



Leveraging the Private Sector in Climate Change Mitigation

How Can Northfield's Climate Action Plan Address the Private Sector?

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I. Executive Summary

Climate change is not merely a national or international issue. Rather, it is a human issue that begs a response from all levels of government. Therefore, local communities and governments, like Northfield's, must develop their own policies and laws to respond to the increasingly demanding threat climate change poses to people.

Our paper focuses on the role the private sector can play to help Northfield reduce its contributions to climate change. Of course, Northfield and the private sector have already taken critical steps in this endeavor. The City has developed an action plan that has recommendations for steps it can take to reduce its greenhouse gas emissions. Still, Northfield can go further by implementing certain policies and laws to transform the behavior of the private sector in order to aid the City's climate change mitigation efforts.

In this paper, we analyzed the climate change mitigation efforts of other cities across the United States and used the MN GreenStep Cities program to identify best practices Northfield adopt to reduce emissions. We identified five policy areas where this can happen: energy efficiency, financing, education and outreach, demand-side policies, and zoning laws.

Our first recommendation focuses on energy efficiency. We recommend that Northfield encourage businesses to adopt environmentally preferable purchasing programs and seek the Green Globes certification. Such encouragement should be facilitated through incentives, which are explored in detail in this paper. Our second recommendation explores financing incentives for businesses for energy efficiency and renewable energy upgrades. We recommend that the City educate businesses about the various financing opportunities that already exist like PACE. Moreover, we recommend that Northfield expand the scope of its current revolving funds to include energy efficiency and renewable energy upgrades. The third policy recommendation focuses on how Northfield should conduct an outreach program so that the City can educate local businesses about the various financing programs already

available for ‘green’ upgrades. The next policy recommends that the City adopt a certification program to encourage businesses to partake in the climate change mitigation effort. Specifically, this certification program should have its standards based on mitigation practices recommended by GreenStep. Lastly, we talk about zoning incentives. We recommend that the City institute a faster permitting process for businesses that are green building certified. This process allows constructions with green standards to proceed quicker. Thus, new building in Northfield will be predominantly energy efficient.

II. Introduction

The unprecedented advent of human-caused climate change has been, and continues to be, propelled by the significant increase in greenhouse gas (GHG) emissions since the late-

1700s.¹ GHGs are gasses that trap heat in the Earth's atmosphere, which is what maintains the hospitable temperatures during nighttime.² As GHGs increase, so does the amount of heat the atmosphere retains. Carbon dioxide currently constitutes 81% of the atmospheric GHGs and it is mainly produced through burning fossil fuels such as coal, natural gas, and oil.³ But there are other significant sources of GHGs such as methane (10%) and nitrous oxide (6%).⁴ As these GHGs increase global temperatures by trapping more heat in the Earth's atmosphere, the resulting climate change can have significant impacts on human activity.

In Minnesota, such impacts are already being felt. Climate change has caused the state to warm "one to three degrees (F) in the last century."⁵ This rise in temperature has increased the frequency of flooding, which causes infrastructural damage, navigational difficulty, and disruptions in commercial activity.⁶ Moreover, the higher temperatures and heavier storms caused by climate change pose a threat to Minnesota's lakes and rivers as warmer water "tends to cause more algal blooms, which can be unsightly, harm fish, and degrade water quality,"⁷ while heavier storms "cause sewers to overflow into lakes or rivers more often, threatening beach safety and drinking water supplies."⁸ Because of the serious costs climate change poses to Minnesota and its cities, it is important to mitigate its sources—namely GHG emissions—at all levels of government.

In creating a Climate Action Plan (CAP) to address climate change mitigation, the city of Northfield must account for the contributions the private sector makes to GHG emissions. Figure #1 shows that the private sector is responsible for a slight majority of the City's total energy consumption. Now although the 21% increase in energy consumption

¹ What Climate Change Means for Minnesota, report no. EPA 430-F-16-02, August 2016

² "Greenhouse Gas (GHG) Emissions," EPA, February 14, 2017, accessed May 01, 2018, <https://www.epa.gov/ghgemissions>.

³ Ibid.

⁴ Ibid.

⁵ Footnote 1.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

predominantly comes from the increasing use of natural gas, it is important to note that, as figure #2 makes clear, electricity usage is responsible for most of Northfield's carbon emissions. Moreover, figure #2 shows that the private sector is responsible for most of the City's carbon emissions.

Figure #1⁹

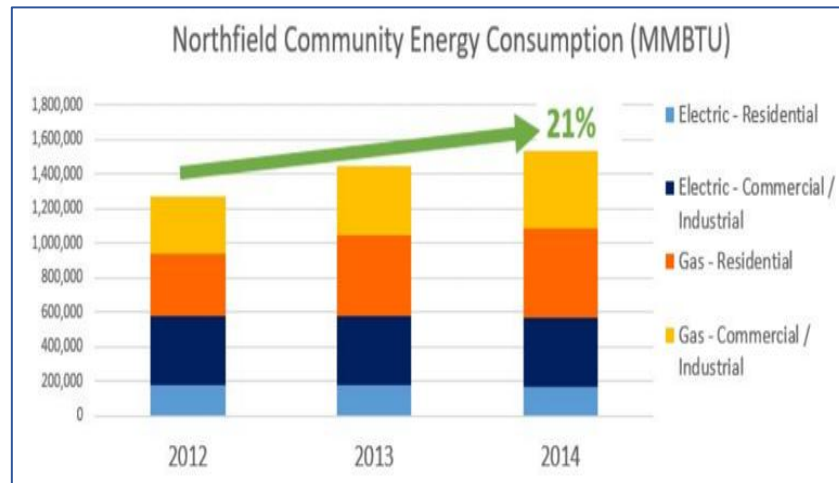
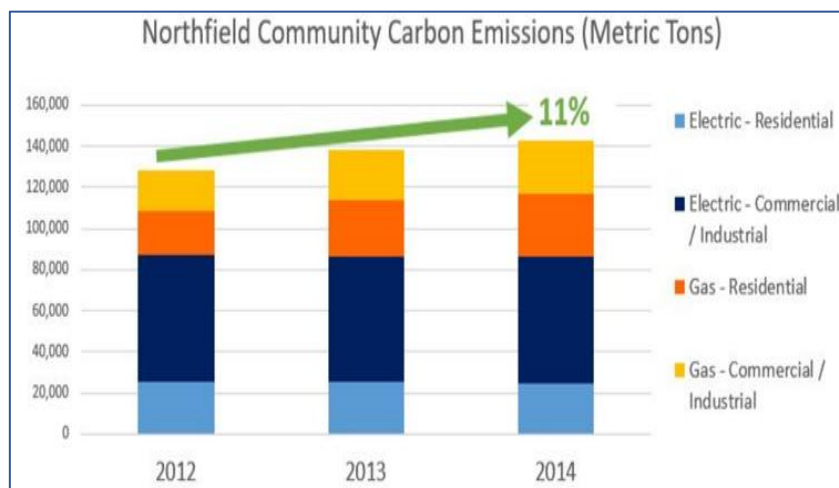


Figure #2¹⁰



Because the private sector is responsible for most of the City's carbon emissions primarily through electricity usage, this paper focuses on how Northfield's CAP can adopt policies that incentivize the private sector to reduce electricity consumption. Furthermore, as

⁹ Northfield Carbon Calculations, report, Energy Working Group, Greater Northfield Sustainability Collaborative, May 11, 2017, 4-6, <http://northfieldsustainability.org/wp-content/uploads/2018/03/NEWG-Task-1-Energy-and-Carbon-Graphics.docx.pdf>.

