevention awareness campaigns, food waste reduction targets, and food recovery and donation programs. I used broad topics of discussion to guide the interviews in a conversation style. I determined the specific topics to investigate the interviewees' knowledge and experience with food waste and to obtain their perspectives on issues that were raised in my research. The topics of discussion I used in each interview are listed below.

1. Opinions on the food waste problem
2. Current actions taken by your organization to prevent or mitigate food waste
3. Challenges of preventing food waste
4. Knowledge of local food recovery and donation opportunities
5. Barriers and challenges of food recovery and donation
6. Possible solutions to food waste issues
7. Opinions on food waste prevention and food recovery and donation policies used in other jurisdictions

The primary purpose of the interviews is to collect primary data from knowledgeable individuals from Metro Vancouver to gain insights on food waste prevention and food recovery/donation policies that I identify in my case studies and

² Carrie Hightower, Business Services Provider, Sustainable Business Services, Policy and Planning Department, Metro Vancouver, Emme Lee, Metro Vancouver Zero Waste Implementation Research Assistant and Vancouver Food Policy Council Member and Chair of Food Waste Working Group, and Erin Nichols, Manager Community Angel Food Runners, Greater Vancouver Food Bank Society. The restaurant professional wished to remain anonymous.

background research. I use interviews to complement secondary data and fill in any information gaps on the local context of consumer and food service and retail sector food waste and the practicality and/or challenges of potential policy options. A brief summary of the participants' comments are divided by policy category below.

7.1. Participant's Key Points: Food Waste Prevention

- Food Waste prevention is a priority of Metro Vancouver's, but it is a long term goal. In comparison, implementing organics recycling has been more "manageable" and achievable in the short term.
- Food waste prevention was expressed by all interviewees to be an obvious "win" for businesses because it would save them money. They felt the business case just needs to be promoted. Additionally, public awareness of the excessive amounts of food waste is low and all interviewees emphasized the need for cultural change through education on how to reduce food waste.
- The National Zero Waste Council is looking at licensing the Love Food Hate Waste Campaign, but there needs to be collaboration with different partners on establishing the appropriate messaging and the appropriate type of campaign. The interviewee from Metro Vancouver expressed concern that the messaging to consumers needs to be effective, but must be positive. Metro Vancouver has received some backlash over previous waste reduction campaigns and would not want any negative public reaction over a food waste prevention campaign.
- Voluntary commitments to reduce food waste, such as the UK Courtauld Commitments were supported by the interviewees. The staff person from Metro Vancouver stated the "preference is for business to lead their own change", but Metro Vancouver could play a role in collaborating with business to assist them with technology, tools, and could publicize their achievements.
- The restaurant professional stressed restaurant businesses would react negatively to government intervention that included increased regulations.
- Metro Vancouver is aware food waste reduction targets require increased data on business food waste generation. They are working on LeanPath pilots with a few businesses to test out how the software works at measuring and tracking waste.

- Interestingly, the interviewee from the restaurant business explained corporate restaurants and professional chefs already make concerted efforts to reduce food waste to save money. The interviewee suggested experienced chefs should already know how to incorporate left overs into new meals, such as soups and stews. From his experience, he saw that small, privately owned restaurants generated larger quantities of food waste due to a lack of education and experience of how they could cut down their waste.
- The interviewees felt government interventions would be effective if they targeted businesses with food waste prevention tools, technology, and education.

7.2. Participant's Key Points: Food Recovery and Donation

- Metro Vancouver previously partnered with Farmfolk Cityfolk on a Craig's List for food recovery and donation called Shared Harvest. The purpose was to provide a centralized website to link those who had excess food with those who needed quality, perishable food. Food businesses had the opportunity to post what types of surplus food they had and food recovery agencies could contact them and pick it up. Unfortunately, the website did not last and was cancelled because it was not overly effective. The interviewees from Metro Vancouver and the Greater Vancouver Food Bank felt this was because the program was premature and was implemented ahead of its time.
- A barrier Shared Harvest encountered was businesses were hesitant advertising what types and quantities of surplus food they had. They wanted this information to be kept confidential in order to not give their competitors any advantage. Thus, food recovery and donation programs need to be discrete to be successful.
- Food donation also needs to be easy and convenient for businesses because they are extremely busy and cannot waste time.
- Additionally, donors want to be assured their food is not going to be resold. Businesses are concerned about receiving the appropriate paper work in the form of a receipt to officially document their donation. They can currently use the receipt for a tax deduction. They also require the recovery agency to have documentation that proves they are a legitimate charity, such as their non-profit number. Well

established food recovery and donation programs such as the Vancouver Angel Food Runners have this documentation. Smaller agencies that are just starting to incorporate food recovery have not been prepared to provide this to businesses and this has been a challenge for both parties.

