



Zero Waste Plan

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Executive Summary

The City of Northfield Climate Action Plan (CAP), adopted November 2019, calls for a Zero Waste Plan (ZWP) to be "developed and adopted" within three years.ⁱ

The Goals of the Climate Action Plan are for Northfield to be a 100% carbon-free community by 2040 and become more environmentally resilient.ⁱⁱ

One way these goals will be achieved is by limiting the creation of waste by using materials more sustainably, preventing existing waste from entering the landfill and by reducing quantities of unnecessary materials in packaging and purchases through a shift to a life-cycle materials management approach, creating economic benefits in the process.

Zero Waste is a materials management approach centered on reducing consumption, conserving resources, and increasing reuse and recovery of materials in order to minimize or eradicate the amount of waste being sent to landfills and incinerators.

Nearly all waste produces harmful emissions and contributes to other serious problems. The manufacture and distribution of unnecessary goods and materials that are thrown away add even more greenhouse gas (GHG) emissions.

The Purpose of the Zero Waste Plan is to guide the City in creating the legal, operational, and cultural changes necessary for reducing waste and its associated GHG emissions.

Specifically, this plan sets the targets of reducing waste going to the landfill by 90% from 2020 levels by 2030 and ensuring that all organic waste, from residential, commercial, institutional, industrial and City government sources, is composted or processed for reuse by 2025, in accordance with the CAP goal. Some of the ZWP proposals are already under way, and many other changes will unfold incrementally over time.

Priorities of the Plan emphasize reducing consumption along with reuse, since these methods have the greatest potential to mitigate both downstream waste and upstream GHG emissions and minimize environmental damage.ⁱⁱⁱ

Using Minnesota's Waste Use Hierarchy, the Minnesota Pollution Control Agency points out that because it is easier to discard than to influence product design, industrial practices, and community consumption patterns, the areas where reduction and reuse can be achieved, addressing the early

stages of the product life cycle are the most challenging to tackle. Therefore, local governments are called upon to wisely take the lead in reductions and recycling by

- moving towards eliminating wasteful purchases of goods and materials
- growing their reuse and recycling economy
- buying local as means of decreasing the demand for raw material extraction
- reducing transportation emissions

With these notable challenges in mind, the plan calls upon the City to:

- rethink materials use and waste management so that Northfield will be able to limit significantly the creation of waste in the future and divert most existing waste from the landfill, and to
- implement programs that address the root problem of wasteful consumption habits, while also considering the cost and the physical and human capital needed to carry out each objective.

Costs and Benefits: As with any plan, there will be associated costs. One of the advantages of Zero Waste is that many of the recommendations will lower costs in the long-run and, in some cases, can do so immediately. Moving towards Zero Waste in a steady, incremental way with a clear timetable has benefits not only for the environment but for the social and economic wellbeing of the community. Zero Waste as well as providing cost saving opportunities, presents opportunities for entrepreneurs to fill market niches and for increased employment. Becoming carbon and waste free will in the short and long term enhance the local economy as well as ecological and human health and ease the burden that waste generation places on already marginalized people within the community.

Strategies and Recommendations comprise the bulk of the plan. Comprising eight strategic major goals, they collectively present ninety-two specific policies and programs to achieve Zero Waste. These 8 major goals and their general strategies, are as follows:

Education & Awareness programs and interest groups to arm citizens, businesses, and institutions with information on the detrimental environmental and human health effects of waste and its associated GHG emissions. These efforts will help consumers, enterprises, and the community realize environmental monetary savings. (14 recommendations)

City Leadership in Waste Reduction has the City government lead by example and help others establish best practices based upon its research, practices and the City's own example. (24 recommendations)

Prevention & Donation of Food Processing Waste & Otherwise Wasted Food works to reduce the chief contributor to greenhouse gas in the waste realm -- uncaptured methane produced by decomposing organic waste in the Rice County landfill. (4 recommendations)

Organic Waste Reduction & Diversion from Landfill, mostly involving long overdue city-wide composting by 2025 and some reduction and reuse measures, establishes means for significantly curtailing methane emissions. (11 recommendations)

Residential Reuse & Recycling sets forth ideas to promote reuse and recycle businesses and foster better household recycling practices in order to improve environmental sustainability while creating economic opportunity by reducing what gets landfilled. (10 recommendations)

Commercial & Industrial Sector Waste Reduction centers on partnerships, practices, and policies that address this sector's particular opportunities and challenges to help commercial enterprises lower costs. (15 recommendations)

Increased Reuse & Deconstruction in the Construction & Demolition Sector makes recommendations based largely on programs throughout Minnesota and pursued by our State. It also promotes new business opportunities in the salvage and reuse sector. (14 recommendations)

Improving Institutional Waste Management identifies best practices individual Northfield schools, colleges, assisted living facilities and the like should adopt more broadly and extensively than many of them do. (6 recommendations)

A summary table of all recommendations grouped into actions, priorities and proposed timeframes is provided at the end of Section 4.

Conclusion: Four key principles, prioritized in order to maximize impact, underpin this ZWP and are critical for its success.

- Prioritizing Preventing Waste, Reduction, and Reuse
- Education for Culture Change
- Equitable Opportunity for the Entire Community
- Monitoring and Evaluation

Community buy-in is crucial to the success of the entire Climate Action Plan and stakeholders' responsiveness to recommendations play a key role in this.

Priorities within the recommendations including the incremental implementation of the ZWP by 2030 as stipulated in the CAP will constantly need to be reset based on events, stakeholders' responsiveness, staff and volunteers' time and resources, grants opportunities, and the development of new technologies.

Obstacles to fulfilling the goals of the plan must not prevent its implementation, but rather encourage the seeking of creative and innovative solutions that will ensure its implementation.

SECTION 1: INTRODUCTION

Northfield's CAP, adopted in 2019, established the target of becoming carbon free by 2040 and laid out actions the City will take to achieve this goal. Solid Waste was identified as one of the core six areas of focus, within which, the creation and adoption of a ZWP within three years of the CAP's adoption was one of the directives.^{iv}

The creation of a ZWP aligns with Minnesota Statutes 115A, known as the Minnesota Waste Management Act of 1980 which, among other things, seeks to enhance the separation and recovery of materials and energy from waste and educate the public on resisting the indiscriminate dependence on the disposal of waste.

A ZWP also aligns Northfield with recent recommendations from the Minnesota Pollution Control Agency 2019 Solid Waste Policy Report^v (p. 53) to develop a statewide solid waste plan that is consistent with neighboring Metro Solid Waste Policy Plan goal (p. 12): to reach 75% reduction (by weight and by 2030) of combined traditional recycling and organics from the landfilled waste stream.^{vi}

What is Zero Waste?

The term Zero Waste has been defined in varying ways in the different places it has been undertaken. For the purposes of this plan, **Zero Waste is the materials management approach centered on reducing consumption, conserving resources, and increasing reuse and recovery of materials in order to minimize or eradicate the amount of waste being sent to landfills and incinerators.**

Purpose of this Plan

In its ongoing commitment to sustainability and as part of its 2019 Climate Action Plan (CAP), the City of Northfield adopted the goal of creating a Zero Waste Plan (ZWP) in order to reduce waste and the greenhouse gas (GHG) emissions that result from current waste management practices.

This Zero Waste Plan is intended to guide the City in creating the legal, operational, and cultural changes necessary for reducing waste and its associated GHG emissions. It is a holistic framework for rethinking resource management that prioritizes changing consumption habits in order to lessen the need for new products.

Specifically, this plan sets the targets of reducing waste going to the landfill by 90% from 2020 levels by 2030 and ensuring that all organic waste, from residential, commercial, institutional, industrial and City government sources, is composted or processed for reuse by 2025, in accordance with the CAP goal.

Goals of Zero Waste

The goals of Zero Waste are twofold: limiting the creation of waste by using materials more sustainably and preventing existing waste from entering the landfill. The aims are to reduce quantities of unnecessary materials in packaging and purchases and to shift to a life-cycle materials management approach, creating economic benefits in the process.

Lifecycle materials management, unlike standard waste management, extends the lifetime productivity of materials through reuse and recycling in order to serve human needs and minimize environmental damage.^{vii}

These changes in mindset surrounding the use of materials hold the greatest potential for reducing waste and costs and producing environmental benefits. They require addressing the early stages of the product life cycle and are the most challenging to tackle in American culture.

