

# Park Forest Climate Action and Resilience Plan



Approved by Park Forest Village Board

February 18, 2019



# Acknowledgments

While many people contributed to this endeavor, the following individuals and organizations were instrumental in providing the guidance, data, and inspiration needed to complete this plan.

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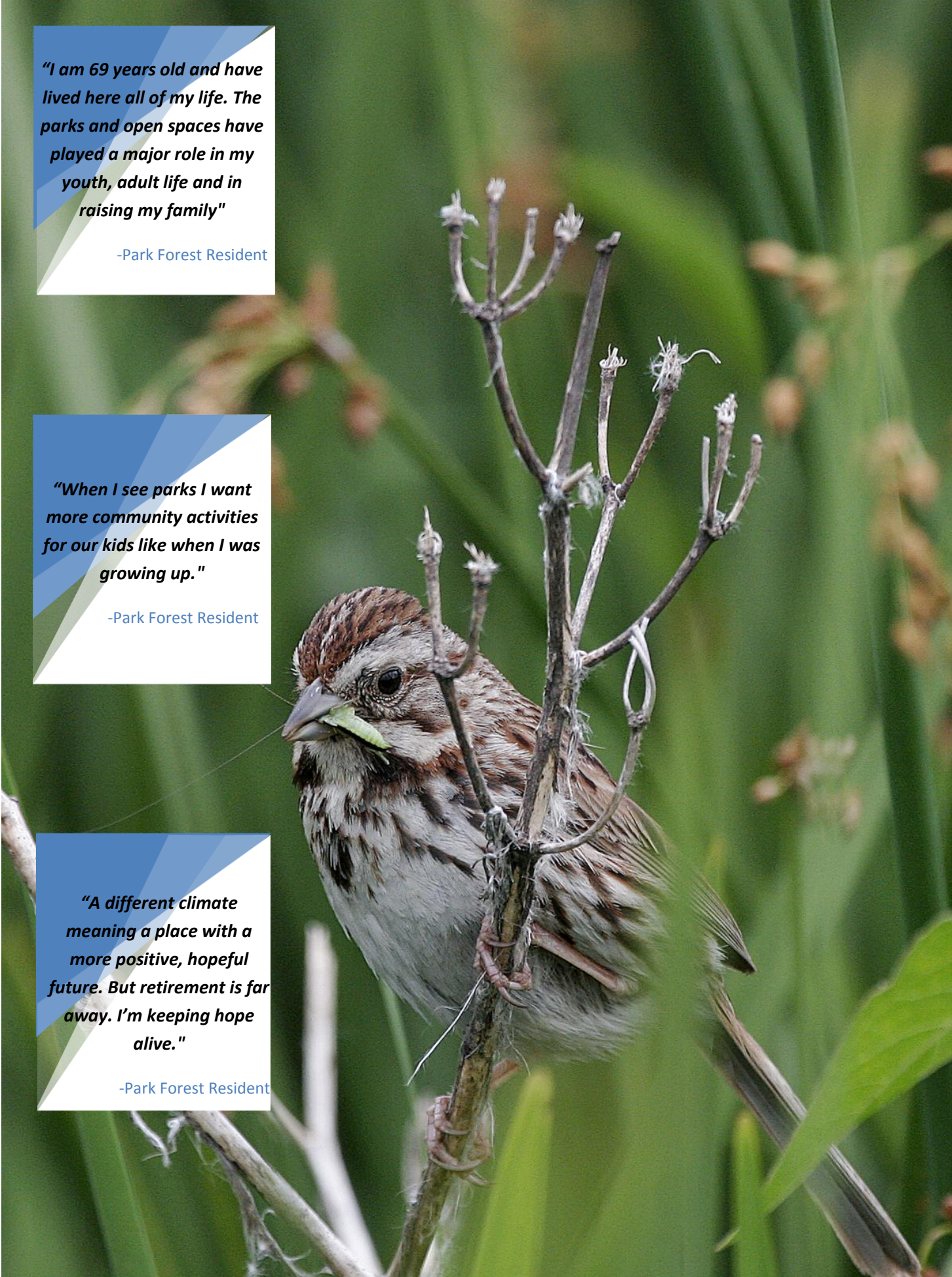
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***"I am 69 years old and have lived here all of my life. The parks and open spaces have played a major role in my youth, adult life and in raising my family"***

**-Park Forest Resident**

***"When I see parks I want more community activities for our kids like when I was growing up."***

**-Park Forest Resident**

***"A different climate meaning a place with a more positive, hopeful future. But retirement is far away. I'm keeping hope alive."***

**-Park Forest Resident**



# Introduction

Climate change is the greatest environmental challenge of the 21st century, with overwhelming scientific evidence showing that it poses a serious threat to natural resources, human health, and local infrastructure, among other things. The 2014 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5), written by a panel of hundreds of climate experts and scientists and approved by a team of external reviewers, states unambiguously that anthropogenic or “man-made” GHG emissions are causing global climate change. The report confirmed that human activities have caused approximately 1.0°C of global warming above pre-industrial levels.<sup>1</sup> In December 2015, at the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris (“the Paris Climate Agreement”), 197 countries agreed to strengthen the global response to the threat of climate change by keeping the global temperature rise this century well below 2.0°C above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5°C. As part of the decision to adopt the Paris Climate Agreement, the world’s governments invited the IPCC to prepare a special report on the impacts of global warming of 1.5 °C above pre-industrial levels. The IPCC’s report, issued in October 2018, determined that “limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society. With clear benefits to people and natural ecosystems, limiting global warming to 1.5°C compared to 2.0°C could go hand in hand with ensuring a more sustainable and equitable society”.<sup>2</sup>

Climate change is caused by the accumulation of greenhouse gases (GHG), such as carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>), in the atmosphere, primarily as a result of burning fossil fuels and land use changes. Although the natural greenhouse effect is needed to keep the earth warm, a human enhanced greenhouse effect with the rapid accumulation of GHG in the atmosphere leads to too much heat and radiation being trapped. Carbon emissions from human activities have continued to rise in recent decades, reaching the highest rates in human history between 2000 and 2010.<sup>2</sup> About half of all carbon dioxide emitted between 1750 and 2010 occurred in the last 40 years. The energy, industry, and transportation sectors have dominated these emissions increases. With the current worldwide trend of population growth, urbanization, and reliance on personal vehicles, global transportation emissions alone are expected to double by 2050. Given the critical impacts of climate change on humanity, the time to act to reduce GHG and the carbon footprint is now.

Work conducted by the Chicago Metropolitan Agency for Planning (CMAP) indicates that the most likely impacts of climate change in the Chicago area include heavy rains and more frequent heat waves. These climactic changes are likely to result in the following:

- Heavy rains are likely to fall more frequently, causing flooding more often.
- Light rains are likely to fall less frequently, particularly in the summer, leading to drought.
- Heat waves will probably become more frequent, more intense, and last longer.
- Higher temperatures in summer will increase cooling demands that may strain the electric grid<sup>33</sup>.

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<sup>1</sup> Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/report/ar5/>

<sup>2</sup> Intergovernmental Panel on Climate Change. Climate Change 2014: Impacts, Adaptation, and Vulnerabilities: Summary for Policymakers, 2014.



- Hot summer temperatures will worsen air quality, and high humidity will encourage infectious diseases.
- Weather variability may make operating municipal utilities more difficult and financially risky.<sup>3</sup>

These changes over the long term have the potential for a wide variety of secondary impacts, including detrimental impacts on human health and safety, economic continuity, water supply, ecosystem function, and provision of basic services. While climate change is a global challenge, most of its impacts will be felt on a local level, impacting the transportation, water, sanitary sewer, and storm sewer infrastructure systems that are the responsibility of municipal governments.

The Village of Park Forest is joining an increasing number of local governments committed to addressing climate change at the local level. The Village recognizes the risk that climate change poses to its citizens, and is taking **action** to reduce the Greenhouse Gas (GHG) emissions of both its government operations and the community as a whole through a set of strategies laid out in this *Climate Action and Resilience Plan* (CARP). These actions, often referred to as “mitigation”, represent Park Forest’s contribution to the global effort of limiting or reducing the emission of GHG in order to slow the impacts of climate change. At the same time, the Plan establishes adaptation strategies that will increase the community’s **resilience** in the face of the climate related challenges the community may face. These adaptation strategies describe how Park Forest will change “business as usual” in order to respond to changes in climate and thereby lessen the impacts of climate change on people, nature, and the built environment. Overriding all actions and strategies laid out in the CARP is the effort to simultaneously enhance livability for residents and improve **equity** for those who might not otherwise have access to the benefits of living in a community that works to be intentionally sustainable.

## History

Park Forest has a history of promoting sustainable living and development. The Village also has a progressive history of fostering racial, cultural, and economic diversity and cohesion. This section summarizes the Village’s actions to date, which led to the conclusion that it was important to develop a specific *Climate Action and Resilience Plan* to make a compelling case for intentional and comprehensive action to lessen the community’s impact on the environment and prepare for the impacts of climate change.

Taking an early leadership role in response to climate change concerns, in May 2007 the Village Mayor and Board of Trustees adopted a Resolution endorsing the US Conference of Mayors’ *Climate Protection Agreement*. Among other things, this Resolution commits the Village to:

- Inventory global warming emissions in municipal operations and the community, set reduction targets, and create an action plan.
- Adopt and promote a number of strategies to reduce GHG emissions, including land use policies that reduce sprawl, preserve open space, and create a compact, walkable community; promote alternate transportation options; increase the use of clean, alternative energy; make Village facilities more energy efficient; enhance the energy efficiency of the municipal vehicle fleet; increase recycling rates; maintain healthy urban forests; and educate the public.

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<sup>3</sup> Chicago Metropolitan Agency for Planning. Climate Adaptation Guidebook for Municipalities in the Chicago Region, Appendix A: Primary Impacts of Climate Change in the Chicago Region. June 2013.  
<https://www.cmap.illinois.gov/programs/sustainability/climate-adaptation-toolkit>

On May 14, 2012, the Village Mayor and Board of Trustees adopted the *Growing Green: Park Forest Sustainability Plan*<sup>4</sup> as an element of the Village's comprehensive plan. Among the 14 chapters of the *Sustainability Plan*, several guide the development of a climate action/resilience plan, including Development Patterns, Transportation and Mobility, Open Space and Ecosystems, Water, Waste, Energy, Greenhouses Gases, and Municipal Policies and Practices. The *Sustainability Plan* includes a baseline GHG inventory for 2010 and establishes a goal to reduce GHG emissions by 6 percent from the baseline year by 2025. Village Staff has conducted an analysis of the Strategies included in each of the chapters noted above to determine how much has been accomplished since 2012. These Strategies and the Village's accomplishments to date (see Appendix I: *Growing Green: Park Forest Sustainability Plan Accomplishments*) were used as a starting point for the *Climate Action and Resilience Plan*.

In 2014, the Village became a Leadership STAR Communities member. The STAR Community Rating System is the first national framework to measure sustainability at the city or county scale and provide a tracking system to help local government organizations measure progress towards achieving community sustainability goals. The Village submitted its initial certification application in early 2015 and received a 3 STAR Community rating. A recertification application will be submitted in early 2019, and this *Climate Action and Resilience Plan* will be an important indicator of the Village's commitment to addressing climate change through mitigation and adaptation measures. In late 2018, the STAR Communities rating system was integrated into the U.S. Green Building Council's LEED for Cities and LEED for Communities programs. So, Park Forest is now a Bronze LEED for Cities member.

On March 21, 2016, the Village Mayor and Board adopted a Resolution endorsing the Metropolitan Mayors Caucus *Greenest Region Compact 2* (GRC2). Signatories to the GRC2 commit to support the consensus goals of the document, both in their own communities and in collaboration throughout the region. These goals address the areas of climate, economic development, energy, land, leadership, mobility, municipal operations, sustainable communities, waste and recycling, and water. The GRC2 includes a framework that communities can use to develop more detailed sustainability plans and/or climate action plans. Strategies recommended by the GRC2 framework were used to guide the development of this Plan.

In December 2017, the Mayor and Board of Trustees adopted the *Unified Development Ordinance* (UDO), which completely revised the Village's long-standing zoning and subdivision ordinances to be consistent with the *Sustainability Plan*. The UDO incorporates many of the strategies called for in the US Conference of Mayors *Climate Protection Agreement* by creating mixed use and urban residential zoning districts, requiring sidewalks, bicycle parking, and street trees for new development, allowing alternative energy generation uses and local food production uses by right, establishing build-to lines in commercial zoning districts, and many other sustainable development strategies.

On December 5, 2017, Mayor Ostenburg signed the *Chicago Climate Charter* at the North American Climate Summit held in Chicago. Some of the commitments made by signatory communities to the Charter include:

- Achieve a percent reduction in GHG equal to or greater than the US' Nationally Determined Contributions to the Paris Climate Agreement.
- Quantify, track, and publicly report local GHG emissions.
- Include diverse voices in the discussions about climate change.

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<sup>4</sup> <http://www.villageofparkforest.com/DocumentCenter/View/653/Park-Forest-Sustainability-Plan?bidId=>

The commitments represented by the actions described above signaled to the Village the need to update the GHG emissions inventory, create a more formal plan to reduce the Village's impact on the climate, and prepare for future climate challenges.

## Purpose

The Village of Park Forest is strongly committed to addressing climate change at the local level. This Plan takes advantage of common sense approaches and cutting-edge policies that the Village is uniquely positioned to implement – actions that can reduce energy use and waste, create local jobs, improve air quality, preserve the local landscape, reduce risk to people and property, and in many other ways benefit Park Forest for years to come. By creating a clear course of action in which everyone has a role in creating and achieving climate and sustainability goals, the *Climate Action and Resilience Plan* drives and coordinates local efforts toward a reduction in GHG emissions levels by 26 percent below 2010 emission levels by 2025.

In addition to addressing mitigation concerns, the CARP also highlights Park Forest's vulnerability to climate hazards and establishes strategies to respond to these vulnerabilities in order to increase resilience. The goal of this adaptation framework is to reduce the risk of climate impacts to Park Forest's resources and infrastructure, as well as to increase social and economic resilience. Reduction of risk is a far more complex undertaking than reducing emissions, as these challenges are interconnected with inequitable systems of economy, healthcare, education, transit, and others. Ultimately, no one strategy will undo these challenges, but the implementation of multi-faceted strategies will set Park Forest on the right path.

Equity and inclusion concepts and components are interwoven throughout the Plan. Low income populations, communities of color, people with disabilities, elders, and other marginalized communities often bear the brunt of climate impacts without the necessary infrastructure and support systems, and without gaining any of the benefits of a clean and sustainable future. Inequity correlates with greater vulnerability to physical challenges, making many in Park Forest disproportionately at risk from natural disasters and the impacts of climate change.

While Park Forest has already begun to reduce greenhouse gas emissions and climate risk through a variety of actions, this Plan is a critical component of a comprehensive, deliberate approach to join the global community in its efforts to address this critical environmental challenge.

## Vision Statement and Objectives

The Park Forest *Climate Action and Resilience Plan* offers a robust set of objectives and strategies that will address climate hazard vulnerabilities and aim for a 26 percent reduction in GHG emissions over the baseline year (2010) by 2025. Each Objective and Strategy was created and reviewed by a *Climate Action and Resilience Plan* Steering Committee, which considered funding constraints, public support, equity concerns, the feasibility of implementation, and other factors.

The Vision for the Plan is to:

Create a connected, healthy, resilient, and equitable Park Forest for future generations, while improving the quality of life for those who live here today.

The following list summarizes the targets established in the Plan to make this Vision a reality:

#### MITIGATION OBJECTIVES - by 2025

- Reduce GHG emissions by 26 percent over the 2010 base line year.
- Reduce energy use in existing residential buildings by 20 percent.
- Reduce energy use in existing commercial and industrial buildings by 10 percent.
- Reduce energy use in Village-owned and other public buildings by 25 percent.
- Reduce vehicle miles travelled in Park Forest by 10 percent.
- 100 percent of Park Forest residents have access to waste reduction and recycling resources.
- Increase land actively used for urban agriculture and community gardening by 20 percent.
- All new development in the Village will be energy efficient, accessible to transit, and incorporate renewable energy when possible.
- Increase water efficiency.

#### ADAPTATION OBJECTIVES – by 2025

- Incorporate climate change impacts into infrastructure planning and operations.
- Maintain potable water reliability and affordability through water conservation, efficiency, and independence.
- Maintain an accessible record of facilities and locations with concentrations of populations of concern.
- Maintain low levels of heat-related illness and death.

#### EQUITY OBJECTIVES – by 2025

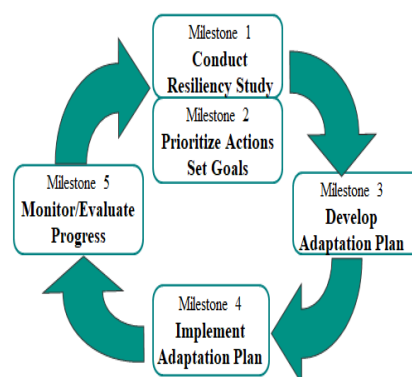
- An emergency cooling center is located within a 10 minute walk for the most vulnerable residents.
- Increase annual number of households reached by low-income energy efficiency programs.
- Decrease the energy costs of low-income residents.
- Accessible record of facilities and locations with concentrations of populations of concern.

## Process

The *Climate Action and Resilience Plan* was developed, and will be implemented, using an approach developed by ICLEI – Local Governments for Sustainability, USA (ICLEI), known as the Five Milestones for Climate Mitigation and Adaptation.



**Figure 1:** Five Milestones for Climate Mitigation<sup>5</sup>



**Figure 2:** Five Milestones for Climate Adaptation

<sup>5</sup> ICLEI – Local Governments for Sustainability, USA (ICLEI)



The planning process to create the *Climate Action and Resilience Plan* took 12 months and included Milestones 1 through 3 as shown in Figures 1 and 2 above. The first Milestone involved data collection to evaluate ongoing actions related to GHG emission reduction and implementation of *Park Forest Sustainability Plan* goals. A GHG inventory was conducted at the community level and the governmental operations level to define the Plan Focus Areas based on the community’s highest emission sources. A vulnerability assessment was completed to identify how climate change is most likely to impact Park Forest’s residents, businesses, and built environment.

In Milestones 2 and 3, 10 Steering Committee meetings were held to inform the project team’s understanding of existing conditions in Park Forest and develop a set of Strategies and Actions for each Focus Area. These Strategies and Actions were selected from a list created from the GRC2 framework, *Growing Green Sustainability Plan* recommendations, and local and national best practices. The Steering Committee included all members of the Environment Commission, one member of the Planning and Zoning Commission, a representative of School District 163, and a Rich East High School student. Meetings were also held with the multifamily building property managers, Elevate Energy, the South Suburban Managers and Mayors Association’s (SSMMA) transportation planner, and the Village departments. This ensured that a diversity of stakeholders were involved in the planning process, so the final document will be useful to a variety of audiences, from residents and business owners to municipal leaders. Based on the input from these stakeholders, the Steering Committee drafted Objectives and implementation Strategies to achieve the established targets.



**Figure 3:** Climate Action and Resilience Plan Timeline



**Figure 4:** Park Forest Multi-family buildings managers meet with Elevate Energy

A glossary of all acronyms and technical terms is included in Appendix II of this Plan.

# Equity in the Climate Action and Resilience Plan

Climate change poses significant equity challenges. How people contribute to climate change, experience its impacts, and adapt to these impacts is determined largely by variables such as gender, ethnicity, socio-economic status, age, and physical ability. Since environmental conditions and the availability of resources both contribute to the ability to deal with climate-related events and disasters, low-income populations, senior citizens, and communities of color will be disproportionately impacted by climate change.

Successful climate adaptation cannot be achieved without addressing existing disparities and advancing equitable outcomes. By addressing the needs of those who are most vulnerable to climate change or are experiencing a shortage of resources, a mitigation and adaptation plan will produce benefits for everyone. The *Park Forest Climate Action and Resilience Plan* used an equity lens to prioritize the needs of the most vulnerable populations. Throughout the planning process, the CARP Steering Committee examined and addressed equity issues to ensure that outcomes will be improved for all residents of Park Forest.

## Populations of Concern

Vulnerability to climate change varies across time and location, across communities, and among individuals within communities. Addressing equity in CARP starts with identifying vulnerable groups of people, described as “populations of concern”. The data used to determine the populations of concern in Park Forest was drawn from the Environmental Protection Agency’s (EPA) Environmental Justice Screen report (Table 1).<sup>6</sup>

Demographic Indicators	Park Forest	Illinois Average	US Average
Populations of Color	74%	38%	38%
Low Income Population	41%	32%	34%
Linguistically Isolated Population	1%	5%	5%
Population Under 5 years of age	5%	6%	6%
Population over 64 years of age	14%	14%	14%

**Table 1:** Park Forest Demographic Indicators. From the EPA EJSCREEN Report, 2017.

- **Low Income Residents:** Park Forest has a high percentage of low income residents compared to state and national averages. Low-income populations are more likely to be impacted by extreme weather events that occur as a result of climate change. This is due to reduced access to healthy and energy efficient housing, transit, safe walking routes, key information, and available programs and services.

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<sup>6</sup> Environmental Protection Agency. Environmental Justice Screen, 2017. <https://www.epa.gov/ejscreen/>  
Park Forest Climate Action Plan

- People of Color: Seventy-four percent of Park Forest's residents are people of color, mostly African American. In keeping with the goals of the Village's REAL Steering Committee (Race Equity and Leadership), the CARP has identified people of color as a population of concern in order to be deliberate about ensuring that the Plan does not create new barriers or overlook existing barriers to full participation in the mitigation and adaptation Objectives and Strategies laid out in the Plan.
- Senior Citizens: Older adults, families with children, and people with disabilities are more likely to be impacted by extreme weather events that occur as a result of climate change. The percentage of 65 or older population in Park Forest is the same as state and national averages. However, according to the Census Bureau's American Community Survey, the percentage of 60 or older population in Park Forest increased from 16.4 percent in 2009 to 20.9 percent in 2016.<sup>7</sup> Park Forest's older population is, therefore, considered a population of concern in this Plan.

Understanding how potential exposures to climate risks overlap with the geographic location of populations of concern is critical for selecting and implementing appropriate adaptation actions. Mapping the population of concerns is an important tool for preparing for and responding to climate-related risks, which enhance emergency and disaster risk management. All the three categories are mapped using in the Figures 5, 6, and 7.

## Equity Considerations

A list of equity considerations was developed to conduct a basic equity assessment of every action proposed while the *Climate Action and Resilience Plan* was still in draft form. The Steering Committee answered these questions while reviewing each action, and actions were revised and updated based on their assessment:

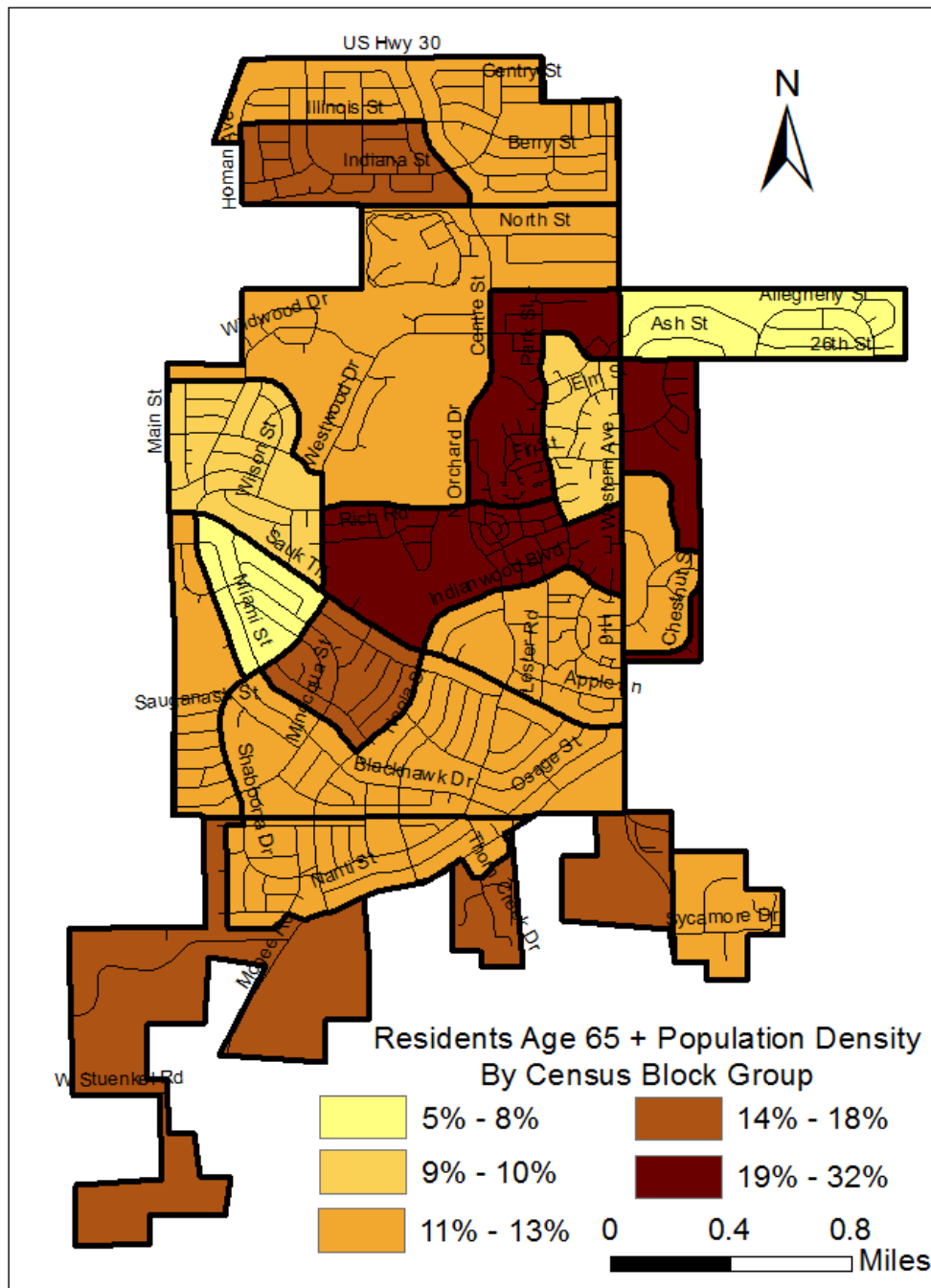
- Can the proposed action advance equity in the community by targeting low income residents, residents of color, and seniors?
- Are the benefits derived from the proposed action accessible to all the populations of concern?
- Does the proposed action generate any type of burden for the populations of concern? If so, can these impacts be mitigated?
- Can this action make access to community services and assets more equitable?

The Village of Park Forest is committed to the equitable implementation of the actions in the *Climate Action and Resilience Plan* in ways that address the needs of populations of concern. During the process of drafting the Plan, the Village's REAL Steering Committee provided considerable feedback about whether the Plan would appropriately address equity. Their feedback identified the actions that are most likely to enhance equity, and included more detailed suggestions for implementation of these actions. Their feedback on implementation is incorporated into the implementation strategies and metrics developed for the Plan.

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<sup>7</sup> Census Bureau. 2016 American Community Survey.  
[https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml)

## Density of Residents 65+, Park Forest, Illinois, 2015

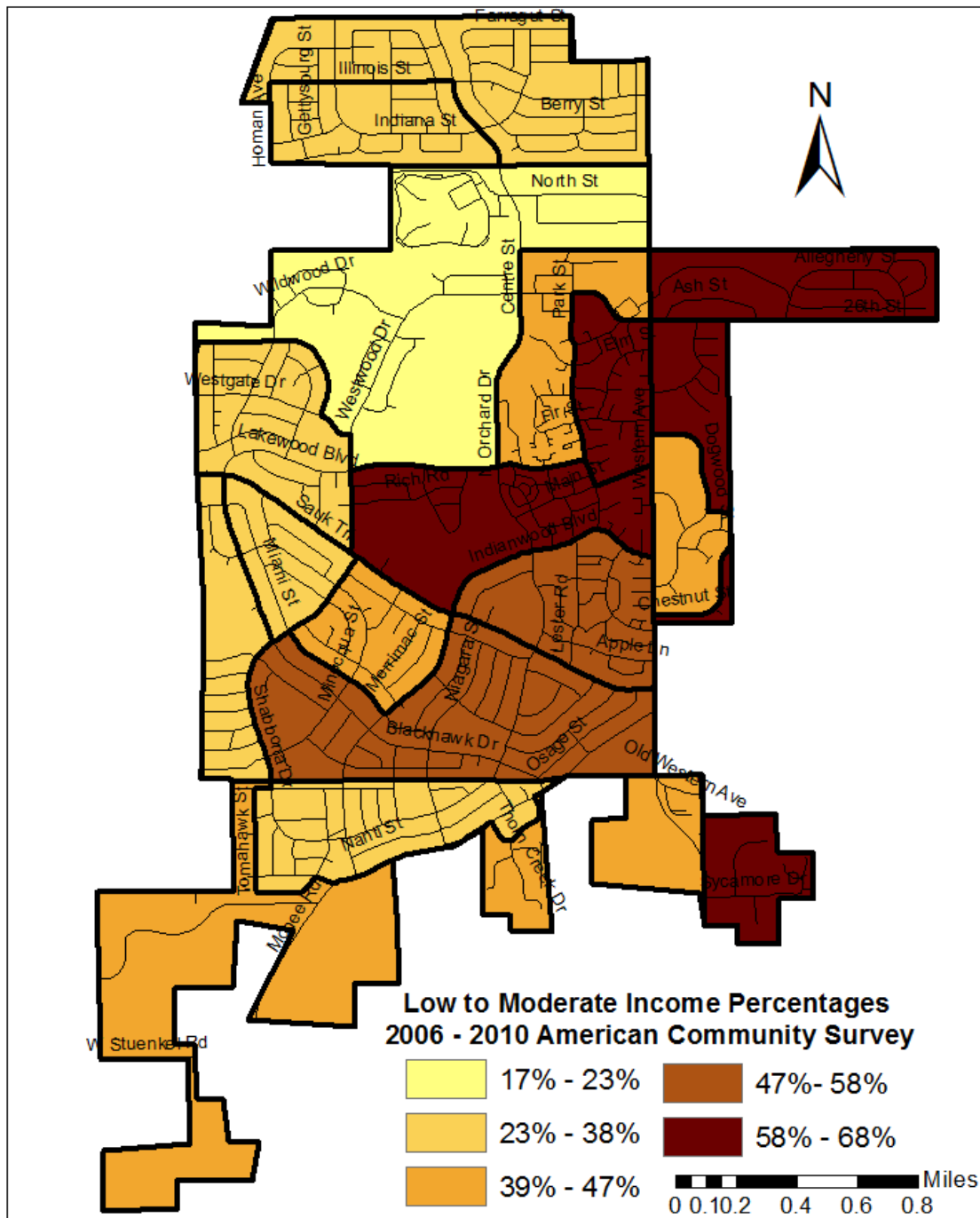


Created By: Andrew Brown, Greenest Region Corps  
Projection: NAD\_1983\_StatePlane\_Illinois\_East\_FIPS\_1201\_Feet

Sources: American Community Survey 5 Yr Survey 2015,  
TIGER Line Road Data for Cook and Will County



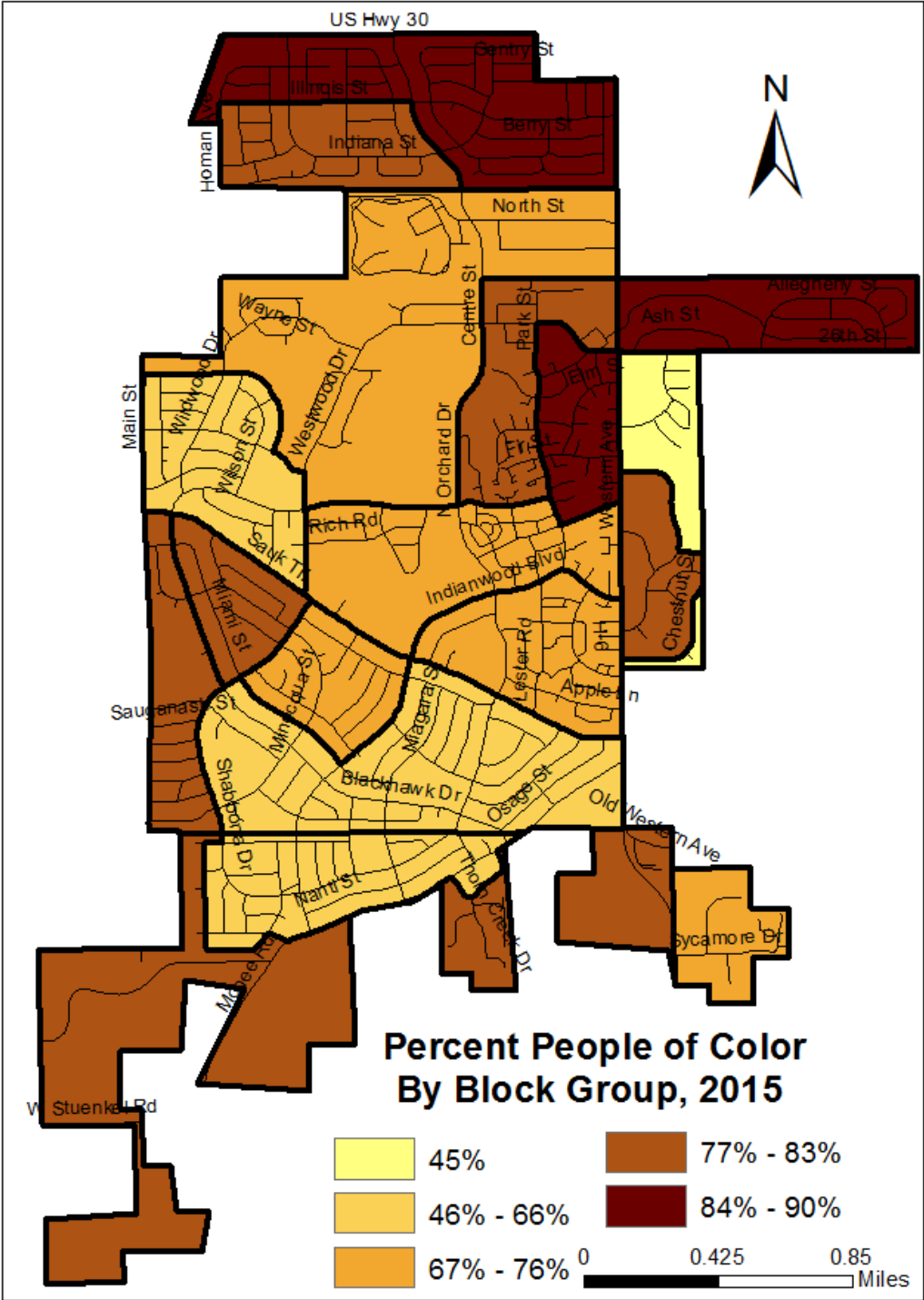
# Low to Moderate Income, Park Forest, Illinois, 2010



Created By: Andrew Brown, Greenest Region Corps  
Projection: NAD\_1983\_StatePlane\_Illinois\_East\_FIPS\_1201\_Feet

Sources: American Community Survey 5 Yr Survey 2010  
provided by HUD, TIGER Line Road Data for Cook and Will  
County and TIGER Line Boundary Data for Places in Illinois.