- The Shared Harvest initiative also found volunteers from food recovery agencies were unreliable at times. They missed pick-ups from businesses, were late for the pick-ups, or were unorganized and took too long during the pick-ups. Businesses were annoyed by this and eventually felt like their time was being wasted. A lesson learned from this was recovery program staff must be professional and efficient in order to have a successful partnership with businesses.
- A greater tax incentive for business was suggested as a way to entice them to put up with anything that went wrong, such as a late or lengthy pick-up. Even though businesses state they do not donate for the tax break, if they knew their efforts were not completely for free this may assist them in putting up with some lack of efficiency. However, one interviewee stressed tax incentives could be a problem if best practices and standards for food donation were not already in place because this could increase the donation of poor quality food.
- The largest barrier stressed by all the interviewees was businesses are very concerned about perceived liability issues when donating food. All interviewees expressed concern that the Food Donor Encouragement Act is not well known. The interviewee from the restaurant business wanted to be able to donate food, but felt the liability issues were a significant barrier.
- All interviewees stated education regarding the existence and meaning of the *Food Donor Encouragement Act* was greatly needed. The interviewees highlighted a common interpretation issue: the act explains that as long as food was donated in good faith, the donor is covered, but food businesses do not know how to interpret what donating in good faith means. Once, they receive explanation that it means following food safety protocols, they will understand and will be more inclined to donate.
- A Metro Vancouver staff member is currently working with the BC Centre for Disease (BCCDC) Control to create donation guidelines for businesses that are sector specific. Metro Vancouver feels the BCCDC is the appropriate agency to inform

business of food safety guidelines for donation. Staff training for both donors and charitable agencies is also required and can be incorporated into such guidelines.

- Donors are concerned their food is too far gone to donate because of spots and blemishes. Education needs to be targeted to explain the difference between saleable and edible; food that is not saleable may still be safe to eat. This information would be best coming from the BCCDC to educate donors.
- The role of the regional government could be as a convener to assist in building relationships between recovery agencies and potential donors. The interviewee stated Metro Vancouver has the “story telling ability, can be a convener and get the norm established”.
- Currently, Metro Vancouver does not fund any food recovery donation grants or programing. The interviewee from Metro Vancouver felt Metro Vancouver’s role should be one of stimulation and support instead.
- A challenge with providing grants would be creating the associated in-depth application and evaluation process to establish who and what should be awarded funding. The process would be necessary to demonstrate government was following proper procurement procedures and was doing things in a transparent and open way. This process could deter non-profits who do not have the skill sets or time to devote to a lengthy application process from applying or succeeding. A concern would be that the funding may not get to those agencies that really need it.
- However, the interviewee from the Greater Vancouver Food bank expressed increased food recovery and donation infrastructure was needed for small agencies because they have the most difficulties in expanding their operations. Small agencies lack the staff, established processes, contacts in the food industry, and refrigerated trucks to adequately pick-up more perishable food.

7.3. Analysis of Interview Results – Food Waste Prevention

Preventing the generation of food waste is a clear business “win”. Businesses will be more inclined to reduce their food waste if they can take the initiative themselves and see proof that monitoring and tracking their food waste will save them significant

money. Thus, cost savings is a significant motivational factor that should be a priority of policies aimed at changing food retail and service food waste behaviours.

Policies will also need to demonstrate to business that it is easy for them to take action to reduce their food waste. A significant cause of retail food waste is that it is currently easier for these actors to waste their food rather than take steps to avoid it even though it would ultimately monetarily benefit them. This is mainly due to a lack of knowledge and awareness of food waste. Thus, education and awareness building should be a policy priority. It is required to demonstrate to businesses that it is necessary and relatively simple to become conscious of the food they waste and take steps to address it. Addressing food waste could be made easier on businesses if government initially provided them with the tools and technology to assist them in their efforts to change their food waste habits. Fortunately, Metro Vancouver already supports assisting businesses with tools and education to help them reduce their food waste. Their role is to collaborate with business and convene partners. Metro Vancouver is an important government stakeholder that has the authority and influence to develop more food waste reduction strategies.

Voluntary food waste reduction targets and agreements were favoured over regulatory targets because business would not want increased regulation. Also voluntary targets would be a way for business to take a leadership role which was supported in the interviews.

7.4. Analysis of Interview Results – Food Recovery and Donation

It is important that food recovery and donation programs make the process as streamlined and efficient as possible for business. Food businesses lack the time to deal with unorganized volunteers and need any kind of donation pick-up to be quick and efficient. Policies that improve coordination and organization of food recovery and donation would address this. Education and awareness is once again an important policy consideration because many businesses are very concerned about perceived liability issues due to their lack of knowledge of the *Food Donor Encouragement Act*.

Businesses need to be educated on the Act in order for food recovery and donation levels to increase. Increased tax incentives may help to increase food recovery and donation as well.

Small food recovery agencies lack the capacity to expand their operations to take on more food. They lack proper refrigerated trucks, storage space, and established processes that would make relationship building with businesses easier. Addressing this infrastructure deficit could be addressed by government policy through grants. However, it was raised in an interview that infrastructure grants for these small agencies would be difficult; mainly because the administrative application and evaluation process could be very complicated and time consuming. The process would become an unintended barrier that causes some agencies to not apply. The concern is those really in need may not receive the grant.

An important policy consideration raised in the interviews is that when it comes to food waste tracking or surplus food donation, businesses do not want their competitors to know what they are not selling. Policies will need to address this issue and be discrete.

Chapter 8. Food Waste Prevention Policy Solutions

Evidence from my review of the literature, case study analysis, and interviews inform the development of an optimal sequence of food waste prevention policies. These policies are not mutually exclusive and are practical government interventions to reduce the generation of food waste by the food service and retail food industry and consumers. Figure 8.1 shows the practical sequence of policy solutions.

A brief description of the policies follows, which include a food waste educational and awareness campaign, standardized food date labelling and voluntary and regulatory food waste reduction targets. The analysis chapter describes the implications of each policy and how each policy addresses the behavioural causes of food waste in the retail/food service and consumer sectors.