¹⁰ Ibid.

this paper addresses the role of the private sector in climate change mitigation, specific policies regarding the colleges of Carleton and St. Olaf are not investigated. This is because both Carleton¹¹ and St. Olaf¹² have undertaken their own plans towards climate change mitigation, which fortunately allows the City to focus its resources and attention on other private actors. Also beyond the scope of this paper are specific policies towards industrial firms. The main reason for this is that Northfield is not an industrial city given that it has very few industrial firms.¹³ Another reason is that some of these industrial firms, like Malt-O-Meal, have already adopted ‘green’ practices aimed at reducing waste and energy consumption.¹⁴ Therefore, this paper focuses on general policies that are mainly applicable to non-college commercial firms, although some of the policy recommendations can be applied to industrial firms in the City.

When talking about policies that can get businesses to partake in the climate change mitigation effort, it is important to first recognize that the private interest to make a profit is often not aligned with the public interest to enact effective environmental policy. Therefore, policy recommendations must aim to rectify this misalignment of interests by *incentivizing* firms to adopt ‘green’ practices if the City is to gain the full cooperation of the private sector. This cooperation is vital because the private sector is becoming increasingly essential as a vehicle for enhancing climate change resilience.¹⁵ With incentivized cooperation in mind, the private sector can play a positive role in mitigating the sources of climate change in Northfield. In this paper, we identified five areas in which Northfield can involve the private sector in its CAP:

¹¹ "Climate Action Plan." Sustainability at Carleton. June 29, 2017.
<https://apps.carleton.edu/sustainability/about/cap/>

¹² "Campus Sustainability." April 17, 2015. <https://wp.stolaf.edu/sustainability/>.

¹³ Email exchange with Mr. Alan Anderson, who is the advisor to this paper.

¹⁴ "Malt-O-Meal® Wins Regional Environmental Award." MOM Brands. May 18, 2011.
<http://mombrands.com/2011/05/malt-o-meal-wins-regional-environmental-award/>.

¹⁵ Bonizella Biagini and Alan Millar, "Engaging in Private Sector in Adaptation to Climate Change in Developing Countries: Importance, Status, and Challenges," *Climate and Development* 5 (2013): 2.

1. **Energy Efficiency:** Businesses can effectively reduce GHGs by adopting more energy efficient practices. To this end, we recommend that Northfield encourage businesses to participate in the Green Globes program and adopt an Environmentally Preferable Purchasing (EPP) program. This could be done through incentivizing businesses to adopt such energy efficient practices by providing them monetary benefits or preferential treatment, like exemptions from certain city laws.
2. **Financing:** Attractive financing options for renewable energy and energy efficiency upgrades are essential in helping businesses overcome the high up-front costs associated with implementing ‘green’ technology. Although several financing options already exist, certain information barriers prevent businesses from accessing them. Thus, we recommend that Northfield educate businesses about these financing options. Moreover, the possibility of a ‘green revolving’ fund is investigated and recommended.
3. **Education & Outreach:** Because of the information barriers mentioned before, we investigate ways Northfield can reach out to businesses and educate them about available ‘green’ programs and/or practices. Specifically, we identify short and long-term strategies that the City can adopt to eliminate the asymmetry of information.
4. **Demand-side policies:** These policies stem from the realization that consumer culture is increasingly sympathetic to the green movement. Because consumer demand has an enormous influence on business practices, Northfield should underscore these demand-drivers by adopting a green certification program. If consumers can see which businesses are ‘green,’ many in the private sector will alter their behavior to attain certification.
5. **Zoning incentives:** Finally, Northfield should provide exceptions to commercial zoning laws for ‘green’ businesses in the city. All Northfield businesses are allowed to get an exemption from certain zoning laws if they meet variance requirements. However, the variance process is not conducive to ‘green’ businesses, who have to undergo the same

uncertain process as non- ‘green’ businesses to obtain exemptions. Thus, we recommend that Northfield provide an alternative, expedited permit approval process for business development projects that are built with green standards. The more “green” businesses Northfield can help develop, the greater the city’s ability to reduce GHG emissions.

Addressing the titular question of this paper in Northfield’s CAP by implementing the foregoing recommendations could yield several opportunities to the city. The obvious one is that, given the private sector’s role in GHG emissions, the City can do its part for the global effort in climate change mitigation. This is especially important as state and local governments now have greater responsibilities in reducing GHGs because of the possible US withdrawal from the Paris Agreement and the current administration’s hostility to environmental policy. Another advantage is that involving the private sector through policies recommended by this paper can, in the long-run, shift some of the burdens of climate change mitigation from the City government to businesses. Such a shift can reduce the burden on government resources. And lastly, as mentioned before, certain environmental policies—such as the paper’s policy on energy efficiency—can, in fact, appeal to the economic interests of businesses. Incentivizing policies can reduce the misalignment of public and private interests and make Northfield’s CAP more effective in the process.

In the next section, we summarily explore why the five policy areas were selected. Then, for each of these policy areas, we discuss what Northfield is already doing to address the area and what it plans to do in the future. Finally, we discuss what other municipalities have done before making our own recommendations.

III. Policies for Leveraging the Private Sector

In 2016, the City's Energy Working Group for its CAP planning process published a comparative analysis of CAPs from cities it deemed similar to Northfield.¹⁶ The report analyzed CAPs from the cities of Evanston (IL,) Bedford (NY,) Emeryville (CA,) Urbana (IL,) Ann Arbor (MI,) Creve Coeur (MO,) Oberlin (OH,) Dubuque (IA,) Burlington (VT,) and Oak Park & River Forest (IL.)¹⁷ Because these cities are comparable to Northfield in terms of population and climate conditions, looking at what policies their CAPs advocate for are essential to determining what policies are best suited for the City.¹⁸ Thus, one (minor) reason for why this paper explores the five policy areas is simply because each policy is addressed by at least one of the foregoing CAPs. Furthermore, with the CAPs that estimate reductions in carbon emissions from certain policies, recommendations relating to energy efficiency, renewable energy, and financing are frequently estimated to be the most effective policies. Therefore, a big focus is placed on subsections A and B of this section.

In assessing effective policies for climate change mitigation in Northfield, substantive guidance is also offered by the Minnesota GreenStep Cities program, which was established in 2010 by the Minnesota Pollution Control Agency in partnership with several state organizations and agencies.¹⁹ Based on its assessment of various practices, the program recommends 29 actions or "best practices" cities in Minnesota can adopt on a voluntary basis in exchange for public recognition.²⁰ Northfield is currently one of the 122 cities that have joined the program.²¹ The program's best practices that target the private sector address all of the policy areas in this paper. Thus, each policy area is a proven prescription for climate

¹⁶ "Community-wide Climate Action Plans." January 9, 2016. http://northfieldsustainability.org/wp-content/uploads/2018/02/NEWG-Task-3-Climate-Action-Plan-Comparison_Initial-Summary.pdf.

¹⁷ Ibid, 3.

¹⁸ Ibid.

¹⁹ "The Minnesota GreenStep Cities Program." Minnesota GreenStep Cities. <https://greenstep.pca.state.mn.us/aboutProgram.cfm>.

²⁰ Ibid.

²¹ Ibid.

change mitigation. Because GreenStep’s recommendations are, in fact, determinations of *best* practices for cities in Minnesota, we rely heavily on the recommendations the program provides and the various ways Minnesota cities have implemented them when exploring each policy area.

