



A Food Loss and Waste Strategy for Canada

NATIONAL ZERO WASTE COUNCIL





The National Zero Waste Council is a leadership initiative bringing together governments, businesses and non-government organizations to advance waste prevention and the circular economy in Canada.

VISION

Canada united in the achievement of zero waste, now and for future generations.

MISSION

To act collaboratively with business, government and the community, at the national and international level, as an agent of change for waste prevention and reduction in the design, production and use of goods.

nzwc.ca

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FORWARD

More than a third of food produced and distributed in Canada never gets eaten, with significant environmental, economic and social consequences.

This grossly inefficient use of resources forces local governments into excessive costs for waste disposal, generates avoidable greenhouse gases at all stages of the production and distribution chain, and costs the Canadian economy up to \$100 billion annually¹. In addition, organic waste in landfills, largely food, generates four per cent of Canada's greenhouse gases.

This problem is not unique to Canada. Global estimates are that nearly half the food produced never gets eaten. As a result, preventing and reducing food waste has become a matter of urgency around the world, featured prominently as an action item for governments, businesses, and consumers.

In September 2015, the United Nations set Sustainable Development Goals that included a commitment to reducing food waste by 50% by 2030. Shortly afterward, France became one of the world's leading change makers on food waste by passing a law that forbade grocery stores to throw away or destroy unsold food. UK's Waste and Resources Action Programme, established back in the early 2000's, has continued to ramp up its food waste reduction work, announcing increasingly robust voluntary agreements with grocers and manufacturers. Many other countries throughout Europe – Italy, Spain, Denmark, the Netherlands, to name but a few – have continued to support market innovations, and establish various policies and fiscal incentives to drive down food waste. Some have created national consumer campaigns. In the past three years, the US has seen a proposal for a national food recovery act, the launch of a national consumer campaign, and a published roadmap on

how to comprehensively tackle food loss and waste. The Food and Agriculture Organization launched food loss and waste initiatives in Asia-Pacific with various partners, under its Save Food program, as early as 2013.

The list carries on. And the speed and level of sophistication in the adoption of successful activities is rapidly increasing.

In this context of international and North American action, Canada risks lagging behind. There have been a number of isolated initiatives, ranging from organics bans to regional consumer campaigns, and even national interest in a food policy that would include food loss and waste activities. However, overall Canadian action has been at best disparate and fragmented. There is a lack of coordination and collaboration, and there is no system-wide vision for change. The gap is startling.

The National Zero Waste Council is responding to this gap by developing a collaborative food loss and waste strategy for Canada. It is hoped that this strategy offers a rallying point for numerous and diverse stakeholders; that it provides tangible solutions that leverage action emerging in Canada and other parts of the world; and that it offers a clear way forward.

The Council would like to acknowledge and thank the many individuals and organizations who contributed to the development of this strategy. In particular, we would like to thank Provision Coalition, who have been working tirelessly on advancing sustainability within Canada's food and beverage processing and manufacturing sector. We look forward to continued collaboration with Provision Coalition, and other Canadian champions, on addressing food loss and waste.

1 <http://vcm-international.com/wp-content/uploads/2014/12/Food-Waste-in-Canada-27-Billion-Revisited-Dec-10-2014.pdf>

INTRODUCTION

In 2016, the National Zero Waste Council prepared an outline for a strategy with a suite of tools to reduce food waste in Canada. The strategy was built around three pillars: national, provincial and local policy change; innovation in technology and community infrastructure; and behaviour change throughout the supply chain. The actions under each pillar combined to tackle food waste challenges, from post-farm through to the consumer.



The strategy was then deepened by analyzing its potential contribution to Canada's efforts to reduce greenhouse gas emissions. A broader proposal, *Reducing Food Waste & Cutting Canada's Carbon Emissions: Policies for Reaping the Environmental, Economic and Social Benefits*², was submitted in June 2016 to the federal government in response to their call for proposals to their Pan Canadian Framework on Clean Growth and Climate Change.

Subsequently, an abbreviated document, the *National Food Waste Reduction Strategy* was submitted to the federal government in early 2017 in support of efforts to develop a Food Policy for Canada.

The National Zero Waste Council

The Council is a leadership initiative bringing together governments, businesses and non-government organizations to advance waste prevention through the design, production and use of goods in Canada. It is tackling food waste as part of its overall commitment to waste prevention and the circular economy.

The Council then undertook a robust stakeholder engagement process to gain feedback on and refine the proposed strategy. While none of the actions that were presented in the strategy were wholly new, many had neither been tested in a Canadian context, nor previously recommended as part of a comprehensive, shared national effort. The specific goals of the stakeholder engagement were to identify potential collaborators, ensure the strategy aligned with new developments in Canadian policy and innovation, prioritize actions, and develop an implementation plan.

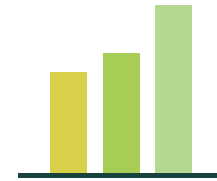
The stakeholder engagement program ran from February to September 2017, involving more than 900 representatives from the public, private and community sectors involved in food loss and waste activities in Canada. These representatives ranged

² <http://www.nzwc.ca/focus/food/national-food-waste-strategy/Documents/NZWCSUBMISSIONONPAN-CANADIANFRAMEWORKFORCOMBATINGCLIMATECHANGE.pdf>

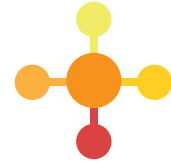
from global businesses, small enterprises and business associations, to all three levels of government, and non-governmental organizations working on environmental protection, food security, and sustainable consumption. Leading global champions, including the UK's Waste Resources and Action Programme (WRAP), the World Resources Institute (WRI), and ReFED also provided feedback that has been included in this document. The process utilized a range of engagement tools: an online survey, webinars, workshops, special event presentations, and targeted interviews.

The feedback received was generous and thorough. Highlights included confirmation that there is interest and support for a National Zero Waste Council-led national strategy, but that a full supply chain approach was needed, with the primary emphasis on upstream change, preventing food loss and reducing waste from farm to fork, rather than on waste diversion. It was recommended that collaborators include provincial and territorial-level governments, along with both established and emerging innovation hubs. Stakeholders suggested alignment and engagement with the emerging *Food Policy for Canada*. Recommendations for priority actions included addressing issues associated with best before dates, infrastructure investment that strengthens the capacity of the charitable sector, the development of a national consumer campaign, and educational and communication materials that support nutritious food donations.

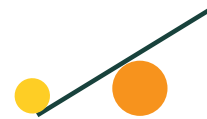
This document presents a revised strategy that gives thoughtful consideration to the feedback received. It presents a solid range of actions that will help Canada achieve a globally-aligned goal to cut food loss and waste in half by 2030.