# People of Color, By Percent of Block Group Park Forest, Illinois, 2015



Created By: Andrew Brown, Greenest Region Corps  
 Projection: NAD\_1983\_StatePlane\_Illinois\_East\_FIPS\_1201\_Feet  
 Sources: American Community Survey 5 Yr Survey 2015, TIGER Line Road Data for Cook and Will County, TIGER Line Place Boundary





# Park Forest

Live Grow Discover

***"A different climate meaning a place with a more positive, hopeful future. But retirement is far away. I'm keeping hope alive."***

-Park Forest Resident

***"More than 50% of surveyed residents think they have equal quality facilities/services in their neighborhood."***

-POLCO Online Survey

***"Bus transportation does not serve my destinations."***

***"I try to take local trips by bicycle. Otherwise I drive."***

Park Forest Resident

# Park Forest's Greenhouse Gas (GHG) Emissions

A GHG emissions inventory is an estimate of GHGs emitted to, or removed from, the atmosphere over a period of time. It is conducted by documenting the amount and source of GHG emissions in a given base year and using that base year inventory as a reference point for tracking the effectiveness of reduction strategies and actions implemented in future years. Since the early 1990s, US cities have developed community-wide and local government operations GHG inventories based on accounting protocols created by ICLEI. Known as the *US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* and the *Local Government Operations Protocol*, these standards created a credible and defensible methodology which accelerated the number of inventories conducted and provided consistency within and across US communities. In 2014, ICLEI partnered with the World Resources Institute and the C40 Climate Leadership Group to create the *Global Protocol for Community Scale GHG Emissions*, which allows communities around the world to compare their emissions footprint.<sup>8</sup>

The benefits of conducting and regularly updating an inventory are as follows:

- Identify the greatest sources of GHG emissions within the community's boundaries.
- Understand emission trends over time.
- Establish a basis for developing an action plan.
- Track progress in reducing emissions.
- Quantify the benefits of activities that reduce emissions.
- Revise goals and targets for future reductions.

In addition, a government operations GHG inventory provides the following additional benefits:

- Improve the community's ability to manage energy use and opportunities for cost savings within its own buildings and facilities.
- Lead by example and create a starting point to communicate and share best practices with local businesses and other organizations.
- Increase transparency and accountability of local government.

Park Forest conducted its first GHG inventory in 2010 as part of the *Growing Green: Park Forest Sustainability Plan*, using ICLEI's Community and Local Government Protocols, and their 2009 Clean Air and Climate Protection (CACP) software. With the 2010 base-year GHG inventory in place, the *Sustainability Plan* established a long-term GHG reduction target of 6 percent below 2010 levels by the year 2025.<sup>9</sup> As part of the development of the *Climate Action and Resiliency Plan*, the Village again used ICLEI Protocols, and their updated ClearPath tool, to update the 2010 GHG inventory for the year 2015. This has enabled the Village to document the success of efforts to reduce GHG emissions since adoption of the *Sustainability Plan*.

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<sup>8</sup> [https://ghgprotocol.org/GPC\\_development\\_process](https://ghgprotocol.org/GPC_development_process)

<sup>9</sup> Growing Green: Park Forest Sustainability Plan, Chapter 7-Greenhouse Gases, and Appendix C: Sustainability Assessment, Chapter 7-Greenhouse Gases. 2014. <http://www.villageofparkforest.com/633/Plans>  
Park Forest Climate Action and Resilience Plan

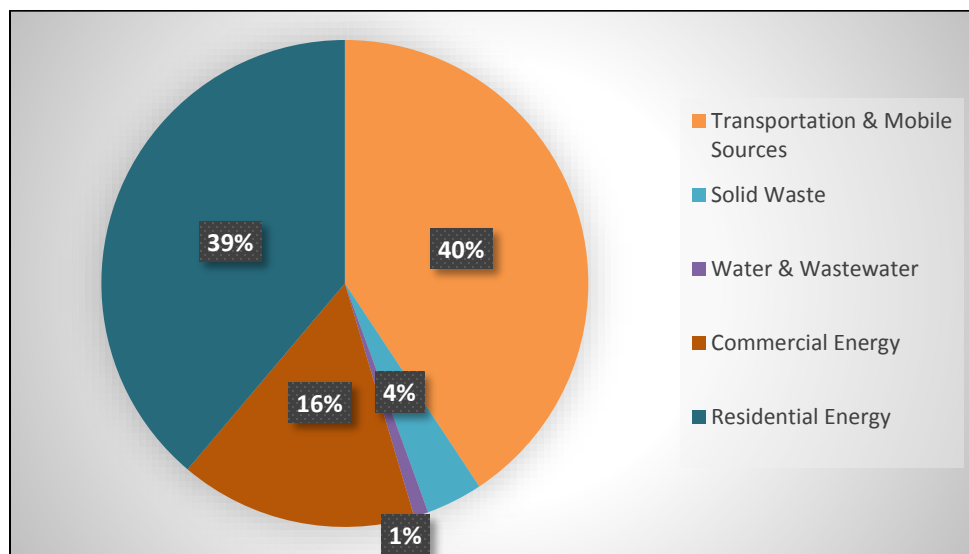


When Mayor Osterburg signed the *Chicago Climate Charter* in December 2017 at the North American Climate Summit, Park Forest committed to achieving a percent reduction in GHG emissions equal to the United States' nationally determined contribution to the Paris Climate Agreement. In effect, this means that the Village has committed to reducing GHG emissions to 26 percent below 2010 levels by the year 2025. The inventory presented within this report updates the community inventory for the 2015 calendar year, discusses trends between the 2010 and 2015 inventory years to show progress over time, and serves as a baseline for tracking the Village's progress towards reaching the new goal for reduction of GHG emissions. The detailed GHG Inventory Report is included in Appendix III.

## Park Forest's GHG Inventory

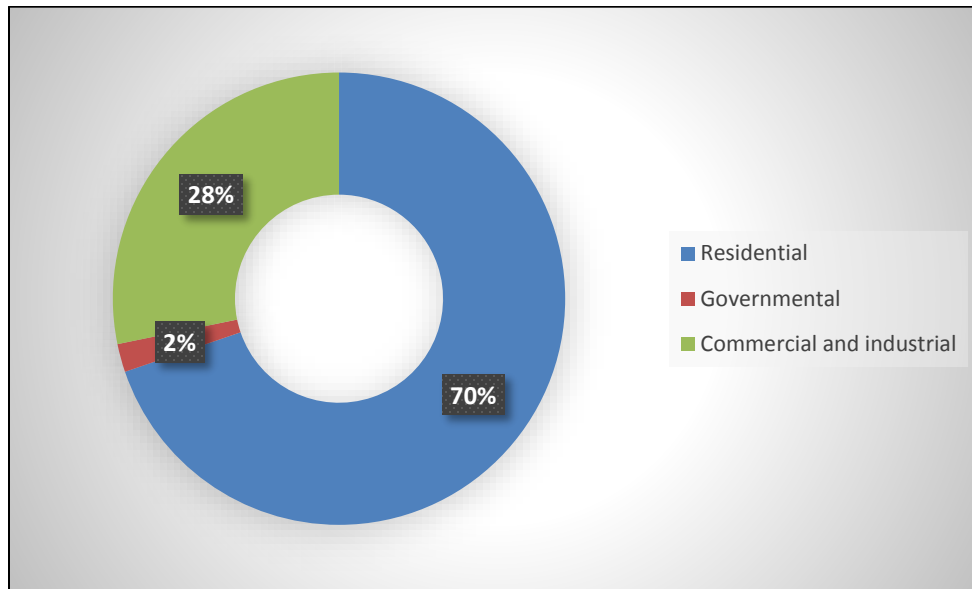
As described in the Process section of this Plan, the first Milestone in development of the CARP was to prepare a GHG inventory at both a community-wide level and a government operations level. The community-wide GHG inventory tracks GHG emission sources throughout the community, such as energy used by buildings, all modes of vehicular transportation used in the community, solid waste generation, water use, and wastewater treatment from all residents and businesses in the community. The government operations GHG inventory tracks the GHG emission sources generated by Village-owned facilities and utilities, including energy used by Village-owned buildings, street lights and traffic signals, the vehicle fleet, employee commute, the water treatment buildings and operations, and process and fugitive emissions.

In 2015, Park Forest as a community generated an estimated 192,076 metric tons of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions. Park Forest's largest source of GHG emissions was the use of electricity and natural gas in buildings (Figure 5). With residential energy accounting for 39 percent of CO<sub>2</sub>e emissions, and commercial energy at 16 percent, the community's consumption of energy in buildings (also known as "stationary source emissions") altogether accounted for 55 percent of GHG emissions.

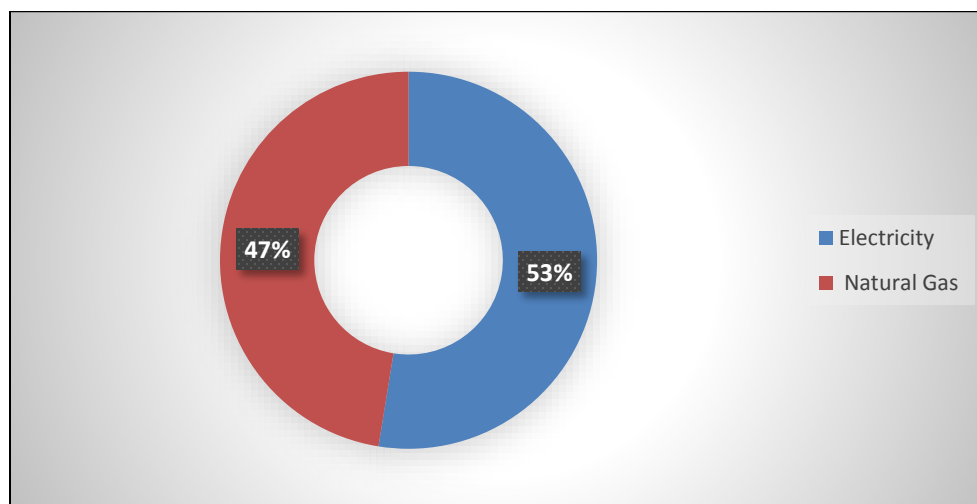


**Figure 5:** Park Forest Community-Wide GHG Emissions, 2015

Since the majority of Park Forest's buildings are residential, they clearly generate the vast majority of stationary source emissions. Figure 6 demonstrates the breakdown of stationary source emissions by building type. Stationary source emissions can also be analyzed according to the type of energy used. Figure 7 shows that stationary source emissions from electricity and natural gas consumption is almost equal.



**Figure 6:** Stationary Source Emissions by Sub-Sector, 2015



**Figure 7:** Stationary Source Emissions by Energy Source, 2015

After accounting for stationary source emissions, the transportation sector accounted for 40 percent of the GHGs emissions attributable to the community in 2015. Because of Park Forest's location at the edge of the metropolitan region, and the lack of a good public transit system, residents are highly auto-dependent. This results in increased vehicle miles travelled and an associated high amount of transportation-related GHG emissions.

Solid waste emissions include those that are attributed to paper products, yard waste, wood, textile, or other waste that is disposed from various sources. Solid waste emissions are determined by the type and amount of waste disposed. Due to the fact that solid waste is taken to landfills that are outside of the control of municipalities, many emissions models do not mandate that these emissions are included in the total emissions inventory. The amount of solid waste produced, however, is within the control of the residents and businesses within the community.

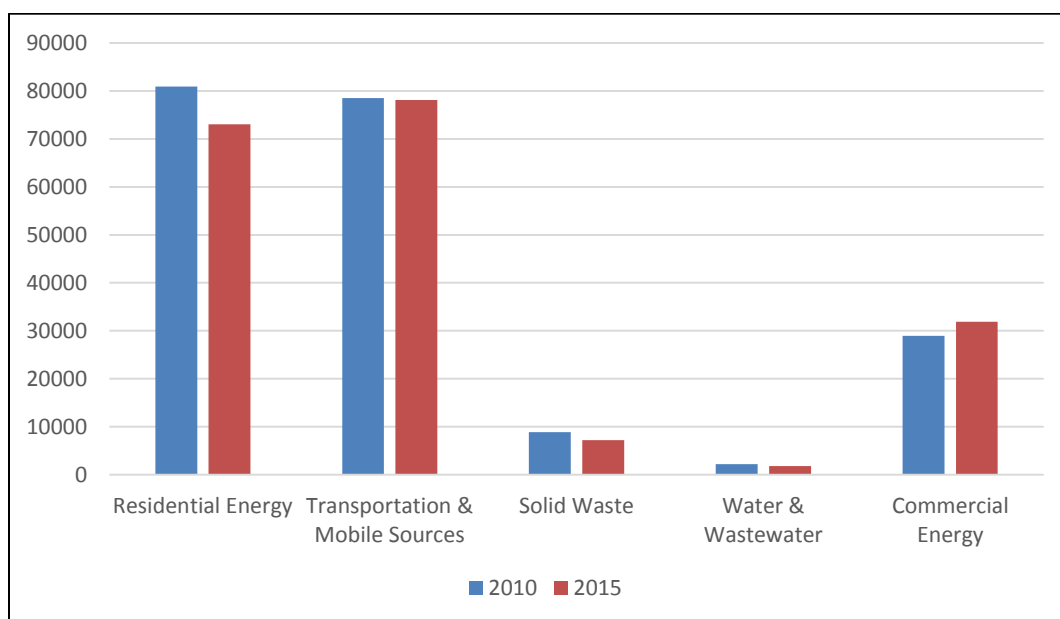
The smallest amount of GHG emissions are from water and wastewater treatment, representing around 1 percent of total community-wide GHG emissions. Park Forest is dependent on groundwater for its

potable water supply, and the Village operates the water collection, conveyance, and water treatment system. Wastewater is liquid waste that is discharged by commercial, residential, industrial, or institutional sources. Wastewater emissions are determined by the amount of wastewater discharged and the method of wastewater treatment. While the wastewater treatment center is outside of the control of the municipality, the amount of water and wastewater produced is within the control of the community.

Table 2 and Figure 8 illustrate the change in community-wide GHG emissions from the base inventory year of 2010 to the update year of 2015. Overall, Park Forest community-wide GHG emissions decreased by 3.8 percent from 2010 to 2015. During this period, the Village provided educational materials to Village residents and conducted a series of ComEd “house parties” to introduce the community to energy efficiency measures and incentives available to residents. Whether as a result of these efforts, or by the efforts of residents and multifamily property owners themselves, GHG emissions from residential properties accounts for the largest portion of the overall decrease. Unfortunately, commercial energy emissions actually increased during the five year period. This is an indicator that the Village, and the community as a whole, has a lot of work to do in order to meet the goal of this Plan to reduce GHG emissions levels by 26 percent below 2010 emission levels by 2025.

Year	Transportation & Mobile Sources	Solid Waste	Water & Wastewater	Commercial Energy	Residential Energy	Total GHG emission (MT)	Percent Change
2010	78523	8856	2229	28931	80895	199434	N/A
2015	78112	7211	1824	31864	73065	192076	3.8%

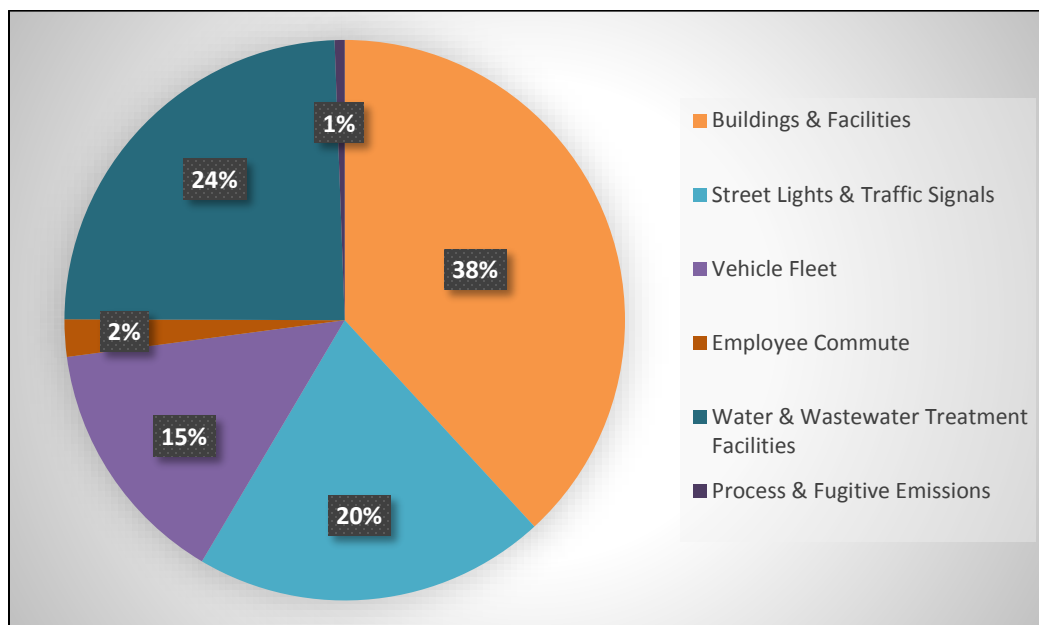
**Table 2:** Community CO<sub>2</sub>e (MT) Emissions by Sector 2010 – 2015



**Figure 8:** Park Forest CO<sub>2</sub>e (MT) Emissions by Sector from 2010 and 2015.

Emissions from Village facilities are embedded within the community-wide totals. For example, emissions from government buildings are included in the “Commercial” sector and emissions from the Village fleet vehicles are included in the “Transportation” figure above. Government operations are

therefore a subset of total community emissions. Government emissions include all sources for which the local government exercises direct operational control including water service, streetlights, and Village buildings and facilities.

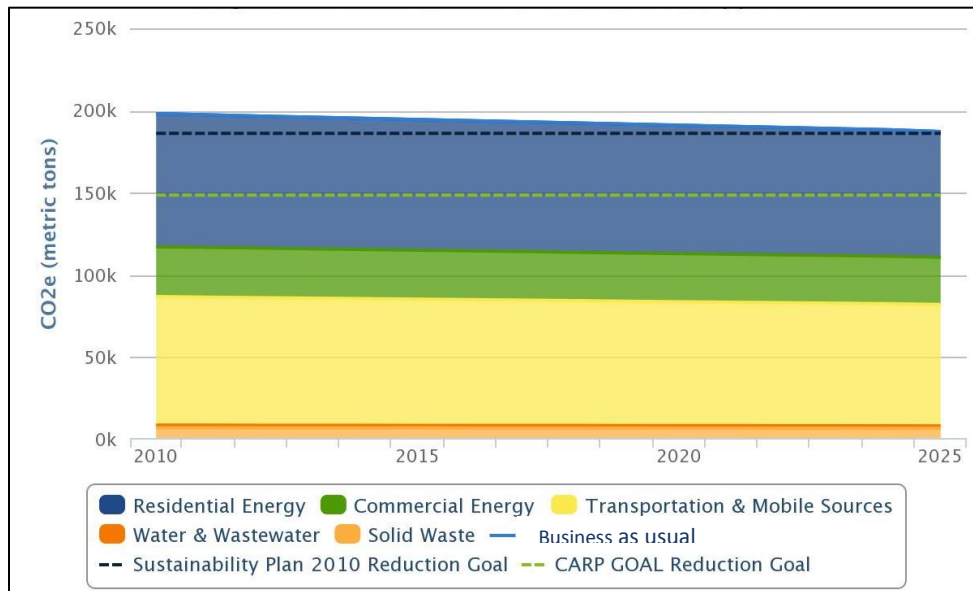


**Figure 9:** Park Forest Village Operations GHG Emissions, 2015

Like the community-wide emissions inventory, emissions from buildings and facilities are the primary source of GHG emissions generated from Village operations (see Figure 9). The Village's water treatment plant, street lights and traffic signals, and the Village vehicle fleet each produce significant amounts of GHG emissions as well.

The Village has also completed an emissions forecast based on projections of current data and expected future trends (Figure 10). The emissions forecast is a "business as usual" forecast, a scenario estimating future emissions levels if no further local action (i.e. strategies recommended by this *Climate Action and Resilience Plan*) were to take place. The forecast indicates that, if the Village does not take action and experiences no changes in the built environment (new/redeveloped residential, commercial, or industrial projects), GHG emissions will continue to decrease slowly due to historic growth trends, and will likely achieve the original 6 percent reduction goal established by the *Sustainability Plan*. However, the decrease will not be at all sufficient to meet the 26 percent GHG reduction goal established by this Plan. Further, if the Village is successful with its economic development goals, there will be an increase in population and an expansion of business and industrial uses. This means the Village needs to take robust actions to reduce GHG emissions from existing development and ensure that new development is built in a manner that minimizes its impact on the climate.

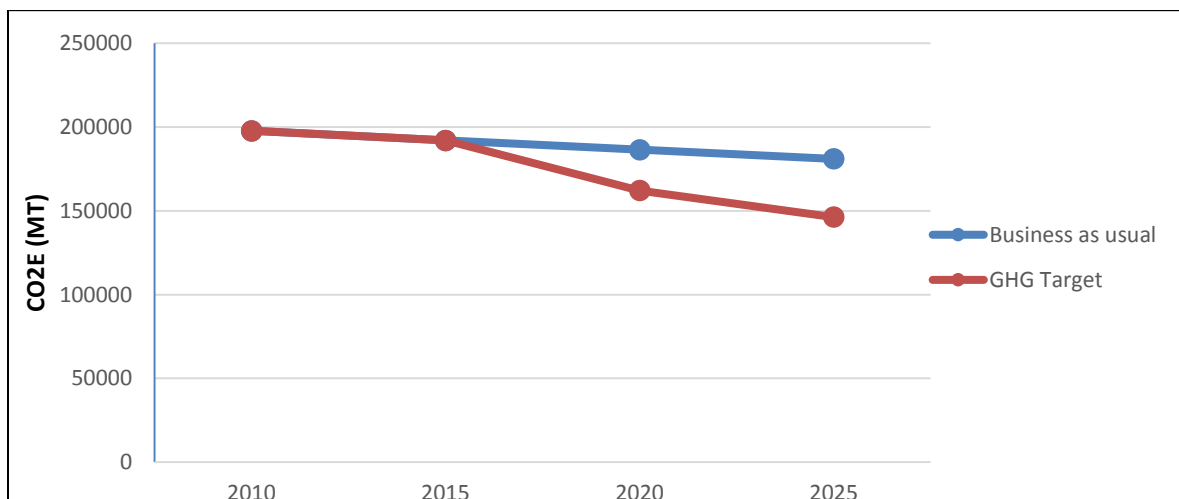




**Figure 10:** Projected GHG Emissions in Park Forest, Illinois.

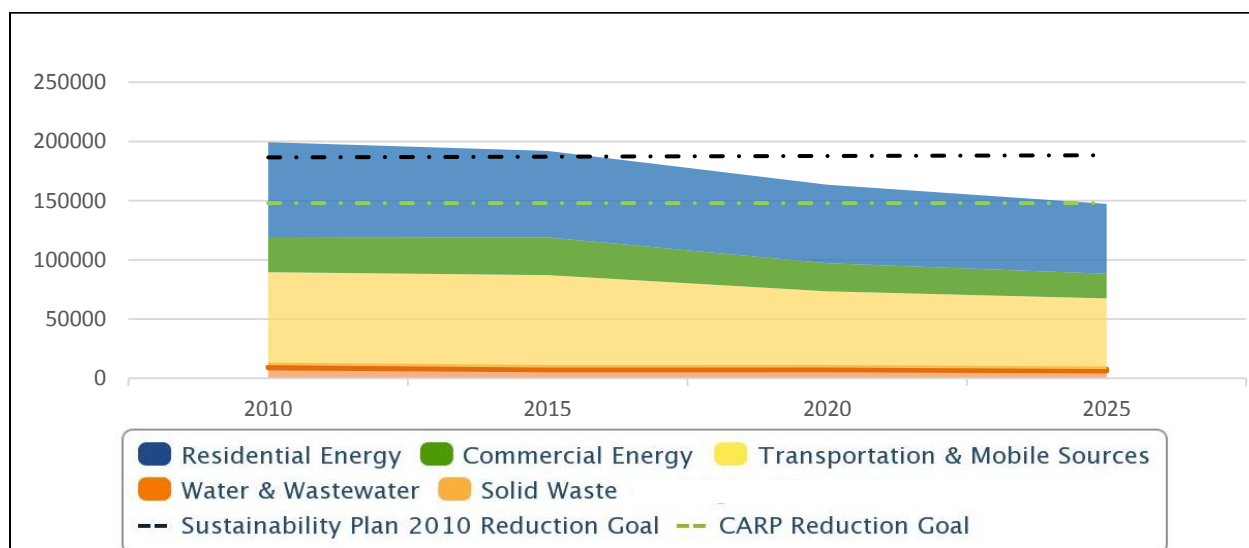
## Park Forest's GHG Reduction Target

The CARP has set a target to reduce community-wide GHG emissions by 26 percent below 2010 levels by 2025 (Figure 11). This goal is the same as that adopted at the UNFCCC that has come to be known as the Paris Climate Agreement. The combination of measures that Park Forest has already implemented, those currently planned, and those recommended in this *Climate Action and Resilience Plan* are designed to achieve the 2025 target. Projected reductions by 2025 rely on the best information currently available pertaining to population forecasts, future changes to building codes, and vehicle fuel efficiency standards, among other information.



**Figure 11:** Greenhouse Gas Reduction Target and Trajectory from 2010 to 2025.

Figure 12 depicts historic GHG emissions, the forecasted reduction in emissions, and the goal for emissions reduction from 2010 to 2025. The color wedges represent the projected reductions in emissions based on successful implementation of the CARP.



**Figure 12:** CARP's Projected Impact on GHG Emissions


Table 3 below summarizes the Focus Areas within the Park Forest *Climate Action and Resilience Plan*, the number of strategies within each Focus Area, and the contribution of each Focus Area toward the GHG reduction goal. Each Focus Area has a dedicated section within the next chapter of the Plan, where specific strategies are described. While open spaces and ecosystem strategies will not reduce the community GHG emissions directly, trees absorb GHGs such as carbon dioxide, preventing them from accumulating in the atmosphere, which will reduce the amount of GHG in the atmosphere.

While Park Forest local government cannot address climate change by itself, government policies and practices can dramatically reduce greenhouse gas emissions from a range of sources and help prepare Park Forest for the anticipated impacts of climate change. In addition, the Village will assist residents and businesses in their endeavors to reduce emissions through strategies described in this Plan. By working together, Park Forest can do its part toward achieving a stable, sustainable climate, and Village residents and businesses can reap the benefits of healthier air, lower costs for utilities and services, improved transportation and accessibility, a more vibrant local economy, and many other positive co-benefits of reducing the community's carbon footprint.

Focus Area	Description	Number of Distinct Actions	Anticipated MTCO <sub>2</sub> e Reduction by 2025	Percentage of Total Reduction at 2025
<b>Energy Efficiency and Buildings</b>	Policies and programs to reduce residential, commercial, and municipal sector GHG emissions, and promote local small-scale renewables.	14	~29900	58%
<b>Transportation</b>	Policies and programs to reduce transportation-related GHG emissions	9	~18800	36%
<b>Waste Reduction and Recycling</b>	Policies and programs to reduce waste generation and landfill emissions, promote recycling	14	~2600	5%
<b>Water and Wastewater Management</b>	Policies and programs to reduce water demands and corresponding wastewater treatment needs	8	~640	1%
<b>Open Space and Ecosystems</b>	Policies and programs to reduce GHG emissions by enhancing open spaces and ecosystems	5	----	-----

**Table 3:** CARP GHG Reduction Strategies Summary Table, 2010-2025

\*CO<sub>2</sub>e (MT) (Metric tons of CO<sub>2</sub> equivalent)



***Transportation and housing costs  
are more than 45% of Park Forest  
average household income.***

-Center of Neighborhood  
Technology

***“Low-income families  
are spending anywhere from 10  
to 35 percent of annual income  
on utility bills.”***

-Low Income Home Energy  
Assistance Program (LIHEAP)

***“All these teenagers that live  
in Park Forest need a public  
means to get to work during  
the summers. Please make  
working more accessible to  
them.”***

-Park Forest Resident






# Climate Action Plan

Each of the following Focus Areas are explored in the following pages.

<b>Energy Efficiency and Buildings</b>	<b>Water and Wastewater Management</b>
<b>Transportation</b>	<b>Open Space and Ecosystems</b>
<b>Waste Reduction and Recycling</b>	

In each Focus Area, a series of Objectives with supporting Strategies and Implementation Actions are established. An “Objective” is a goal, end result, or target that supports a Focus Area, and “Strategies” and “Implementation Actions” are the means of realizing the Objective. Each Focus Area draws on the actions of both the local government and Park Forest residents and businesses, although some areas may be largely one or the other. Government operations Objectives are specific to the internal operations of Park Forest. They apply to buildings Park Forest owns or leases, vehicles used to provide services such as police, fire, and public works, and lighting of roadways, etc. Community Objectives require involvement and participation from citizens and businesses. Each strategy Objective is noted as one or both of these.






