NOV 2018

CITY OF FLAGSTAFF

CLIMATE ACTION & ADAPTATION PLAN

A LETTER FROM THE MAYOR

To the Flagstaff community,

Thank you to all our community members that helped to develop Flagstaff's first community-wide Climate Action and Adaptation Plan. Climate change is one of the greatest challenges we will face in the next century, and I am proud of Flagstaff for taking initiative to prepare for that change.

We know the climate is changing. In future years, we will see warmer winters and increasing threats to the Ponderosa pine ecosystem. We've heard stories from community members about the changes they see in their own lives, from warmer summer days, to more mosquitos and javelina sightings, to increases in housing demand pressures and costs to keep ballfields green.

Flagstaff is an incredible place to live. This Plan recognizes the value of our community, our thriving economy, our neighborhoods, and our people. To protect what we love about this town, we need to ensure that we are prepared for change. The benefits of planning ahead are innumerable: we see that value through forest treatments that help us avoid catastrophic wildfire and flooding, as well as through investments in services that keep our vulnerable community members safe.

This Plan was made by and for the Flagstaff community. Hundreds of residents contributed through open houses, online surveys, and Coffee and Climate conversations. The members of the Steering Committee represented a broad spectrum of viewpoints and areas of expertise. Thank you for helping to make sure that this Plan reflects Flagstaff and protects what we love, while preparing for climate change.

Now the work truly begins! I look forward to your involvement as we work to implement this Plan, collaborate with partners to tackle climate challenges, and celebrate action by individuals, businesses, neighborhoods, and the municipal organization. Flagstaff can be both a climate leader and a wonderful place to live.

Sincerely,

Coral Evans

Mayor Coral J. Evans

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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Acknowledgments

Sincere gratitude to the Flagstaff community for their time and dedication to this process.

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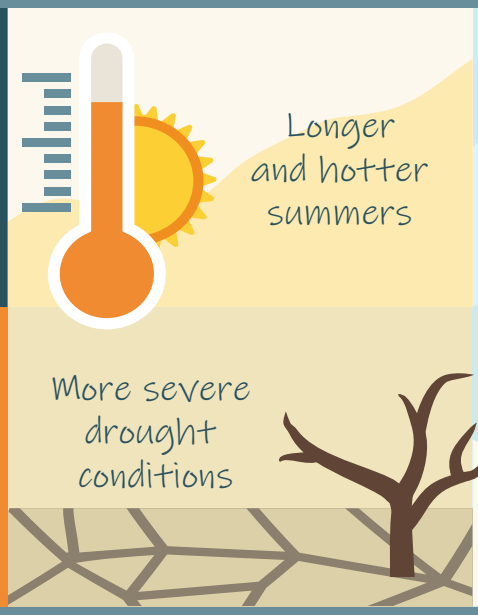
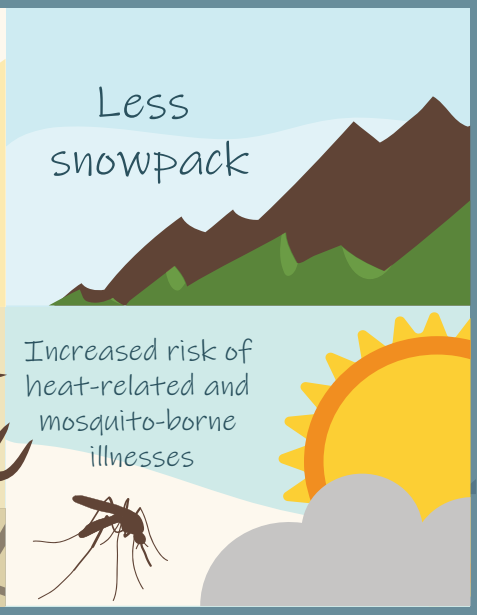
The climate is changing.

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**:

- NATURAL ENVIRONMENT
- WATER
- ENERGY
- TRANSPORTATION & LAND USE
- WASTE & CONSUMPTION
- PUBLIC HEALTH & SAFETY
- PROSPERITY & RECREATION

9 equity considerations will guide the Plan and ensure it 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

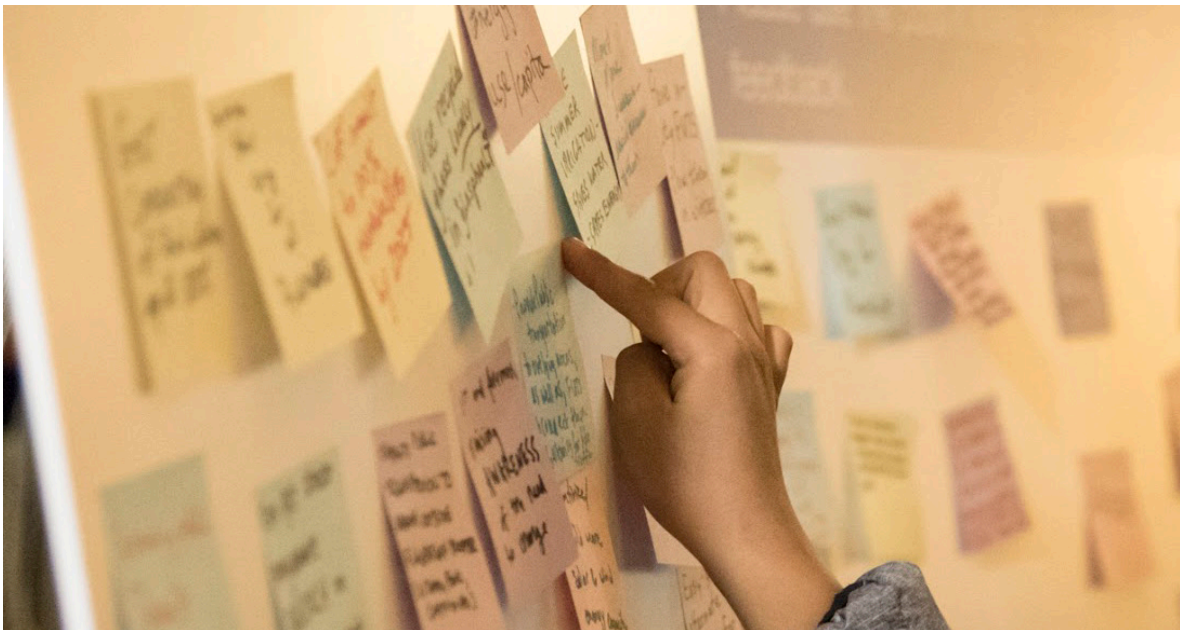
Transportation and building energy consumption combined make up nearly 90% of Flagstaff's greenhouse gas emissions. Residential-owned vehicles account for most of the transportation emissions. The consumption of electricity and use of natural gas in homes, businesses, and industrial buildings account 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 move us towards 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.