A. Energy Efficiency

Energy efficiency refers to the use of any type of energy-saving measure to provide the same goods and services with less energy use.²² Environmental scholars and scientists argue that energy efficiency is potentially the most important and cost-effective means for mitigating greenhouse gas emissions in the private sector.²³ Thus, an increasing number of cities and businesses leverage energy efficiency for climate mitigation. Northfield has taken steps in the past, and plans to take future steps, to achieve energy efficiency in the private sector. In this section of the paper, we discuss how Northfield can use energy efficiency to mitigate the effects of climate change. Then we recommend that Northfield provide preferential treatment to businesses that have adopted energy efficient practices like Green Globes project certification and Environmentally Preferable Purchasing (EPP) programs.

Northfield has already taken several steps to achieve energy efficiency. For one, it formed the Energy Working Group, which assessed the City’s energy consumption in the residential and commercial/industrial sectors.²⁴ Their assessment allowed Northfield and businesses to evaluate the amount of energy used by businesses, and thus, how much can reasonably be reduced. The group’s findings show that the commercial sector should be one

²² Bailie, Alison; Roger Peters, Matt Horne & Kristin Zarowny, “Successful Strategies for Energy Efficiency,” *The Pamina Institute*, 2006.

²³ Worrell, Ernst, Lenny Bernstein, Joyashree Roy, Lynn Price, Jochen Harnisch, “Industrial energy efficiency and climate change mitigation,” in *Energy Efficiency*, (Netherlands: Springer, 2009), 109.

²⁴ Northfield Energy Working Group. *Northfield Carbon Calculations*. Northfield, MN: Energy Working Group, 2017.

of the main focal points of energy use reduction in Northfield because it is responsible for the largest percentage of the City's energy use.²⁵

Another step already taken by the City was the development of the Northfield Energy Task Force (NETF). In 2017, the ad hoc committee published the "Action Plan for Northfield Area Energy Sustainability" report that made recommendations to businesses on the best green practices to achieve energy efficiency.²⁶ Their recommendations were categorized under "Green", "Greener," or "Greenest" based on their potential impacts on the environments. The "Green" recommendations included: take advantage of Xcel Energy's energy efficiency and demand management, provide incentives for employees to walk and bike to work, facilitate employee telecommuting, and develop carpooling programs.

The "Greener" recommendations included initiatives like: sponsor a car-pooling program for business employees, provide preferential parking for electric scooters and electric plug-ins, provide fuel-efficient company vehicles, or provide electrical plug-ins for plug-in vehicles. Finally, the "Greenest" recommendations included long-term, drastic changes like generate energy with on-site renewable energy systems such as photovoltaic, vertical wind turbines, solar thermal installations, and geothermal heat pump, install green roofs on facilities, take a cradle-to-cradle approach in all processes. According to the Comprehensive Plan for Northfield, the City intends to evaluate the Energy Task Force's recommendations and promote the implementation of the listed strategies.²⁷

Beyond the aforementioned past actions, Northfield plans to take future steps to achieve energy efficiency in the private sector. According to its comprehensive plan, one of these future actions is the development of incentives to promote energy efficiency in the

²⁵ Footnote 9.

²⁶ Northfield Energy Task Force. *With Hope: A Resilient Community an Action Plan for Northfield Area Energy Sustainability*. Northfield, MN: Energy Task Force, 2008.

²⁷ Northfield, MN. *Comprehensive Plan for Northfield*. Prepared by ACP Visioning + Planning, Ltd.. 2008

design construction, and operation of commercial buildings.²⁸ Northfield also has pending GreenStep Cities actions to complete. For example, as a Step 3 GreenStep city, Northfield is expected to complete two actions related to expanding a greener, more resilient business sector in the future.²⁹ Currently, the specific actions the City plans to accomplish is unclear. However, they may include: using targeted assistance and new workforce development to grow a new/emerging green business sector, participating in marketing/outreach programs to connect businesses with assistance providers that can help them develop energy-saving mechanisms, lowering the environmental and health risks footprint of brownfield remediation/redevelopment projects, recognizing green businesses, and/or participating in buy local campaigns for community members.

While Northfield continues to discover ways to achieve energy efficiency in the private sector, there are several promising actions we found in other municipalities that may help the City mitigate the effects of climate change. For example, several cities incentivize businesses to become more energy efficient by giving them preferential treatment if they build or retrofit for green building certification. Preferential treatment refers to procedural exceptions to city laws like an expedited project or permit approval processes. It does not refer to monetary benefits, although many cities provide the latter.

Some of the cities we looked at give preferential treatment to businesses seeking Leadership in Energy and Environmental Design (LEED) certification. LEED is a credit-based rating system that provides certification of buildings with green features to encourage the development of more energy-efficient buildings.³⁰ Chicago and Indianapolis are two of these cities that we investigated. In Chicago, commercial projects pursuing low-level LEED certification receive their permits within 30 days, while projects striving for higher levels of

²⁸ Ibid.

²⁹ "Best Practice Actions [See Action Tools, Guidance, City Reports]." Minnesota GreenStep Cities. Accessed May 27, 2018. <https://greenstep.pca.state.mn.us/bestPracticesDetail.cfm?bpid=24>.

³⁰ "LEED Certification - LEED Certification Requirements." Green Building Design. Accessed May 27, 2018. <http://www.concretethinker.com/solutions/LEED-Certification.aspx>.

LEED certification undergo an expedited permit process.³¹ Similarly, in Indianapolis, private projects seeking LEED certification receive reduced or rebated permitted fees.³²

Providing preferential treatment for green building certification projects increases the amount of energy efficient buildings within a city. According to several environmental scholars, this ultimately leads to a reduction in the total greenhouse gas emissions within a city.³³ The logic is quite reasonable. The more energy efficient businesses within a city, the fewer greenhouse emissions emanating from the commercial sector.

Cities in Minnesota provide similar incentives but for commercial buildings that are a part of the SB2030 standards program, which is an energy conservation program that derives from the national Architecture 2030 program.³⁴ The SB2030 is a standards-based program that works with participating businesses to achieve net zero carbon emissions by the year 2030. Participating SB2030 businesses commit to a 10% reduction in carbon emissions.³⁵ The reductions are made every five years until the year 2030 to reach net zero carbon emissions. Participating businesses tend to target energy efficiency to reduce their carbon emissions. The incentives provided by cities in Minnesota for participating businesses include lower interest loans and lowered building or equipment permit fees.³⁶ The cities that provide these benefits include Royalton, Falcon Heights, and Woodbury. Other cities including Rochester, Maplewood, Maple Grove, and Oakdale provide grants, rebates, or property tax breaks and expedited permit review processes.³⁷

Finally, most of the climate action plans of other cities either require or provide monetary incentives to encourage businesses to retrofit their buildings. Incentives are the

³¹ Chicago, IL. *Chicago Zoning Ordinances*. Prepared by City of Chicago. 2007.

³² Indianapolis, IN. Consolidated Zoning/Subdivision Ordinance. Prepared by City of Indianapolis. 2017.

³³ Moatassem Abdallah, Khaled El-Rayes, and Caroline Clevenger, "Minimizing energy consumption and carbon emissions of buildings," *Procedia Engineering* 118 (2015): 890.