Calculating expected GHG emissions reductions for each Objective or Strategy requires making assumptions about the level of implementation, the technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each Objective or Strategy. To address this uncertainty and provide a simple but useful reference for reduction potential, a series of symbols and percentage ranges has been devised to represent the emission reductions associated with each Objective and its Strategies.

Symbol	GHG Reduction
	<b>Small Impact Range</b>
	<b>Medium Impact Range</b>
	<b>Large Impact Range</b>

**Table 4:** GHG Reduction Potential



In addition to measuring the GHG reduction potential, each Strategy is also evaluated for co-benefits, including improvements to public health, equity and justice, jobs and prosperity, the environment, and resiliency. More specific Objectives, Strategies, and Implementation Actions for addressing resiliency are established in the Climate Resilience Plan section of the CARP. However, the climate action, or mitigation, Objectives and Strategies will also have co-benefits that improve resiliency. The symbols shown in Table 5 will indicate which co-benefits an Objective will generate.

Symbol	Co-Benefit
	High potential to support jobs and prosperity
	High potential to advance equity
	High potential to improve local environmental quality
	High potential to improve health
	High potential to improve resilience to climate change and other impacts

**Table 5:** Co-Benefits of Climate Action Plan Objectives and Strategies









Legend for Leads and Partners
<p><b>CE</b> = ComEd; <b>DCD</b> = Department of Community Development; <b>DEDP</b> = Department of Economic Development and Planning; <b>DPW</b> = Department of Public Works; <b>EC</b> = Environmental Commission; <b>EE</b> = Elevate Energy; <b>F</b> = Finance Department; <b>FD</b> = Fire Department; <b>HD</b> = Homewood Disposal; <b>MFP</b> = Multifamily Properties; <b>N</b> = Nicor; <b>PD</b> = Police Department; <b>PFHA</b> = Park Forest Housing Authority; <b>PFPL</b> = Park Forest Public Library; <b>POW</b> = Place of Worship; <b>RPD</b> = Recreation and Parks Department; <b>S</b> = Local Schools; <b>SC</b> = Sustainability Coordinator; <b>HC</b>= Health Coordinator; <b>VPF</b> = Village of Park Forest</p>


**Table 6:** Abbreviations found in Climate Action and Resilience Plan Objectives and Strategies


# Energy Efficiency and Buildings


Energy consumed in residential buildings accounts for 39 percent of GHG emissions in the Village in 2015, while the energy consumption from non-residential buildings accounts for 16 percent of CO2e emissions. The community's consumption of energy in buildings altogether accounted for 55 percent of GHG emissions. Improving the energy efficiency of all buildings in Park Forest will contribute significantly to achieving the Village's GHG reduction target, while saving residents and businesses money on utility bills and reducing the need for new infrastructure. This Focus Area identifies opportunities to retrofit existing public and private buildings, educate residents and businesses about how they can increase energy efficiency, create opportunities for alternative energy generation, and ensure that future activities in this sector are compatible with the community's climate resilience goals.

Note that new construction is not directly addressed in this Plan because the Village has addressed this element in a variety of ways. In November 2018, the Mayor and Board of Trustees approved updates to the following construction codes: International Green Construction Code (2018), International Energy Conservation Code (2018), and the Green Building Code (2015). Further, the Village's adoption of the Unified Development Ordinance in 2017 ensures that new development will be compatible with sustainable development patterns.


Objective	Community/ Government	Co-Benefit	Reduction Potential
1 Achieve a 20% reduction in energy use in existing residential buildings by 2025.	Both		
2 Achieve a 10% reduction in energy use in existing commercial and industrial buildings by 2025.	Both		
3 Achieve a 25% reduction in energy use in Village-owned and other public buildings by 2025.	Government		
4 Encourage the production and use of clean, local energy.	Both		



Objective 1 – Energy In Households	
Achieve a 20% reduction in energy use in existing residential buildings by 2025.	 


Strategy E1A	Modify energy use behavior and habits	Lead & Partner	
<b>Implementation Actions Needed:</b>	Develop an energy efficiency campaign to encourage modifying energy use behavior and habits.	<b>VPF, DCD, EC</b>	



	Develop and implement a residential energy challenge.	VPF, SC	
	Develop a green building handbook to assist homeowners in implementing green practices.	VPF, SC	
	Hold energy efficiency workshops at the public library, Village Hall, and other locations.	VPF, SC, CE	
<b>Strategy E1B</b>	<b>Increase residential use of utility incentives for energy efficiency</b>	<b>Lead &amp; Partner</b>	
	Develop a comprehensive energy efficiency upgrade outreach program to increase awareness of incentives/rebates available from utilities.	VPF, SC, CE, EE	
	Expand and better integrate programs that increase energy efficiency in low income households.	VPF, DCD, SC, CE, PFHA	




<b>Objective E2 – Energy in Commercial and Industrial Buildings</b>			
<b>Achieve a 10% reduction in energy use in existing commercial and industrial buildings by 2025.</b>			



<b>Strategy E2A</b>	<b>Increase commercial and industrial use of utility incentives for energy efficiency</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Develop an energy efficiency campaign to encourage businesses to install energy efficient appliances, fixtures, amenities, and systems.	VPF, SC, CE, EE	
	Partner with local utility companies so commercial and industrial properties maximize use of energy efficiency rebate programs.	VPF, SC, EE, CE, N	

<b>Objective E3 – Energy in Governmental Buildings</b>			
<b>Achieve a 25% reduction in energy use in Village-owned and other public buildings by 2025.</b>			

<b>Strategy E3A</b>	<b>Increase the energy efficiency in Village-owned buildings</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Continue installing energy efficient appliances, fixtures, amenities, and systems.	VPF, DRP	
	Continue energy use tracking and benchmarking.	VPF, SC	

<b>Strategy E3B</b>	<b>Modify energy use behavior and habits in Village-owned buildings</b>	<b>Lead &amp; Partner</b>	
	Develop and implement a multi-department energy challenge.	<b>VPF, SC</b>	
	Develop an energy efficiency campaign to encourage modifying energy use behavior and habits.	<b>VPF, SC</b>	
<b>Strategy E3C</b>	<b>Increase the energy efficiency in schools</b>	<b>Lead &amp; Partner</b>	
	Expand partnership with school districts for Climate Action outreach, competitive programs, and energy efficiency campaign.	<b>VPF, SC</b>	





<b>Objective E4 – Renewable Energy Production</b>		
Encourage the production and use of clean local energy.		



<b>Strategy E4A</b>	<b>Facilitate renewable energy investment</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Convert at least one Village-owned building to renewable energy.	<b>VPF, CE</b>	
<b>Strategy E4A</b>	<b>Support the adoption of renewable energy technologies in the community</b>	<b>Lead &amp; Partner</b>	
	Provide access to community solar.	<b>VPF, DEDP</b>	







# Transportation



Emissions from transportation are a common sight to nearly everyone in Park Forest. Besides emitting greenhouse gases, transportation fossil fuels also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting the health of residents. Transportation accounts for 40 percent of Park Forest's total GHG emissions. This Focus Area identifies programs and policies to Objectives, Strategies, and Implementation Actions to reduce emissions from transportation and includes design-oriented approaches as well as expansion of alternate modes such as walking, biking, or public transportation to and from the most common destinations in Park Forest.

Objective	Community/Government	Co-Benefit	Reduction Potential
1 Achieve 10% reduction of vehicles miles traveled.	Both		
2 Reduce emissions from vehicle miles traveled.	Both		

<b>Objective T1 –Vehicle Miles Traveled (VMT) Reduction</b>		
<b>Achieve 10% reduction of vehicle miles traveled.</b>		







<b>Strategy T1A</b>	<b>Promote sustainable transportation behavior and habits</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Actively promote walking and biking as safe modes of local travel, particularly for children attending local schools.	<b>VPF, DPW, EC, S</b>	
	Initiate a community awareness of public transportation options campaign in schools, park facilities, community buildings, and shopping areas.	<b>VPF, SC, DEDP, S, MFP, DPW</b>	
<b>Strategy T1B</b>	<b>Improve transportation options</b>	<b>Lead &amp; Partner</b>	
	Increase Pace access to Metra trains and intermodal linkages.	<b>VPF, SC, DPW</b>	
	Continue to include sustainable transportation improvements in the Village's Capital Plan.	<b>VPF, DPW, SC</b>	
	Establish car sharing and/or bike sharing services at Metra stations and other key locations around the Village.	<b>VPF, DEDP, MFP</b>	



Objective T2 – Reduce Emissions from VMT.			
Reduce emissions from vehicles operated by the Village or owned by residents.			



Strategy T2A	Promote sustainable transportation behavior and habits	Lead & Partner	
	Develop an idling reduction campaign at waiting locations such as schools, parks, ball fields, community buildings, and shopping areas.	<b>VPF, DEDP, S, RPD, SC</b>	
	Increase accommodation and promotion of alternatively fueled vehicles.	<b>VPF, DEDP, PD, DPW</b>	
Strategy T2B	Reduce Village fleet vehicle emissions	Lead & Partner	
	Conduct fleet size and utilization study.	<b>VPF, DPW, RPD</b>	
	Adopt sustainable purchasing policy to include a replacement program for alternatively fueled vehicles within the Village's fleet.	<b>VPF, PD, RPD, DPW, FD</b>	


# Waste Reduction and Recycling


Emissions from waste directly contribute 4 percent of Park Forest’s total GHG emissions and contribute to emissions in the Transportation sector because of hauling of waste. Additionally, embodied energy within the items that are thrown away can be harnessed through reuse and recycling of materials. It is in Park Forest’s long-term interest to expand recycling opportunities and enable re-use of construction materials and other goods. The Objectives, Strategies, and Implementation Actions included in this Focus Area are designed to decrease the amount of waste sent to landfills by raising awareness and understanding of reuse and recycling, make it easier for residents and businesses to recycle, and encourage innovative techniques like deconstruction.

Objective	Community/ Government	Co-Benefit	Reduction Potential
1 100% of Park Forest residents have access to waste reduction and recycling resources.	Both		
2 Increase commercial waste reduction and recycling participation efforts.	Both		
3 Increase waste reduction and recycling participation at Village buildings, operations, parks, and events.	Government		

Objective R1 – Residential Waste and Recycling		
100% of residents have access to waste reduction and recycling resources.		

Strategy R1A	Increase recycling behavior and habits in the community	Lead & Partner	
<b>Implementation Actions Needed:</b>	Partner with schools, library, and churches to enhance education about reducing, reusing, recycling, and composting waste.	VPF, DCD, PFPL, SD, POW, S	
	Expand and support efforts to increase community awareness around recycling through special events, drop boxes, publications, garage sales, and recycling pick up services.	VPF, DEDP, DCD, SC	
Strategy R1B	Connect residents with resources for recycling materials.	Lead & Partner	
	Continue to expand the Growing Green Recycle Fest for paper shredding, electronics, clothes and shoes collection, and other materials.	VPF, DEDP, SC, EC	
	Develop a composting program, and provide incentives for residents to practice.	VPF, SC, EC	
	Expand curb-side electronic recycling program to multifamily properties.	VPF, MFP, HD	





Objective R2 –Commercial Waste and Recycling		
Increase commercial waste reduction and recycling participation efforts.		

Strategy R2A	Decrease commercial and industrial waste.	Lead & Partner	
<b>Implementation Actions Needed:</b>	Work with local businesses to reduce the use of disposable items such as plastic bags and take-out containers.	VPF, DEDP, SC	



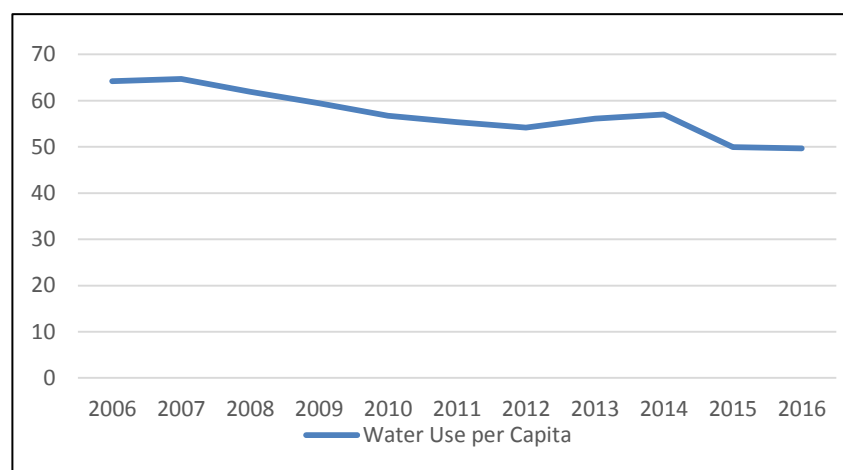
	Consider a tax or ban on single-use plastic bottles and plastic bags in order to discourage usage.	<b>VPF, DEDP, SC</b>	
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<b>Objective R3 – Governmental Operation Waste</b>			
<b>Increase waste reduction and recycling participation at Village buildings, operations, parks, and events.</b>			

<b>Strategy R3A</b>	<b>Increase waste reduction and recycling in public buildings</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Develop an environmentally friendly purchasing policy. Require the purchase of “green” products and the minimization of the use of disposables such as Styrofoam cups, plates and plastic ware, and bottled beverages.	<b>VPF, F</b>	
	Reduce municipal solid waste (MSW) going to landfills by effectively reusing materials and increasing recycling.	<b>VPF, SC</b>	
<b>Strategy R3B</b>	<b>Increase waste reduction and recycling participation at Village’s events and public spaces</b>	<b>Lead &amp; Partner</b>	
	Require every event held by the Village to offer recycling by providing specifically marked bins and arranging for collection of recyclables.	<b>VPF, RPD, DEDP, SC</b>	
	Encourage every event held in the Village public spaces to offer recycling by providing specifically marked bins and arranging for collection of recyclables trash.	<b>VPF, RPD, DEDP, SC, PFPL</b>	
<b>Strategy R3C</b>	<b>Increase the reuse and recycling of construction and demolition waste</b>	<b>Lead &amp; Partner</b>	
	Require reuse and recycling of construction and demolition waste in Village projects.	<b>VPF, DCD</b>	
	Offer incentives to increase the reuse and recycling of construction and demolition waste in private projects.	<b>VPF, DEDP, DCD</b>	
<b>Strategy R3D</b>	<b>Increase waste reduction and recycling in schools</b>	<b>Lead &amp; Partner</b>	
	Expand partnerships with school districts for recycling outreach, competitive programs, and campaigns.	<b>VPF, SC, S</b>	

# Water and Wastewater Management

Park Forest is dependent on groundwater for its potable water supply, and the Village operates the water collection, treatment, and delivery systems. Emissions from water and wastewater services directly contribute 1 percent of Park Forest's total community-wide GHG emissions. Distributing and treating water for the Village is an energy intensive task. In 2015, 27 percent of the Village operation's emissions were generated to treat and distribute water. Reduction of water use and continued upgrades to the collection, treatment, and distribution systems will help the Village reduce its overall energy consumption, and it will ensure that water is available as periods of drought and heat increase as a result of climate change. Over the 10 year period from 2006 to 2016, water use per capita in Park Forest declined by 15 percent (Figure 13). Village Staff speculates that this may, in part, be due to increased water rates and decreased population. However, it is a trend that the Village should seek to maintain and improve upon because it will enhance the Village's climate mitigation and adaptation response. For example, improvements to the Village's water infrastructure (distribution lines, storage facilities, meters, treatment plant) will ensure that a high percentage of water treated is accounted for in water bills. In addition, water customers should be encouraged to save water through use of water efficient appliances, rainwater water harvesting systems, and other means.



**Figure 13:** Water Use per Capita (gallons/day) in Park Forest  
2006 to 2016

The Illinois EPA expects water systems to lose no more than 10 percent of water, determined by the difference between the amount of water pumped and the water billed. Table 7 indicates that water loss has been a problem in the Village's water system in 2016 and 2017. This section identifies Objectives, Strategies, and Actions to reduce water use, water loss, and the amount of wastewater production in the community.




	2013	2014	2015	2016	2017
Water main breaks repaired	133	99	117	165	154
Water main replaced (feet)	34	1,358	54	15,000	10,000
Water pumped (gallons)	483,819,000	407,073,000*	444,087,000	476,784,000	460,653,000
Water billed (gallons)	462,613,041	414,614,360	399,076,629	406,410,240	389,029,436
% Water billed	4.4%	--	10.1%	14.8%	15.5%
Water use per capita (gallons)**	21,190	18,992	18,280	18,616	17,820

\*Three months (July – September) of pumping data is missing due to water plant SCADA system not functioning. The data, therefore, represents only nine months of operation.

\*\* Water use per capita was determined based on a population of 21,831 (Source: CMAP Community Data Snapshot, 2016).



**Table 7:** Park Forest Water System Data




Objective	Community/Government	Co-Benefit	Reduction Potential
1 Make efficient use of water.	Both		

Strategy W1A	Improve water system efficiency	Lead & Partner	
<b>Implementation Actions Needed:</b>	Continue upgrading the mechanical and electrical systems at water plant and on the water wells to reduce electric demand.	<b>VPF, DPW</b>	
	Regularly review water service rates to ensure long-term sustainability.	<b>VPF, F</b>	
	Systematically replace water meters in homes and businesses so billing accurately reflects water usage.	<b>VPF, F, DPW</b>	
	Develop a plan to replace water mains in danger of breaking.	<b>VPF, DPW</b>	
Strategy W1B	Reduce community water consumption per capita	Lead & Partner	
	Raise public awareness and provide education about water resources.	<b>VPF, DPW, SC, EC</b>	
	Adopt an ordinance that requires use of water efficient appliances, including low-flow faucets, shower heads, and toilets in new construction or rehabilitation projects of more than 50 percent of the value.	<b>VPF, DEDP, DCD</b>	
	Encourage use of Water Sense and Energy Star appliances, including low-flow faucets, shower heads, and toilets.	<b>VPF, MFP, DCD, SC</b>	
Strategy W1C	Implement policies and practices that treat rainwater as a resource	Lead & Partner	
<b>Implementation Actions Needed:</b>	Adopt policies, ordinances, and codes that promote green solutions to storm water management.	<b>VPF, DEDP, DPW</b>	
	Expand green infrastructure best management practices on municipal properties.	<b>VPF, DPW, RPD</b>	
	Develop and implement a rain garden incentive program, and continue to provide rain barrels to residents.	<b>VPF, DPW, RPD, SC</b>	

# Open Spaces and Ecosystems

Trees in urban areas can become major carbon storage reservoirs through carbon sequestration. Urban trees and green spaces can also influence public health and local climate by reducing the urban heat island effect and consequently reducing the use of electricity from air conditioning units. Park Forest has an exceptionally high amount of open space per capita, including wetlands, creeks, forest preserves, and Village parks that add to the quality of life in the community. However, the natural areas and ecosystems in Park Forest are facing the impacts of climate change. This Focus Area identifies opportunities to reduce GHG emissions by diversifying the tree species planted in the Village, and increasing the amount of green space and tree canopy. An estimated 3,000 to 3,500 trees are located in public areas in the Village.

Objective	Community/ Government	Co-Benefit	Reduction Potential
1 Reduce GHG emissions by increasing green spaces and tree canopy and assuring local food security.	Both		

<b>Strategy O1A</b>	<b>Maintain and preserve public open spaces</b>	<b>Lead &amp; Partner</b>	
<b>Implementation Actions Needed:</b>	Preserve open spaces and increase residents' accessibility to public open spaces.	<b>VPF, RPD</b>	
<b>Strategy O1B</b>	<b>Maintain and increase the tree canopy</b>	<b>Lead &amp; Partner</b>	
	Increase canopy cover diversity on public property for air quality and shade.	<b>VPF, RPD</b>	
	Require the use of native plants in all public park landscape projects.	<b>VPF, RPD</b>	
<b>Strategy O1C</b>	<b>Increase urban agriculture/community gardening practices</b>	<b>Lead &amp; Partner</b>	
	Promote urban agriculture practices, and increase community involvement in community gardens or urban food forests.	<b>VPF, RPD, DEDP, SC, S, PFPL, POW</b>	
	Increase active urban farms and community gardens by 20%.	<b>VPF, RPD, DEDP, SC</b>	





***40% of survey respondents will move out of Park Forest when they retire to live in a different climate.***

POLCO Online Survey

***70% of survey respondents stated sidewalks are not in good condition, safe and accessible for everyone.***

POLCO Online Survey

***70 % of survey respondents think there are no available seasonal services in Park Forest, such as lawn work or snow removal for low-income and older adults.***

POLCO Online Survey



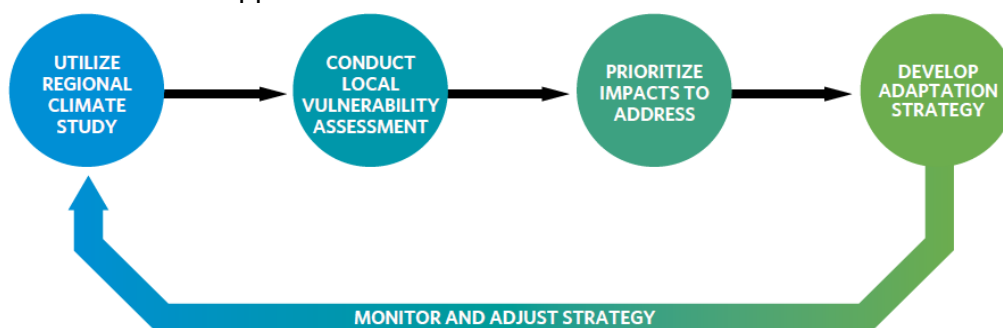
# Climate Resilience Plan

Preparing for the impacts of climate change is a complex challenge. Climate science is evolving and is complicated by the uncertainty of future global emissions levels. Recognizing the uncertain nature of climate science, and the difficulty that creates for communities that want to prepare for climate change with limited resources, Dr. Katharine Hayhoe, an atmospheric scientist and professor at Texas Tech University, noted that climate resilience plans should have three types of actions<sup>10</sup>, including:

- Actions that build resilience to address known climate risks. These are projects such as addressing existing street flooding because heavy rainfall events are already happening, or increasing the species diversity in the urban forest because climate variability is already causing trees to die.
- Actions that increase resilience to address climate risks that are clearly getting worse and/or more frequent. This type of action might include the adoption of the stormwater management ordinance that requires a greater level of flood resilience in new developments because heavy rainfalls are expected to continue to worsen.
- Develop climate projections for risks that are expected to intensify, but the future risks are not yet known. These projections should be monitored and updated regularly so improvements can be implemented at the right time. Actions that might be addressed in this scenario include drainage improvements to address flooding at the Orchard Drive viaducts, or adding cooling centers to support populations of concern as heat waves become more frequent and longer lasting.

This type of proactive planning for climate impacts can be more cost-effective than a reactive approach of responding to damage after the fact by ensuring that Village infrastructure and systems continue to function as climate conditions change.

CMAP's *Climate Adaptation Guidebook for Municipalities in the Chicago Region*<sup>11</sup>, referenced in the Introduction, provides climate adaptation planning guidance to local governments. The guide describes the basis for climate change adaptation planning and details a step-by-step process for assessing local climate vulnerability and developing an adaptation strategy (see Figure 14). The Village of Park Forest followed this process to prepare this element of the CARP. A detailed Climate change Vulnerability Assessment can be found in Appendix IV.



**Figure 14:** Steps for developing a municipal climate adaptation strategy

<sup>10</sup> Urban Sustainability Director's Network/Climate Neutral Cities Alliance All-Network Call with Dr. Katharine Hayhoe - Building Resilience to a Changing Climate: High-Resolution Climate Projections for Impact Assessments. November 5, 2018.

<sup>11</sup> Chicago Metropolitan Agency for Planning. *Climate Adaptation Guidebook for Municipalities in the Chicago Region*. June 2013. <https://www.cmap.illinois.gov/programs/sustainability/climate-adaptation-toolkit>

The Village's vulnerability assessment used CMAP's regional climate study as the basis for establishing the most likely impacts of climate change in the Chicago area. As noted in the Introduction to the CARP, these climactic changes are likely to result in the following:

- Heavy rains are likely to fall more frequently, causing flooding more often.
- Light rains are likely to fall less frequently, particularly in the summer, leading to drought.
- Heat waves will probably become more frequent, more intense, and last longer.
- Higher temperatures in summer will increase cooling demands that may strain the electric grid.
- Hot summer temperatures will worsen air quality, and high humidity will encourage infectious diseases.
- Weather variability may make operating municipal utilities more difficult and financially risky.<sup>12</sup>

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<sup>12</sup> Chicago Metropolitan Agency for Planning. Climate Adaptation Guidebook for Municipalities in the Chicago Region, Appendix A: Primary Impacts of Climate Change in the Chicago Region. June 2013.

<https://www.cmap.illinois.gov/programs/sustainability/climate-adaptation-toolkit>

# Vulnerability Assessment

Before the climate resilience/adaptation strategies could be developed, the Village conducted a vulnerability assessment. Village Staff from the Departments of Public Works, Recreation and Parks, Police, Fire, and Economic Development and Planning examined how the Village's infrastructure, resources, facilities, and residents are likely to be impacted by the climate changes described above. As recommended by CMAP's *Climate Adaptation Guidebook*, the following key areas were included in the assessment.

1. Critical facilities and infrastructure flooding readiness: assess if the community's critical facilities and infrastructure are located in areas impacted by the floodplain and/or other storm event scenarios. Park Forest's critical facilities include all of the facilities that provide public services to residents, visitors, and businesses, including public safety, healthcare, and education. Many of these facilities, like schools and recreation centers, also can serve as emergency shelters and cooling centers during severe weather and heatwaves.
- Built environment and infrastructure: assess how climate variability may impact the safety and effectiveness of community's infrastructure such as storm sewers, waste and drinking water systems, roads and bridges, and detention basins. These systems are essential to keeping the Village running, and ensuring their resilience to future changes in climate must be a priority for the Village.
- Operations and maintenance: assess if the community experienced a need for additional infrastructure operations or maintenance work associated with extreme storm events, drought, high winds, increased temperatures, fluctuating water levels, or other climate-related events. Minimizing these additional operation and maintenance expenses by planning for resilience can reduce future expenses, especially those that are unexpected.
- Water resources: assess how climate change and variability may impact the municipality's ability to meet water demands and sustain water quality.
- Ecosystems and habitats: climate change will impact Park Forest's natural environment, including streams, groundwater, wildlife, and plants. The vulnerability assessment identified the habitats at greatest risk to the effects of climate change and recommends climate-smart management actions for habitat restoration and protection.
- Tourism and recreation: assess if the community's events or festivals that are season-dependent may need to be rescheduled or cancelled entirely due to climate related impacts.
- Business plans and equipment: evaluate resources the retail stores in the community have to re-open after a power outage, flooding, or other impacts due to an extreme weather event. Focus on stores that provide for basic needs (grocery, gas, hardware). Assess other commercial and industrial buildings as well, because if they are temporarily or permanently impacted, not only could employers and employees be exposed to dangerous conditions, but businesses could lose revenue in the short term or move away in the long term.
- Community plans: identify specific community plans already adopted, underway, or planned, where climate education and associated climate change adaptation can be incorporated.

The assessment results in a low, medium, or high rating for each category, depending on answers from the Village Staff. The medium and high readiness ratings do not necessarily mean low potential for impact and a low readiness rating is not the only factor in deciding priorities for further vulnerability assessments. Rather, the purpose of the ratings is to identify key areas of potential vulnerability that need further exploration.

According to the results of the assessment, the ecosystems and habitat, and business plans and equipment categories have low readiness ratings. These functional areas are likely to be impacted by high rainfall and flooding, high snowfall, extreme heat, drought, and impacts of invasive species. Also, the Department of Public Works (DPW) stated that, in the last ten years, the Village has experienced a need for additional infrastructure operations and maintenance work associated with extreme storm events and increased temperatures. More detail on the readiness rating of each category is provided in this *Climate Resilience Plan* element of the CARP.

In addition to examining the Village's vulnerability within each of the functional areas described above, Village Staff and the Steering Committee also assessed the needs of the populations of concern. Park Forest's most vulnerable populations, including lower income residents, people of color, and older residents, are at greater risk from the impacts of climate change, and they often have the fewest resources to respond to changing conditions. Fostering resilience among these more vulnerable residents and supporting their recovery after extreme events is critical. To enhance equity, climate change preparedness strategies should:

- Prioritize actions that help vulnerable populations to moderate potential impacts and to cope with the consequences of climate change.
- Incorporate input and perspectives from members of the vulnerable populations.

## Critical Infrastructure and Facilities

Critical infrastructure flooding readiness is assessed based on whether the infrastructure is located in a floodplain, or is likely to be impacted by flooding due to a 100 year, 24 hour storm, or by a storm that is 50 percent greater than the 100 year, 24 hour storm. The infrastructure examined is noted in Table 8. Based on the self-assessment conducted by the DPW, the Village's critical community infrastructure most likely to be impacted by these scenarios are roadways and evacuation routes, and two local schools. Following are the specific locations that are of concern to the DPW.

Infrastructure and Facilities	Located in Floodplain	Flooding expected due to 100-years, 24 hour storm	Flooding expected due to storm event 50% greater than column 2
Sewage treatment system			
Power grid			
Drinking water system	X	X	X
Roadways/ evacuation routes	X	X	X
Village Hall			
Police station			
Fire station			
Public work facilities	X	X	X
Local schools	X	X	X

**Table 8:** Critical Infrastructure and Facilities Flooding Readiness

- While improvements to the Thorn Creek Bridge in 2013 elevated it above the floodplain, DPW staff is concerned that predicted future increases in the 100 year flood elevation will place the bridge at risk. This bridge represents the only access to a portion of the Thorn Creek Woods subdivision that includes 54 homes.
- Sioux and Seminole Streets are consistently impacted by flooding during heavy rainfalls due to insufficient capacity in detention facilities in Richton Park. When the detention facilities to the west of Park Forest overflow, these Park Forest streets flood. While, to date, only the streets



have been impacted, not the houses, it creates a potential problem related to emergency response times and evacuation routes.

- The Orchard Drive viaducts located both north and south of North Street have flooded more often in the past several years. Flooding in these locations is caused by heavy rainfall, but also by clogged storm drains. Keeping these drains clear is of critical importance due to the need to keep Orchard Drive open for emergency response.
- 26<sup>th</sup> Street and Sauk Trail, east of the Village limits, have also flooded more often in recent years. While the location of the flooding on both roads is outside the Village limits, it creates problems for Village DPW staff who have to take time from their local responsibilities to block access to these roads.
- The neighborhood south of Lakewood Boulevard and Rich East High School are shown to be at risk of flooding based on the updated FEMA floodplain maps, as well as the more detailed floodplain maps prepared by the Metropolitan Water Reclamation District (MWRD).
- Michelle Obama School is shown to be in the floodway based on the MWRD maps.

Based on DPW's assessment of critical facilities, the Police and Fire Stations, Village Hall, emergency operation center, and Public Works facilities are not at serious risk of flooding.

Table 9 summarizes the results of the climate vulnerability assessment for each of the functional areas, other than Critical Infrastructure and Facilities. The assessment includes a set of questions within each functional area that are designed to get Village Staff thinking about potential vulnerabilities within each area. Based on the number of "yes" answers within each functional area, the assessment indicates the community's readiness to respond to climate threats. The results are described in more detail below.

Categories	Total Yes Answers	Translate Total Answers to Readiness Index	Readiness Index
Built environment and infrastructure	1	0-2 (high) 3-5 (medium) 6-8 (low)	High
Operations and maintenance	4	0-1 (high) 2-4 (medium) 5-6 (low)	Medium
Water resources	2	0-2 (high) 3-5 (medium) 6-7 (low)	High
Ecosystems and habitats	8	0-2 (high) 3-5 (medium) 6-8 (low)	Low
Tourism and recreation	0	0-2 (high) 3-5 (medium) 6-8 (low)	High
Business plans and equipment	0	0-2 (high) 3-5 (medium) 6-8 (low)	Low
Community plans	0	0-2 (high) 3-5 (medium) 6-8 (low)	Low

**Table 9:** Climate Vulnerability Readiness

## Built Environment and Infrastructure

The concerns regarding the vulnerability of the Village's built environment and infrastructure are the same as those described above with regard to critical infrastructure flooding readiness. Specific areas of the Village's road network are at risk of flooding, causing limitations for emergency response and evacuation, should it become necessary.

