



**SEPT  
2018**

CITY OF FLAGSTAFF  
**CLIMATE ACTION & ADAPTATION PLAN**

# Draft Review: Community Input Opportunities

**This is a draft** of the Flagstaff Climate Action and Adaptation Plan. It has been developed with input from community members, technical staff, partners and a Steering Committee over the last ten months.

**Community input** is needed on this draft. Input received between September 19<sup>th</sup> and October 24<sup>th</sup> 2018 will be used to revise Plan strategies, actions, and targets. **We hope to hear from you.**

## COMMUNITY REVIEW

This draft Plan will be reviewed by the Flagstaff City Council and community members starting in September 2018. All comments from the public are welcome.

### City Council

The Flagstaff City Council will review the Draft Plan at three Council Work Sessions:

Date	September 25 <sup>th</sup> , 2018	October 9 <sup>th</sup> , 2018	October 23 <sup>rd</sup> , 2018
Topics	<b>Plan foundations</b>  <b>Focus areas:</b> Energy Transportation and Land Use	<b>Focus areas:</b> Natural Environment Water Resources Waste and Consumption Economic Prosperity and Recreation	<b>Focus areas:</b> Public Health and Emergency Services  <b>Implementation Strategy</b>

All three work sessions will begin at 6:00 pm. The public is invited to provide comments on the Plan during the work sessions.

Council agendas are available at <https://www.flagstaff.az.gov/991/Agendas-Minutes>.

### Open Houses

Three Open Houses will be held to review the Plan with the community and collect public comments. The Open Houses are scheduled as follows:

- 5:30 – 7:30 pm on Thursday, October 4<sup>th</sup>
- 5:30 – 7:30 pm on Monday, October 8<sup>th</sup>
- 5:30 – 7:30 pm on Thursday, October 11<sup>th</sup>

All Open Houses will take place at the Murdoch Community Center, located at 203 E. Brannen Avenue, Flagstaff, AZ 86001.

### Online Feedback

The Plan Draft is also available online at [www.Flagstaff.AZ.Gov/ClimatePlan](http://www.Flagstaff.AZ.Gov/ClimatePlan).

A Flagstaff Community Forum feedback survey will collect public comments at [www.Flagstaff.AZ.Gov/FCF](http://www.Flagstaff.AZ.Gov/FCF).



# Acknowledgments

## ACKNOWLEDGMENTS

The goals, strategies, and indicators presented in this plan were developed through collaboration with residents of Flagstaff, City of Flagstaff staff, and City Council members.

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<b>Charlie Odegaard</b>	Council member
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# Acknowledgements

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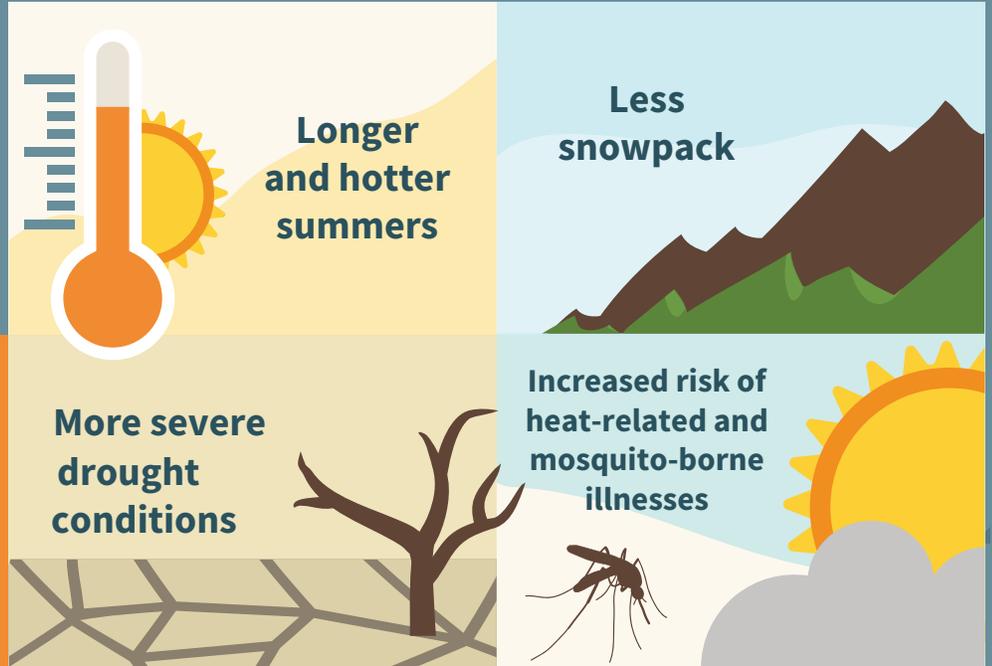
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## Appendix

Sources cited in the Plan

# The climate is changing.

Climate change will affect all facets of the Flagstaff community. Anticipated impacts in Flagstaff include:



## What is Flagstaff going to do about it?

This Climate Action and Adaptation Plan will guide the Flagstaff community in preparing for climate risks, reducing greenhouse gas emissions, and protecting the wellbeing of residents for decades to come.

### OUR GOALS

Reduce greenhouse gas emissions

by **80%**

by 2050, compared to the 2016 emissions baseline.

Make sure that our **neighborhoods, resources and economy are more resilient** to climate change impacts.

Address climate change impacts in a manner that **prioritizes those most impacted.**

To meet these goals, we are **taking action across sectors:**



WATER



ENERGY



TRANSPORTATION & LAND USE



WASTE & CONSUMPTION



PUBLIC HEALTH & SAFETY



PROSPERITY & RECREATION

# 9

**equity considerations** will guide Plan implementation and ensure that participation in climate action is accessible to the entire Flagstaff community.

The Climate Action and Adaptation Plan will be **updated every**

# 5 years

# EXECUTIVE SUMMARY

## WHY DO WE NEED A PLAN?

Climate change is bringing changes in temperature, snowpack, water availability, and wildfire risk to Flagstaff. These changes threaten Flagstaff’s natural resources, economy, infrastructure, and quality of life. This Climate Action and Adaptation Plan (Plan) is a strategic roadmap to guide the Flagstaff community in preparing for climate risks, reducing greenhouse gas emissions, and protecting the wellbeing of residents for decades to come.

## CLIMATE CHANGE RISKS

Anticipated climate change impacts in Flagstaff include the following:



### Hotter temperatures

- Longer and hotter summers
- Difficulty for sensitive populations and those without air conditioning
- Increased risk of disease or illness from mosquitoes and other pests



### Less snowpack

- More rainfall instead of snowfall
- Increased flooding of infrastructure and buildings from more intense rainstorms
- Increased risk of post-wildfire floods



### Less healthy forests

- Increased wildfire risk for local forests
- Increased damage from forest pests due to hotter temperatures and drought-stressed trees



### Drier conditions

- More severe drought conditions as temperatures rise
- Lower water quality of reservoirs

## FLAGSTAFF'S CONTRIBUTION TO CLIMATE CHANGE THROUGH GREENHOUSE GAS EMISSIONS

Transportation and building energy consumption combined make up nearly 90% of Flagstaff's greenhouse gas emissions. Residential-owned vehicles account for most of the transportation emissions. The consumption of electricity and use of natural gas in homes, businesses, and industrial buildings account for most of the energy emissions. Solid waste disposal, water and wastewater treatment, and fugitive emissions (e.g., from leaks) make up relatively smaller portions of Flagstaff's emissions.

Forecasts estimate that Flagstaff's overall emissions will increase 34% by 2050 compared to a 2016 baseline in the absence of climate action. This Climate Action and Adaptation Plan is designed to get us to a more sustainable future with lower emissions.

## DEVELOPMENT OF THIS PLAN

This Plan was written with the community, for the community, through an extensive year-long community and stakeholder engagement process that included:

- » Six public open houses attended by over 300 community members.
- » Three online surveys taken by over 250 community members.
- » Meetings with local organizations and neighborhood groups and collaborations with Coconino County representatives.
- » A 15-member citizen steering committee that provided input and feedback throughout the planning process.
- » Workshops and meetings with technical experts, including 30 City staff across divisions, to vet and evaluate plan targets, strategies, and actions.



# Executive Summary



## VISION FOR 2050

Our vision for the future is that the Flagstaff community proactively preserves the natural environment, works towards carbon neutrality, and enhances the quality of life for all residents while ensuring equity, self-sufficiency, and climate resiliency.

## OVERARCHING GOALS

This Plan is designed to achieve the following climate goals:

- » Reduce greenhouse gas emissions by 80% by 2050, compared to the 2016 emissions baseline. We have interim targets of a 15% reduction by 2025 and a 30% reduction by 2030.
- » Prepare the city’s neighborhoods, systems, and resources to be more resilient to climate change impacts
- » Address climate change in a manner that prioritizes those most impacted and ensures that the costs and benefits of climate adaptation and mitigation are equitably distributed.

## STRATEGIES

This Plan recommends the following strategies to achieve City of Flagstaff's overarching climate goals.



### Natural Environment

- STRATEGY 1.** Protect existing forests, resources, and meaningful open spaces.
- STRATEGY 2.** Improve forest management through collaboration with regional partners.
- STRATEGY 3.** Educate the public on forest health risk and fire prevention.
- STRATEGY 4.** Encourage diverse native plant ecosystems in the built environment.
- STRATEGY 5.** Proactively manage for expected ecosystem transitions, including the potential threats to ponderosa pine forests.



### Water Resources

- STRATEGY 1.** Improve water infrastructure and expand water reuse.
- STRATEGY 2.** Improve ecosystem management for protection of water resources.
- STRATEGY 3.** Continue to support water conservation efforts across the Flagstaff community.
- STRATEGY 4.** Maximize passive and active community rainwater infiltration.



### Energy

- STRATEGY 1.** Improve energy efficiency in all sectors.
- STRATEGY 2.** Expand renewable energy generation and use.
- STRATEGY 3.** Manage energy demand and consumption in residential, commercial, and industrial sectors, to reduce greenhouse gas emissions.



### Transportation and Land Use

- STRATEGY 1.** Advance land use planning that minimizes the distance people have to travel by car and that increases community resiliency.
- STRATEGY 2.** Prioritize, incentivize, and promote transportation by biking, walking, and transit.
- STRATEGY 3.** Support the use of clean, energy-efficient vehicles.
- STRATEGY 4.** Encourage efficient driving practices.
- STRATEGY 5.** Manage transportation demand and reduce the frequency with which people drive alone.
- STRATEGY 6.** Increase the supply of housing that is affordable to Flagstaff residents and located in areas that support biking, walking, and transit access to goods and services.

# Executive Summary



## Waste and Consumption

- STRATEGY 1.** Increase waste diversion.
- STRATEGY 2.** Support sustainable and accessible production and consumption.
- STRATEGY 3.** Optimize collection and disposal systems to minimize greenhouse gas emissions.
- STRATEGY 4.** Improve data collection on consumption, waste, and diversion.
- STRATEGY 5.** Increase local food production through partnerships and policies.



## Public Health, Services, Facilities and Safety

- STRATEGY 1.** Identify and target support for at-risk populations.
- STRATEGY 2.** Adequately fund services for disaster preparedness.
- STRATEGY 3.** Increase community awareness of climate change risks and impacts and improve community capacity to respond to new or expanding risks to public health.
- STRATEGY 4.** Improve the resiliency of public infrastructure.
- STRATEGY 5.** Prepare for changing risks to public health due to climate change.



## Economic Prosperity and Recreation

- STRATEGY 1.** Build an economy that reduces emissions and can effectively adapt as the climate changes.
- STRATEGY 2.** Protect natural areas and ecosystem services that are most vulnerable to the impacts of increased visitation and climate change.
- STRATEGY 3.** Plan for changes to recreation and respond to the impacts of climate change on current Parks and Recreation facilities and operations.

## ANTICIPATED EMISSIONS REDUCTIONS

The suite of strategies, taken together, will result in a 60% reduction in community greenhouse gas emissions. While this falls short of the 80% reduction goal, it represents significant progress and an important first step for climate action and adaptation by the City of Flagstaff. The Plan represents an ongoing and iterative process; it will be updated and adjusted in regular increments as the 80% goal and target date nears.

## IMPLEMENTATION

The Flagstaff City Council will be responsible for oversight of the Climate Action and Adaptation Plan and will make policy decisions to support implementation of the Plan. City staff will integrate Plan goals and strategies into City operations and decision-making and report back on progress.

Achievement of our climate goals will require that staff throughout the City of Flagstaff, community members, business leaders, as well as students and institutions all take action. City staff will work to support community members in taking climate action and involve residents in implementation decisions.

Because climate change most negatively affects vulnerable communities, implementation of this Plan will strive to advance equity while addressing climate change. Nine equity considerations will guide the implementation of climate actions and ensure that participation in climate action is accessible to the entire Flagstaff community. Staff will work to establish partnerships with underserved communities, build capacity for climate leadership across the community, and involve diverse community voices from the start of any program.

## FUTURE UPDATES

The 2018 Climate Action and Adaptation Plan represents the beginning of an ongoing and iterative conversation between the City of Flagstaff and the community it serves. The City will work with the community, local partners, and technical experts to update the Plan every five years, so that we can respond to changing circumstances and learn from implementation challenges and successes.



# Introduction



## Climate Mitigation versus Climate Adaptation

**Climate “mitigation”** refers to actions that reduce greenhouse gas emissions, which contribute to climate change.

**Climate “adaptation”** refers to actions that increase the ability to withstand, respond to, or cope with climate change impacts.

# INTRODUCTION DRAFT

**W**ith clean air, a cooler climate, and beautiful natural areas, Flagstaff is a great place to live and visit. Residents and visitors enjoy the many amenities Flagstaff has to offer—from the Flagstaff Urban Trails System (FUTS) of bike and pedestrian paths to the Grand Canyon to the unique biodiversity of surrounding forests. Home to Northern Arizona University and world-class research centers, Flagstaff residents are informed, passionate, and engaged in issues concerning their community.

Global greenhouse gas (GHG) emissions are changing the climate in ways that threaten Flagstaff’s unique amenities and way of life. Projected changes in temperature, snowpack, water availability, and wildfire risk exacerbate existing challenges and introduce new challenges to Flagstaff’s natural resources, economy, infrastructure systems, and quality of life. While we can work to reduce Flagstaff’s contributions to those climate, preparing for inevitable impacts of these changes in Flagstaff is necessary.

By taking action now to reduce the community’s emissions and prepare for climate risks, the City of Flagstaff can better protect the wellbeing of its residents for decades to come. There are many community benefits to climate action, while the cost of inaction is incredibly high.

This Climate Action and Adaptation Plan (Plan) creates a vision and strategic roadmap for the Flagstaff community to address these risks by reducing greenhouse gas emissions and adapting to a changing climate. It was written by the community, for the community—building on our knowledge of projected local climate changes, sources of greenhouse gas emissions, and community vulnerabilities, priorities, ideas and concerns. It focuses on activities that achieve the greatest emission reductions or do the most to increase our community preparedness and in the most cost-effective and equitable manner. The entire community—Flagstaff businesses, residents, and visitors—all have a role in both implementing the Plan and enjoying its benefits.

# INTRODUCTION

## Plan Overview

The Plan presents goals, targets, strategies, and actions for mitigating and adapting to climate change. It is organized into seven focus areas:



**Natural Environment** refers to ecosystem health, environmentally sensitive lands, plants, soils, and wildlife in the context of natural systems worthy of conservation and protection. This focus area also includes open spaces that protect environmental quality and biodiversity, support tourism, and protect historic and cultural resources.



**Waste and Consumption** refers to the lifecycle of goods and materials, including opportunities to reduce emissions associated with manufacturing, use, and disposal.



**Water Resources** refers to surface water, groundwater, and reclaimed water that serves our residential, commercial, industrial, recreational, and agricultural needs. It includes 100-year water supply planning, diversification of the water supply portfolio, and conservation to sustain our water supplies and quality for future generations.



**Public Health, Services, Facilities, and Safety** refers to facilities and services focused on community health, safety, security, and emergency response.



**Energy** refers to community energy consumption and efficiency, clean and renewable energy sourcing, and a more climate-resilient energy grid. It includes strategies for renewable energy sources and efficient building standards.



**Economic Prosperity and Recreation** refers to community and economic health, including opportunities to reduce emissions and prepare the community's tourism and recreational sectors for climate change.



**Transportation and Land Use** refers to the form and function of transportation systems, including ways to reduce greenhouse gas emissions through design and clean and efficient transportation systems.

# Introduction



For each focus area, this document tells the story of Flagstaff’s climate goals, related activities, strategies, and actions for achieving those goals. The strategies and actions are presented in order of priority as articulated by the Flagstaff community, City staff, and Steering Committee. Each focus area is organized in the following manner:

**Goals, Targets, and Indicators** provide metrics for assessing progress towards achieving the focus area vision.

**Strategies** represent thematic groupings of actions that all work toward a specific goal. Strategies within each focus area are ordered by priority.

**Priority Actions** are actions within a strategy that were prioritized from a broader set of potential actions through an evaluation of cost, effectiveness, feasibility, and co-benefits. These actions are ordered from highest to lowest priority as identified through the evaluation process, and these actions are also included in the implementation plan.

**Other Actions** are opportunities that were identified as potential actions but were not considered high-priority through the community and stakeholder engagement process. These actions will be revisited in future plan updates.

## A LIVING DOCUMENT

To ensure that the Plan reflects the voice of the Flagstaff community, the plan was developed through an extensive year-long community and stakeholder engagement process that included:

**Six public open houses**, attended by over 300 community members.

**Three online surveys**, taken by over 250 community members.

**Regular meetings with a 15-member citizen steering committee**, who provided input and feedback throughout the planning process.

**Workshops and meetings with technical experts**, including 30 City staff across divisions to vet and evaluate plan targets, strategies, and actions.

**Meetings** with local organizations and neighborhood groups and collaborations with Coconino County representatives.



## Introduction

Strategies in this plan were developed to be actionable, achievable, and impactful. Actions focus on mechanisms or “levers” that the City or community can use to affect change, including:

**Inspiring voluntary action** through information, outreach, and technical assistance.

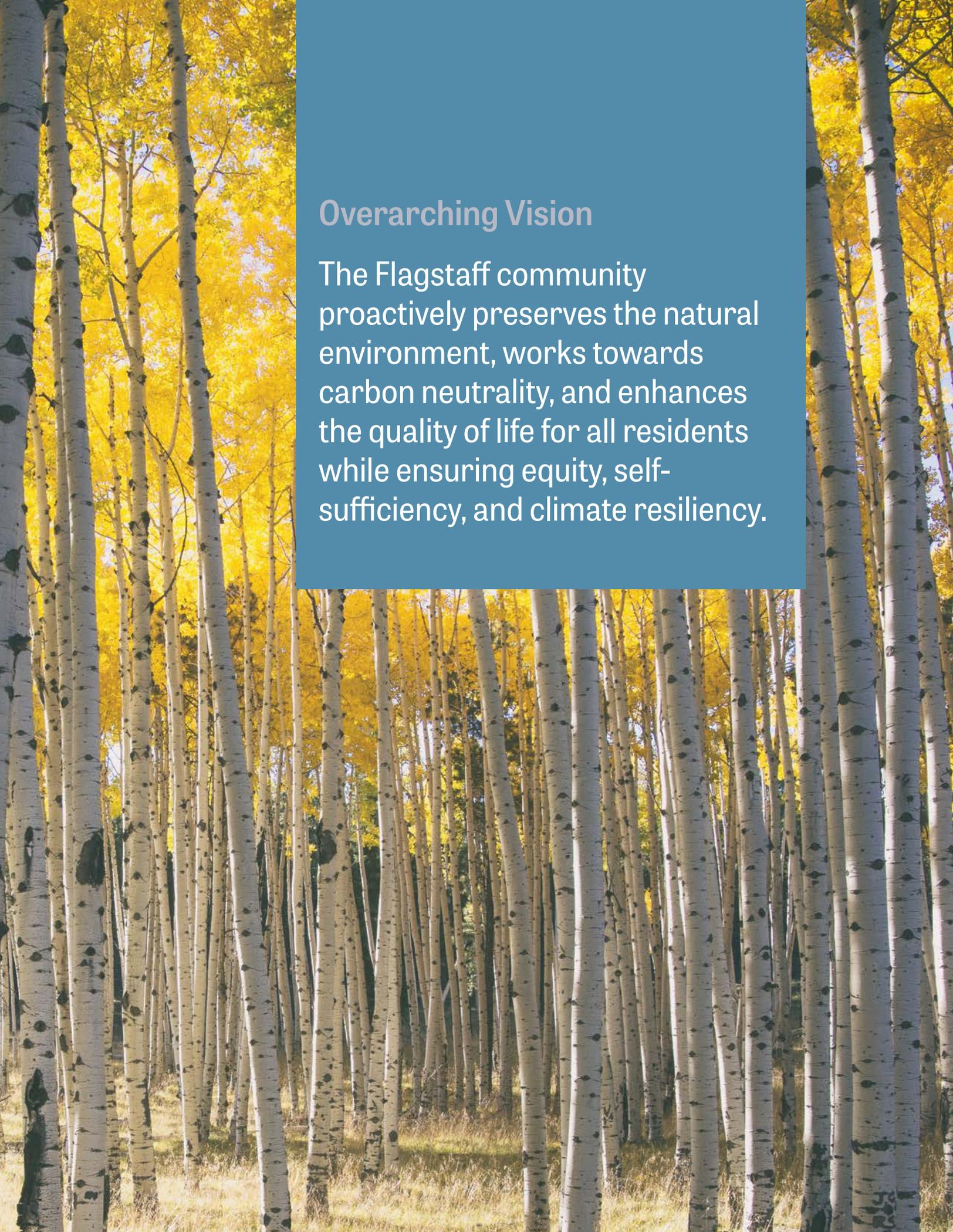
**Sending price signals** to encourage or discourage behaviors.

**Making public investments** to visibly demonstrate government commitment to climate action and influence decision-making.

**Mandating change** to stimulate comprehensive, community-wide adjustment.

This foundational Plan represents the beginning of an ongoing and iterative conversation between the City of Flagstaff and the community it serves. The goals, strategies, and actions presented herein reflect the community’s priorities and needs as articulated by City staff, residents, and organizations who participated in the plan development process. As the community’s priorities shift, technologies change, and new knowledge is revealed, the Plan will undergo a continual process of monitoring, evaluation, and evolution to keep pace with changing needs.



A photograph of a forest of white-barked trees, likely aspens, with vibrant yellow autumn foliage. The trees are tall and slender, with white bark and dark lenticels. The leaves are bright yellow, creating a warm, golden atmosphere. The background is a solid blue color, which serves as a backdrop for the text.

## Overarching Vision

The Flagstaff community proactively preserves the natural environment, works towards carbon neutrality, and enhances the quality of life for all residents while ensuring equity, self-sufficiency, and climate resiliency.

# Introduction

## Overarching Goals and Targets

The Climate Action and Adaptation Plan centers on achievement of the following overarching goals.

- 1 REDUCE** Flagstaff's contribution to climate change by reducing community greenhouse gas emissions.
- 2 PREPARE** the city's communities, systems, and resources to be more resilient to climate change impacts.
- 3 ADDRESS** climate change in a manner that prioritizes those most impacted and ensures the costs and benefits of climate adaptation and mitigation are equitably distributed.

DRAFT



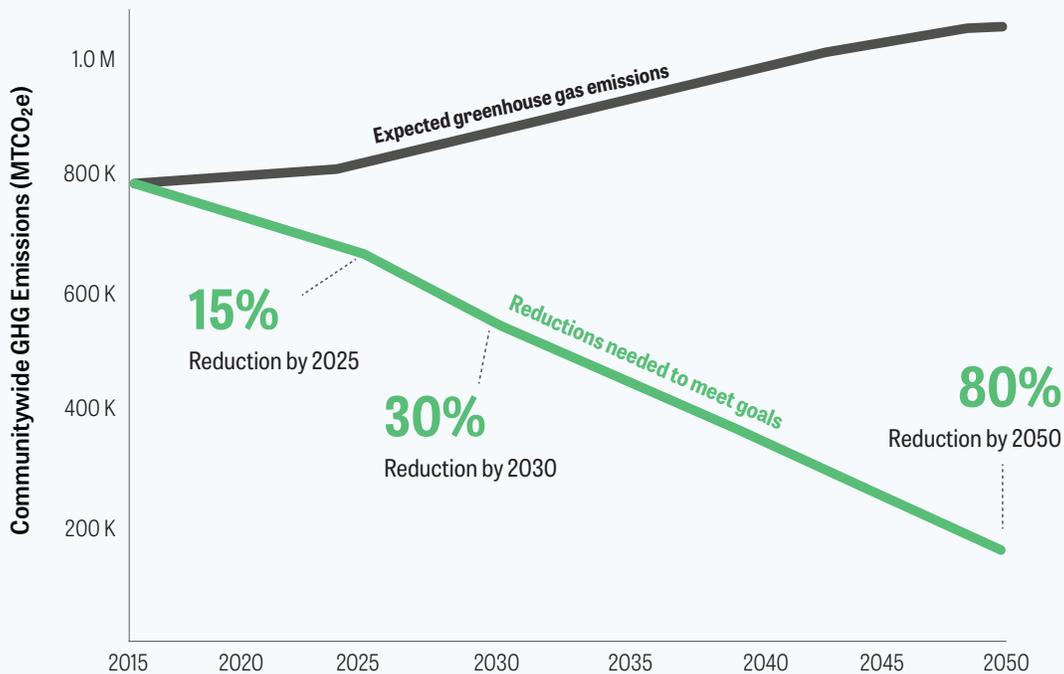
# Greenhouse Gas Reduction Targets

The Climate Action and Adaptation Plan sets an overarching and per-capita reduction target for community greenhouse gas emissions.