DATA DRIVEN



HARMONIZE



USE LEVERAGE

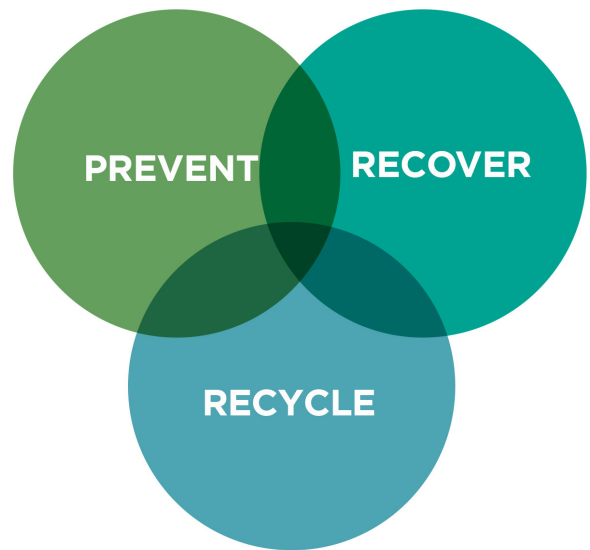


BEST BEFORE

A Food Loss and Waste Strategy for Canada

What is food loss and waste?

The loss of edible food and inedible food parts at the point of retail or consumer use is typically considered food waste. Food that is lost in the stages between production and distribution, where, for example, food may have spoiled as a result of production and processing technologies, is considered food loss. Food Loss and Waste (FLW) is used throughout this strategy. In some instances, food waste is used as a short-hand stand in for both loss and waste. This Strategy provides recommendations that address the full range of food loss and waste taking place throughout the supply chain.



The National Zero Waste Council has developed a nation-wide, multi-year framework for action that brings together the private sector, governments, and civil society in a collaborative and systematic effort to reduce the waste of edible food – throughout the value chain, from farm to fork. This strategy proposes an approach that closes the loop on food waste occurring during the production, processing, distribution and consumption of food, and supports the shift to a circular value chain. In this approach, waste is prevented first, then rescued and recovered, and finally recycled/composted, so that resources invested in food production are secured and optimized.

A Food Loss and Waste Strategy for Canada brings together insights, experiences, and thoughtful feedback from a wide array of leaders involved in food loss and waste, both within Canada and globally. These leaders range from global businesses to small enterprises, local governments to NGO's, recognized champions from WRAP and WRI to ReFED. It takes into consideration the vastness of Canada's geography, its economic structure, and the current context of Canadian action on the issue. The goal of the strategy is to reduce both food loss and waste by 50% by 2030 in alignment with Sustainable Development Goal 12.3 and the U.S. domestic target.

The strategy calls for the federal government to publicly announce a national target and takes a systems approach that aims to change practices and policies at key leverage points along the value chain and in the mandates of governments, as well as encourage new behaviours. It is anchored by three broad objectives:

- **Prevent** food waste from occurring in the first place;
- **Recover** safe and nutritious food for people and food scraps for animals; and
- **Recycle energy and nutrients** from the remaining, unavoidable food waste.

Included are an array of key elements that, working together, will contribute to optimizing the food value chain and will:

- Promote innovation and investment in emerging technologies and community infrastructure;
- Provide economically viable opportunities for businesses engaged in the food chain;
- Build community resiliency by encouraging the redistribution of nutritious, surplus food;
- Reduce the climate, water, energy and soil impacts of producing and distributing food that ends up uneaten;
- Reduce garbage disposal costs for municipalities; and
- Engage Canadians in becoming part of the solution.

THE CANADIAN CONTEXT

While leaders in other parts of the world hold lessons for us in Canada, we have a unique context that requires modified action, and in some cases, unique

approaches. Our geography is vast, our urban centres relatively few and small in a global context and are complemented by large rural areas inhabited by small communities and isolated farmsteads. The distances over which we transport food are large. Rail and road infrastructure pass through sparsely settled areas. Food insecurity is found in both urban and rural contexts. We have a young food security support network. All this makes for greater challenges associated with, for example, cold storage and logistics.

The Canadian economy is largely made up of small and medium enterprises (SMEs). A recent study found 98% of the country's businesses have less than 500 employees, and that many share an ethos of sustainability³. Large businesses are fewer and hold larger shares of the market, making it both easier and more difficult to collaborate, as there are fewer interests to negotiate but potentially greater concerns over data-sharing and retaining competitive advantages. The large proportion of smaller enterprises in Canada's food economy, and their frequent alignment with sustainability interests, suggests a more nimble business environment, with less embedded inertia, than may be typical in the US or Europe.

COLLABORATION IS KEY

Successfully tackling food loss and waste throughout a supply chain necessitates coordinated action and true collaboration – within Canada, and globally. Across the country, many initiatives to reduce food waste are under way, though in varying degrees of isolation from each other. These initiatives are happening at a local government and provincial level (such as organics bans through to province-wide

³ Governing and Accelerating Transformative Entrepreneurship (GATE) Survey Report, 2018. Sarah Burch, Canada Research Chair in Sustainability Governance and Innovation, University of Waterloo.

organic waste frameworks), in business start-ups and with large retailers (from food sharing apps to consumer campaigns), and with various community organizations working on food security and environmental issues.

At a national level there is emerging, focused policy work on food system sustainability, climate protection, and the circular economy.

The National Zero Waste Council's Food Loss and Waste Strategy provides recommendations for addressing food waste that directly align with and help Canada deliver on these initiatives. *The Pan Canadian Framework on Climate Change and Clean Growth* commits Canada to meeting ambitious targets for reductions in greenhouse gas [GHG] emissions that match the objectives under the Paris Agreement. A 44 million tonne gap exists between projections of GHG's in Canada and Canada's target for reductions by 2030. Reducing food waste could reduce Canada's carbon footprint and help to close this gap.⁴

A Food Policy for Canada is focused on making Canada's food system more efficient, sustainable and fair. It will set a long-term vision for health, environmental, social, and economic goals related to food. Reducing food loss and waste is being recognized as an important cross-cutting theme in this endeavour. A circular approach to food loss and waste resonates with emerging federal interest in the circular economy, as there is a shared interest in bolstering economic returns, supporting innovation, and building community resiliency while conserving resources.