The Current Status

Knowledge of Northfield's current waste diversion status and waste stream make-up is essential for monitoring progress towards Zero Waste and adjusting programs in order to optimize their success in Northfield.

Currently, Northfield's residential trash is collected by Dick's Sanitation Inc. (DSI) and taken to Rice County's Solid Waste Facility, which includes a landfill, construction & demolition dump, hazardous waste dump and yard waste dump. DSI takes single stream recyclable materials and processes them at its Recycle Minnesota facility in Lakeville, MN. Northfield has an exclusive contract with DSI meaning that DSI is the only waste hauler approved to collect single-family residential trash and recycling in the City. Multi-family, commercial, industrial, and institutional entities are free to contract with other waste hauling companies. DSI provides weekly curbside collection for trash and bi-weekly (every other) collection for single-stream recycling, with a variety of bin sizes available for both trash and recycling. Trash collection is charged to households at a fixed monthly rate depending on the size of their trash carts and there is no additional fee for recycling. The DSI contract also allows curbside composting to be added to the required services, but at last attempt, public interest in this service was not great enough to warrant the additional costs of adding curbside composting.

However, a separate, new, local company, Northfield Curbside Composting, provides a subscription-based curbside compost service with some 600 residents enrolled. As previously stated, this ZWP sets a goal of establishing curbside composting to all residents of Northfield by 2025, whether provided by DSI, Northfield Curbside Composting, or another hauler. 2025 is the same year that the current contract with DSI ends, creating an opening to renegotiate the terms of the contract to elicit a greater degree of waste reduction efforts by DSI or to contract with a different company.

In the 2019 renewal of the City's contract with DSI, annual waste sorts by DSI were instated as a new measure for data collection. Waste sorts began in the fall of 2020, so there is currently limited available data on Northfield's waste stream composition. Instead, county-level and state-level data are used to estimate the percentage of Northfield's waste going to different types of waste facilities. According to the CAP, approximately 46% of Northfield's waste was sent to landfills, 52% to recycling plants, 2% to resource recovery facilities (waste to energy)^{viii} and <1% was composted in 2019. Of the landfilled waste, it is estimated that it is composed of 31% organics, 24.5% paper, 17.9% plastic, and 25.6% other materials including metal, glass, hazardous waste and electronics as of the 2013 Solid Waste Report from the MPCA.^{ix}

In order to measure progress towards the Zero Waste goal, it will be necessary to have data for Northfield specifically, rather than having to infer Northfield's statistics from county or state level data. The Rice County Sanitary landfill also collects some data about the waste coming into its

facility and reported that in 2019, single family households in Northfield generated 3122.31 tons of waste.

How to Get There

The EPA reports that “many communities across the country and around the world are working towards zero waste” and offers tools to achieve this that inform the Northfield ZWP.^x Its goals will be achieved **through education, culture change, and the adoption of environmentally-sound strategies, practices and policies.**

SECTION 2: ACHIEVING ZERO WASTE

Throughout the plan, opportunities for reduction of consumption and reuse of items are emphasized, since these methods have the greatest potential to mitigate both downstream waste and upstream GHG emissions. The EPA’s food waste hierarchy and Minnesota’s waste management hierarchy, which champion reduction and reuse, are used as guiding principles throughout to ensure that the most impactful interventions are prioritized

Product Life Cycle

The product life cycle, depicted in Figure 1, can be envisioned as an open loop consisting of five phases: product design, manufacturing, distribution, use, and disposal. Zero Waste and life-cycle materials management emphasize closing this loop so that waste items can be reused and recycled to become the inputs for new or repaired products. Reducing quantities of throw away materials and using waste materials to create new items not only prevents waste from entering the landfill but mitigates upstream effects, namely the extraction of raw materials.

Whether through mining, clearing trees, or harvesting crops, extracting raw materials can be an extremely environmentally costly process, emitting vast quantities of greenhouse gases and producing air and water pollution. The manufacturing and distribution phases of production are also huge sources of carbon emissions due to the machinery needed to create and transport products.



Figure 1. The Product Lifecycle. Shows the steps involved in creating, using, and disposing of products.

Image source: MPCA, 2019, Solid Waste Policy Report. Retrieved from <https://www.pca.state.mn.us/sites/default/files/lrw-sw-1sy19.pdf>

Local governments wisely take the lead in reductions and recycling. On a community level, Northfield must:

- move towards eliminating wasteful purchases of goods and materials

- grow its reuse and recycling economy
- buy local as means of decreasing the demand for raw material extraction
- reduce transportation emissions.

Reduced Consumption

The shift towards reduced consumption and greater regulation of manufacturing has proven challenging on the public policy level, and in practice. Recycling and composting efforts have instead been the focus of governments and companies. A report by the Minnesota Pollution Control Agency (MPCA) suggests that this is because “the waste management hierarchy has been operationalized to create incentives for pursuing recycling or composting over reducing the size, material, or toxicity of an item” and because “it has been easier [...] to manage and measure discards instead of working to influence [...] product design, industrial practices, and community consumption patterns — the areas where reduction and reuse can be achieved”.^{xi} Ironically, recycling has helped people think that they can accumulate more plastics, despite the dire environmental consequences of doing so.

As a society, we lost sight of the original intent behind the “3 R’s,” - Reduce, Reuse, Recycle. We need to put renewed focus on the more impactful first two. This ZWP provides Northfield with the means to do just that.

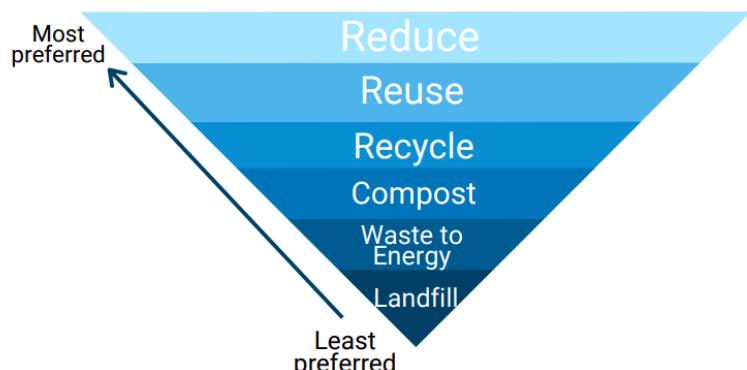


Figure 2. Minnesota Waste Management Hierarchy

With these notable challenges in mind, the City must:

- rethink materials use and waste management so that Northfield will be able to greatly limit the creation of waste in the future and divert most existing waste from the landfill.
- implement programs that address the root problem of wasteful consumption habits, while also considering the cost and the physical and human capital needed to carry out each objective.

SECTION 3: COSTS AND BENEFITS OF ZERO WASTE

As with any plan, there are associated costs. The City, recognizing the potential of financial stress that implementing costly interventions could cause, initially seeks to avoid significant increases in prices or taxes.

One of the advantages of Zero Waste is that many of the recommendations will lower costs in the long-run and, in some cases, can do so immediately. Moving towards Zero Waste in a steady, incremental way with a clear timetable has benefits not only for the environment but for the social and economic wellbeing of the community.

Northfield has been a leader in environmental stewardship for many years and in 2018 announced “Climate Change Impacts” as one of its six strategic goals for 2018-2020. In surveying the community for the creation of the CAP, Northfielders demonstrated their concern for matters of sustainability. 81% of survey respondents said that they thought about climate change at least once a week and of the 962 who said they were taking actions to reduce their climate impact, 91% reported trying to reduce waste.^{xii} Thus, members of the Northfield community, along with the City’s government, have indicated their interest in working towards the goal of mitigating climate change through waste reduction efforts. This plan, in support of the CAP and the city’s strategic goals, responds directly to wishes and expectations of the community.

Becoming Carbon Free

Preventing waste from entering the landfill reduces GHG emissions and can stimulate reuse and recycling industries, adding value to the economy.