**OVERARCHING TARGET:** An 80% reduction in GHG emissions by 2050 compared to 2016 levels.

**PER-CAPITA TARGET:** An equivalent reduction to the overarching target given anticipated population growth. This reduction equates to an 85% reduction in GHG emissions by 2050 compared to 2016 levels. The per-capita target needs to be more ambitious (85% per person) than the community-wide target for an 80% reduction from baseline because of estimated population growth.

Key Performance Indicator	Baseline (2016)	2025 Target	2030 Target	2050 Target
Communitywide greenhouse gas emissions	787,315 (MTCO <sub>2</sub> e*)	669,218 (MTCO <sub>2</sub> e)	551,121 (MTCO <sub>2</sub> e)	157,463 (MTCO <sub>2</sub> e)
Per-capita communitywide greenhouse gas emissions	11.0 (MTCO <sub>2</sub> e / person)	8.3 (MTCO <sub>2</sub> e / person)	6.5 (MTCO <sub>2</sub> e / person)	1.7 (MTCO <sub>2</sub> e / person)
Estimated population	71,617	81,044	84,795	95,088



\*Metric ton carbon dioxide equivalent (MTCO<sub>2</sub>e) serves as a standard unit for greenhouse gases, indicating the impact of different greenhouse gases in terms of the amount of CO<sub>2</sub> that would create the same amount of warming. For example, methane has 28 times the impact of carbon dioxide in the atmosphere, so 1 metric ton of methane would equal 28 MTCO<sub>2</sub>e.

## Benefits of a Climate Action and Adaptation Plan

Implementation of the Flagstaff Climate Action and Adaptation Plan will realize many benefits beyond addressing climate change.

In addition to the societal benefits from equitable and inclusive climate action, many actions in the Flagstaff Climate Action and Adaptation Plan will enhance quality of life for Flagstaff residents. For example, the introduction of energy-saving equipment and behaviors not only addresses climate goals but can also lower energy costs. This plan prioritizes these “win-win” solutions that benefit both the climate and other facets of the Flagstaff community. Some co-benefits include the following:

**Support for low-income and disadvantaged communities.** When implemented carefully and correctly, actions such as local green job training and subsidy programs for energy efficiency upgrades can be especially helpful for low-income and disadvantaged communities.

**Public health.** Some actions that reduce greenhouse gas emissions also promote healthier lifestyles, such as supporting more people walking and biking and eating less carbon-intensive foods.

**Quality of life and well-being.** Many climate actions can also improve quality of life for Flagstaff residents, such as benefits from green jobs to the local economy and creation of more comfortable and inviting homes through energy efficiency improvements.

**Local habitat, recreation, and aesthetic.** In addition to enhancing ecosystem resilience, minimizing heat impacts, and storing carbon, actions that improve natural habitat can also enhance natural beauty and provide recreation opportunities for visitors and residents.



## COSTS OF INACTION

This Plan makes an investment in the preparation and adaptation of the entire Flagstaff community to climate change. Preparation is far less costly than response. While we do not know the exact cost of not taking action now, we can estimate. For example, the Flagstaff Watershed Protection project—a local example of a climate adaptation project—is funded by a \$10 million bond and is expected to prevent \$573 million to \$1.2 billion in costs associated with expected future fires and resulting floods.<sup>1</sup> Additionally, 2017 was the most expensive disaster year in U.S. history, costing nearly 400 billion dollars.<sup>2</sup> We also know that disasters like those experienced in 2017 are expected to continue and strengthen in the future.<sup>3</sup>

<sup>1</sup> Flagstaff Watershed Protection Project. <http://flagstaffwatershedprotection.org> (23 May 2018).

<sup>2</sup> Umair Irfan and Brian Resnick. “Megadisasters devastated America in 2017. And they’re only going to get worse.” Vox. 26 March 2018. <https://www.vox.com/energy-and-environment/2017/12/28/16795490/natural-disasters-2017-hurricanes-wildfires-heat-climate-change-cost-deaths> (23 May 2018).

<sup>3</sup> “Extreme Weather and Climate Change.” Center for Climate and Energy Solutions. <https://www.c2es.org/content/extreme-weather-and-climate-change> (23 May 2018).

In addition to the cost savings of preparation, many programs and actions in this plan also have a high return on investment. For example, renewable energy is now cost-competitive with non-renewable energy and brings other benefits to the community such as reduced emissions of dangerous air pollutants, reduced reliance on imported energy, and reduced sensitivity to price fluctuations. When these other societal benefits are taken into account, the return on investment is even higher.



## THE SOCIAL COST OF CARBON

Purchasing and burning fossil fuels contributes to impacts that have real economic consequences, such as infrastructure damage from flooding, fires, or extreme storms. Despite the very real nature of these costs, the market price of fossil fuels does not include these societal cost “externalities.” The failure of markets to account for climate risk in the price of fossil fuels has spurred research into quantifying the economic impact of each new metric ton of carbon emitted into the atmosphere. This estimate is called the social cost of carbon. The social cost of carbon is a policy tool to estimate future economic impacts of climate change and allow entities to calculate the actual costs and benefits of various options to guide decision-making.

The U.S. Environmental Protection Agency (EPA) estimates a range of possible social costs of carbon depending on the year and discount rate applied to the future. These range from \$36 per metric ton of carbon dioxide equivalent (MTCO<sub>2</sub>e) in 2015 to \$69 per MTCO<sub>2</sub>e in 2050.<sup>1</sup> However, the EPA acknowledges current modeling does not include all important damages; estimates by other agencies and researchers are far higher. Some recent estimates have determined the social cost of carbon could be as high as \$100-\$200 per MTCO<sub>2</sub>e.<sup>2</sup>

<sup>1</sup> U.S. EPA. “The Social Cost of Carbon.” 2017

<sup>2</sup> Nwuccitelli, Dana. “Republican hearing calls for a lower carbon pollution price. It should be much higher.” The Guardian. 1 March 2017. [www.theguardian.com/environment/climate-consensus-97-per-cent/2017/mar/01/republican-hearing-calls-for-a-lower-carbon-pollution-price-it-should-be-much-higher](http://www.theguardian.com/environment/climate-consensus-97-per-cent/2017/mar/01/republican-hearing-calls-for-a-lower-carbon-pollution-price-it-should-be-much-higher) (3 July 2017).

# Introduction



## BUILDING ON A FOUNDATION

Flagstaff has already made notable progress toward reducing both its community emissions and its vulnerability to the potential impacts of climate change.

Flagstaff has a variety of plans, policies, programs, and studies that are connected to the needs and solutions for addressing climate change issues and challenges. Some things the community is already doing to address climate change include the following:



The City regularly tracks and reports on its **greenhouse gas emissions inventory**.<sup>1</sup>



The **Greater Flagstaff Forest Partnership**, an alliance of environmental, governmental, and business organizations, works on forest ecosystem restoration in and around Flagstaff.



The community participates in ongoing **invasive weed removal** events on Flagstaff Open Space properties.



The City of Flagstaff has been using **reclaimed water for irrigation** since 1971, expanding reclaimed water use to offset potable water use by 20%.



Flagstaff voters approved a \$10M bond to support the **Flagstaff Watershed Protection Project** - a partnership effort between the State, City, and Coconino National Forest to reduce the risk of devastating wildfire and post-fire flooding in the Rio de Flag and Upper Lake Mary watersheds.



The City of Flagstaff provides home energy efficiency, water efficiency, and rainwater harvesting tank **rebates** for residents.

<sup>1</sup> Reports can be found on the City website at this link: <http://flagstaff.az.gov/3625/Greenhouse-Gas-Emissions-Reporting>. More information on other City sustainability activities can be found here: <http://www.flagstaff.az.gov/1605/Sustainability-Section>.



The City’s Water Services Division has conducted energy audits of their **water and wastewater treatment facilities** to identify ways to reduce energy consumption and has been proactive at replacing aging inefficient equipment with more energy efficient equipment.



Several local companies are installing residential and commercial **rooftop solar systems** throughout Flagstaff.



In 2018, a six-month pilot program brought **bike sharing** to the City of Flagstaff and the Northern Arizona University campus, making bike trips possible for more residents.



The City is exploring an adaptive **reuse incentive program** to encourage infill and the reuse of existing structures.



The **Azulita Project**, a local non-profit, is partnering with local businesses to eliminate the use of plastic straws and other single-use plastic.



The **Flagstaff Master Recycler** program provides training to community members on waste prevention and composting practices.



The **Ready Set Go** campaign encourages residents to be more informed about potential emergencies and prepared to evacuate.



Through the **Woods Watch** program, the City of Flagstaff, Coconino County and the U.S. Forest Service partner with residents to monitor for careless fire behavior on forested lands to protect the community from wildfire.



The **Sustainable Economic Development Initiative** promotes sustainable economic prosperity in Northern Arizona.



The **Innovate Waste Challenge** is incentivizing businesses to discover new ways to convert waste into marketable products.



The **Mountain Line bus system** has recently added a weekend bus route to Snowbowl to serve both residents and tourists who ski and snowboard.

# Introduction



## Relationship to Other City Plans

The list below presents other City plans that inform or could be informed by the Climate Action and Adaptation Plan. Some of these documents already emphasize climate solutions described in this plan, while others will need to be updated to integrate climate change and climate action. Where linkages are clear, this plan highlights “levers” in existing plans and programs and brings them together to address a common goal.



The **Rethink Waste Plan** outlines initiatives toward achieving the City’s waste prevention and recycling goals.



The **High Occupancy Housing Plan** encourages higher-density housing that is more compatible with existing neighborhoods.



The City is currently developing a **Water Conservation Strategic Plan** to set water conservation targets and identify and prioritize actions to achieve those targets.



The **Flagstaff Regional Plan 2030** presents a comprehensive, long-term plan for the Flagstaff community.



The **Sustainability Section Strategic Plan** establishes detailed strategies for accomplishing sustainability program area goals.



The **Management Plan for Legally-Designated Open Space Properties** seeks to restore watershed health, forest structure, native plant communities, and rare habitat types, among other goals.



The **Coconino County Multi-Jurisdictional Hazard Mitigation Plan** includes an assessment of drought, flood, and wildfire risks and strategies to reduce those risks.



The **Coconino County Emergency Operations Plan** is a guide for disaster response activities and includes hazards such as floods, flash floods, severe weather, and wildfire.

## THE CITY OF FLAGSTAFF'S EXPANDING COMMITMENT TO CLIMATE ACTION

This Climate Action and Adaptation Plan builds on a foundation of climate leadership by the Flagstaff City Council. A few significant highlights:

<b>2006</b>	Through <u>Resolution 2006-59</u> , the City of Flagstaff adopted the U.S. Mayors Climate Protection Agreement.
<b>2007</b>	The City of Flagstaff Sustainability Section was established.  The Sustainability Commission was established by <u>Ordinance 2007-27</u> .
<b>2008</b>	<u>Resolution 2008-32</u> required all new municipal buildings be constructed to earn a minimum of Leadership in Energy and Environmental Design (LEED silver certification).
<b>2010</b>	<u>Resolution 2010-16</u> committed the City to increase energy efficiencies and renewable energy production and purchase for City facilities and properties.
<b>2012</b>	<u>Resolution 2012-22</u> adopted the 2012 City of Flagstaff Resiliency and Preparedness Study.
<b>2014</b>	<u>Resolution 2014-09</u> requires all occupied City-owned new construction, major renovations and large additions to achieve LEED, Green Globes, or Living Building Challenge certification.
<b>2017</b>	City Council set a 2017-2019 goal to take meaningful climate action.  Flagstaff became Arizona's first city to <u>call for national revenue-neutral carbon fee and dividend legislation</u> , urging the U.S. Congress to assess a steadily increasing fee on carbon at the point of fossil fuel extraction; return the net revenue to American households on an equitable basis; and incorporate a border adjustment that levels the playing field for trade with countries without an equivalent tax.  Mayor Coral Evans joined with over 200 other U.S. Mayors in committing to adopt, honor, and uphold the landmark Paris Climate Agreement.



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## Ties to the Regional Plan

This document builds upon goals outlined in the current *Flagstaff Regional Plan 2030* and informs potential priority areas for the next regional plan update. Reducing greenhouse gas emissions and adapting to climate change will improve the local economy, support public health, and benefit ecosystems. There is strong overlap between the goals of the *Regional Plan* and the Climate Action and Adaptation Plan.

**The following *Regional Plan* goals are furthered by the Climate Action and Adaptation Plan strategies:**

- Goal E&C.2.** Reduce greenhouse gas emissions.
- Goal E&C.3.** Strengthen community and natural environment resiliency through climate adaptation efforts.
- Goal E&C.6.** Protect, restore, and improve ecosystem health and maintain native plant and animal community diversity across all land ownerships in the Flagstaff region.
- Goal E&C.10.** Protect indigenous wildlife populations, localized and larger-scale wildlife habitats, ecosystem processes, and wildlife movement throughout the planning area.
- Goal OS.1.** The region has a system of open lands, such as undeveloped natural areas, wildlife corridors and habitat areas, trails, accesses to public lands, and greenways to support the natural environment that sustains our quality of life, cultural heritage, and ecosystem health.
- Goal WR.1.** Maintain a sustainable water budget incorporating regional hydrology, ecosystem needs, and social and economic well-being.
- Goal WR.2.** Manage a coordinated system of water, wastewater, and reclaimed water utility service facilities and resources at the City level and identify funding to pay for new resources.
- Goal WR.5** Manage watersheds and stormwater to address flooding concerns, water quality, environmental protections, and rainwater harvesting.
- Goal WR.6** Protect, preserve, and improve the quality of surface water, groundwater, and reclaimed water in the region.
- Goal LU.8.** Balance future growth with available water resources.
- Goal E.1.** Increase energy efficiency.
- Goal E.2.** Expand production and use of renewable energy.
- Goal LU.1.** Invest in existing neighborhoods and activity centers for the purpose of developing complete, and connected places.
- Goal LU.2.** Develop Flagstaff’s Greenfields in accordance with the *Regional Plan* and within the growth boundary.
- Goal LU.5.** Encourage compact development principles to achieve efficiencies and open space preservation.
- Goal LU.6.** Provide for a mix of land uses.
- Goal LU.10.** Increase the proportion of urban neighborhoods to achieve walkable, compact growth.
- Goal LU.18.** Develop well designed activity centers and corridors with a variety of employment, business, shopping, civic engagement, cultural opportunities, and residential choices.
- Goal NH.3.** Make available a variety of housing types at different price points, to provide housing opportunity for all economic sectors.
- Goal T.1.** Improve mobility and access throughout the region.
- Goal T.2.** Improve transportation safety and efficiency for all modes.
- Goal T.5.** Increase the availability and use of pedestrian infrastructure, including FUTS, as a critical element of a safe and livable community.
- Goal T.6.** Provide for bicycling as a safe and efficient means of transportation and recreation.
- Goal T.7.** Provide a high-quality, safe, convenient, accessible public transportation system, where feasible, to serve as an attractive alternative to single-occupant vehicles.
- Goal T.9.** Strengthen and support rail service opportunities for the region’s businesses and travelers.

## Climate and Equity

Climate change impacts some groups more than others.

**E**xisting advantages and disadvantages will be exacerbated by climate change stresses and hazards. Public health, housing security, and socioeconomic conditions may all be impacted by predicted changes in weather and migration. Already, low-income residents, communities of color, and tribal nations disproportionately experience environmental harm and health impacts of pollution. This plan incorporates strategies to advance environmental justice and social equity while addressing climate change.

Considering social equity when addressing climate adaptation involves looking at communities' existing disadvantages and ensuring those most at risk are protected. For example, communities

already facing housing insecurity may be displaced by climate-induced migration. This plan proposes proactively taking action to protect communities at risk of displacement. To address social equity when implementing climate change mitigation strategies, it is necessary to consider if the strategy inadvertently creates new burdens to disadvantaged groups and consider if all communities have opportunities to reduce emissions. For example, when expanding public transit, it is imperative to ensure public transit is financially and physically accessible to disadvantaged communities. The “Next Steps” section of this plan details steps the City and community should take to ensure that these equity considerations are integrated throughout the Plan implementation process.

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# Introduction



## Climate Change and Flagstaff

Climate change is a shift in the long-term, average weather pattern.

**W**hen climate changes over thousands of years, plants and animals often adapt. When climate changes rapidly over hundreds of years, drastic changes including mass extinctions have occurred. Our climate is changing rapidly. Decades of burning fossil fuels and other human activities have released dangerous levels of heat-trapping gases into the atmosphere. These greenhouse gases—carbon dioxide, methane, nitrous oxides, and others—are driving abrupt changes in our climate.

This section presents the context of climate change in Flagstaff, including an overview of anticipated climate changes and associated impacts and an introduction to the sources of greenhouse gas emissions produced by the Flagstaff community. More information on anticipated climate changes can be found in *the [Climate Profile for the City of Flagstaff](#)*.

## Climate Change Impacts

Climate change threatens to destabilize global weather patterns and ecosystems, impacting Flagstaff and communities globally. Coconino County is already experiencing climate changes, and many of these changes are projected to worsen in the future. Key changes include the following:



### Hotter temperatures

- Longer and hotter summers
- Difficulty for sensitive populations and those without air conditioning
- Increased risk of disease or illness from mosquitoes and other pests



### Less snowpack

- More rainfall instead of snowfall
- Increased flooding of infrastructure and buildings from more intense rainstorms
- Increased risk of post-wildfire floods



### Less healthy forests

- Increased wildfire risk for local forests
- Increased damage from forest pests due to hotter temperatures and drought-stressed trees



### Drier conditions

- More severe drought conditions as temperatures rise
- Lower water quality of reservoirs



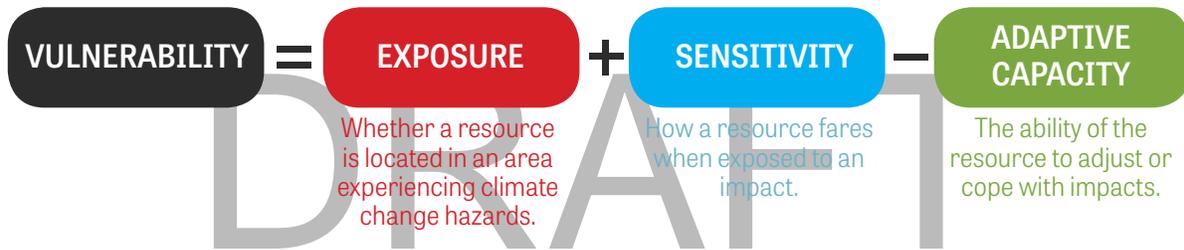
# Introduction

## Climate Vulnerability Assessment

To better understand the extent to which these climate changes will affect Flagstaff, the Plan includes a Flagstaff-specific climate vulnerability assessment. The assessment identified key climate-related risks to Flagstaff’s resources, systems, and populations. This section summarizes outcomes from the vulnerability assessment.

### What is Climate Vulnerability?

Flagstaff’s vulnerability to climate change is a function of its exposure, sensitivity, and adaptive capacity:



Flagstaff’s climate vulnerability assessment looked at how key resources and sectors could be impacted by identified climate risks:

Flagstaff’s climate vulnerability assessment looked at how these **resources and sectors...**

Public health, safety, and emergency services

Land use, infrastructure, and affordable housing

Forest health and wildfire

Water supply, quality, and infrastructure

Tourism and recreation

...could be affected by these **climate risks** and their associated impacts.



wildfire



hotter temperatures



drought

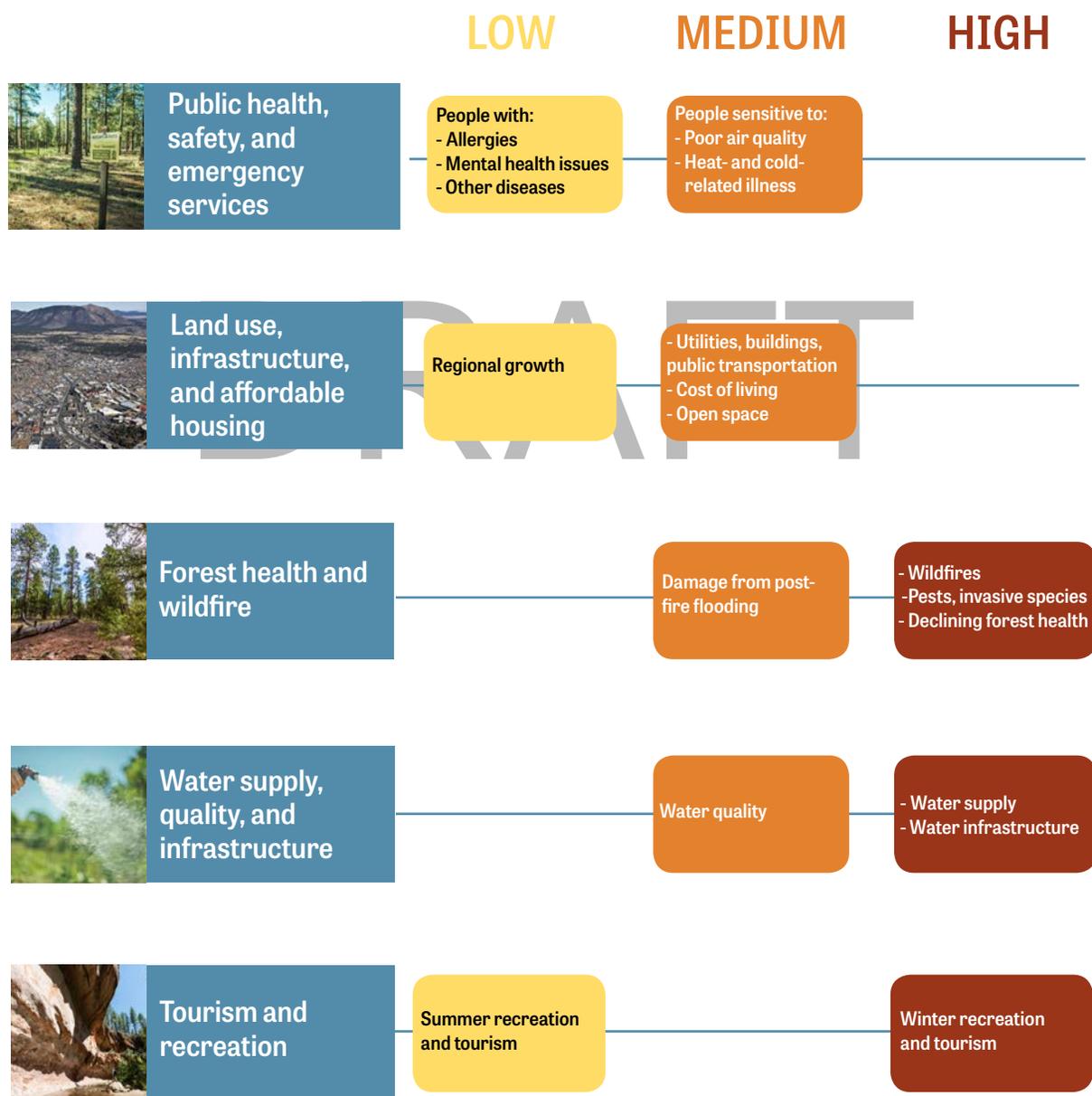


flooding

### What is at Risk?

Flagstaff’s climate vulnerability assessment ranked the relative climate vulnerability of several resources and sectors. The table below summarizes the outcomes from that assessment.

Within these resources and sectors... ..the following populations and systems are at varying risk levels in Flagstaff due to climate change:



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A longer warm season and more intense wildfires may increase the risk of some diseases, mental illnesses, and respiratory health concerns. Emergency response systems will need to be ready to respond to these risks.

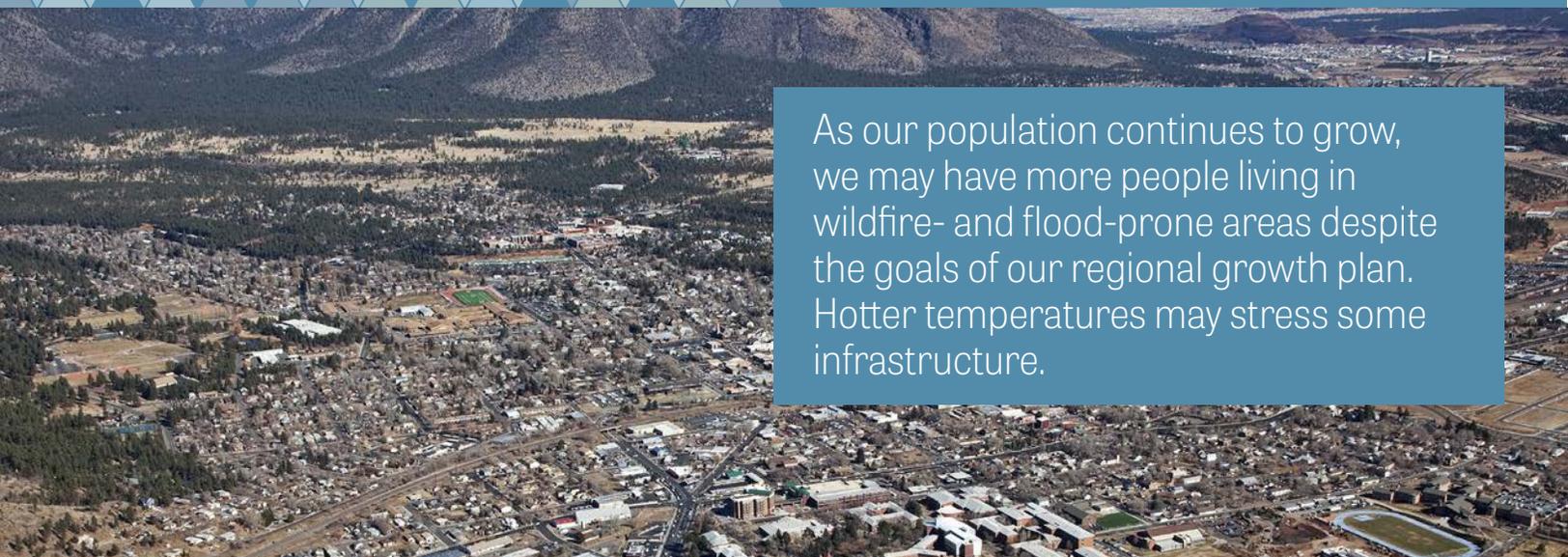


## Public Health, Safety, and Emergency Services Vulnerability to Climate Change

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By 2100, Flagstaff communities are likely to face:

MEDIUM VULNERABILITY	MEDIUM VULNERABILITY	LOW VULNERABILITY	MEDIUM-LOW VULNERABILITY	MEDIUM-LOW VULNERABILITY
				
More periods of poor air quality due to larger and more frequent wildfires.	More extreme heat days (>90°F) could increase risk of heat-related illness.	Increased exposure to allergens is possible as spring grows warmer and more dry weather increases dust.	More frequent extreme events could increase risk of mental health issues.	Increased exposure to valley fever and West Nile virus is possible as the warm season lengthens. Existing response resources may be adequate.