Internationally, from the World Economic Forum through to Champions 12.3, businesses and governments are coming together to identify and implement strategic action. Collaboration across policy

efforts amongst change agents will build a richer, more effective response to any issue. Therefore, this strategy pays attention to how action is coalescing in North America and Europe around the issue of food loss and waste, and building resilient food systems – and leverages this work in Canada. The Strategy builds on this momentum of action, and recommends linkages with other campaigns, targets, monitoring and measurement efforts, and innovative approaches to changes in physical infrastructure. The strategy uses a shared vocabulary, important for businesses operating in a global marketplace with supply chains operating in part, or in whole, in Canada. Joining an emerging powerful global network of businesses, governments and civil society representatives working on food waste and loss enables more effective, efficient action domestically, secures supportive partners, and helps keep Canada in step with change.



A Food Loss and Waste Strategy for Canada incorporates and builds upon this existing work, both inside and outside the country, pulling together the best practices used to date. The recommended actions that follow help bring together under one issue area the valuable, though disparate, actions across Canada.

4 <http://www.nzwc.ca/focus/food/national-food-waste-strategy/Documents/NZWCSUBMISSIONONPAN-CANADIANFRAMEWORKFORCOMBATINGCLIMATECHANGE.PDF>

They offer opportunities for knowledge sharing, efficiencies, greater potential for harmonized policies, and a touch-point for various Canadian actors to work together and leverage each other's work. The strategy also helps ensure that Canada can stay in-step with changes happening around the world.

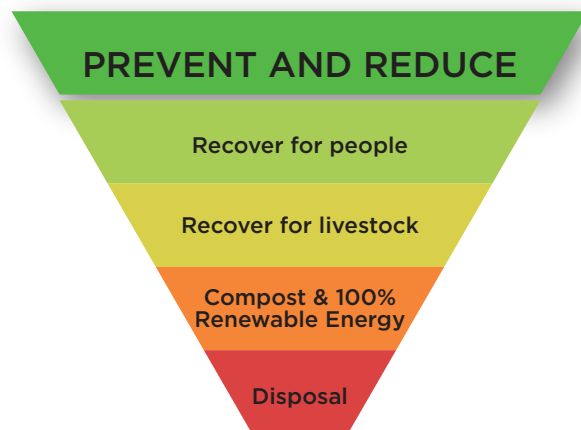
And to do so, the Council has begun to build the collaborative relationships needed to undertake the necessary work, on the home front and internationally.

THE FOOD RECOVERY HIERARCHY: A STRATEGIC FOUNDATION

The United States Environmental Protection Agency and other organizations and agencies working on FLW recommend an approach to reducing food waste that has wide acceptance, prioritizing the actions organizations can take based on their environmental benefit.

At the top of the list is preventing and reducing the volume of surplus food that is generated in the first place. As the EPA points out, the benefits include preventing the pollution related to the production of unused food, such as from fertilizers and pesticides, and the energy associated with growing, preparing and transporting it.

FOOD WASTE PYRAMID



Preventing waste at the top of the hierarchy also provides the greatest economic benefits by saving the waste of resources. The economic costs increase the further down the food chain that food is wasted. Investments in transportation and processing for food that ends up uneaten must be borne by companies and ultimately consumers. Some analysts have argued that food waste prevention could reduce the cost of food by 10-20 per cent.⁵

For these reasons, this hierarchy of actions is foundational to the strategy. Food loss and waste prevention and reduction is primary, followed by recovering food to feed people and then animals, and finally recycling and energy recovery through anaerobic digestion.

⁵ Food Waste: Aligning Government and Industry Within Value Chain Solutions, Gooch M., et al: Value Chain Management International Inc. 2016; and A Roadmap to Reduce U.S. Food Waste by 20 Percent, ReFED (Rethink Food Waste through Economics and Data), 2016

Sustainable Development and Food Waste

Seventeen Sustainable Development Goals (SDGs) were adopted as part of the 2030 Agenda for Sustainable Development⁶. Each goal has a set of targets.

SDG 12 seeks to “ensure sustainable consumption and production patterns.” The third target under this goal, 12.3, states “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.”

International organizations, from WRAP to the European Union’s REFRESH and Champions 12.3, are bringing together a wide cross-sector of organizations to act on food waste, ensuring that action plans are aligning with efforts aimed at securing national and global sustainability.

CAUSES AND SOLUTIONS

The problem of food loss and waste has been most comprehensively articulated in Canada by the Value Chain Management Centre (VCM).⁷ VCM found that waste occurs along all elements of the supply chain – from food production through to retail and post-consumer disposal as garbage. Essentially half of the food loss and waste in Canada is the result of decisions and actions of businesses within the food supply chain while consumers are responsible for the other half.

While a range of factors cause food loss and waste, Provision Coalition identifies five root causes:⁸

- Human behaviour and the incentives behind it (consumer, employee and management decisions);
- Time-limited biological reality of food – particularly fresh and unpackaged food;
- Limited or lack of advanced technology, equipment, packaging, etc.;
- Risk perception and risk avoidance among businesses and consumers; and
- Unintended consequences of regulation.

Reducing food loss and waste in Canada will be challenging, but many jurisdictions and businesses in Canada and across the globe demonstrate that food waste can be reduced through intentional actions. Key to long-term, lasting reductions is the application of a systems approach to ensure that unintended consequences do not emerge that simply relocate costs or impacts. For instance, actions to increase the amount of donated food going to community agencies and food banks who do not have the capacity to

6 <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf>

7 <http://vcm-international.com/wp-content/uploads/2016/10/Food-Waste-Aligning-Government-and-Industry-VCMI-Oct-4-2016.pdf>

8 *Developing an Industry led Approach to Addressing Food Waste in Canada*, Uzea, Gooch and Sparling: Provision Coalition 2014

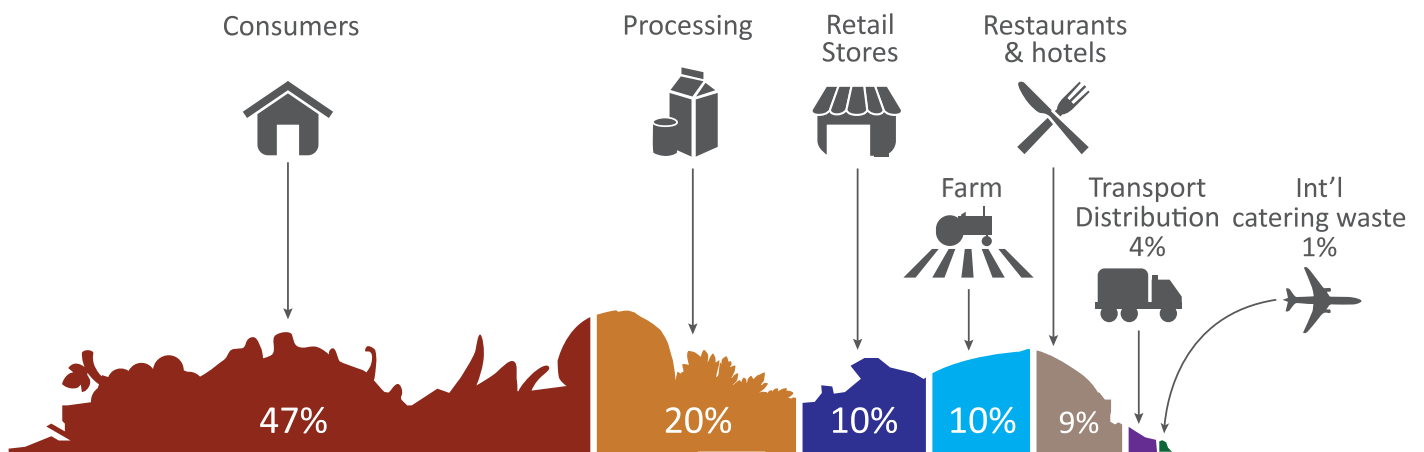
handle greater volumes could result in the same amount of food being disposed.