The CAP estimated that in 2017, 27,545 tons of waste were produced in Northfield, generating 3,737 tonnes of GHGs. The majority of those emissions came from landfilled waste, especially organic matter (e.g. food, yard scraps) which, when decomposing under the anaerobic conditions of landfills, releases methane, a greenhouse gas 84 times stronger than carbon dioxide.^{xiii}

Through its emphasis on reduced consumption and increased reuse, a Zero Waste mindset will divert waste from the landfill and lessen the demand for new products, thereby mitigating the upstream emissions that go into the extraction of raw materials, processing, and transportation required to bring new products to the market. Through Zero Waste practices, Northfield can move towards its goal of becoming carbon free by 2040.

Enhancing the Local Economy

While there will be short-term costs necessary to implement many of the suggestions, reduced consumption, the top goal of this ZWP, has the potential to significantly lower costs for consumers. In 2014, the USDA found that the average American wastes more than 400 pounds of food annually. One commentator has said it’s as if “we would leave the store with five bags and drop two in the parking lot. And leave them there.”^{xiv}

Educating people about the cost-cutting opportunity of reducing consumption is a critical part of this plan. The City understands that short-term costs may present a financial hardship to members of the community. Therefore, this section discusses potential sources of funding so that undue burden is not placed on Northfield residents and businesses. A number of them will be of little cost to the City or will provide revenue for other projects. Some possibilities include:

- households that switch from the largest offered trash cart size to the smallest or second smallest size can save money even if they also sign up for weekly curbside compost collection.
- ordinances such as a plastic bag fee present only a small cost to consumers that can easily be avoided by changing behaviors. Such an ordinance can be used to fund other initiatives, such as educational campaigns, like other cities have done with revenue from

similar fees.

- point-of-purchase fees levied on difficult to recycle materials or hazardous waste can help pay for the disposal for these items.
- funding, albeit limited, could come from reallocating existing City dollars. Since Northfield has an exclusive contract with DSI, residents pay the City directly for their garbage hauling, and the City pays DSI. The City government reserves some of the garbage hauling tax revenue, which is used to fund projects.
- grant or loan funding from different sources may supplement the changes proposed in this ZWP. The MPCA offers grants and loans for a variety of projects including combating food waste^{xv} or source reduction, composting and recycling^{xvi} for businesses. Grants are also available from non-governmental agencies like the Environmental Education & Research Foundation, which offers grants for waste research^{xvii}.
- Zero Waste presents opportunities for entrepreneurs to fill market niches that arise as the economy shifts towards greater reuse and recycling and away from raw material extraction. For example, Northfield could become home to businesses that process any number of recyclable materials such as glass, plastics or paper -- new businesses that use recycled materials as their inputs. Existing businesses will have to adapt to meet more ambitious environmental goals, but there is opportunity for ingenuity during this process.

Whether looked at from an ecological or economic perspective, Zero Waste is an objective that businesses and residents alike can get behind. Reducing materials by increasing paperless practices, buying in bulk, and reducing packaging in other ways save businesses and individuals money. Many of the materials currently discarded have value that could be kept in the local economy. Reusable and recyclable items can become products for consumption in local markets and expansion of local industries in the reuse and recycling sectors can create jobs for Northfielders. In fact, the Institute for Local Self Reliance (ISLR) has estimated the number of jobs created in the processing of different material types and has found that reuse of high value products employs more people at higher wages than recycling, while recycling employs more people than landfilling or incineration.^{xviii}

Transitioning to a more circular economy - one where waste items become resources and raw materials are seldom used - does come with some costs, namely increasing labor costs. However, with the right incentives and support from the government and community, more labor-intensive production actually benefits society by employing more people, while also serving the planet.

Maintaining Human and Ecological Health in the Long Term

Zero Waste practices are closely intertwined with protecting the physical health of Northfielders and the ecological health and resilience of the natural environment. In reducing consumption, limiting disposal for landfilling, and promoting local products, GHG emissions will be diminished.

In the CAP's survey, 80% of respondents said they were worried about decreased air quality and 85% said they were concerned about the impact on food and agricultural production.^{xix} Curtailing

GHG emissions will have positive impacts on air quality and will contribute to the progress being made at state, national, and global levels to combat climate change.

Realizing Zero Waste goals can ease the burden that waste generation places on already marginalized people within the community.

While some additional costs may be unavoidable, as was addressed in the Costs & Benefits section, the benefits of Zero Waste are not limited to economic ones; cleaner air and water will produce health benefits not only for Northfield residents, but indirectly for people across the country. For instance, extraction and processing of raw materials in factories are large sources of pollution - pollution that disproportionately affects low-income people and those who lack the political resources to prevent pollution near their homes. Zero Waste moves away from an over dependence on raw material extraction, allowing for cleaner air and therefore better respiratory health for people living near factories.

Similarly, reducing the amount of trash going to landfills will extend the life of the Rice County landfill, which will delay the need to set aside more land for the eventual creation and added costs of a new landfill. The creation of new landfills is a process which, even when done carefully, pollutes the surrounding environment, presenting real health threats to underrepresented groups, whose homes, schools, and workplaces in the U.S. are disproportionately found close to these sources of pollution.

SECTION 4: STRATEGIES AND RECOMMENDATIONS

What follows in the rest of this plan are the specific strategies (policies and programs) that the City will take to achieve Zero Waste. Providing strategies that can be used by *all* members of the Northfield community - residents, businesses, institutions, industries, and the City government alike - is extremely important to the success and fairness of this plan.



Figure 3. Graphical Overview of Plan Achievement.

This series of recommended policies and programs that Northfield can pursue were generated by assessing measures taken in other cities, compiling best practices from a variety of environmental organizations such as Minnesota's GreenStep Cities, and through communication with stakeholders and community members. Figure 3 shows eight main categories and the top priorities within each that were identified in which specific sets of recommendations could be implemented over time. These categories are:

- Education & Awareness
- City Leadership in Waste Reduction
- Prevention & Donation of Food Processing Waste & Otherwise Wasted Food
- Organic Waste Reduction & Diversion from Landfill
- Residential Reuse & Recycling
- Commercial & Industrial Sector Waste Reduction
- Increased Reuse & Deconstruction in the Construction & Demolition Sector
- Improving Institutional Waste Management.

Each of these categories begins with a brief overview of the category followed by specific recommendations to achieve each of the goals. Where appropriate, definitions of relevant terms, and an update on the current status of waste diversion in that area is provided and, where possible, examples of similar measures taken in other cities are included to provide additional credibility to the suggestions in the plan.

Education & Awareness

Education & Awareness are cross-cutting goals that pertain to all of the categories that follow. Arming citizens, businesses, and institutions with information on the detrimental environmental and human health effects of waste and its associated GHG emissions is critical to convincing people of the many benefits of prevention, reduction and reuse of waste. For example, publicizing statistics on the methane produced by organic matter decomposition may help convince people of the critical importance of composting and reducing food waste.

Education must be wide-spread and consistent, with multi-media messaging and community engagement. Community-based social marketing, an increasingly used method of direct, community-level engagement to create behavior change, will be an important approach in embedding Zero Waste practices within the community.

Community-based social marketing emphasizes a variety of techniques based on social psychology such as changing social norms, providing incentives, and making sustainable behaviors convenient, in order to create the most wide-spread and lasting change.^{xx}

Many of the recommendations that follow utilize community-based social marketing. Although not all of the recommendations in this section are explicitly about reducing consumption, education of the public is perhaps the most important initial step towards achieving this desired change in purchasing patterns and waste disposal practices.

Recommendations:

1. Continue updating and improving the Materials & Waste page of the City's website to include information about Zero Waste services, policies, and progress.
2. Make use of educational tools such as the Minnesota Chamber of Commerce's Recycling Education Toolkit.
3. Have volunteers table and assist in waste sorting at public events such as the Defeat of Jesse James Days and other events to promote reduction and reuse.
 - a. Example: "Master Recyclers" from Dakota County's master recycling program volunteer at events to educate the public about proper waste disposal and recycling.

Through conversation with residents at public events, messaging about correct waste is spread.