³⁴ "2030energystandard." B3. Accessed May 27, 2018. <https://www.b3mn.org/2030energystandard/>.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Minnesota GreenStep Cities. Accessed May 27, 2018. https://greenstep.pca.state.mn.us/bestPracticesDetail_actions.cfm?bpid=2&aid=726.

most popular practice among cities we observed. For example, Oakland provides 0% interest loans ranging from \$6,500--\$30,000 for energy efficiency improvements to commercial buildings.³⁸ However, other cities passed ordinances that require retrofitting. These cities include Upland, CA and Evanston, IL.³⁹

1. Green Building Certification

Northfield can reduce greenhouse gas emissions by encouraging green building and energy efficiency by incentivizing green building standards. Thus, our first recommendation is for Northfield to follow the example of other cities and provide preferential treatment to businesses that meet green building standards. This action will yield the most significant impact in reducing greenhouse gas emissions because, as stated before, the greener buildings that exist in the city the greater the city's ability to reduce emissions.⁴⁰ Green building is important because commercial buildings around the world account for up to 40% of total end-use energy, which means it contributes a substantial amount to total emissions. Northfield can help counter this trend.

The most common form of preferential treatment cities offer are exceptions to certain building and/or zoning requirements. Several cities like Chicago provide an expedited building permit approval process for businesses seeking green building certification. In MN, this form of preferential treatment is given to businesses that participate in the SB2030 program. Unfortunately, it is too late for Northfield businesses to join the SB2030 program and reach the goal of net zero carbon by 2030. Thus, Northfield should direct its attention towards other existing programs. Below we compare the programs that are most used by other cities, and the most respected among policymakers. They include LEED, Green Globes,

³⁸ City of Oakland. *West Oakland Redevelopment Plan*. Prepare by Lamphier-Gregory. 2012.

³⁹ City of Evanston. *Evanston Climate Action Plan*. Prepare by Network of Evanston's Future. 2008.

⁴⁰ Moatassem Abdallah, Khaled El-Rayes, and Caroline Clevenger, "Minimizing energy consumption and carbon emissions of buildings," *Procedia Engineering* 118 (2015): 891.

and Sustainable Sites Initiative. In assessing the potential cost of each program to Northfield businesses, we focus on registration fees and certification costs. For every program, all other costs vary based on the type of projects seeking certification.

LEED is a credit-based system that provides independent third-party verification for new and existing buildings and commercial interiors. It is the most widely used system in the world. However, it is also one of the most expensive.⁴¹ Registration costs for LEED is \$1,200. Certification fees range from \$2,500 to \$33,000 based on project size. While the total costs of joining LEED depends on the project proposal, businesses would need to budget 2 percent for construction costs and about \$150,000 in soft costs for Gold Level Certification. There are no on-site visits required. Instead, the program requires project teams to compile documentation and show compliance with requirements. Certification is awarded upon completion of construction.

Green Globes, like LEED, is credit-based and verifies new and existing building projects for certification. However, unlike LEED, the program sends a Green Globes Assessor to perform onsite assessments of proposed building projects. There is no registration cost for Green Globes. The project entry and complete pre-design stage are also free.⁴² However, the cost of the mandatory online assessment is \$1,500 per project. This price only covers the use of the online tool to complete the design assessments, it excludes the verification and certification of Green Globes rating. The certification cost ranges from \$3,000-\$20,000 depending on building square footage.⁴³ This is cheaper than LEED.⁴⁴

Finally, the Sustainable Sites Initiative (SITES) provides a comprehensive rating system that distinguishes landscapes, measures their performance and evaluates their value.

⁴¹ "LEED Certification - LEED Certification Requirements." Green Building Design. Accessed May 27, 2018. <http://www.concretethinker.com/solutions/LEED-Certification.aspx>.

⁴² Green Globes - Costs. Accessed May 27, 2018. <https://www.greenglobes.com/interiors/frontcost.aspx>.

⁴³ "LEED Certification Fees | USGBC." LEED | USGBC. Accessed May 27, 2018. <https://new.usgbc.org/cert-guide/fees>.

⁴⁴ Green Building Initiative. "Green Globes Price List." Green Building Initiative. 2014 <https://www.thegbi.org/content/misc/Green-Globes-CIEB-Price-List.pdf>

SITES certification is a point-based system. Here the number of points earned determines the certification level the project is awarded (Certified, Silver, Gold, or Platinum). Registration for SITES is \$2,500 for members, and \$3,000 for non-members. To be certified is \$6,500 members, and \$9,000 for non-members.⁴⁵ Thus, a combined registration and certification cost for members is \$9,000, and \$12,000. However, the registration and certification costs are calculated on a per-project basis. There are more certification programs in the United States that the City can apply for. The three we analyze are the most popular in other cities.⁴⁶

We recommend that Northfield give preferential treatment to companies that seek Green Globes certification. While LEED is more popular in other cities, it's expensive, and its prices are increasing.⁴⁷ Additionally, LEED does not provide proper guidance for businesses like Green Globes does. SITES does not have the administrative robustness that LEED and Green Globes has. Thus, Green Globes is the most preferable option for Northfield businesses because of its low prices and the unique guidance it provides businesses through an on-site assessor.

If Northfield provides preferential treatment for Green Globes certification, it can potentially inspire other businesses to build green. Green building is essential for the City. Especially considering the Energy Working Group's 2017 finding that the commercial sector contributes the highest percentage to the City's energy consumption. The sector's high consumption is rooted in large part to how business buildings are built to use energy. Through green building Northfield businesses will build sustainably; that is, in ways that will reduce energy use. As businesses build sustainably, carbon emissions will also be reduced.⁴⁸

⁴⁵ "SITES Rating System." National Renewable Energy Lab (NREL) Research Support Facility | SITES. Accessed May 27, 2018. <http://www.sustainablesites.org/certification-guide>.

⁴⁶ "Green Building Standards and Certification Systems." WBDG | WBDG Whole Building Design Guide. September 12, 2016. Accessed May 27, 2018. <https://www.wbdg.org/resources/green-building-standards-and-certification-systems>.

⁴⁷ Holmes, Selina. "LEED Pricing Update Effective December 1." U.S. Green Building Council. November 04, 2016. Accessed May 27, 2018. <https://www.usgbc.org/articles/leed-pricing-update-effective-december-1>.

⁴⁸ Moatassem Abdallah, Khaled El-Rayes, and Caroline Clevenger, "Minimizing energy consumption and carbon emissions of buildings," 895.

Additionally, there are economic, financial, and social benefits to building green for businesses. Economically, businesses create, expand, and shape markets for green products.⁴⁹ Businesses can also improve occupant productivity and optimize life-cycle economic performance by building green. Financially, businesses can earn savings from maintenance and utility costs. In fact, building green results in a life cycle savings of 20% of total construction for most businesses.⁵⁰ Socially, green building allows businesses to enhance occupant comfort and health, heighten aesthetic qualities, and improve the overall quality of life by encouraging the reduction of carbon emissions for civilians.⁵¹ Thus, Northfield can expect a significant impact on climate change by providing preferential treatment to building projects seeking Green Globe certification.

2. Environmentally Preferable Purchasing (EPP) Program

Our second recommendation is that Northfield should give preferential treatment to businesses that adopt Environmentally Preferable Purchasing programs (EPPs) by providing preferential treatment for them. EPP is where businesses purchase a product that has a lesser or reduced negative effect or increased positive effect on human health and the environment than competing products. Buying and using these sustainable products improve energy efficiency and saves money for the businesses.⁵²

Moreover, EPPs allow businesses to can reduce greenhouse gas emissions (including CO2 emissions) and air pollutants, improve energy efficiency, and support the development of cleaner technologies by focusing on sustainable products and construction that protect the

⁴⁹ David Turcotte, Julie Villareal and Christina Bermingham. *The Benefits of Building Green*. Lowell, MA: University of Massachusetts-Lowell's Center for Family, Work & Community, 2004.