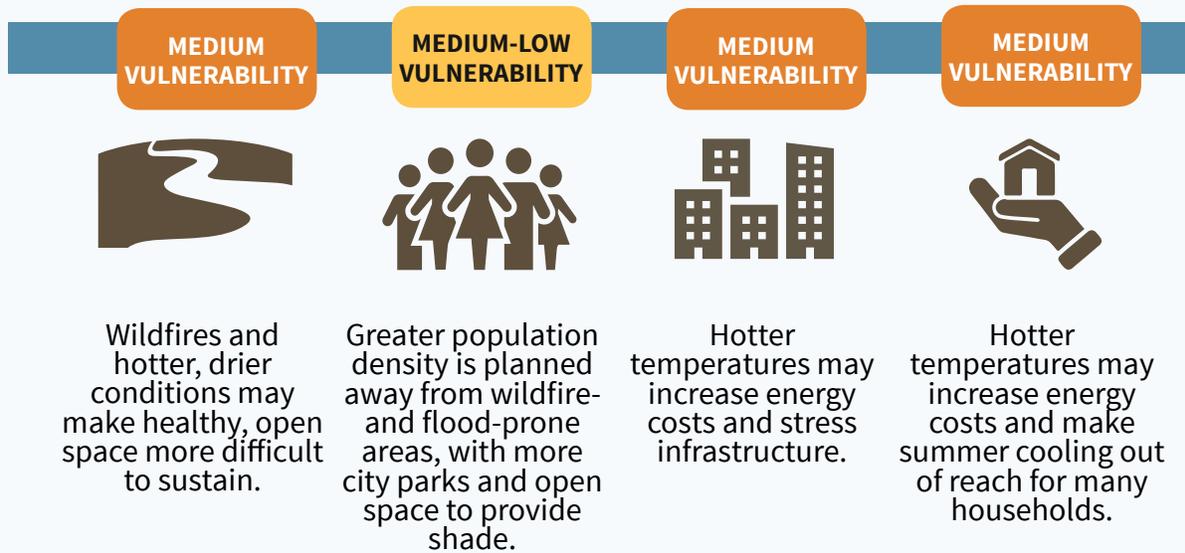


As our population continues to grow, we may have more people living in wildfire- and flood-prone areas despite the goals of our regional growth plan. Hotter temperatures may stress some infrastructure.

## Land Use, Infrastructure, and Affordable Housing Vulnerability to Climate Change

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By 2100, Flagstaff communities are likely to face:



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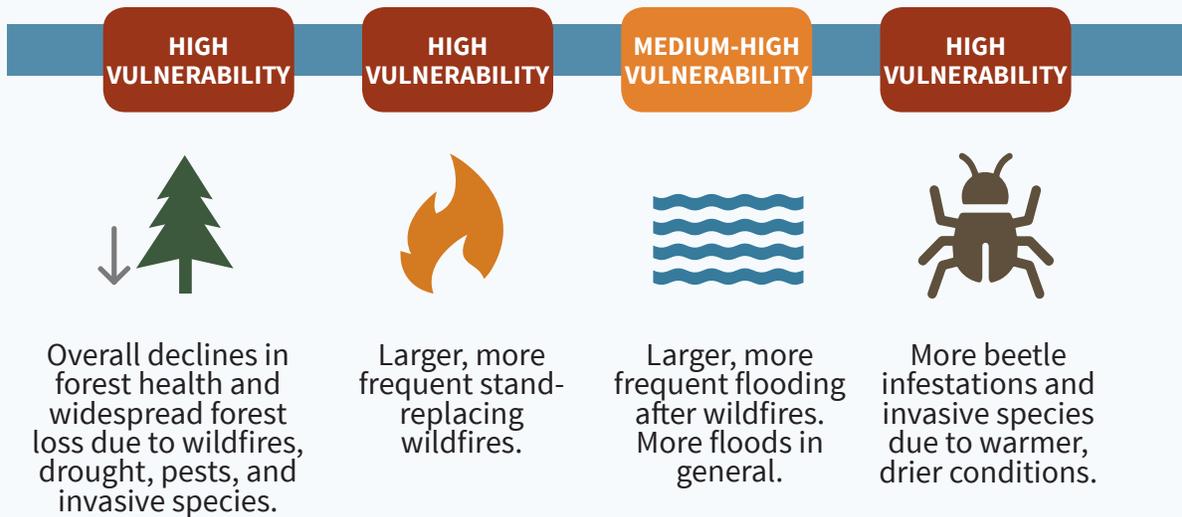


A longer warm season and drier climate are likely to reduce overall forest health, lead to more damaging and hazardous wildfires and floods, and enable worsening pine beetle infestations. Forest management and emergency response systems will need to be ready to respond to these growing threats.

## Forest Health and Wildfire Vulnerability to Climate Change

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By 2100, Flagstaff communities are likely to face:



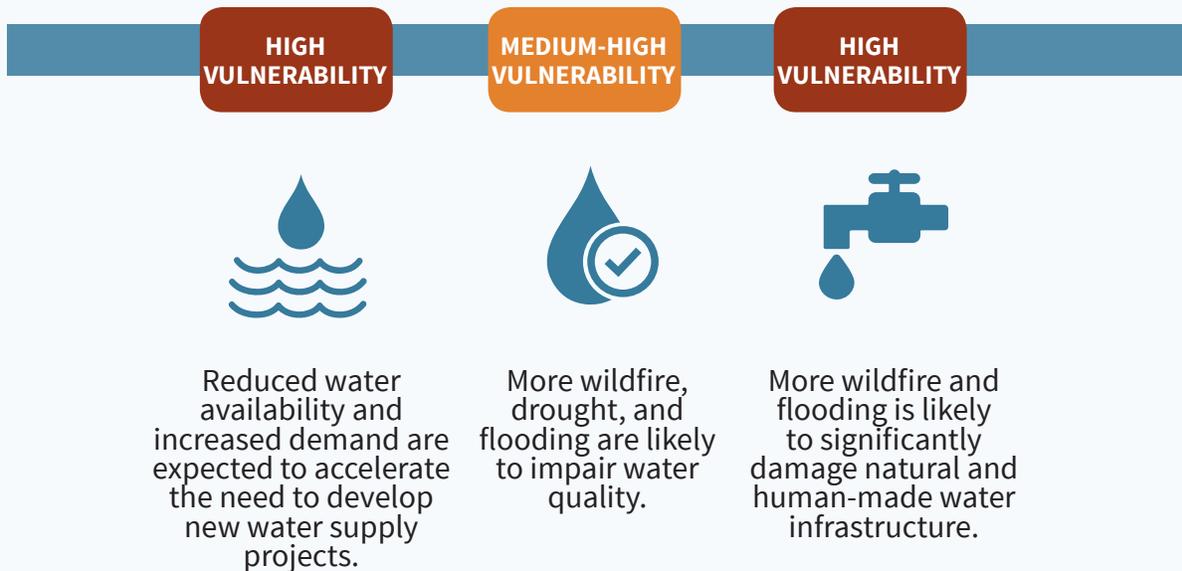


Our water comes from forests at high risk of significant wildfire damage. Despite progress in water conservation, as our population grows, tourism increases, and the climate changes, we expect to face water shortages despite progress in water conservation. Our community will need to be ready.

## Water Supply, Quality, and Infrastructure Vulnerability to Climate Change

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By 2100, Flagstaff communities are likely to face:



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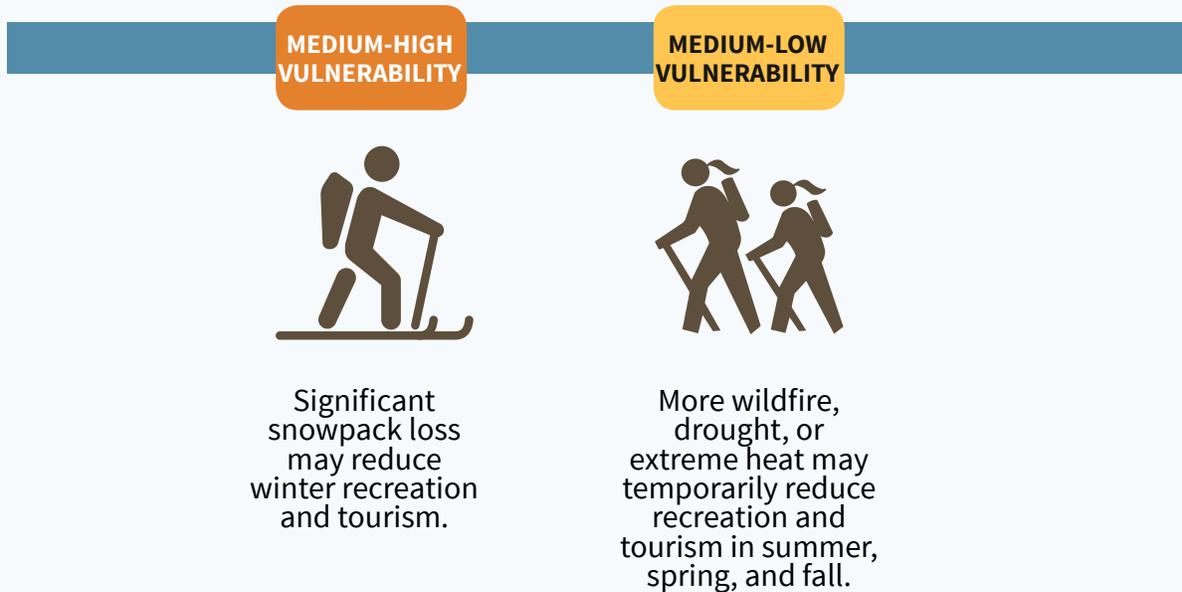


Significant losses are expected to snow-based tourism and recreation as snowpack declines. Our businesses and services will need to be ready to handle a pronounced shift to warm-season recreation and tourism.

## Tourism and Recreation Vulnerability to Climate Change

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By 2100, Flagstaff communities are likely to face:



## Flagstaff's Greenhouse Gas Emissions

Activities in Flagstaff release greenhouse gas emissions when fossil fuels are burned for transportation and energy, when solid waste breaks down, and when water and wastewater are produced and treated.

To avoid the most dangerous impacts of climate change, the international community came together to ratify the Paris Agreement, which recognizes the need to reduce greenhouse gas emissions to keep global temperature rise below 2 degrees Celsius.<sup>1</sup>

Flagstaff has committed to meeting the intentions of the Paris Agreement. This plan sets an ambitious target to reduce greenhouse gas emissions by 80% below baseline by 2050. To track progress on implementing climate and sustainability strategies, Flagstaff has been tracking community-wide greenhouse gas emissions since 2009. In 2016, community-wide emissions were 787,315 metric tons carbon dioxide equivalent (MTCO<sub>2</sub>e).

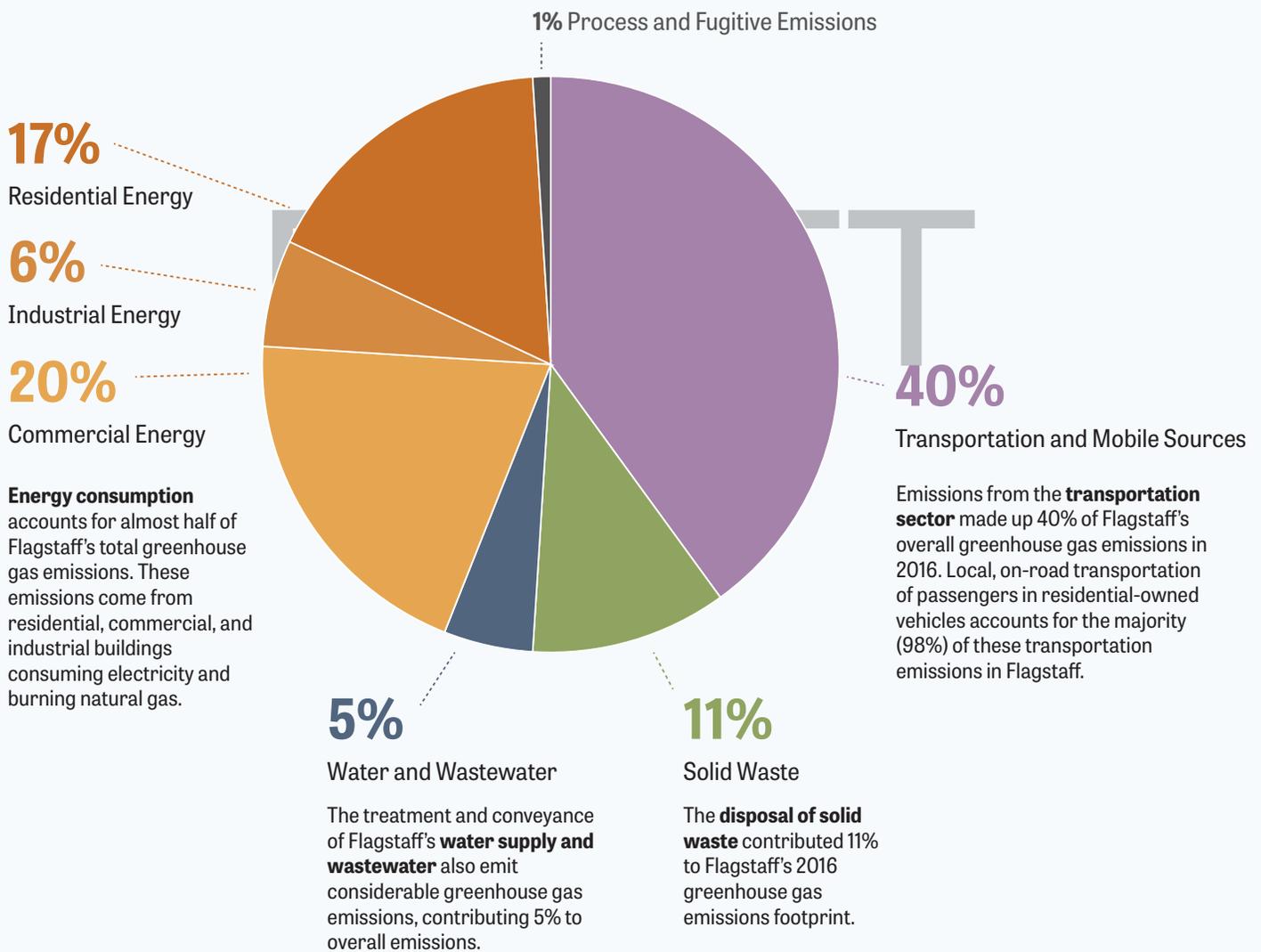
<sup>1</sup> UNFCCC. "The Paris Agreement." <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>



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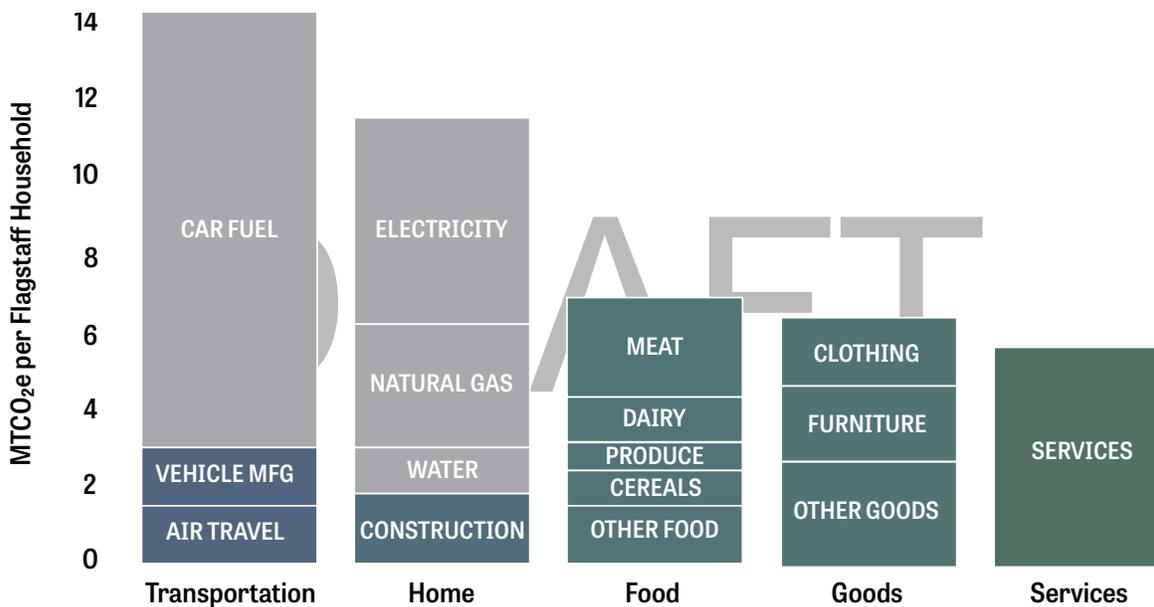
## WHERE DO OUR EMISSIONS COME FROM?

In 2016, Flagstaff’s greenhouse gas emissions were primarily from transportation and energy use, with solid waste, water and wastewater treatment, and fugitive emissions (e.g., from leaks) making up small portions of Flagstaff’s total inventory.

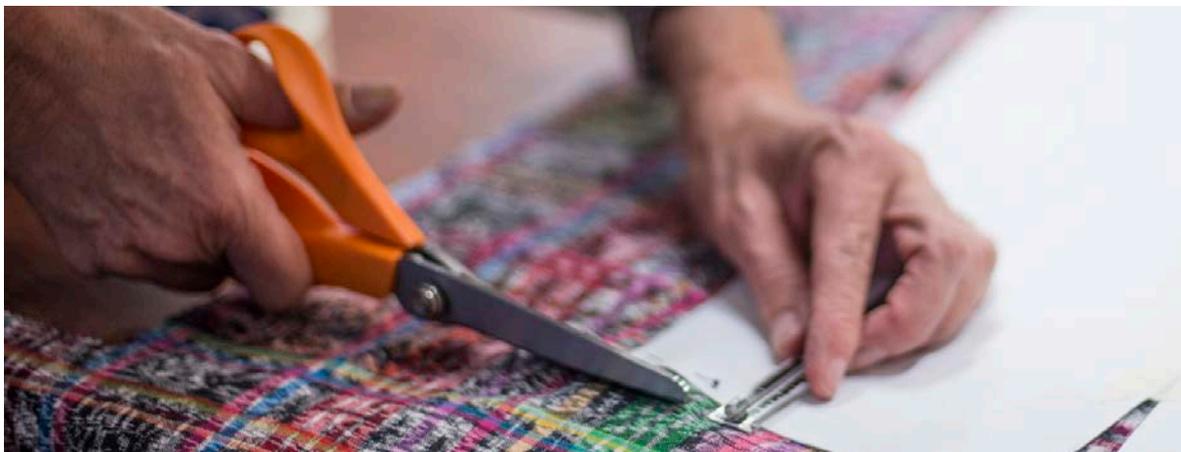


### Not all emissions are currently reflected in Flagstaff’s inventory

While Flagstaff’s community inventory accounts for emissions released directly within the city or from closely related community activities, consumption-based emissions convey the upstream greenhouse gas impacts of consuming household products. Global economic trade results in the U.S. importing many of the goods that homes consume. As a result, the U.S. has essentially exported greenhouse gas emissions related to manufacturing. Consumption-based emissions inventories approximate upstream impacts so individuals can understand how to reduce their personal carbon footprints, taking into account the emissions associated with manufacturing and transporting the goods and services they consume. The figure below represents an estimated profile of one household’s consumption-based emissions in Flagstaff.<sup>1</sup> The components of the profile that are currently covered in Flagstaff’s greenhouse gas inventory are shown in grey. City of Flagstaff will begin incorporating consumption-based emissions to reflect the other components in future updates.



<sup>1</sup> “Average Annual Household Carbon Footprint.” UC Berkeley CoolClimate Network. (2013).



# Introduction

## HOW WILL EMISSIONS CHANGE IN THE FUTURE?

A business-as-usual (BAU) forecast provides an estimate of potential future emissions, assuming that the city takes no further action. It considers the influence of external factors on Flagstaff’s emissions, such as population growth, changes in the regional electricity fuel mix, and energy demand.

The business-as-usual forecast for Flagstaff is presented below. Key assumptions for Flagstaff’s business-as-usual forecast are as follows:

	<b>35% forecasted Flagstaff population growth rate.</b> <sup>1</sup>
	<b>Residential electricity demand</b> expected to <b>grow by 60% by 2030.</b> <sup>2</sup>
	<b>Commercial electricity demand</b> expected to <b>grow 50%.</b> <sup>3</sup>
	<b>Industrial electricity demand</b> expected to <b>grow 1%.</b> <sup>4</sup>
	<b>Electricity carbon intensity</b> expected to change at the same rate as national electricity carbon intensity, <b>declining 37% by 2050.</b> <sup>5</sup>
	<b>50% growth in vehicle miles traveled.</b> <sup>6</sup>

1 “Population Projections.” Arizona Office of Economic Opportunity <https://population.az.gov/population-projections>

2 “2017 Integrated Resources Plan.” APS. April 2017.

3 Ibid.

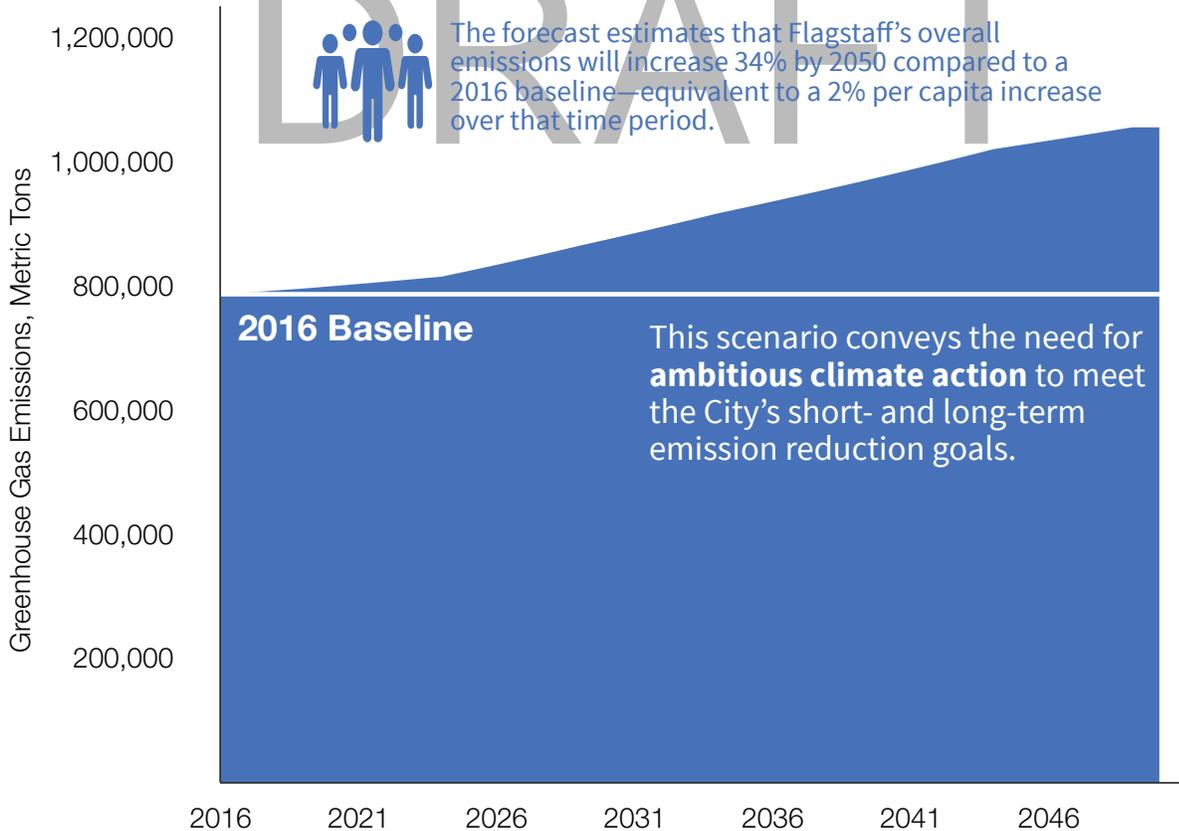
4 Ibid.