In addition, there are neighborhoods in the Village that are more susceptible to flooding than others. As noted above, Sioux and Seminole Streets are subject to street flooding when the detention facilities in Richton Park reach capacity. Peach Street also experiences street flooding because the storm drains in that area tend to get blocked more often than in other areas. Another neighborhood of concern lies south of Lakewood Boulevard between Westwood Drive and Orchard Drive. Based on updated floodplain maps prepared by the Metropolitan Water Reclamation District (MWRD), this neighborhood is located within the 100 year flood plain. FEMA maps show this as the 500 year flood plain.

**Operations and Maintenance**

The climate vulnerability assessment includes an examination of whether or not the Village has experienced a need for additional infrastructure operations or maintenance work associated with extreme storm events, drought, high winds, increased temperatures, fluctuating water levels, or other climate-related events. Village Staff indicated the following specific concerns:

- Storm sewer system repair: repairs and system improvements are expected to be an annual occurrence. For example, in 2017, a portion of the storm sewer in Thorn Creek Drive was upsized from 36 inches to 48 inches. This improvement is directly related to heavy flooding that occurred in the neighborhood in 2011. Also, the Village has begun to install more rain gardens in strategic locations to address localized flooding, and has created a residential rain garden grant program. The new Village Green expansion was designed and built to detain a 100 year storm event.
- Road buckle and pot hole maintenance: in 2014, the Village Board approved the annual budgeting of General Fund revenues to address local street improvements in order to enhance quality of life in the Village. Table 10 shows how some of these funds have been used to address roadway conditions that are often caused by extreme temperatures, including cold, snow, and extreme heat.

Year	2013	2014	2015	2016	2017
Streets patched (square yards)	2,868	1,625	505	5,425	1,571

**Table 10:** Road Buckle and Pot Hole Maintenance

- Sanitary sewer system: the sanitary sewer overflow facility, located at the Public Works Yard, is currently off-line. It must be repaired. A majority of the Village’s sanitary sewer system was originally constructed of unreinforced concrete, which deteriorates slowly over time due to the reaction with hydrogen sulfide gas and creates structural problems as well as infiltration. Other portions of the Village sanitary system are made of clay, which is brittle and breaks over time. As a result, the Village has embarked on a multi-year program of re-lining the sanitary sewers.
- Urban tree inventory: maintenance and replacement is on the rise, because of both the Emerald Ash Borer problem and because of the age of the Village’s tree inventory. In addition, weather variability is impacting the health of the Maple trees in the Village. The Village is developing a long range maintenance and replacement plan and has a budget line item for urban forestry, which is used to match grants received for tree planting.

**Water Resources**

Park Forest is dependent on groundwater for its potable water supply. The Village is supplied by groundwater pumped from six wells drilled approximately 340 feet deep into a dolomite limestone aquifer. The wells are all located within a one-mile radius of the Village’s water treatment plant. The Village has never failed to meet local water demands, or needed to implement water use restrictions.

Drinking water is tested for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not the Village's drinking water meets health standards. According to the Illinois EPA, Park Forest's Annual Water Quality Report has indicated that no regulated contaminants have been detected in the Park Forest water supply during required testing since 1982.<sup>13</sup>

Water quality can be threatened or impacted by different climate events. The Department of Public Works has noted that community groundwater supplies have never shown any reductions in capacity or water quality associated from drought or flooding. Park Forest is part of the Thorn Creek and Butterfield Creek watersheds. The Thorn Creek watershed is facing concerns about surface water quality as multiple water bodies have been identified as impaired by EPA standards. Based on information obtained in a Well Site Survey, published in 1992 by the Illinois EPA, 24 possible problem sites were identified within the survey area of Park Forest. The Illinois Environmental Protection Act requires a minimum protection zone of 400 feet for Park Forest's wells. These minimum protection zones are regulated by the Illinois EPA to protect drinking water supplies from potential routes and sources of groundwater contamination. Existing water supply wells are protected from encroachment by new potential routes or sources of contamination. This approach ensures a baseline program that will prevent or greatly lessen the likelihood of well contamination by the most direct means.

Possible future drought conditions within the region, increased development, and population growth will cause pressure on the availability of water in the aquifer system from which the Village draws water. This could result in some well interference (losing access to water because of a nearby high-volume water appropriation and water levels recede below the pump of the affected well) or even water shortages. The Village has adopted policies to ensure that the jurisdiction has the authority to enact water conservation measures during periods of drought. The Village evaluated the entire water system in 2007 to plan a water main replacement schedule, and continues to address its water quality with ongoing efforts to replace the aged water mains that deliver water to residents and businesses. Annual water rate increases encourage residents to regulate their water use and recognize patterns of water usage so to be more aware of water conservation.

## **Ecosystems and Habitats**

Park Forest has an exceptionally high amount of open space per capita, including wetlands, creeks, forest preserves, and Village parks that add to the quality of life in the community. In the year 2000, the Village initiated a project to restore the Central Park Wetlands, a 50-acre wetland in the very center of the community that provides an exceptional habitat for a large variety of birds, mammals, and plants. The wetlands also help to absorb millions of gallons of storm water annually. The Village also co-owns and manages the Thorn Creek Nature Preserve, another vital habitat for native plants and animals. These ecosystems and habitats have to be managed carefully to ensure that the flora and fauna is not permanently and negatively impacted by climate change. The Department of Recreation and Parks completed the Ecosystems and Habitats portion of the self-assessment, with the conclusion that this important element of the Village has a low-readiness for the impacts of climate change. Better understanding of factors that contribute to climate change vulnerability within Park Forest's natural habitat is needed to determine the right management responses.

The Village's urban forest (on parks and public rights-of-way) supports between 3,000 and 3,500 trees, based on a conservative estimate. This takes into account more than 1,000 trees that have been lost to the Emerald Ash Borer (EAB) infestation since 2009. In summer 2018, the Village inventoried 648 of the Village's trees, noting species, condition, and potential hazard. Once tabulated and completed, this data will be the basis for development of a maintenance and replacement plan. In addition to the loss

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<sup>13</sup> [http://water.epa.state.il.us/dww/JSP/Violations.jsp?tinwsys\\_is\\_number=716218&tinwsys\\_st\\_code=IL](http://water.epa.state.il.us/dww/JSP/Violations.jsp?tinwsys_is_number=716218&tinwsys_st_code=IL)

of trees to EAB, the Village's urban forest has also been stressed by climate variability, including both exceptionally hot and cool summers, and summers that have been excessively wet or dry. The hot and dry summers cause the most stress as the nutrient reserves within the trees become depleted. Particularly hard hit have been the Village's Silver Maple trees, although Red and Sugar Maples have also been lost in large amounts. In 2018 alone, 20 dead trees were removed from Winnebago Park, seven from Murphy Park, and 109 dead trees are marked for removal from Village parkways. Since 2011, however, the Village has planted 248 new trees in Village parks and rights-of-way.

In addition to the environmental stress on the Village's urban forest, following are some of the specific issues that have been observed:

- Erosion along Thorn Creek is increasing due to the fluctuating water levels. This creates the potential for increased sediment and contaminants in the creek. During heavy rain falls, further erosion and failure along the creek banks is a real threat.
- Increasing water temperatures, fluctuating water levels, and increased volume and velocity of storm water runoff will change the type of flora and fauna found in the Village's creeks and in the Central Park Wetlands.
- More invasive species are moving into the Village. This includes plant species that have to be controlled in the Central Park Wetlands, and along Thorn Creek and its tributaries. Invasive species also include mammals such as foxes, coyotes, and skunks. The changes in plant species in the Wetlands is causing a change in the bird species that live there permanently and that use the Wetlands on a seasonal or migratory basis.

One important measure that the Village has already taken to address invasive species concerns is the development and implementation of a three year *Ecosystem Enhancement Plan for Central Park Wetland* starting in 2013. The goal of the Plan was to increase and sustain higher levels of native floristic quality and biodiversity in Central Park Wetland. The Village has deliberately set out to re-establish native habitats in its parks and public spaces. Projects include the Central Park Wetlands Restoration, and installation of native rain gardens and site specific trees and woody shrubs in selected park locations. Also, the Village was part of the *Thorn Creek Watershed Basin Plan* (2014) which focused closely on the goal of protecting and enhancing surface water quality to support uses designated for Thorn Creek by Illinois EPA. Other resource-based goals were considered, including protecting and restoring aquatic and terrestrial habitat, protecting and enhancing groundwater quality and quantity, and reducing flooding and flood-related damages.

The Recreation and Parks Department has received a grant from the US Fish and Wildlife Fund's Five Star Urban Waters program to install large rain gardens in Shabbona, Marquette, and Onarga Parks. This is primarily designed to address stormwater management in those neighborhoods, but the rain gardens will also incorporate native plants and pollinator habitat.

## **Tourism and Recreation**

At this point, the Village has not experienced negative impacts on the Village's tourism and recreation programming as a result of climate change. Over the course of the next 10 to 20 years, however, heavy rains and extreme temperatures could impact outdoor summer activities such as the annual Fourth of July celebration and Main Street Nights. Similarly, increased summer rain events could impact use of the Park Forest Aqua Center.

## Business Plans and Equipment

Park Forest businesses, in general, do not have the business plans or equipment in place that would ensure a quick recovery after an extreme weather event. Based on semi-annual inspections conducted by the Fire Department, few local retail stores that provide for the community's basic needs (grocery, gas, hardware) have equipment such as generators, back-up options for water, waste and communication, plans to bring in additional staff, or plans for re-stocking of store shelves.

## Community Plans

It is important to identify the opportunities available in the Village's existing plans to determine vulnerabilities related to climate resiliency and to recommend strategies to address those concerns. The Village has adopted several plans which might address climate change impacts. Also, Park Forest is part of the *Cook County Multi-Jurisdictional Hazard Mitigation Plan* (2014). The goal of the County Plan is to identify risks and provide a sustainable cost-effective set of actions to mitigate the impact of natural hazards at the local level. The Plan meets FEMA planning requirements of the National Flood Insurance Program's (NFIP) Community Rating System (CRS). CRS allows participating communities to earn credit towards discounts in flood insurance premiums. Also, the Village Board passed a resolution in 2003 to opt-into *Will County's Storm Water Management Ordinance*. The Village's local plans and ordinances address some of the impacts created by climate change, but they are not necessarily discussed in relation to climate change and variability. These plans and ordinances are:

1. *Park Forest Unified Development Ordinance* (2017)
2. *Village of Park Forest Response Plan* (December 2014)
3. *Ecosystem Enhancement Plan* (2013)
4. *Growing Green: Park Forest Sustainability Plan* (2012)

None of the Village's plans currently in place have incorporated climate change education and adaptation into the process or the final report. The *Park Forest Response Plan* does address the Village's response to natural hazards, including severe and excessive heat/cold, severe thunderstorms, high winds, microbursts, lightning, hail, tornadoes, and winter storms. The CARP recommends that the *Park Forest Response Plan* and the Village's comprehensive plans be re-examined to ensure that they also address climate adaptation and education in order to reduce the impact of climate change on the community's residents, businesses, infrastructure, and facilities.







# Adaptation Focus Areas

Each of the Focus Areas within the Resilience Plan is explored in the following pages. In each Focus Area, an Objective and series of Strategies with supporting Implementation Actions are explored. An “Objective” is a goal, end result, or target that supports a focus area, and “Strategies” and “Implementation Actions” are the means of realizing the Objective. Each Focus Area draws on the actions of both the local government and Park Forest residents and businesses, although some areas may be largely one or the other.





Since many adaptation Strategies do not fit into one particular Focus Area but instead affect, build on, or are a component of all areas, the Plan notes when these Strategies have a high potential to improve resilience to climate change as a co-benefit in other climate action Focus Areas. This can help to call out the importance of cross-cutting strategies. Although embedded in components of other Focus Areas, calling out cross-cutting strategies allows one to set quality thresholds or success metrics for these activities, ensuring that these Objectives are observed and done well.

Government operations Strategies are specific to the internal operations of Park Forest. They apply to buildings Park Forest owns or leases, vehicles used to provide services such as Police, Fire, and Public Works, lighting of roadways, etc. Community Strategies require involvement and participation from citizens and businesses. Each Strategy is noted as one or both of these.

Each Strategy is also evaluated for other benefits such as public health, equity and justice, jobs and prosperity, and environmental benefits. The symbols below will indicate which co-benefits a measure will generate.

Symbol	Co-Benefit
	High potential to support jobs and prosperity
	High potential to advance equity and justice
	High potential to improve local environmental quality
	High potential to improve health

**Table 11:** Co-Benefits for Resilience Plan Objectives and Strategies


Focus Area	Community/Government	Co-Benefit
1 Local public health and safety.	Both	
2 Emergency preparedness.	Both	
3 Flooding and Storm Water Management	Government	
4 Ecosystems and Open Spaces	Both	

## Local Public Health and Safety

Objective 1 –Local Public Health and Safety	
Support local public health and safety.	

Strategy 1A	Focus on Vulnerable Populations	Lead & Partner
<b>Implementation Actions Needed:</b>	Develop an accessible record of facilities and locations with concentrations of populations of concern.	<b>VPF, FD, HC</b>
	Educate residents, especially populations of concern, about how to prepare for and protect themselves from climate changes most likely to occur in the Park Forest area.	<b>VPF, DPW, FD</b>
Strategy 1B	Increase public awareness	Lead & Partner
	Coordinate public awareness and education of severe weather events and tips on how to stay safe during these events.	<b>VPF, SC, HC, FD</b>
	Create a handbook of available resources and assets in case of emergency.	<b>VPF, HC, FD</b>
	Build community partnerships to support neighborhood preparedness.	<b>VPF, HC, FD</b>

## Emergency Preparedness

Objective 2- Emergency preparedness.	
Adopt comprehensive adaptation strategies to prepare for climate-related emergencies	

Strategy 2A	Address climate resilience in disaster preparedness efforts	Lead & Partner
<b>Implementation Actions Needed:</b>	Incorporate hazard mitigation and climate resilience considerations into the Village's emergency response plan and the Village's comprehensive plan..	VPF, FD, DEDP
	Identify additional cooling centers that are accessible within a 10 minute walk to populations of concern.	VPF, FD, PD, PFPL, S
Strategy 2B	Incorporate climate change impacts into infrastructure planning and operations	Lead & Partner
	Incorporate improvements to address climate-related risks into capital improvement plans.	VPF, DPW, RPD
	Require measures to improve building material durability.	VPF, DCD
	Integrate climate change scenarios into water supply system planning.	VPF, DPW
	Monitor climate impacts on water quality and the associated potential health outcomes, specifically on populations of concern.	VPF, DPW
	Identify and protect vulnerable critical facilities.	VPF, PD,RPD, DPW, S
Strategy 2C	Public Outreach	Lead & Partner
	Work with local businesses to increase their ability to recover after an extreme weather event.	DEDP, SC

## Flooding and Storm Water Management

### Objective 3- Flooding and Stormwater Management.



Plan for flood recovery and long-term flood resilience in the community

Strategy 3A	Address climate change flood risks in storm water management practices	Lead & Partner
<b>Implementation Actions Needed:</b>	Apply modern storm water design methods to future developments that recognize 100 year flow paths and elevate critical facilities with appropriate freeboard.	<b>VPF, DPW</b>
	Increase flood protection elevation for houses and other buildings in flood areas.	<b>VPF, DEDP, DPW</b>
	Implement policies and procedures for post-flood recovery.	<b>VPF, DPW, FD</b>
	Develop a stormwater master plan to identify needed drainage improvements.	<b>VPF, DPW</b>
	Integrate green infrastructure measures into development requirements for public and private projects.	<b>VPF, DPW, DEDP</b>

## Ecosystems and Open Spaces

### Objective 4- Ecosystems and Open Spaces



Manage ecosystems and open spaces for resiliency.

Strategy 3A	Preserve habitat and natural areas	Lead & Partner
<b>Implementation Actions Needed:</b>	Preserve and restore the structural complexity and biodiversity of vegetation in wetlands.	<b>VPF, RPD</b>
	Establish open space corridors that are part of a connected regional network.	<b>VPF, RPD</b>
	Increase species diversity in the Village's urban forest by addressing stressors such as invasive species, tolerance to heat, uneven precipitation, and drought.	<b>VPF, RPD, DPW</b>
	Incorporate green infrastructure into Village-owned parks and open space to enhance stormwater management, water quality, habitat, and educational resources.	<b>VPF, RPD, DPW</b>
	Complete the inventory of the Village's urban forest and develop a plan for maintenance and replacement.	<b>VPF, RPD</b>



A photograph of three elderly people walking through a dense field of tall, dry reeds and grasses. In the background, there are trees with some autumn-colored leaves under a cloudy sky. The people are wearing jackets and hats, suggesting cooler weather. One person is in a red jacket, another in a blue jacket, and the third in a pink jacket. They appear to be engaged in a walk or hike.

***"Getting in some walks along the Old Plank and Thorn Creek Nature Preserve trails are always enjoyable, as are treks out into the Central Park Wetlands observation deck and up to the Rail Fan observation platform"***

**-Park Forest Resident**

***"How amazing it was as a kid to have such easy access to a park. My friends and I could go on our own and spend the day. Everything was just a bike ride away."***

**-Park Forest Resident**

***"Sidewalks are in deplorable condition where I live and it's a hardship on the seniors in the neighborhood trying to stay active."***

**-Park Forest Resident**



# Monitoring Plan

Over the coming months, Park Forest Staff and the Steering Committee will engage with community members, businesses, institutions, and other stakeholders through a Climate Action and Resilience Plan implementation process. This process will help to identify specific metrics related to the Objectives, Strategies, and Actions recommended in the Plan. A preliminary list of suggested metrics is included in Appendix V.

Establishing a monitoring process enables Park Forest to track the impacts of the actions included in the Plan and compare estimated impacts to what is actually achieved in terms of energy savings, renewable energy production, and GHG emissions reduction. Assessing the implementation status of the strategies and actions will allow the Village to determine whether the action is performing well and to identify corrective measures. This process is also an opportunity to understand barriers to implementation and identify best practices or new opportunities for moving forward.

Action reports are to occur every two years and will include status updates on the strategies in the Plan, and report the implementation status (completed, in progress, on hold) of key actions and update their impacts. The full monitoring report will occur every five years, and will include the components in the action report, as well as an updated community and municipal GHG inventory. This will help Park Forest track its GHG emissions reduction progress. With the approval of this *Climate Action and Resilience Plan* in early 2019, the first monitoring action report will be due in early 2021. The updated GHG inventories will be for 2020 and 2025.

# APPENDIX I: *Growing Green: Park Forest Sustainability Plan Accomplishments*

Since adoption of the *Growing Green: Park Forest Sustainability Plan* in May 2012, the Village has been actively involved in programs and projects that will enhance the way that people live and work more sustainably. Following is a listing of many of these activities. Each section relates to a specific chapter in the *Sustainability Plan*.

Actions noted in blue will enhance GHG reduction, while actions noted in green will enhance resilience.

## Development Patterns

- The Unified Development Ordinance was adopted on December 11, 2017. The UDO addresses strategies for Development Patterns outlined in the Sustainability Plan. For example, the UDO created a mixed use zoning district and an urban residential zoning district, it permits accessory dwelling units in single family zoning districts, and it establishes design requirements to enhance walkability and bike-ability.

## Transportation and Mobility

- 2017 – Bicycle Signage and Directional Signs installed along all bike routes included in the *Bicycle and Pedestrian Plan*.
- The Village Board adopted the *Bicycle and Pedestrian Plan* in December 2014.
- 2013 – An electric vehicle charging station with two hookups was installed in the parking lot of Village Hall to demonstrate the Village's commitment to new, clean technologies that will reduce the amount of greenhouse gasses emitted in the community. Use of the EV station is free. Two electric vehicle charging stations are also located at the Walgreens store at Orchard Dr/Lakewood Blvd.
- 2017 – The Village completed installation of a sidewalk along US30/Lincoln Highway from Indiana Street to Orchard Drive as part of an Illinois Transportation Enhancement Program grant. In 2018, the Village applied, and received preliminary approval, for RTA Access to Transit/CMAQ funding to complete the sidewalk from Orchard Drive to the Village's eastern limit.
- The Village Board adopted a Complete Streets Policy in 2015. Smart Growth America recognized the Village's Policy by ranking it the 3<sup>rd</sup> best policy adopted in 2015.
- The UDO includes requirements for
  - Bicycle parking at new developments (non-single family residential).
  - Better design of new development to address walkability (build-to lines, location of parking lots on rear and interior side yards, landscape buffers for parking lots, wider sidewalks, etc).
- 2017 – CMAQ funding was used to install bikeway pavement marking along Federal Aid qualified routes consistent with *Bike and Pedestrian Plan*. This project added 12.8 miles of sharrow markings along Village roads.
- 2017 – Five pedestrian cut-throughs were improved to install 10 foot wide multi-use paths, (replaced five foot paths), new lighting, and ADA connections at streets.

## Open Space and Ecosystems

- FY2010 – the Village adopted the EAB (Emerald Ash Borer) Readiness Plan, which calls for a deliberate increase in species diversity in the Village's urban forest
- Since 2011, the Village has planted 248 new trees in parks and parkways to replace trees lost

to the EAB.

- 2017 – A new pocket park was installed in the Eastgate neighborhood. The park was requested by neighborhood residents as a way to use lots where blighted houses have been demolished.
- 2017 – 2018 – The Village installed new play equipment in Murphy Park, which serves the housing cooperatives. Swings are from a traditional manufacturer, but all other equipment was created from locust trees harvested from the Village's Hidden Meadows property. The playground is a departure from what is understood as a "traditional playground" and incorporates evolving concepts of natural play.
- 2017-2018 – Village Green was expanded into the area formerly occupied by the Marshall Fields department store. The new park creates an expanded destination park for DownTown Village activities. It is also designed to hold stormwater from a 100 year storm.
- The Unified Development Ordinance contains requirements for using native landscaping and planting new trees in new developments and redevelopment projects.
- In each of the summers of 2016- 2018, the Village has benefitted from the volunteer efforts of a team of young adults from the AmeriCorps National Civilian Conservation Corps (NCCC). Work conducted by the NCCC Teams which relates to the Open Space and Ecosystems element of the *Sustainability Plan* included:
  - Painted over 500 storm sewer inlets with environmental messages and distributed 1,000 door hangers with environmental messages.
  - Cut down about 250 feet of invasive trees in about three acres of the Central Park wetlands.
  - Cleared 1,833 linear feet of drainage way in Central Park of woody vegetation in Central Park.
  - Cut down about 200 feet of brush and small trees along the trail in Indiana Park.
  - Removed weeds, trees, and other undesirable species of plants at the Fire Training site.
  - At the St. Irenaeus Catholic Church Community Garden, assisted with transplanting, weeding and cultivation of the vegetable beds, and harvested eight half-bushels of wax beans and five half-bushels of blueberries.
  - Cleared thousands of feet of tree limbs and small trees back of the walking paths throughout the Central Park Wetlands and the Winnebago Park drainage-way.
  - Cleared ½ mile of tree limbs and small trees along the Old Plank Road Trail.
  - Conducted Village tree inventory of 648 trees, including data on species, condition, and hazard.
  - Cleared 2,640 feet of trail at the Thorn Creek Nature Center and installed sign posts and benches along the trail. Also, corrected 13 water drainage bars and reduced erosion for ¼ mile of a heavily used trail. Re-trenched and cleared vegetation around 25 water drainage bars on a mile of the Woodland Trail, and realigned and cleared a ¼ mile damaged section of this trail. Cleared and widened the Nature Center loop trail for approximately ½ mile.
- In 2014-2016, the Village partnered with the University of Illinois Extension to provide a series of gardening educational sessions with the purpose of increasing resident knowledge and building capacity to expand the community garden program. The program has been successful with 15 to 25 residents attending each session. In 2017, the Environment Commission took over the Gardening Series and decided to hold all classes in the Wetland Discovery Center. The program continued through 2018 and the Commission has plans to continue into 2019.

## Waste

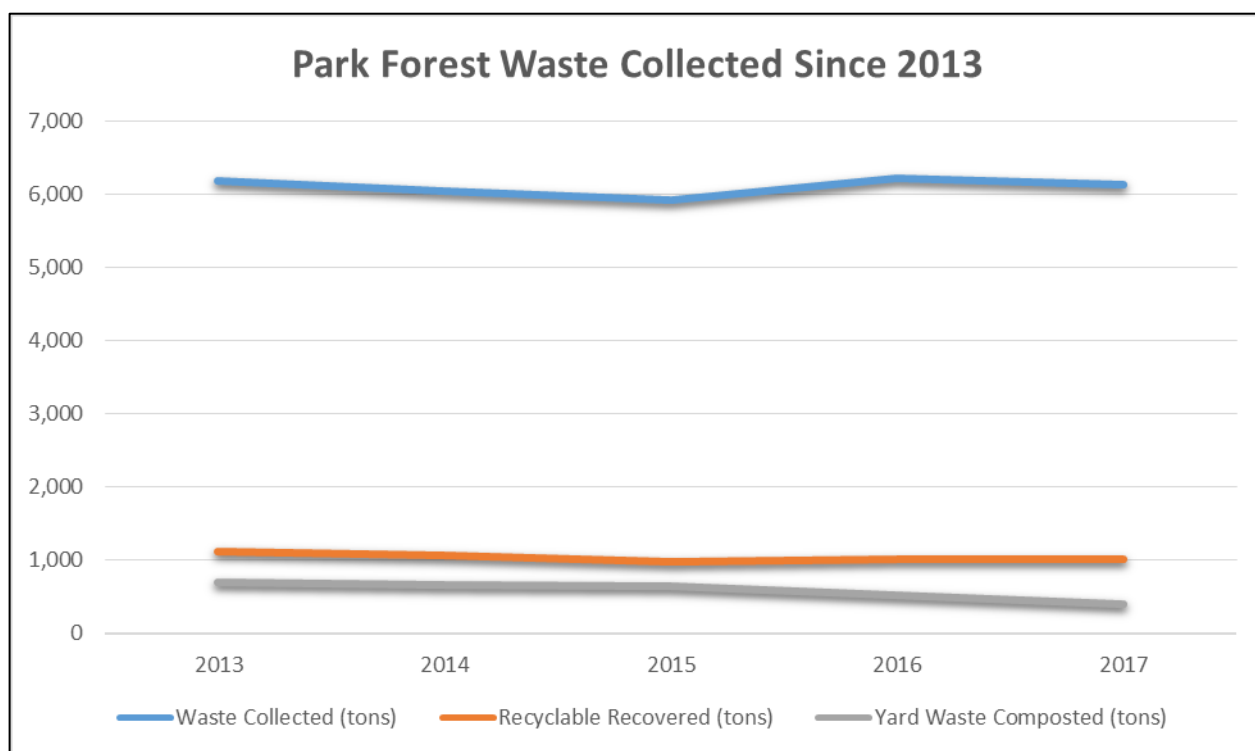
- The Village is the recipient of two grants from the IHDA Blight Reduction Program (BRP). This program funded the acquisition of 22 vacant/blighted houses, deconstruction, and maintenance and "greening" of the lots until a final use is identified. As of November 2018, 13 of these houses have been deconstructed by the Cook County Sheriff's Office RENEW program.

- In 2016-2018, the Village has conducted a Growing Green Recycle Fest, which took the materials noted in the table below.

Item	2018	2017	2016
Paper Shredding	3,000 lbs.	6,000 lbs.	12,000 lbs.
Electronics	13,000 lbs.	2,432 lbs. (not TVs)	8,783 lbs.
TV	208	169/10,663 lbs.	232
Eye glasses	240	70	300
Clothes and shoes	1,316 lbs.	412 lbs. clothing, 60 lbs. shoes + 830 pairs shoes	2,500 pairs of shoes
Plastic bags	15 lbs.	Two 50 gallon trash bags	
Medication	36 lbs.	200 bottles	
Batteries			500 lbs.
Books	2655 books collected (2,400 donated to individual community members, 1,220 picked up by Books for Cause)		

- For five years, the Village partnered with the Keeling Family Foundation's VetTech organization to maintain a large bin in the Village Hall lobby to collect electronics waste from residents. This organization trains and prepares Veterans for the IT career fields while simultaneously collecting and recycling/repurposing E-waste. Starting in 2018, weekly curbside electronics pick-up started for single family homes.
- The Village partnered with Will County to host two tire recycling events in the Downtown, in 2012 and 2014. These events were designed to collect used tires from municipalities, counties and other public agencies in the south suburban area. The 2012 event collected approximately 5,000 tires and the 2014 event collected 6,000 tires.
- In 2012, the Village initiated the waste reduction practice of using reusable dishware, flatware, and glassware for Village Board meetings, staff events, and general daily use.
- Recycling bins have been distributed to all Village facilities and are used during Village functions, both indoor and outdoor.
- The Village's curbside waste and recycling program (single family residential) has generated the following volumes from 2013-2017. The Village's waste management contractor has indicated that the decrease in recyclables may be due, at least in part, to the decrease in newspaper use. (Source: Homewood Disposal)

Year	Waste Collected (tons)	Recyclables Recovered (tons)	Yard Waste Composted (tons)
2013	6,182	1,111	705
2014	6,044	1,060	666
2015	5,920	972	653
2016	6,222	1,014	530
2017	6,132	1,006	406



## Water and Wastewater

- In 2016, Public Works partnered with the Metropolitan Water Reclamation District of Chicago to supply free rain barrels to Park Forest residents within Cook County. The Village distributed 1,173 rain barrels to 418 Cook County residents. In 2017, the Village implemented a similar program for Park Forest residents in Will County with 196 (55 gallon) rain barrels distributed. Based on a one-inch rain event, these rain barrels collect the equivalent of 75,295 gallons of water with just one use.
- In 2016-2017 the Village is replacing four miles of water mains in various locations throughout the Village. This project is funded by a \$5 million low interest loan from the Illinois EPA.
- In 2018, the Village received a grant from the US Fish and Wildlife Foundation to design and install large scale rain gardens in three Village parks – Shabbona, Marquette, and Onarga. The rain gardens will be installed in spring 2019.

Name of Project	Description
2014 Water Main Lining	Approximately 1,350 LF of 6" water main was lined.
2015 Storm Sewer Repairs	Replace 16 LF of 24" storm sewer, replace 160 LF of 36" storm sewer, replace 100 LF of 48" storm sewer and replace 30 LF of 42" storm sewer.
Thorn Creek Tributary D Storm Sewer Rehab	Install 2,360 LF of 54" CIPP Liner in the storm sewer.
Thorn Creek Subdivision Drainage Imp.	Remove 135 LF of 36" CMP. Install 76 LF of 24" and 30" HDPE , and 118 LF of 48" RCP. Remove 25 LF of dual 36" culvert and replace with 4'x10' box culvert.
2016 Water Main Improvements	Replaced approximately 18,700 LF of 8" water main and 5,600 LF of 12" water main.



Standpipe Chlorine Storage Building	The chlorine storage building at the Tamarack standpipe was replaced. This updates the chlorine feed and monitoring to the water at the standpipe.
2018 Street and Water Main Improvements	Replace 1,100 LF of 6" water main with 8" water main.
2018 Water Main Booster Extension	Install approximately 5,000 LF of new 12" water main and a new booster station.

- The Unified Development Ordinance will update the Village's stormwater management requirements to better incorporate best management practices. The UDO will be adopted in early 2019.
- In 2013, two Elkay retrofit water bottle filling stations were added to the water fountains in Village Hall, one in the lobby and one on the second floor employee area. A sanitary, no-touch sensor activates the filtered and cooled water, and a green ticker counts the quantity of 12 oz. bottles diverted from the landfill when guests reuse their water bottle rather than purchasing new. [To date, nearly 30,000 water bottles have been kept out of the landfill.](#)
- Public Works completed both phases of work for a \$500,000 USEPA grant for sanitary sewer improvements. A majority of this work consisted of lining sanitary sewers located in the back and side yards of residences and businesses as well as manhole rehab. This effort rehabilitates the system before failure and a more costly repair that would entail accessibility restrictions.

Name of Project	Description
2014 USEPA Sanitary Sewer Lining Project	The following sizes of sanitary main were lined: 6" - 201 LF, 8" – 2,539 LF, 12" – 1,405 LF, 15" – 2,022 LF.
2015 Decanting and Wash Rack	Installed a wash area at the Public Works yard to wash down vehicles so that the water would be diverted to the sanitary sewer.
Niagara and D2 Sewer	Replace 267 LF of 8" san. sewer by open cut and replace 288 LF of san. sewer by pipe bursting.
Oswego Sewer Repair	Replace 235 LF of 8" san. sewer.
Sangamon Lift Station	Replace old lift station with new wet well, valve vault and control cabinets. New lift station powered by natural gas.