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.

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. Accelerate the transformation to a low-carbon economy that minimizes 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

With 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 changes, 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.

Adaptation versus Mitigation

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.

Climate Change and Flagstaff

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

When 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 *Appendix A. 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

Ponderosa Pines in Jeopardy

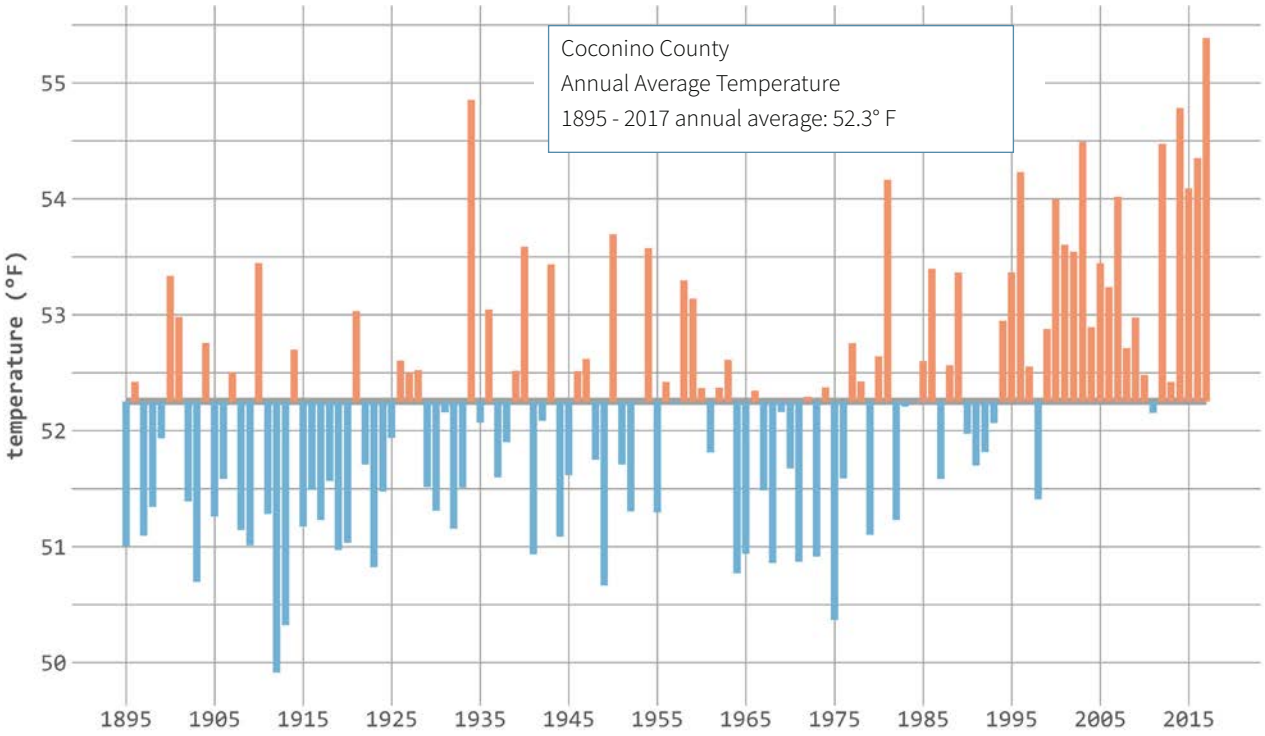
As climate change leads to drier conditions in Flagstaff, the iconic ponderosa pine forest that surrounds the city will face several threats. Warmer temperatures will result in unfavorable growing conditions that will decrease the ability of ponderosa pines to re-establish after large, stand-replacing fires.[1] Drier conditions will increase tree susceptibility to beetle infestation,[2,3] while declines in forest health will contribute to increased wildfire risks. These changes mean that ponderosa pines will have greater difficulty surviving at Flagstaff's elevation of 7,000 feet, beginning a transition to a shrubland or grassland ecosystem, resembling the nearby, lower elevation landscapes of Northern Arizona. By 2100, widespread losses of pinyon and ponderosa pine forests are projected. [4]

[1] M. T. Rother and T.T. Veblen, "Limited conifer regeneration following wildfires in dry ponderosa pine forests of the Colorado Front Range," Ecosphere, vol. 7, no. 12, pp 1–17, 21 December 2016.
[2] A. P. Williams, D. D. Allen, C. L. Millar, T. W. Swetnam, J. Michaelsen, C. J. Still and S. W. Leavitt, "Forest response to increasing aridity and warmth in the southern United States," PNAS, vol. 107, no. 50, pp 21289–21294, 14 December 2010.
[3] J. A. Abatzoglou and A. P. Williams, "Impacts of anthropogenic climate change on wildfire across western US forests," PNAS, vol. 113, no. 42, pp 11770–11775, 18 October 2016.
[4] X Jiang, S. A. Raushcer, T. D. Ringler, D. M. Lawrence, A. P. Williams, C. D. Allen, A. L. Steiner, D. M. Cai and N. G. McDowell, "Projected future changes in vegetation in western North America in the Twenty-First Century," Journal of Climate, vol. 26, pp. 3671–3687, 2013.

Climate Change is Here

Temperatures have been increasing in Coconino County. The average temperature from 1895 to 2017 was 52.3 degrees Fahrenheit, as indicated on by the grey horizontal line in the graph below. Since the 1980s, we have seen a fairly consistent increasing trend in annual temperatures in the County. While year-to year changes in temperature are natural and expected, almost every year since 1985 has seen average annual temperatures above the long-term average. These above-average years are represented by orange lines in the graph below.

Climate change is not an abstract, future event. It is something Coconino County is beginning to experience today.



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?