Figure 8.1 Optimal Sequence of Food Waste Prevention Policy Options

8.1. Educational and Awareness Campaign

The success of the Love Food Hate Waste Campaign demonstrates that a targeted food waste prevention campaign is a necessary first step to reduce food waste. The OECD also found this type of policy tool to be effective in changing behaviour. The key to food waste prevention is informing the biggest generators of food waste (consumers and the food service and retail sectors) of how much food they waste and to educate them on how they can personally take steps to combat the problem. If consumers and the food industry are not aware of the large amounts of food waste they produce, they cannot take action to reduce it. Moreover, when people become informed of the negative consequences of food waste, and the opportunity for significant cost savings, they will be less likely to continue to waste food.

Food waste awareness campaigns are growing in popularity all over the world. The BIO Intelligence Service (2010) explains,

“The predominance of awareness campaigns and informational tools further underlines that food waste prevention is at an early stage of development. Indeed, 39% of the initiatives identified were launched in 2009, a majority of those in the autumn, and the fact that twenty-two initiatives beginning in 2010 have already been identified, shows that this issue strongly resonates with stakeholders at the present time and is growing rapidly” (BIO Intelligence Service, 2010, p. 95).

Food waste awareness campaigns are usually national and would appear to be the most effective in generating widespread interest in the issue. Local campaigns would be very beneficial as well because they can easily be customized and targeted.

Food waste prevention initiatives will only be successful if consumers and the food industry believe they are justified and support them. In order to obtain increased public buy-in it makes the most sense to begin by educating the public and then legitimizing the information with food waste reduction targets.

The literature also emphasizes the importance of standardizing date labelling to increase consumer awareness and understanding. Much food waste is caused by consumer’s lack of understanding on the different types of date labels and this information would ideally be incorporated into an awareness campaign. Policy

recommendations on how to reform Canada's date labelling system is outside of the scope of this project. Date labelling reforms would need to occur at the national level and implemented by the Canadian Food Inspection Agency.

8.2. Food Waste Reduction Targets

In addition to a food waste awareness campaign, governments who have implemented food waste prevention policies have begun by implementing some form of food waste reduction targets. Food waste reduction targets go a step further than general waste diversion targets because they specifically put food waste on the agenda and demonstrate a commitment by government to reduce the waste of food along the food supply chain.

As shown in the case studies, creating food waste reduction targets requires research and consultation to decide what an appropriate target would be. Considering the lack of extensive food waste research in our region, this would need to be rectified in order to create reasonable and effective targets. Before targets can be set, everyone needs to agree on the definition of food waste which means that all the techniques to measure food waste must be standardized (BIO Intelligence Service, 2010).

There are two main types of food waste reduction targets. They could either be legislated, which would make them legally-binding, or they could be voluntary commitments. Businesses will also need to see the target is based on quantitative evidence rather than an arbitrary amount. That is why food waste audits and food waste tracking is an essential part of implementing regulatory or voluntary targets.

8.2.1. Voluntary Food Waste Reduction Targets

Food businesses voluntarily sign an agreement that would commit them to reaching a specified goal to reduce their food waste by a certain quantity within a specific timeframe. A benefit of voluntary commitments is they can be smaller scale and customized for each type of business or food supply sector. Or, voluntary commitments can be the same for the entire food industry the signatories are a part of. A necessary part of establishing voluntary commitments is convening industry and consulting them on

what type of an agreement could be reached. Consultation is necessary to understand their unique waste issues and come to an agreement on what an achievable target and timeframe would be. The commitment will be more successful if businesses play a role in establishing the target and implementation and subsequently feel the target is reasonable and achievable.

8.2.2. Regulated Food Waste Reduction Targets

Legally binding food waste reduction targets send a signal to consumers and businesses that reducing food waste is high on the political agenda. The purpose of a mandatory food waste reduction target is to formally establish that it is imperative to start preventing the waste of food and the government will now require all actors to make a strong commitment to reduce it.

Regulated targets considered treat all actors the same across the board and apply to a broad group of entities. This could increase equality between businesses because everyone would be forced to take action to reduce food waste. Legislated food waste reduction targets could even increase competitiveness between food businesses to outperform one another which would increase environmental and social benefits (BIO Intelligence Service, 2010, p. 95). A reward system could accompany this policy option along with the necessary economic disincentives to enforce compliance, such as fines or sanctions. Legally binding food waste reduction targets would need to be enforced by government in order to give them legitimacy.

Chapter 9. Food Waste Prevention Policy Analysis

Each policy option is evaluated according to how it addresses the food waste behaviours of food retailers, the food service industry and consumers in order to ultimately shift their behaviour over time to waste less food; the societal objectives are a much more sustainable environment and efficient use of food. I also examine important government considerations of implementation complexity, acceptability, and costs of each of the options.

9.1. Educational and Awareness Campaign

An educational and awareness campaign is the most practical policy option to implement first. My research shows the main cause of food retail, service and consumer food waste is a lack of awareness regarding how much food they actually waste and a lack of awareness of steps they can take to reduce it.

9.1.1. Considerations of Targeted Behaviours, Motivations, and Acceptability

My case study analysis demonstrates households and businesses drastically reduced their food waste once they started regularly tracking how much they actually wasted. They became conscious of ways they could reduce their food waste generation when their knowledge of the issues was increased by government staff, advertising, and/or informational materials and technologies.

An educational and awareness campaign will address the key actions of households that generate food waste such as over-purchasing, fear of eating food past its best before date, lack of meal planning, and not using left overs. Generally, the root cause of consumer food waste behaviour is a lack of general information and education

which causes them to unnecessarily discard food. Thus, an awareness campaign can target shopping, planning, and recipe tips and tricks that build consumer knowledge and fosters a cultural shift to once again value meal planning and the use of left overs. The Love Food Hate Waste campaign is a prime example of how these educational tips effectively target those consumer behaviours and have caused them to be positively altered.