## Energy

- The Village adopted the Unified Development Ordinance in 2017, which allows small wind energy collection systems and solar energy collection systems to be built in all zoning districts based on established standards. Solar farms are permitted in the manufacturing zoning district by right, and in all other zoning districts with a Special Use Permit.
- Three Park Forest businesses have taken advantage of ComEd's energy audit and improvement program to have new energy efficient lighting installed in their facilities.
- In May of 2013 the Park Forest Village Hall, Police Station/LaRabida, Tennis & Health Club and Freedom Hall received lighting updates. Outdated T-12 florescent lamps and fixtures were replaced with energy efficient T-8 lamps & ballasts and other green lighting technologies. Fixtures in Village Hall were reduced from three to two bulbs, generating the same amount of light by adding reflective material. Exit signs were retrofitted to include LED bulbs that are not only more energy efficient but reduce the need to replace them as often. The total project cost was \$76,810 and the Village received a grant of over \$61,246 from Illinois Clean Energy and Illinois Department of Commerce & Economic Opportunity. The cost to the Village was \$15,564. In this program the amount awarded is tied directly to the annual savings in kilowatts as a result of the program.

- Additionally in 2018, the Village upgraded the interior and exterior lighting systems at Freedom Hall and the DPW Yard. At Freedom Hall 114 interior fixtures and 14 exterior features were upgraded. At DPW Yard 102 interior fixtures and 22 exterior fixtures were upgraded.
- The thermostat systems in Village Hall and the Park Forest Public Library were replaced in 2014 in order to institute a more efficient use of natural gas. This project's goals are to maintain a consistent temperature throughout the buildings, increase the comfort of all building occupants, and balance the HVAC system so no one unit is working harder than another, thereby extending the life expectancy of the units. Village staff is able to manage the system remotely, saving vehicle miles traveled (VMT) and time. The software used by staff is very user friendly and there have been multiple staff trained to use it. The project costs for both buildings were \$16,800 and after grants in the amount of \$12,260 the remaining costs to the Village were \$4,540.
- Street and parking lot lighting replacements to install LED lights since 2016:

Year	Number of lights Converted to LED	Locations
2016	127 (95 Street Lights & 32 Outside Lights)	Indianwood, Merrimac, Manitowac, Marquette, Meota and the water plant
2017	131 (Street Lights)	Orchard Dr (US 30 to Lakewood Blvd), Forest/Norwood/Westwood (Western Ave to Indianwood Blvd), Indianwood Blvd (Western Ave to Forest Blvd), Main St ( Western Ave to Forest Blvd), and all of Tamarack St.
2018	343 (19 Street lights, 160 Fixtures, 36 Parking Lot Lights, 128 Fixtures)	North and South Streets, DPW and Parks Yard, Matteson Metra Lot, Freedom Hall
Total	601	

## Greenhouse Gases

- In 2015, Park Forest as a community generated an estimated 192,076 metric tons of CO2 equivalent (CO2e) emissions. [Park Forest community-wide GHG emissions decreased by 3.8 percent from 2010 to 2015.](#) During this period, the Village provided educational materials to Village residents and conducted a series of ComEd “house parties” to introduce the community to energy efficiency measures and incentives available to residents.

## Green Economy

- The Economic Development and Planning Staff partnered with the Urban Sustainability Directors Network (USDN) and the International Economic Development Council (IEDC) on a USDN Innovation Fund project to develop stronger ties between sustainability and economic development professionals. A convening of 40 professionals took place prior to the September 2016 IEDC annual conference.

## Local Food Systems

- In 2016 there were four active community gardens in the Village, three of which are planted and maintained by community organizations.
- In the summers of 2016-2018, the Village benefitted from the volunteer efforts of nine young adults from the AmeriCorps National Civilian Conservation Corps (NCCC). Work conducted by the NCCC Team which relates to the Local Food Systems element of the Sustainability Plan included:

- Built a combination rain harvester/tool shed at the Neola Street community garden (this garden is planted and maintained by the South Suburban Special Recreation Association and local residents).
- Streamlined the delivery process at the St. Irenaeus Food Pantry in suggesting new procedures to get food to correct shelves. Unloaded deliveries and stocked over 65,000 pounds of food. Helped the St. Irenaeus/Catholic Charities Food Pantry respond to 1,239 household requests for food, which translates to 5,300 individuals.
- Assisted at the St. Irenaeus community garden on multiple occasions. Cleared out the yard waste and debris from the compost bins on the east side of the main garden area. Cleared the weeds out an entire corner of the garden which will be planted with native plants. Cleared out a planting area to the south of the rectory and rebuilt the cinder block foundation of a new rain barrel collection array on the east side of the building. Assisted with transplanting, weeding, and cultivation of vegetable beds, and harvested eight half-bushels of wax beans and five half-bushels of blueberries.
- Also at the St. Irenaeus community garden, worked with volunteers from a halfway house program, members of the parish and SAFE (Sustainable Agriculture Food Exchange).
- In 2015, the AmeriCorps VISTA program awarded Park Forest a VISTA volunteer to work on anti-hunger related programs. The VISTA volunteer in Park Forest worked to improve access to nutritious food options by enhancing awareness of the availability of utilization of benefits at farmers' markets; support local, community gardening and agriculture efforts; and provide nutrition education information and opportunities for low-income residents. The VISTA volunteer also developed a community garden logo and worked with the St. Irenaeus food pantry on several projects.
- Since 2015, the Village has partnered with *Haunts Against Hunger* to conduct its Safe Halloween activities. The event includes a haunted house, entrance to which required a monetary or food donation for the local Township food banks. Collections over the past four years are noted below.

Items Collected	2015	2016	2017	2018
Food Items	2908	7229	5176	581
Dollars	\$749.80	\$4000	\$3188	\$4560

- In 2013, the Park Forest Farmers Market began to offer the opportunity for customers to use SNAP or Link cards to purchase fresh fruits and vegetables through an electronic benefit transfer (EBT) system. This program enables the Village to begin to address health inequities in regards to food access. The Village received a Farmers Market SNAP support grant totaling \$16,975, distributed to the Village from September 30, 2016-September 30, 2018. The grant expands the use of EBT/LINK card utilization at area Farmers Markets by local low-income families. In 2018, it is estimated that over 7,000 customers visited and shopped at the new location.
- Starting in 2016, the Village began to incorporated an incentive program at the Farmers Market to encourage more low-income SNAP recipients to shop for healthier foods for their families. The *Double Value Bucks Program* solicited donations from local businesses to support this effort to address local barriers to healthy food access. For each \$20 per week that a SNAP recipient spends, they are eligible to receive \$40 worth of fresh fruits and vegetables.
- The Health Department has applied for an additional grant called, *LINK UP ILLINOIS Double Value Coupon Grant*, available to Illinois Farmers Markets to help increase the access to affordable fresh and healthy foods for low-income communities by giving customers more buying power. If this grant is approved, the Village will have \$12,500 to help extend the DVBP until 2017.

## Municipal Policies and Practices

- The Village's Five-Year Capital Plan identifies all projects that support the Sustainability Plan.
- The Communications Director continues to reduce paper usage by making more processes digital, when and if possible. Paperless registration has been available for the Village-wide Garage Sale, home buyer's workshops in Park Forest, for the Park Forest Civic Leadership Academy, and for all boards and commissions. When possible, messaging/forms/additional fliers are included on the reverse side of print pieces included in water bills to reduce paper and print costs.
- The Fire Department continues to look at expanding "Green Initiatives" into the physical plant, vehicles, and operations. The Fire Department continues to move to a paperless pre-planning process eliminating large binders and replacing them with re-usable thumb data drives. Efforts at going paperless within Fire Prevention are being made by increasing e-mail reporting capabilities. Paperless EMS and Fire reporting have been implemented via SouthCom Dispatch and a new Fire Records Management System. [The Fire Department is continuing development and refinement of an anti-idling and sustainability policy to reduce the use of fossil fuels and the generation of exhaust gases. A solar panel was added to the Department's newest ambulance to allow the maintenance of electrical equipment without the vehicle needing to be running and two such panels are being placed on the squad/pumper now on order as a replacement for Engine 56.](#)
- The STAR Community Rating System is the first national framework to measure sustainability at the city or county scale and provide a tracking system to help local government organizations measure progress towards achieving community sustainability goals. Park Forest was selected to participate in the inaugural Leadership STAR Communities Program. The Village submitted an application for STAR certification in January 2015 and was awarded recognition as a 3 Star Community.
- The Village currently has a part-time Sustainability Coordinator on staff and a Greenest Region Corps (GRCorps) Member from the Metropolitan Mayor's Caucus. The GRCorps member will focus on completing the *Climate Action and Resiliency Plan* and the application for STAR Communities. The GRCorps member began work for the Village in October 2018 and will complete their assignment in August 2019.

## Education

- The Communications Director supports the triple bottom line concept of fiscal and service sustainable practices of the Village by incorporating sustainable tips and reminders in as many forms of communication as possible.
- The October 2015 issue of the Illinois Municipal Magazine included an article on the Village's STAR Communities Award. Exposure from the article's printing is hoped to gain more attention and awareness that may lead to more contacts being made who recognize the Village as a leader in sustainability.

## Community Health and Wellness

- In 2015, the Village partnered with the South Suburban Mayors and Managers Association (SSMMA), the Cook County Department of Public Health (CCDPH), the American Lung Association, and the Respiratory Health Association to promote a tobacco-free community health initiative in the community. To this end, the Village coordinated a community health initiative to limit involuntary environmental exposure to second-hand smoke. A \$10,000 grant was received from the American Lung Association for staff training, classroom participant materials, and outreach visits. The outreach visits were aimed at encouraging multifamily property owners to become smoke-free housing units. Overall, two properties in the Village made the transition: Victory Center of Park Forest and Juniper Towers. The Village also enrolled

as an Illinois Quit-Line referral site to assist anyone attempting to quit smoking.

- The Health Department participated in various community health events in 2015 to promote health and wellness by providing blood pressure, glucose screenings and general educational talks/presentations. Venues included Faith United Protestant Church, St. Irenaeus Church, Youth Day, Wright Family and Veterans Fitness Fest, Governors State University Daycare Parent's Health Fair, Back to School Health Fair in Ford Heights.
- The Department partnered with the Senior Commission to coordinate a community transportation presentation for disabled, seniors or veteran residents. Transportation vendors on hand included PACE, RTA, Rich Township, and Bloom Township.
- In March 2016, the Health Department and the Senior Commission hosted a community safety seminar to address safety inside the home, safety from fraudulent scams, and safety from domestic violence. The South Suburban Family Shelter, and the Park Forest Police and Fire Departments participated.
- In fall 2016, the Health Department and the Senior Commission sponsored three community events: a Free Legal Seminar for Seniors, a De-Stress Seminar with advice on recognizing symptoms of Heart Attack or Stroke, and a Care Giver's Resource Seminar for residents caring for a family member with Alzheimer's or Dementia.
- In 2015, the Health Department staff received a Facilitators Training through Age Options and taught two six-week sessions of "*Take Charge of Your Health*" classes at the Rich Township Senior Center. This was an empowering class to mentor seniors with self-management of chronic illnesses such as Hypertension, Diabetes, Arthritis, Heart Disease, or Cancer.
- In 2014, the Park Forest Health Department renewed a long term contract with Rich Township Senior Center to continue to provide monthly health screening services at the Shirley Green Senior Center and four of the area Rich Township senior buildings including Garden House, Victory Centre of Park Forest, Juniper Towers, and Cedar Ridge of Richton Park.
- In mid-2018, the Village created the position of Community Health Coordinator. The Coordinator is responsible for working with the residents of the Village's senior buildings to advise on health related matters, acting as Staff liaison to the Senior Commission, managing the Farmers Market, coordinating the work of the environmental health sanitarian, conducting health inspections when needed, and other tasks to be developed.

## Housing Diversity

- In 2015, the SSMMA received a Local Technical Assistance project from CMAP to work with the Villages of Park Forest, Hazel Crest, Richton Park, and Lynwood on new *Homes for a Changing Region* plans. In 2018, the Village adopted an updated *Comprehensive Housing Plan* to account for the recommended strategies from the *Homes Plan* that had been implemented, as well as changes in the housing market since the original plan was developed.
- In order to stabilize the Eastgate neighborhood, 82 homes have been demolished/deconstructed in Eastgate with combined funding from a Delta Institute grant, a State CDBG-IKE grant, two Cook County NSP grants, two IHDA Blight Reduction Program (BRP) grants, Village funding, and bank funded demolitions. The Village and the South Suburban Land Bank and Development Authority (SSLBDA) combined own 68 vacant lots in Eastgate.
- The Village has also been active in removing blighted single family structures and obtaining the property deeds in other neighborhoods throughout the Village. Using Cook County, State of Illinois, and IHDA grants, the Village has demolished 30 of these homes in the past 10 years. The Village owns 16 of these vacant lots. In addition, the Village has obtained the deeds to 15 lots that may not be buildable, as they were not developed when the Village was founded.
- The SSLBDA continues to support Park Forest's land development efforts. As of November 2018, the SSLBDA has sold eight single family homes, and four additional homes are for sale. The SSLBDA also owns one commercial property in the Village, which is being marketed for sale.



- The Cook County Land Bank and Development Authority (CCLBDA) has sold six previously vacant, tax delinquent single family homes (as of November 2018) and three additional sales are pending.

## Arts and Culture

- The Village's Cultural Arts Manager is a founding member of the Southland Arts, Municipalities, and Business Alliance (SAMBA). Key goals for the organization include promoting the south suburbs, attracting and welcoming new businesses and artists to the region, fostering creativity and active participation in building community through the cooperative efforts of arts organizations, municipalities and businesses. Since its creation in 2017, SAMBA has conducted regional events to showcase performing arts venues, art galleries, and festivals in the south suburbs.
- Village Staff has formed a Public Arts Committee to plan for new installations of public art in the community. Starting in FY2015, this effort has been funded with a \$10,000 annual allocation of Village general revenue funds. Initial projects have included interpretive signage for two outdoor murals and the Freedom Hall mural, two Street Art Pianos which are used at all outdoor events on the Village Green, annual demonstrations by Chicago Chalk Art Champion, Shaun Hays, and installation of a sculpture in the new Village Green.
- The Cultural Arts Manager continues to spearhead the Village's public art efforts and has worked with staff from multiple departments to develop an arts policy to guide the commissioning of art pieces that reflect the Village's history and position as an "All American City". In 2018, the group recommended to Village officials the formation of a Public Arts Committee/Commission. This team continues to meet regularly to discuss public art projects and to establish standards for commissioning and placing public art works and related nature exhibits around the theme of – "The All-American Village." The staff art team commissioned two pieces of art in 2018. They were the labyrinth and fountain sculpture, which were added to the Village Green.
- The combined FY2016 and FY2017 Village budgets included \$454,000 to expand the Village Green into the area formerly occupied by the Marshal Fields store to create a festival space for the Village. This project started in the spring of 2017 and opened on June 13, 2018. It includes a native planting garden, a labyrinth, a small growth of edible fruit trees, pedestals for future installations of public art, and an expanded Village Green for public seating at outdoor music concerts and other events.

# APPENDIX II: Acronyms and Definitions

## ACRONYMS

<b>CARP</b>	Climate Action and Resilience Plan
<b>GRC2</b>	Greenest Region Compact 2
<b>EPA</b>	Environmental Protection Agency
<b>FEMA</b>	Federal Emergency Management Agency
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>MEPI</b>	Midwest Economic Policy Institute
<b>MRCC</b>	Midwestern Regional Climate Center
<b>MT</b>	Metric Tons
<b>NOAA</b>	National Oceanic and Atmosphere Administration
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>WRI</b>	World Resource Institute

## DEFINITIONS

**100 year, 24 hour storm:** Calculated to be the level of storm (within a 24-hour period) expected to be equaled or exceeded every 100 years on average or a storm that has a 1 percent chance of being equaled or exceeded in any single year. This standard is typically used as a basis for flood protection (Appendix A: Primary Impacts of Climate Change in the Chicago Region, Chicago Metropolitan Agency for Planning, June 2013)

**303(d) 1 list:** A state's list of impaired and threatened waters (e.g. stream/river segments, lakes). States are required to submit their list for EPA approval every two years. For each water on the list, the state identifies the pollutant causing the impairment, when known. In addition, the state assigns a priority for development of Total Maximum Daily Loads (TMDL) based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors (40 C.F.R. §130.7(b)(4)). (<https://www.epa.gov/tmdl/overview-listing-impaired-waters-under-cwa-section-303d>)

**Air Emissions:** Discharge of pollutants into the atmosphere from stationary sources such as smokestacks, and other vents, and from surface areas of commercial or industrial facilities and mobile sources, for example, motor vehicles, locomotives, and aircraft. (<https://www.eea.europa.eu/help/glossary/eea-glossary/air-emission>)

**Brackish Water:** Water that has a greater dissolved-solids content than occurs in freshwater, but not as much as seawater (35,000 milligrams per liter). The term "saline" commonly refers to any water having dissolved-solids concentration greater than 1,000 mg/L and includes the brackish concentration range. (<https://water.usgs.gov/ogw/gwrp/brackishgw/brackish.html>)

**Building Resilience Against Climate Effects (BRACE):** A five-step process that allows health officials to develop strategies and programs to help communities prepare for the health effects of climate change (<https://www.cdc.gov/climateandhealth/BRACE.htm>)

**Built Environment:** The physical parts of where we live and work (e.g., homes, buildings, streets, open spaces, and infrastructure). (<https://www.cdc.gov/nceh/publications/factsheets/impactofthebuiltenvironmentonhealth.pdf>)

**Business as Usual:** Unchanged behavior. Despite difficulties or disturbances the status quo is attempted to be maintained.

**C40 Climate Leadership Group:** Around the world, C40 Cities connects 96 of the world's greatest cities to take bold climate action, leading the way towards a healthier and more sustainable future. Representing 700+ million citizens and one quarter of the global economy, mayors of the C40 cities are committed to delivering on the most ambitious goals of the Paris Agreement at the local level, as well as to cleaning the air we breathe. (<https://www.c40.org/about>)

**Carbon Dioxide (CO<sub>2</sub>) Emission:** Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees, and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. (<https://www.epa.gov/ghgemissions/overview-greenhouse-gases>)

**Chicago Climate Charter:** A document organized by the City of Chicago and signed by 55 mayors during the North American Climate Summit held in Chicago in December 2017. The charter was written in light of President Trump pulling out of the Paris Agreement in 2017. The commitments in the charter include reduction in GHGs, tracking GHGs, and advocating for more aggressive action on climate change. (<https://www.cityofchicago.org/content/dam/city/depts/mayor/Press%20Room/Press%20Releases/2017/December/ChicagoClimateCharter.pdf>)

**Chlorofluorocarbons (CFCs):** Manufactured substances used as coolants and computer-chip cleaners. When these products break down they destroy stratospheric ozone, creating the Antarctic Ozone Hole in the Southern Hemisphere spring (Northern Hemisphere autumn). While no longer in use, their long lifetime will lead to a very slow removal from the atmosphere. (<https://forecast.weather.gov/glossary.php?letter=c>)

**Climate Adaptation Guidebook for Municipalities in the Chicago Region:** A guide meant to aid municipalities in the Chicago region that are interested in adapting their planning and investment decisions to a changing climate. Essentially, this means improving resilience to future weather impacts. The central reason for considering climate change is that, in many instances, it will be cheaper and less disruptive to plan for anticipated conditions than to retrofit or rebuild later. (<https://www.cmap.illinois.gov/documents/10180/14193/FY13-0119%20Climate%20Adaptation%20toolkit.pdf/fa5e3867-8278-4867-841a-aad4e090847a>)

**Climate Vulnerability Readiness:** The state of preparedness of an area or region in regards to susceptibilities brought on by climate change.

**Critical Infrastructure:** Assets, systems, and networks, whether physical or virtual, which are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof. (<https://www.dhs.gov/critical-infrastructure-sectors>)

**Criteria Air Pollutants:** Six of the most common air pollutants are carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide. These six common air pollutants are considered criteria air pollutants due to their widespread presence. Due to this, the EPA has created national ambient air quality standards for these six pollutants, which are then used to help protect public

health.  
([https://www.epa.gov/sites/production/files/2015-10/documents/ace3\\_criteria\\_air\\_pollutants.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/ace3_criteria_air_pollutants.pdf))

**Drought:** An extended period of months or years when a region notes a deficiency in its water supply whether surface or underground water; based on the Palmer Drought Severity Index, when the index is less than zero (Appendix A: Primary Impacts of Climate Change in the Chicago Region, Chicago Metropolitan Agency for Planning, June 2013)

**Embodied Energy:** the total amount of energy required to create a building component or an entire building. This includes raw materials extraction, transportation, manufacturing, and the assembling energy once at the building site. The summation is completed using a life cycle analysis.

**Environmental Justice Screen Report:** In order to better meet the Agency's responsibilities related to the protection of public health and the environment, EPA has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports. (<https://www.epa.gov/ejscreen>)

**Environmental Stress:** Cumulative demands or threats placed on an organism, which can create unlivable circumstances when they reach a point where the organism can no longer respond to the stressors.

**Extreme Heat Events:** The U.S. Environmental Protection Agency defines extreme heat events as "periods of summertime weather that are substantially hotter and/or more humid than typical for a given location at that time of year. (<https://www.cdc.gov/climateandhealth/pubs/ClimateChangeandExtremeHeatEvents.pdf>)

**Extreme Heat:** Summertime temperatures that are much hotter and/or humid than average. Because some places are hotter than others, this depends on what's considered average for a particular location at that time of year. Humid and muggy conditions can make it seem hotter than it really is. ([https://www.cdc.gov/disasters/extremeheat/heat\\_guide.html](https://www.cdc.gov/disasters/extremeheat/heat_guide.html))

**Extreme Storm Events:** Also known as Extreme Weather Events. They can include hurricanes, heat waves, drought, or tornados.

**Flood Insurance Rate Maps (FIRMs):** FIRMs are the official maps on which the Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Area (SFHA). (Cook County Multi-Jurisdictional Hazard Mitigation Plan, 2014)

**Flood Insurance Studies (FIS):** A compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables. (<https://www.fema.gov/flood-insurance-study>)

**Flooding Readiness:** The state of preparedness prior to a flooding event.

**Fugitive Emissions:** Fugitive emissions are defined as uncontrolled releases of gases from industrial activities. This is compared to venting emissions or flaring emissions, which are controlled releases of gas into the atmosphere. In the case of fossil fuel industries, fugitive emissions include releases resulting from the production, processing, transmission, storage, and use of solid, liquid, or gaseous fuels. (<https://www.canada.ca/en/environment-climate-change/services/climate-change/publications/technical-guidance-reporting-greenhouse-gas/chapter-4.html>)

**Global Warming Potential (GWP):** This is the measure of GHGs ability to retain additional energy in the Earth's atmosphere relative to CO<sub>2</sub>. CO<sub>2</sub> emissions have a GWP of 1. Therefore, the higher the GWP of a gas the more that gas warms the earth compared to CO<sub>2</sub>. This value helps policy makers and analysts make comparisons of gases using a standardized metric.

**Gray Infrastructure:** Infrastructure designed to move urban stormwater away from the built environment and includes curbs, gutters, drains, piping, and collection systems. Generally, traditional gray infrastructure collects and conveys stormwater from impervious surfaces, such as roadways, parking lots, and rooftops, into a series of piping that ultimately discharges untreated stormwater into a local water body. (<https://www.epa.gov/G3/why-you-should-consider-green-stormwater-infrastructure-your-community>)

**Green Infrastructure:** Infrastructure designed to mimic nature and capture rainwater where it falls. Green infrastructure reduces and treats stormwater at its source while also providing multiple community benefits such as, reducing localized flooding, improving community aesthetics, encouraging more neighborhood socialization, improving economic health by increasing property values and providing jobs opportunities for small businesses, decreasing the economic and community impacts of flooding, which delivers environmental, social, and economic benefits. (<https://www.epa.gov/G3/why-you-should-consider-green-stormwater-infrastructure-your-community>)

**Greenest Region Compact 2:** developed by the Metropolitan Mayors Caucus, this document provides a template of a sustainability plan to align the work of diverse communities and achieve greater regional impacts. (<http://mayorscaucus.org/wp-content/uploads/2014/06/GRC2-short-summary.pdf>)

**Greenhouse Gases (GHG):** Gases that trap heat in the atmosphere are called greenhouse gases. (<https://www.epa.gov/ghgemissions/overview-greenhouse-gases>)

**Ground-level Ozone:** Tropospheric, or ground level ozone, is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC). This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant because of its effects on people and the environment, and it is the main ingredient in "smog." (<https://www.epa.gov/ozone-pollution/basic-information-about-ozone>)

**Healthy Food Source:** A grocery store, community garden, or farmer's market which provides affordable and nutritious foods.

**Heat Wave:** A period of abnormally and uncomfortably hot and unusually humid weather. Typically a heat wave lasts two or more days. (<https://forecast.weather.gov/glossary.php?word=heat%20wave>)

**Intermodal Transportation:** the use of many types of transportation (e.g. ship, rail, and truck) without the need to handle the freight between changes of the type or mode of transportation.

**International Council on Local Environmental Initiatives (ICLEI):** A global network of over 1,500 cities, towns, and regions committed to building a sustainable future.

**Invasive Species:** (1) Non-native (or alien) to the ecosystem under consideration and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes). Human actions are the primary means of invasive species introductions. (<https://www.invasivespeciesinfo.gov/whatis.shtml>)



**Methane (CH<sub>4</sub>):** Human activities emitting methane include leaks from natural gas systems and the raising of livestock. Methane is also emitted by natural sources such as natural wetlands. Natural processes in soil and chemical reactions in the atmosphere help remove CH<sub>4</sub> from the atmosphere. (<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide>)

**Metric Tons of Carbon Dioxide Equivalent (MT - CO<sub>2</sub>e or CO<sub>2</sub>e (MT)):** A standardized unit of measure used to make comparisons between various greenhouse gases. The calculation is made using the Global Warming Potential (GWP) of the GHG and the amount of that substance. (GWP x Metric Tons of the Gas)

**Metropolitan Mayors Caucus:** A membership organization of 275 cities, towns, and villages in the Chicago Metropolitan Area, which was founded in 1997 by then Chicago Mayor Richard M. Daley to collaborate on common problems and work toward a common goal of improving the quality of life in the region.

**National Flood Insurance Program's (NFIP) Community Rating System (CRS):** A voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. (<https://www.fema.gov/national-flood-insurance-program-community-rating-system>)

**Nitrous Oxide (N<sub>2</sub>O):** Human activities such as agriculture, fuel combustion, wastewater management, and industrial processes are increasing the amount of N<sub>2</sub>O in the atmosphere. Nitrous oxide is also naturally present in the atmosphere as part of the Earth's nitrogen cycle, and has a variety of natural sources. (<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide>)

**Paris Climate Agreement:** The Paris Agreement is an international agreement with a central aim to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. (<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>)

**Population of Concern:** groups of people who demonstrate relatively greater vulnerability to the health impacts of climate change.

**Process Emissions:** Emission from an industrial process involving chemical or physical reactions other than combustion and where the primary purpose of the industrial process is not energy production.

**Rain Gardens / Native Rain Gardens:** A garden of native shrubs, perennials, and flowers planted in a small depression, which is generally formed on a natural slope. It is designed to temporarily hold and soak in rain water runoff that flows from roofs, driveways, patios, or lawns.

**Resilience:** The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. (<https://www.epa.gov/raine#self>)

**Sanitary Sewer Overflow (SSO):** Occasionally, sanitary sewers will release raw sewage. These types of releases are called sanitary sewer overflows (SSOs). SSOs can contaminate waters resources, causing serious water quality problems, and back-up into homes, causing property damage and threatening public health. (<https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos>)

**Special Flood Hazard Area (based on 100-year flood):** The base floodplain delineated on a Flood Insurance Rate Map. The SFHA is mapped as a Zone A in riverine situations and zone V in coastal

situations. The SFHA may or may not encompass all of a community's flood problems. (Cook County Multi-Jurisdictional Hazard Mitigation Plan, 2014)

**The U.S. Climate Resilience Toolkit:** A website designed to help people find and use tools, information, and subject matter expertise to build climate resilience. The Toolkit offers information from all across the US Federal government in one easy-to-use location. (<https://toolkit.climate.gov/>)

**Urban Heat Island:** Built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality. (<https://www.epa.gov/heat-islands>)

**Very Heavy Precipitation:** Refers to instances during which the amount of rain or snow experienced in a location substantially exceeds what is normal. What constitutes a period of heavy precipitation varies according to location and season. (<https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation>)

**Vulnerability:** The level of exposure or susceptibility an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damage, the vulnerability of one element of the community is often related to the vulnerability of another. (Cook County Multi-Jurisdictional Hazard Mitigation Plan, 2014)

# APPENDIX III: Greenhouse Gas Inventory – The Village of Park Forest 2015

## Introduction

Greenhouse gases (GHG) are atmospheric gases that trap energy in the form of heat from the sun and directly relate to the quality of our atmosphere and climate. Measured greenhouse gases (GHG) include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and three replacements for chlorofluorocarbons (HFCs, PFCs, SF<sub>6</sub>). The first three GHGs are dominant and account for more than 98 percent of GHGs emitted nationally<sup>14</sup>. Carbon dioxide is produced primarily from the burning of fossil fuels, and it is the largest contributor to global warming. Methane is produced by waste decomposition (primarily in landfills). Various GHGs have different global warming potentials, or ability to trap heat in the atmosphere. In order to compare from different sources, greenhouse gases are reported together on a common standardized basis as metric tons of carbon dioxide equivalent (CO<sub>2</sub>e (MT)).

The increase in greenhouse gases is directly related to the potential for accelerated climate change. Research has shown an unequivocal average temperature increase at the Earth's surface by 1.2 - 1.4°F since 1900. In the Upper Midwest, climate change is likely to result in more frequent and intense storm events and heat waves, as well as longer periods of drought. Communities are a significant and growing source of energy consumption and GHG emissions because of the concentration of people and buildings. On a global scale, communities are major players in GHG emissions: they are responsible for more than 70 percent of global energy-related carbon dioxide emissions. Therefore, communities represent the single greatest opportunity for tackling climate change<sup>1</sup>.

Since 2010, the Village of Park Forest has tracked community-wide GHG emissions to measure future progress towards meeting established targets. The Village developed a community-scale GHG emissions inventory for the calendar year 2010 as part of the *Growing Green: Park Forest Sustainability Plan*. The 2010 base-year GHG inventory led the Village to establish a long-term GHG reduction target of 6 percent below 2010 levels by the year 2025. As part of the development of the *Climate Action and Resiliency Plan*, the Village updated the 2010 GHG inventory for the year 2015. This has enabled the Village to document the success of efforts to reduce GHG emissions since adoption of the *Sustainability Plan*.

When Mayor Osteburg signed the *Chicago Climate Charter* in December 2017 at the North American Climate Summit, Park Forest committed to achieve a percent reduction in GHG emissions equal to the United States' nationally determined contribution to the Paris Agreement. In effect, this means that the Village committed to reducing GHG emissions to 26 percent below 2010 levels by the year 2025. The inventory presented within this report updates the community inventory for the 2015 calendar year, discusses trends between the 2010 and 2015 inventory years to show progress over time, and serves as a baseline for the Village's future reduction goals.

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<sup>14</sup> EPA. "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006." 2008

# GHG Emissions Inventory

A GHG emissions inventory is an estimate of GHGs emitted to, or removed from, the atmosphere over a period of time, by documenting the amount and source of greenhouse gas emissions in a given year. The base year inventory serves as a reference point for monitoring future performance and progress and tracking the effectiveness of Village strategies and actions. The Village conducted a GHG inventory at two levels, including a community-wide level and a government operations level. The community-wide GHG inventory tracks GHG emission sources such as energy used by buildings throughout the community, all modes of vehicular transportation used in the community, and solid waste generation, water use, and wastewater treatment from all residents and businesses in the community. The government operations GHG inventory tracks the GHG emissions generated by Village-owned and operated facilities and utilities, including energy used by Village-owned buildings, street lights and traffic signals, the vehicle fleet, employee commute, the water treatment buildings and operations, and process and fugitive emissions.