4. Consider starting a Master Recycling Program. Dakota County's Master Recycling is a six week program in which interested individuals learn about waste management and upon completion, give back to the community by volunteering for 30 hours of community service.
5. Partner with schools, especially elementary schools, to incorporate Zero Waste reductions and reuse information into curricula and increase Zero Waste practices.
6. As suggested in the CAP, create a rewards program to recognize businesses and residents who embody Zero Waste reductions and reuse principles. Post on the City's website.
7. Offer training and workshops for City staff, local businesspeople, and community members to learn about Zero Waste practices for the home and workplace.^{xxi}
8. Use consistent signage in public places, parks, and schools about items to go in trash, recycling and compost.
 - a. Example: the City of Minneapolis has signage approved by Hennepin County that is used on waste disposal bins in apartments, parks, and some institutions.
9. Promote reuse donation opportunities on the City's website. For example, provide information about where to drop off unwanted clothes, furniture, and appliances that are still in good condition.
10. Promote alternatives to disposable diapers.
11. Develop a social marketing/behavior change program to find the best means to motivate people to reduce, reuse, recycle, and compost, in collaboration with faculty and students from Carleton and St Olaf.
12. Use multi-media campaigns to support initiatives in all categories; use social media, mailers, radio, podcasts, and publicly displayed signs to deliver key messages to the public. Ground messaging in shared values, and highlight progress being made.
13. Publicize information on the City's website about where environmentally friendly and local products can be purchased so that consumers can make informed choices.
14. Take advantage of the Minnesota Chamber of Commerce, Waste Wise workshops on evaluation and redesign of products and packaging to prevent waste and reduction or elimination of non-reusable packaging, transport containers, and service ware from their processes and retail stores.

City Leadership

Leading by example is a core principle in this ZWP. In order to maximize engagement from the community, the City has an obligation to show its own efforts to follow Zero Waste practices as it has recently committed itself to doing.

The City has ample room for improvement; waste management was the only category in which the City did not reduce its emissions between 2015 and 2017.^{xxii} The City government is also positioned to affect large-scale change because of its jurisdiction over parks and public spaces, which are spaces where Zero Waste messaging can be reinforced. Finally, the City has the unique power to pass or change ordinances regarding Zero Waste, which can create lasting legal changes.

Many of the more ambitious goals in this plan may require ordinance changes in order to ensure permanence and compliance.

Hazardous waste risks show up in a variety of places such as when people change motor oil in the cars at home and dump the old oil into the sewer along with remnants of herbicides and the like. People also put hazardous waste in recycling and trash containers instead of properly disposing of them.

The City needs to help people understand better what items are hazardous wastes, what are common mistakes in handling them, spot check recycling bins with tagging programs, and provide good, easily accessible information about alternatives to some hazardous wastes and how and where different wastes are to be disposed properly.

Recommendations:

1. Update the City's Policy for Community Events to require that community events and City sponsored events are Zero Waste. Currently, the policy states that the "applicant shall instruct all vendors about recycling requirements and shall provide receptacles for collection of recyclables" but does not include rules about composting or using recyclable or compostable materials at the event. This rule would reduce waste produced at community events and could require an ordinance change.
 - a. Example: As per San Francisco's Mandatory Recycling and Composting Ordinance, all events must offer recycling and compost. The City's website provides information about acceptable food service ware as well as a tool to help event planners make their own signs about recycling and compost.^{xxiii}
 - b. Example: Austin, TX offers a Zero Waste Event Rebate to financially incentivize event organizers to make events more sustainable.^{xxiv}
2. Fully develop and implement the City's environmental purchasing policy to prioritize Zero Waste principles when purchasing goods and services for the City, with a goal of having the policy and implementation within 5 years of the CAP's adoption.^{xxv} This includes avoiding disposable, difficult-to recycle, and highly packaged products in the City's contractual purchases. Currently, the City has achieved a two star rating on environmental purchasing from Minnesota's GreenStep Cities by passing a resolution to continue purchasing recycled paper and Energy Star Products, but it can improve to three stars by expanding its environmental purchasing policy. The Responsible Purchasing Network (RPN) has a Sustainable Procurement Playbook,^{xxvi} and the MPCA offers advice on developing a sustainable purchasing policy,^{xxvii} both of which can be used to help develop policies, communicate the importance of sustainable procurement, and identify best practices.
 - a. Example: Los Angeles County established a Green Products Purchasing Policy that defines environmentally preferable products and instructs county departments to prioritize these products when making purchasing decisions.^{xxviii}
 - b. Example: San Francisco, CA mandates that that city departments buy pre-approved "green" products that have been reviewed by the San Francisco Department of Environment.^{xxix}
 - c. Example: San Diego, CA implemented it's environmental purchasing policy in a phased manner, with differing deadlines for different types of purchases, allowing for businesses and the city government to adjust to new regulations^{xxx}
3. Develop a list of local products that can be used by the City and local businesses. Work to purchase items from these suppliers.^{xxxi}

4. Establish non-binding recycling targets with the service provider; provide technical assistance across government operations (e.g., police, fire, facilities, parks and public areas, venues and events) to increase recycling and/or composting rates.
5. Encourage storing of unwanted office supplies for re-use by City employees or staff and teachers in the school district to the extent that this would make sense and be used.
6. Conduct a survey of waste receptacles in public spaces and City departments. Consider requiring that all trash bins have adjacent recycling bins and organic waste bins in order to increase composting and recycling by eliminating the need to search for the proper receptacles.
7. Provide opportunities for City employees to become trained in Zero Waste best practices and encourage each City department to have an employee volunteer to hold their department accountable. Alternatively, create a task-force or work-group whose role is to evaluate waste reduction opportunities and implement them in each department.
8. Set up a loan system of reusable items like plates, silverware, etc. for large events.
9. Commit to lowering waste from meetings. For example, go paperless, require and fully realize the recently developed goal that City meetings use compostable or recyclable food-ware and ban single-use plastic water bottles.^{xxxii}
10. Review and annually report each City department's solid waste management operations.
11. Create a guide for distribution amongst City departments addressing the proper methods by which to reuse, recycle, or dispose of items generated from City buildings.
12. Ask the City's Service Provider to develop strategies to transform the current collection infrastructure.
13. Continue to include provisions in-future waste hauling contracts for waste sorts and provide incentives for the waste hauler to participate in waste reduction efforts.
14. Make use of EPA tools and examples of best practices to follow when establishing waste hauler contracts.^{xxxiii}
15. Explore creation of compost, recycle and reuse processing opportunities or develop working relationships with existing ones not far from Northfield. Have the City and its EDA seek out companies, entrepreneurs, and investors, and work with the County, the State and others to see such facilities established. Job creation, property tax collection, along with eliminating the costs for a new landfill site are some economic benefits. Monies from such operations might be used to defray the costs of implementing the plan, and possibly eventually underwrite it, as is practice in some other locales.
16. Collaborate with neighboring small communities to jointly market recyclable materials to attract buyers and receive more competitive pricing from bulk volumes.
17. Work with the Northfield Area Chamber of Commerce and the Northfield Downtown Development Corp to elevate Zero Waste practices and provide examples and support for businesses implementing changes to reduce waste. Take advantage of the Minnesota Chamber of Commerce Waste Wise offerings and grants.
18. Encourage a nonprofit to develop a Goods Bank of reusable items for donation to social services programs, teachers, artists and/or the public.

Hazardous Waste Specific

19. More widely and better publicize the locations for properly disposing of hazardous waste materials, including the Rice County Landfill Hazardous Waste drop-off site. Further, consider the creation of city hazardous waste collection days where hazardous waste can be dropped off in Northfield for a reduced cost.

20. Offer recurring “take back” days, whereby the City or a business or waste hauler partner will take hazardous waste items to be disposed of.
21. Provide information about hazardous wastes, alternatives to them, and common mistakes in the education programs and the Sustainability website.
22. Include hazardous wastes as items on the checklist for any recycling bin tagging program.
23. Explore establishing, or at least promoting, voluntary, point-of-sale fees for products that are toxic and/or hard to reuse, recycle or compost.
24. Encourage businesses to take back products and associated packaging, especially items that are toxic in their manufacture, use, or disposal that are not currently reusable, recyclable or compostable locally.