Consumers and businesses in the case studies reaped economic benefits which an awareness campaign will need to promote. My research and interviews highlight cost savings for households and businesses as a key incentive for these actors to reduce their food waste generation. An effective educational and awareness campaign can incorporate information on the economic incentives to address this key motivation of consumers and businesses.

The UK Love Food Hate Waste model also educates the public of the environmental implications of food waste. This helps to foster greater pro-environmental attitudes. The OECD (2011) suggests government should foster pro-environmental behaviour through educational campaigns to change household behaviours to reduce their waste generation. Furthermore, pro-environmental policies will be more publically acceptable if a societal norm of positive attitudes towards environmental sustainability is developed (OECD, 2011).

Government will need to convince food retailers and food service providers they will not only increase their profits by reducing food waste, but will lose popularity with consumers if they do not (Stuart, 2009, p. 207). An educational and awareness campaign on food waste could help achieve this because it would increase the public's knowledge of food waste and motivate businesses to signal to consumers they are taking action to curb their food waste as well.

An important insight provided in the interviews is that an educational and awareness campaign must not shame consumers or businesses for their food waste behaviours. The Love Food Hate Waste campaign certainly highlights troubling consumer and retail behaviour such as not using food before it becomes inedible, or improperly storing it so it goes bad faster or reduces quality. That being said, the

campaign is framed as an informative tool to reduce food waste by offering appropriate actions consumers and retailers can take and is not just a platform to criticize.

9.1.2. Implementation and Cost Considerations

An education and awareness campaign will require substantial coordination, research and marketing prior to implementation. However, a significant amount of work has been done by the UK on developing an effective campaign that local stakeholders could utilize. Notably, our local or regional government could purchase the Love Food Hate Waste brand which would decrease the implementation complexity significantly.

The cost of the policy is always important to consider. The annual operating fund of the UK Love Food Hate Waste campaign is approximately \$3.7 million Canadian. This is a national campaign which means a local campaign could be smaller in scale and, thus less costly. However, the costs of the educational and awareness campaign could be offset by the reduction in waste disposal costs. Right now, the current organics tipping fee in Metro Vancouver is about \$63. Businesses and residents generate about 188,000 tonnes of food waste per year (Metro Vancouver, “Closing the Loop”). If that food waste generation was cut in half, Metro Vancouver would save approximately \$5.7 million which would cover the annual operating cost. A 50% reduction in food waste generation would most likely not occur right away, but it is not an unrealistic long term goal. Even if the food waste was cut by 20%, this would result in approximately \$2.4 million in cost savings. When the cost savings are considered along with the other non-monetary benefits of reducing food waste, the cost of an educational and awareness campaign is relatively small.

Research and consultation will be required before the development of food waste reduction targets. The targets should be phased in to allow for an easier transition and greater public and stakeholder acceptability. The targets could also start out low and then gradually become higher every five years. Voluntary targets will prepare businesses of the intent of government to implement regulated targets in the future.

9.2. Voluntary Food Waste Reduction Targets

The UK Courtauld Commitments demonstrate how national voluntary food waste reduction targets could impact a reduction in the generation of food waste. Between 2009 and 2012, approximately 270,000 tonnes of UK food waste was reduced per year due to 53 grocers, manufacturers and distributors making a voluntary commitment to reduce their food waste by 4%. I use this case as evidence of the positive impact such targets can have on changing food retailer behaviours to reduce their food waste.

9.2.1. Considerations of Targeted Behaviours and Incentives

Essentially, voluntary commitments will allow businesses to make the decision themselves to change their wasteful behaviour and test out strategies that will help achieve their goal. Successful strategies can be promoted and developed into best practices that other businesses can use. Voluntary commitments incentivise businesses to participate by providing them with the support and tools to monitor their food waste which will save them money. This addresses one primary root cause of retail food waste which is that it is perceived to be cheaper to just discard food they do not use (BIO, 2010, p. 10). Voluntary targets will initiate the tracking of food waste which will quickly demonstrate the cost savings from not throwing away already purchased food and reduced disposal costs. The businesses that participate will be able to see that it is much more cost effective to reduce food waste at the source rather than discard it. The Metro Vancouver organics ban will also increase this incentive by making composting mandatory which will complicate the disposal of food waste for businesses.

Businesses that participate in voluntary commitments can also be promoted and their success advertised. This could give them a competitive advantage in the market when combined with an awareness campaign that stresses the importance for the public to reduce food waste. Businesses that are not on board with a cultural shift towards greater sustainability through food waste reduction may lose favour, and ultimately, revenue. Voluntary targets highlight a necessity to reduce food waste where businesses have the opportunity to demonstrate their commitment to environmental sustainability.

The UK food waste prevention model identifies an important connection between the generation of food waste and the knowledge sharing and behavioural dependence between retailers and consumers. Retailers got on board with promoting the Love Food Hate Waste campaign in addition to the Courtauld Commitments. They utilized and endorsed the Love Food Hate Waste informational and promotional materials because they understood they are a key stakeholder in helping consumers alter their food purchasing, meal planning and food storage behaviours. Food waste reduction goals, voluntary or regulatory, will cause retailers to address consumer shopping behaviours, such as an unwillingness to purchase blemished fruit or vegetables, because these behaviours also increase their business generation of food waste.