## Purpose of GHG Emissions Inventories

The GHG emissions inventory provides the Village with an understanding of where GHG emissions are coming from and assists in creating a starting point for developing strategies that can effectively reduce GHG emissions. Both the community-wide and government operations emissions inventory provide the following benefits:

- Identify the greatest sources of GHG emissions within the Village boundaries.
- Understand emission trends over time.
- Track progress in reducing emissions.
- Quantify the benefits of activities that reduce emissions.
- Establish a basis for developing an action plan.
- Revise goals and targets for future reductions.

In addition, the government operations GHG inventory provides the following added benefits:

- Improve the ability to manage energy use and opportunities for cost savings.
- Lead by example, and create a starting point to communicate and share best practices with local businesses and other organizations.
- Increase transparency and accountability for the Village government.

## GHG Inventory Methodology

The Village of Park Forest's previous GHG emission inventory was conducted using the International Council on Local Environmental Initiatives' (ICLEI) Clean Air and Climate Protection (CACP) 2009 software. The current GHG inventory was conducted using ICLEI's ClearPath tool, which allows local governments to complete GHG inventories following the US Community Protocol and the Local Government Operations Protocol.<sup>15</sup>

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<sup>15</sup> ICLEI. *ClearPath online Software*. [https://clearpath.icleiusa.org/community\\_scale/inventory\\_years/](https://clearpath.icleiusa.org/community_scale/inventory_years/)  
Park Forest Climate Action and Resilience Plan

Greenhouse gas emissions calculation, tracking, and management were conducted at the government operations and community scales. Emissions inventories are commonly expressed in metric tons (MT) of carbon dioxide (CO<sub>2</sub>) equivalent per year (CO<sub>2</sub>e (MT) /year), Carbon dioxide equivalent (CO<sub>2</sub>e) is the universal unit for comparing emissions of different GHGs to CO<sub>2</sub> based upon the varying global warming potentials (GWP) of each gas<sup>16</sup>.

The 2015 emissions inventory was prepared using a combination of measured and estimated data, depending on the availability of data. Data were converted into greenhouse gas emissions using relevant emissions factors. Emission factors relate the amounts of greenhouse gases emitted by an action to a set amount of activity under that action. Factor Sets were created for some of the most common types of variables that are used this way: fuel economy and emissions rates for on-road transportation, grid electricity emissions factors, and waste characterization factors.

Emissions were calculated using the following equation:

$$\text{Amount of Activity} \times \text{Emissions Factor} = \text{GHG Emissions for the Action}$$

## Data Sources

Data to conduct the community-wide greenhouse gas emissions inventory were obtained from various sources including the following:

- Community-wide electricity consumption data for 2015 was obtained from ComEd.
- Total on-road vehicle miles traveled (VMT) data was provided by the Center for Neighborhood Technology's "Park Forest Energy and Emissions Profile." This data set is for the year 2015.
- The composition of the vehicle classification on Park Forest's road links was obtained from CMAP's 2015 travel demand model.
- Community-wide natural gas consumption data for 2016 was obtained from Nicor.
- The total volume of water consumption in 2015 was obtained from the Village Water Treatment Plant Superintendent.
- The total volume of solid waste and waste composition was obtained from Homewood Disposal.
- The total volume of wastewater and wastewater treatment was estimated from data provided by the Thorn Creek Basin Sanitary District.

Data to conduct the government operations greenhouse gas emissions inventory were obtained from various sources including the following:

- Electricity and natural gas consumption data for 2015 was obtained from the Village records.
- Streetlights and traffic signals data for 2015 was obtained from ComEd.
- Vehicle Fleet data was obtained from the Department of Public Works.
- Employee commute data obtained from surveying the Village employees, based on total employee VMT and the average fuel economy and emissions rates of their vehicles.
- Records for process & fugitive emissions was obtained from the Recreation and Parks Department.

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<sup>16</sup> IPCC, 2007: *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.



## Detailed Results - Community-wide GHG Inventory

In the base year 2015, Park Forest generated an estimated 192,076 metric tons of CO<sub>2</sub> equivalent emissions. Park Forest's largest single source of GHG emissions was the use of electricity and natural gas in residential buildings (*Figure 1*). With residential energy accounting for 39 percent of CO<sub>2</sub>e emissions, and commercial energy at 16 percent, the community's consumption of energy in buildings (also known as "stationary source emissions") altogether accounted for 55 percent of GHG emissions. Following the building sector, on-road vehicles accounted for 40 percent of the GHGs attributable to the community in 2015. Emissions related to solid waste accounted for 4 percent, while emissions from water and wastewater treatment represented around 1 percent.

### Stationary Source Emissions

Stationary energy-related emissions from buildings accounted for 55 percent of total community emissions in 2015. Since the majority of Park Forest's buildings are residential, residential buildings generate approximately 70 percent of the stationary energy sector emissions, commercial and government buildings provide an additional 28 percent and 2 percent, respectively (*Figure 2*). Stationary energy can also be analyzed according to the type of energy used. As shown in *Figure 3*, emissions from electricity and natural gas consumption in buildings are almost equal.

### Mobile Source Emissions

Transportation sector emissions account for 40 percent of total community emissions. As shown in *Figure 1*, the majority of transportation emissions come from vehicle miles traveled by Park Forest residents. The Village's location at the edge of the metropolitan region and associated auto-dependence results in increased miles traveled by Village residents and, therefore, increased emissions.

### Waste Emissions

Waste emissions include those that may be attributed to solid waste. This sector comprises a relatively small proportion of Park Forest's emissions, at 4 percent. Solid waste includes paper products, yard waste, wood, textile, or other waste that is disposed from various sources. Solid waste emissions are determined by the type and amount of waste disposed. Due to the fact that solid waste is taken to landfills that are outside of the control of municipalities, many emissions models do not mandate that these emissions are included in the total emissions inventory. The amount of solid waste produced, however, is within the control of the municipality.

### Water and Wastewater

Water and wastewater emissions are the least source of GHG emissions at 1 percent. Park Forest is dependent on groundwater for its potable water supply. The Village Water Department operates the Village's water collection, conveyance, and water treatment system. Wastewater is liquid waste that is discharged by commercial, residential, industrial, or institutional sources. Wastewater emissions are determined by the amount of wastewater discharged and the method of wastewater treatment. While the wastewater treatment center is outside of the control of the municipality, the community can reduce the amount of water use, and thereby reduce the amount of wastewater produced.

## Detailed Results - Government GHG Inventory

In the base year 2015 an estimated 5,896 metric tons of CO<sub>2</sub> equivalent emissions were released through government operations. This represents 2.8 percent of the community-wide emissions. So, while it is important to address GHG emissions from government sources, it is even more vital to get the community involved in addressing GHG emission sources such as residential energy use, vehicular travel patterns, and recycling and waste disposal.

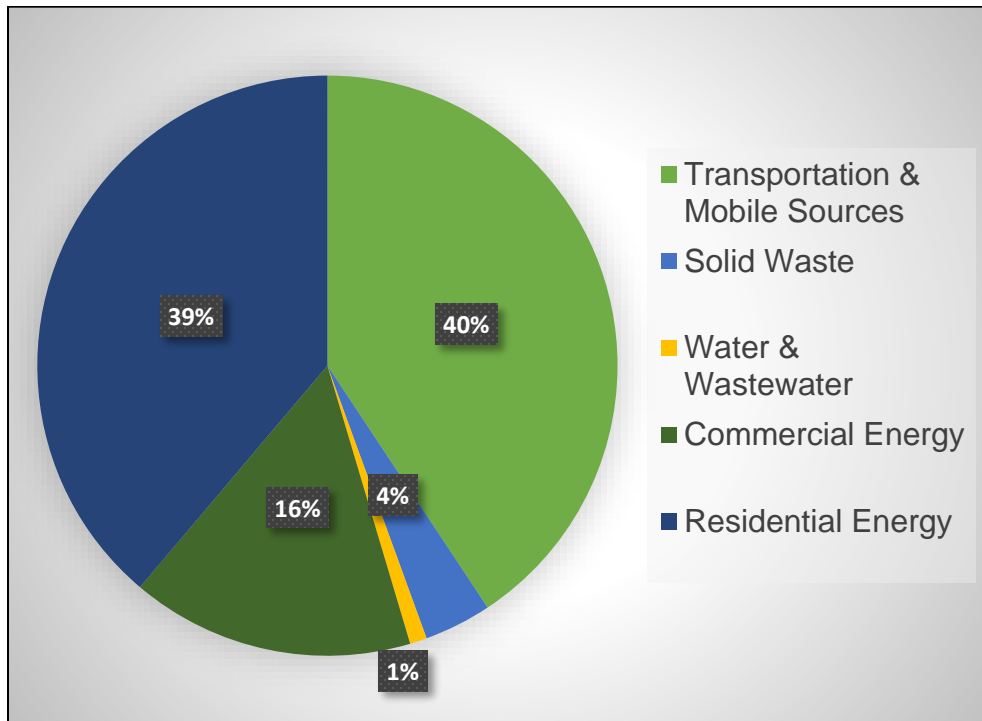
The largest single source of greenhouse gas emissions from government sources was the use of electricity and natural gas in Village-owned buildings and facilities (*Figure 4*), with building energy accounting for 36 percent of CO<sub>2</sub>e emissions, the Water Plant at 27 percent, and street lights and traffic signals at 19 percent. The government's consumption of energy in buildings altogether accounted for 82 percent of the total GHG emissions. Following energy consumption from stationary sources, mobile source emissions from Village employees' commute and vehicle fleet accounted for 17.5 percent of the GHG emissions from government operations in 2015. Emissions related to process & fugitive emissions accounted for less than 1 percent.

## Emissions Trends

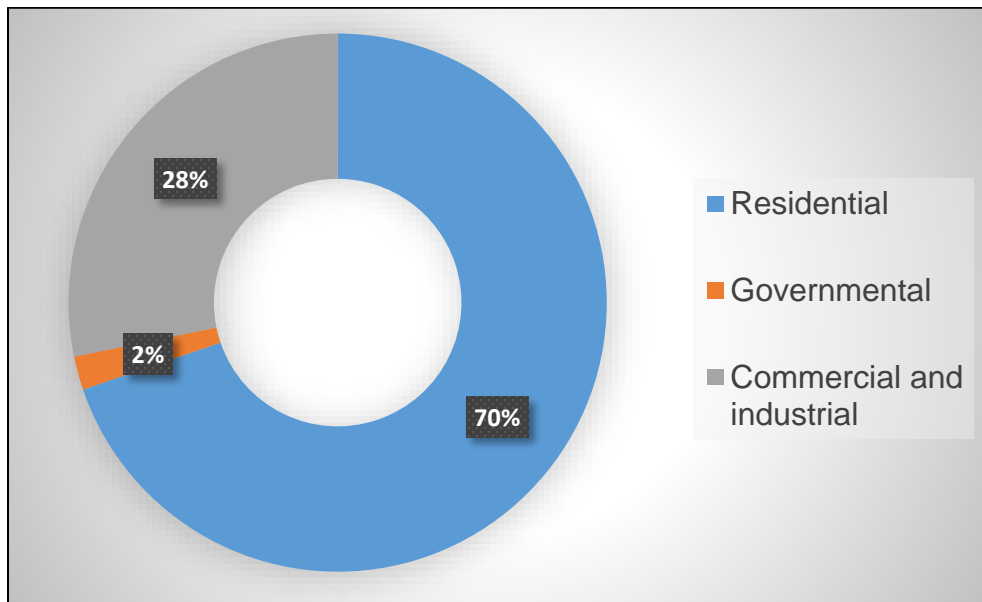
Park Forest community-wide GHG emissions have decreased from 2010 to 2015 as shown in *Figure 5* and Table 1. While emissions from interim years have not been quantified, the two inventories indicate a steady decline in emissions during this period. Between 2010 and 2015, total emissions decreased by 3.6 percent. While the overall emissions decreased, the relative distribution of emissions by sub-sector changed minimally between the two inventory years. In each inventory, the largest sources of emissions are the residential and commercial energy and on-road transportation energy.

At the government level, GHG emissions have decreased from 2010 to 2015 as shown in *Figure 6* and Table 2. The two inventories indicate more progress toward emission reduction during this period at the government level than at the community-wide level. Between 2010 and 2015, total emissions generated at the government level decreased by 11 percent. While the distribution of emissions by sub-sector changed minimally between the two inventory years, the highest emission reduction was in buildings and facilities energy consumption. This is largely the result of the lighting upgrades which were conducted in most Village buildings. Also, measurable reduction of emission from water treatment facilities is shown in the *Figure 7*, which is the result of the Water Plant efficiency upgrades which took place in 2014/2015. Street lights and traffic light emission reduction is a result of replacing/upgrading street lights.

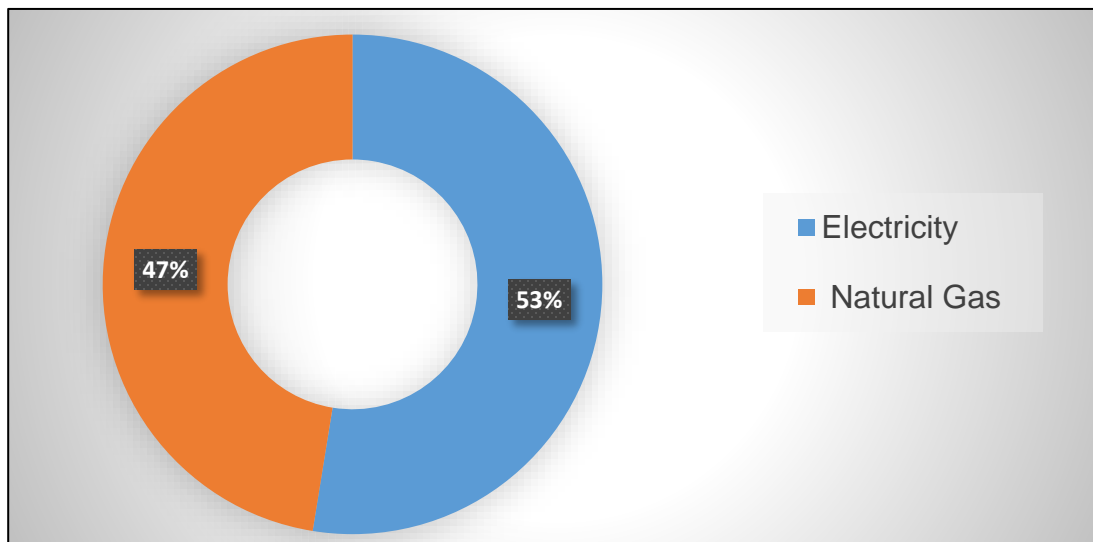
Given the progress the Village has made in reduction of GHG emissions at both the community-wide and government operations levels, and the Village's stated commitment to the Paris Climate Agreement goals (*Figure 7 & Figure 8*), the *Climate Action and Resiliency Plan* recommends a revision to the GHG emission reduction goal. While the 2010 base year will remain the same, the emission reduction target will be shifted from the original 2010-based target of 6 percent reduction by 2025, to the more ambitious target of 26 percent by 2025 consistent with the Paris Climate Agreement. This transition is compatible with the change in international emissions reduction targets. It should be noted, however, that the International base year is 2005 or similar (under the Paris Agreement), yet the Village's base year will remain 2010 since it is the earliest GHG inventory conducted. This change will also increase the accuracy in tracking the community's emissions performance and its contribution to global climate protection efforts.



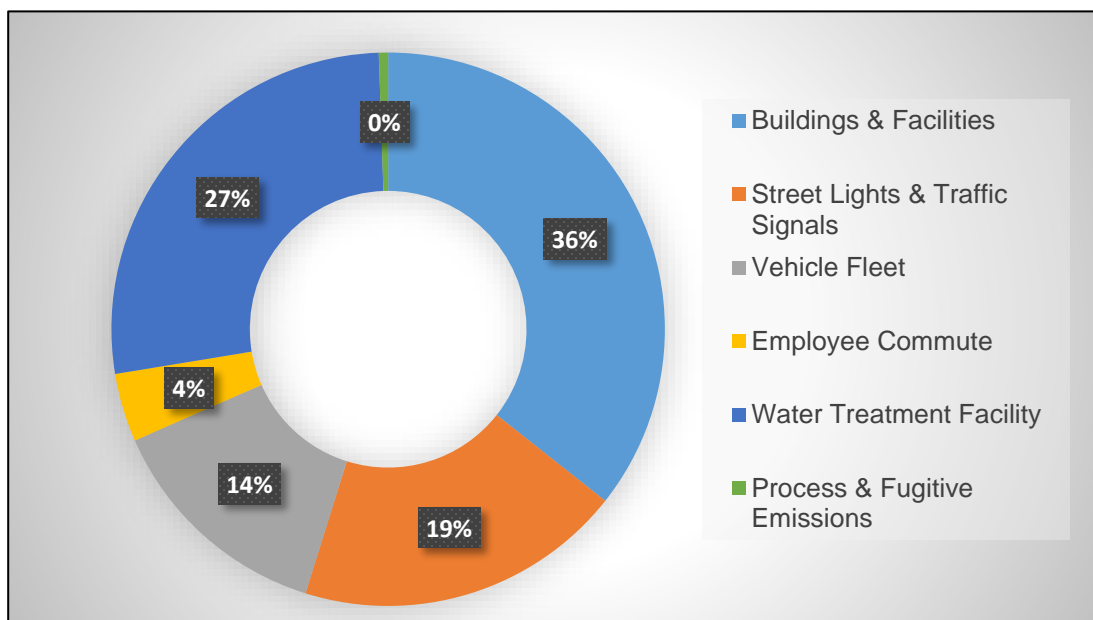
**Figure 1:** Park Forest Community-Wide GHG Emissions



**Figure 2:** Stationary Source Emissions by Sub-Sector



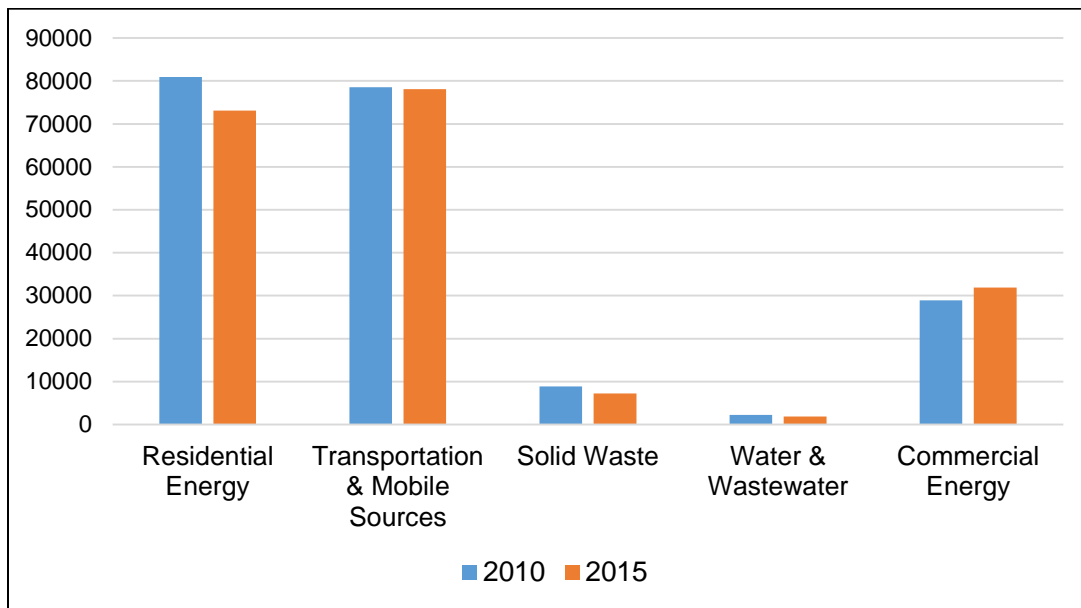
**Figure 3:** Stationary Source Emissions by Energy Source



**Figure 4:** Park Forest Government Inventory

Year	Transportation & Mobile Sources	Solid Waste	Water & Wastewater	Commercial Energy	Residential Energy	Total GHG emission (MT)
2010	78523	8856	2229	28931	80895	199434
2015	78112	7211	1824	31864	73065	192076

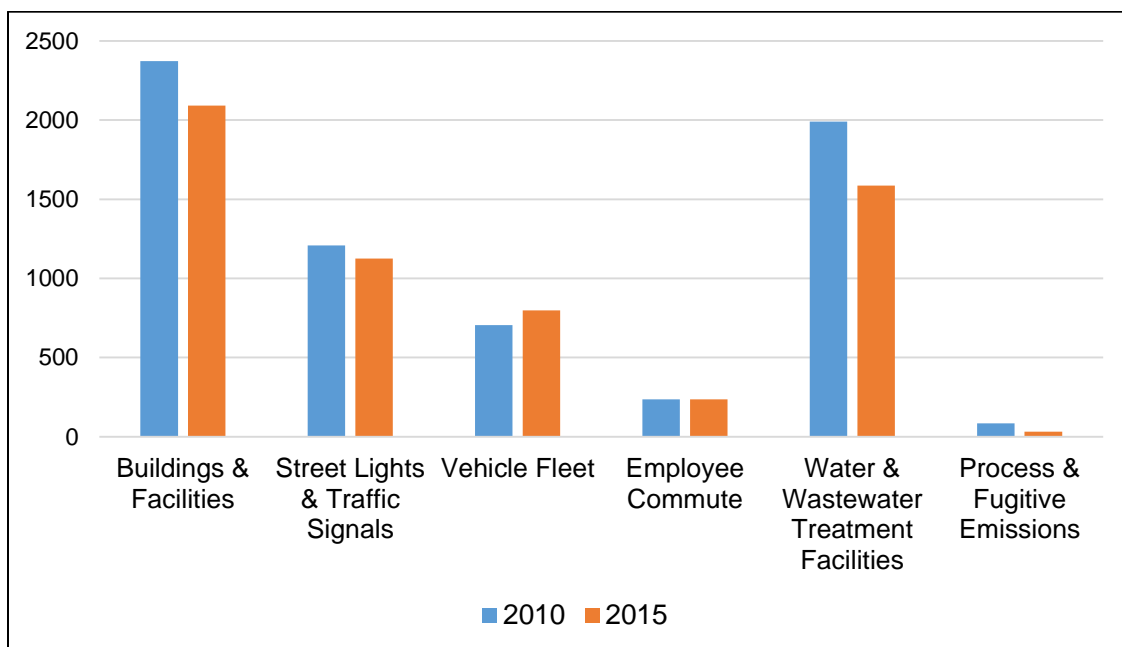
**Table 1:** Community CO<sub>2</sub>e (MT) Emissions by Sector 2010 - 2015



**Figure 5:** Community CO2e (MT) Emissions by Sector 2010 - 2015

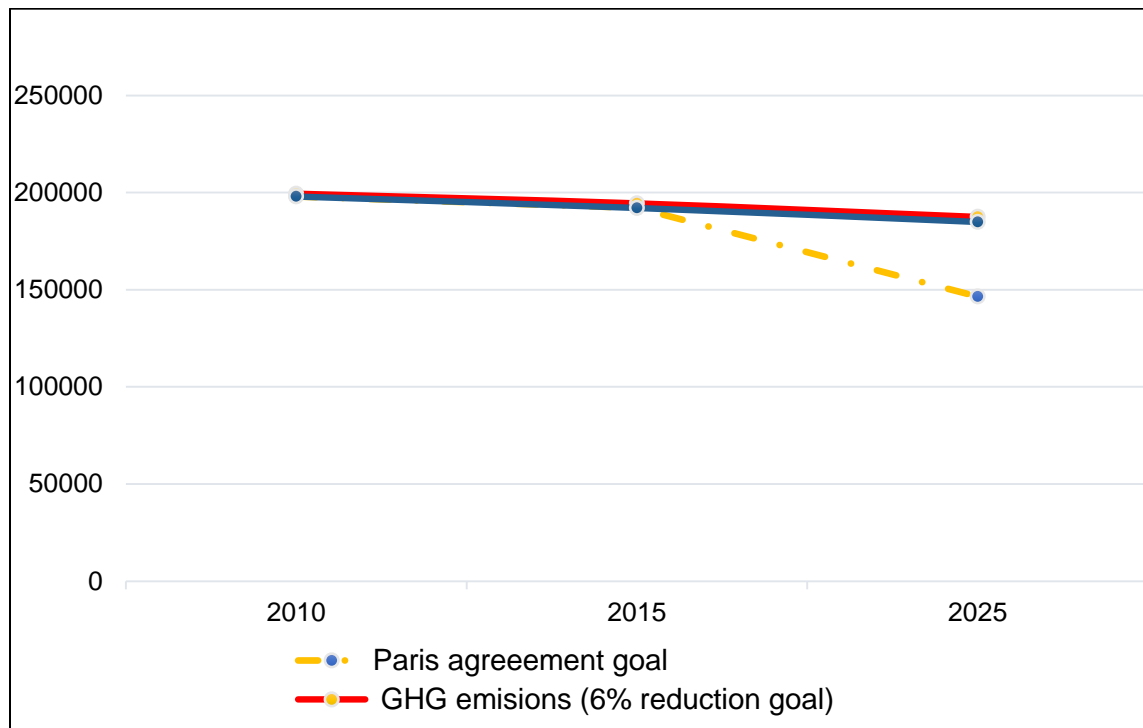
Year	Buildings & Facilities	Street Lights & Traffic Signals	Vehicle Fleet	Employee Commute	Water & Wastewater Treatment Facilities	Process & Fugitive Emissions
2010	2373	1209	704	235	1991	85
2015	2092	1126	797	235	1587	32

**Table 2:** Government operations CO2e (MT) Emissions by Sector 2010 – 2015

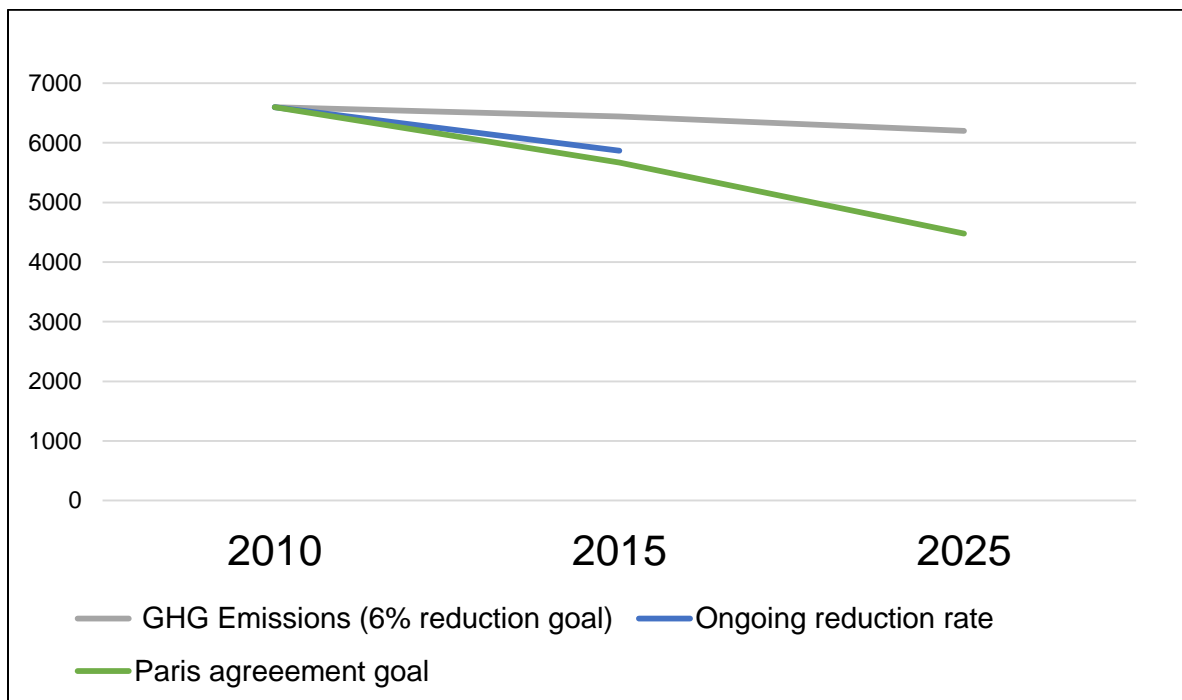


**Figure 6:** Government operations CO2e (MT) Emissions by Sector 2010 - 2015





**Figure 7:** Community GHG Emissions Trends



**Figure 8:** Government operations GHG Emissions Trends.

# APPENDIX IV: Climate Change Vulnerability Assessment

## Introduction

Evidence clearly indicates that the climate is changing worldwide. Work conducted by the Chicago Metropolitan Agency for Planning (CMAP) indicated that the impacts of climate change that are likely to happen in the Chicago area include the following:

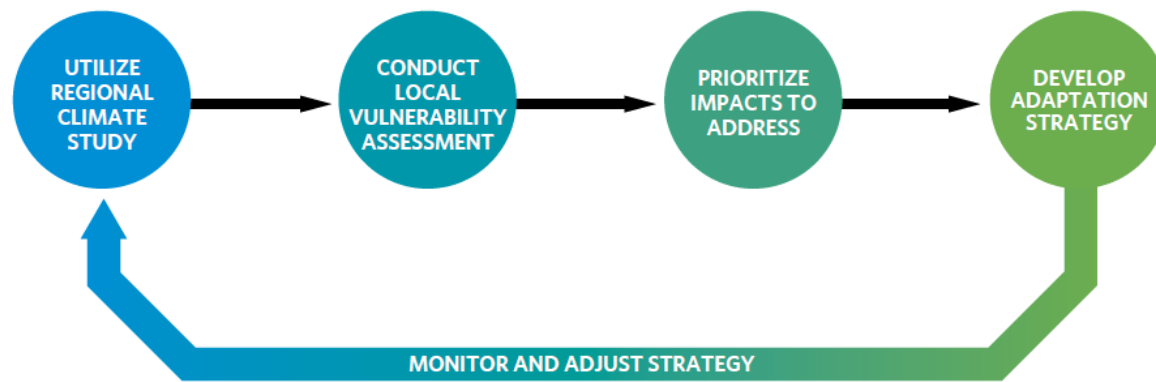
- Heavy rains are likely to fall more frequently, causing flooding more often.
- Light rains are likely to fall less frequently, particularly in the summer, leading to drought.
- Heat waves will probably become more frequent, more intense, and last longer.
- Higher temperatures in summer will increase cooling demands that may strain the electric grid.
- Hot summer temperatures will worsen air quality, and high humidity will encourage infectious diseases.
- Weather variability may make operating municipal utilities more difficult and financially risky.<sup>17</sup>

These changes over the long term have the potential for a wide variety of secondary impacts, including detrimental impacts on human health and safety, economic continuity, water supply, ecosystem function, and provision of basic services. The transportation, water, sanitary sewer, and storm sewer infrastructure systems that are the responsibility of municipal governments are particularly at risk of physical damage caused by these climate incidents, leading to far wider economic impacts. The increased frequency and severity of climate-related natural disasters such as droughts and floods in the Midwest region cause vast economic damage<sup>1</sup>. The Village of Park Forest, as part of the Midwest region, will experience these changes as well.

In order for communities to adapt to climate change, they must take early action to reduce their vulnerability and build their resilience to new risks. Investments that reduce the climate vulnerability of the community can help reduce the adverse consequences of climate change for people, while at the same time reduce expenses for crisis management. The *Climate Adaptation for Municipalities in the Chicago Region* provides climate adaptation planning guidance to local governments. Developed by the CMAP in 2013, the guide introduces the basis for climate change adaptation planning and details a step-by-step process for local climate vulnerability assessment and adaptation strategy development. The Village of Park Forest followed this process to create this *Climate Change Vulnerability Assessment*.