5 “Annual Energy Outlook 2018. U.S. Energy Information Association. 2018.

6 “Blueprint 2040: Regional Transportation Plan.” Flagstaff Metropolitan Planning Organization. May 2017.



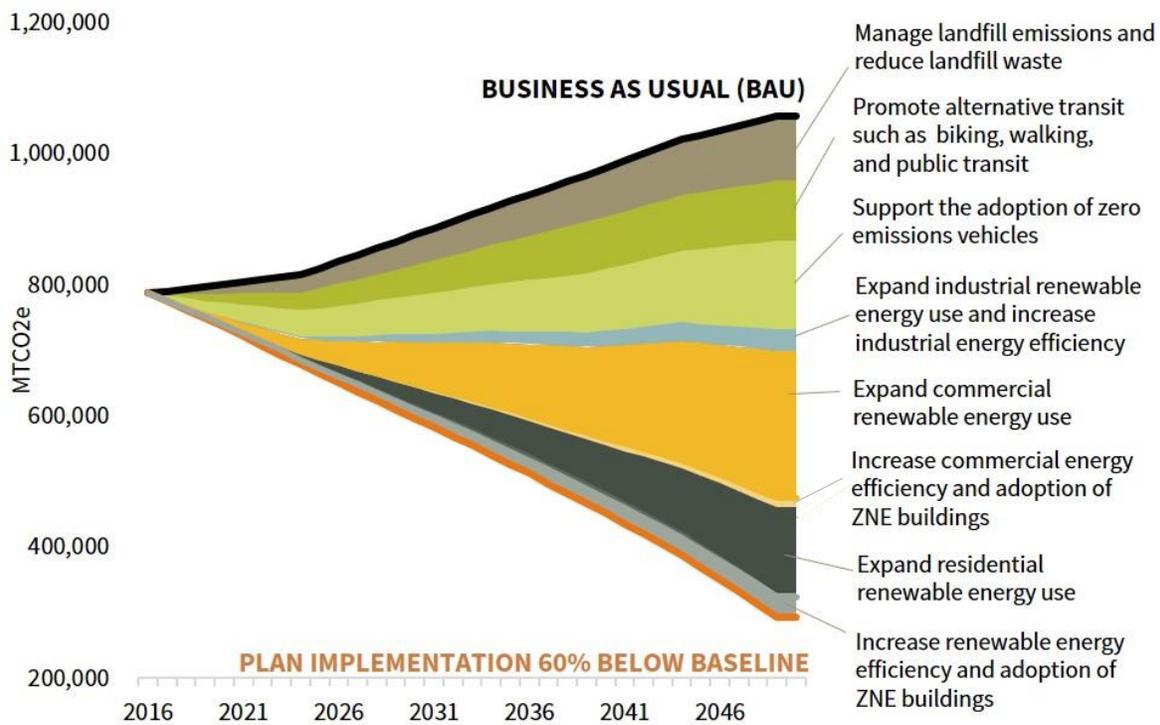
**Business-as-usual Emissions:  
34% above 2016 baseline by 2050**



# PROJECTED EMISSIONS REDUCTION FROM PLAN IMPLEMENTATION

This graph indicates the greenhouse gas emissions reductions that are possible if the City implements the strategies and actions in this Plan, as laid out in the following section. Flagstaff’s projected emissions with no action—business as usual—are represented by the top black line. Projected emissions with climate action implementation are represented by the dark orange line, which moves downward each year. Each color band represents the impacts of a different strategy that reduces emissions below our current trajectory.

By reducing transportation emissions, transitioning to renewable energy, maximizing energy efficiency, and reducing waste, Flagstaff can reduce its greenhouse gas emissions **60% below the 2016 emissions baseline by 2050**. This represents significant progress toward the 80% by 2050 goal and it demonstrates the substantial impact that local climate leadership can have on emissions.



Additional reductions may be possible if national, state, and global action impact the community’s carbon footprint. Furthermore, as technology improves and policies change, emissions may be reduced in ways that are currently unforeseeable. In the coming years, the City will take advantage of new technologies and emerging opportunities. To address this gap between projected emissions reductions and the 80% goal, the City will revise Plan strategies during regular updates to ensure it will achieve the 80x50 target.



## STRATEGIES AND ACTIONS

The following sections detail the **strategies and actions** the City and community will take to help reach our carbon pollution reduction and climate resiliency goals.



## Natural Environment

**Natural Environment** refers to ecosystem health, environmentally sensitive lands, plants, soils, and wildlife in the context of the conservation and protection of natural systems. This focus area also includes open spaces that protect environmental quality and biodiversity, support tourism, and protect historic and cultural resources.

### BACKGROUND INFORMATION

Flagstaff is fortunate to have a bounty of beautiful natural spaces that provide multiple benefits for the community, including the provision of clean air and water, recreational opportunities, and wildlife habitat. Many of Flagstaff’s natural systems and surrounding natural areas will be impacted by climate change, threatening important services such as water filtration, flood abatement, recreation, and fire protection. Changes in temperature, snowpack, and the abundance of diseases and pests will stress Flagstaff’s surrounding forests and the species that depend on them. Although not formally accounted for in Flagstaff’s greenhouse gas emissions inventory, natural ecosystems such as forests capture and store carbon, acting as a greenhouse gas “sink.” Proper ecosystem management can optimize this process of carbon sequestration, as well as minimize the potential risk of greenhouse gas emissions from wildfires.





## CURRENT COMMUNITY EFFORTS

- ▲ In 2012, residents of Flagstaff overwhelmingly approved a **\$10 million bond to support forest restoration work** within two key watersheds in the Coconino National Forest and on State and City lands. The Flagstaff Watershed Protection Project is one of a few examples in the country where forest restoration work in a national forest is being funded by a municipality, and the only known instance where such an effort is funded through voter-approved municipal bonds.
- ▲ The **Greater Flagstaff Forest Partnership** is an alliance of environmental, governmental, and business organizations working on forest ecosystem restoration in and around Flagstaff.
- ▲ **Community volunteer events** on Flagstaff Open Space properties remove invasive weeds that threaten natural ecosystems.





## GOALS, TARGETS, AND INDICATORS

### GOAL

Maintain ecosystems within and outside of the City of Flagstaff as dependable sources of recreation, economic prosperity, biodiverse plant and wildlife habitat, cultural identity, and spiritual connection in the face of a changing climate and expected ecosystem transitions.

#### KEY PERFORMANCE INDICATORS

#### TARGET

Acres of protected open space within city limits

Maintain at 3,069 acres through 2030

Legally protected open space funding per acre

Identify and fund management at \$100 per acre of legally protected open space by 2050

### GOAL

Strengthen ecosystem resilience to climate change with a focus on benefits provided by local ecosystems, including forests, watersheds, and wildland-urban interface areas.

#### KEY PERFORMANCE INDICATOR

#### TARGET

Number of acres of managed forest planned for future treatment, undergoing treatment, or with treatment completed

10,000 additional acres by 2030

Acres of managed forest burned by prescribed fire

5,000 additional acres by 2030



**GOAL**

Incorporate the use of climate-adapted native plants in landscaping and restoration work in the built environment.

**KEY PERFORMANCE INDICATORS**

Development of a municipal strategy for identifying and utilizing climate-adapted native plants

**TARGET**

Creation of a strategy by 2020

**WHAT IS RESILIENCE?**

Climate resilience in the natural environment describes the capacity of ecosystems to bounce back from climate stress and hazardous events. In the near term, Flagstaff can increase the resilience of existing ecosystems through open space protection, fire management, and forest restoration projects. In the long term, natural resilience to climate change may lead to new biomes emerging after climate-related extreme events. As drought, extreme heat, and wildfire increase with climate change, plants and animals that thrive in high desert ecosystems may become more prevalent. Forests in and around Flagstaff may shift, as Ponderosa pines will likely struggle to adapt to Flagstaff’s future climate. This makes room for new, climate-adapted forest ecosystems, like Pinyon-Juniper woodlands.



**STRATEGIES AND ACTIONS**

**STRATEGY 1. Protect existing forests, resources, and meaningful open spaces.**

Environmental systems—including the Rio de Flag watershed, grasslands, wildlife corridors, cultural sites, sites of community significance, and biodiverse wildlife and plant habitats—provide benefits to the Flagstaff community. Ensuring that the forests in and around Flagstaff are healthy can reduce wildfire risk, increase climate resilience, and sequester carbon by facilitating the historic ponderosa pine ecosystem.

Priority Actions

NE-1-A	Support planning and zoning efforts that protect natural resources, including surface water resources.
NE-1-B	Reduce urban encroachment into the forest, such as by promoting infill development as supported in the Regional Plan.

Other Actions

NE-1-C	Increase funding for the procurement and management of open spaces.
NE-1-D	Work with the San Francisco Peaks Weed Management Area (SFPWMA) and other partners to map invasive plant infestations, seek funding and organize effective and well-coordinated programs, and work with development projects to create invasive species and weed management plans, to control invasive plant species across all jurisdictions.
NE-1-E	Offer education, assistance, and incentives to private property owners to control invasive species on their land.



**STRATEGY 2. Improve forest management through collaboration with regional partners.**

New collaborations and funding are needed to ensure that we can achieve the desired forest health outcomes.

Priority Actions

NE-2-A	Identify permanent funding from the City of Flagstaff to support forest health improvements to reduce wildfire risk and provide ecosystem service protection.
NE-2-B	Establish long-term governmental agreements with federal, state, local, tribal, and private partners to implement aggressive forest thinning, prescribed burning, post-treatment monitoring, and invasive weed control.



**NE-2-C** Support forest product industry innovation and the construction of a biomass-based energy facility to use the abundant forest products resulting from the thinning and restoration of regional forests.

Other Actions

**NE-2-D** Establish a year-round fire crew.

**NE-2-E** Identify or dedicate City land—or ease land use regulations—to allow for establishment of forest product industry operations.



**STRATEGY 3. Educate the public on forest health risk and fire prevention.**

Public engagement and education can help prevent wildfires. While fire is a critical part of the ponderosa pine ecosystem and there are benefits of naturally caused wildfires, as Flagstaff’s populations grows and vulnerabilities increase, there may be an increase in human-caused fires. Educational outreach programs can help to prevent unnatural, high-severity wildfires caused by human activity.

Priority Actions

**NE-3-A** Expand public awareness campaigns on human-caused fires including linkages between public health, quality of life, and ecological resources, targeted at both Flagstaff residents and visitors.

**NE-3-B** Create a new, permanent City of Flagstaff staff position, with dedicated funding, for outreach and education related to forest health.

Other Actions

**NE-3-C** Increase capacity for Firewise programming and wildland-urban interface (WUI) code enforcement within Flagstaff neighborhoods.



**STRATEGY 4: Encourage diverse native plant ecosystems in the built environment.**

Incorporating climate-adapted native landscaping into Flagstaff’s developed areas and neighborhoods helps to conserve water resources, provides habitat for animals and pollinators, and increases community resilience.

**Priority Actions**

- NE-4-A Expand current incentive programs to encourage low-water and climate-adapted native landscaping.
- NE-4-B Strengthen current zoning code requirements for native landscaping to include the use of climate-adapted varieties of native species that can survive in changing conditions.

**Other Actions**

- NE-4-C Provide educational opportunities for residents to learn about the techniques and benefits of native and climate-adapted landscaping.

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**STRATEGY 5: Proactively manage for expected ecosystem transitions, including the potential threats to ponderosa pine forests.**

A changing climate will stress Flagstaff’s dominant ponderosa pine ecosystem. Proactive land management can include collaborations to help Flagstaff plant communities adapt to a changing climate or restore areas after disturbance.

**Priority Actions**

- NE-5-A Collaborate with the research community on projects related to assisted migration and identification of plant varieties that are more tolerant of future climate conditions.
- NE-5-B Partner with land managers to increase the use of climate-adapted native plants in all restoration efforts.

**Other Actions**

- NE-5-C Implement an education campaign related to climate change and ecosystem/vegetation adjustments and resulting impacts in Flagstaff’s natural areas.

### LINKING OPEN SPACE TO ECONOMIC PROSPERITY AND RECREATION

Flagstaff's natural environment supports a robust tourist economy in Flagstaff, with visitors coming to ski, hike, and mountain bike. Visitors support an estimated 8,000 jobs and bring \$500 million to the local economy. Maintaining the health of Flagstaff's natural environment directly impacts the strategies in the Economic Prosperity and Recreation section of the Plan. For example, most years, over 104,000 people visit Snowbowl, but far fewer people visit when snowfall is below 118 inches per year. As Flagstaff's natural ecosystems and seasons shift with climate change, ensuring Flagstaff continues to appeal to outdoor enthusiasts will be essential to maintain local economic health.





## Water Resources

**Water Resources** refers to surface water, groundwater, and reclaimed water that serves our residential, commercial, industrial, recreational, and agricultural needs. It includes 100-year water supply planning, diversification of the water supply portfolio, and conservation to sustain our water supplies and quality for future generations.

### BACKGROUND INFORMATION

The treatment and conveyance of Flagstaff's water supply and wastewater emit a considerable quantity of greenhouse gas emissions. Actions to minimize water use and optimize treatment and conveyance processes can help lower the community's greenhouse gas footprint.

A significant portion of Flagstaff's water comes from forests at high risk of significant wildfire damage. Despite progress in water conservation, as our population grows, tourism increases, and the climate changes, we expect to face reduced surface water availability.

## CURRENT COMMUNITY EFFORTS

- ▲ The City of Flagstaff has been using reclaimed water to off-set potable water used for irrigation since 1971.
- ▲ The City’s Water Conservation Program provides numerous incentives to Flagstaff residents for water conservation measures including rainwater harvesting, changing out high water use toilets, and efficient landscapes.
- ▲ The City has tiered water rates for the single-family residential sector, the highest water use category by volume.
- ▲ The City’s Water Services Division has conducted energy audits of their water and wastewater treatment facilities to identify ways to reduce energy consumption.
- ▲ Due to water conservation efforts of the City and residents, water use per capita has decreased approximately 40% in the past 30 years.
- ▲ The City of Flagstaff has a 100-year Designation of Adequate Water Supply from the Arizona Department of Water Resources, demonstrating the City’s commitment towards securing a long-term water supply.



### VISION:

In 2030, water resources are distributed equitably and sustainably, the community is empowered to use water efficiently, and water and wastewater treatment minimizes greenhouse gas emissions.



## GOALS, TARGETS, AND INDICATORS

### GOAL

Ensure a secure and sustainable water supply that is accessible and affordable in light of climate change impacts.

KEY PERFORMANCE INDICATOR	TARGET
Compliance with the Adequate Water Supply Designation Program	Maintain 100 year Adequate Water Supply Designation, through 2050.
Sources and volume indicators and targets will be established through the 2020 Water Resources Master Plan update.	
Affordability and accessibility indicators and targets will be assessed through the 2019 Water Rate Study	

### GOAL

Conserve community water resources, maximize water efficiency, and support innovations in water resources, including stormwater, groundwater, surface water, and reuse.

KEY PERFORMANCE INDICATOR	TARGET
Per-capita potable water use (gallons per capita per day (gpcd))	Targets will be set through the Water Conservation Strategic Plan process
Total annual potable water usage (million gallons)	Targets will be set through the Water Conservation Strategic Plan process

### GOAL

Reduce greenhouse gas emissions from water production and delivery and wastewater treatment in the public and private sectors.

KEY PERFORMANCE INDICATOR	TARGET
Kilowatt hours (kWh) and per gallon of potable water produced; per gallon of reclaimed water produced	Begin tracking indicator and establish targets by 2020
Greenhouse gas emissions per gallon of potable water produced; per gallon of reclaimed water produced	Begin tracking indicator and establish targets by 2020

## STRATEGIES AND ACTIONS

### STRATEGY 1. Improve water infrastructure and expand water reuse.

Infrastructure that enables and expands water reuse can help conserve water resources.

#### Priority Actions

WR-1-A	Evaluate the greenhouse gas emissions and financial impacts of potable reuse, water importation, and groundwater mining.
WR-1-B	Continue to incorporate enhanced energy efficiency and smart controls into water production and wastewater treatment designs on new projects and upgrades of existing equipment.

#### Other Actions

WR-1-C	Evaluate the viability and costs of new advanced reclaimed water treatment technologies to increase water quality for potable reuse.
WR-1-D	Purchase backup generators for the Flagstaff water and wastewater infrastructure system in order to achieve the City Council’s goal of providing a “sustained minimal” level of water services in the event of a catastrophic power loss.
WR-1-E	Create a Water Resources Master Plan to ensure a long-term sustainable and secure supply when faced with climate-related hazards.
WR-1-F	Evaluate options for enhancing resiliency of the reclaimed water system, such as additional storage and looped piping.

### STRATEGY 2. Improve ecosystem management for protection of water resources.

Maintaining forest and ecosystem wellbeing through management is vital for watershed function and health.

#### Priority Actions

WR-2-A	Maximize groundwater recharge, such as by prioritizing the use of reclaimed water to recharge aquifers.
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#### Other Actions

WR-2-B	Evaluate landscape and stormwater codes to ensure suitability for projected changes in temperature and precipitation, and to examine how well the codes support the development of green infrastructure.
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#### Related Action

NE-2-B	Establish long-term governmental agreements with federal, state, local, tribal, and private partners to implement aggressive forest thinning, prescribed burning, post-treatment monitoring, and invasive weed control.
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**STRATEGY 3. Continue to support water conservation efforts across the Flagstaff community.**

Reducing water use through conservation reduces the use of energy for water delivery and treatment and protects vital resources.

Priority Actions

WR-3-A	Expand public education on water conservation and the “one water” concept, which says that all water is reusable.
WR-3-B	Work with high water users within the recreational, commercial, and manufacturing customer classes to maximize water use efficiency.
WR-3-C	Develop policy and processes to evaluate water use and community benefits such as economic development when permitting new businesses and community events.
WR-3-D	Evaluate the viability of introducing various water conservation requirements for new construction, such as rainwater harvesting for irrigated spaces.

Other Actions

WR-3-E	Increase participation in water conservation incentives and rebates for indoor and outdoor water use efficiency, as recommended by the City’s Water Conservation Strategic Plan, to be delivered in 2018.
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**STRATEGY 4. Maximize passive and active community rainwater infiltration.**

Promotion of natural drainage systems and low impact development can curb flooding and stormwater issues that may be exacerbated under future climate conditions, as well as recharge aquifers that serve as a critical water source for humans and ecosystems.

Priority Actions

WR-4-A	Increase implementation of low impact development and water programs, including rainwater harvesting, the low impact development ordinance, and the NPDES/ADEQ Clean Water Act Section 402 Permit Program.
WR-4-B	Maintain the rural floodplain ordinance.

Other Actions

WR-4-C	Commit funding for new and the replacement of old stormwater infrastructure to ensure adequate sizing to accommodate anticipated precipitation changes.
WR-4-D	Create a watershed management plan.

Related Action

TLU-1-F	Stabilize or lower parking minimums for new developments, to decrease the cost of housing and reduce impervious surfaces, among other benefits. Consider parking maximums where appropriate.
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## Energy

**Energy** refers to the ways energy usage impacts and is impacted by climate change. It includes strategies related to community energy consumption and efficiency, clean and renewable energy sourcing, future energy grid resilience, and energy-related land use, transportation, and building standards.

### BACKGROUND INFORMATION

Building energy consumption accounts for almost half of Flagstaff's total greenhouse gas emissions. These emissions come from residential, commercial, and industrial buildings consuming electricity and burning natural gas. Emissions forecasts show that without action, emissions from energy will grow 35% by 2030. Climate change will shift building heating and cooling demands. By 2050, Flagstaff will likely see hotter temperatures and longer summers. The growth in cooling needs will increase energy use and costs, which in turn may stress lower-income families.

### CURRENT COMMUNITY EFFORTS

- ▲ The City of Flagstaff provides home energy efficiency rebates for residents who upgrade equipment or weatherize their homes.
- ▲ Several local companies are installing residential and commercial rooftop solar systems throughout Flagstaff.
- ▲ Solar installations have been installed at City facilities throughout Flagstaff, including City Hall, Rio de Flag Water Reclamation Plant, and the Aquaplex.





## VISION:

In 2030, Flagstaff residents, businesses and organizations have access to affordable renewable energy, new building construction is designed to minimize energy use, and existing buildings have been upgraded to maximize energy efficiency.

## GOALS, TARGETS, AND INDICATORS

The City of Flagstaff will prioritize reducing community greenhouse gas emissions associated with energy use by:

- (1) Reducing energy consumption
- (2) Adopting cost-effective energy efficiency improvements
- (3) Maximizing renewable energy generation and storage capacity
- (4) Meeting 100% of the community’s electric energy needs through renewable energy resources.

### GOAL

Reduce energy consumption and associated greenhouse gas emissions from heating, cooling, and powering buildings.

#### KEY PERFORMANCE INDICATORS

Greenhouse gas emissions from heating, cooling and powering buildings

#### TARGET

Reduce emissions by 30% by 2030.

### Goal

Increase renewable energy generation within the community and City municipal organization.

#### KEY PERFORMANCE INDICATORS

Proportion of municipal electricity use from renewables (%)

#### TARGET

2017: 5.4%  
100% by 2025

Proportion of community electricity use from renewables (%)	100% by 2050 <i>2030 and 2040 targets to be established</i>
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**Goal**

Pursue a greater array of options for Flagstaff’s energy needs in order to reduce greenhouse gas emissions.

KEY PERFORMANCE INDICATORS	TARGET
Renewable energy generation capacity on residential and commercial buildings	<i>Target to be established once benchmark data is available</i>

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## **BALANCING ENERGY CONSERVATION AND FLAGSTAFF'S DARK SKY HERITAGE**

Dark skies are a part of Flagstaff's identity. They enhance quality of life for Flagstaff residents while supporting wildlife, enhancing tourism, and sustaining economic development in Flagstaff's astronomy industry. As the world's first International Dark Sky City, the Flagstaff community has worked to proactively address problems associated with increased artificial light, air pollution, illuminated signage, and development since 1958.

To preserve its dark sky heritage, Flagstaff must often balance dark skies, energy conservation, and economic development. Streetlights are a good example. The City needs to replace its current low pressure sodium (LPS) lighting, which is dark-sky friendly but has been discontinued. The City and its partners have been working since 2012 to secure light emitting diode (LED) technology for streetlight fixtures that will support dark skies, provide appropriate lighting levels, and be cost-effective. The City and its partners have found that the type of LEDs that best protect dark skies use more energy in some applications than the current LPS fixtures. A thoughtful, collaborative, and rigorous process determined that dark sky preservation is, in this case, a greater priority than energy conservation.

Implementation of this Climate Action and Adaptation Plan may lead to other areas where climate action seems to conflict with community values. It will be important to continue this collaborative, transparent approach with strong public participation and technical rigor so that the City can effectively balancing competing demands.

## STRATEGIES AND ACTIONS

### STRATEGY 1. Improve energy efficiency in all sectors.

Constructing and upgrading buildings to meet the highest thresholds for green building performance can dramatically reduce long-term energy use and emissions.

#### Priority Actions

E-1-A	Establish a revolving loan fund to advance energy efficiency upgrades and make \$125,000 available annually in loans for building efficiency upgrades.
E-1-B	Develop viable financing options for energy efficiency upgrades to commercial and residential buildings, such as a revolving loan program and new service and product models that enable homeowners to participate in energy efficiency improvements without upfront costs.
E-1-C	Fund and implement a contractor training and rebate program for solar thermal, on-demand water heaters, electric heat-pump space heaters, and conversions from gas to electric appliances, based on analysis demonstrating reductions in greenhouse gas emissions.
E-1-D	Subsidize home energy efficiency retrofits for affordable housing units, and housing that serves low-income and senior populations while maintaining the supply of existing housing.
E-1-E	Adhere to a consistent schedule for adopting the most up-to-date energy codes in alignment with Coconino County, ensure enforcement, and consider where local Flagstaff codes should exceed minimum standards.
E-1-F	Perform a full-scale energy audit and implement recommended energy retrofits for all City of Flagstaff facilities from this full-scale audit and the Airport Sustainability Plan.
E-1-G	Develop and adopt a SmartReg rental licensing policy program requiring minimum efficiency standards for all housing rentals.
E-1-H	Require zero-net-energy construction for all new residential and commercial buildings by 2040.

#### Other Actions

E-1-I	Introduce a policy that rewards builders who go beyond energy efficiency code requirements or obtain 3 <sup>rd</sup> -party certification for green building performance, such as LEED certification, with lower City fees and expedited review.
E-1-J	Expand homeowner energy efficiency workshops and other energy efficiency outreach and strengthen partnership support for the Coconino County Sustainable Building Program.
E-1-K	Develop an EnergySmart program to offer technical assistance, help schedule contractors for energy efficiency improvements, and offer incentives above and beyond what is offered by the utility.



E-1-L	Develop a policy requiring new affordable housing to be energy-efficient.
E-1-M	During City facility upgrades and new construction, install electric space and water heaters.
E-1-N	Work with APS to develop programs that incentivize residents to electrify water and space heating.

**STRATEGY 2. Expand renewable energy generation and use.**

Clean energy generation presents a key opportunity to cut greenhouse gas emissions, enhance resiliency, and promote long-term economic security. Careful consideration should be given to ensure that any energy development is truly reducing greenhouse gas emissions.