A drawback of voluntary food waste reduction commitments is they are not as effective as regulatory targets because compliance is voluntary and not enforced by government. A voluntary commitment will not cause all stakeholders to reduce their food waste, only the percentage of those who sign up. The overall tonnes of food waste reduced by a voluntary commitment will depend on the number of signatories, their generation of food waste relative to the overall waste stream, and their reduction percentages. Considering a commitment of this nature has not been implemented in this region, it is difficult to estimate the exact percentage of businesses that would sign up. However, even with a small participatory group of businesses initially, food waste generation will be reduced. Voluntary commitments will grow and become more effective when they are developed after an awareness campaign has been implemented and is achieving some success.

Voluntary commitments are susceptible to free riding of businesses that resist changing their business practices to reduce food waste. Free riding can be a problem of an voluntary environmental commitment especially when the targets are industry wide (Alberni and Segerson, 2002). Some firms within the industry make significant strides and achieve the targets while some firms continue with the status quo and free ride on the success of the other firms. Unfortunately, this is not entirely avoidable. That being said the more businesses that participate, the stronger the incentive will be for other businesses to maintain their competitive advantage. This is also an important reason to eventually develop regulated food waste reduction targets that are mandatory for all businesses to comply.

An important consideration is that most likely, the initial businesses that voluntarily commit to reduce their food waste will already be environmental stewards and will not need much convincing to reduce their food waste. Businesses that are unaware of the food waste problem and waste large quantities of food may be less likely to commit because of perceived inconvenience and high administrative costs. That is why an educational and awareness campaign, in conjunction with research and outreach, will help to increase the participation of a range of food retailers and food service businesses.

My interview results suggest small restaurants generate larger quantities of food waste than large corporate restaurants because of a lack of food waste prevention knowledge and inefficient operations. However, the literature on voluntary environmental agreements argues larger firms are more likely to participate in voluntary commitments than smaller firms because they have lower marginal costs, more staff and resources, and greater influence over regulators (Alberini and Segerson, 2002, p. 165). The costs of voluntarily participating would be lower for larger firms for those reasons. However, reducing food waste will save businesses of all sizes money and offer an attractive business case to motivate participation. The key will be for government to allocate the time and resources to educate and persuade businesses of this in their facilitation efforts of voluntary commitments. Government could also negotiate and design different voluntary commitments for small and large firms that address the unique needs of each.

9.2.2. Target Ambition Considerations

The UK Courtauld Commitments 2 and 3 included food waste reduction targets of 4% and 5% each to be achieved in three year periods. If all three Courtauld Commitment targets were met, this would produce a 20% reduction in food waste over 10 years. These are relatively small goals when compared with the EU's proposed mandatory 50% reduction target to be achieved in six years by 2020. Although the EU target has been described as overly ambitious in the literature, this highlights the issue that voluntary commitments are usually negotiated with industry partners and may result in less ambitious goals than if they were only determined by government.

9.2.3. Implementation Complexity

A voluntary food waste reduction target will require collaboration with the food industry and relationship building. WRAP worked closely with the signatories of each Courtauld Commitment to assist in developing implementation plans and appropriate targets. It will take time to educate businesses of the need to participate in a commitment to reduce food waste and highlight the benefits of achieving the target.

Subsequently, consultation and collaboration with the food industry would require additional staff time and resources to assist the businesses with their goals. Additional research may be required to negotiate the agreements, but because business would be a partner, the complexity of the implementation would not entirely be government's responsibility.

9.2.4. Acceptability

The literature, case studies, and interviews show that a voluntary food waste reduction target is the common approach to reduce food waste because it is more popular with business, stakeholders, and governments. A voluntary food waste reduction target is not perceived as negatively by business as regulatory initiatives are mainly because participation and compliance is not enforced through government intervention. Voluntary targets focus on the economic incentives and business case for reducing food waste instead of top down enforcement. My interview with a Metro Vancouver staff member also demonstrated a strong willingness by the regional government to collaborate with local businesses on a similar agreement as the Courtauld Commitment.

The voluntary food waste reduction commitments that have been implemented in the UK and the US provided businesses the opportunity to be a part of the design and implementation of the policy. Businesses are generally highly supportive of this type of approach because they tend to appreciate being able to regulate themselves rather than having the government do it. This makes the policy more flexible and adaptable and, as such, is viewed as a “softer” policy approach to reducing food waste.

The Nordic food service industry has expressed they would greatly prefer positive reinforcement not negative sanctions when it comes to policies aimed at reducing their food waste (Marthinsen et al., 2012, p. 101). This attitude would most likely be shared among the food service industry in our region. My interview and case study results also confirm that demonstrating the positive benefits of reducing food waste, especially the monetary benefits, will be the way to get retailers and the hospitality industry on board with reducing food waste.

Public acceptance of voluntary food waste reduction targets will be high. Voluntary commitments would produce slower change so the public would have a longer period of time to get used to reducing their individual food waste generation. Essentially, people would be given the choice to change rather than government forcing them to do so.

Nation-wide political will to reduce food waste is gaining momentum in Europe and the United States, but is not on the political agenda in Canada as of yet. Local composting programs have highlighted the negative environmental impacts of organic waste, but significant awareness building regarding the need to reduce food waste at the source is lacking. Voluntary targets are the logical next step after awareness and education campaign on food waste has been implemented. This step would further reinforce to the public and businesses there is an important need to reduce food waste.