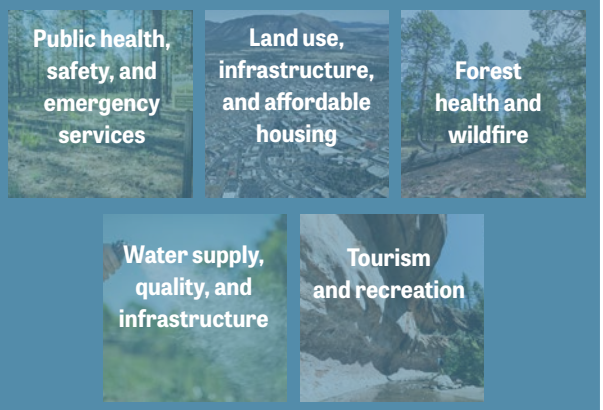
Flagstaff's vulnerability to climate change is a function of its exposure, sensitivity, and adaptive capacity:

VULNERABILITY = EXPOSURE + SENSITIVITY − ADAPTIVE CAPACITY

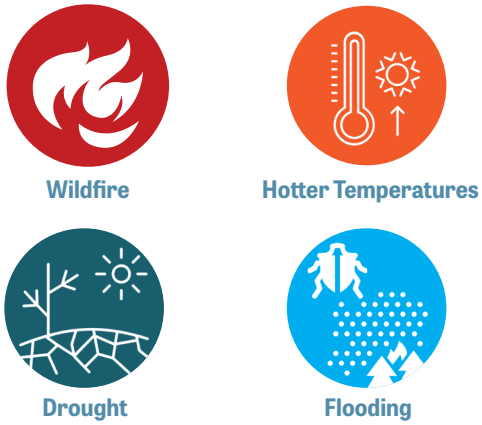
- **EXPOSURE**: Whether a resource is located in an area experiencing climate change hazards.
- **SENSITIVITY**: How a resource fares when exposed to an impact.
- **ADAPTIVE CAPACITY**: The ability of the resource to adjust or cope with impacts.

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**...

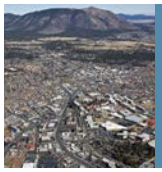


...could be affected by these **climate risks** and their associated impacts.



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. One-page summaries by focus area are also detailed in the Strategies and Actions section of the Plan.

Within these resources and sectors...	..the following populations and systems are at varying risk levels in Flagstaff due to climate change:		
	LOW	MEDIUM	HIGH
Forest health and wildfire		Damage from post-fire flooding	- Wildfires - Pests, invasive species - Declining forest health
Water supply, quality, and infrastructure		Water quality	- Water supply - Water infrastructure
 Land use, infrastructure, and affordable housing	Regional growth	- Utilities, public transportation, buildings - Cost of living - Open space	
Public health, safety, and emergency services	People with: - Allergies - Mental health issues - Other diseases	People sensitive to: - Poor air quality - Heat- and cold-related illness	
Tourism and recreation	Summer recreation and tourism		Winter recreation and tourism

Climate and Equity

Climate change impacts some groups more than others.

Existing 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 Implementation Strategy 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.

Who is More Vulnerable to the Impacts of Climate Change?

While all populations are at risk of being impacted by climate change, certain groups are more vulnerable. The very young and very old, outdoor workers, those with pre-existing illnesses or weak social ties, those living on the street, and low-income communities may be especially sensitive to climate change related health impacts. This Plan considers all these communities when discussing vulnerable communities and equity.

Inequity in our society means that some individuals are better able to respond to change—or stressors —than others. For example, those with lower incomes may have to make difficult choices between paying for heating or meeting other basic needs, and may not have access to quality healthcare. In Flagstaff, low-income communities are disproportionately communities of color, specifically Hispanic and Native American households. The elderly, undocumented migrants, or people from families with mixed immigrant status are less likely to leave their homes to seek aid. This Plan seeks to identify and support disadvantaged communities that may have more trouble adapting to change.

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.[1]

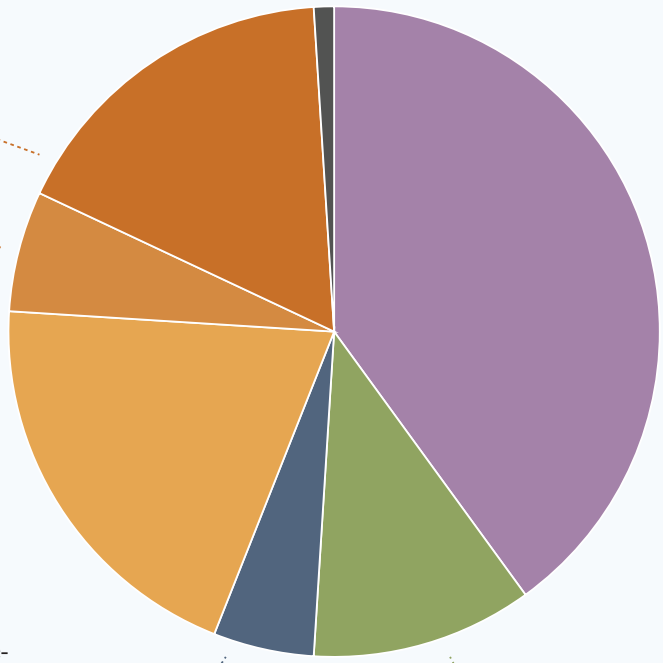
Flagstaff has committed to meeting the intentions of the Paris Agreement. This plan sets an ambitious target to reduce greenhouse gas emissions by 80% below baseline by 2050. To track progress on implementing climate and sustainability strategies, Flagstaff has been tracking community-wide greenhouse gas emissions since 2009. In 2016, community-wide emissions were 787,315 metric tons carbon dioxide equivalent ($MTCO_2e$).

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a report highlighting the need to contain global temperature to 1.5 degrees Celsius, and the extraordinary measures needed to achieve this goal.

[1] UNFCCC. "The Paris Agreement." https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

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.



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.

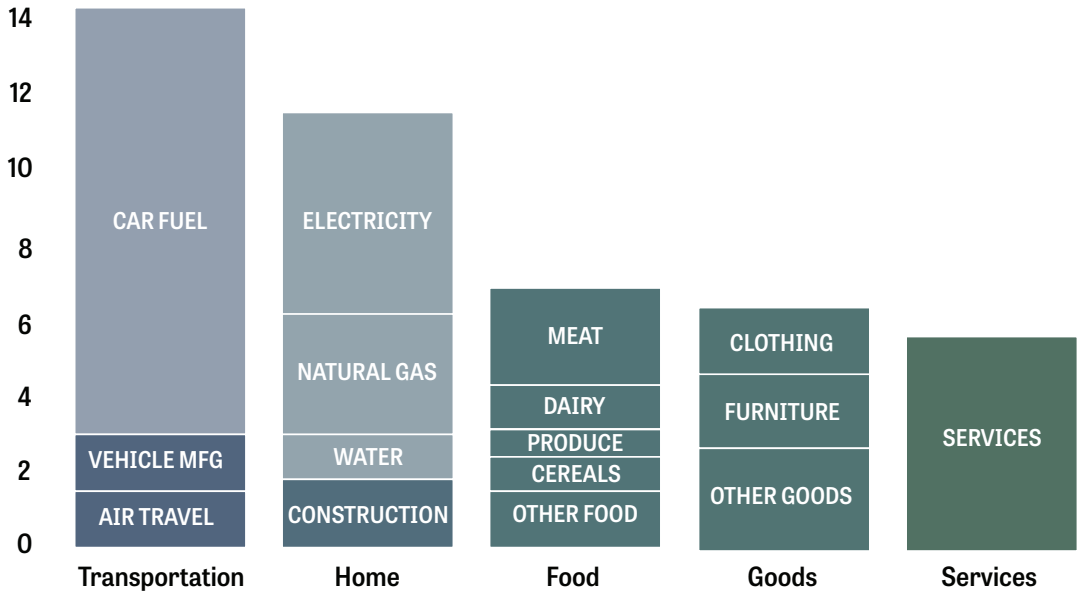
Emissions from the **transportation sector** made up 40% of Flagstaff's overall greenhouse gas emissions in 2016. Local, on-road transportation of passengers in residential-owned vehicles accounts for the majority (98%) of these transportation emissions in Flagstaff.