**Priority Actions**

E-2-A	Move forward with City Council target of 100% renewable energy use for the municipality with a plan for achieving that target by 2025.
E-2-B	Move forward with City Council target of 100% renewable energy use for the community with a plan for achieving that target by 2050.
E-2-C	Establish a revolving loan fund to advance renewable energy and make \$125,000 available annually in loans for renewable energy development.
E-2-D	Buy and produce local and regional renewable energy, including through partnerships with Arizona tribes.
E-2-E	Introduce local policies that incentivize renewable energy adoption and passive solar. This could include providing funding for expedited building code review for new homes with solar and for solar installations on existing homes as well as reduced City fees for homes with renewable energy.
E-2-F	Establish a locally controlled revolving loan fund or similar mechanism to improve community access to financing for renewable energy development—particularly solar—at commercial and residential sites.
E-2-G	Update City code to require pre-wiring for solar in all new residential and commercial buildings to reduce the cost of post-construction rooftop solar, battery storage, and electric charging system installations.

**Other Actions**

E-2-H	Improve the co-digestion process at Wildcat Hill Water Reclamation Plant and increase clean energy production.
E-2-I	Investigate renewable heat standards that would require or incentivize a percentage of thermal loads in all new homes to be generated renewably (i.e., solar thermal, heat pumps, biomass boilers).

Related Action

NE-2-C	Support forest product industry innovation and the construction of a biomass-based energy facility, to use the abundant forest products resulting from the thinning and restoration of regional forests.
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**STRATEGY 3. Manage energy demand and consumption in residential, commercial, and industrial sectors, to reduce greenhouse gas emissions.**

Reducing peak energy demand helps energy providers reduce total electricity generation. This serves as an important step in reducing emissions from Flagstaff’s energy usage.

Priority Actions

E-3-A	Collaborate with large energy users, such as Northern Arizona University, on reducing energy consumption and adopting new energy-saving technologies.
E-3-B	Provide tools and resources to help households manage their energy use.
E-3-C	Update the building code to clarify steps for the installation of battery storage systems by residents and businesses.

Other Actions

E-3-D	Continue to support community members in taking ‘first-step’ solutions that can be easily, inexpensively, and rapidly implemented by community members, such as unplugging appliances and installing LEDs indoors.
E-3-E	Develop a comprehensive energy management plan for government facilities and operations.
E-3-F	Form partnerships with businesses, APS, and entities such as Electrify America to increase the use of and piloting of energy storage systems such as batteries, thermal storage, and electric vehicles.
E-3-G	Educate customers about energy price signals such as time-of-use pricing and how to mitigate energy use at high-price times, to both reduce greenhouse gas emissions and save money.
E-3-H	Continue community collaborations to maintain Flagstaff’s dark skies, select appropriate outdoor lighting that balances energy efficiency and dark sky goals, and reduce outdoor lighting.

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#### **What about electric vehicles?**

Switching from gas to electric vehicles provides an opportunity to reduce emissions associated with transportation. Strategies related to electric vehicles are covered in the **Transportation and Land Use Focus Area** on page 74. However, electric vehicles only offer emission savings if the grid electricity comes from renewable sources. By maximizing renewable energy generation, strategies in the Energy sector have the potential to enable green transportation, transforming both energy and transportation emissions.

#### **What about nuclear?**

The burning of fossil fuels produces greenhouse gases. Therefore, this Plan focuses on the production of renewable energy. The Plan does not contemplate nuclear energy, as the supply of nuclear energy is expected to remain a consistent portion of Arizona's energy mix.



## STATE-LEVEL OPPORTUNITIES

Preparing for the multifaceted impacts of climate change requires coordination among local governments, state agencies, and federal agencies. Statewide action can enable Arizona residents, agencies, and municipalities to take proactive steps that make communities stronger amidst change.

The City will advocate for the following state-level actions to help achieve our greenhouse gas emissions reduction goals:

#### **Energy:**

- State legislative and regulatory changes to allow broader implementation of solar in the community and decrease the proportion of fossil fuels in the energy mix.
- A statewide home performance rating system to require home energy performance scores at the sale of a home.
- Allowing cities to require energy benchmarking, to compare the energy performance of buildings over time and across the City to inform and motivate performance improvement.
- Improvements in and expansion of demand-side management programs and incentives.
- Legislation enabling local governments to establish Commercial Property Assessed Clean Energy (C-PACE) programs.



## Transportation and Land Use

**Transportation and Land Use** refers to the form and function of transportation systems and the layout of a community, including ways to reduce greenhouse gas emissions through design and clean and efficient transportation systems.

### BACKGROUND INFORMATION

Emissions from the transportation sector made up 40% of Flagstaff’s overall greenhouse gas emissions in 2016. Local, on-road transportation of passengers in residential-owned vehicles accounts for the majority (98%) of these transportation emissions in Flagstaff.

Flagstaff’s roads, bridges, and real estate could be at risk from wildfires, floods, and heat impacts. With increased temperatures and smoke, biking and walking may become more hazardous and people may rely more on vehicles.



## The Rise of Electric Vehicles

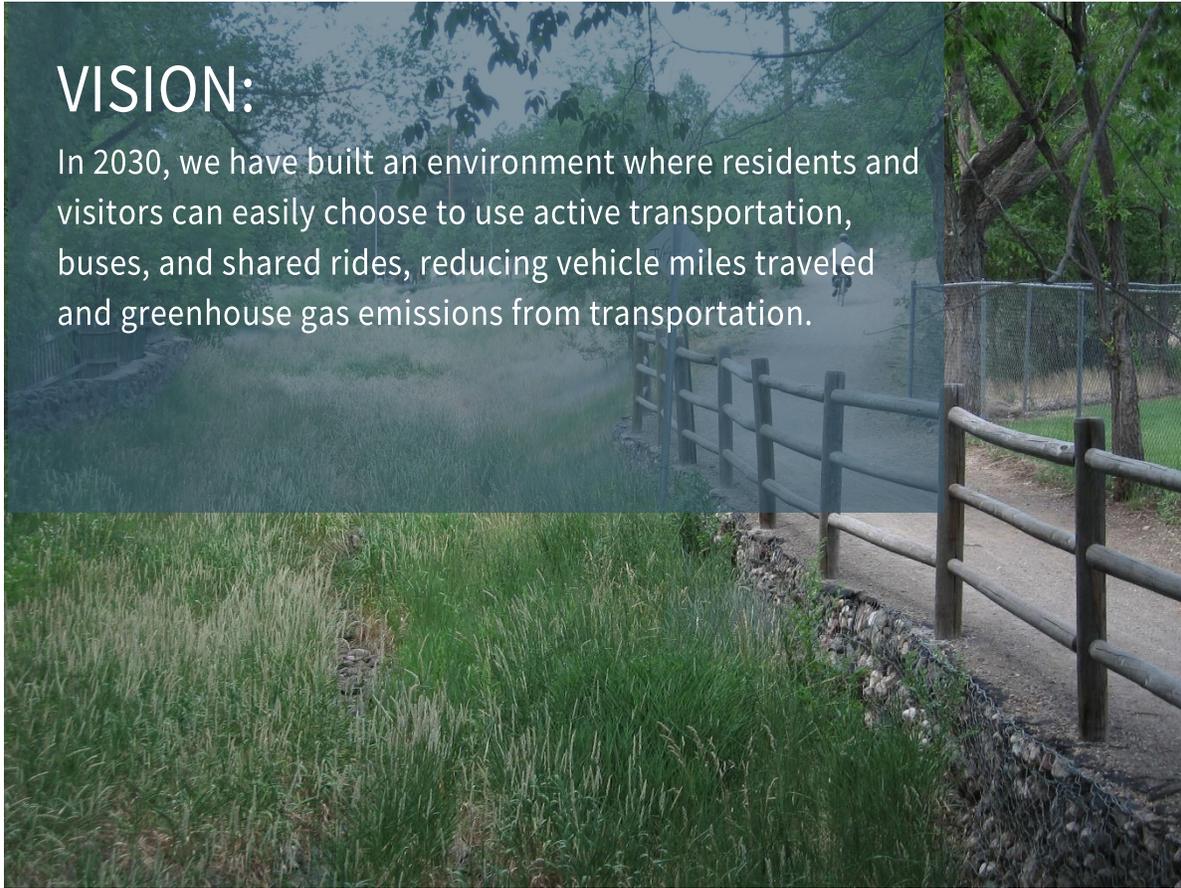
Almost every sixth car sold in the world will be electric by 2025, according to a global autos survey released in 2017. The rise of electric vehicles will alter more than how we drive: from the way the electricity grid operates to the future vehicle fueling infrastructure, the shift to electric vehicles will reshape our cities' major infrastructure systems. Communities will need to prepare for the changes that electric vehicles will bring.

### CURRENT COMMUNITY EFFORTS

- ▲ In 2018, bike sharing was introduced to the City of Flagstaff and the NAU campus, making one-way bike trips possible for residents.
- ▲ The High Occupancy Housing Plan encourages higher-density housing that is more compatible with existing neighborhoods.
- ▲ The City is exploring an adaptive reuse incentive program to encourage infill and the reuse of existing structures.
- ▲ Ridership on the Mountain Line bus system has increased for 18 years straight. There were 2.4 million rides from July 2017 to June 2018, a 17% increase over the previous year. This bucks the national trend of declining bus ridership.

## VISION:

In 2030, we have built an environment where residents and visitors can easily choose to use active transportation, buses, and shared rides, reducing vehicle miles traveled and greenhouse gas emissions from transportation.



## GOALS, TARGETS, AND INDICATORS

### Goal

Reduce greenhouse gas emissions from vehicle use.

#### KEY PERFORMANCE INDICATORS

Greenhouse gases from transportation in Flagstaff

#### TARGET

Reduce by 30% by 2030



**Goal**

Increase the proportion of vehicles that are electric or high-efficiency.

KEY PERFORMANCE INDICATORS	TARGET
Number of permitted, publicly available electric vehicle chargers in the City	10 by 2030
High-efficiency or alternative fuel vehicles in City fleet (%)	<i>Targets to be recommended by the Fleet Management Committee for different vehicle types</i>

**Goal**

Prioritize transportation modes and infrastructure such as walking, biking, and public transit that promote public health, maintain Flagstaff’s clean air status, and reduce emissions.

KEY PERFORMANCE INDICATORS	TARGET
Percent of City of Flagstaff employee commute trips made by public transit, biking, walking, or carpooling	50% of all trips by 2030
Percent of trips made by public transit, biking, walking, or carpooling	<i>Target to be established</i>
Mileage of City bike lanes	<i>Target to be established</i>
Bike parking corrals	<i>Target to be established</i>

**Goal**

Promote vibrant and affordable neighborhoods and infill development in order to enable residents to easily walk, bus, or bicycle to meet basic daily needs; decrease the distance needed to drive to reach services, schools, parks, and businesses; and improve quality of life.

KEY PERFORMANCE INDICATORS	TARGET
% of households living within ¼ mile of public transit	<i>Target to be established</i>
% of households living within a 10-minute walk of a neighborhood park	2030: 65% of Flagstaff households 2040: 75% of Flagstaff households

**Goal**

As population grows and visitation increases, ensure a higher proportion of Flagstaff workers can find adequate housing in the city.

KEY PERFORMANCE INDICATOR	TARGET
Affordability index: average housing + transportation cost as a percentage of income	Target to be established

## STRATEGIES AND ACTIONS

### STRATEGY 1. Advance land use planning that minimizes the distance people have to travel by car and that increases community resiliency.

Creating vibrant, centralized activity centers with a dense and diverse mix of services, amenities, jobs, and housing types in areas well-served by the Permanent Transit Network can reduce transportation emissions and support vibrant neighborhoods.

#### Priority Actions

TLU-1-A	Support intentional high-density development that increases mixed uses and residential density.
TLU-1-B	Increase the supply of attainable housing in proximity to employment opportunities, activity centers, and the permanent transit network.
TLU-1-C	Reduce vulnerability of new developments to fire and flooding, including encouraging development to reduce the risk of fire and flooding impacts by locating in areas of lower vulnerability.
TLU-1-D	Locate businesses, services, governmental offices, and schools that generate many trips near the permanent transit network.
TLU-1-E	Audit the incentives and standards in the zoning code to promote climate change resiliency and emissions reduction.
TLU-1-F	Stabilize or lower parking minimums for new developments to decrease the cost of housing and reduce impervious surfaces, among other benefits. Consider parking maximums where appropriate.
TLU-1-G	Host community workshops and discussion forums on density and its trade-offs and opportunities, and create continuous educational opportunities about the cost of free parking and other land use issues.

#### Other Actions

TLU-1-H	Strengthen incentives in the City’s zoning code that promote climate change resiliency and emissions reduction, such as reduced parking requirements, higher densities, and adoption of the newest energy codes.
TLU-1-I	Promote infill growth while protecting the beauty of the city and natural areas.



TLU-1-J	Plan and develop a connected system of parks, open spaces, and trails throughout Flagstaff.
TLU-1-K	Create more usable green space in our activity centers and work to incorporate a higher volume of smaller parks and urban public spaces.
TLU-1-L	Develop policies to require new construction in urban activity centers to establish shared parking districts, as appropriate.

**STRATEGY 2. Prioritize, incentivize, and promote transportation by biking, walking, and transit.**

Traveling by biking, walking, and transit has far less of a climate impact than traveling by personal vehicle.

**Priority Actions**

TLU-2-A	Expand infrastructure and amenities for pedestrians and bikes by drafting, adopting, funding, and implementing the Active Transportation Master Plan, prioritizing measures that can be shown to directly reduce greenhouse gas emissions.
TLU-2-B	Implement the transit-supportive recommendations of the Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) Five-Year Transit Plan for the Mountain Line, to increase ridership and transit frequency on the permanent transit network.
TLU-2-C	In order to analyze greenhouse gas emissions impacts for all major transportation infrastructure decisions, evaluate transportation impacts based on vehicle miles traveled (VMT), considering person trips.
TLU-2-D	Prioritize bus operations through mechanisms such as signal prioritization, bus slip lanes, and bus-dedicated lanes. Evaluate the feasibility of introducing dedicated bus lanes or carpool lanes.
TLU-2-E	Adopt a complete active transportation network policy to ensure there are efficient, comfortable, appealing, and safe connections throughout Flagstaff for all road users.
TLU-2-F	Secure additional funding to support biking, walking, and transit.

**Other Actions**

TLU-2-G	Increase transit service coverage and frequency, including enhancing bus, vanpooling, and shuttle services for outlying communities such as Kachina Village and Bellemont.
TLU-2-H	Develop transit services for visitors to Flagstaff, including to popular destinations such as Snowbowl, Twin Arrows, and the Grand Canyon, and between Phoenix and Flagstaff.
TLU-2-I	Add showers to City facilities to encourage commuting by active transportation and support employee health.
TLU-2-J	Re-establish local safe routes to school programming, including programs like trip tracker dollars and in-school education, to decrease the number of students being driven to school.

TLU-2-K	Promote educational events that teach people how to bike safely and use the bus, and provide information about the financial, health, and other benefits of transit and active transportation.
TLU-2-L	Increase access to bikes, including electric bikes, through bikeshare, expanded bike parking, electric bike rebates, and other opportunities.
TLU-2-M	Have a community discussion regarding the challenges and opportunities of electric bikes, scooters, and other electric-powered mobility devices and develop regulations to guide electric bike use.
TLU-2-N	Provide opportunities for collaboration with new mobility companies as technology changes, incorporating consideration for public safety, liability, and nuisance issues.
TLU-2-O	Prioritize pedestrian movement when configuring traffic signal timing, mid-block crossings, and maximizing visibility of crosswalks.
TLU-2-P	Partner with businesses and local institutions to increase the number of bike corrals and motorcycle and scooter parking spots, in downtown Flagstaff, the fourth street corridor, and other targeted locations.

**STRATEGY 3. Support the use of clean, energy-efficient vehicles.**

Clean, energy efficient vehicles such as hybrid and electric vehicles reduce emissions of greenhouse gases and other pollutants that can affect human health.

**Priority Actions**

TLU-3-A	Develop public and private partnerships, and refine regulations to streamline permitting, for the installation of fast-charging electric vehicle chargers in publicly accessible parking areas along tourism corridors, at workplaces, and in multi-family housing developments.
TLU-3-B	Develop public-private partnerships to develop electric vehicle charging stations at City facilities including the airport, Aquaplex, and rights-of-way.
TLU-3-C	Adopt a policy requiring 100% of new light-duty City fleet vehicles to be electric vehicles, meet high-efficiency standards, or use alternative fuels by 2020, and 75% of new medium and heavy-duty city fleet vehicle purchases to be electric by 2025.
TLU-3-D	Adopt electric vehicle-ready building codes for residential buildings to ensure homes have sufficient capacity and wiring to accommodate electric vehicles and avoid expensive future retrofits.
TLU-3-E	Incorporate electric vehicle information and education into transportation, energy, and green business outreach programs.

Other Actions

TLU-3-F	Educate City staff on best practices to respond to and support the transition to electric vehicles within the community.
TLU-3-G	Educate the public on existing state and federal incentives for efficient and electric vehicles, including tax incentives and at-home electric vehicle charging outlet incentives.
TLU-3-H	Introduce local incentives for efficient and electric vehicles, such as modest mid-stream incentives for car dealers to sell electric vehicles, a sales tax refund, and incentives for visitors to rent efficient vehicles.
TLU-3-I	Explore the development of bio-gas at City-owned facilities such as Cinder Lake Landfill and Wildcat Water Reclamation Plant to fuel vehicle fleets.
TLU-3-J	Partner with private entities, such as APS, to prepare electricity infrastructure for electric vehicle charging demand.
TLU-3-K	Encourage car-free living by attracting additional electric vehicle car-sharing businesses to Flagstaff, providing incentives to ensure accessibility to residents in all neighborhoods.
TLU-3-L	Work with leading figures—such as elected officials, Northern Arizona University leaders, and business leaders—to commit to visibly switching to electric vehicles.
TLU-3-M	Partner with APS and large private fleets to encourage EV fleet conversion.
TLU-3-N	Incentivize multi-family housing to offer electric vehicle charging stations.

**STRATEGY 4. Encourage efficient driving practices.**

Transportation contributes a large portion of Flagstaff’s total greenhouse gas emissions. Through actions like reducing vehicle idling, the City and the community can reduce emissions and improve air quality.

Priority Actions

TLU-4-A	Establish a policy to prohibit idling of City fleet vehicles, excluding emergency response vehicles.
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Other Actions

TLU-4-B	Pass an ordinance to ban the practice of rolling coal, a vehicle modification aimed to emit excess exhaust.
TLU-4-C	Pass an ordinance to limit vehicle idling in City limits.
TLU-4-D	Work to define climate change as a public nuisance.

**STRATEGY 5. Manage transportation demand and reduce the frequency with which people drive alone.**

The largest portion of Flagstaff’s transportation emissions stem from people driving alone in their cars. Transportation demand management helps to reduce single-occupant vehicle trips, enabling people to more efficiently use the transportation infrastructure that already exists.

**Priority Actions**

TLU-5-A	Provide employee benefits for those who commute by foot, transit, bicycle, or carpooling.
TLU-5-B	Fund a Transportation Demand Management (TDM) program, as recommended in the High Occupancy Housing Plan.
TLU-5-C	Invest in training and education for City staff to prepare for the transition to autonomous vehicles, including guidance for anticipating changes in transportation and land use patterns and potential negative impacts including zero-occupancy car trips.

**Other Actions**

TLU-5-D	Conduct a study that evaluates options for disincentivizing single-occupancy vehicle trips.
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**STRATEGY 6. Increase the supply of housing that is affordable to Flagstaff residents and located in areas that support biking, walking, and transit access to goods and services.**

The provision of affordable housing in pedestrian, bicycle, and transit-friendly areas close to goods and services reduces transportation-related greenhouse gas emissions and builds community resilience. People who can afford to live, work, and play in areas near their homes drive less and are more able to withstand impacts that climate change may bring, such as increased energy and food costs and infrastructure damage.

**Priority Actions**

TLU-6-A	To increase use of affordable housing incentives, improve the Incentive Policy for Affordable Housing and increase funding.
TLU-6-B	Encourage the construction of accessory dwelling units to increase rental opportunities in both established neighborhoods and new development.
TLU-6-C	Adopt a City policy requiring new City facilities and appropriate City-owned properties to consider a mix of uses, including housing where appropriate.

**Other Actions**

TLU-6-D	Create a working group to evaluate ways to encourage the construction of housing that can be adapted to meet the needs of various demographic groups over time, including students, seniors, and families.
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## Related Action

E-1-B

Subsidize home energy efficiency retrofits for affordable housing units, and housing that serves low-income and senior populations while maintaining the supply of existing housing.

**STATE-LEVEL OPPORTUNITIES**

As noted earlier, statewide action can enable Arizona residents, agencies and municipalities to take proactive steps that make communities stronger amidst change.

**The City will advocate for the following state-level actions to help achieve our greenhouse gas emissions goals:**

**Transportation and Land Use:**

- State-level policies that would encourage more climate-friendly land use policies, including inclusionary zoning, transfer of development rights, and tax increment financing.
- More stringent vehicle emissions inspection requirements.
- Allowing inclusionary housing, to harness the economic power of the private market to increase the supply of affordable housing.
- Additional state funding for public transit and active transportation systems.

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## Waste and Consumption

**Waste and Consumption** refers to the lifecycle of goods and materials, including opportunities to reduce emissions associated with manufacturing, use, and disposal.

### BACKGROUND INFORMATION

Greenhouse gas emissions from the disposal of solid waste contributed 11% to Flagstaff’s 2016 greenhouse gas emissions footprint. The consumption of goods and services by residents and businesses can also carry a significant carbon footprint—notably from meat consumption, home construction, and the purchase of furniture, clothing, and vehicles.

Agriculture may become stressed from pests, disease, and drought under future climate change, potentially reducing the availability of regional food. Climate change may also disrupt global supply chains and thereby affect the cost of household goods and services.



## The Role of Consumption

The production and delivery of goods and services consumed by Flagstaff households contribute significant greenhouse gas emissions. These goods and services include food, furniture, home construction materials, electronics, and clothing, as well as the production of transport fuels, natural gas, and electricity consumed in Flagstaff. Certain foods, such as meats, are more carbon-intensive to produce than dairy and grains, and therefore contribute the largest proportion of food-related emissions.

Despite the large contribution of household consumption to Flagstaff's greenhouse gas footprint, the City of Flagstaff has little direct control over household purchasing behavior, product manufacturing, and product transportation. As a result, City-initiated options to reduce emissions from consumption are limited. However, as global markets and energy sources become greener over time, we expect the goods and services that Flagstaff residents and visitors consume to be greener as well.

### CURRENT COMMUNITY EFFORTS

- ▲ The City developed a Rethink Waste Plan that outlines initiatives toward achieving the City's waste prevention and recycling goals.
- ▲ The Azulita Project, a local non-profit, is partnering with local businesses to eliminate the use of plastic straws and other single-use plastics.
- ▲ The Flagstaff Master Recycler program provides training to community members on waste prevention and composting practices.



## GOALS, TARGETS, AND INDICATORS

### Goal

Reduce greenhouse gas emissions associated with material consumption.

#### KEY PERFORMANCE INDICATOR

Change in consumption-based GHG emissions (MTCO<sub>2</sub>e)

#### TARGET

*Begin measuring indicator by 2021. Target to be established after the consumption-based GHG emissions inventory is complete.*



**Goal**

Reduce community waste generation in residential, commercial, and industrial sectors.

KEY PERFORMANCE INDICATOR	TARGET
Per capita waste generation (pounds)	Reduce growth to 0% by 2021. <i>Long-term target to be established based on a long-term materials management plan to be drafted by 2021.</i>

**Goal**

Increase diversion of waste from the landfill.

KEY PERFORMANCE INDICATOR	TARGET
Waste diversion rate (%)	90% diversion by 2050

**Goal**

Optimize landfill management to minimize greenhouse gas emissions.

KEY PERFORMANCE INDICATOR	TARGET
Methane capture from landfill (%)	<i>Target to be established</i>

## STRATEGIES AND ACTIONS

**STRATEGY 1. Increase waste diversion.**

Diverting waste keeps material out of landfills, where it would break down and generate greenhouse gases. Reduction, recycling, reuse, and composting offer climate-positive alternatives to sending waste to the landfill.

**Priority Actions**

WC-1-A	Expand infrastructure and introduce new technology to divert new waste streams.
WC-1-B	Expand composting services to divert and reduce food waste from the landfill, including curbside compost pickup and provision of composting bins.
WC-1-C	Introduce a yard waste program to divert yard waste from the landfill.
WC-1-D	Provide equal access to recycling services for single-family and multifamily housing and commercial facilities.

Waste and Consumption

WC-1-E	Conduct a study to evaluate the costs and benefits associated with mandating waste diversion.
WC-1-F	Require and incentivize the collection and diversion of construction and demolition waste.
WC-1-G	Install hydration stations at public facilities to reduce bottle waste.
WC-1-H	Plan for waste diversion services, including recycling, at multi-family housing and commercial developments.

Other Actions

WC-1-I	Develop incentives to divert more waste in the residential, commercial, and industrial sectors, such as rate structures, density bonuses, and volumetric pricing.
WC-1-J	Promote new markets for recycled or reused materials, such as through increased local business purchasing of recycled products and increased reuse of construction materials.
WC-1-K	Introduce restrictions on straws at stores and restaurants.
WC-1-L	Increase community utilization of the Hazardous Products Center.

**STRATEGY 2. Support sustainable and accessible production and consumption.**

Consuming goods, services, and food can contribute to greenhouse gas emissions. Supporting sustainable business practices, improving City procurement, and educating consumers can reduce emissions.