⁵⁰ Ibid, 3.

⁵¹ Ibid.

⁵² Environmental Protection Agency, *Evaluation of the Environmentally Preferable Purchasing Program* (Washington, DC: EPA, 2014).

environment.⁵³ However, there are benefits beyond this. First, EPPs can promote sustainable business practices by saving businesses money. Environmentally friendly products are competitive in terms of quality but cost far less than comparable conventional alternatives over the life of the produce.⁵⁴ Thus, businesses will be receiving high-performing equipment for low cost by employing devices that conserve energy.

EPPs also provide positive public relations for businesses, which can lead to greater sales. Sustainable operations are becoming more important in the public eye as civilians realize the importance of environmental protection. Implementing a green purchasing policy will signal to consumers that a particular business shares in their awareness of environmental protection. EPPs raise consumer awareness about the environmental and social implications associated with different types of purchases. As businesses purchase more efficient lighting, customers may choose to do the same, leading to a chain of green purchasing from the commercial to the public sectors.

Procedural preferential treatment is a feasible incentivizing tool for Northfield because it doesn't involve the City giving out money and doesn't require anything of businesses, which may push them away. However, procedural preferential treatment can be applied to the extent that the City doesn't get inundated by an overwhelming number of projects that qualify for such preferential treatment. This is one significant issue that may arise from the provision of preferential treatment. That is, so many companies may qualify for such benefits that certain laws and rules may become obsolete because of the exemptions provided to them. This is why it's essential for the City to determine which laws it's willing to provide preferential treatment for. While having every project qualify for the City's determined preferential treatment for green building is great for climate mitigation, the City must account for the possibility of being inundated with proposals.

⁵³ Environmental Protection Agency, *Evaluation of the Environmentally Preferable Purchasing Program* (Washington, DC: EPA, 2014).

⁵⁴ Ibid.

B. Financing Renewable Energy and Energy Efficiency Upgrades

It is no secret that the main resistance from the private sector to the adoption of energy efficiency and renewable energy comes from the high installation costs associated with ‘green’ technology.⁵⁵ Despite the fact that these costs have dramatically decreased since the early 2000s, resistance to these ‘green’ upgrades continues.⁵⁶ Therefore, any effective CAP must address how the City’s policy can help local businesses overcome these financial barriers. In Northfield, the city government, as of the time of writing, has not implemented or adopted policies that would specifically help businesses finance their use of renewable energies and energy efficiency upgrades. The City does, however, have in place certain tax incentives and loan programs to support business activities.⁵⁷ But due to their generic nature, they are not specifically tailored to the adoption of green technologies. In this section, we explore existing ‘green’ financing programs and the possibility of a ‘green’ revolving fund.

1. Existing Financing Programs

When it comes to financing energy efficiency and renewable energy, the GreenStep’s main recommendation in Best Practice no. 25, action 3, is that cities “partner with a financial institution (local bank, investment firm) to create a renewable energy/energy efficiency loan product” and/or facilitate “PACE [Commercial Property-Assessed Clean Energy] financing to local businesses.”⁵⁸ PACE is a financing method whereby the financing entity covers all the upfront costs of energy efficiency and renewable energy upgrades through a low-interest rate loan. The property owner then pays back the loan through a special property tax. The advantage of this financing method is that the repayment period is generally longer and

⁵⁵ "Barriers to Renewable Energy Technologies." Union of Concerned Scientists. December 20, 2017. <https://www.ucsusa.org/clean-energy/renewable-energy/barriers-to-renewable-energy#.Wt6RT0xFzIU>.

⁵⁶ Ibid.

⁵⁷ "Get Financing." Economic Development. <https://www.ci.northfield.mn.us/168/Get-Financing>.

⁵⁸ "Renewable Energy, Practice no. 26, Action 3." Minnesota GreenStep Cities. https://greenstep.pca.state.mn.us/bestPracticesDetail_actions.cfm?bpid=25&aid=870

cheaper than “many utilities programs and conventional loans.”⁵⁹ Moreover, because the tax is property-based, current owners who intend on selling their property would not be dissuaded from using PACE for energy efficiency and renewable energy upgrades given that the new owner would be responsible for the tax payments.⁶⁰ But it is important to keep in mind that the property-based aspect can also be a disadvantage because it does not incentivize property *renters* to participate in the program.⁶¹ Therefore, in cities where the majority of businesses rent their property, PACE may face certain obstacles to acceptance.

The other aspect of the recommendation is that the city partners with a local financial institution to create a loan product for energy efficiency and renewable energy upgrades. The clear advantage of this approach is that the city can tailor the financing program to its businesses. For example, if businesses generally rent their property, then a loan program that is not property-based can be created to suit a city’s commercial dynamics. Moreover, the fact that the loan product would be created locally reinforces the previous point that the product could be better tailored to local businesses due to the greater availability of local knowledge. The obvious disadvantage, however, is the time and resources that would be spent in contacting and negotiating with a local financial institution in the creation of the loan product. This is especially true when there are other financial programs like PACE that are already available.

According to GreenStep, Northfield has not adopted this best practice and there is no indication that it will do so in the near future.⁶² Although this may be the case, PACE financing is available in Northfield to local businesses through the Saint Paul Port Authority

⁵⁹ Merrian C. Fuller, Cathy Kunkel, and Daniel M. Kammen, *Guide to Energy Efficiency & Renewable Energy Financing Districts for Local Government*, Report, University Of California, Berkeley (2009), 7.

⁶⁰ *Ibid.*

⁶¹ *Ibid.*, 8.

⁶² "Northfield's Progress to Date," GreenStep Cities Program | Northfield, MN - Official Website, <https://www.ci.northfield.mn.us/727/Progress>

(SPPA,) ⁶³ which is an economic development agency established by Minnesota. ⁶⁴ The advantage of this arrangement is that there is no financial burden on the city to have the program as it is facilitated by SPPA. But despite the availability of PACE in Northfield, there are no projects currently under the program in the city. ⁶⁵

To see what Northfield can do to get businesses to use PACE for financing green energy upgrades, it is important to see what other cities in Minnesota have already done. Given that the PACE program in Minnesota does not place a financial burden on the city, it is unsurprising that an overwhelming majority of cities that have taken up GreenStep's recommendation have opted to facilitate PACE rather than create a new loan product with a financial institution. ⁶⁶ Some cities that have taken up PACE have actively promoted the program in their communities. The city of Red Wing, for example, had promoted PACE in their 'Partners in Energy' campaign in 2016. ⁶⁷ Another example is Winona, which conducted a more targeted campaign where the county "held a 'lunch and learn' for businesses to learn about the PACE program" in 2017. ⁶⁸ In both localities, applications for PACE were submitted. Thus, active promotion by educating the business community and the public about the program and its merits is key. Currently, Northfield has merely listed PACE as a "public financing" option on its website. ⁶⁹ Therefore, educating the businesses about PACE should be an important part of the City's CAP. Exactly how Northfield should do this is explored in Section 3C.

But PACE is not the only available financing option in Northfield. The City's main electric utility provider, Xcel Energy, has several financing programs for businesses that want

⁶³ "Commercial Property-Assessed Clean Energy (PACE) Programs in Minnesota." Commercial Property-Assessed Clean Energy (PACE) Programs in Minnesota | Clean Energy Resource Teams. Accessed April 28, 2018. <https://www.cleanenergyresourceteams.org/pace#sppa>.