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<sup>17</sup> *Climate Adaptation Guidebook for Municipalities in the Chicago Region*, CMAP

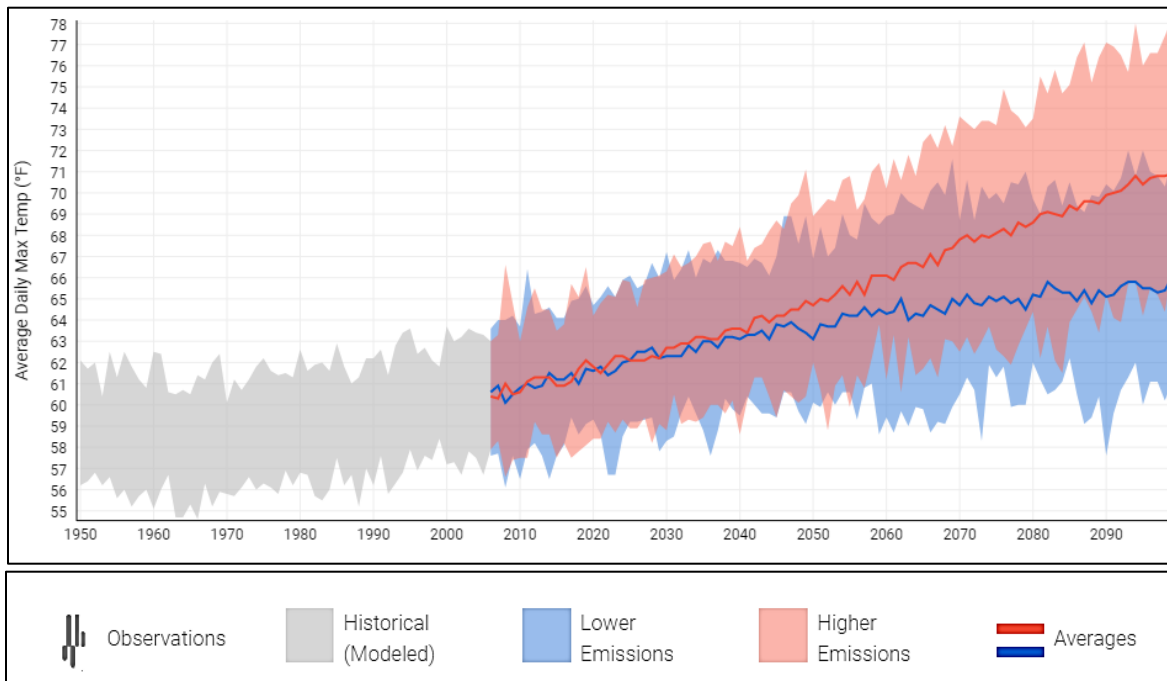


**Figure 1:** Steps for developing a municipal climate adaptation strategy. Source: Chicago Metropolitan Agency for Planning (CMAP)

The purpose of this vulnerability assessment is to identify the primary threats facing Park Forest from a changing climate by examining the Village’s overall capacity to mitigate the effects of floods, severe storms, extreme temperatures, and other climate hazards. The Village can then begin to develop and prioritize community-driven, locally generated adaptation strategies that increase community resilience. The results of this process will be incorporated into the Village’s *Climate Action and Resilience Plan* and related documents.

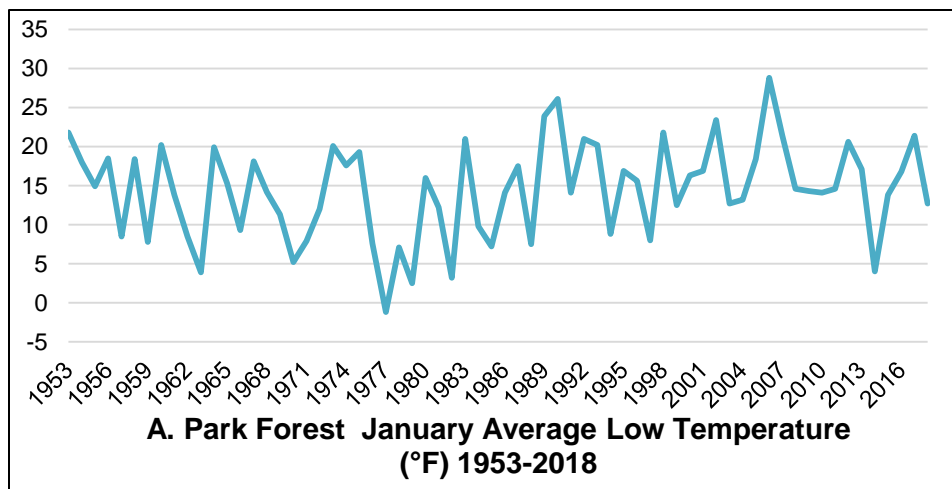
## Climate Change and Variability

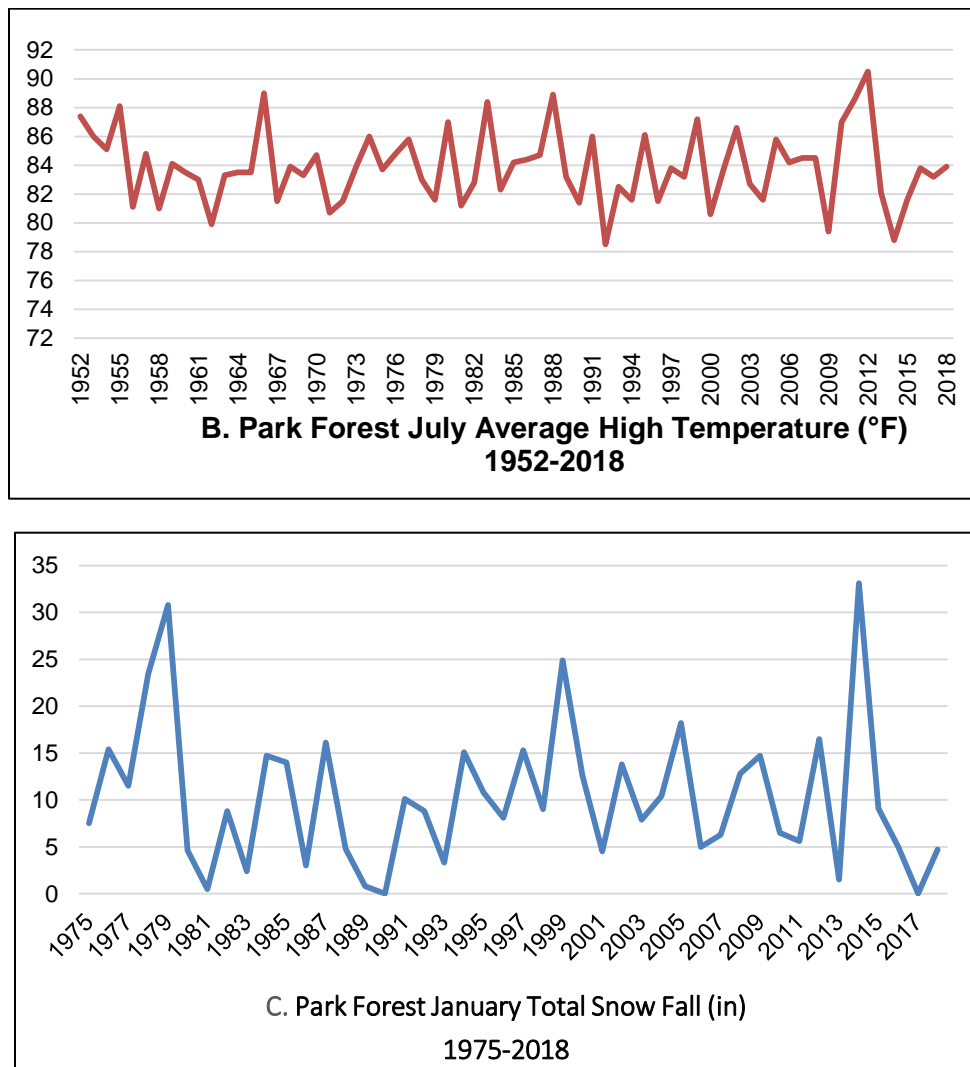
Annual temperature trends in the Chicago area have exhibited slightly higher trends since the late 1970’s. According to the Midwest Economic Policy Institute (MEPI), the average air temperature in the Midwest increased by 4.5 degrees from 1980 to 2010, and the percent of days with “very heavy precipitation” (precipitation greater than 2 inches) has increased by 27 percent in the Midwest since the late 1950s. These conditions are expected to worsen, with temperatures continuing to rise and precipitation patterns changing through the mid-century. Projection trends for precipitation and temperature depend partially on the carbon dioxide emissions scenarios used. Figure 2 shows that annual average temperatures for Cook County will likely continue to increase gradually by mid-century and later under both high and low emission scenarios. Annual temperatures are projected to be 4° to 9°F higher than they are today by the end of the 21st century under low to high emissions. Researchers found that 1995-type heat waves are projected to occur two to five times per decade by mid-century, and by the end of the century they could occur every summer.



**Figure 2:** Cook County Observed annual averages temperatures from 1950-2013; climate model simulations from 1950-2005; and climate model projections for two possible emission scenarios out to 2100. (The U.S. Climate Resilience Toolkit)

Climate variability explains how one winter can be cold and snowy while the next is milder, or how one decade is exceptionally dry and the next very wet. Park Forest has been experiencing a large year-to-year variability. The figures below show the variability of the weather in Park Forest in January and July over several decades.





**Figure 3:** Park Forest Weather Variability; A) January Average low temperature (°F); B) July average high temperature (°F); C) January total snow fall (in). Source: Midwestern Regional Climate Center (MRCC).

## Risk Assessment

The community has and always will be impacted by climate, whether it is an extreme rainfall event, intense heat wave, or other events. The impacts of climate change create the possibility of more frequent extreme storm events, increasing temperatures, reduced ice cover, and greater wind speeds. Therefore, it is important to identify key areas where the Village is likely to be most at-risk.

A vulnerability assessment was conducted to identify the risks associated with the climate changes likely to occur in the Midwest. The following steps were used to define the climate related risks in the Village:

- Profile each risk, describing the geographic area it affects, its frequency and severity.
- Use maps of risk impact areas to determine how many structures, facilities, and systems are exposed to flood risk.



- Assess the vulnerability of exposed structures and infrastructure based on exposure and the probability of occurrence of the event.

## **Extreme weather conditions:**

Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. It includes extreme heat, lightning, hail, fog, and high winds. According to the 2014 Cook County Hazard Mitigation Plan, the area is severely vulnerable to severe storms, with a high vulnerability to extreme heat<sup>18</sup>.

Extreme heat conditions are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year<sup>19</sup>. Extreme heat is a public health threat, because it has many potential adverse health outcomes, often increases the number of daily deaths in affected populations. High-risk groups are older people, especially those over 75, infants and young children, people with a serious chronic condition, especially heart or breathing problems, people with mobility problems, people with serious mental health problems, people on certain medications, and homeless and low-income people. The heat wave of July 1995 was one of the worst disasters in Illinois history, with over 700 deaths statewide over five-days. The effects of climate change may result in an increase in the frequency of extreme heat events such as the 1995 event. The number of very hot days (over 90° F) in Chicago area are projected to increase from the present-day level of about 15 days per year to five weeks per year under the lower emissions scenario and eight weeks under the higher emissions scenario.<sup>20</sup>

## **Flood risk assessments**

Floods and extreme storms damage property and infrastructure and affect the public health and well-being. The frequency and intensity of floods and storms are likely to be affected by climate change. Greater storm intensity will result in more direct runoff and flooding. Changes in watershed vegetation and soil moisture conditions will similarly change runoff and recharge patterns. The historical hydrologic data which are used to model floods will not be efficient. New forecast-based tools will have to be developed with more consideration to climate change.

FEMA provides communities with updated Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) that focus on the probability of floods and where flooding may occur. These maps and studies also show the calculated 1 percent annual chance flood elevation. The 1 percent annual chance flood, also known as the base flood, has a 1 percent chance of being equaled or exceeded in any given year. Information presented in the FIRM maps (see Figure 4) and in the FEMA report was used to identify areas that may need additional focus when conducting the Village Vulnerability Assessment.

According to the flood insurance statistics report for Park Forest, as of 2014, only 10 flood insurance policies exist in Park Forest<sup>2</sup>. This number is very low compared to the total area which is vulnerable to flooding, and taking into consideration that not all of the flood risk in the Village is reflected in current maps. Flood risk assessment should serve as the basis for mitigation strategies and actions by defining the hazard, informing the stakeholders, and increasing public awareness. Assessing flood risk requires identifying the flooding source and determining the flood hazard occurrence probability, developing a complete profile of the flood hazard including historical occurrence and previous impacts, defining

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<sup>18</sup> Cook County Multi-Jurisdictional Hazard Mitigation Plan; Volume 1—Planning-Area-Wide Elements.

<sup>19</sup> <https://www.epa.gov/sites/production/files/2016-10/documents/extreme-heat-guidebook.pdf>

<sup>20</sup> [https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global\\_warming/climate-change-illinois.pdf](https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/climate-change-illinois.pdf)

assets located in the identified flood hazard area, and estimating potential future flood losses caused by exposure to the flood hazard area.

## **Drought**

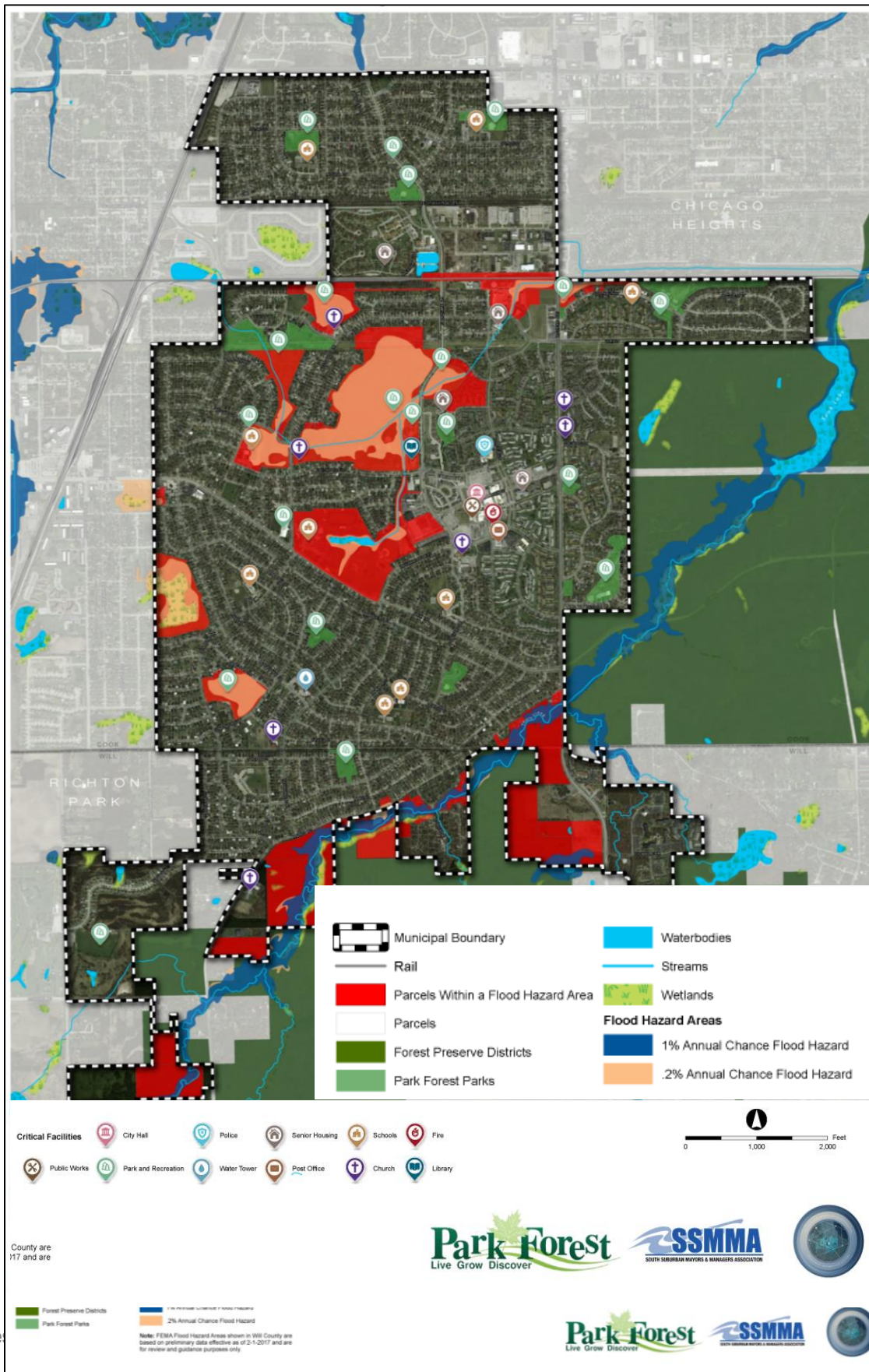
Droughts originate from a deficiency of precipitation resulting from an unusual weather pattern. With a warmer climate, droughts could become more frequent, more severe, and longer-lasting. The National Drought Mitigation Center describes likely drought impacts as those affecting agriculture, water supplies, and the risk of fire. Drought is generally a weather condition that affects a large geographic area with similar weather patterns. According to Cook County Hazard Mitigation Plan, the drought risk in the area is low.<sup>21</sup>

While drought generally does not affect groundwater sources as quickly as surface water supplies, groundwater supplies generally take longer to recover. Groundwater supplies will not replenish at a normal rate due to reduced precipitation during a drought. This will result in a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. There is no current stress on the Park Forest water supply, but the Village can prepare for the impacts of climate change by building flexibility and robustness into its water supply system. Flexibility helps to ensure a quick response to changing conditions, and robustness helps people prepare for and survive the worst conditions.

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<sup>21</sup> *Cook County Multi-Jurisdictional Hazard Mitigation Plan; Volume 1—Planning-Area-Wide Elements*

**Figure 4:** Park Forest FEMA Flood Risk Areas and National wetland Inventory locations.



# Park Forest Vulnerability Assessment

The Village of Park Forest conducted a climate vulnerability assessment to identify and quantify the effects of a changing climate on municipal assets and operations. The Departments of Public Works, Recreation and Parks, Police, Fire, and Economic Development and Planning participated in the assessment. The self-assessment tool, designed by CMAP for communities in the Midwest Region, provides community leaders with a method to review vulnerabilities regarding climate change, and indicates the community's ability to restore and maintain an acceptable level of functionality following severe weather events.

Following are the functional areas that are examined in the self-assessment. The results of this self-assessment for Categories 1 and 2 are shown in Table 2 and the results for Categories 3-9 are shown in Table 1. These tables are excerpted from CMAP's *Climate Adaption Guidebook*. Further explanation of the Village's assessment for all categories is provided in this section.

1. Critical infrastructure flooding readiness: assess if the community's critical infrastructure is located in areas impacted by the floodplain and/or other storm event scenarios.
2. Critical facilities flooding readiness: assess if the community's critical buildings are located in areas impacted by the floodplain and/or other storm event scenarios.
3. Built environment and infrastructure: assess how climate variability may impact the safety and effectiveness of the community's infrastructure such as storm sewers, waste and drinking water systems, roads and bridges, and detention basins.
4. Operation and maintenance: assess if the community experienced a need for additional infrastructure operations or maintenance work associated with extreme storm events, drought, high winds, increased temperatures, fluctuating water levels, or other climate-related events.
5. Water resources: Assess how climate change and variability may impact the municipality's ability to meet water demand and sustain water quality.
6. Ecosystems and habitats: identify the risks that climate change poses to the community's ecosystems and habitats, and the capacity to adapt to these changes.
7. Tourism and recreation: Assess if community's events or festivals that are season-dependent may need to be rescheduled or cancelled entirely due to climate related impacts.
8. Business plans and equipment: Evaluate resources the retail stores in the community have to re-open after a power outage, flooding, or other impacts due to an extreme weather event. Focus on stores that provide for basic needs (grocery, gas, hardware).
9. Community plans: identify specific community plans already adopted, underway, or planned, where climate education and associated climate change adaptation can be incorporated.

The assessment results in a low, medium, or high rating for each category, depending on answers from the Village Staff. The medium and high readiness ratings do not necessarily mean low potential for impact and a low readiness rating is not the only factor in deciding priorities for further vulnerability assessments. Rather, the purpose of the ratings is to identify key areas of potential vulnerability that need further exploration.

The unique character of Park Forest as a preplanned community means that all the infrastructure was built and all trees were planted within a relatively short time. Therefore, more efforts to restore and maintain the aging infrastructure and trees will be required.

According to the results of the assessment, the ecosystems and habitat, and business plans and equipment categories have low readiness ratings. These functional areas are likely to be impacted by high rainfall and flooding, high snowfall, extreme heat, drought, and impacts of invasive species. More efforts should be taken to examine these potentially vulnerable areas and prioritize actions to create climate resilience. Also, the Department of Public Works stated that, in the last ten years, the Village

has experienced a need for additional infrastructure operations and maintenance work associated with extreme storm events and increased temperatures. More detail on the readiness rating of each category is provided below.

Categories	Total yes Answers	Translate total answers to readiness index	Readiness index
Built Environment and infrastructure	1	0-2 (high) 3-5 (medium) 6-8 (low)	High
Operation and maintenance	4	0-1 (high) 2-4 (medium) 5-6 (low)	Medium
Water resources	2	0-2 (high) 3-5 (medium) 6-7 (low)	High
Ecosystems and habitats	8	0-2 (high) 3-5 (medium) 6-8 (low)	Low
Tourism and recreation	0	0-2 (high) 3-5 (medium) 6-8 (low)	High
Business plans and equipment	0	0-2 (high) 3-5 (medium) 6-8 (low)	Low
Community plans	0	0-2 (high) 3-5 (medium) 6-8 (low)	Low

**Table 1:** Categories 3-9, Climate Vulnerability Readiness

Infrastructure or Facilities	Located in Floodplain	Flooding expected due to 100-years, 24 hour storm	Flooding expected due to storm event 50% greater than column 2
Sewage treatment system			
Power grid			
Drinking water system	√	√	√
Roadways/ evacuation routes	√	√	√
Village Hall			
Police station			
Fire station			
Public works facilities	√	√	√

**Table 2:** Critical Infrastructure and Facilities Flooding Readiness

### Critical Infrastructure and Facilities:

Critical infrastructure flooding readiness is assessed based on the infrastructure located in a floodplain, or likely to be impacted by flooding due to a 100 year, 24 hour storm, or by a storm that is 50 percent greater than the 100 year, 24 hour storm. The infrastructure examined includes the power grid, drinking

water system, sanitary sewer system, and roadways and evacuation routes. Based on the self-assessment conducted by the Village's Department of Public Works (DPW), the Village's critical community infrastructure most likely to be impacted by these scenarios are roadways and evacuation routes. Following are the specific locations that are of concern to the DPW:

- While improvements to the Thorn Creek Bridge in 2013 elevated it above the floodplain, DPW staff is concerned that predicted future increases in the 100 year flood elevation will place the bridge at risk. This bridge represents the only access to a portion of the Thorn Creek Woods subdivision that includes 54 homes.
- Sioux and Seminole Streets are consistently impacted by flooding during heavy rainfalls due to insufficient capacity in detention facilities in Richton Park. When the detention facilities to the west of Park Forest overflow, these Park Forest streets flood. While, to date, only the streets have been impacted, not the houses, it creates a potential problem related to emergency response times and evacuation routes.
- The Orchard Drive viaducts located both north and south of North Street have flooded more often in the past several years. Flooding in these locations is caused by heavy rainfall, but also by clogged storm drains. Keeping these drains clear is of critical importance due to the need to keep Orchard Drive open for emergency response.
- 26<sup>th</sup> Street and Sauk Trail, east of the Village limits, have also flooded more often in recent years. While the location of the flooding on both roads is outside the Village limits, it creates problems for Village DPW staff who have to take time from their local responsibilities to block access to these roads.
- The neighborhood south of Lakewood Boulevard and Rich East High School is shown to be at risk of flooding based on the updated FEMA floodplain maps, as well as the more detailed floodplain maps prepared by the Metropolitan Water Reclamation District (MWRD).
- Michelle Obama School is shown to be in the floodway based on the MWRD maps.

Based on DPW's assessment of critical facilities (Police and Fire Stations, Village Hall, emergency operation center, Public Works facilities), there are no serious flooding risks at this time.

The concerns regarding the vulnerability of the Village's built environment and infrastructure (Category 3) are the same as those described above with regard to critical infrastructure flooding readiness. Specific areas of the Village's road network are at risk of flooding, causing limitations for emergency response and evacuation, should it become necessary.

## **Operations and Maintenance:**

The climate vulnerability assessment includes an examination of whether or not the Village has experienced a need for additional infrastructure operations and maintenance work associated with extreme storm events, drought, high winds, increased temperatures, fluctuating water levels, or other climate-related events. Village Staff indicated the following specific concerns:

- Storm sewer system repair: repairs and system improvements are expected to be an annual occurrence. For example, in 2017, a portion of the storm sewer in Thorn Creek Drive was upsized from 36 inches to 48 inches. This improvement was directly related to heavy flooding that occurred in the neighborhood in 2011. As a result, the Village has embarked on a multi-year program of re-lining the storm sewers. Also, the Village has begun to install more rain gardens in strategic locations to address localized flooding, and has created a residential rain garden grant program. The new Village Green expansion was designed and built to hold a 100 year storm event.
- Road buckle and pot hole maintenance: in 2014, the Village Board approved the annual budgeting of General Fund revenues to address local street improvements in order to enhance quality of life in the Village. Table 3 shows how some of these funds have been used to address



roadway conditions that are often caused by extreme temperatures, including cold, snow, and extreme heat.

Years	2013	2014	2015	2016	2017
Streets patched (square yards)	2,868	1,625	505	5,425	1,571

**Table 3:** Road Buckle and Pot Hold Maintenance

- Sanitary sewer system: the sanitary sewer overflow facility, located at the Public Works Yard, is currently off-line. It must be repaired. A majority of the Village's storm sewer system was originally constructed of reinforced concrete, which deteriorates slowly over time due to the reaction with hydrogen sulfide gas and creates structural problems as well as infiltration. Other portions of the Village sanitary system are made of clay, which is brittle and breaks over time. As a result, the Village has embarked on a multi-year program of re-lining the sanitary sewers.
- Urban tree inventory: maintenance and replacement is on the rise, because of both the Emerald Ash Borer problem and because of the age of the Village's tree inventory. In addition, weather variability is impacting the Maple trees in the Village. The Village is developing a long range maintenance and replacement plan and has a budget line item for urban forestry, which is used to match grants received for tree planting.

## Water Resources

While the Village's water resources show a "high" readiness to climate vulnerability, there are some issues that need to be addressed to enhance readiness. The Village's water bodies, including Thorn Creek and the Central Park Wetlands are both subject to invasive species that have to be constantly managed. These issues are addressed in more detail in the next paragraph on ecosystems and habitats. The quality and continued availability of the drinking water supply are also concerns that need to be constantly monitored.

Park Forest is dependent on groundwater for its potable water supply. The Village is supplied by groundwater pumped from six wells drilled approximately 340 feet deep into a dolomite limestone aquifer. The wells are all located within a one-mile radius of the Village's water treatment plant. The Village has never failed to meet local water demands, or needed to implement water use restrictions. Drinking water is tested for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not the Village's drinking water meets health standards. According to the Illinois EPA, Park Forest's Annual Water Quality Report has indicated that no regulated contaminants have been detected in the Park Forest water supply during required testing since 1982.<sup>22</sup>

Water quality can be threatened or impacted by different climate events. The Department of Public Works has noted that community groundwater supplies have never shown any reductions in capacity or water quality associated from drought or flooding. Park Forest is part of the Thorn Creek and Butterfield Creek watersheds. The Thorn Creek Watershed is facing concerns about surface water quality as multiple water bodies have been identified as impaired by EPA standards. Based on information obtained in a Well Site Survey, published in 1992 by the Illinois EPA, 24 possible problem sites were identified within the survey area of Park Forest. The Illinois Environmental Protection Act requires a minimum protection zone of 400 feet for Park Forest's wells. These minimum protection zones are regulated by the Illinois EPA to protect drinking water supplies from potential routes and sources of groundwater contamination. Existing water supply wells are protected from encroachment by new potential routes or sources of

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<sup>22</sup> <http://www.vopfwaterreport.com/>

contamination. This approach ensures a baseline program that will prevent or greatly lessen the likelihood of well contamination by the most direct means.

Possible future drought conditions within the region, increased development, and population growth will cause pressure on the availability of water in the aquifer system from which the Village draws water. This could result in some well interference (losing access to water because of a nearby high volume water appropriation and water levels recede below the pump of the affected well) or even water shortages. The Village has adopted policies to ensure that the jurisdiction has the authority to enact water conservation measures during periods of drought. The Village evaluated the entire water system in 2007 to plan a water main replacement schedule, and continues to address its water quality with ongoing efforts to replace the aged water mains that deliver water to residents and businesses. Annual water rate increases encourage residents to regulate their water use and recognize patterns of water usage so to be more aware of water conservation.

## **Ecosystems and Habitats**

Park Forest has an exceptionally high amount of open space per capita, including wetlands, creeks, forest preserves, and Village parks that add to the quality of life in the community. In the year 2000, the Village initiated a project to restore the Central Park Wetlands, a 50-acre wetland in the very center of the community that provides an exceptional habitat for a large variety of birds, mammals, and plants. The wetlands also helps to absorb millions of gallons of storm water annually. The Village also co-owns and manages the Thorn Creek Nature Preserve, another vital habitat for native plants and animals. These ecosystems and habitats have to be managed carefully to ensure that the flora and fauna is not permanently and negatively impacted by climate change. The Department of Recreation and Parks completed the Ecosystems and Habitats portion of the self-assessment, with the conclusion that this important element of the Village has a low-readiness for the impacts of climate change. Better understanding of factors that contribute to climate change vulnerability within Park Forest's natural habitat is needed to determine the right management responses.

The Village's urban forest (on parks and public rights-of-way) supports between 3,000 and 3,500 trees, based on a conservative estimate. This takes into account more than 1,000 trees that have been lost to the Emerald Ash Borer (EAB) infestation since 2009. In summer 2018, the Village inventoried 648 of the Village's trees, noting species, condition, and potential hazard. Once tabulated and completed, this data will be the basis for development of a maintenance and replacement plan. In addition to the loss of trees to EAB, the Village's urban forest has also been stressed by climate variability, including both exceptionally hot and cool summers, and summers that have been excessively wet or dry. The hot and dry summers cause the most stress as the nutrient reserves within the trees become depleted. Particularly hard hit have been the Village's Silver Maple trees, although Red and Sugar Maples have also been lost in large amounts. In 2018 alone, 20 dead trees were removed from Winnebago Park, seven from Murphy Park, and 109 dead trees are marked for removal from Village parkways. Since 2011, however, the Village has planted 248 new trees in Village parks and rights-of-way.

In addition to the environmental stress on the Village's urban forest, following are some of the specific issues that have been observed:

- Erosion along Thorn Creek is increasing due to the fluctuating water levels. This creates the potential for increased sediment and contaminants in the creek. During heavy rain falls, further erosion and failure along the creek banks is a real threat.
- Increasing water temperatures, fluctuating water levels, and increased volume and velocity of storm water runoff will change the type of flora and fauna found in the Village's creeks and in the Central Park Wetlands.
- More invasive species are moving into the Village. This includes plant species that have to be controlled in the Central Park Wetlands, and along Thorn Creek and its tributaries. Invasive

species also include mammals such as foxes, coyotes, and skunks. The changes in plant species in the Wetlands is causing a change in the bird species that live there permanently and that use the Wetlands on a seasonal or migratory basis.

One important measure that the Village has already taken to address invasive species concerns is the development and implementation of a three year *Ecosystem Enhancement Plan for Central Park Wetland* starting in 2013. The goal of the Plan was to increase and sustain higher levels of native floristic quality and biodiversity in Central Park Wetland. The Village has deliberately set out to re-establish native habitats in its parks and public spaces. Projects include the Central Park Wetlands Restoration, and installation of native rain gardens and site specific trees and woody shrubs in selected park locations. Also, the Village was part of the *Thorn Creek Watershed Basin Plan* (2014) which focused closely on the goal of protecting and enhancing surface water quality to support uses designated for Thorn Creek by Illinois EPA. Other resource-based goals were considered, including protecting and restoring aquatic and terrestrial habitat, protecting and enhancing groundwater quality and quantity, and reducing flooding and flood-related damages.