Farmers make decisions about what to grow long before their products will get to market. Businesses within the food value chain are making decisions based on market information, shareholder expectations and the regulatory environment. Consumers make decisions about the food they purchase and eat based on tastes and a range of social influences, including marketing efforts of businesses, as well as prices. Encompassing this value

chain are governmental regulations and policies that seek to accomplish a variety of objectives, from the safety and quality of food to how and where food waste is directed. Canada's food system is complex, and reducing food waste will require a new level of collaboration amongst a wide array of stakeholders and value-chain influencers.

In summary, solving food waste requires a systems approach that addresses the causes of food waste and loss from farm to fork to landfill. This strategy takes that approach.

WHERE FOOD WASTE OCCURS THROUGH CANADA'S FOOD VALUE CHAIN⁹



(Source: \$27 billion revisited: The cost of Canada's annual food waste, VCM International, 2014)

The staggering volume of food waste is caused by inappropriate decisions at all stages of the food chain. The opportunity is to engage all players in an integrated, national, food waste reduction strategy.

⁹ <http://vcm-international.com/wp-content/uploads/2014/12/Food-Waste-in-Canada-27-Billion-Revisited-Dec-10-2014.pdf>

1.0 Prevent



At the top of the food recovery hierarchy, with the highest economic and environmental benefits, is the prevention and reduction of food waste and loss. By reducing the amount of food waste, we avoid the loss of important resources like land, labour,

water and energy invested in food that is not consumed. In addition, the externalities of food production and consumption can be avoided, such as water pollution associated with some agricultural and processing practices, and greenhouse gas emissions from production, transportation, and the storage of food. Less food waste will also generate cost savings throughout the food supply chain.

IMPORTANT ACTIONS INCLUDE:

1.1 ADOPT AND COMMUNICATE A NATIONAL TARGET

In Canada, the federal government should publicly set and widely promote a national food loss and waste target. This will provide a common, measurable objective to drive actions by all levels of governments, businesses, NGOs and even the public. A per-capita national target, with a sub-target index for retail businesses, manufacturers, and consumers, would elevate awareness, demonstrate the commitment to act, and serve as a rallying point for public and private sector strategies and initiatives.

We recommend that both governments and businesses work with the World Resources Institute and the UN Food and Agriculture Organization to implement the Food Loss and Waste Reporting and Accounting Standard, which sets out definitions and recommendations for targets and sub-indicators¹⁰. Research and investment will also be required to monitor and measure efforts to implement the target and index.

Monitoring and Measuring Tools

Provision Coalition's KPI Dashboard¹¹ is a readily available monitoring and tracking solution for FLW. While it has been specifically designed for food and beverage manufacturers, it can be extended to serve other businesses operating at other points in the supply chain.

In supporting cross-sector collaboration within Canada, it is key to:

- assist those who have expressed an interest in setting targets but are looking for tangible ways to align and implement them.
- ensure research agendas are shared to avoid duplication and to leverage findings

¹⁰ <https://champions123.org/>

¹¹ <https://provisioncoalition.com/tools/kpidashboard>

1.2 HARMONIZE GOVERNMENT POLICIES

While municipalities, regions and provinces have different mandates and serve distinct jurisdictions, policies need to be coordinated and aligned as much as possible. Many of the businesses along the food value chain work across local, provincial, territorial, and national boundaries. As governments and their agencies, at all levels, develop new policies aimed at reducing food loss and waste, it is important that they are harmonized so that businesses can work within a common policy framework to avoid confusion, duplication and inefficiencies.

The Canadian Council of Ministers of the Environment (CCME) has typically played the role of coordinating inter-provincial and territorial initiatives. For initiatives such as Extended Producer Responsibility programs, this extends to sharing of best practices among ministry and provincial and territorial staff. If food waste was similarly prioritized by the CCME, the same could be done for food loss and waste prevention. Best practices could be more fully shared within an orchestrated approach to food waste prevention.

For instance, organics bans are recognized as effective means for diverting food waste from landfills and to comply with such bans, businesses must develop new systems and infrastructure to enable staff to sort organics from other waste. There also needs to be appropriate organics recycling infrastructure in place to receive sorted waste. However, currently there is little or no coordination amongst provinces to help ensure that businesses can work within standardized rules across provincial and territorial or even regional jurisdictions. Nor is there active leveraging of solutions in one jurisdiction to advance food waste prevention in another. One example would be a harmonized approach to establishing organics recycling infrastructure. Once a specific policy is demonstrated to be effective in reducing food waste, there must be

greater efforts by governments and their agencies to adopt successful policies and work towards harmonization.

1.3 REDUCE CONFUSION OVER DATE LABELLING

Food items have an array of date labels that cause consumers to be wary of buying or consuming food close to “best before”, “use by”, “sell by” and “expiry” dates. Greater clarity about the information these date labels provide, and a change in wording that aligns with the Consumer Goods Forum (CGF) global voluntary guidance, and with the specific recommendations coming from the Food Marketing Institute (FMI) and the Grocery Manufacturers Association (GMA) in the U.S., would reduce the unnecessary disposal of safe and healthy food, either by consumers or businesses who remove them prematurely from their shelves.

For instance, in 2017, FMI and GMA announced voluntary guidance for industry to align around a two-code date labelling system - “Best if Used By” as a quality-based date, and “Use By” for a limited number of highly perishable products with potential food safety concerns. Later that year, CGF issued a global call to action to align to the two code system.

Reducing confusion includes not only the wording found on date labels, but also the physical placement of the text, legibility, and consistency of formats. Progress on reducing confusion on date labelling will involve actions involving the federal government, specifically the Canadian Food Inspection Agency (CFIA), and the food processing and retail industry.