Priority Actions

WC-2-A	Expand consumer education on sustainable consumption and materials management, including prevention of wasted food in households and businesses and low-carbon food consumption.
WC-2-B	Provide outreach and education to Flagstaff businesses in reducing greenhouse gas emissions in their supply chains.
WC-2-C	Support “collaborative consumption” community projects like tool libraries and repair cafes through mini-grant programs.

Other Actions

WC-2-D	Raise awareness of businesses that sell used clothing, bicycles, appliances, and other items for repurposing, and those that sell food and goods with little to no packaging.
WC-2-E	Update and enforce the City sustainable purchasing policy, incorporating restrictions on the purchase of Styrofoam and bottled water for staff use.
WC-2-F	Collaborate across the community to recognize and certify businesses that reduce their waste.



**STRATEGY 3. Optimize collection and disposal systems to minimize greenhouse gas emissions.**

Maximizing the efficiency of waste processing can reduce emissions associated with solid waste.

**Priority Actions**

WC-3-A	Reduce the resource consumption of the waste collection fleet through efforts such as alternative fuel, fuel efficiency, vehicle optimization, and other new technologies.
WC-3-B	Manage the landfill to reduce greenhouse gas emissions, such as through landfill gas capture, biofuel development, and waste-to-energy technologies.

**STRATEGY 4. Improve data collection on consumption, waste, and diversion.**

Current gaps in available waste and consumption data reduce the effectiveness of waste reduction efforts.

**Priority Actions**

WC-4-A	Measure and incorporate greenhouse gas emissions from consumption in the Flagstaff community greenhouse gas inventory.
WC-4-B	Work with waste and recycling haulers operating in the City of Flagstaff to collect data on collection and diversion.

**Other Actions**

WC-4-C	Improve City of Flagstaff Solid Waste operations data collection for community waste production, collection, and diversion.
WC-4-D	Use data to communicate local best practices in waste reduction and diversion.

**STRATEGY 5. Increase local food production through partnerships and policies.**

Food consumed by Flagstaff residents and visitors often travels significant distances before arriving at grocery store shelves. Increasing local production of foods appropriate to our climate would reduce these transportation emissions. Local food production also helps build a more resilient community as global food supply chains may become disrupted by climate shocks and food price fluctuations.

**Priority Actions**

WC-5-A	Support local agriculture through economic development initiatives and enabling policies.
WC-5-B	Expand urban agriculture opportunities in community gardens, schools, and parks and on rooftops.

**Other Actions**

WC-5-C	Change zoning to be more supportive of urban agriculture.
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## STATE-LEVEL OPPORTUNITIES

Statewide action in the Waste and Consumption sector can also support our ability to achieve our community climate action goals.

The City will advocate for the following state-level actions to help achieve our greenhouse gas emissions goals:

### Waste and Consumption:

- Allowance of plastic bag bans or fees and a beverage container deposit program.
- Requirements for access to recycling services at multi-family housing units.
- Support for materials management initiatives at the local level, such as extended producer responsibility or a bottle bill.
- Extension of producer responsibility at the state and federal levels.

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## Public Health, Services, Facilities, and Safety

**Public Health, Services, Facilities, and Safety** refers to facilities and services focused on community health, safety, security, and emergency response.

### BACKGROUND INFORMATION

Flagstaff's outdoor workers, the elderly, the very young, and low-income populations will be especially vulnerable to health impacts from wildfire smoke and extreme heat. Increased wildfire risk will also stress emergency services and expand wildfire risk areas to encompass more homes. Climate change is already changing vector (mosquito) densities and ranges and there is potential for increases in the prevalence of various diseases and parasites.

Emissions associated with public health, safety, and security services are encapsulated in other sectors of the greenhouse gas inventory and do not make up a large proportion of overall emissions. Nonetheless, actions to increase the efficiency of these services can help reduce the community's carbon footprint.

## CURRENT COMMUNITY EFFORTS

- ▲ The Ready Set Go campaign encourages residents to be more informed about potential wildfire emergencies, mitigation measures, and evacuation preparations.
- ▲ Through the Woods Watch program, the City of Flagstaff, Coconino County, and U.S. Forest Service partner with citizens to monitor for careless fire behavior on forested lands and protect the community from wildfire.
- ▲ The Coconino County Public Health Services Department is currently developing a Mosquito Management Plan for Coconino County.



## GOALS, TARGETS, AND INDICATORS

### Goal

Prioritize public safety and health services in the face of anticipated climate change impacts.

KEY PERFORMANCE INDICATOR	TARGET
Initiation of a community working group to study public health and climate and make recommendations	Initiation by 2020



**Goal**

Improve the resiliency of building infrastructure to climate hazards.

KEY PERFORMANCE INDICATOR	TARGET
Establishment of programs to assist vulnerable populations during extreme temperature events	Establishment by 2023

**Goal**

Anticipate climate change impacts that will affect public health by identifying at-risk community groups and neighborhoods and planning appropriate responses.

KEY PERFORMANCE INDICATOR	TARGET
Assessed climate risk to neighborhoods	<i>Target to be established after neighborhood-level climate risks are assessed</i>

**STRATEGIES AND ACTIONS**

**STRATEGY 1. Identify and target support for at-risk populations.**

The elderly, homeless, and low-income populations are most vulnerable to climate change impacts. Identifying and protecting vulnerable communities now can help reduce the negative impacts of climate change.

**Priority Actions**

PH-1-A	Characterize relative fire, flood, mosquito, and other risk exposures to climate change among community groups and neighborhoods.
PH-1-B	Adequately fund health and emergency services reaching populations vulnerable to climate change impacts.
PH-1-C	Address woodsmoke, such as through a regulation that requires use of only certified wood stoves, a public education campaign, and/or rebates for wood stove buybacks or replacements.

**Other Actions**

PH-1-D	Encourage low-emissions, energy-efficient climate control measures, such as through building codes, to help sensitive populations deal with higher temperatures.
PH-1-E	Work with partners to identify threats to food security for vulnerable populations and to develop solutions.

**STRATEGY 2. Adequately fund services for disaster preparedness.**

Preparing for climate change hazards and their effect on public service demand and provision will allow the Flagstaff community to be more prepared for climate change.

Priority Actions

PH-2-A	Dedicate increased funding to accommodate demand for public health services among at-risk populations.
PH-2-B	Embrace grassroots and neighborhood movements that advocate for greater services.

Other Actions

PH-2-C	Create educational campaigns to raise awareness of climate-related health and safety issues and services.
PH-2-D	Increase coordination between disaster preparedness and health services.
PH-2-E	Complete the Rio de Flag flood control project.

**STRATEGY 3. Increase community awareness of climate change risks and impacts and improve community capacity to respond to new or expanding risks to public health.**

Community outreach will help the Flagstaff community to better prepare for changing public health risks. Actions that build community awareness about risk—such as the interaction of heat risks, disease, and poor air quality—will give community members the knowledge needed to plan and take action.

Priority Actions

PH-3-A	Train K-12 teachers on climate change science and curriculum.
PH-3-B	Provide in-school lessons on climate change science and climate action in K-12 classrooms in Flagstaff.
PH-3-C	Improve community messaging on how to respond to simultaneous heat risks and poor air quality due to smoke.

Other Actions

PH-3-D	Provide information on what residents can do to reduce their carbon footprint and how their households can be more resilient.
PH-3-E	Increase information available to community members regarding increased risk of health impacts due to climate change.



**STRATEGY 4. Improve the resiliency of public infrastructure.**

Functional public infrastructure such as roads, shelters, and utility services are critical for sustainable economic and social wellbeing in the face of climate change. Actions to improve the resiliency of public infrastructure, such as through improved maintenance and planning, will enable the community to withstand unanticipated shocks and disruptions like flood events.

Priority Actions

PH-4-A	Create preparedness and recovery plans for all City divisions.
PH-4-B	Prepare for public buildings to be used in different ways, both in lower-impact ways, such as seniors using the library to cool down during hot June days, and as safe-havens during acute emergencies.

Other Actions

PH-4-C	Update asphalt engineering standards and maintenance practices to increase resiliency amidst higher temperatures and increased incidences of flooding.
PH-4-D	Incorporate green infrastructure principles into all public infrastructure projects, creating more natural amenities throughout the City.
PH-4-E	Develop reserve funding for extreme weather events in the City of Flagstaff.

**STRATEGY 5. Prepare for changing risks to public health due to climate change.**

As climate change increases the risk of some diseases, collaborations across agencies will enable more efficient response.

Priority Actions

PH-5-A	Continue collaborations to study and prepare for increased risk of illness and disease due to increased dust, a warmer climate, higher mosquito densities, and other potential results of climate change.
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Other Actions

PH-5-B	Increase collaboration between the Coconino County Public Health Services Department (CCPHSD) and the City to evaluate the interaction between the built environment and disease vectors like mosquitos.
PH-5-C	Study how the changing ecosystem around Flagstaff contributes to increased risk of disasters.
PH-5-D	Support CCPHSD in providing education to healthcare providers on how climate change will affect heat-related illness, altitude-related issues, fatalities, and demand for services.



## Economic Prosperity and Recreation

**Economic Prosperity and Recreation** refers to community and economic health, including opportunities to reduce emissions and help the community’s business, tourism, and recreational sectors prepare for climate change.

### BACKGROUND INFORMATION

Climate change will impact all sectors of the local economy as well as the broader national economy. The Flagstaff community has an opportunity to adapt to changing conditions and create a stronger community and greater shared prosperity. Businesses can help lead the way in innovation and resiliency.

Changing conditions will affect recreation for both residents and visitors alike. Flagstaff will need to continue to diversify its tourism activities and businesses will need to prepare for low-snow years. Drought and an increased risk of wildfire can lead to forest closures and reduce access to the local forests, heavily depended on for recreation. At the same time, rising temperatures in Central Arizona can increase visitation in Northern Arizona in the summer. By preparing for these impacts, the City can protect its economy as well as the health of its residents and visitors.

Tourists also contribute to Flagstaff’s energy use, water consumption, and transportation emissions. Efforts to minimize the environmental impact from tourism and recreation make good business sense and can position Flagstaff as a visible leader in sustainability.

### CURRENT COMMUNITY EFFORTS

- ▲ The Innovate Waste Challenge is incentivizing businesses to discover new ways to convert waste into marketable products.
- ▲ Flagstaff is home to a thriving local brewing industry, with eight breweries calling Flagstaff home.
- ▲ The Mountain Line bus system has recently added a weekend bus route to Snowbowl to serve both residents and tourists who ski and snowboard.

## VISION:

In 2030, Flagstaff is a prosperous and stable economy with abundant and equitable access to employment and recreational opportunities.



### GOALS, TARGETS, AND INDICATORS

#### Goal

Build a diverse, strong, resilient, and equitable economy in the face of threats from climate change, supporting community members whose jobs are at risk from climate change impacts and the creation of jobs in renewable energy and energy efficiency.

#### KEY PERFORMANCE INDICATOR

Initiate a study to identify threats to current industries from climate change and opportunities for new industries.

#### TARGET

Initiation of study by 2020

#### Goal

Manage and enhance existing recreation and outdoor opportunities to maximize resilience to the impacts of climate change.

#### KEY PERFORMANCE INDICATOR

Initiate a study to identify methods for ecosystem monitoring to assess impacts of recreation and climate change

#### TARGET

Initiation of study by 2021

**Goal**

Accommodate the increased use of City Parks and Recreation facilities and changing maintenance needs.

**KEY PERFORMANCE INDICATOR**

Emissions from water and energy use at City parks and recreation facilities, per acre or per square foot

**TARGET**

Maintain 2017 levels by 2030



## The Benefits of Sustainable Living

Making sustainable choices—such as car sharing, biking, and walking to get around—can also save money and promote a healthy lifestyle.



## STRATEGIES AND ACTIONS

### STRATEGY 1. Build an economy that reduces emissions and can effectively adapt as the climate changes.

By promoting a sustainable local economy, Flagstaff can support businesses as they reduce emissions and plan for a changing climate.

#### Priority Actions

EPR-1-A	Promote Flagstaff as an environmentally friendly destination by highlighting the businesses that are taking steps to reduce resource consumption.
EPR-1-B	With community stakeholders and partners, conduct a study and host a community conversation to identify threats to current industries, opportunities for new businesses and industries, and areas that need support.
EPR-1-C	Work with businesses to assess their climate change vulnerability and plan for the future.
EPR-1-D	Utilize existing community resources to support community members whose jobs may be at risk from climate change impacts through retraining programs and business support.
EPR-1-E	Prepare water, road, and other public infrastructure for increased demands from growth and tourism.
EPR-1-F	Strengthen the fossil fuel divestment policy for the City of Flagstaff.
EPR-1-G	Promote Flagstaff as a car-free destination through informational campaigns for visitors.

#### Other Actions

EPR-1-H	Organize and facilitate roundtables with business leaders focused on clean economy strategies.
EPR-1-I	Ensure companies that are considering locating here are well-informed about how well local resources are matched to their demands.
EPR-1-J	Continue to support diversification of the tourism sector to accommodate year-round travel and activities.
EPR-1-K	Encourage visitor-focused businesses to implement programs that reduce resource consumption.

**STRATEGY 2. Protect natural areas and ecosystem services that are most vulnerable to the impacts of increased visitation and climate change.**

Ensuring Flagstaff’s ecological resources can sustain increases in visitation improves both climate and economic resiliency.

Priority Actions

EPR-2-A	Prioritize natural resource protection in high-demand recreational areas.
EPR-2-B	Continue the Flagstaff Convention and Visitors Bureau public awareness campaign that emphasizes 'treading lightly' on the land to accommodate increased visitation and impact.

Other Actions

EPR-2-C	Maintain cooperation with County and U.S. Forest Service recreation programs to plan for and respond to increased visitation and use of recreational services and open spaces.
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**STRATEGY 3. Plan for changes to recreation and respond to the impacts of climate change on current Parks and Recreation facilities and operations.**

Climate change may increase demands for recreation services while stressing park resources. Preparations include understanding how fields will respond to increased temperatures, evaluating health risks, and preparing for increased electricity demand.

Priority Actions

EPR-3-A	Incorporate changing climate conditions and risks to community health, Parks and Recreation staff members, and facilities into the Parks and Recreation Master Plan and Open Space Management Plan update processes.
EPR-3-B	Investigate new technologies and techniques to decrease water, electricity, and fuel use at Parks and Recreation facilities.
EPR-3-C	Implement energy and water efficiency retrofits to decrease water and electricity use and costs at all Parks and Recreation facilities.
EPR-3-D	Continue to utilize low-water, climate-adapted, native plantings for all facilities, parks, and streetscapes, and create a best practices manual for irrigation and other operations.



Other Actions

EPR-3-E	Prepare for the financial and greenhouse gas emissions impacts of potential increases in electricity and water use at all Parks and Recreation facilities.
EPR-3-F	Prepare for increases in demand for programs and facilities, and impacts on Parks and Recreation capital projects, budget, staffing, maintenance, and operations.
EPR-3-G	Work with community partners to understand how closing sections of the nearby national forests due to fire danger impacts local residents, and develop creative approaches to help residents find alternative ways to exercise, recreate, and socialize.

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## IMPLEMENTATION STRATEGY

Flagstaff has made progress in reducing emissions, developing innovative sustainability initiatives, and building community support. This Plan was developed to build on key climate action successes and provide a pathway to reach deep decarbonization targets. Making progress will require leadership and commitment from the City government and the community. The Implementation Strategy **identifies a responsible City department** for each strategy as well as a **timeline for taking action**. In addition to actions undertaken by the City, individual and community actions will be essential. The **Community Action Guide** provides a set of strategies that individuals and households can implement, while an **outreach strategy** outlines how to preserve momentum in the community.

To ensure that climate action and adaptation strategies meet the needs of the community and make the best possible use of resources, this section also lays out a series of tracking metrics and a reporting structure so that City staff can report progress to Council, update the community, and measure successes.



## Leadership

### Flagstaff City Council

The Climate Action and Adaptation Plan is a continuation of the Resiliency and Preparedness Study of 2012, adopted by the Flagstaff City Council by Resolution 2012-22. The success of this Plan is contingent on the Flagstaff City Council continuing to demonstrate leadership on climate change. Plan implementation also relies on continued public support for the Plan.

The Flagstaff City Council will have oversight responsibility for the Plan. They will receive annual updates on Plan progress and make policy decisions, budgetary appropriations, and workplan approvals that will enable the implementation of the Plan.

### Sustainability Commission

The City Council-appointed Sustainability Commission will provide ongoing citizen oversight by focusing on Plan implementation and public engagement.

The role of the Commission will include:

- ▲ Monitoring and tracking progress towards meeting Plan goals.
- ▲ Serving in an advisory capacity and making recommendations to City Council.
- ▲ Engaging with local organizations and community groups.
- ▲ Supporting the City's public outreach efforts.

### City Leadership

Climate change is the defining challenge of the 21st century. For a City to take meaningful action on climate change mitigation and adaptation, it is critical for every aspect of the municipal organization to be involved in implementation. Leaders at the City of Flagstaff—from the City Manager's Office to division directors and individual supervisors—should work to ensure that climate action and resiliency are considered and implemented throughout City operations.

The City Manager's Office will support the Council's climate commitments by recognizing the involvement of all City divisions in the successful implementation of the Plan. Methods to ensure leadership across the organization include:

- ▲ Renewing our commitment to the actions recommended in the City of Flagstaff Resiliency and Preparedness Study, adopted by City Council in 2012. The core elements of this study will continue to prepare the City for climate-related impacts, and staff throughout the organization should work to implement these seven recommendations:
  1. Build, sustain, and leverage local and regional partnerships.
  2. Consider how differential exposures to pollution, poverty, and access to resources exacerbate the effects of climate change.
  3. Ensure that operational decisions integrate resiliency.

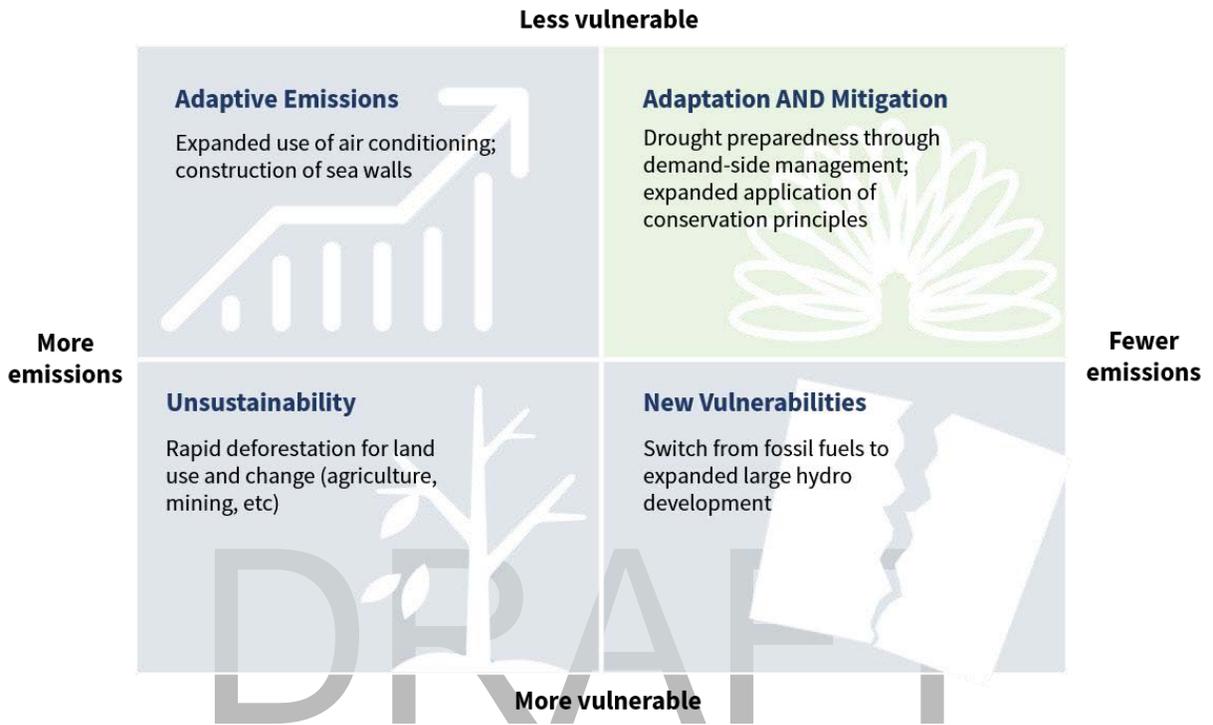
4. Take climate change into account when planning for new development.
  5. Prioritize proactive education within City operations to build resiliency.
  6. Incorporate resiliency as a City priority during City planning efforts.
  7. Allocate municipal resources to adapt City operations to climate change, including ongoing assessment of the City's vulnerability and risk.
- ▲ Organizing biannual City Manager's Climate Roundtables to foster an environment of climate leadership and sharing. Hosted by the City Manager's Office, these roundtables will provide an opportunity for each Division Director to share climate action successes and challenges in their division with City leaders.
  - ▲ Forming an internal Climate Action Committee to ensure involvement from all City divisions in the Plan. The City Manager will work with the Sustainability Section to form this Committee, which will have a staff representative from each City division, with section-level representation as appropriate. The Committee will meet quarterly to review implementation responsibilities, report on progress, and discuss challenges.
  - ▲ Identifying efforts that support resiliency and greenhouse gas mitigation during the budget review process.
  - ▲ Close coordination between Sustainability staff and Community Development staff on the Regional Plan annual reporting process, which reports on many climate-related indicators. Because the first update of this Plan, five years after initial adoption, will coincide with Flagstaff Regional Plan update process, coordination among Sustainability and Community Development staff teams will be especially valuable.

### Capacity for Climate Action Coordination

Successful implementation will require dedicated staff efforts to ensure that climate action and adaptation are continually incorporated in existing City operations. The Plan recommends the creation of a climate action coordinator position in the Sustainability Section, who will assist with implementation of the actions recommended in the Plan, reporting on progress, and coordinating with City staff across divisions.

The Plan recommends enhancements—and in some cases staff positions—for various City programs, such as a permanent City of Flagstaff staff position for outreach and education related to forest health. These staffing decisions will be considered through the program planning and City of Flagstaff budgeting processes.

The following matrix is a tool that can be used to support decision-making within the City of Flagstaff. The City should strive for actions that both reduce vulnerability and reduce emissions (top right quadrant).



## Operationalizing Equity

Each Climate Action and Adaptation Plan action should be implemented in a manner that supports equity and mitigates structural racism and historic inequality. Considering equity when implementing climate action goes beyond merely distributing resources equally. Providing equitable access requires meeting community needs in the context of existing vulnerabilities and inequalities. It is also possible that climate action strategies may lead to adverse, unintended impacts. For example, improving bike lanes and adding open space could increase the speed of gentrification and displacement, while additional City fees could add new burdens for low-income communities. The potential for other, unforeseen impacts to the community will be considered during implementation processes, and efforts will be made to anticipate and address any such impacts or burdens as they arise.

Some ways to ensure that equity is considered throughout the Plan implementation process include the following:

- ▲ **Design policies and programs that serve disadvantaged communities first.** Target policies and programs at communities experiencing high pollution burdens, low-income, poverty, health issues, and exposure to climate hazards.
- ▲ **Engage with the community.** Proactively engage community leaders on an ongoing basis.
- ▲ **Utilize an “equity checklist” when implementing actions.** See example list below.

Ensuring that participation in climate action is accessible to the entire Flagstaff community will require considering equity in policy, outreach, and infrastructure development. City staff will work to involve diverse community voices from the start of any new initiative and will track progress towards advancing equity.

Below are **key equity considerations and questions** that Flagstaff should consider when implementing climate actions. These considerations are drawn from the [City of Portland’s Climate Action Plan](#), which is recognized as a leading document on integrating climate plans and equity.<sup>1</sup>

- ▲ **Disproportionate impacts:** Does the proposed action generate burdens (including costs), either directly or indirectly, to communities of color or low-income populations? If yes, are there opportunities to mitigate these impacts?
- ▲ **Shared benefits:** Can the benefits of the proposed action be targeted in progressive ways to reduce historical or current disparities? Are the benefits dispersed not only equally, but equitably?
- ▲ **Accessibility:** Are the benefits of the proposed action broadly accessible to households and businesses throughout the community—particularly communities of color, low-income populations, and minority, women, and emerging small businesses?
- ▲ **Engagement:** Does the proposed action engage and empower communities of color and low-income populations in a meaningful, authentic, and culturally appropriate manner? Are community stakeholders involved and engaged in implementation?
- ▲ **Capacity:** Does the proposed action help build community capacity through funding, an expanded knowledge base, or other resources?

- ▲ **Alignment and partnership:** Does the proposed action align with and support existing communities of color and low-income population priorities, creating an opportunity to leverage resources and build collaborative partnerships?
- ▲ **Relationship building:** Does the proposed action help foster the building of effective, long-term relationships and trust between diverse communities and local government?
- ▲ **Economic opportunity and staff diversity:** Does the proposed action support communities of color and low-income populations through workforce development, contracting opportunities or the increased diversity of City and County staff?
- ▲ **Accountability:** Does the proposed action have appropriate accountability mechanisms to ensure that communities of color, low-income populations, or other vulnerable communities will equitably benefit and not be disproportionately harmed?