Food Waste Prevention and Recovery

An article *When Good Food Goes Bad* written by Minnesota Pollution Control Agency (MPCA) states, “Food is the single largest component of waste going to landfills and incinerators.” ^{xxxiv}

Recognizing that food waste contributes significantly to methane, a greenhouse gas more potent than carbon dioxide, the MPCA recently convened a Sustainable Materials Management (SMM) team. The SMM team works to identify the greatest environmental impacts at different life cycle stages of a product. Of the three ways to manage food waste - prevention, reuse, or recycling – the SMM team learned, using the Life Cycle Assessment (LCA) model that *preventing* too much food from being produced in the first place would result in significantly less greenhouse gas impacts than any form of food disposal. ^{xxxv} Because of these findings, the SMM team is prioritizing food waste reduction and food-to-people programs as one of the first projects for the team.

Northfield, as a unique agricultural community, presents an opportunity to expand its local food security and sustainability options by highlighting and elevating local sustainability, food recovery, and waste prevention. Locally supplied food fits with the SMM team’s LCA model of preventing waste in the first place with better management of the production and distribution of the food system.

Supporting local food efforts, better management of the food system, and recovering food waste are all strategies outlined in the City’s Climate Action Plan to become a carbon-free and resilient community. Less food loss and waste can be achieved by: growing, transporting, and processing only what is needed; reusing and reducing excess food; and recycling unavoidable food waste.

Recommendations

1. Create over time a Food Advisory Board that represents the local agriculture sector. It would address many concerns raised in the CAP. Its mission with respect to zero waste would be to promote food from a sustainable materials management (SMM) and Life Cycle Assessment (LCA) perspective to 1) prevent food waste through the supply chain, 2) rescue and reuse food, and 3) recycle food. This group would strategize how to implement local Farm-to-Table programs, how to efficiently run large-scale food reuse and rescue efforts and coordinate public outreach efforts on the topics of food waste prevention, local food and sustainability, food reuse and rescue, and proper recycling unavoidable food waste.

2. Designate City staff, volunteer, or intern to regularly update the City's Sustainability page and other social media feeds with Food Waste Prevention and Recovery information to include the Food Map.^{xxxvi}
3. Educate the community and implement feasible measures to prevent growing, processing, and transporting too much food in the first place. (Generate less.) Use MPCA's SMM team and LCA guidelines.
 - a. Survey local farmers, grocers, restaurants, institutions, and businesses to elucidate quantities of donated food, overproduction, or food processing waste. Based on findings, make cost-based arguments to the entity in favor of reducing quantities of food purchased from suppliers to reduce food waste.
 - b. Example of food that is already being donated: The CAC receives food from local grocers and weighs and redistributes this food. Collaborate with the CAC and the City's Food Working Group to assess food waste generated by grocery (or other entities) stores.
4. Recovery: expand upon and make certain that food recovery initiatives become permanent enterprises - such as the CAC and programs at the two colleges promoting rescue and reuse to eliminate food waste. Recovering food for people should be prioritized where possible, with the secondary option of recovering food for animals. Food processing waste from food manufacturers and breweries can also be used as animal feed.
 - a. Example: Food Recovery Network, a program in which leftover food from the dining halls are donated to local organizations. Both St. Olaf and Carleton Colleges participate in this program.^{xxxvii}
 - b. Example: Rutgers University diverts food scraps from their dining facilities to a local farm to feed hogs and cattle.
 - c. Example: Spent grains from beer processing can be repurposed and upcycled into specialty flours (NETZRO).^{xxxviii}

Organic Waste Reduction & Composting

Based on national-level waste stream data, diverting organic waste from landfills presents a large opportunity for GHG reduction, with organic waste making up the largest portion of the landfilled waste by weight.

At the state level, 31% of landfilled waste was made up of organic material as of 2013. Meanwhile, in 2018 only 36% of food waste was composted based on state-wide data.^{xxxix}

Rice County's statistics are better with 70% of food waste being diverted from the landfill, but it is unclear whether Northfield reaches this 70% mark.

Organic waste consists of two types of materials: household organic waste, and yard waste. Household organic waste includes uneaten food (including meat, eggshells and coffee grounds), soiled paper products, and certified compostable kitchenware, while yard waste consists of yard clippings, twigs, branches, and leaves.

The decomposition of organic material (both household and yard waste) in landfills is one of largest national sources of methane, an extremely potent greenhouse gas. If composted, however, organic waste does not emit methane and instead can be used as fertilizer.

Removing organics from US landfills would reduce US annual greenhouse gas emissions by the same amount as removing 37 million cars from the roads for a year. This can be achieved not only by composting organic waste, but by reducing food waste itself by utilizing wiser shopping and food preparation techniques.

There exist a number of options for composting in Northfield that allow for the diversion of organic material from the landfill. The City has a seasonal yard waste site at Armstrong Road along with a household organic waste dumpster and year-round, household organic waste receptacles at the 1710 Riverview Drive City Maintenance Facility where organics such as food, soiled paper products, can be dropped off. For yard waste, DSI also provides optional weekly curbside collection May through November for \$90 total, or one-time curbside pick-up in the spring and fall, which can be purchased by buying yard waste stickers for \$3 each from Family Fare.

Curbside collection of food waste is also available from Northfield Curbside Composting. Unlike DSI, Northfield Curbside Composting does not have a contract with the City to provide these services but instead, interested residents can sign up for weekly organics collection on their website for \$10 a month. Currently, Northfield Curbside Composting collects waste from about 600 out of Northfield's roughly 6,000 households. Curbside composting is also available for residents at certain apartment buildings such as the Central Block (Rare Pair) and Koester Court if residents request service and figure out collection logistics.

However, many apartment buildings either do not allow or do not have any residents using the service. Thus, it is necessary to develop sound means for compost pickup at multi-family housing facilities.

Recommendations

1. By 2025, ensure that all organic waste, from residential, commercial, institutional, industrial and city government sources, is composted or processed for reuse in accordance with the CAP.
2. Work to see that Northfield has access to a large-scale composting facility either by collaborating with Rice County or assisting a private entity to create such a facility.
3. When feasible, run a pilot of the EPA's Food Too Good to Waste^{xi} initiative, a program designed to reduce household food waste and promote critical engagement with the issue of food waste. The program involves collecting and weighing food waste in a paper bag each week along with the dissemination of strategies on how to save money while reducing waste. Consider partnering with elementary schools in Northfield to encourage children to do the challenge with their families.
 - a. Example: The EPA has information publicly available on two pilot programs - one in King County, Washington, and another Honolulu, Hawaii. Findings from both pilots suggest a reduction in waste over the course of the program (28% in King County and 19% in Honolulu), and both reported positive qualitative feedback from participants.^{xli}

4. Update the Garbage & Waste webpage on the City's website to include information about the possibility of receiving curbside compost collection. Currently the website only provides information about compost drop-off options.
5. Once composting becomes more mainstream, make it opt-out rather than opt-in, meaning that the default option is for households to be enrolled in a curbside composting pick-up program unless they can demonstrate that they do their own year-round composting.
6. Along with expanding residential and business access to composting, pass an ordinance banning organics from refuse collection. This should have fines with an educational grace period before they would be levied.
7. Collaborate with local organizations, schools, and farms to host "how-to" compost education events and activities.
8. Encourage and incentivize backyard composting for houses, apartments, and schools. Consider offering composting workshops or discounted composting bins.^{xlvi} Several counties across the country offer free workshops on composting and sell backyard composting bins.
9. Require that apartment buildings have organic dumpsters onsite or promote Northfield Curbside Composting so that residents have the opportunity to compost.
10. To increase the level of participation in recycling and composting programs, provide recognition for successes through a Green Business program or a Zero Waste Businesses or Schools program.
11. Develop or facilitate an online network to foster business-to-business connections to match unwanted material byproducts or commodities to opportunities for reuse or recycling as feedstock.

Residential Waste Reduction

Aside from organic waste, which was addressed in the previous section, household waste consists of reusables, recyclables, hazardous waste, and refuse (waste that can only be disposed of in the landfill).

The Rice County Sanitary Landfill cited reusable items in good condition as the most problematic type of waste being sent to the landfill. In order to prevent economically valuable items such as furniture and clothes from entering the waste stream, there are several businesses in Northfield that accept used-good donations, and events such as Lighten up and Carleton's repair fair which facilitate reuse and repair.

Recyclable material that ends up in the trash is another major source of wasted potential resources. Dick's Sanitation Inc (DSI) contracts with the City to provide curbside recycling, trash, and yard waste collection to residents of single-family and multi-family dwellings of up to six units.