The treatment and conveyance of Flagstaff's **water supply and wastewater** also emit considerable greenhouse gas emissions, contributing 5% to overall emissions.

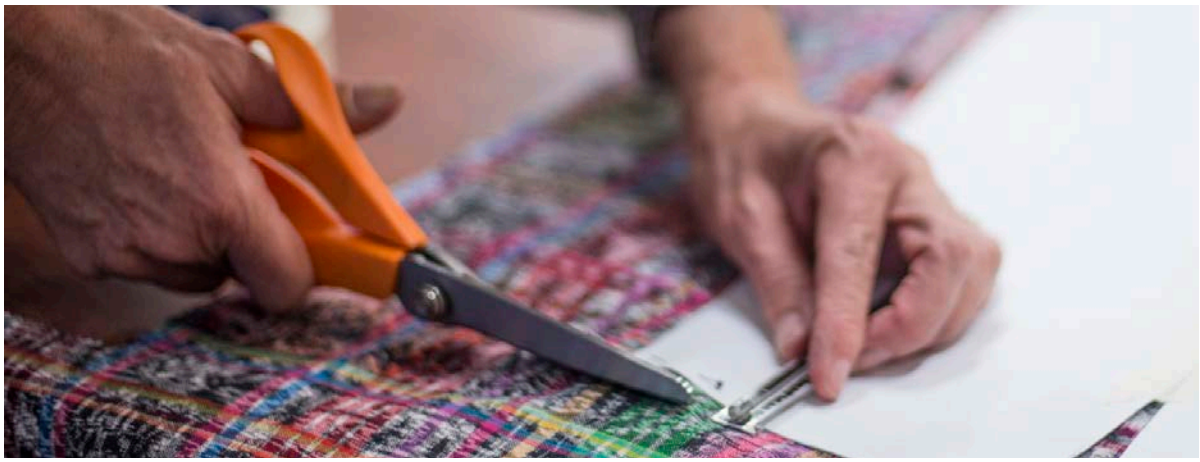
The **disposal of solid waste** contributed 11% to Flagstaff's 2016 greenhouse gas emissions footprint.

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.[1] 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.



[1] "Average Annual Household Carbon Footprint." UC Berkeley CoolClimate Network. (2013).



HOW WILL EMISSIONS CHANGE IN THE FUTURE?

A business-as-usual (BAU) forecast provides an estimate of potential future emissions, assuming that Flagstaff 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:

35% forecasted Flagstaff **population growth** by 2050.[1]

Residential electricity demand expected to **grow by 60%** by 2030.[2]

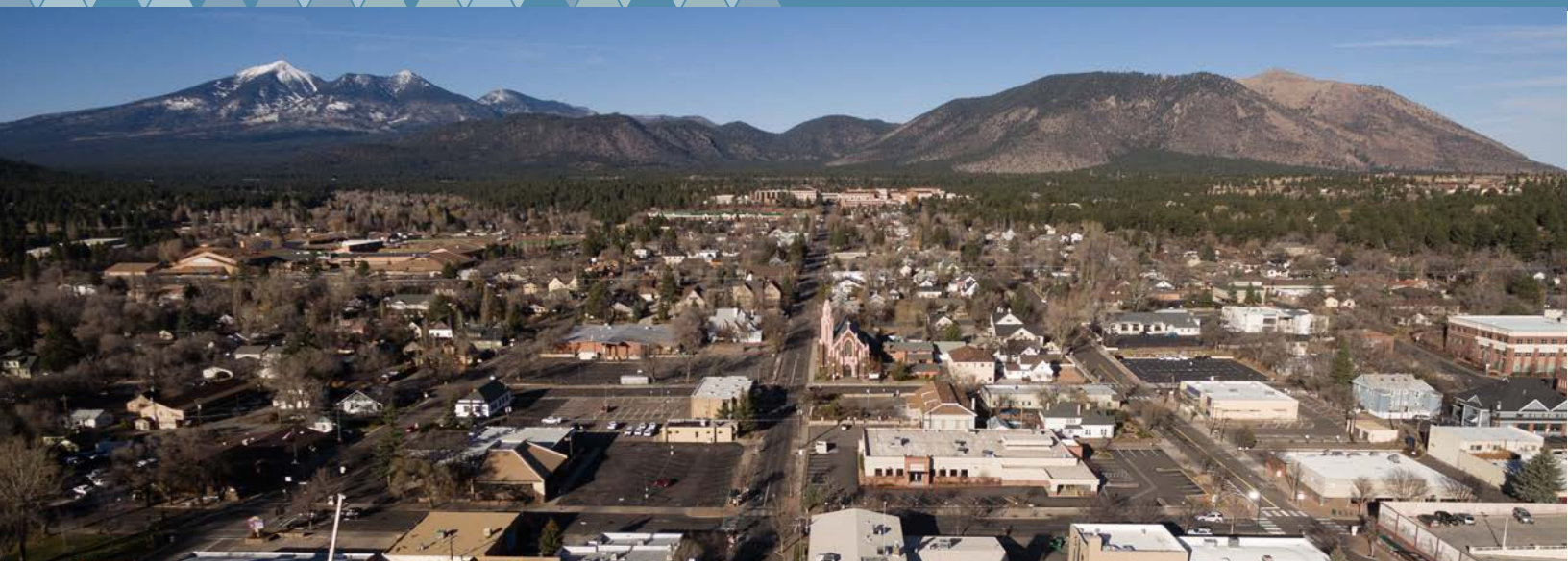
Commercial electricity demand expected to **grow 50%** by 2030.[3]