The CFIA is involved in a food labelling modernization initiative that will ensure food safety, consumer protection and a fair and secure marketplace. Given the global market for food, new labelling policies as well as voluntary practices will need to align with those

of similar agencies in the United States and Europe to avoid unnecessary generation of more food waste.

A wide array of stakeholders needs to be engaged in this discussion. Among those are organizations such as ReFED in the US and WRAP in the UK who have produced date labelling guidance¹²; the organizations mentioned previously including CGF, FMI, and GMA, and important industry organizations in Canada like the Retail Council of Canada and Provision Coalition. Incorporating educational messaging that helps consumers interpret current and future labelling should be an important element of public campaigns aimed at reducing food waste.

1.4 USE AND COMMUNICATE EVIDENCE-BASED APPROACHES TO PACKAGING

Exploring new packaging approaches to reduce food spoilage while responding to market demands is necessary.

Applying appropriate packaging where needed to reduce spoilage, exploring new packaging materials that support a circular economy, and re-sizing packaged food portions are all important.

Packaging food to protect and extend its shelf life, particularly for fresh fruit and vegetables, is a relatively simple solution. Any new food packaging introduced must be food grade and approved by food safety standards. Recent research identifies a strong correlation between foods with the highest percentage of wastage and the least amount of packaging.¹³ So an important role for food packaging is to retain and optimize the value of food that has already been

produced. An increase in the use of packaging may conflict with consumer views or preferences on amounts and types of packaging materials. However, in the solid waste stream handled by local governments in Canada, organic waste, including food waste, is a large component of the waste that has to be managed, not the packaging.

Clear research on the value of some packaging in reducing food waste, and a powerful communications campaign with the general public, are needed to ensure best practices can be implemented without raising public concern.

Food processors are engaged in packaging innovation, from changing the materials used to package food to technologies that help reduce contamination of packaged food on the assembly line. But more research is needed to understand what might be the most effective packaging approaches and technologies — passive technologies, or active and intelligent packaging through chemical or biological agents to prevent food spoilage. The goal is clear: reducing food waste while avoiding excessive increases in packaging materials, and maintaining packaging safety, quality and recyclability.

Packaging developments are also needed to respond to market demand that is evolving due to demographic changes. There is a growing number of single member households as well as older, “empty nester” homes, and families living in relatively small spaces. This market does not require, and cannot efficiently use, food in packages designed for larger families or groups, and as a result any foods that can't be eaten are discarded. Important actions in reducing food waste involve both portion-sizing and the type of

¹² *ReFED Date Labeling Standardization Tool*, ReFED 2017; *Labelling Guidance: Best practice on food date labelling and storage advice*, WRAP, Food Standards Agency, Department for Environment Food & Rural Affairs (DEFRA), 2017

¹³ *Quantifying the Value of Packaging – As a strategy to prevent food waste in America*, Ameripen 2018; and *The Value of Flexible Packaging in Extending Shelf Life and Reducing Food Waste*, prepared by McEwen Associates for the Flexible Packaging Association

packaging used in fresh and prepared foods – actions that will involve the collaboration of businesses in processing and manufacturing as well as packaging design.

1.5 MANAGE INVENTORIES TO PREVENT LOSS AND WASTE

A critical step in food loss and waste reduction is ensuring inventories in the food supply chain are appropriately sized, both in businesses and in homes, and stored in ways that reduce spoilage. Optimizing procurement and technical innovations would all be useful in reducing inventory waste.

Large institutions which provide meals, such as schools, hospitals and prisons, are major purchasers of food. Their purchasing power gives them influence with their suppliers and the ability to affect change throughout the supply chain. Additionally, carefully considered procurement practices could significantly reduce food waste in their own operations. For example, procurement policies that consider food ordering within the context of meal types and size options for consumers, and how these tie to strict inventory management systems, are all essential. Timely food purchasing and for the types and amounts that can be eaten – not just bulk buys which offer best or most consistent pricing – can significantly reduce waste production. Procurement policies can and should include recommendations for food donations.

Support is needed for knowledge transfer on how to include food loss and waste prevention objectives and best practices. Procurement guidelines and training for businesses are also required to avoid large food surpluses. There is some overlap with institutional procurement guidelines, but considerable areas where there are unique requirements. Strategies ranging from loosening aesthetic requirements to whole crop purchasing should be considered.

Procurement Guidance to Reduce FLW

There are many existing resources to help guide waste-conscious procurement decisions. Examples from outside of Canada include recommendations for the health sector¹⁴, more specific recommendations for hospital systems¹⁵ or even guidelines for office purchasing.¹⁶

New digital technologies can create new opportunities to manage inventories, the shipment of food and the identification of food surplus issues in a timely manner. All could reduce food spoilage and food waste.

Investments and support for new technological approaches such as blockchain can assist with authenticating, monitoring, or modifying inventories in ways that would significantly reduce food loss and waste. Good data supporting inventory management could provide easier, real-time ordering, help capture

14 http://www.procuraplus.org/fileadmin/user_upload/Activities_files/Events/Rome_2016/reducing_food_waste_healthcare_sector_by_Grazia_Cioci_and_Paola_Hern%C3%A1ndez.pdf

15 https://www.researchgate.net/publication/241092161_Food_waste_catering_practices_and_public_procurement_A_case_study_of_hospital_food_systems_in_Wales

16 <https://www.rockefellerfoundation.org/report/food-waste-toolkit-for-the-office/>

value from unsold food, and can help track solutions that work at preventing, rescuing, and recovering food.

What is blockchain technology?

Blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record can't be altered without the agreement and active involvement of everyone in the network. Transactions can be viewed simultaneously and in real time, with both greater security and transparency. Blockchain's unique characteristics offer users an ability to be highly responsive to changes within a supply chain.

Inventory management can be applied in the home as well, and support for good design that better enables consumers to prevent and reduce waste is important. The design of fridges, freezers, even consumer apps that support food sharing and meal planning can help prevent food waste at home. Appropriate design for Canadian markets could come from partnerships among industrial design schools and businesses that engage with consumers and food storage. Solid government and health organization support for food sharing-technology is required for innovations to be successful, as public policy can facilitate – or create a barrier to – the uptake of new approaches to sharing food outside of standard commercial kitchens.

Food retailers can also take steps to help households better manage their inventories and reduce food

waste. Marketing campaigns that push volume, like two-for-one sales, and packaging that doesn't allow consumers to easily separate portions required for a meal often lead to food waste.