⁶⁴ "About Us." Saint Paul Port Authority. Accessed April 28, 2018. <https://www.sppa.com/about>.

⁶⁵ Footnote 65.

⁶⁶ Footnote 58.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Footnote 57.

to undertake renewable energy and energy efficiency upgrades.⁷⁰ Taking the former upgrades, for example, Xcel has instituted the Solar Rewards program for businesses that install solar panels whereby any excess energy that is fed back into the grid is credited through monthly payment to the business owner.⁷¹ Like PACE, however, Northfield businesses may not be aware of such programs and so the City needs to educate them about these opportunities. In addition to the two previous financing options, both the City⁷² and the Northfield Area Chamber of Commerce⁷³ have listed several financing options on their websites. But because these options are not explicit as to whether they apply to ‘green’ upgrades, businesses may be discouraged from the effort needed to sift through the diverse options. Therefore, the City must reduce this additional information barrier by possibly working with the Chamber of Commerce to categorize the financing options in such a way that businesses know which ones apply to renewable energy and energy efficiency upgrades.

2. Green Revolving Fund

In the previous subsection, the possibility of a local loan product was briefly discussed. If Northfield would like to take a more proactive approach to financing these ‘green’ upgrades, then a revolving fund would be appropriate. A revolving fund is essentially a fund that does not require constant injections of capital into it by the financing authority because the fund replenishes itself. This is made possible by a one-time injection of capital, which is then loaned out with an interest rate, repayment of which replenishes the fund. Depending on the interest and inflation rates, the repayment may even increase the fund, which in turn increases the funding capacity of the financing authority.

⁷⁰ "Business Programs & Rebates." Xcel Energy.

https://www.xcelenergy.com/programs_and_rebates/business_programs_and_rebates.

⁷¹ "Solar*Rewards® for Residences." Programs and Rebates.

https://www.xcelenergy.com/programs_and_rebates/residential_programs_and_rebates/renewable_energy_options_residential/solar/available_solar_options/on_your_home_or_in_your_yard/solar_rewards_for_residences.

⁷² "Get Financing." Economic Development. <https://www.ci.northfield.mn.us/168/Get-Financing>.

⁷³ "Business Resources." Northfield Area Chamber of Commerce and Tourism. Accessed May 28, 2018. <http://www.northfieldchamber.com/pages/BusinessResources>.

Currently, the City has two sets of revolving funds: The Downtown Revolving Loan Fund Program (DRL) and the City-Wide Revolving Loan Fund Program (RLF).⁷⁴ The former is restricted to Downtown businesses and provides a low-interest loan of up to \$25,000, which can be used for energy efficiency upgrades.⁷⁵ The RLF applies to all businesses that are either located in or relocating to Northfield.⁷⁶ Although the RLF does not explicitly refer to energy efficiency as the DRL does, it can be used for building construction or renovation, which would include the implementation of the green building standards discussed in Section 3A.

The City can implement a revolving fund for ‘green’ upgrades by building on the existing revolving funds. One way of doing this is by expanding the scope of the RLF and DRL. Currently, they do not apply to installations of renewable energy technologies. Therefore, Northfield should allow businesses to access the funds for such upgrades. If this expansion were to take place, the City will have to increase the loan cap of \$25,000 because the average cost of installing these technologies like a 5-kilowatt solar panel, for example, is \$25,000-\$35,000.⁷⁷ Expanding the loan cap will not only allow the private sector to adopt renewable energy technologies but it will also allow it to implement more dramatic energy efficient upgrades. Such an expansion might require Northfield to conduct a one-time injection of capital from its General Fund.

Northfield could, however, establish a new revolving fund specifically for renewable energy and energy efficiency upgrades. This would require a greater one-time injection of capital from the City’s General Fund. But doing so would not increase the financial pressure placed on the DRL and RLF by increasing their scope to include ‘green’ upgrades. Because

⁷⁴ "EDA Grants & Loans." Northfield Economic Development. <https://www.ci.northfield.mn.us/753/EDA-Grants-Loans>.

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ Kinnear, John. "How Much Do Solar Panels Cost to Install?" November 29, 2016. <https://www.solarpowerauthority.com/how-much-does-it-cost-to-install-solar-on-an-average-us-house/>.

the injection of capital would be significantly greater by creating a separate ‘green’ fund, the City could partner with a local financial institution as GreenStep recommended. Although this would reduce the financial burden on Northfield, it could time and resources to negotiate a partnership with a local financial institution. Therefore, this paper recommends that the City simply expand both the scope and loan caps of the two revolving funds rather than create a separate specialized one from scratch in order to save time, money, and other resources.

C. Educating and Outreach

As stated in the last section, there is an asymmetry of information problem that exists among businesses. In other words, there are many financing programs already in place, like PACE and Xcel rebates, that help businesses finance energy efficiency and renewable energy upgrades but are simply not known to local businesses. As mentioned before, Northfield has listed several resources on its website that businesses can investigate for financing various initiatives.⁷⁸ Similarly, the Northfield Area Chamber of Commerce and Tourism has listed the contact information and description of numerous services offered by various federal, state, and local organizations that Northfield businesses can go to.⁷⁹ But in both cases, there is no targeted effort at providing information on energy efficiency and renewable energy financing. Moreover, both cases convey a passive effort at educating local businesses about financing options in that the city does not reach out to these businesses. Rather, businesses must make the active choice to go to these websites and discern among the several options for financing. These information barriers may not incentivize businesses to pursue green energy use. Thus, this section focuses on *how* Northfield can create an outreach program that actively educates the private sector about the several financing opportunities and encourages it to adopt them.

GreenStep recommends that cities implement an outreach program “to connect businesses with assistance providers, including utilities, who provide personalized energy,

⁷⁸ Footnote 72.

⁷⁹ Footnote 73.

waste or sustainability audits and assistance.”⁸⁰ As of the time of writing, Northfield has not implemented such a program, nor does it have plans to do so in the future. But connecting with the private sector is key if they are to be an active stakeholder in Northfield’s CAP. There are several ways cities in Minnesota have gone about this in the implementation of such an outreach program. The city of Arlington, for example, has taken the initiative to coordinate “annual business visits with a representative from [the Minnesota Municipal Power Agency] MMPA to discuss potential energy saving projects.”⁸¹ Other cities like Hutchinson have hosted events in which business owners could attend and learn about various green energy-related programs.⁸² Presenters in these events include city officials and representatives from various environmental organizations. Furthermore, cities like Maplewood have provided state programs like the Minnesota Waste Wise program “a list of manufacturers and businesses located within the city so the Waste Wise program can reach out to these companies.”⁸³

These examples serve to illustrate the many degrees of involvement Northfield could undertake in such an outreach program based on the time and resources the City can spare. It could, like Arlington, spearhead the program or, like Maplewood, decentralize the responsibility by simply notifying the appropriate organizations of relevant groups of businesses and letting the organizations execute the outreach initiatives. In the short-run, the City can adopt Maplewood’s decentralized example by simply compiling a list of businesses for state or federal agencies to contact and educate about various ‘green’ opportunities. But in the long-run, a more active and centralized approach should be pursued because the City can tailor it to local needs, and local businesses are likely to be more responsive to local outreach initiatives than to state or federal ones. Although the decentralized method will cost little to

⁸⁰ "Green Business Development, Practice no. 25, Action 2." Minnesota GreenStep Cities.
https://greenstep.pca.state.mn.us/bestPracticesDetail_actions.cfm?bpid=24&aid=861

⁸¹ Ibid.