Northfield's recycling is single stream, meaning that residents do not have to sort their recyclables. Types 1-7 plastic, glass jars (no lids), steel and aluminum cans, and unsoiled paper and cardboard are accepted. However, it can still be difficult to know what is recyclable, so contamination is one of the main issues with the curbside recycling program.

Recyclable waste is collected every-other week and taken to Rice County's recycling plant. All households whose trash is collected by DSI also receive recycling carts, which come in two sizes, 64

and 96 gallons. Of the 4,877 households whose waste is collected by DSI, 447 of them use the larger recycling cart size while only 282 families use the smallest size trash cart. Moving towards larger recycling carts and smaller trash carts represents a possible area for improvement.

Apartments larger than six units are free to contract with any waste hauler but are not required to provide recycling. Of the seven apartment building managers reached, six said that recycling dumpsters were provided on-site. The apartment building that did not offer recycling cited high contamination rates resulting in high fees as the reason that recycling was not offered.

Recommendations:

1. Promote the existing online directories on Rice County, Dakota County, and DSI Recollect Wizard websites. These directories help people determine where items should be disposed of and direct residents to donation sites and reuse stores where specific types of household waste, such as unwanted clothes and furniture, can be taken.
2. Carry out bin-tagging campaign to educate residents on reducing contaminants in residential recycling. A decrease in contaminants protects workers and machinery, increasing the efficiency of recycling plants.^{xlvi}
 - a. Example: Atlanta and Columbus have both run "Feet of the Street" initiatives to raise awareness and provide feedback for residents on contaminants in recycling. A Columbus news outlet reported that 39% of households whose bins were tagged "improved their recycling habits dramatically" after the 8 weeks program.^{xliv}
 - b. The Recycling Partnership in collaboration with the Massachusetts Department of Environmental Protection created a toolkit^{xlv} to be used in implementing a bin tagging program.
3. Consider moving to an every week recycling schedule, every other week trash collection schedule. This change, combined with an increase in residential compost collection, has the potential to divert a significant amount of waste. The MPCA "Metropolitan Solid Waste Management Policy Plan, 2016-2036" states that "offering recycling and organics collection weekly allows for a transition to bi-weekly trash collection, leading to potential cost savings for haulers and residents... and may result in greater [recycling and organics] recovery rates".^{xlvi}
 - a. Example: Portland Oregon switched to an every-other week trash collection schedule with every week recycling and compost collection and saw a reduction from about 60% to 31.4% of waste going to landfills.^{xvii}
4. Enact a weight-based fee structure for trash once this becomes technologically feasible through collection trucks that can weigh trash.
5. Consider starting a Block Leaders program in which neighborhood members volunteer to promote proper recycling and engage their neighbors in sustainable waste disposal practices.
 - a. Example: Minneapolis has a Block Leader program in which residents volunteer to share recycling updates with their neighbors and encourage them to participate in organics recycling. Information can be shared via door-knocking, social media, tabling at block parties, email updates, or other creative methods.^{xlviii}
6. Find a way over time for waste haulers or others to offer technical assistance to customers to help them select containers that are the right size for the amount of trash, recyclables, and compostables produced.

7. Enact an ordinance prohibiting the disposal of recyclable materials with refuse collections and requiring that residents and businesses separate recyclables from trash. Several cities have passed such ordinances.^{xliv}
8. Provide outreach and technical assistance to owners and tenants of multi-family units to address recycling and/or composting logistics and to increase tenant participation.
9. Require that all multifamily buildings in Northfield have recycling dumpsters. Currently, apartment buildings are not obligated to offer recycling.
10. Explore the possibility that the local “makers group” or a service organization can offer product repair workshops or reuse workshops.

Commercial & Industrial Waste Reduction

It is important that businesses are also given opportunities and oversight for reducing waste in order to maximize the impact that Northfield as a whole can have. The City’s sustainability office seeks to develop a market for recycled products and encourage businesses that process recycled materials into new items to move to Northfield. Specifically, businesses that create value from waste items that are in abundant supply (as opposed to those that would increase demand for waste) represent the greatest potential for offsetting landfilled waste. This way, the private sector can help close the loop from waste item to new product and prevent landfilling of discarded materials.

The City is also interested in developing more reuse stores and warehouses to bolster the market for reused items. The demand required to develop such markets can be fostered both by an increase locally in recycled product businesses as well as through educational campaigns to make these types of products more desirable.

The market for products coupled with the availability of land and property are the main drivers of business location choices. Northfield’s main selling points to potential businesses include its proximity to a highway, its workforce, and benefits from the City government. Northfield has a limited repertoire of tools it can use to foster and incentivize business development such as EDA loans, project-based grants, and land subsidies. Existing businesses, meanwhile, can improve their own waste disposal habits.

A full assessment of the current laws regarding commercial waste disposal was not undertaken. However, City ordinances require that businesses contract with a certified waste hauler to dispose of their waste. Additionally, Minnesota Statute section 115A.151 requires that owners of commercial buildings ensure that at least three recyclables are collected from their buildings.

Recommendations

1. Work with businesses to assist them in developing comprehensive, waste reduction policies and practices appropriate to their setting such as Carleton College has done. Publicize these when possible so businesses can learn from each other and have City government policies and practices to help serve as a model.¹
2. Offer a Zero Waste certification program for businesses such as the EPA’s WasteWise program; promote efforts and success.

- a. Example: The city of Clifton, New Jersey is an “endorser” in the WasteWise program, meaning that they encourage businesses to participate in the program in which they demonstrate waste reduction in exchange for awards and recognition.
- b. Example: The TRUE program offers certificates for facilities such as business factories or warehouses that have demonstrated reducing or eliminating their waste, with an emphasis on the cost-saving potential of waste reduction.ⁱⁱ

3. Create guides and trainings for businesses on how to improve the sustainability of their businesses and request sustainable options from suppliers including take-back packaging, returnable containers, less packaging, and products and packaging that can be reused locally.⁹ Provide these materials to businesses to help them comply with the City's Zero Waste goals and demonstrate the City's commitment to supporting businesses.
4. Encourage local buying cooperatives or other coordinated approaches for private sector businesses and organizations to procure recycled content products.
5. Require all businesses to separate recyclables and compostables (once the city establishes residential curbside compost pickup) and consider developing a compliance reporting system.
 - a. Example: Boulder, Colorado includes a compliance reporting system for their mandatory city-wide recycling and composting program.
6. Continue work underway to establish and implement single use plastics ordinances, fees, and City government practices. The state of Minnesota prohibits cities from outright bans on plastic bags, but the single-use task force has been considering options for other ordinances such as a plastic bag fee or banning plastic bags in certain establishments like restaurants.
 - a. Example: As of January 1, 2020 there is a \$0.05 fee for customers for taking plastic and paper carryout bags in Minneapolis. After June 1, 2020, retailers can be fined for non-compliance if they do not enforce the fee.
 - b. Example: The city of Duluth implemented a similar ordinance, establishing a \$0.05 fee for plastic and paper carryout bags, in order as of April 1, 2020. It is worth noting that several cities have also implemented higher fees, which Northfield should consider.
7. Encourage restaurants to implement offering 1/2-size or smaller portions of meals on their menus.ⁱⁱⁱ
8. Work with fast food restaurants to use reusable plates, bowls, cups and cutlery for dine-in customers instead of single-use products. Eventually establish an ordinance to ensure compliance.
9. Consider a Green to Go initiative or ordinance, which stipulates what may or may not be used in take-out food packaging.
 - a. Example: Minneapolis's Environmentally Acceptable Packaging Ordinance requires that food and beverages prepared to-go be placed in containers that are reusable, recyclable, or compostable.^{iv}
10. Consider applying for a Southern Minnesota Initiative Foundation Economic Impact Grant to foster economic development for businesses that use recycled materials.
11. Conduct a survey of businesses in Northfield to assess current waste management practices.
12. Offer waste management consultations, audits and signage for businesses interested in pursuing more sustainable options.^{iv}

13. If the City decides to pursue a more active approach to recycling business development, offer incentives such as reduced water prices or subsidized land to businesses who create products with recycled materials.
14. Work with hotels to ensure rooms and lobbies are equipped with recycling and composting bins.
15. Assist interested parties in creating a tool and supplies loan-it business or systems where residents can borrow items as needed for DIY projects. Alternatively, create a publicly run tools and supplies “library”.