Industrial electricity demand expected to **grow 1%** by 2030.[4]

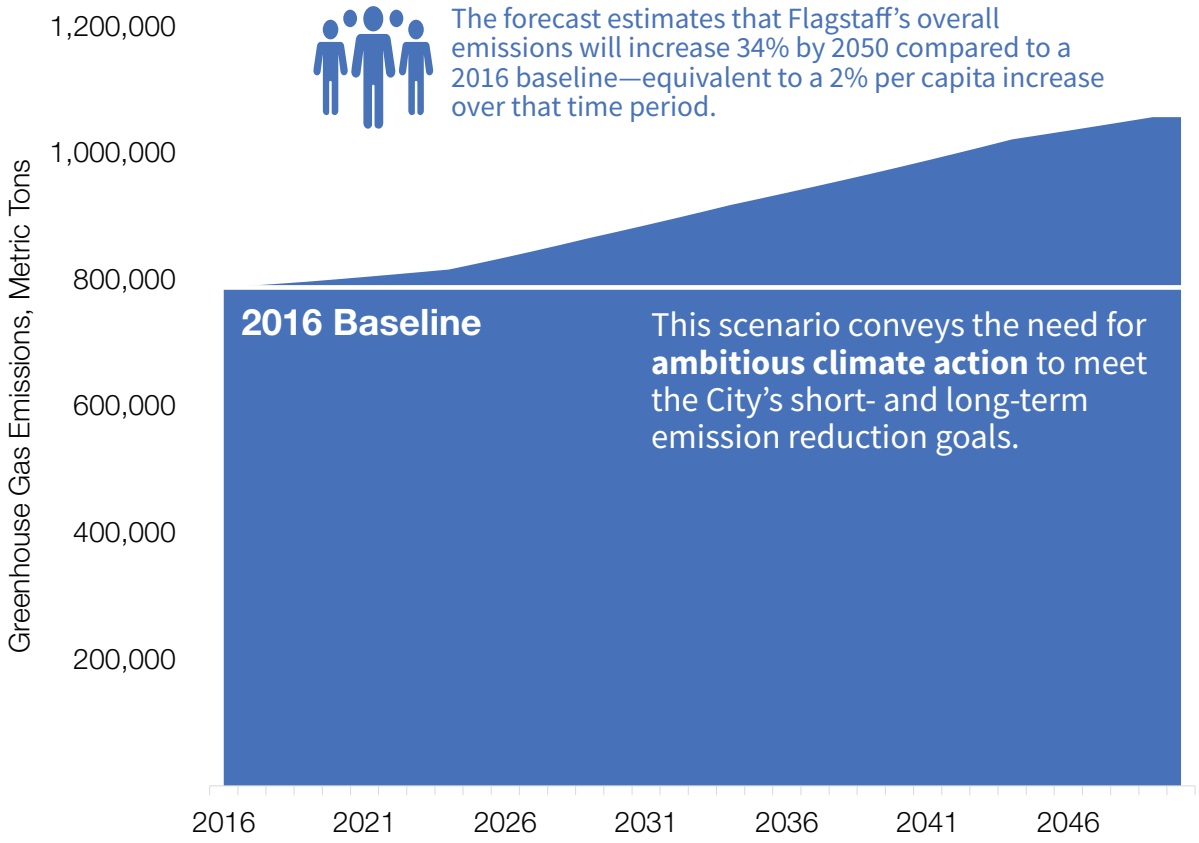
Electricity carbon intensity expected to change at the same rate as national electricity carbon intensity, **declining 37%** by 2050.[5]

50% growth in **vehicle miles traveled** by 2040.[6]

[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



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 aesthetics. 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.

Economic stability. Looking ahead can help the Flagstaff community prepare for potential shifts in both climate and visitation. Climate action can help existing businesses be more resilient amidst change, while emerging businesses capitalizing on the need for climate solutions can create high-quality jobs.

Tensions between Climate Action Goals and Other Community Priorities

While there are strong benefits to climate action, there are also areas where climate action goals may conflict with other community priorities. Challenges range from the search for street lighting that protects our dark skies while conserving energy, and balancing the need for mixed use buildings that help residents drive less with the desire to preserve community character.

This Plan seeks to transparently identify these tensions and start discussions about how to both meet the need for climate action and advance other community goals. Each focus area of the Plan contains a case study weighing these questions and discussing possible solutions. Find these case studies on pages 72, 81, 87, 102, 112, 120, and 127.

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

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.

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.

Energy

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.

Transportation and Land Use

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.

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.

Public Health, Services, Facilties, and Safety

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

Economic Prosperity and Recreation

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.

Where shown, this icon refers to items that span two or more of the focus areas described above.

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 Strategy.

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:

Nine public open houses, attended by over 350 community members.

Four 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.

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:

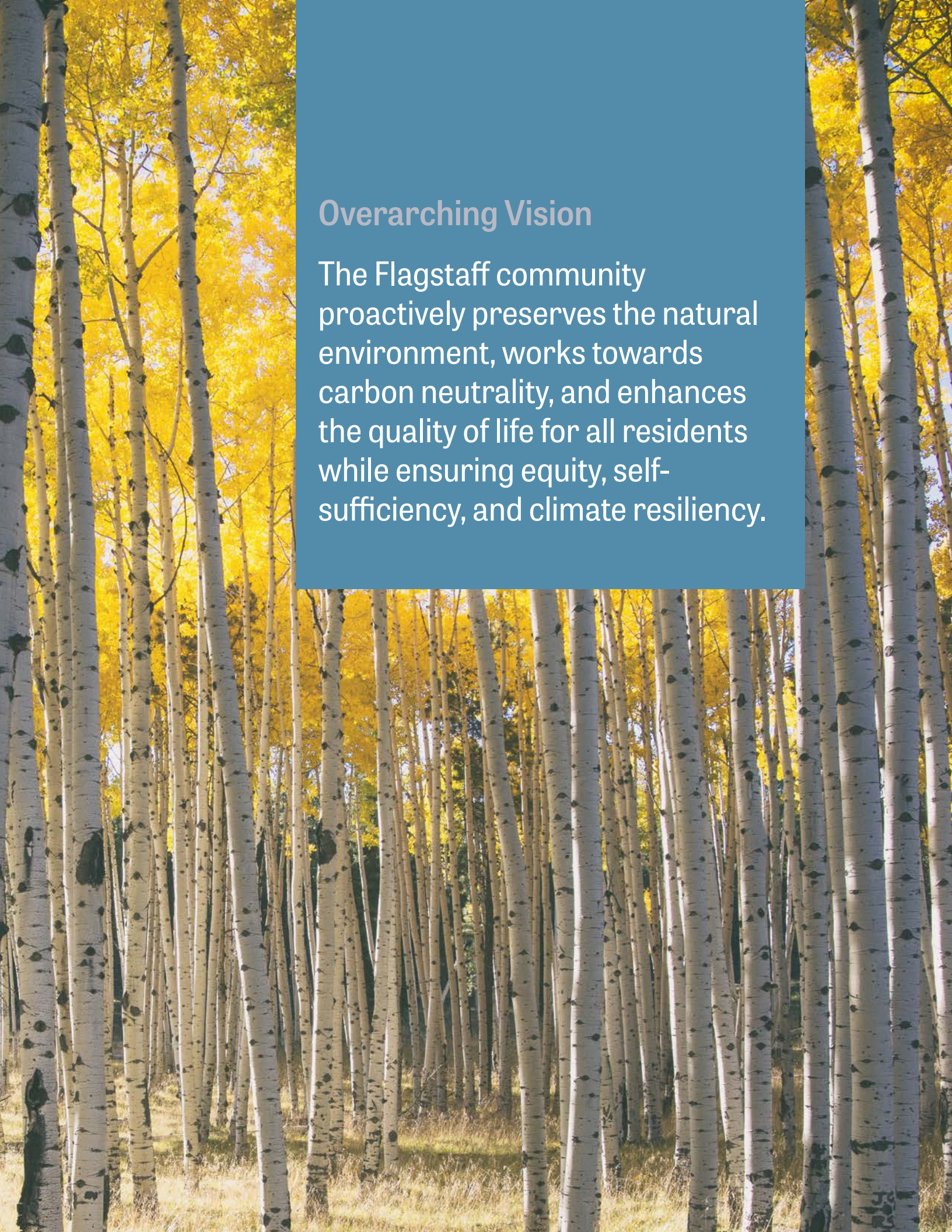
Inspiring voluntary action through information, outreach, and technical assistance.

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.



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.

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.

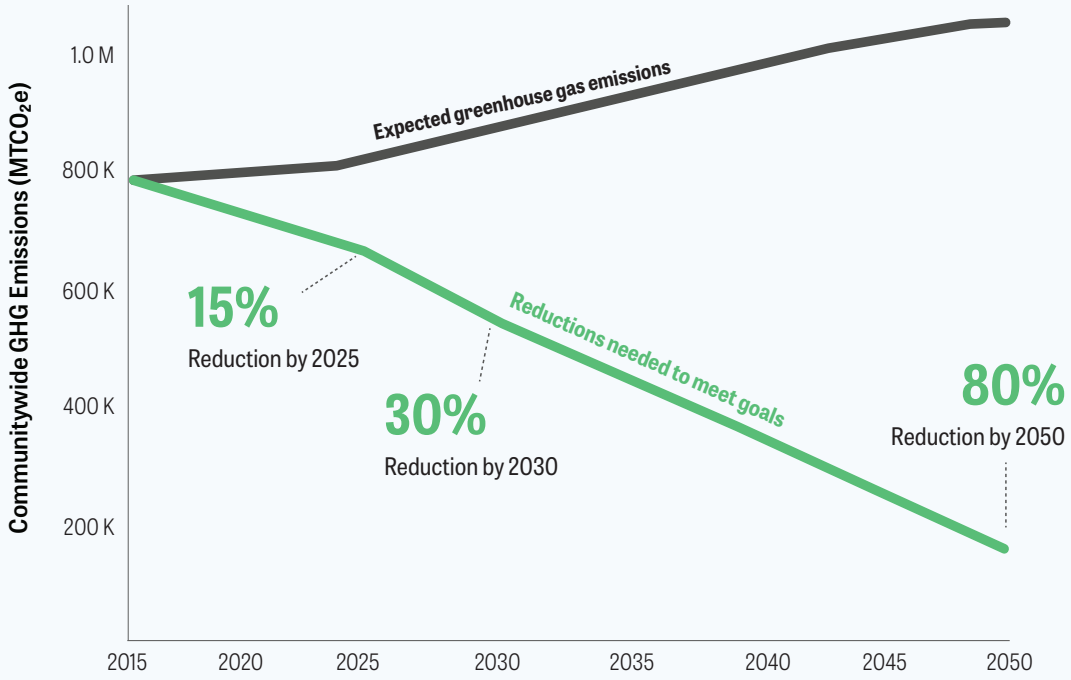
Greenhouse Gas Reduction Targets

The Climate Action and Adaptation Plan sets a 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
Annual communitywide greenhouse gas emissions		15% reduction	30% reduction	80% reduction
	787,315 ($MTCO_2e$*)	669,218 ($MTCO_2e$)	551,121 ($MTCO_2e$)	157,463 ($MTCO_2e$)
Annual per-capita communitywide greenhouse gas emissions		25% reduction	41% reduction	85% reduction
	11.0 ($MTCO_2e$ / person)	8.3 ($MTCO_2e$ / person)	6.5 ($MTCO_2e$ / person)	1.7 ($MTCO_2e$ / person)
Estimated population		13% growth	18% growth	33% growth
	71,617	81,044	84,795	95,088



*Metric ton carbon dioxide equivalent ($MTCO_2e$) serves as a standard unit for greenhouse gases, indicating the impact of different greenhouse gases in terms of the amount of CO_2 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 $MTCO_2e$.

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.[1] Last year was the most expensive disaster year in U.S. history, costing nearly 400 billion dollars.[2] We also know that disasters like those experienced in 2017 are expected to continue and strengthen in the future.[3]

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.

1 Flagstaff Watershed Protection Project. http://flagstaffwatershedprotection.org (23 May 2018).
2 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).
3 "Extreme Weather and Climate Change." Center for Climate and Energy Solutions. https://www.c2es.org/content/extreme-weather-and-climate-change (23 May 2018).