### Equity Implementation

Implementation of the Climate Action and Adaptation Plan presents an opportunity to ensure that the benefits of climate action are shared. However, our work to consider equity is not complete. The following steps will ensure that the above considerations are incorporated into Plan implementation:

- ▲ Establish a climate and equity working group to build partnerships within the community, continue to identify community needs, and ensure that Plan implementation follows the nine key equity considerations above.
- ▲ Conduct a needs assessment in the community to understand how needs are being met and how climate change impacts neighborhoods differently.
- ▲ Incorporate equity indicators into monitoring and evaluation processes.
- ▲ Create opportunities for youth to be at the table.
- ▲ Ensure that community members from all income levels, races and ethnicities, political persuasions, and neighborhoods are engaged in Plan outreach efforts, such as through Climate Ambassador programs and community meetings on climate change preparation and mitigation.

## Accountability and Reporting

### ACCOUNTABILITY

To support Plan implementation, Flagstaff should join the Global Covenant of Mayors. The Global Covenant of Mayors is an international coalition of cities committed to climate change mitigation and resilience. Becoming a signatory would officially commit the City to greenhouse gas reporting, submitting a plan for climate action, assessing climate risks and vulnerabilities, and defining reduction targets. The Plan fulfills many of the Covenant's requirements. However, ongoing public reporting and disclosure requirements could help Flagstaff maintain momentum on implementation, regardless of staff or elected changes.

### MONITORING, REPORTING, AND EVALUATION

This section presents a structure for ongoing monitoring, evaluation, and reporting on Plan progress. Investing in data collection and consistent reporting is a key aspect of implementation and increases transparency. City staff will regularly track and report on Plan indicators, greenhouse gas emissions, and notable progress on implementing strategies.

#### Monitoring

The City of Flagstaff has been annually monitoring and reporting both municipal and community greenhouse gas emissions since 2009. These inventories provide insight into Flagstaff's progress and trends in emissions. The City will continue to update the municipal and community greenhouse gas inventories on an annual basis.

Progress on other key performance indicators will be updated every one to three years.

Progress towards Plan actions will be monitored every six months.

#### Reporting

Regular reporting will ensure transparency and progress of Plan implementation.



On an annual basis, the City Manager will request that City staff produce a Plan progress report that includes:

- ▲ Progress of each Plan action.
- ▲ Key performance indicator updates, including an annual greenhouse gas inventory.

A publicly available online dashboard will illustrate progress against the Plan's actions. This dashboard will be updated annually, with indicators showing which actions have been completed, which are in progress, and which have not been started.

Key performance indicators from this Climate Action and Adaptation Plan are aligned with existing metrics used for annual reporting on the Flagstaff Regional Plan.

### Evaluation

The Sustainability Commission will review the annual Climate Action and Adaptation Plan progress report to assess the effectiveness of Plan implementation.

Informal progress reports will be provided by City Staff at regular Climate Action Committee meetings.

### Plan Updates

The City will work with community partners to update the Plan every five years. This five-year update schedule will ensure that the plan can respond to changing circumstances, market factors, implementation challenges, and successes. This process will include updating Plan goals, adjusting indicators, and re-prioritizing strategies and actions based on local circumstances.

## KICK-STARTING INTERNAL IMPLEMENTATION

A strong foundation of internal leadership and process will facilitate Plan implementation.

The City of Flagstaff municipal organization must prepare for how climate change will impact its ability to serve the residents of Flagstaff. The 2012 Resiliency and Preparedness Study serves as a foundation for considering how the City can continue to build resilience across the municipal organization.

The activities of the City of Flagstaff contribute to climate change. The City is committed to reducing its greenhouse gas emissions in order to reduce the pace of global climate change and contribute to the achievement of this Plan's overarching goals. Building local resiliency against risk from climate variability within the municipal organization will help ensure continued prosperity.

To ensure the City is incorporating both climate mitigation and adaptation into its operations, in addition to completing the actions called for in this Plan, the City will update the City of Flagstaff Resiliency and Preparedness Study to analyze how the municipal organization can be more resilient and prepared for anticipated climate changes. City staff will continue to track municipal greenhouse gas emissions and publish a greenhouse gas inventory, improving its dissemination to City staff.

The following actions, to be completed in the first year, will kick-start successful execution within the City organization.

**FIRST-YEAR IMPLEMENTATION ACTIONS FOR CITY OPERATIONS**

The City Manager will direct division directors to designate a Climate Action Lead, who will represent the division at the Climate Action Committee.

The City will join the Global Covenant of Mayors.

The City Manager will host a first Climate Roundtable.

The City will begin the process of updating the City of Flagstaff Resiliency and Preparedness Study, completed in 2012, to analyze how the municipal organization can be more resilient and prepared for anticipated climate changes.

The City will update its greenhouse gas emissions goals to complement the Climate Action and Adaptation Plan goals.

City staff will work with City Council to identify legislative and budgetary priorities that support the goals of the Plan and enable implementation of Plan strategies and actions.

## Funding

Financial investments are necessary to prepare Flagstaff for climate change. Yet investing in building resiliency throughout Flagstaff has many benefits, financial and otherwise. The benefits of adaptation include the costs we avoid by reducing or averting the negative local impacts of climate change, while mitigation helps us avoid damage from larger changes in the climate. Climate action can also be used to strengthen local businesses, support vulnerable community members, and improve quality of life.

Funding for the implementation of Plan strategies will need to come from within the City budget, agency grants, and new revenue sources. Some actions in the Plan require capital investment in City infrastructure and others will require increases in annual operating budgets. Some actions are good candidates for state, federal, or foundation funding.



### CLIMATE PREPARATION, CREDIT RISK, AND BONDING CAPACITY

In 2017, Moody's Investor's Services Inc. published a report outlining how it weights climate change risks as part of credit rating assessments. The agency assesses how a city takes action to prepare for both short-term climate shocks and long-term climate trends. A city that is less prepared to handle climate extremes and instability may receive lower credit ratings for bond issues. These developments further reinforce the economic incentive for cities to understand their risks and prepare for climate change.

[https://www.moody.com/research/Moodys-Climate-change-is-forecast-to-heighten-US-exposure-to--PR\\_376056](https://www.moody.com/research/Moodys-Climate-change-is-forecast-to-heighten-US-exposure-to--PR_376056)



Funding options include:

- ▲ **Renewable energy development savings.** The City of Flagstaff is committed to transitioning to 100% renewable energy for all City government operations. When the City moves forward with partnerships to develop renewable energy, the cost savings can be substantial. Cost savings can then be redirected to fund climate action within Flagstaff.
- ▲ **Revisions to the City of Flagstaff Environmental Management Fee (EMF).** The EMF, established in 2002 and authorized in the [Solid Waste Code Chapter 7-04-001-0010 FEES](#), is a fee of \$4 per month per utility bill charged to fund citywide environmental programs, including but not limited to sustainability, environmental management, and conservation education programs. The fee assessment structure could be revised to more equitably distribute the costs of community impacts and programming designed to mitigate those impacts. An assessment based on water consumption, for example, could generate significant funding while promoting water conservation.
- ▲ **Energy efficiency upgrade savings.** Energy efficiency retrofits can lead to significant savings for City operations. These savings could be allocated to a climate action fund for reinvestment into mitigation and adaptation actions.
- ▲ **Carbon pricing.** The City of Flagstaff was the first city in Arizona to call for revenue-neutral carbon fee and dividend legislation.<sup>2</sup> A carbon fee and dividend places a fee on fossil fuels at the source (a mine, well, or port). All revenue from this fee, minus a small administrative portion, is returned to households equally. Carbon pricing can be both a strategy to encourage positive environmental behaviors as well as a funding mechanism to support City climate work. Some leading cities are

experimenting with carbon impact fees, and others with revenue neutral taxes. Strategies to price carbon and support City climate change goals include:

- Develop a local carbon offset program, collecting optional financial contributions from residents seeking to offset their carbon footprint. Proceeds would go to local climate action projects.
  - Establish a carbon impact fee on new building projects to support climate mitigation efforts.<sup>3</sup>
  - Implement a utility tax on fossil fuel energy that reflects the social costs of emissions.
- ▲ Identify projects that align with both climate goals and economic development and community investment goals. Economic Vitality currently supports projects that achieve climate and economic goals such as the Innovate Waste Challenge and the adaptive reuse program.
- ▲ The City of Flagstaff, local businesses, and individuals should pursue state and federal incentives and external funding programs such as:
- Federal incentives and programs
    - [Residential renewable energy and efficiency tax credits](#)<sup>4</sup>
    - [Business Energy Investment Tax Credit](#) for renewable energy<sup>5</sup>
    - [Federal Energy Management Program](#) for federal agency energy efficiency<sup>6</sup>
    - Fannie Mae [Green Financing Loans](#)<sup>7</sup>
    - [Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants](#)<sup>8</sup>
    - [Rural Energy for America Program Energy Audit & Renewable Energy Development Assistance Grants](#)<sup>9</sup>
    - [FHA PowerSaver Loan Program](#)<sup>10</sup>
    - Federal [Tax Credit for All Electric and Plug in Hybrid Vehicles](#)<sup>11</sup>
    - FEMA [Hazard Mitigation Assistance](#)<sup>12</sup>
    - [Agricultural Management Assistance Program](#)<sup>13</sup>
    - [Water Bank Program](#)<sup>14</sup>
    - [Conservation Stewardship Program](#)<sup>15</sup>
    - [Environmental Quality Incentives Program](#)<sup>16</sup>
  - Arizona
    - [Renewable Energy Production Tax Credit](#)<sup>17</sup>
    - [Multifamily Energy Efficiency Program](#)<sup>18</sup>
  - APS programs
    - [Residential Energy Efficiency Rebate Program](#)<sup>19</sup>
    - [Energy Star Homes Program for Builders](#)<sup>20</sup>
    - [Business rebates](#)<sup>21</sup>
  - External Funding Opportunities
    - [Keeling Curve Prize](#)
    - [Urban Sustainability Director’s Network](#) funding



# FLAGSTAFF COMMUNITY CLIMATE ACTION GUIDE

## Setting a goal is just the first step!

Making progress towards Flagstaff's ambitious climate action goals is going to take more than just action from the City itself—individuals and community groups all have a critical role to play as well. Through thoughtful and committed actions from all, Flagstaff can become a more resilient, healthier, and more equitable city for people to live in and visit for both current and future generations. **This guide highlights actions that individuals can take to reduce their carbon footprint or increase community resilience.**

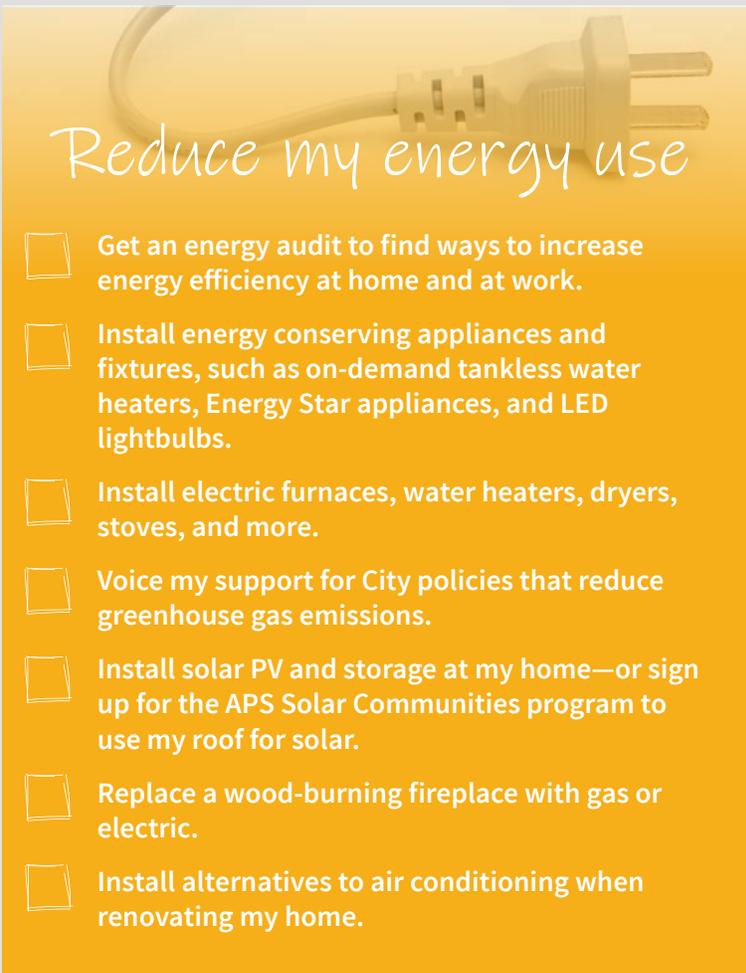


# WHICH ACTIONS WILL YOU TRY TAKING?



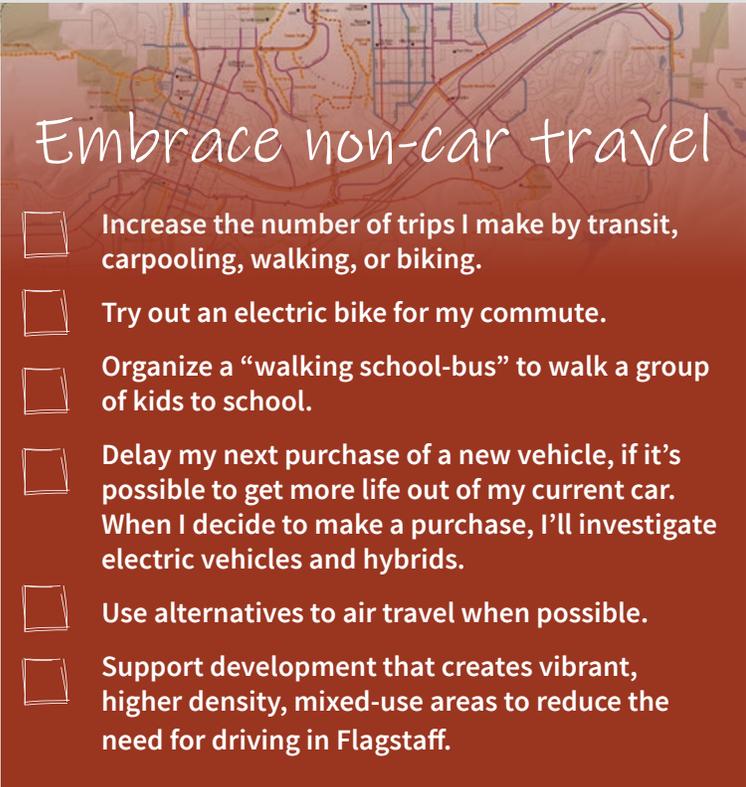
## Reduce my garbage

- Reduce the amount of food my household wastes.
- Compost organic waste in my backyard or purchase compost pick-up.
- Fix things that are broken instead of buying new.
- Use the Hazardous Products Center and bulky item pick-up programs to properly dispose of old refrigerators, e-waste, and air-conditioning units.
- Talk with my contractor about alternatives to traditional building demolition, such as relocation, deconstruction, and salvage.
- Shop locally and support local businesses.
- Support efforts to reduce and limit single-use disposable plastics.
- Eat more low-carbon foods, such as minimally processed foods, fruits, grains, and vegetables.
- Encourage the creation of community gardens on public and private lands including school campuses, City lands, and church properties.
- Start a tool lending library in my community.



## Reduce my energy use

- Get an energy audit to find ways to increase energy efficiency at home and at work.
- Install energy conserving appliances and fixtures, such as on-demand tankless water heaters, Energy Star appliances, and LED lightbulbs.
- Install electric furnaces, water heaters, dryers, stoves, and more.
- Voice my support for City policies that reduce greenhouse gas emissions.
- Install solar PV and storage at my home—or sign up for the APS Solar Communities program to use my roof for solar.
- Replace a wood-burning fireplace with gas or electric.
- Install alternatives to air conditioning when renovating my home.



## Embrace non-car travel

- Increase the number of trips I make by transit, carpooling, walking, or biking.
- Try out an electric bike for my commute.
- Organize a “walking school-bus” to walk a group of kids to school.
- Delay my next purchase of a new vehicle, if it's possible to get more life out of my current car. When I decide to make a purchase, I'll investigate electric vehicles and hybrids.
- Use alternatives to air travel when possible.
- Support development that creates vibrant, higher density, mixed-use areas to reduce the need for driving in Flagstaff.



## Conserve water

- Conduct a water audit at my home, and replace inefficient toilets and fixtures.
- Set a goal of reducing my household's hot water use by 15%.
- Consider efficient alternatives to traditional water heaters, like tankless water heaters, electric heat pump water heaters, or solar thermal hot water heaters.
- Install a rain barrel to harvest rainwater for outdoor use.
- Replace turf grass with drought tolerant landscaping or native plants; install smart technology on existing irrigation systems.



## Community Outreach

Individual actions and community engagement are crucial to reduce emissions and adapt to climate change. Over 300 Flagstaff community members have participated in the Plan development process, demonstrating the City's deep commitment to collaboratively addressing climate change. To continue to leverage community engagement, the City will sustain outreach efforts in person and online through:

- ▲ **The City of Flagstaff's Climate Programs webpage.** The "Climate Programs" page on the City website will be utilized to share information on climate change and efforts to reduce greenhouse gas emissions as well as case studies of businesses and homeowners exhibiting climate leadership. The City's website will also provide information on relevant rebates, incentives, and climate action programs.
- ▲ **Showcasing leadership.** The City can consider hosting a climate awards program to showcase businesses, schools, and homeowners that are taking innovative sustainability actions. Promoting success stories demonstrates what is possible, increases awareness and provides recognition.
- ▲ **Online performance dashboard.** The City could develop an online dashboard to track building and City-wide sustainability performance, thereby providing accountability and increasing awareness. The dashboard would display energy and water use intensity of public buildings, schools, or businesses willing to participate in the program. The dashboard could facilitate friendly competition to see which building can reduce its energy intensity the most.
- ▲ **Social media.** Flagstaff can grow its social media presence on platforms like Twitter, Facebook, Instagram, and NextDoor to facilitate communication about climate change among community members and City staff and leaders. Social media can be effective for announcing events, soliciting feedback, and showcasing successes.
- ▲ **Collaboration and community group development.** Relationships with existing community groups are essential to effectively implement strategies, address equity, and spread awareness. The City will aim to partner with local community groups to implement Plan strategies. The City can also support the creation of new community groups focused on climate action. For example, the City could facilitate the creation of neighborhood block groups organized around energy efficient behavior, shared resiliency tools and resources, or renewable energy.
- ▲ **Partnership with the Flagstaff Climate Action Council and other organizations.** The City should identify groups focused specifically on climate action to partner with on Plan implementation. Groups such as the Flagstaff Climate Action Council can take responsibility for implementing various strategies and actions in the Plan that are best achieved by community groups. Certain community groups focused specifically on climate action can become powerful forces for Plan implementation, outreach, and achievement of community goals.
- ▲ **Community forums, meetings, and updates.** To maintain interest and participation in Plan implementation, the City will continue to organize public forums each year to share progress and new initiatives. Convening spaces for public input and education will play an invaluable role in the ultimate success of all Plan strategies. Additionally, providing periodic public updates will hold the City accountable for completing action in a timely manner. For example, coupling Plan reports with a local climate action speaker series would be educational and support tracking the

implementation of Plan strategies. Coffee and Climate sessions can continue to serve as an informal forum to discuss climate action with staff.

- ▲ **Monthly newsletter.** The City will continue to use the monthly Climate Plan newsletter to send updates on new action and upcoming events. This channel could also be used to highlight Plan implementation success stories or direct residents to new surveys.

## Building Community Capacity

Discussing climate change need not happen only in formal settings. To reach more people, we need to foster climate change conversations at the community garden, at schools, at church, and at the dinner table. To expand the climate change conversation and inspire action across Flagstaff, we need to build capacity within the community. Programs to help people learn from their neighbors include the following:

- ▲ **Climate ambassadors.** The City will develop a Climate Ambassadors Program, modeled after similar City of Flagstaff programs and climate ambassador programs around the country, which will equip Flagstaff residents with skills and resources to discuss climate change and climate action with their peers. It will include a workshop series to review climate change resources, bring in guest speakers, and help participants practice their “pitch” for climate action.
- ▲ **Youth climate education and action.** The City will continue to support climate education and youth climate action through programs like climate education curriculum in schools, the Flagstaff Youth Climate Challenge, and the Youth Climate Summit. These programs ensure that students are knowledgeable about how climate change will affect Flagstaff and are equipped to deal with climate challenges. They also encourage and celebrate student climate action.
- ▲ **Climate leaders training.** This program will help community leaders, from sectors ranging from education to healthcare, to lead on climate action. It will equip leaders to effectively discuss climate change, identify risks to their industries, and develop practical solutions.



## Implementation Summary and Schedule

The following table lays out actions in this plan along with information relevant to implementation, including timeframe for implementation and responsible parties. This implementation matrix covers all of the Priority Actions in each sector.

### KEY

<b>Cost</b>	<p><b>Very Low:</b> Less than \$50,000  <b>Low:</b> \$50,000 to \$1,000,000  <b>Medium:</b> \$1,000,000 to \$7,000,000  <b>High:</b> More than \$7,000,000</p>
<b>Timeframe</b>	<p><b>Shorter-term actions</b> (2019-2025) may be:</p> <ul style="list-style-type: none"> <li>▲ Relatively easy and quick to implement</li> <li>▲ Precursors for other additional actions</li> </ul> <p><b>Longer-term actions</b> (2026 to 2030) may be:</p> <ul style="list-style-type: none"> <li>▲ More difficult or time-intensive to implement</li> <li>▲ Contingent upon new funding sources, preliminary research, or coordination with partner entities</li> <li>▲ Less important to get started early (e.g., lower priority/ranking action)</li> <li>▲ A logical follow-on to a shorter-term action</li> </ul>
<b>Lever</b>	<p><b>Policy:</b> a new requirement or formal adoption of a plan  <b>Infrastructure:</b> development or changes to physical structures (e.g., bike lanes, solar panels)  <b>Information/Education:</b> development of informational materials, education and outreach programs, community engagement  <b>Management:</b> changes in day-to-day management practices.</p>

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
 <b>NATURAL ENVIRONMENT</b>									

**STRATEGY 1. Protect existing forests, resources, and meaningful open spaces.**

NE-1-A	Support planning and zoning efforts that protect natural resources, including surface water resources.	Both	Low	Environment	Community Development	City and Community	Coconino County	Ongoing	Policy
NE-1-B	Reduce urban encroachment into the forest, such as by promoting infill development as supported in the Regional Plan.	Both	Very Low	Environment	Community Development	City	Development community	Ongoing	Policy

**STRATEGY 2. Improve forest management through collaboration with regional partners.**

NE-2-A	Identify permanent funding from the City of Flagstaff to support forest health improvements to reduce wildfire risk and provide ecosystem service protection.	Both	High	Quality of Life, Economy	Flagstaff Fire Department	City and Community	Greater Flagstaff Forest Partnership	Short term	Policy
NE-2-B	Establish long-term governmental agreements with federal, state, local, tribal, and private partners to implement aggressive forest thinning, prescribed burning, post-treatment monitoring, and invasive weed control.	Both	High	Quality of Life, Economy	Flagstaff Fire Department	City	Greater Flagstaff Forest Partnership, Coconino County, State of Arizona, U.S. Forest Service	Long term	Policy



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
NE-2-C	Support forest product industry innovation and the construction of a biomass-based energy facility to use the abundant forest products resulting from the thinning and restoration of regional forests.	Both	Medium	Quality of Life, Economy	Economic Vitality	Community	Greater Flagstaff Forest Partnership, Coconino County, State of Arizona, U.S. Forest Service	Long term	Infrastructure

**STRATEGY 3. Educate the public on forest health risk and fire prevention.**

NE-3-A	Expand public awareness campaigns on human-caused fires including linkages between public health, quality of life, and ecological resources, targeted at both Flagstaff residents and visitors.	Adaptation	Very Low	Quality of Life, Economy, Public Health	Flagstaff Fire Department	City	Greater Flagstaff Forest Partnership	Short term	Information, Education
NE-3-B	Create a new, permanent City of Flagstaff staff position, with dedicated funding, for outreach and education related to forest health.	Adaptation	Medium	Quality of life, Economy, Public Health	Flagstaff Fire Department	City		Long term	Management

**STRATEGY 4: Encourage diverse native plant ecosystems in the built environment.**

NE-4-A	Expand current incentive programs to encourage low-water and climate-adapted native landscaping.	Both	Low	Environment	Water Services	City and Community	Flagstaff Arboretum	Short term	Policy
NE-4-B	Strengthen current zoning code requirements for native landscaping to include the use of climate-adapted varieties of native species that can survive in changing conditions.	Both	Low	Environment	Community Development	City	Flagstaff Arboretum, NAU	Short term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
<b>STRATEGY 5: Proactively manage for expected ecosystem transitions, including the potential threats to ponderosa pine forests.</b>									
NE-5-A	Collaborate with the research community on projects related to assisted migration and identification of plant varieties that are more tolerant of future climate conditions.	Adaptation	Low	Quality of life	Water Services	Community	NAU, CCC, Flagstaff Arboretum	Long term	Information
NE-5-B	Partner with land managers to increase the use of climate-adapted native plants in all restoration efforts.	Adaptation	Low	Quality of life	Water Services	City	Coconino County, State of Arizona, U.S. Forest Service, Bureau of Land Management	Long term	Policy



**WATER RESOURCES**

**STRATEGY 1. Improve water infrastructure and expand water reuse.**

WR-1-A	Evaluate the greenhouse gas emissions and financial impacts of potable reuse, water importation, and groundwater mining.	Both	Low	Economy	Water Services	City	NAU	Short term	Policy
WR-1-B	Continue to incorporate enhanced energy efficiency and smart controls into water production and wastewater treatment designs on new projects and upgrades of existing equipment.	Mitigation	Medium	City Budget	Water Services	City		Ongoing	Infrastructure