1.6 DEVELOP NEW PRODUCTS AND MARKETS

Canada's food supply chain is largely made up of small to medium-sized enterprises (SMEs). These businesses tend to lack the capital and internal infrastructure to support the research and development required for new products (technological and otherwise) that could reduce food waste. In this context, government support for the creation and maintenance of a food innovation hub that supports linking food processors with investors, researchers and other businesses in the food supply chain would be valuable.

Relying on individual actors in a large, dispersed national food chain to connect to fully utilize food resources will delay efforts to create a circular food economy. And even if the connections are made, the access to capital to make ideas a reality are limited.

An innovation hub would help support businesses eager to initiate and pilot new ideas. It would also provide an opportunity for investors to act as brokers between ideas, projects, practices, and a place where capital could be pooled to build out larger projects.

New products created from food that is currently under-utilized but still edible could help reduce waste, and demonstrate how the food system could become more integrated into a circular economy. For instance, surplus bread has been used to create *Toast A/le beer*,¹⁷ and new uses for whey, a cheese by-product,¹⁸ are

17 <https://www.toastale.com>

18 https://dairygood.org/content/2017/knocking-out-food-waste-whey-cool?utm_source=Hub&utm_medium=NDC0302whey_campaign=Hub2017&utm_content=NDC

providing high-quality protein to consumers. Surplus spinach is being converted into dry 'pucks' for the smoothie market. The Greater Vancouver Food Bank is using surplus tomatoes from a local distributor and the skills of a local chef to make a tasty tomato sauce for their clients.

The above examples speak to not only finding new ways to use food that would otherwise go to waste, but also to redefining what people think of as an edible food product. The range of potential food products and markets is vast. The examples above are the results of individuals making connections, but a hub could expand idea and market development opportunities. At this point, examples of such hubs are few, and are too often limited to a web-presence, but opportunities to establish a better interface for those advancing ideas should be explored.¹⁹

In developing new products and markets, entrepreneurs and start-ups need access to financial resources as well as networks in the food industry. In the US, ReFED has developed a database of 400 start-ups with creative ideas and are actively trying to assemble capital for the most viable ones. In Canada, a network of investors and funders interested in food market opportunities could be linked to new enterprises with innovative and marketable ideas for new food products that would reduce the waste of food. There is also an important role for online platforms that would allow entrepreneurs to identify new opportunities for food products or new ingredients and to connect to potential funders or incubating opportunities.

Another innovation that could reduce food waste while providing farmers with more security is whole crop purchasing, which involves a food processor or

food retailer committing to buying all of a certain farm product from a farmer at the beginning of the season. Whole crop purchasing reduces the amount of food left on the field and should stimulate the development of new products or marketing schemes. New digital applications may allow farmers to indicate what portion of their crop would be best destined for retail sale and which best destined for food processing due to cosmetic irregularities. Alternatively, interesting campaigns have been designed by food retailers on the value of irregular or 'ugly' produce.

Reducing FLW through Technological Innovation

Hyperspectral chemical imaging is a Canadian technology produced by P&P Optics that allows companies to sort product by quality.

1.7 ENCOURAGE A CULTURE SHIFT AND NEW BEHAVIOURS

Preventing and reducing food waste in Canada requires a culture shift in businesses within the food supply chain – from CEO and executive offices to the shop floor – that cutting food waste is an important financial as well as social and environmental objective. There is already leadership within some global corporations who see how prevention is linked to their competitiveness and profitability, corporate responsibility objectives, and brand. Champions 12.3 is a good example. In other food businesses, however, this kind of leadership is an opportunity yet to be seized.

¹⁹ <https://furtherwithfood.org/> or Provision Coalition's online resources <https://provisioncoalition.com/ideahub/ideahubdetail/welcome-to-provision-coalitions-online-sustainability-portal> or EU Fusions <https://www.eu-fusions.org/>

In Canada, working directly with small and medium enterprises offers a potentially easier road forward. For example, training with procurement managers and assembly line workers can be more direct and with a smaller number of individuals who have significant inventory control, and where innovation can be piloted on-site with employees that can learn directly from new techniques and approaches.

Essential for making progress on preventing and reducing food waste is communicating this new commitment to staff and providing training at all levels of the business, from change management training at the leadership level to specific training on the shop floor. Staff need to know that reducing food waste is a new key performance indicator that will be important, and given information on, for example, how inventories of food products are to be managed, how to identify and maintain the quality of surplus food, and how to distinguish organic waste from material destined to the landfill. Changes to standard operating procedures, and staff training on how to prevent food loss along production lines will also be required.

This involves creating an ethos of waste prevention, where employees embrace the need for change and are provided enough information, skills and tools to implement new practices

Culture-shifting and SMEs

Provision Coalition, Canada's food and beverage sustainability association, provides training and technical support to food processors and manufacturers on how FLW can be addressed within their businesses – and how an ethos of waste prevention can be nurtured.

Since consumers are responsible for almost half of the food waste generated in Canada, engaging with them is essential. In the United Kingdom, WRAP's Love Food Hate Waste campaign has demonstrated the power of creating greater awareness of the amount of food waste generated in the home, and then providing simple tips for making positive changes. Through primarily the use of social media coupled with some targeted outreach and in-store promotions, consumers are given tangible and engaging messages about the environmental and economic impacts of food waste. They are provided with some relatively simple messages about how to use up the food they buy, store the food to preserve its freshness, and plan meals and shopping to better manage their home inventory.

Metro Vancouver, a regional government in British Columbia, has a licensing agreement that allowed them to introduce Love Food Hate Waste to the metropolitan area of Vancouver. In 2018, the National Zero Waste Council, in collaboration with local and provincial and territorial governments, national food retailers and NGO partners, will launch the country-wide Love Food Hate Waste Canada campaign in both official languages.

2.0 Recover



While the actions described under **1.0 Prevent** are intended to take place at the top end of the waste hierarchy, food recovery, or rescue, is needed to divert the remaining safe and nutritious food to people, and food scraps to animals.

Donations to community organizations and non-profits who organize meal and food programs, and developing mechanisms that assist neighbourhoods share food more effectively, help build community resilience and connection. Recovering food scraps for feeding animals maintains the value of food as an input into further food production rather than turning these scraps into garbage.

Ensuring that the resources invested in food production are not wasted but are instead used productively for feeding people or animals is an example of how circular economy concepts can be effectively integrated into the Canadian food system.

IMPORTANT ACTIONS INCLUDE:

2.1 ENHANCE INFRASTRUCTURE AND ENCOURAGE INNOVATION

Canada's geography – with significant distances between communities – presents transportation challenges for distribution and storage networks. Solving reverse logistics challenges and establishing opportunities for shared cold storage will assist in deepening food recovery. This will require advancements in IT-enabled transportation and better logistics software.