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_2e$) in 2015 to $69 per $MTCO_2e$ in 2050.[1] 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 ton of emissions.[2]

1 U.S. EPA. "The Social Cost of Carbon." 2017
2 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 (3 July 2017).

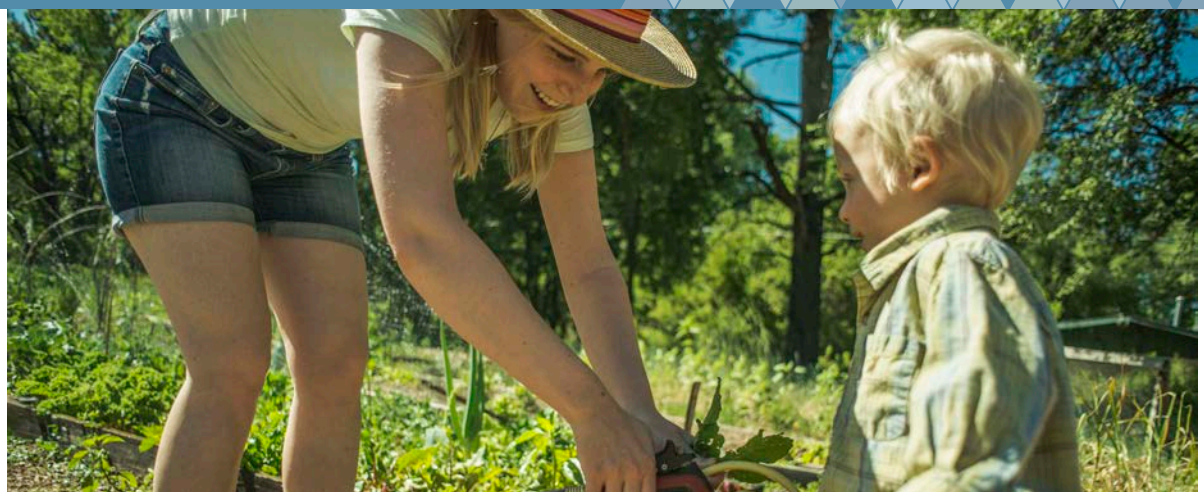
BUILDING ON A FOUNDATION

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 tracks and reports on its **greenhouse gas emissions inventory** annually.[1]
- 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.

[1] 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.residents.

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.

THE CITY OF FLAGSTAFF'S EXPANDING COMMITMENT TO CLIMATE ACTION

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

2006	Through Resolution 2006-59, the City of Flagstaff adopted the U.S. Mayors Climate Protection Agreement.
2007	The City of Flagstaff Sustainability Section was established. The Sustainability Commission was established by Ordinance 2007-27.
2008	Resolution 2008-32 required all new municipal buildings be constructed to earn a minimum of Leadership in Energy and Environmental Design (LEED) silver certification.
2010	Resolution 2010-16 committed the City to increase energy efficiencies and renewable energy production and purchase for City facilities and properties.
2012	Resolution 2012-22 adopted the 2012 City of Flagstaff Resiliency and Preparedness Study.
2014	Resolution 2014-09 requires all occupied City-owned new construction, major renovations and large additions to achieve LEED, Green Globes, or Living Building Challenge certification.
2017	City Council set a 2017-2019 term to take meaningful climate action. Flagstaff became Arizona's first city to call for national revenue-neutral carbon fee and dividend legislation, 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.

The 2012 City of Flagstaff Resiliency and Preparedness Study

In 2012, the City of Flagstaff conducted the Resiliency and Preparedness Study to better understand how the impacts of local climate changes will directly affect City operations. The study assessed the level of vulnerability, the degree of risk, and the potential impacts of 115 of the City's critical operations. Completed by a team of City staff and regional partners, the study recommends an overarching policy to increase protection and resilience within government operations to hazards including fire, severe winter storms, drought and floods.

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.

Ties to the Flagstaff 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.

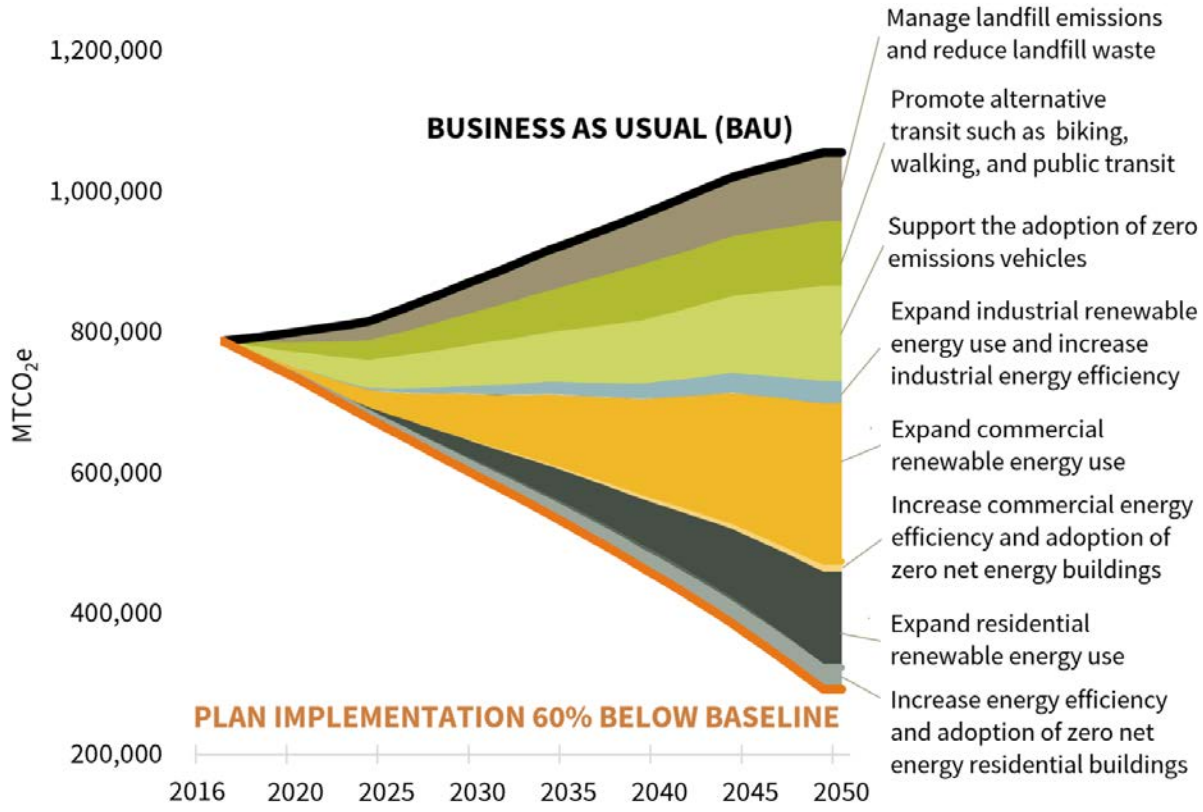
Goal T.7. Provide a high-quality, safe, convenient, accessible public transportation system, where feasible, to serve as an attractive alternative to single-occupant vehicles.