The Recreation and Parks Department has received a grant from the US Fish and Wildlife Fund's Five Star Urban Waters program to install large rain gardens in Shabbona, Marquette, and Onarga Parks. This is primarily designed to address stormwater management in those neighborhoods, but the rain gardens will also incorporate native plants and pollinator habitat.

<b>Ecosystems and Habitats</b>	<b>Yes</b>	<b>No</b>
Does local water quality have the potential to be contaminated by extreme storm events, drought, or increasing temperatures?	√	
Does your area include inland or coastal aquatic habitats susceptible to erosion and sedimentation issues?	√	
Are there aquatic plant and animal populations in the area susceptible to increasing water temperatures, fluctuating water levels, or increasing volume and velocity of stormwater runoff?	√	
Are there terrestrial plant and animal populations in the area susceptible to increasing temperatures, increased stormwater runoff, or drought?	√	
Are there rivers, streams or lakes in your area with instream flow requirements, listed as impaired or on your state's 303(d) 1 list, or other known stressors to aquatic life?	√	
Are there exposed estuaries, wetlands, or beaches that are susceptible to more frequent coastal storms and or water level fluctuations in your area?	√	
Are you aware of new plants or animals that have moved into the area in the last 10 – 20 years including invasive species?	√	
Are corridors for species to naturally migrate away from threats potentially blocked by existing or future development (i.e., roads, buildings) or resource extraction (i.e. timber management, mining)?	√	
Are there recognized threats due to the introduction and/or spread of invasive species (aquatic or terrestrial) to local ecosystems?	√	

**Table 4:** Ecosystems and Habitats Climate Vulnerability

## Tourism and Recreation

At this point, the Village has not experienced negative impacts on the Village's tourism and recreation programming as a result of climate change. Over the course of the next 10 to 20 years, however, heavy rains and extreme temperatures could impact outdoor summer activities such as the annual Fourth of

July celebration and Main Street Nights. Similarly, increased summer rain events could impact use of the Park Forest Aqua Center.

## Business Plans and Equipment

Park Forest businesses, in general, do not have the business plans or equipment in place that would ensure a quick recovery after an extreme weather event. Based on semi-annual inspections conducted by the Fire Department, few local retail stores that provide for the community's basic needs (grocery, gas, hardware) have equipment such as generators, back-up options for water, waste and communication, plans to bring in additional staff, or plans for re-stocking of store shelves.

## Community Plans

It is important to identify the opportunities available in the Village's existing plans to determine vulnerabilities related to climate resiliency and to recommend strategies to address those concerns. The Village has adopted several plans which might address climate change impacts. Also, Park Forest is part of the *Cook County Multi-Jurisdictional Hazard Mitigation Plan* (2014). The plan goal of the County Plan is to identify risks and provide a sustainable cost-effective set of actions to mitigate the impact of natural hazards at the local level. The plan meets FEMA planning requirements of the National Flood Insurance Program's (NFIP) Community Rating System (CRS). CRS allows participating communities to earn credit towards discounts in flood insurance premiums. Also, the Village Board passed a resolution in 2003 to opt-into *Will County's Storm Water Management Ordinance*. The Village's local plans and ordinances address some of the impacts created by climate change, but they are not necessarily discussed in relation to climate change and variability. These plans and ordinances are:

1. *Park Forest Unified Development Ordinance* (2017)
2. *Village of Park Forest Response Plan* (December 2014)
3. *Ecosystem Enhancement Plan* (2013)
4. *Growing Green: Park Forest Sustainability Plan* (2012)

The table below was developed to address areas of concern related to climate change in the Village and how they are included in the Cook County or Village plans.

Area of concern	Impacts		Cook County Multi-Jurisdictional Hazard Mitigation Plan	Village Plans
Built Environment and Infrastructure	Increase the frequency of storms and floods on critical infrastructure		√	
	Increased flood damage because area of significant flood risk and elevation of floodwaters are underestimated on flood maps			
	Critical facilities exposed to the flood risk		√	
	Increased downstream flood damage due to inadequate detention			

	Increased damage to roofs, windows, and other building components			
Water Resources	Poor water quality		√	
	Increases challenge of planning for demand			
	Increases drinking water demand			
	Higher chance of microbial contamination from flooding			
	Drought		√	
Operation and Maintenance	Rapid increase in storm sewer system repair and management		√	√
	Rapid increase in roads and infrastructure maintenance			
	Greater peak demand for electricity due to cooling needs			
	Increase needs of community cooling and heating centers			
Public Health and Safety	Increased Frequency of Severe Storm Events		√	√
	Food availability and Access		√	√
	Heat Stress and Mental stress and fatigue.		√	√
	Mosquitoes and animals		√	
	pandemic human diseases		√	√
	Hazardous material incidents		√	√
	Power Outages		√	
Ecosystems and Habitats	Increase of invasive species			√
	Destruction of habitat		√	
	Erosion and sedimentation issues			
	Increased stress on street trees, landscaping, and other natural areas			
Economy	Businesses Plan and Equipment shortage			
	Evacuation and limited supplies		√	√
	Capacity for backup power generation		√	
	Power Outages		√	

**Table 5:** Areas of Concern within Community plans.

None of the Village's plans currently in place have incorporated climate change education and adaptation into the process or the final report. The *Park Forest Response Plan* does address the Village's response to natural hazards, including severe and excessive heat/cold, severe thunderstorms, high winds, microbursts, lightning, hail, tornadoes, and winter storms. The *Climate Action and Resilience Plan* will recommend that the *Park Forest Response Plan* and the Village's comprehensive plans be re-examined to ensure that they also address climate adaptation and education in order to reduce the impact of climate change on the community's residents, businesses, infrastructure, and facilities.

## Potential Adaptation Strategies

The climate vulnerability assessment should result in a list of priority adaptation strategies that will increase the Village's resilience to climate change. The *Climate Adaptation Guidebook for Park Forest Climate Action and Resilience Plan*

*Municipalities in the Chicago Region* was developed by CMAP in 2013 to aid municipalities that are interested in adapting their planning and investment decisions to climate change<sup>23</sup>. According to the guide, the following principles should be considered while developing these strategies:

- Identifying clear objectives and measurable targets is critical to guiding the overall direction of an adaptation strategy.
- Identifying parties that will be responsible for implementation and oversight helps to organize the plan of action.
- Identifying available funding sources early ensures that recommendations can actually be implemented.
- Identifying any relevant existing plans, codes, and policies allows local leaders to dovetail adaptation with existing operations.
- Implementation can be streamlined if the mechanism to carry out the measure can be clearly identified. Improving infrastructure, for example, may be implemented by a public works department, while strengthening floodplain management standards may require changes to local ordinances.
- Communicating with the public about the measures that are being undertaken can educate residents about the importance of adaptation to their public infrastructure and services, as well as provide examples of actions that residents and business owners can undertake on their own properties.

Following are some strategies that meet these criteria and the Village may want to consider.

## **Flooding and Storm Water Management**

The Village owns and maintains the storm drainage system and the storm sewers. With heavier rain events occurring more frequently over time, higher demands will be placed on this system increasing the potential for failure. Improvements should be considered to address climate change flood risks, such as:

- Increase flood protection elevation for houses and other buildings in flood areas.
- Apply floodplain management requirements to areas larger than the historic Special Flood Hazard Area (based on 100-year flood).
- Develop a storm water master plan to identify needed drainage improvements.
- Model and reduce inflow/infiltration in the sanitary sewer system.
- Implement policies and procedures for post-flood and/or post-fire repairs.
- Increase capacity for wastewater and storm water collection and treatment.
- Integrate green and gray infrastructure measures for a more adaptive storm water management strategy.

## **Drinking Water**

The variability in weather conditions may cause an increase in water demand due to warmer temperatures and longer periods without rain. According to the Illinois State Water Survey, projected demand can be met, but with some consequences. For instance, groundwater users may have to rely on deeper, more brackish water since shallower aquifers will probably be dewatered by mid-century at

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<sup>23</sup> *Climate Adaptation Guidebook for Municipalities in the Chicago Region*, CMAP



current rates of use. There could be financial implications, as well, because water rates will be higher due to increased costs for pumping and treatment, and the costs of environmental damage must be included. Some potential adaptation strategies to minimize these impacts are:

- Integrate climate change scenarios into the water supply system.
- Increase water storage capacity.
- Implement conservation measures.
- Model and monitor groundwater conditions.
- Prepare for increased frequency/severity of droughts and other emergencies.

## **Built Environment and Infrastructure**

It is important to take into consideration that buildings and infrastructure should be suited to a changed climate situation. Moreover, buildings and infrastructure affect the climate and contribute to climate change. Adaptation strategies can minimize the effects of the built environment and vice versa. Potential adaptation measures are:

- Integrate climate-related risks into capital improvement plans.
- Require measures to improve building material durability.
- Identify and protect vulnerable facilities.
- Minimize utility infrastructure conflicts with trees on public and private property.
- Permit and encourage distributed renewable energy generation.
- Support energy efficiency efforts.

## **Public Health and Safety**

The climate change threats on public health and safety is one of the greatest concerns to the community. It is important to address possible ways the community can take to reduce anticipated, current, and future climate threats to public health. The Centers for Disease Control and Prevention's (CDC) Building Resilience Against Climate Effects (BRACE) program includes a set of strategies to help communities prepare for the health effects of climate change including:

- Develop an accessible record of facilities and locations with concentrations of high-risk individuals.
- Extend hours of operation at community centers with air conditioning.
- Arrange for extra staffing of emergency support services.
- Coordinate public awareness and education of severe weather events and tips on how to stay safe during these events.
- Identify the climate impacts on water quality and the associated potential health outcomes, specifically on vulnerable populations.

## **Ecosystems and Open Spaces**

Trees have a significant influence on reducing the urban heat island effect in urban areas, which generally have higher temperatures than surrounding undeveloped areas. Shading and the uptake/release of moisture from trees both help to moderate summer temperatures. Trees also help lessen some of the impacts of climate change by reducing the runoff from storm. Furthermore, trees help remove air emissions that lead to ground-level ozone, which triggers asthma and has other negative health effects. Finally, trees help mitigate climate change by helping remove carbon dioxide from the atmosphere.









- Establish open space corridors that are part of a connected regional network.
- Take actions to grow and protect the urban forest.
  - Review approved list of tree species for street trees based on resilience to invasive species and tolerance to heat and drought and replace trees as appropriate.
  - Undertake a review of natural area management for climate change.

# APPENDIX V: Suggested Metrics

This Appendix identifies a number of metrics that might be used for ongoing monitoring of the implementation of the CARP. After the CARP is adopted, Park Forest Staff and the Steering Committee will engage with community members, businesses, institutions, and other stakeholders to identify specific metrics related to the Objectives, Strategies, and Actions recommended in the Plan. The metrics in this Appendix provide a place for that discussion to begin.

Suggested metrics that are **highlighted** address populations of concern as described in the CARP.





## Focus Area 1: Energy Efficiency and Buildings

Objective	Community/ Government	Co-Benefit	Reduction Potential
1. Achieve a 20% reduction in energy use in existing residential buildings by 2025.	Both		
2. Achieve a 10% reduction in energy use in existing commercial and industrial buildings by 2025.	Both		
3. Achieve a 25% reduction in energy use in Village-owned and other public buildings by 2025.	Government		
4. Encourage the production and use of clean, local energy.	Both		

<b>E1A : Modify energy use behavior and habits</b>	<b>Lead &amp; Partner</b>	
Develop an energy efficiency campaign to encourage modifying energy use behavior and habits.	VPF, DCD, EC	<ol style="list-style-type: none"> <li>1. Number of outreach material produced</li> <li>2. Number of attendees at events</li> <li>3. Number of households reached</li> <li>4. Number of households in priority neighborhoods reached by the campaign</li> </ol>
Develop and implement a residential energy challenge.	SC	<ol style="list-style-type: none"> <li>1. Number of households that participated in the challenge</li> <li>2. Amount of reduction in energy consumption in the participating households</li> </ol>
Develop a green building handbook to assist homeowners in implementing green practices.	VPF, SC	<ol style="list-style-type: none"> <li>3. Number of copies sent out or downloaded from the website</li> <li>4. Number of inquiries received</li> </ol>
Hold energy efficiency workshops at the public library, Village Hall, and other locations.	VPF, SC, CE	<ol style="list-style-type: none"> <li>1. Number of workshops held</li> <li>2. Population categories targeted by workshops</li> <li>3. Number people in attendance at the workshops</li> </ol>
<b>E1B: Increase residential use of utility incentives for energy efficiency</b>	<b>Lead &amp; Partner</b>	
Develop a comprehensive energy efficiency upgrade outreach program to increase awareness of incentives/rebates available from utilities.	VPF, DEDP, EE	<ol style="list-style-type: none"> <li>1. Number of households reached</li> <li>2. Number of households who participate in energy efficiency incentives available from utilities (Data from ComEd, Nicor)</li> </ol>
Expand and better integrate programs that increase energy efficiency in low income households.	VPF, DCD, DEDP, PFHA	<ol style="list-style-type: none"> <li>1. Number of households reached by events or flyers in neighborhoods with high percentage of low income people (mapped)</li> </ol>
<b>E2A: Increase commercial and industrial use of utility incentives for energy efficiency</b>	<b>Lead &amp; Partner</b>	
Develop an energy efficiency campaign to encourage businesses to install energy efficient appliances, fixtures, amenities, and systems.	VPF, DEDP, EE	<ol style="list-style-type: none"> <li>1. Number of businesses reached.</li> <li>2. Number of businesses that make energy efficiency upgrades (self-reported)</li> </ol>
Partner with local utility companies so commercial and industrial properties maximize use of energy efficiency rebate programs.	VPF, DEDP, CE, N	<ol style="list-style-type: none"> <li>1. Number of businesses that participate in the programs</li> <li>2. Energy consumption change for the participating businesses (self-reported)</li> </ol>
<b>E3A: Increase the energy efficiency in Village-owned buildings</b>	<b>Lead &amp; Partner</b>	

Continue installing energy efficient appliances, fixtures, amenities, and systems.	VPF, DRP	1. Amount of energy efficiency upgrade at the Village owned buildings. (number of appliances, fixtures, etc. upgraded) 2. Energy consumption difference
Continue energy use tracking and benchmarking.	VPF, SC	1. Prepare annual energy consumption reports
<b>E3B: Modify energy use behavior and habits in Village-owned buildings</b>	<b>Lead &amp; Partner</b>	
Develop and implement a multi-department energy challenge.	VPF, FD, SC	1. Number of departments participating in the challenge annually 2. Energy consumption reduction in the challenge period and after (measure the challenge effect in creating new habits)
Develop an energy efficiency campaign to encourage modifying energy use behavior and habits.	VPF, SC	1. Number of workshops, lectures held for the Village employees 2. Number of employees reached by the campaign(attendance at workshops, flyers distribution) 3. Employee self-reported changes in habits
<b>E3C: Increase the energy efficiency in schools</b>	<b>Lead &amp; Partner</b>	
Expand partnership with school districts for Climate Action outreach, competitive programs, and energy efficiency campaign.	VPF, SC	1. Number of schools reached 2. Number of events held at schools (number of events, number of students attending workshops or outreach events) 3. Number of schools performing energy efficiency upgrades (self-reported)
<b>E4A: Facilitate renewable energy investment</b>	<b>Lead &amp; Partner</b>	
Convert at least one Village-owned building to renewable energy.	VPF, CE	The percentage of energy supplies which come from renewable energy in Village-owned buildings
<b>E4B: Support the adoption of renewable energy technologies in the community</b>	<b>Lead &amp; Partner</b>	
Provide access to community solar.	VPF, DEDP	Number of electrical accounts with access to community solar

## Focus Area 2: Transportation







Objective	Community/Government	Co-Benefit	Reduction Potential
1 Achieve 10% reduction of vehicles miles traveled.	Both		
2 Reduce emissions from vehicle miles traveled.	Both		

T1A: Promote sustainable transportation behavior and habits	Lead & Partner	
Actively promote walking and biking as safe modes of local travel, particularly for children attending local schools.	VPF, DPW, EC, SC	<ol style="list-style-type: none"> <li>1. The number of students reached by outreach material or programs</li> <li>2. Survey the number of children who walk or bike to school</li> </ol>
Initiate a community awareness of public transportation options campaign in schools, park facilities, community buildings, and shopping areas.	VPF, SC, DEDP, S, MFP, DPW	<ol style="list-style-type: none"> <li>1. Number of residents reached by outreach material or programs.</li> <li>2. Travel mode community survey (base line - 93% of POLCO survey respondents' primary means of transportation is their cars)</li> </ol>



T1B: Improve transportation options	Lead & Partner	
Increase Pace access to Metra trains and intermodal linkages.	VPF, SC, DPW	<ol style="list-style-type: none"> <li>1. The increase of percentage of people within a walking distance from a bus route or other type of public transportation access</li> <li>2. Percentage of population of concern within a walking distance from a bus route or other type of public transportation access</li> </ol>
Continue to include sustainable transportation improvements in the Village's Capital Plan.	VPF, DPW, SC	<ol style="list-style-type: none"> <li>1. Percentage increase in bike lanes and sidewalks</li> <li>2. Percentage increase in ADA accessible sidewalks.</li> <li>3. Number of sidewalk-to-street ramps added</li> </ol>
	VPF, DEDP, MFP	<ol style="list-style-type: none"> <li>1. Percentage of community covered with bike sharing or car sharing station</li> <li>2. Amount of active use of the bikes/cars in the program</li> <li>3. Percentage of priority neighborhoods covered with bike sharing or car sharing station</li> </ol>
T2A: Promote sustainable transportation behavior and habits	Lead & Partner	
Develop an idling reduction campaign at waiting locations such as schools, parks, ball fields, community buildings, and shopping areas.	VPF, DEDP, S, RPD	<ol style="list-style-type: none"> <li>1. Amount of different outreach material produced and number given away or downloaded online.</li> <li>2. Number of locations where the outreach material given away or outreach event held</li> </ol>
Increase accommodation and promotion of alternatively fueled vehicles.	VPF, DEDP, PD, DPW	<ol style="list-style-type: none"> <li>1. Number of electrical charging stations in the Village</li> </ol>
T2B: Reduce Village fleet vehicle emissions.	Lead & Partner	
Conduct fleet size and utilization study.	VPF, DPW, RPD	<ol style="list-style-type: none"> <li>1. Complete of study</li> <li>2. Number of recommendations which are implemented</li> </ol>
Adopt sustainable purchasing policy to include a replacement program for alternatively fueled vehicles within the Village's fleet.	VPF, PD, RPD	<ol style="list-style-type: none"> <li>1. Adoption of sustainable purchasing policies</li> <li>2. Number of alternatively fueled vehicles in Village fleet</li> </ol>

## Focus Area 3: Waste Reduction and Recycling

Objective	Community/ Government	Co-Benefit	Reduction Potential
1 100% of Park Forest residents have access to waste reduction and recycling resources.	Both		
2 Increase commercial waste reduction and recycling participation efforts.	Both		
3 Increase waste reduction and recycling participation at Village buildings, operations, parks, and events.	Government		

R1A: Increase recycling behavior and habits in the community	Lead & Partner	
Partner with schools, library, and houses of worship to enhance education about reducing, reusing, recycling, and composting waste.	VPF, DCD, PFPL, SD, POW,	<ol style="list-style-type: none"> <li>1. Number of educational events held at schools, library, houses of worship, and local venues.</li> <li>2. Number of schools and houses of worship that maintain or initiate recycling programs</li> </ol>
Expand and support efforts to increase community awareness around recycling through special events, drop boxes, publications, garage sales, and recycling pick up services.	VPF, DEDP, DCD, SC	<ol style="list-style-type: none"> <li>1. Number of special events, drop boxes, publications, garage sales, and recycling pick up services available.</li> <li>2. Number of households in priority neighborhoods reached by these programs.</li> </ol>
R1B: Connect residents with resources for recycling materials.	Lead & Partner	
Continue to expand Growing Green Recycle Fest for paper shredding, electronics and clothes and shoes collection, and other materials.	VPF, DEDP, SC, EC	<ol style="list-style-type: none"> <li>1. Growing Green Recycle Fest numbers</li> </ol>
Develop a composting program, and provide incentives for residents to practice.	VPF, SC, EC	<ol style="list-style-type: none"> <li>1. Progress in developing composting program</li> <li>2. Number of incentives available for residents</li> <li>3. Number of households participating in composting program</li> </ol>

Expand curb-side electronic recycling program to multifamily properties.	VPF, MFP, HD	1. Percentage of multifamily households covered by curb-side electronic recycling program
<b>R2A: Decrease commercial and industrial waste.</b>	<b>Lead &amp; Partner</b>	
Work with local businesses to reduce the use of disposable items such as plastic bags and take-out containers.	VPF, DEDP	1. Number of businesses participating in reducing the use of disposable items
Consider a tax or ban on single-use plastic bottles and plastic bags in order to discourage usage	VPF, DEDP	1. Development of ordinance or policy which bans single-use plastic bottles and plastic bags
<b>R3A: Increase waste reduction and recycling in public buildings</b>	<b>Lead &amp; Partner</b>	
Develop an environmentally friendly purchasing policy. Require the purchase of “green” products and the minimization of the use of disposables such as Styrofoam cups, plates and plastic ware, and bottled beverages.	VPF, F	1. Adoption of environmentally friendly purchasing policy
Reduce municipal solid waste (MSW) going to landfills by effectively reusing materials and increasing recycling.	VPF, SC	1. The amount of recycling from the Village buildings (self-tracking)
<b>R3B: Increase waste reduction and recycling participation at Village’s events and public spaces</b>	<b>Lead &amp; Partner</b>	
Require every event held by the Village to offer recycling by providing specifically marked bins and arranging for collection of recyclables.	VPF, RPD, DEDP, PD, FD	1. Number of events held by the Village which offer recycling
Encourage every event held in the Village public spaces to offer recycling by providing specifically marked bins and arranging for collection of recyclables trash.	VPF, RPD, DEDP, SC, PFPL	
<b>R3C: Increase the reuse and recycling of construction and demolition waste</b>	<b>Lead &amp; Partner</b>	
Require reuse and recycling of construction and demolition waste in Village projects.	VPF, DCD	1. Require reports on amount of materials reused and recycled for each Village demolition project

Offer incentives to increase the reuse and recycling of construction and demolition waste in private projects.	VPF, DEDP, DCD	1. When incentives approved, require reports on amount of materials reused and recycled for each project
<b>R3D: Increase waste reduction and recycling in schools</b>	<b>Lead &amp; Partner</b>	
Expand partnerships with school districts for recycling outreach, competitive programs, and campaigns.	VPF, SC, S	1. Number of schools that participate in programs 2. Amount of recycling materials generated by each event


## Focus Area 4: Water and Wastewater Management

Objective	Community/Government	Co-Benefit	Reduction Potential
1 Make efficient use of water.	Both		

<b>W1A: Improve water system efficiency</b>	<b>Lead &amp; Partner</b>	
Continue upgrading the mechanical and electrical systems at water plant and on the water wells to reduce electrical demand.	VPF, DPW	1. Reduction in electric demand at water treatment and distribution facilities.
Systematically replace water meters in homes and businesses so billing accurately reflects water usage.	DPW, F	1. Number of water meters upgraded annually. 2. Number of water meters upgraded in priority neighborhoods annually.

Regularly review water service rates to ensure long-term sustainability.	VPF, F	1. Time interval for water service rates review
Develop a plan to replace water mains in danger of breaking.	VPF, DPW	1. Linear feet of water mains replaced annually 2. Improvement in the water loss rate
<b>W1B: Reduce community water consumption per capita</b>	<b>Lead &amp; Partner</b>	
Raise public awareness and provide education about water resources.	VPF, DCD, SC, EC	1. The number of people reached by outreach material or programs
Adopt an ordinance that requires use of water efficient appliances, including low-flow faucets, shower heads, and toilets in new construction or rehabilitation projects of more than 50 percent of the value.	VPF, DEDP, DCD	1. Adoption of the ordinance
Encourage use of Water Sense and Energy Star appliances, including low-flow faucets, shower heads, and toilets.	VPF, MFP, DCD	1. Number of households which use Water Sense and Energy Star appliances( self-reported)
<b>W1C: Implement policies and practices that treat rainwater as a resource</b>	<b>Lead &amp; Partner</b>	
Adopt policies, ordinances, and codes that promote green solutions to storm water management.	VPF, DEDP	1. Adoption of policies, ordinances, and codes
Expand green infrastructure best management practices on municipal properties.	VPF, DPW, DRP	1. Number of installations of green infrastructure on Village property
Develop and implement a rain garden incentive program, and continue to provide rain barrels to residents.	VPF, DPW, DRP	1. Number of people who participate in the rain garden program 2. Number of rain gardens installed in the community 3. Number of rain gardens installed in neighborhoods with flooding issues





## Focus Area 5: Open Spaces and Ecosystems

Objective	Community/ Government	Co-Benefit	Reduction Potential
1 Reduce GHG emissions by increasing green spaces and tree canopy and assuring local food security.	Both		

O1A: Maintain and preserve public open spaces	Lead & Partner	
Preserve open spaces and increase residents' accessibility to public open spaces	VPF, RPD	1. Percentage of residents within walking distance from open spaces
O1B: Maintain and increase the tree canopy		
Increase canopy cover diversity on public property for air quality and shade.	VPF, RPD	1. Number of tree species in the Village 2. Life span of the trees in the Village
Require the use of native plants in all public park landscape projects.	VPF, RPD	1. Percentage of native plants used in the Village landscape projects
O1C: Increase urban agriculture/community gardening practices		
Promote urban agriculture practices, and increase community involvement in community gardens or urban food forests.	VPF, RPD, DEDP, SC, S, PFPL, POW	1. Number of residents involved in community gardening 2. Number of organizations involved in community gardening
Increase active urban farms and community gardens by 20%.	VPF, RPD, DEDP, SC	1. Number of active community gardens



## Adaptation Focus Areas


Focus Area	Community/Government	Co-Benefit
1 Local public health and safety.	Both	
2 Emergency preparedness.	Both	
3 Flooding and Storm Water Management	Government	
4 Ecosystems and Open Spaces	Both	

### Local Public Health and Safety

Objective 1 –Local Public Health and Safety	
Support local public health and safety.	

HS1A: Focus on Vulnerable Populations	Lead & Partner	
Develop an accessible record of facilities and locations with concentrations of populations of concern.	VPF, FD, HC	<ol style="list-style-type: none"> <li>1. The percentage of residents who are considered populations of concern documented in the records.</li> <li>2. The availability of information on the size, location, and composition of the target population.</li> </ol>
Educate residents, especially populations of concern, about how to prepare for and protect themselves from climate changes most likely to occur in the Park Forest area.	VPF, DPW, FD	<ol style="list-style-type: none"> <li>1. Number of residents reached by outreach material or programs.</li> <li>2. Number of outreach events held and their locations.</li> </ol>
HS1B: Increase public awareness	Lead & Partner	
Coordinate public awareness and education of severe weather events and tips on how to stay safe during these events.	VPF, SC, HC, FD	<ol style="list-style-type: none"> <li>1. Number of residents reached by outreach material or programs.</li> <li>2. Number of outreach events held and their locations.</li> </ol>
Create a handbook of available resources and assets in case of emergency.	VPF, HC, FD	<ol style="list-style-type: none"> <li>1. Number of copies sent out or accessed online.</li> <li>2. Number of inquiries received</li> </ol>
Build community partnerships to support neighborhood preparedness.	VPF, HC, FD	<ol style="list-style-type: none"> <li>1. Number of residents involved in community partnerships</li> <li>2. Percentage of community neighborhoods covered by partnerships</li> </ol>

## Emergency Preparedness

Objective 2- Emergency preparedness.	
Adopt comprehensive adaptation strategies to prepare for climate-related emergencies	

EP1A: Address climate resilience in disaster preparedness efforts	Lead & Partner	
Incorporate hazard mitigation and climate resilience considerations into the Village's emergency response plan.	VPF, FD	<ol style="list-style-type: none"> <li>1. Number of policies, ordinances, and codes adopted taking into consideration climate related risk</li> <li>2. Revisions made to Emergency Response Plan and Comprehensive Plan to incorporate hazard mitigation and climate resilience</li> </ol>
Identify additional cooling centers that are accessible to populations of concern.	VPF, FD, PD, Library	<ol style="list-style-type: none"> <li>1. Number of cooling centers</li> <li>2. Percentage of residents who are within populations of concern within 10 miles from a cooling center</li> </ol>
EP1B: Incorporate climate change impacts into infrastructure planning and operations.	Lead & Partner	
Incorporate improvements to address climate-related risks into capital improvement plans.	VPF, DEDP	<ol style="list-style-type: none"> <li>1. Number of improvement projects which address climate-related risks</li> </ol>
Require measures to improve building material durability.	VPF, DEDP	<ol style="list-style-type: none"> <li>1. Number of measures adopted taking into consideration climate-related risk on water supply</li> </ol>
Integrate climate change scenarios into water supply system planning.	VPF, DPW	<ol style="list-style-type: none"> <li>1. Water supply system plan adopted taking into consideration climate related risk to buildings.</li> </ol>
Monitor climate impacts on water quality and the associated potential health outcomes, specifically on populations of concern.	VPF, DPW	<ol style="list-style-type: none"> <li>1. Regular reports analyzing climate change associated potential health outcomes (consider five year intervals)</li> </ol>
Identify and protect vulnerable critical facilities.	VPF, PD,RPD	<ol style="list-style-type: none"> <li>1. Existence of vulnerable critical facilities records</li> <li>2. Number of improvements to critical facilities and infrastructure to prepare for climate change threats</li> </ol>
EP1C: Public Outreach	Lead & Partner	
Work with local businesses to increase their ability to recover after an extreme weather event.	DEDP, SC	<ol style="list-style-type: none"> <li>1. Number of local businesses that have recovery plans</li> </ol>

## Flooding and Storm Water Management

### Objective 3- Flooding and Stormwater Management.

Plan for flood recovery and long-term flood resilience in the community



FS1A: Address climate change flood risks in storm water management practices	Lead & Partner	
Apply modern storm water design methods to future developments that recognize 100 year flow paths and elevate critical facilities with appropriate freeboard.	VPF, DPW	1. Flood risk data used in development projects
Increase flood protection elevation for houses and other buildings in flood areas.	VPF, DEDP, DPW	1. Number of houses and buildings in flood areas which have addressed flood risk 2. Adoption of requirements for increased flood protection.
Implement policies and procedures for post-flood recovery.	VPF, DPW	1. Adopted policies and procedures which address post-flood recovery 2. Village employees trained on post-flood recovery policies and procedures
Develop a stormwater master plan to identify needed drainage improvements.	VPF	1. Adoption of stormwater master plan to identify needed drainage improvements
Integrate green infrastructure measures into development requirements for public and private projects.	VPF, DPW	1. Number of projects which incorporate green infrastructure measures 2. Adoption of policies and ordinances which require green infrastructure measures to be integrated into new projects

## Ecosystems and Open Spaces

### Objective 4- Ecosystems and Open Spaces

Manage ecosystems and open spaces for resiliency.



NS1A: Preserve Habitat and natural areas	Lead & Partner	
Preserve and restore the structural complexity and biodiversity of vegetation in wetlands	VPF, RPD	<ol style="list-style-type: none"> <li>1. Number of species restored and protected in wetland (assessment)</li> <li>2. Number of species lost or endangered in wetland</li> </ol>
Establish open space corridors that are part of a connected regional network	VPF, RPD	<ol style="list-style-type: none"> <li>1. Acreage of new open spaces that are part of a regional network</li> </ol>
Increase species diversity in the Village's urban forest to address stressors such as invasive species, tolerance to heat, uneven precipitation, and drought.	VPF, RPD, DPW	<ol style="list-style-type: none"> <li>1. Number of species in the Village's urban forest (assessment)</li> </ol>
Incorporate green infrastructure into Village-owned parks and open space to enhance stormwater management, water quality, habitat, and educational resources.	VPF, RPD, DPW	<ol style="list-style-type: none"> <li>1. Number of projects on Village-owned land which incorporate green infrastructure measures</li> </ol>
Complete the inventory of the Village's urban forest and develop a plan for maintenance and replacement.	VPF, RPD	<ol style="list-style-type: none"> <li>1. Completion of the urban forest inventory and plan for continual updates</li> <li>2. Development of a plan for maintenance and replacement of the urban forest</li> </ol>