**STRATEGY 2. Improve ecosystem management for protection of water resources.**

WR-2-A	Maximize groundwater recharge, such as by prioritizing the use of reclaimed water to recharge aquifers.	Adaptation	Low	Environment	Water Services	City	NAU	Long term	Management
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ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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**STRATEGY 3. Continue to support water conservation efforts across the Flagstaff community.**

WR-3-A	Expand public education on water conservation and the “one water” concept, which says that all water is reusable.	Adaptation	Low	Resiliency	Water Services	City and Community		Long term	Education
WR-3-B	Work with high water users within the recreational, commercial, and manufacturing customer classes to maximize water use efficiency.	Mitigation	Low	Economy	Water Services	City and Community	Business community	Short term	Management
WR-3-C	Develop policy and processes to evaluate water use and community benefits such as economic development when permitting new businesses and community events.	Both	Low	Economy	Community Development	City	Business community	Long term	Management
WR-3-D	Evaluate the viability of introducing various water conservation requirements for new construction, such as rainwater harvesting for irrigated spaces.	Both	Low		Water Services	City	Development community	Short term	Information

**STRATEGY 4. Maximize passive and active community rainwater infiltration.**

WR-4-A	Increase implementation of low impact development and water programs, including rainwater harvesting, the low impact development ordinance, and the NPDES/ADEQ Clean Water Act Section 402 Permit Program.	Both	Medium	Environment	Water Services	City		Long term	Management
WR-4-B	Maintain the rural floodplain ordinance.	Adaptation	Low	Quality of Life	Community Development	City	Coconino County	Ongoing	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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 ENERGY

**STRATEGY 1. Improve energy efficiency in all sectors.**

E-1-A	Establish a revolving loan fund to advance energy efficiency upgrades and make \$125,000 available annually in loans for building efficiency upgrades.	Mitigation	Medium	Economy	Sustainability Section	City and Community	Coconino County	Long term	Policy
E-1-B	Develop viable financing options for energy efficiency upgrades to commercial and residential buildings, such as a revolving loan program and new service and product models that enable homeowners to participate in energy efficiency improvements without upfront costs.	Mitigation	Low	Equity	Sustainability Section	City and Community	Coconino County	Short Term	Policy
E-1-C	Fund and implement a contractor training and rebate program for solar thermal, on-demand water heaters, electric heat-pump space heaters, and conversions from gas to electric appliances, based on analysis demonstrating reductions in greenhouse gas emissions.	Mitigation	Low	Economy	Sustainability Section	City and Community	Contractors, business community, APS, Coconino County	Short Term	Education, Policy
E-1-D	Subsidize home energy efficiency retrofits for affordable housing units, and housing that serves low-income and senior populations while maintaining the supply of existing housing.	Both	Medium	Equity	Sustainability Section	City and Community	Contractors, business community, APS, Coconino County	Long term	Policy



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
E-1-E	Adhere to a consistent schedule for adopting the most up-to-date energy codes in alignment with Coconino County, ensure enforcement, and consider where local Flagstaff codes should exceed minimum standards.	Mitigation	Low		Community Development	City	Contractors, development community, APS, Coconino County	Short Term	Policy
E-1-F	Perform a full-scale energy audit and implement recommended energy retrofits for all City of Flagstaff facilities from this full-scale audit and the Airport Sustainability Plan.	Mitigation	Low	City Budget	Sustainability Section	City	APS	Short term	Infrastructure
E-1-G	Develop and adopt a SmartReg rental licensing policy program requiring minimum efficiency standards for all housing rentals.	Mitigation	Low	Equity	Sustainability Section	City	Property owners and managers, Coconino County	Long term	Policy
E-1-H	Require zero-net-energy construction for all new residential and commercial buildings by 2040.	Mitigation	Medium	Quality of Life	Sustainability Section	City	Development community	Long term	Policy

**STRATEGY 2. Expand renewable energy generation and use.**

E-2-A	Move forward with City Council target of 100% renewable energy use for the municipality with a plan for achieving that target by 2025.	Mitigation	Medium	Resiliency	Sustainability Section	City	APS, tribal nations	Short term	Policy, infrastructure
E-2-B	Move forward with City Council target of 100% renewable energy use for the community with a plan for achieving that target by 2050.	Mitigation	Medium	Resiliency	Sustainability Section	City and Community	APS	Long term	Policy, infrastructure
E-2-C	Establish a revolving loan fund to advance renewable energy and make \$125,000 available annually in loans for renewable energy development.	Mitigation	Low	Economy	Sustainability Section	City	APS	Short Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
E-2-D	Buy and produce local and regional renewable energy, including through partnerships with Arizona tribes.	Mitigation	Medium	Resiliency	Sustainability Section	City and Community	APS, tribal nations	Long Term	Infrastructure
E-2-E	Introduce local policies that incentivize renewable energy adoption and passive solar. This could include providing funding for expedited building code review for new homes with solar and for solar installations on existing homes as well as reduced City fees for homes with renewable energy.	Mitigation	Low	Economy	Community Development and Sustainability Section	City with community participation	APS	Short Term	Policy
E-2-F	Establish a locally controlled revolving loan fund or similar mechanism to improve community access to financing for renewable energy development—particularly solar—at commercial and residential sites.	Mitigation	Medium	Economy	Sustainability Section	City and Community	APS	Long Term	Policy
E-2-G	Update City code to require pre-wiring for solar in all new residential and commercial buildings to reduce the cost of post-construction rooftop solar, battery storage, and electric charging system installations.	Mitigation	Low	Economy	Community Development and Sustainability Section	City		Short Term	Policy

**STRATEGY 3. Manage energy demand and consumption in residential, commercial, and industrial sectors, to reduce greenhouse gas emissions.**

E-3-A	Collaborate with large energy users, such as Northern Arizona University, on reducing energy consumption and adopting new energy-saving technologies.	Mitigation	Low	Economy	Sustainability Section	Community	NAU, business community	Long Term	Management
E-3-B	Provide tools and resources to help households manage their energy use.	Both	Medium	Economy	Sustainability Section	City and Community	APS	Short Term	Education



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
E-3-C	Update the building code to clarify steps for the installation of battery storage systems by residents and businesses.	Both	Low	Economy	Community Development and Sustainability Section	City	APS	Short Term	Policy



**TRANSPORTATION AND LAND USE**

**STRATEGY 1. Encourage land use planning that minimizes the distance people have to travel by car and that increases community resiliency.**

TLU-1-A	Support intentional high-density development that increases mixed uses and residential density.	Mitigation	Low	Quality of Life	Community Development	Community	Development community	Ongoing	Policy
TLU-1-B	Increase the supply of attainable housing in proximity to employment opportunities, activity centers, and the permanent transit network.	Mitigation	Medium	Equity, Quality of Life	Community Development	City and Community	Development community	Long Term	Policy
TLU-1-C	Reduce vulnerability of new developments to fire and flooding, including encouraging development to reduce the risk of fire and flooding impacts by locating in areas of lower vulnerability.	Adaptation	Low	Resiliency	Community Development	City	Development community	Long Term	Policy
TLU-1-D	Locate businesses, services, governmental offices, and schools that generate many trips near the permanent transit network.	Mitigation	Low	Quality of Life, Economy	Community Development	City and Community	NAIPTA, Development community	Short Term	Policy
TLU-1-E	Audit the incentives and standards in the zoning code to promote climate change resiliency and emissions reduction.	Both	Low	Resiliency	Community Development	City		Short Term	Information

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
TLU-1-F	Stabilize or lower parking minimums for new developments to decrease the cost of housing and reduce impervious surfaces, among other benefits. Consider parking maximums where appropriate.	Mitigation	Low	Economy, Equity	Community Development	City	Development community	Short Term	Policy
TLU-1-G	Host community workshops and discussion forums on density and its trade-offs and opportunities, and create continuous educational opportunities about the cost of free parking and other land use issues.	Both	Low	Resiliency	Community Development and Sustainability Section	Community	Non-profit organizations	Short Term	Information

**STRATEGY 2. Prioritize, incentivize, and promote transportation by biking, walking, and transit.**

TLU-2-A	Expand infrastructure and amenities for pedestrians and bikes by drafting, adopting, funding, and implementing the Active Transportation Master Plan, prioritizing measures that can be shown to directly reduce greenhouse gas emissions.	Mitigation	Medium	Public Health	Community Development and Flagstaff Metropolitan Planning Organization	City	NAIPTA, ADOT, bike and pedestrian organizations	Short Term	Policy, infrastructure
TLU-2-B	Implement the transit-supportive recommendations of the Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) Five-Year Transit Plan for the Mountain Line, to increase ridership and transit frequency on the permanent transit network.	Mitigation	Medium	Economy	Community Development and Flagstaff Metropolitan Planning Organization	City	NAIPTA	Short Term	Policy, infrastructure
TLU-2-C	In order to analyze greenhouse gas emissions impacts for all major transportation infrastructure decisions, evaluate transportation impacts based on vehicle miles traveled (VMT), considering person trips.	Mitigation	Low	Resiliency	Community Development and Flagstaff Metropolitan Planning Organization	City	ADOT	Short Term	Policy



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
TLU-2-D	Prioritize bus operations through mechanisms such as signal prioritization, bus slip lanes, and bus-dedicated lanes. Evaluate the feasibility of introducing dedicated bus lanes or carpool lanes.	Mitigation	Medium	Economy	Community Development and Flagstaff Metropolitan Planning Organization	City	NAIPTA, ADOT	Long term	Policy, infrastructure
TLU-2-E	Adopt a complete active transportation network policy to ensure there are efficient, comfortable, appealing, and safe connections throughout Flagstaff for all road users.	Mitigation	Low	Public Health	Community Development and Flagstaff Metropolitan Planning Organization	City	Bike and pedestrian organizations	Short Term	Policy
TLU-2-F	Secure additional funding to support biking, walking, and transit.	Mitigation	Medium	Public Health	Community Development and Flagstaff Metropolitan Planning Organization	City	NAIPTA, ADOT, bike and pedestrian organizations	Ongoing	Policy

**STRATEGY 3. Support the use of clean, energy-efficient vehicles.**

TLU-3-A	Develop public and private partnerships, and refine regulations to streamline permitting, for the installation of fast-charging electric vehicle chargers in publicly accessible parking areas along tourism corridors, at workplaces, and in multi-family housing developments.	Mitigation	Medium	Economic	Economic Vitality and Sustainability	City and community	APS	Short term	Management
TLU-3-B	Develop public-private partnerships to develop electric vehicle charging stations at City facilities including the airport, Aquaplex, and rights-of-way.	Mitigation	Medium	Economic	Sustainability	City	APS	Long Term	Management

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
TLU-3-C	Adopt a policy requiring 100% of new light-duty City fleet vehicles to be electric vehicles, meet high-efficiency standards, or use alternative fuels by 2020, and 75% of new medium and heavy-duty city fleet vehicle purchases to be electric by 2025.	Mitigation	Medium		Fleet Services	City	APS	Short Term	Policy
TLU-3-D	Adopt electric vehicle-ready building codes for residential buildings to ensure homes have sufficient capacity and wiring to accommodate electric vehicles and avoid expensive future retrofits.	Mitigation	Low	Economy	Community Development	City	APS	Long term	Policy
TLU-3-E	Incorporate electric vehicle information and education into transportation, energy, and green business outreach programs.	Mitigation	Low	Economy	Sustainability Section	City and community	APS	Short Term	Information

**STRATEGY 4. Encourage efficient driving practices.**

TLU-4-A	Establish a policy to prohibit idling of City fleet vehicles, excluding emergency response vehicles.	Mitigation	Low	City Budget, Public Health	Fleet Services	City		Short Term	Policy
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**STRATEGY 5. Manage transportation demand and reduce the frequency with which people drive alone.**

TLU-5-A	Provide employee benefits for those who commute by foot, transit, bicycle, or carpooling.	Mitigation	Low	Public Health	Sustainability Section	City	NAIPTA	Short Term	Policy
TLU-5-B	Fund a Transportation Demand Management (TDM) program, as recommended in the High Occupancy Housing Plan.	Mitigation	Medium	Public Health	Community Development and Flagstaff Metropolitan Planning Organization	City	NAIPTA	Long Term	Policy



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
TLU-5-C	Invest in training and education for City staff to prepare for the transition to autonomous vehicles, including guidance for anticipating changes in transportation and land use patterns and potential negative impacts including zero-occupancy car trips.	Both	Low		Community Development	City	ADOT	Short Term	Information

**STRATEGY 6. Increase the supply of housing that is affordable to Flagstaff residents and located in areas that support biking, walking, and transit access to goods and services.**

TLU-6-A	To increase use of affordable housing incentives, improve the Incentive Policy for Affordable Housing and increase funding.	Mitigation	Medium	Equity	Community Development	City		Short Term	Policy
TLU-6-B	Encourage the construction of accessory dwelling units to increase rental opportunities in both established neighborhoods and new development.	Mitigation	Low	Equity	Community Development	City and Community	Development community	Short Term	Policy
TLU-6-C	Adopt a City policy requiring new City facilities and appropriate City-owned properties to consider a mix of uses, including housing where appropriate.	Mitigation	Low	Equity	Community Development	City		Long Term	Policy



**WASTE AND CONSUMPTION**

**STRATEGY 1. Increase waste diversion.**

WC-1-A	Expand infrastructure and introduce new technology to divert new waste streams.	Mitigation	Medium		Solid Waste Section	City		Long Term	Infrastructure
WC-1-B	Expand composting services to divert and reduce food waste from the landfill, including curbside compost pickup and provision of composting bins.	Mitigation	Medium		Solid Waste Section, Sustainability	City	Business community	Long Term	Infrastructure

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
WC-1-C	Introduce a yard waste program to divert yard waste from the landfill.	Mitigation	Low		Solid Waste Section	City		Short Term	Infrastructure
WC-1-D	Provide equal access to recycling services for single-family and multifamily housing and commercial facilities.	Mitigation	Low	Equity	Solid Waste Section	City and community	Development community	Long term	Infrastructure
WC-1-E	Conduct a study to evaluate the costs and benefits associated with mandating waste diversion.	Mitigation	Low		Sustainability Section	City		Short term	Policy
WC-1-F	Require and incentivize the collection and diversion of construction and demolition waste.	Mitigation	Low		Solid Waste Section	City	Development community, contractors	Short Term	Policy, Infrastructure
WC-1-G	Install hydration stations at public facilities to reduce bottle waste.	Mitigation	Low	Public Health	Sustainability Section	City		Short Term	Infrastructure
WC-1-H	Plan for waste diversion services, including recycling, at multi-family housing and commercial developments.	Mitigation	Low	Equity	Community Development	City and community	Development community, business community	Short Term	Policy

**STRATEGY 2. Support sustainable and accessible production and consumption.**

WC-2-A	Expand consumer education on sustainable consumption and materials management, including prevention of wasted food in households and businesses and low-carbon food consumption.	Mitigation	Low		Sustainability Section	City and community	Waste and consumption organizations	Short Term	Education
WC-2-B	Provide outreach and education to Flagstaff businesses in reducing greenhouse gas emissions in their supply chains.	Mitigation	Low	Economy	Sustainability Section	City and community	Business community	Short Term	Education
WC-2-C	Support “collaborative consumption” community projects like tool libraries and repair cafes through mini-grant programs.	Mitigation	Low	Resiliency	Sustainability Section	Community	Waste and consumption organizations	Short Term	Infrastructure and Education



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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**STRATEGY 3. Optimize collection and disposal systems to minimize greenhouse gas emissions.**

WC-3-A	Reduce the resource consumption of the waste collection fleet through efforts such as alternative fuel, fuel efficiency, vehicle optimization, and other new technologies.	Mitigation	Low	City budget	Solid Waste Section	City		Long term	Policy
WC-3-B	Manage the landfill to reduce greenhouse gas emissions, such as through landfill gas capture, biofuel development, and waste-to-energy technologies.	Mitigation	High	Resiliency	Solid Waste Section	City		Long term	Infrastructure

**STRATEGY 4. Improve data collection on consumption, waste, and diversion.**

WC-4-A	Measure and incorporate greenhouse gas emissions from consumption in the Flagstaff community greenhouse gas inventory.	Mitigation	Low		Sustainability Section	City		Short Term	Management
WC-4-B	Work with waste and recycling haulers operating in the City of Flagstaff to collect data on collection and diversion.	Mitigation	Low		Solid Waste Section	City	Waste and recycling collection services	Long Term	Information

**STRATEGY 5. Increase local food production through partnerships and policies.**

WC-5-A	Support local agriculture through economic development initiatives and enabling policies.	Mitigation	Low	Economy	Community Development	City and community	Coconino County	Short Term	Policy
WC-5-B	Expand urban agriculture opportunities in community gardens, schools, and parks and on rooftops.	Mitigation	Low	Quality of Life	Sustainability Section	City and community	Coconino county, business community	Long term	Infrastructure

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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**PUBLIC HEALTH, SERVICES, FACILITIES, AND SAFETY**

**STRATEGY 1. Identify and target support for at-risk populations.**

PH-1-A	Characterize relative fire, flood, mosquito, and other risk exposures to climate change among community groups and neighborhoods.	Adaptation	Low	Equity, Public Health	Sustainability Section	City	Coconino County	Short Term	Information
PH-1-B	Adequately fund health and emergency services reaching populations vulnerable to climate change impacts.	Adaptation	Medium	Equity	Sustainability Section	City	Coconino County	Long Term	Policy
PH-1-C	Address woodsmoke, such as through a regulation that requires use of only certified wood stoves, a public education campaign, and/or rebates for wood stove buybacks or replacements.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County	Short term	Policy, Information

**STRATEGY 2. Adequately fund services for disaster preparedness.**

PH-2-A	Dedicate increased funding to accommodate demand for public health services among at-risk populations.	Adaptation	Medium	Public Health	Sustainability Section	Community	Coconino County	Long Term	Policy
PH-2-B	Embrace grassroots and neighborhood movements that advocate for greater services.	Adaptation	Low		Sustainability Section	Community	Coconino County	Long Term	Policy

**STRATEGY 3. Increase community awareness of climate change risks and impacts and improve community capacity to respond to new or expanding risks to public health.**

PH-3-A	Train K-12 teachers on climate change science and curriculum.	Both	Low		Sustainability Section	City and community	Flagstaff Unified School District, CCC, NAU	Short Term	Education
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ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
PH-3-B	Provide in-school lessons on climate change science and climate action in K-12 classrooms in Flagstaff.	Both	Low		Sustainability Section	City and community	Flagstaff Unified School District, CCC, NAU	Short Term	Education
PH-3-C	Improve community messaging on how to respond to simultaneous heat risks and poor air quality due to smoke.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County	Short Term	Information

**STRATEGY 4. Improve the resiliency of public infrastructure.**

PH-4-A	Create preparedness and recovery plans for all City divisions.	Adaptation	Low	City Budget	Sustainability Section	City	Coconino County	Short Term	Policy
PH-4-B	Prepare for public buildings to be used in different ways, both in lower-impact ways, such as seniors using the library to cool down during hot June days, and as safe-havens during acute emergencies.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County	Long Term	Management

**STRATEGY 5. Prepare for changing risks to public health due to climate change.**

PH-5-A	Continue collaborations to study and prepare for increased risk of illness and disease due to increased dust, a warmer climate, higher mosquito densities, and other potential results of climate change.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County, NAU	Short Term	Policy
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ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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**ECONOMIC PROSPERITY AND RECREATION**

**STRATEGY 1. Build an economy that reduces emissions and can effectively adapt as the climate changes.**

EPR-1-A	Promote Flagstaff as an environmentally friendly destination by highlighting the businesses that are taking steps to reduce resource consumption.	Adaptation	Low	Economy	Economic Vitality	City and community	Business community	Short Term	Information
EPR-1-B	With community stakeholders and partners, conduct a study and host a community conversation to identify threats to current industries, opportunities for new businesses and industries, and areas that need support.	Adaptation	Low	Economy	Economic Vitality	City and community	Business community	Short Term	Management
EPR-1-C	Work with businesses to assess their climate change vulnerability and plan for the future.	Adaptation	Low	Economy	Economic Vitality, Sustainability	City and community	Business community	Long Term	Policy
EPR-1-D	Utilize existing community resources to support community members whose jobs may be at risk from climate change impacts through retraining programs and business support.	Adaptation	Low	Economy	Economic Vitality	City and community	Business community	Long Term	Policy
EPR-1-E	Prepare water, road, and other public infrastructure for increased demands from growth and tourism.	Adaptation	High	Quality of Life	Public Works	City		Long Term	Infrastructure
EPR-1-F	Strengthen the fossil fuel divestment policy for the City of Flagstaff.	Mitigation	Low		Management Services	City		Short Term	Policy
EPR-1-G	Promote Flagstaff as a car-free destination through informational campaigns for visitors.	Mitigation	Low	Quality of Life	Economic Vitality	City and community	Business community	Short Term	Information



ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIMEFRAME	LEVER
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**STRATEGY 2. Protect natural areas and ecosystem services that are most vulnerable to the impacts of increased visitation and climate change.**

EPR-2-A	Prioritize natural resource protection in high-demand recreational areas.	Adaptation	Low	Environment, Quality of Life	Sustainability Section, Parks and Recreation	City	US Forest Service	Long Term	Policy
EPR-2-B	Continue the Flagstaff Convention and Visitors Bureau public awareness campaign that emphasizes 'treading lightly' on the land to accommodate increased visitation and impact.	Adaptation	Low	Environment, Quality of Life	Economic Vitality	City and community	US Forest Service	Short Term	Management

**STRATEGY 3. Plan for changes to recreation and respond to the impacts of climate change on current Parks and Recreation facilities and operations.**

EPR-3-A	Incorporate changing climate conditions and risks to community health, Parks and Recreation staff members, and facilities into the Parks and Recreation Master Plan and Open Space Management Plan update processes.	Adaptation	Low	Public Health	Parks and Recreation, Sustainability	City	Coconino County	Short Term	Policy
EPR-3-B	Investigate new technologies and techniques to decrease water, electricity, and fuel use at Parks and Recreation facilities.	Both	Low	City Budget	Parks and Recreation	City		Short Term	Management
EPR-3-C	Implement energy and water efficiency retrofits to decrease water and electricity use and costs at all Parks and Recreation facilities.	Both	Medium	City Budget	Parks and Recreation	City		Long Term	Infrastructure
EPR-3-D	Continue to utilize low-water, climate-adapted, native plantings for all facilities, parks, and streetscapes, and create a best practices manual for irrigation and other operations.	Both	Low	Environment	Parks and Recreation	City	Flagstaff Arboretum	Short Term	Policy, Management

## APPENDIX: REFERENCES

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- <sup>2</sup> “Climate Programs.” *The City of Flagstaff Arizona*. <http://flagstaff.az.gov/1732/Climate> City Council Climate Action section.
- <sup>3</sup> See the City of Watsonville’s Ordinance establishing a Carbon Impact Fee: Ordinance No. 1314-15. *City of Watsonville*. 30 March 2015. <https://www.cityofwatsonville.org/DocumentCenter/View/196/Carbon-Fund-Ordinance-PDF>
- <sup>4</sup> “Federal Income Tax Credits and Other Incentives for Energy Efficiency.” *Energy Star*. <http://www.energystar.gov/taxcredits>
- <sup>5</sup> “Business Energy Investment Tax Credit (ITC).” *Energy.Gov*. <https://www.energy.gov/savings/business-energy-investment-tax-credit-itc>
- <sup>6</sup> “FEMP.” *Energy.Gov*. <https://www.energy.gov/eere/femp/federal-energy-management-program>
- <sup>7</sup> “Green Financing Loans.” *Fannie Mae*. <https://www.fanniemae.com/multifamily/green-initiative-financing>
- <sup>8</sup> “Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants.” *USDA*. <https://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency>
- <sup>9</sup> “Rural Energy for America Program Energy Audit & Renewable Energy Development Assistance Grants.” *USDA* <https://www.rd.usda.gov/programs-services/rural-energy-america-program-energy-audit-renewable-energy-development-assistance>
- <sup>10</sup> “FHA PowerSaver Loan Program.” *Energy.Gov*. <https://www.energy.gov/savings/fha-powersaver-loan-program>
- <sup>11</sup> “Federal Tax Credits for All-Electric and Plug-in Hybrid Vehicles.” U.S. Department of Energy. <https://www.fueleconomy.gov/feg/taxevb.shtml>.
- <sup>12</sup> “Hazard Mitigation Assistance.” *FEMA*. <https://www.fema.gov/hazard-mitigation-assistance>
- <sup>13</sup> “2014 Farm Bill Agricultural Management Assistance Program.” *USDA* <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/ama/?cid=stelprdb1242818>
- <sup>14</sup> “Water Bank Program.” *USDA* <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/?cid=stelprdb1047790>
- <sup>15</sup> “Conservation Stewardship Program.” *USDA*. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/>
- <sup>16</sup> “Environmental Quality Incentives Program.” *USDA* <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>
- <sup>17</sup> “Renewable Energy Production Tax Credit.” *Arizona Department of Revenue*. <https://azdor.gov/tax-credits/renewable-energy-production-tax-credit>
- <sup>18</sup> “Multifamily.” *APS*. <https://www.aps.com/en/business/savemoney/by-business-type/Pages/multifamily.aspx>
- <sup>19</sup> “Your energy, your options.” *APS*. <https://www.aps.com/en/residential/savemoneyandenergy/your-options/Pages/home.aspx>
- <sup>20</sup> “Energy star homes program for builders.” *APS*. <https://www.aps.com/en/ourcompany/doingbusinesswithus/constructioncorner/Pages/energy-star-homes-program-for-builders.aspx>
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