New on-line digital technologies will enable the creation of networks that can expedite the transfer of foods suitable for consumption to community organizations and non-profits. While food recovery activities have been operating for many years, there are still ways that new digital technologies could enhance the matching of food donors to community organizations.

On-line apps can also help community organizations provide potential donors with information on the type of food donations they generally require, including specific dietary needs or religious restrictions. Furthermore, creating networks that can operate rapidly is essential in moving fresh and perishable foods from donor to recipient organizations. This element is particularly important, as these are the foods that community organizations and food banks are looking for as they seek to develop more nutritious menus for their clients, and inventories of food products that include the full range of foods required for a healthy diet.

Reducing FLW through Social Innovation

FoodMesh was developed by two young Canadian entrepreneurs in 2015. They have created a network of investors, businesses, growers, processors and charities committed to a more circular food system. The on-line platform matches surplus food to demand from businesses and charities in real time. To date, FoodMesh has successfully provided hundreds of thousands of meals to people and has saved over a million dollars in food value by companies using the business to business platform.

The community infrastructure used by these organizations can also be enhanced, especially in terms of cold storage capacity in both warehouses and in vehicles, to expand the ability of these organizations to use fresh produce, milk products and fish and meat in their programs. Cold storage is essential for maintaining perishable foods at the quality required for food service. This is a challenge that governments could address through investment in public infrastructure, or businesses could include in their community responsibility or investment programs.

The redistribution of surplus foods is an important means for increasing community resiliency – it addresses a need and expands linkages between the private sector and the communities they operate within.

Facilitating the development of community kitchens and fridges, and promoting and supporting neighbourhood sharing apps, are examples of how community-based innovation and food waste rescue

and recovery could contribute to greater trust between people, normalize reciprocity, and create a bridge between diverse populations. Philanthropic investment and local government policy change to encourage community-based innovation in sharing surplus food would help build this level of activity as would support and active engagement from health authorities.

Land use planning policies could also help stimulate efforts to strengthen this sector. Comprehensive development zoning that allows food hubs to be built, where a mix of commercial, industrial and residential activities all involving food from production to consumption would be helpful. Food hubs help reduce distribution distance, and can reduce food spoilage due to transportation.

Canada's rural areas face additional challenges in facilitating food rescue. The distances between donor and recipient organizations would usually be much greater than in urban areas, creating even more requirements for effective systems to quickly match potential donors with recipients, accompanied by rapid transportation and storage systems that include refrigeration.

2.2 IMPROVE FOOD SERVICE TRACKING AND DISTRIBUTION

Within food service operations, ranging from corporate and institutional cafeterias to local restaurants, there are actions that can be taken to improve their ability to recover food. These include establishing better waste-tracking equipment and procedures to record and monitor surplus food amounts; identifying best practices with respect to food service donations; increasing the understanding of the challenges associated with appropriate serving strategies, and how these impact food donation; as well as identifying how to best transport hot and cold food to appropriate destinations. Working with food service

businesses to support a move toward trayless dining and plated menus over buffets is critical.

2.3 BUILD GLEANING NETWORKS

Farms can be important sites for recovering food. Gleaning is the recovery of vegetables and fruit that have not been shipped to market from a farm or orchard, and would otherwise be left to rot or be turned under in-field. The reasons why this produce did not get to market vary, including production in excess of contracts, or not meeting market requirements for size, shape, colour or condition. In a gleaning operation, farmworkers or volunteers collect the produce and then it is sent to be processed and distributed to communities locally, nationally or internationally. As a food recovery action, gleaning reduces food waste that would otherwise be generated on-field, and helps move food to communities in need. The gleaning organizations in Canada are looking to establish a national network that would allow cost efficiencies associated with bulk purchasing of supplies, storage, and administration services. Support for the development of a gleaning network in Canada would help increase their capacity and lead to greater food capture.

2.4 REMOVE FINANCIAL, LEGAL AND POLICY BARRIERS

Businesses which donate foods to charities typically face additional costs in sorting, storing and transporting food.

In general, to support the donation of surplus foods, provincial and territorial, and local health authorities need to provide guidance to donors on which surplus foods are most appropriate for donation and how to keep food safe during the donation process.

Aside from the logistics, potential food donors have expressed concerns about liabilities they may be exposed to as a result of donating food. However, in Canada there has not been a reported court decision imposing liability on a business or individual caused by donated foods.

The National Zero Waste Council has already initiated action on this front. The Council has produced food donation guidelines²⁰ for Alberta, Ontario, Quebec and Nova Scotia, based on similar guidelines for British Columbia produced by the BC Centre for Disease Control. These guidelines identify good food donation practices for food retail, service and processing businesses, including types of food and food storage requirements, and provide legal interpretations of Good Samaritan Acts that govern risk liability when donating food. These guidelines will be featured in knowledge transfer workshops conducted by the Council and Provision Coalition in 2018. Additional business training and education campaigns around the issue of liability with respect to food donation programs may be required.

There can be policies, coupled with public perceptions, that inadvertently prevent market development leading to greater food waste recovery. These policies need to be updated, and consumer campaigns supporting a culture shift around food purchasing need to be undertaken. Market initiatives that are gaining traction in jurisdictions outside of Canada include businesses that feature recovered food sold at discount, or wholly feature foods past their best before dates, or consumer-tailored online ordering where portions better meet consumption needs. Similar business opportunities await for businesses in Canada. These types of creative, innovative market opportunities need to be captured and supported.

20 <http://www.nzwc.ca/focus/food/guidelines-for-food-donations/Pages/default.aspx>

2.5 EXPAND THE RECOVERY OF FOOD SCRAPS TO FEED ANIMALS

There are two ways in which recovered food scraps can become animal feed. One is for a food business to donate their food scraps or surplus foods to an animal feed processing facility where the food is transformed into a dry, stable feed. This would include food for pets as well as farm animals. The alternative is for a business to donate its food scraps for operations that directly feed them to the animals. The only processing involved in the latter is that the food scraps may need to be de-packaged or ground into a slurry.

Not all food waste is appropriate for feeding animals. There are restrictions on what animals can be fed. Since provincial and territorial governments are responsible for managing agricultural operations, including livestock, there can be variations in these laws across Canada. To reduce food waste, it would be beneficial to harmonize the guidelines and regulations regarding the recovery of food waste for animal feed.

Distribution and de-packaging issues need to be resolved. Farmers need consistent flows of food waste to feed livestock, and farmers cannot be expected to de-package donated food on farm sites. Where de-packaging happens, and how donating businesses can support this process, is an important discussion. Some retailers are already making headway on this challenge. Facilitating, and then providing longer-term support for knowledge-transfer and relationship-building between processors, retailers, farmers and potentially community organizations, is required. Donated food waste to animals should be tracked and monitored, so it can inform future procurement decisions, and affect upstream loss and waste actions.