⁸² Ibid.

⁸³ Ibid.

nothing for Northfield, conducting a program like Arlington or Hutchinson's would require the City to tap into its General Fund. To minimize the costs of the long-term centralized outreach program, Hutchinson's model would be appropriate. This is because hosting a general event for business owners to attend and learn is less costly to host than hiring personnel to make visits to individual businesses. But the City should be aware that such individual visits are likely to be more successful.

D. Demand-Side Policies

In a consumer culture that is increasingly becoming more sympathetic to the green movement, people "are willing to spend more for products that are environmentally friendly" and businesses are responding by "advertising their products' environmental friendliness."⁸⁴ This is evidenced by the fact that "filings for eco-friendly labels doubled and stores offered 73% more green products in 2010 compared to 2009."⁸⁵ Moreover, the percentage of "millennials willing to pay more for products and services from companies committed to positive environmental and social change increased from 55% in 2014 to 72% in 2015."⁸⁶ Thus, given the enormous influence that consumer demand can have on business behavior, it is important for Northfield to accentuate these demand-drivers in order to incentivize businesses to adopt energy saving practices to reduce GHG emissions.

This is most commonly done through the adoption of a certification program for identified 'green' businesses based on several categories. By having such a branding mechanism, consumers could easily identify which businesses have adopted climate change mitigation actions and alter their purchasing habits accordingly, which in turn would influence business behavior. As of the time of writing, Northfield has not yet adopted or

⁸⁴ Hozik, Michael. "Making the Green by Going Green: Increased Demand for Green Products and the FTC's Role in a Greener Future." *Georgetown Environmental Law Review*. May 18, 2016. <https://gelr.org/2016/02/01/making-the-green-by-going-green-increased-demand-for-green-products-and-the-ftcs-role-in-a-greener-future-georgetown-environmental-law-review/>.

⁸⁵ *Ibid.*

⁸⁶ *Ibid.*

planned to adopt any certification programs. But GreenStep has advised cities to recognize and promote green businesses in their communities, and several cities in Minnesota have done so.⁸⁷

Although there are national certification programs such as the Green America's Green Business Certification program and "the tiered certification system from the Green Business Bureau," as well as international programs such as B Corporation, most cities have created their own certification programs.⁸⁸ Cities like Apple Valley and Eagan are part of the ARROW program, a green certification program run by them and a few other cities in Dakota County.⁸⁹ The program recognizes and promotes businesses that recycle and reuse resources and reduce their overall resource consumption.⁹⁰ Other cities have their own local programs which are point-based such as Elk River.⁹¹ In Elk River's case, the Energy City High Five Program establishes several categories of actions such as water conservation and waste management, completion of which would result in a certain number of points that are based on the difficulty of the action.⁹² Moreover, the program offers businesses recommendations on how to execute each action. A certification program could also involve the community. Woodbury's Environmental Excellence Awards allows community members to nominate businesses that they think "are making Woodbury a more sustainable community through innovative programs and practices that demonstrate environmental leadership."⁹³

⁸⁷ "Green Business Development, Practice no. 25, Action 6." Minnesota GreenStep Cities. https://greenstep.pca.state.mn.us/bestPracticesDetail_actions.cfm?bpid=24&aid=865

⁸⁸ Ibid.

⁸⁹ "Arrow Program." Dakota Valley Recycling. Accessed April 29, 2018. <https://www.dakotavalleyrecycling.org/ARROW>.

⁹⁰ Ibid.

⁹¹ "Energy City High Five Program." Elk River. Accessed April 29, 2018. <https://www.elkrivernm.gov/1137/Energy-City-High-Five-Program>.

⁹² Ibid.

⁹³ "Environmental Excellence Awards." Woodbury. Accessed April 29, 2018. https://www.woodburymn.gov/departments/environment/environmental_excellence_awards.php.

Although Northfield is partly located in Dakota County, it cannot join the ARROW program.⁹⁴ But ARROW has a few benefits that Northfield can emulate and drawbacks that it should avoid. One issue with the program is that it is not as rigorous a certification program as some of the others mentioned. This is because the categories of ARROW are primarily restricted to reducing material consumption whereas other programs tend to include much broader categories that are more effective for mitigation efforts. Moreover, unlike the point-based system of Elk River's Energy City High Five Program, ARROW does not offer a measurable criterion for judging what businesses are 'green' and, therefore, may not be a rigorous certification program. But ARROW's main strength lies in its multi-city nature. Administering a program on this larger scale not only reduces average costs but also reduces overall costs for the partner cities due to cost-sharing. Therefore, Northfield could look into partnering up with neighboring cities to reduce administrative costs. That being said, however, a multi-city program like ARROW is only appropriate if a significant portion of businesses in the City conduct commercial activity in the other partner cities as well.

For Northfield to run its own certification program, it must decide what categories it would judge businesses by, what criteria it would use to evaluate business actions under each category, and how the recognition of the business would be realized. Although cities like Elk River and Woodbury have created their own unique programs, we advise Northfield to follow the example set by the city of Marshall. Marshall established the Marshall GreenStep Business Program, a point-based certification program that recognizes businesses that have undertaken certain environmentally-friendly actions.⁹⁵ What differentiates Marshall's program from the others is that the city bases its categories primarily on the best practices recommended by GreenStep.⁹⁶ This has several advantages. One, the city does not have to create categories from scratch as GreenStep offers a wide range of recommendations that

⁹⁴ Email exchange with ARROW program director Elizabeth Orrick (elizabeth.orrick@burnsvillemn.gov)

⁹⁵ Footnote 87.

⁹⁶ Ibid.

business can execute on their own such as GreenStep's recommendations on energy efficiency for buildings. Another advantage is that by basing the categories for recognition on GreenStep's recommendations, the business community can play a valuable role in the city's quest to be recognized under GreenStep. Moreover, the delegation of some of the responsibility to execute a best practice onto businesses can lead to a more dynamic approach to climate change mitigation as some of the burdens is removed from the city government.

When following Marshall's model, Northfield must ensure that the certification program's categories are primarily based on GreenStep's climate change mitigation recommendations. Such recommendations may include things such as but not limited to energy efficiency upgrades and renewable energy technologies. Furthermore, for the City to administer such a program, the General Fund will have to be used.

E. Zoning

Cities typically use zoning to guide private development and ensure land is used in a way that promotes the best use of land and the prosperity, health, and welfare of the city's residents. Many cities use zoning to implement environmentally conscious rules and practices like preserving open space, protecting watershed and wetland areas, saving areas of aesthetic and historical value, and promoting general environmental goals.⁹⁷ However, zoning can be used by Northfield to directly mitigate the effects of climate change. In this section, we outline how this is possible.

Northfield already employs some promising, environmentally friendly zoning policies similar to the ones employed by most cities. However, they mostly affect the public sector. For example, Northfield has a tree preservation policy. It also strives to obtain LEED

⁹⁷ Steven Ferrey, *Environmental Law* (New York: Wolters Kluwer, 2016),502.

certification for its public facilities.⁹⁸ Additionally, through the Greater Northfield Greenway System Action Plan, the city preserves a corridor for trail connections and recreation, which also serves as stream buffer areas to filter pollutants and preserve wildlife habitats.⁹⁹

Currently, the Land Development Code enforces Euclidean zoning, where land is divided into various use districts based on the broad police power of protecting the health, safety, welfare, and morals of the public. Evidence of Euclidean zoning is found in Northfield's establishment of the Highway Commercial District.¹⁰⁰ This district provides locations for retail and service businesses, who benefit from access to and visibility from the highway and provide locations for mixed-uses within buildings and sites. The district provides locations for businesses that rely on easy auto access and parking plus visibility from the highway while providing safe and attractive routes to businesses for pedestrians and bicycles from neighboring sites and the rest of the City. However, Euclidean zoning is ineffective in protecting environmentally sensitive lands because it focuses on social and economic values rather than on natural resources.¹⁰¹ The important downfall of Euclidean zoning is its inability to directly reduce greenhouse gas emissions, which is where Northfield's zoning practices should be directed.