Construction & Demolition

Construction and Demolition (C&D) is an area that represents significant potential for improvement; the MPCA estimates that 80% of the 1.6 million tons of C&D waste generated in the state of Minnesota was landfilled in 2013. Concrete, bricks, wood, lumber, roofing, and drywall are frequently wasted materials from C&D that could be reused or recycled.

Minnesota Statute 7035.0805 lists items that must be removed from buildings prior to demolition, including but not limited to furniture, appliances, and hazardous waste, but does not mandate that these items are necessarily reused or recycled. Further, it does not address the disposal of buildings’ structural materials such as wood, metal and masonry.

Increasing the prevalence of deconstruction is one of the most impactful changes that can be made in this sector. Deconstruction differs from demolition in that it involves more careful dis-assembly of buildings such that construction supplies can be easily reused. Closely intertwined with deconstruction are intentional design and construction which enable efficient deconstruction.

Although deconstruction involves higher labor costs than demolition, it has notable economic advantages such as reducing cost of materials and transportation for nearby construction projects.^{iv} Alternatively, donation of salvaged materials to nonprofits can offer tax benefits for the deconstruction company.

Aside from deconstruction, the entire planning, construction, and demolition process can be optimized for Zero Waste. Specifically, by integrating reused and recycled materials into construction and incorporating a greater degree of sustainability planning into designing buildings, the reuse sector of the economy can flourish, while waste can be curtailed. However, a significant barrier to the reuse of materials is the cost difference between recycling and landfilling. A 2015 study of C&D in Hennepin county found that the cost of landfilling was cheaper than recycling due to the labor and capital costs of sorting through material associated with processing C&D waste.^{lv}

Ordinance changes or adjustments to the landfilling cost structure will be necessary to incentivize greater reuse and recycling in C&D.

Recommendations

1. Develop metrics-based guidelines such as those found in the state's B3 program for C&D companies in order to reduce the amount of C&D waste that goes to the landfill.^{lvii}
2. Consider ordinance changes and/or changes to building permits to require the reuse or recycling of a portion of C&D materials. This could include reusing fixtures such as doors,

windows, and cabinets, and recycling materials like concrete and masonry, wood, metals, and cardboard.^{lviii} Currently, the City has no ordinance requiring such reuse.

- a. Example: The Cook County, Illinois Demolition Debris and Diversion Ordinance requires that 70-percent of all C&D debris is diverted from disposal and five-percent is reused.^{lix}
- b. Example: Madison, Wisconsin Construction and Demolition Recycling mandates that all new construction projects that use concrete and steel supports recycle 70-percent of their construction debris by weight. New construction projects that use wood framing and remodeling projects (with values more than \$20,000) must recycle clean wood, clean drywall, shingles, corrugated cardboard, and metal.^{lx}

3. Work to make a regular practice of publication in appropriate outlets of all building projects demolition permit applications to solicit salvage of reusable items by deconstruction firms.
4. Consider working with neighboring towns to create a regional reuse facility for construction materials. Northfield's relatively small size makes demolition reuse challenging, so consideration should be given to creating partnerships with Rice County and with established facilities in the Twin Cities Metro area. At the very least, create a list of companies not far from Northfield that do deconstruction over demolition and/or recycle construction materials.
5. Seek to engage a nonprofit such as WasteCap Resource Solutions^{li} to workshop contractors in sustainable practices that can reduce waste in construction projects by as much as 80% and thus save contractors money in materials as well.
6. Prepare and post on the web a how-to deconstruction and projects services guide.
7. Give preferential treatment and/or permit credits for projects that meet Green Building/Sustainable Building Product standards.
8. Work with contractors to develop voluntary practices whereby a contractor's employees with training on material separation, or a service provider, separates C&D recyclable materials from non- recyclable materials on site.
9. Encourage construction companies to use recycled materials and foster a market for reuse. Develop incentives for deconstruction and recycling such as decreased permitting fees and/or more time.^{lxii} Additionally, work with businesses that use recycled materials like recycled roofing to make sure they receive scrap material.^{lxiii}
10. Work with area contractors and others to develop ordinance changes to require an increased use of recycled materials during construction projects.
 - a. A Hennepin county study suggested that a legal requirement to recycle construction materials would boost the recycled material market, which may be necessary due to the lower cost of landfilling.^{lxiv}
11. Create a Green Building Policy that provides incentives attractive to developers, e.g., higher development ratios, lower set-backs, or credits for use of materials made from recycled content or for on-site reuse and recycling.
12. Eventually charge a deposit for permitted projects, refundable upon permittee demonstrating that a high percentage, e.g., 75%, of C&D debris has been delivered to a recovery facility.
13. Expand the use of reusable and recycled C&D materials in municipal road construction, trail development, construction and maintenance projects. Old tires or shingles can be used in asphalt for road pavement. Many landfills ban tires and shingles and there are many other reuses for them.^{lxv}

- a. Example: Sacramento County, CA uses Rubberized Asphalt Concrete, a type of material made from recycled tires, in road upkeep and in doing so has recycled more than 1.5 million waste tires.^{lxvi}
14. Develop an internal policy requiring deconstruction, rather than demolition, for all City buildings set to be torn down.

Institutional Waste Management

The institutional sector includes schools, both public and private, colleges, faith communities, the hospitals, clinics, nursing homes, etc. For this version of the plan, only educational institutions have been considered because other institutions have been difficult to reach. Northfield is home to four elementary schools, including a charter school, one middle school, one high school, a K-8 Catholic school, a non-traditional education center, and two private colleges.

Northfield's public schools have made considerable strides towards reducing waste while meeting the nutritional needs of children in schools. For students who qualify for free and reduced price lunch, the schools use Offer Versus Serve, a model that grants students greater choice when selecting school meals. The national school lunch program requires that schools provide options in five categories - grains, meat, vegetables, fruit, and milk - in order to qualify for a reimbursable meal, but the Offer Versus Serve model allows kids to choose only three, increasing the likelihood that they will actually eat what they take.

Another program in place is "sharing tables" which allow kids to put unopened milk, still packaged food, and unpeeled fruit in designated bins for other kids to take or to be reserved the next day.

Finally, the schools have a relationship with the Community Action Center (CAC) in which volunteers collect uneaten food, especially fresh fruits and vegetables, twice a week to be packed and distributed by the CAC. Composting and recycling occur in all Northfield public schools.

The colleges, Carleton and St Olaf, have also taken steps towards mitigating their waste. Both colleges have robust composting and recycling programs; Carleton contracts with DSI to haul their trash, recycling, and compost, while St Olaf contracts with Waste Management. Each school provides trash and recycling bins in all dorm rooms and trash, recycling, and composting bins in dining halls and public spaces.

Both colleges participate in Food Recovery Network, a program in which leftover food from the dining halls are donated to local organizations. They also are equipped with water bottle filling stations and have run "Take back the Tap" initiatives to reduce the sale of plastic water bottles and encourage reusable water bottle use. Carleton and St Olaf both contract with Bon Appetit for their dining services, which pursues a number of Zero Waste best practices including using recycled paper in 90% of its paper products.

Thus, both the Northfield School District as well as the colleges are active in Zero Waste.

Recommendations

1. Work with each institution to develop comprehensive, waste reduction policies and practices appropriate to its setting such as Carleton College has done. Publicize these when possible

so that institutions can learn from each other and have City government policies and practices to help serve as a model.

2. Encourage Northfield Public Schools to extend time for lunch and have recess before lunch at schools if feasible. Both of these interventions have been shown to increase food consumption, and therefore reduce food waste.^{lxvii}
3. Collaborate with public schools to create informational videos that are age appropriate for students about how to sort waste into trash, recycling and composting. Some such videos have been made with students and teachers in elementary schools.
4. Partner with Carleton College on events like the Free and For Sale Frenzy and the Repair Fair to involve members of the community in the reuse and repair opportunities.
5. Partner with both colleges to develop educational material and incentives for students to reduce what they bring to campus and buy once on campus and what gets recycled and reused. Make them aware that they are major contributors to waste in Northfield and its accompanying environmental problems and benefit from developing good, life-long practices in this realm.
6. Continue reaching out to Professors from Carleton and St Olaf whose work is related to environmental and economic issues for collaboration on projects requiring research that could be done by professors and their students.