3.0 Recycle



Systematic efforts to reduce the generation of surplus food and recover nutritious food that would otherwise be wasted will dramatically reduce the amount discarded. However, these strategies will take time to deliver results,

and cannot be expected to completely eliminate the amount disposed in landfills. As a result, an additional set of activities is needed to prevent food waste being combined with other garbage in landfills. The purpose is to capture the embedded nutrients and energy from those food scraps and reduce the methane emissions from the decay of organic materials in landfills, which in itself accounts for approximately four per cent of Canada's greenhouse gas inventory.²¹

Composting plants and bioenergy facilities are opportunities that can create value from food waste. However, to operate effectively they all need a dedicated and predictable stream of food waste along with other organic materials, such as yard trimmings. As long as food waste is simply thrown away and discarded with other garbage into landfills, the business case for these recycling facilities, whether they are owned by local governments or by the private sector, will be weak. For this reason, there is a need for regulation, effective communications campaigns, and government support for infrastructure to capture the value of the food waste that remains after proactive steps to prevent and recover food waste.

IMPORTANT ACTIONS INCLUDE:

3.1 BAN ORGANICS FROM LANDFILLS

Composting and bioenergy facilities have been built by both the private sector and governments. But to be successful, both need a robust market for their product, compost, and a reliable and uncontaminated supply of their input material, food scraps. Gaining an uncontaminated supply of food scraps is challenging, since it requires new waste separation behaviours by restaurants, groceries and other businesses, institutions such as schools, and residents of single- and-multi-family homes.

To move forward and encourage the growth of these operations, a carefully coordinated set of policy changes and communications campaigns is needed. Local, regional or provincial and territorial governments can set the frame by banning the disposal of organic material in landfills. Ideally, organic bans are supported by provinces that are coordinating with each other, so that businesses operating across the country are responding to a harmonized policy environment. While there are challenges associated with localized residential pick-up and material processing facilities – particularly in rural areas – policy regimes can be modified to fit rural and urban contexts. Minimally, large urban areas across the country should consider developing complementary policy statements. Within metropolitan regions, it is recommended that implementation practices are synergistic as this would assist with measurement and monitoring efforts.

21 National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada. Available at: <https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=662F9C56-1>

The effectiveness of any ban will furthermore depend on additional efforts to encourage individuals in all situations to separate their food scraps from the garbage. Best practice has been to:

- Consult with businesses, institutions and the general public on the details of implementing the ban,
- Provide sufficient lead time for businesses and institutions to invest in new equipment and learn new systems, and
- Initiate and continue comprehensive communications and behaviour change campaigns to encourage everyone to separate food waste from garbage and place it into a separate collection stream.

Government bans on the disposal of food scraps in landfills, along with consumer and business engagement plans to build awareness and encourage new behaviours, have been implemented in several Canadian cities and regions. The result has been a dramatic reduction in food disposal in landfills, gradual improvement in reducing the contamination of other refuse in food waste streams, and the consequent growth of new businesses and technologies that turn food scraps into compost and bioenergy.

Whether local governments or the private sector own and operate the facilities taking in organics, revenue earned from material and energy sales can offset some of the costs of waste disposal. For instance, by creating both compost and biogas that can be substituted for natural gas, some anaerobic digesters may be able to accept food waste at a cost comparable to some landfills. In the process, they add value to the community by eliminating the methane emissions that food waste would have created in a landfill, generating energy that can offset the need for fossil fuel development, and providing a soil amendment that can return fertility to degraded soils and reduce the need for chemical fertilizers.

3.2 ENCOURAGE INVESTMENTS

Composting and biofuel facilities are capital intensive, and could be beyond the reach of many local governments. Continued federal support for their construction is needed. In addition, the Federation of Canadian Municipalities' Green Municipal Fund will need to continue providing financial support to local governments interested in building public composting facilities.

The financial viability of these operations also requires a strong market for compost. This could be facilitated through policies by local, regional or provincial and territorial governments that encourage the use of compost for landscaping or site remediation.

Other opportunities include working with organizations like the Solid Waste Association of North America and the Compost Council of Canada, academic institutions such as the University of British Columbia and the Environmental Research and Education Foundation in Ontario to undertake applied research to develop new technologies for recovering materials and energy from organics. Again, there is a role for the federal government to invest in research and development, but also in facilitating partnerships around clean technology innovation that targets food waste and greenhouse gas capture and transforms it into a green energy source.

3.3 INNOVATIONS IN DESIGN

Adding the separation of food scraps to the recycling efforts of homes, businesses and institutions adds complexity to regular tasks, and often requires additional space – from home and restaurant kitchens to apartment building garbage rooms, to the dining areas of fast-food restaurants.

Better Design Supports FLW Action

New U.S. design guidelines²² for residential, commercial and institutional buildings are intended to support cities deliver on waste prevention and reduction goals. Produced by the US Centre for Architecture, with support from The Rockefeller Foundation, these guidelines offer advice on a wide range of strategies and best practices that span urban design to construction and demolition.

New designs of facilities and spaces are needed to simplify the responsibilities of employees and residents so that they can more easily separate their waste streams. Design guidelines informed by building codes can help designers, building operators and planners collaborate to build and systematize organic waste recycling. Design guidelines can work at the micro scale of individual buildings, through to multi-family building sites and neighbourhoods. They can include details ranging from organic waste chutes in new multi-family buildings to SMART monitoring within residences to help people track their food waste.

22 <https://assets.rockefellerfoundation.org/app/uploads/20171113123723/Zero-Waste-Design-Guidelines-2017.pdf>

Concluding Statement

Food loss and waste costs Canadians – economically, environmentally and socially. It is critical that Canada join other global leaders in addressing the problem – and by doing so, better position us to lead on innovation, support our SME's, strengthen our food system, and create stronger, more resilient communities. We collectively have a target to reach: by 2030, to halve per capita food waste and reduce food losses. To effectively reach this target will require new levels of collaboration across sectors, amongst all levels of government, and with diverse stakeholders. A greater willingness to work together, with greater transparency around how we are measuring and monitoring progress and action planning for success will be important. The actions and tools described in this national strategy provide a way forward, encouraging people and organizations to share knowledge and harmonize action along the way.

The National Zero Waste Council supports collaboration, fosters knowledge transfer, and animates action. We look forward to supporting champions in business/industry, government, and civil society who are diving deep into addressing food loss and waste – and building a more sustainable food system for all Canadians.