9.2.5. Cost Considerations

A voluntary food waste reduction target will impose moderate costs on government. A target, similar to the Courtauld Commitments, will not cost the government a significant monetary investment because food retailers and food service businesses will voluntarily agree to track their food waste and enforce the goals within their staff. Thus, businesses will be responsible for the costs of monitoring and enforcement not government (McEvoy and Stranlund, 2010). However, the EPA and UK case studies demonstrate that government support in helping businesses achieve their food waste reduction goals was pivotal to their success and helped to motivate business participation. Government provided a host of in-kind benefits to the businesses such as staff, research, technical information, and tools. The costs of these in-kind benefits will

be dependent on the government's outreach ambitions, the number of businesses that participate, and the level of need of the participants. Limited spending by government will likely generate less awareness building and consultation which will produce less business participation and less food waste reduced.

Voluntary commitments could be more cost efficient in the long run if used for small scale pilot projects and then were scaled up to become regulatory targets. Voluntary commitments offer a way to test out how businesses could reduce food waste. They could initially operate as an information sharing initiative between government and businesses to eventually create best practices for reducing food waste which was the Oregon Department of Environmental Quality and the City of Hillsboro's plan of action for testing out LeanPath technology in Intel's cafés. Metro Vancouver is also in the early stages of developing pilot projects to test LeanPath's food waste monitoring system.

Starting with a voluntary approach will determine the most cost effective approaches for business and these could then be replicated. That being said, the costs to business will be relatively low anyways as evidenced in the case studies. Intel's Jones Farm Café 5 and Ronler Acres Café 3 used LeanPath software to track their food waste and found the costs were very small and were far outweighed by the savings they generated by reducing their overall food waste by 47% after one year. It only took staff in the cafés an additional 4 minutes each week to track food waste which was roughly \$30 in additional labour costs each week.

9.3. Regulatory Food Waste Reduction Targets

Regulatory food waste reduction targets is the final step of my sequence of policy recommendations for addressing retail/food service and consumer food waste. Mainly because the baseline data, best practices and public acceptability will need to be developed prior to their implementation. The educational and awareness campaign and voluntary targets would enable those things to develop and that is why they need to be implemented prior to regulatory targets.

9.3.1. Considerations of Targeted Behaviours, Motivations, and Acceptability

Legally binding food waste reduction targets will likely achieve a much greater reduction in the total quantity of food waste generated because compliance is monitored and enforced. This means it will be mandatory for retailers, food service providers, and consumers to alter their behaviours that generate food waste. The result will be a larger mitigation of the negative environmental externalities of food waste such as greenhouse gas emissions and the waste of water. Legislation may begin to reduce food waste even before it is implemented because some food businesses would act proactively and alter their business practices to ensure they are ready for the law (Stuart, 2009).

The compliance rate for a regulated food waste reduction target will be fairly high, but it is reasonable to expect that not all businesses will comply and some cheaters will not be caught. In order to achieve a legislated food waste reduction target, mandatory food waste tracking by businesses will be a necessity to obtain baseline data to compare and track progress. Since businesses and consumers significantly reduce their food waste when they track it, a mandatory target will achieve significant results. A mandatory food waste reduction target will also demonstrate to the public the seriousness of the problem and elevate the importance of reducing food waste.

Regulatory food waste reduction targets will also target the attitudes and norms of the public and businesses. A necessity will be in place for the public and food businesses to value and use their food more efficiently. This targets consumer and food retail attitudes that generally undervalue food which generates food waste (BIO Intelligence Service, 2010, p. 10).

9.3.2. Implementation Complexity

Regulations will need to be created to incorporate mandatory food waste reduction targets which will make implementation more difficult and complex. The literature on food waste reduction targets emphasizes the importance of standardized food waste reporting to ensure targets are appropriate and monitoring and enforcement is fair. A common definition of avoidable and unavoidable food waste will be a necessity. Establishing a common understanding of food waste and standardization of

reporting will require extensive research and consensus between stakeholders and government. Notably, obtaining consensus among stakeholders on a specific definition of food waste has even been difficult (BIO Intelligence Service, 2013).

Additionally, determining the appropriate penalty for not meeting the regulated reduction targets could also be complicated. Costly fines for those businesses that are not compliant or other economic incentives would be viable options. Positive economic rewards such as subsidies for further food waste prevention efforts could be given to those compliant food businesses, for example (BIO Intelligence Service, 2011, p. 18).

The creation of a new government regulation, extensive additional research, standardization and consensus, and increased monitoring and enforcement are all administrative requirements that significantly increase the implementation complexity of the policy.

9.3.3. Acceptability

The nature of a regulated food waste reduction target is that it demands compliance and is subsequently viewed as a “hard” approach. My research indicates this approach could be politically unpopular. For example, a mandatory 20% food waste reduction target was proposed in Sweden, but their parliament did not approve it (Rutten et al., 2013, p. 42). Unfortunately, I was unable to find information on the Swedish government’s reasons for not approving it; primarily because it was difficult to obtain public documents that were translated into English. Additionally, my UK case study evidence shows that although the UK has been a pioneer in reducing food waste, the UK government is very opposed to the EU’s proposed mandatory food waste reduction target. This is precisely why regulated food waste reduction targets will be more acceptable as a long term goal. Voluntary targets would be the lead up to such an approach and will effectively work as a warning to change food waste behaviours before compliance is enforced. Regulated targets can also be implemented gradually to ease transition.

In the UK, many food industry interest groups have opposed mandatory food waste reporting legislation. They argue reporting of food waste needs to be “voluntary

and anonymous” so their sales (and lack of sales leading to food waste) and operations details cannot benefit rival companies (Stuart, 2009, p. 212). There are ways compulsory food waste reporting could be designed to keep sensitive information anonymous. Targets could be industry wide in order to not single out individual businesses and the data from each business could be aggregated to depict the industry’s improvements or lack thereof as a whole (Stuart, 2009, p. 213). To combat concerns over regulated targets, governments could promote the discussion early on and conduct extensive consultation to increase the acceptability of the chosen target rate.