Initial Priorities and Timeframe for Recommendations

Knowing that capacity to carry out the ZWP is not infinite it is important to prioritize actions and set up a structure to help guide the work. The information that follows is an attempt to do this. The actions which are in bold are the priorities for the first three years.

In the Recommendations column, the letter abbreviations listed refer to the recommendation sections item numbers in the Zero Waste Plan

E = Education & Awareness, CL = City Leadership, F = Food Waste Prevention & Recovery, OW = Organic Waste Reduction & Composting

RW = Residential Waste Reduction, CI = Commercial & Industrial Waste Reduction, CD = Construction & Demolition, IW = Industrial Waste Management.

Actions	Recommendations	Lead Group (s)	Timeframe
Robust website on variety of Zero Waste topics and links to resources	RW 1, OW 11, CH 21, CH 19, E10, E9, CD 3, CD 6, OW 4, F 2, F 3, RW 7, E 13	Greater Northfield Sustainability Collaborative (GNSC), Carleton College Center for Community & Civic Engagement (CCCE), City of Northfield (City)	Years 1-3
Master Recycler/Composting Program	E4, E3, E5, RW2, RW5, OW7, OW3	Carleton College Sustainability and CCCE staff/students, Community materials & waste	Years 1-3

		group, community partners, City, Rice County	
Multimedia education and behavior change efforts	E12, IW12, E11, E15	Carleton College Sustainability and CCCE staff, community partners, City	Years 1-3
Reuse Center – buy/swap options business/residential/colleges	CL 18, CL5, CL3, IW 4, CL 16, CI 15	Community members, Master Recyclers, Carleton CCCE	Years 1-3
Community organics waste collection	OW 8, OW 5, OW 1, OW 9	City, EQC, Master Recyclers, Community Materials & Waste group	Years 1-3
Survey waste/recycle bins in public spaces	CL6	Carleton CCCE /student project, City	Years 1-3
Educational materials/incentives reduce what students bring to campus	IW5	Carleton & St Olaf /student & staff project	Years 1-3
Incorporate Construction & Demolition items into Sustainable/green building policy	CD 7, CD 1, CD 12	City	Years 1-3
Multifamily Building outreach on zero waste	RW 9	City/Student Interns	Years 1-3
Recycling bin tagging/hazardous waste	CH 22	City/Students	Years 1-3
City environmental purchasing policy (internal)	CL2, CL9,	City	Years 1-3
City policy Zero Waste at Community Events	CL1	City, Master Recyclers	Years 1-3
Single Use Plastics Ordinance	CI 6	City, ECC, with stakeholders	Years 1-3
Increase lunch time and have recess before lunch	IW2	Northfield Public Schools	Years 3+
Food Advisory Board	F1	Sharing Our Roots, Cannon Valley Grown, Master Recyclers	Years 3+
Repair Fair and workshops	IW4, RW11	Cannon Valley Maker Space, Master Recyclers	Years 3+
City policy all multifamily buildings required to have recycling	RW10	City, EQC, Master recyclers	Years 3+

Actions	Recommendations	Lead Group (s)	Timeframe
Work with waste hauler on metrics, recycling targets, schedules, containers, education, etc.	CL4, RW 6, RW 4, RW 3, CL 14, CL 13, CL 12	City, EQC	Years 3+ (part of next waste hauler contract)
Annual report on city solid waste management operation	CL 10	City	Years 3+
City staff support zero waste	CL 11, CL 7, E7	City	Years 3+
Expand use of C&D materials in road, rail and construction/maintenance projects	CD 13	City	Years 3+
City Take-Back Days add Hazardous Waste	CH 20	Rice County/City Streets & Parks, Master Recyclers	Years 3+
Business waste reduction - Share MN Chamber resource etc.	OW 10 CL 17, E2, E6, E14, CI 1, CI 2, CI 1, CI 2, CI 3, CI 7, CI 8, CI 14, CI 11, CI 12	Northfield Chamber of Commerce, College interns, EDA/City?	Years 3+
Local buying cooperative	CI 5		Years 3+
Reuse facility or network information for construction materials	CD 4	Community	Years 3+
Institutional policies around waste management	IW 1,		Years 3+
Ordinance contractor recycling	CD 10	City/County	Years 3+
Economic development for businesses use recycle materials	CI 10, CI 13	County EDA, City EDA, Master Recyclers	Years 3+
Building Permits require reuse or recycle C&D	CD 2	City	Years 3+
Metrics C&D waste to landfill	CD 1	County	Years 3+
Foster market for construction reuse	CD 9	City/County EDA, Master Recyclers	Years 3+
Contractor workshops reduce waste in construction	CD 5	Master Recyclers	Years 3+

SECTION 5: CONCLUSIONS

Not all recommendations in this Plan require implementation. Some are more important than others for success in creating an adaptive and sustainable Northfield. Stakeholders will be more amenable to some more than others, and how they receive them will at times depend on how they are introduced and when relative to others. Community buy-in is crucial to the success of the entire Climate Action Plan and stakeholders' responsiveness to recommendations play a key role in this.

A crucial next step with this Plan and its implementation will be to increasingly map priorities using such tools as those offered in the book *Fostering Sustainable Behavior* by Doug McKenzie-Mohr. Those priorities will constantly need to be reset based on events, stakeholders' responsiveness, staff and volunteers time and resources, grant opportunities, and the development of new technologies.

There are four key principles that underpin this ZWP and are critical for its success. Throughout this plan and its implementation they have been prioritized in order to maximize impact.

Prioritizing Preventing Waste, Reduction, and Reuse:

Strategies that incentivize and promote the top rungs of the waste management hierarchy will have the largest long-run impact on Northfield's waste-related emissions. Creating a culture of reduced consumption is difficult and will take effortful inclusion of the entire community, emphasis on sustainability as a core Northfield value, and time to change attitudes and behaviors. These steps are critical, as creating new products is energy and resource intensive, and, as previously noted, has been more challenging for governments to regulate. To realize Northfield's Zero Waste goals, the City, in concert with its residents and businesses, must use existing materials to their fullest potential.

Education for Cultural Change:

Raising awareness of the City's Zero Waste goals and educating residents, businesses and institutions on the opportunities to contribute to them is essential in creating lasting change. Zero Waste is only possible if large-scale behavior changes towards reduced consumption and more sustainable habits are developed. Thus, buy-in from the community and businesses is a necessary part of the road to Zero Waste. It is worth noting however, that cultural change is not a prerequisite for implementing Zero Waste programs and ordinances, but rather an integral part of the long-term success of Zero Waste in Northfield. Ordinances, actions, and policy must accompany the social network-driven cultural change of this ZWP in order to have robust adoption of Zero Waste best practices.

Equitable Opportunity for the Entire Community

It is important to keep in mind the diversity of attitudes and starting points that people in Northfield will be approaching Zero Waste with. While on the whole Northfielders value sustainability, it is not equally easy for all residents to shift towards reduced waste lifestyles. For example, in looking at the results from the CAP survey, it is important to note that the responses may not represent the attitudes and behaviors of all Northfielders. People who are already engaged in one sustainable behavior are more likely to adopt new ones, and some Zero Waste changes may be more challenging for certain people. It is therefore necessary to keep in mind the differences in beliefs and awareness of Zero Waste practices that exist within the community and to intentionally implement strategies to include all members of the Northfield community in the path to Zero Waste. Full success of this ZWP requires a fulsome buy-in by every group. Those implementing the plan must therefore listen carefully to stakeholders, work collaboratively with them and be imaginative in reaching the important sustainability goals established by the Climate Action Plan. Consideration of differences in ease or difficulty for some in fulfilling the goals of the plan must strive to encourage seeking solutions that will ensure its implementation.

Monitoring and Evaluation

In order to track Northfield's progress, an organized system of collecting data on the City's waste stream will be required. The goal is to implement programs and policies that will have the largest impact, and the City must be able to adjust its projects and ordinances as data about their

effectiveness comes out. Work has begun on this to receive annual data from DSI about the waste composition.

Finally, this plan should be revisited at least every 5 years after its adoption to see how well objectives are being achieved and to make changes as would be appropriate.

NOTES

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