Northfield's future plans can help reduce the city's greenhouse gas emissions. One of the objectives listed as a priority in Northfield's comprehensive plan is enabling higher density commercial land use to increase environmental sustainability. This involves clustering in single districts to achieve better energy, economic and environmental outcomes. Northfield has already done something similar for manufacturing businesses by establishing the Industrial District, which is an area that accommodates manufacturing uses, general business, offices, service and repair businesses, warehousing and offices showroom.

⁹⁸ City of Northfield. *Comprehensive Plan for Northfield*. Prepared by ACP Visioning + Planning, Ltd.. Northfield, MN: 2008

⁹⁹ City of Northfield. *Greater Northfield Area Greenway System Action Plan*. Northfield, MN: 2006.

¹⁰⁰ City of Northfield. *Land Development Code*. Prepared by City of Northfield. Northfield, MN: 2015.

¹⁰¹ Steven Ferrey, *Environmental Law*, 503.

However, according to Scott Tempel, Northfield's City Planner, Northfield is hoping to establish the same for the commercial sector; that is, business in retail and other commercial practices. This strategy will help reduce emissions from vehicles that would otherwise be used to move from one business to the other.

Zoning regulations in other cities are created under the principle of protecting the ecosystem and natural functions. However, the regulatory items that support this principle vary significantly. While some cities focus on overlay zoning to protect natural spaces, others focus on changing business and consumer behavior through zoning policies. For example, Evanston, Ann Arbor, and Albany rezone designated commercial areas to allow mixed-use developments that include a combination of retail, office, and residential uses in the same project or the same site. The intention behind this practice is to reduce the distance between essential centers so people won't need to use vehicles to get from one place to the other. The effectiveness of this policy is measured by the amount of walking and bicycle usage between destinations within the specific district.

More cities identify locations in the city for ground floor commercial uses buildings. In its climate action plan, Evanston proposes that development of retail, office, and residential spaces within the same structure to increase the connectivity of retail, employment, and transit centers.¹⁰² San Diego requires that streets have particular connectivity and accommodation characteristics. By grouping businesses together, they will be able to share a parking lot, and surface area will be minimized, providing more open space and limiting the use of vehicles. This has a positive impact on the environment because the fewer vehicles are used due to the decreased distance between businesses centers the less greenhouse gas emissions are produced by in the city.

¹⁰² City of Evanston. *Evanston Climate Action Plan*. Evanston, IL: City of Evanston, 2012.

Many cities award exceptions to certain zoning laws through variance provisions. Variance is when developers are allowed to violate specific zoning laws that cause unnecessary hardship or practical difficulty for a property owner, due to unique circumstances of the property being built.¹⁰³ To receive variance exceptions, applicants must demonstrate that their situation is caused by a unique circumstance peculiar to their property, and secondly, that the problem is self-created. The advantage of variance is that it provides relief to property owners who will not otherwise be able to build their property under existing zoning requirements.¹⁰⁴

Variance also prevents an unintentional confiscation of property without compensation for developers. However, variance only applies to circumstances that arise from practical difficulties and unnecessary hardships unique to a particular project. Northfield, like other cities, has variance laws. However, the issue with variance rules is that it does not accommodate sustainable practices. That is, sustainable building projects are not guaranteed any form of exceptions to zoning rules. However, zoning is, and can be, an essential tool for sustainable development. Other cities, including Palo Alto, have encouraged green building by providing an expedited permit approval process for projects that meet green standards.

We spoke to Scott Tempel, Northfield's City Planner, and he mentioned that Northfield needs an alternative process to the variance that rewards sustainable business practices. That is, aside from variance, Northfield should implement a new expedited project approval process for projects seeking green building certification. Through this process, a building seeking green building certification through one of the existing certification systems (e.g. Green Globes) will be approved through the expedited process, instead of facing the same treatment as projects that are not being built with green standards.

¹⁰³ Michigan Association of Planning. "<https://www.planningmi.org/downloads/variances.pdf>

¹⁰⁴ Ibid.

We recommend that the City adopt Tempel's alternative process. Currently, green projects are limited because their approval must undergo the same process as non-green projects. Additionally, certain green projects may not be able to achieve exceptions to zoning laws because of the strict variance qualification requirement that they must demonstrate that the difficulty associated with their building is due to circumstances peculiar to the project, and two that the problem is self-created. Thus, variance simply does not encourage or elevate green practices.

An alternative building approval process for green projects would allow green buildings to be built more quickly. The City benefits from this because green buildings use energy more efficiently than non-green buildings. An alternative process for green buildings would increase the amount of energy efficient buildings in the City. This will ultimately reduce the City's overall energy use.¹⁰⁵ The building sector is the largest energy consumer across the United States.¹⁰⁶ This is particularly true for commercial buildings. High energy use in commercial buildings has increased Northfield's share in total GHG emissions. Thus, the need for more buildings that are energy efficient is dire. Northfield can achieve this by making the project approval process easier for green projects.

The effectiveness of this recommendation can be measured by how many additional green buildings added in the City after the implementation of the new process. However, the important measure is the change in the commercial sector's total GHG emissions. Building green is one of the best strategies for mitigating climate change because the technology to make substantial reductions in energy and GHG emissions already exists.¹⁰⁷ In fact, building green has the potential to reduce CO2 emissions while improving bottom line energy and other savings. Thus, using zoning to achieve climate mitigation is essential for the City.

¹⁰⁵Osman Balaban and Jose A. Puppim de Oliveira, "Sustainable buildings for healthier cities: assessing the co-benefits of green buildings in Japan," *Journal of Cleaner Production* 163, no. 2 (October 2017): 71.

¹⁰⁶ Ibid.

¹⁰⁷ David Turcotte, Julie Villareal and Christina Bermingham. *The Benefits of Building Green*. Lowell, MA: University of Massachusetts-Lowell's Center for Family, Work & Community, 2004.

IV. Conclusion

The private sector can play a crucial role in Northfield's efforts to combat climate change. In this paper, we have identified five policy areas in which the city can facilitate just such a role for local businesses: energy efficiency, financing, education, demand-side policies, and zoning.

For energy efficiency, it is important for businesses to adopt a green purchasing policy as well as green building standards due to long-run economizing advantages they provide. For energy efficiency and renewable energy financing, it is important to note that several programs are already established by PACE, Xcel Energy, and others that help businesses deal with the high start-up costs associated with the upgrades. But as pointed out in the Education and Outreach section, there might be an asymmetry of information. This can be remedied by Northfield taking a proactive approach to educating businesses of these programs. Furthermore, a green certification program can be established that would help customers identify 'green' businesses to alter their purchasing behavior. This would in turn change businesses behavior to adopt emission reduction practices. And finally, the City can implement commercial zoning policies so that higher density commercial districts can be formed to reduce transportation costs associated with commuting. The City should develop an alternative, expedited project approval process for businesses that build with green standards. This would increase the amount of green businesses in the City and would, thus, augment the City's ability to reduce greenhouse gas emissions.