9.3.4. Cost Considerations

For a regulatory food waste reduction target to be effective, government will need to consistently conduct extensive monitoring and enforcement which will significantly increase the costs of this policy. However, it will also decrease the government’s waste disposal costs because the policy will effectively reduce the amount of food waste that requires waste management. At this point, though, it is difficult to estimate whether the decrease in disposal costs will outweigh the costs of enforcement and the degree to which fines will help cover enforcement costs.

As previously mentioned in the implementation complexity section, a regulated target will require robust research to come up with food waste baseline data among food businesses, a standardized food waste tracking and monitoring system, and an agreed upon definition of food waste. Robust data will be required to figure out the quantity of unavoidable food waste produced by businesses as well. This degree of information gathering and consultation would require significant government funding. The UK’s WRAP conducted substantial research that cost about \$1.1 million Canadian, prior to the implementation of their Love Food Hate Waste campaign. The costs of implementing and enforcing a regulatory target could be greater than that amount.

Chapter 10. Food Recovery and Donation Policies

This chapter highlights infrastructure grants and a centralized government run program as the most effective approaches for increasing the overall quantity of perishable food that is rescued and provided to charities. A brief discussion on tax incentives is also included.

10.1. Infrastructure Grants and a Government Run Program

Preventing food waste at the source is a top priority, but not all surplus food can be prevented. When food businesses are unable to avoid obtaining a surplus supply of food they can take action to mitigate food waste by donating it to food recovery agencies. The literature and case study analysis show only a small percentage of food businesses currently donate their surplus food on a regular basis, but successful policies have been identified to increase this percentage.

My research indicates there are a number of independent non-profit organizations that exist in countries across the world that conduct small scale food recovery and donation. As previously mentioned, Metro Vancouver also has a small number of food recovery and donation organizations as well. However, these organizations work independently, building their own food networks and potential food donors. This one-off approach is not easily expanded to incorporate a large increase in the level of food recovery and does not address a number of common challenges inherent in the nature of food recovery and donation.

Metro Oregon's research examined the challenges of increasing food recovery and donation and found providing grants to non-profit food recovery agencies was a necessary first step. Once the food recovery and donation infrastructure was expanded, Metro Oregon implemented their Fork it Over! initiative which overcame the primary barriers of a lack of education regarding food recovery and donation among the business

community and a lack of coordination between agencies and potential donors. Fork it Over! also raised the profile of food recovery and donation as an easy process to reduce food waste that was the “right thing” to do for the community.

My research indicates that a combination of infrastructure grants and a centralized government run program has been shown to significantly increase the donation of perishable food to charities and reduce the generation of food waste. These two options are not mutually exclusive and are effective policy options to consider.

10.2. Tax Incentives

In 2012, Food Banks Canada proposed the federal government provide all retailers, importers, manufacturers, and distributors a tax break for donating food. Their proposal would enable businesses to deduct the cost of production of donated food from their taxable income plus one half of the unrealized appreciation, to a maximum deduction of twice the production cost (p. 1). Food Banks Canada (2012) estimates this would result in the federal government losing \$15 million in revenue per year, but would significantly increase the volume of donated food in Canada. Food Banks Canada asserts similar tax incentives have been extremely successful in increasing food donation in the US (2012, p. 4). My interviews also demonstrated support for increased financial incentives for food donors.

The BC government has also shown interest in tax incentives for food donation as well. The BC Strategic Plan includes a goal to implement a 25% tax credit for farmers on the value of farmed food that is donated to food banks, but this policy is not yet in place. (*Province of BC Strategic Plan*, 2013, p. 27).

Nonetheless, the literature suggests tax incentives have not been the main driver for increased business participation in food recovery and donation programs and that is why I chose not to consider further this policy option. The opportunity to help tackle hunger, increased education and awareness, and convenience have played the biggest roles in convincing businesses to participate in a food recovery and donation program. Also, food waste is clearly not on the political agenda in Canada and a tax break to increase food donation and mitigate food waste, would be challenging to propose at this

point in time. It is a topic that merits investigation once there is more awareness of the issue of food recovery.

Chapter 11. Food Recovery and Donation Policy Considerations

Increasing food recovery and donation is a politically popular strategy to reduce food waste because it addresses hunger issues while diverting organics from the waste stream. However, the literature, case study analysis and interviews demonstrate there are many facets to consider when attempting to increase food recovery amounts and it may be easier said than done. Even though public acceptance of this type of strategy is high, a centralized government run food recovery and donation program is very uncommon.

Fork it Over! is the only publically funded food recovery and donation program I could find. Metro Oregon's Fork it Over! is a one of a kind program in that the government created the program from the ground up, Metro staff organized and ran the program in partnership with food banks, secured additional sponsors, built relationships, and monitored the program's success annually. Metro Oregon conducted a cost-benefit study on their food donation infrastructure grants which demonstrated \$31 in net benefits was achieved for every \$1 spent by the government. The Oregon regional government made food recovery and donation a government priority and achieved significant success.

After eight years, Portland State University officially adopted Fork it Over!. Concrete reasons as to why the government took a step back from the program, such as budget limitations or politics, could not be found. Portland State University reviewed the food recovery and donation infrastructure and Fork it Over! program in 2011. They concluded further program expansion and awareness building by the regional government was needed to increase food recovery levels even more, but Metro Oregon staff felt the regional government's capacity was best served as a convener of partners and to assist with tools and systems design (p. 105). My interview with a Metro Vancouver staff member echoed similar feelings. The interview results suggest Metro

Vancouver's role would be to primarily act as a convener to bring together partners to increase food recovery and donation rather than provide funding or spear-heading a program. However, the literature suggests that acting as a convener is not nearly as effective as contributing significant investment towards building the capacity of food recovery agencies in addition to heavy advertisement, education, outreach and coordination.

Metro Oregon had the policy directives and political support in place to increase the quantity of food recovery and donation in the region. Their research and consultation highlighted a number of challenges within the food recovery and donation infrastructure that needed to be addressed first. I infer our region would require similar research, public support, and political will for a government run program to be considered. Moreover, Metro Oregon's initial research cost them \$40,000. A coordinated government effort to increase food recovery and donation will necessitate moderate government resources and spending to overcome the challenges that were stressed in the literature, interviews, and case studies.

The main issues Metro Oregon found businesses were concerned about included: the donation process being an inconvenience to them; liability issues; and not enough staff time to assist with organizing a recovery and donation program. My interview results also highlighted the same issues in this region. Small food recovery and donation agencies are primarily run by volunteers and lack the resources to expand their operations into a professional business model. Metro Oregon's survey of food recovery agencies found they lacked large refrigerated pick-up trucks, walk-in coolers, additional on-site storage space, and paid staff. Metro Oregon determined increasing this infrastructure was a necessity for expanding food recovery and donation programs in the region. Investment of this magnitude in our region would likely achieve positive results too.

Food waste research done by Metro Oregon, the USA EPA, the EU and the UK's WRAP suggests there is a significant amount of surplus food generated by the food industry and an opportunity exists to increase the quantity of perishable food that is recovered and donated. Unfortunately, my research and interviews show one reason for this low percentage is that awareness among businesses on how to donate perishable

food and why it is important to do so is very low. Government could address many food recovery and donation challenges by providing the infrastructure, awareness and outreach, and much needed coordination. Allocating paid staff to build relationships and coordinate would assist in making the process more convenient for business and easier for the non-profits. The end result would be a reduction of food waste and an increased supply of donated food for charities.

Chapter 12. Recommendations

My analysis demonstrates that consumer and food retail and service industry food waste are primarily caused by a lack of awareness of their large contribution to the generation of food waste and a lack of knowledge of how to address it. Thus, an educational and awareness campaign is the first practical policy step to implement. The awareness campaign will set the stage for the development of voluntary food waste reduction targets which will effectively reduce food waste and produce environmental, social and monetary benefits as well. A voluntary commitment will provide an opportunity to work with businesses to obtain research, best practices, and data that will be required to implement a regulatory target in the future.

A regulated food waste reduction target will likely have a significantly greater impact on reducing food waste than a voluntary commitment and that is why it should be considered as a future goal. An education and awareness campaign, voluntary reduction targets, best practices, and baseline data will need to be implemented prior to a legislated food waste reduction target for it to be as effective as possible.

Food waste is becoming a more well-known problem, but awareness of it in our region is still too low to support a legislated target before voluntary commitments have been thoroughly established. Government initiatives to raise awareness and help establish a voluntary food waste reduction target are the more feasible steps to reduce food waste at this time.

Considering Metro Oregon's food recovery and donation issues are similar to those I came across in this region, it is likely food recovery and donation could be increased by the implementation of a government program, similar to Fork it Over!.,. The key drawback of this option is such an endeavour is extremely uncommon even though it has been shown to be beneficial by Metro Oregon.

Non-profits are the ones responsible for the food recovery and donation infrastructure currently and their efforts, while successful, could be increased and replicated. Government could help facilitate greater food recovery and donation by increasing the capacity of food recovery agencies and hiring government staff. The responsibility of the government staff would be to conduct significant outreach and marketing to build further relationships with business to obtain an increased access to the significant quantity of surplus food that exists. However, my interview with Metro Vancouver highlighted this option would not likely be considered.

Metro Vancouver is working on food recovery and donation guidelines with the BCCDC to address the liability concerns of businesses and increase the awareness of food donation as an option to reduce food waste. Metro Vancouver also seemed supportive of playing a role in relationship building between those agencies that recover food and those businesses that have surplus food. These strategies were a part of Metro Oregon's overall approach as well. That being said, the awareness of Metro Oregon's food recovery and donation efforts was largely due to their significant investment in marketing, advertising and outreach. I recommend that any efforts to increase food recovery and donation would require a similar scale of marketing, advertising and outreach investment by Metro Vancouver.

Chapter 13. Conclusions: The Time is Now

Food waste prevention awareness campaigns and food waste reduction targets will be more effective when grouped with policies such as: mandatory separate collection of food waste; economic incentives such as “pay as you throw”; taxing food waste that goes to landfill; a landfill ban on food waste; and laws that remove liability issues of food recovery and donation programs (BIO, 2013, p. 10). Fortunately, Metro Vancouver has already implemented composting programs in many of its municipalities and is preparing for the upcoming 2015 Organics Landfill Ban. The BC *Food Donor Encouragement Act* also provides the legal framework to enable the recovery and donation of more surplus food in the region.

Therefore, the regulatory framework exists to add food waste prevention and food recovery and donation to the local agenda by first increasing awareness and coordinating voluntary food waste reduction targets. The ultimate objective of the combination of food waste prevention policies is to eventually implement mandatory food waste reduction targets into the Metro Vancouver Integrated Solid Waste and Resource Management Plan. The Metro Vancouver region could be a leader in addressing food waste that other municipal and regional governments could model themselves after.

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