Goal T.9. Strengthen and support rail service opportunities for the region's businesses and travelers.

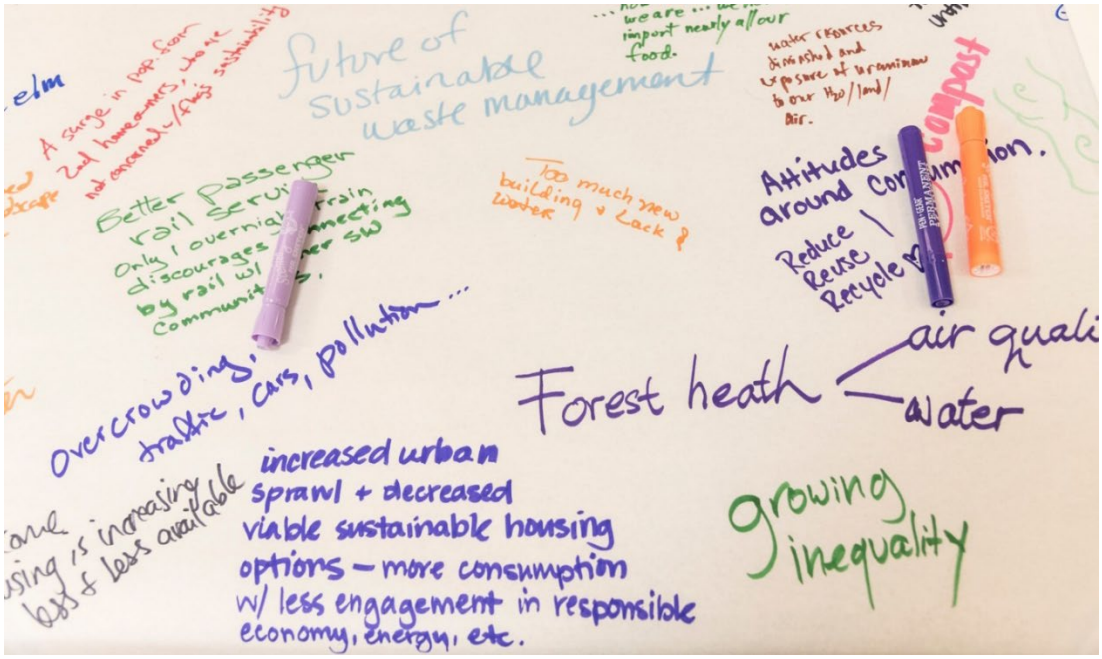
PROJECTED EMISSIONS REDUCTION FROM PLAN IMPLEMENTATION

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.



Community Open Houses asked Flagstaff residents for their input at every stage of Plan development. At the first Community Open House in January 2018, residents described why they are proud of Flagstaff and their concerns about climate change.

IMPLEMENTATION STRATEGY

Flagstaff has made progress in reducing emissions, developing innovative sustainability initiatives, and building community support for climate action. This Plan was developed to build on key climate action successes and provide a pathway to reach aggressive 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**. The **outreach strategy** outlines how to preserve momentum in the community while the **Community Action Guide** provides a set of strategies that individuals and households can use to take climate action.

To ensure that climate action and adaptation strategies meet the needs of the community and use resources efficiently, 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.

Kickstarting Implementation

A strong foundation of internal leadership and process will ensure that Flagstaff meets the goals of this Plan. Plan implementation will require strategic and coordinated actions among divisions, as well as leadership to ensure that mitigation and adaptation are priorities throughout the municipal organization. The first year of Plan implementation sets the stage and determines its relevance and success going forward.

STRATEGY 1. Reinforce organizational commitments to climate action.

Priority Actions

IM-1-A	Join the Global Covenant of Mayors.
IM-1-B	Update the City of Flagstaff greenhouse gas emissions goals to match the goals of this Plan.
IM-1-C	Develop a climate mitigation and adaptation decision matrix to be integrated into City plan creation and updates, including the regional plan, zoning code, and engineering standards.
IM-1-D	Establish financing systems that facilitate investments, emergency funds, and cash-flow availability to develop climate adaptation initiatives.

STRATEGY 2. Establish a foundation for successful Plan implementation.

Priority Actions

IM-2-A	Refine targets for all goals in the first six months of implementation.
IM-2-B	Create detailed blueprints for the implementation of each Plan strategy within the first six months of implementation.
IM-2-C	Host a community conversation on the *Global Warming of 1.5° C* special report by the Intergovernmental Panel on Climate Change, to identify if City goals should be refined.
IM-2-D	Identify how city codes complement this Plan and identify areas that may need minor and major modifications.

The Need for Aggressive, Global Action

Global Warming of 1.5° C, the October 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report, highlighted the need to contain global temperature rise to 1.5 degrees Celsius or less. To achieve this, global carbon dioxide emissions need to fall to 45 percent of 2010 levels by 2030, and net zero global emissions by 2050. This Plan does not incorporate the heightened urgency for action due to the timing of the report's release. The Flagstaff community must discuss this report and determine an appropriate response.

Leadership

Flagstaff City Council

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 climate action.

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 facilitate implementation.

STRATEGY 3. Include climate action in Council priorities.

Priority Actions

IM-3-A	Identify goals for the upcoming City Council term that will support Plan implementation.
IM-3-B	Identify City Council budgetary priorities to support Plan implementation.
IM-3-C	Identify state and federal legislative priorities that support the goals of the Plan and enable implementation of Plan strategies and actions.

Sustainability Commission

The City Council-appointed Sustainability Commission will provide ongoing assistance by supporting Plan implementation and public engagement.

The Commission will actively participate in Plan implementation by:

- Monitoring and tracking progress towards meeting Plan goals.
- Making recommendations to City Council on climate initiatives.
- Engaging with local organizations and community groups on climate action.
- Working with City staff to make recommendations on policies that further the goals of the Plan.

STRATEGY 4. Utilize the Sustainability Commission to oversee and promote the Plan.

Priority Actions

IM-4-A	Review the Climate Action and Adaptation Plan progress report annually to assess the effectiveness of Plan implementation.
IM-4-B	As part of the annual budget process, make recommendations to the City Manager's Office for areas to prioritize in the City Manager's proposed budget.

City Leadership

For a city to take meaningful action on climate 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—must proactively consider climate action and resiliency when conducting all City operations.

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

- Biannual City Manager's Climate Roundtables, which will foster a culture 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.
- Renewing the City's commitment to the actions recommended in the City of Flagstaff Resiliency and Preparedness Study, adopted by City Council in 2012.
- Integrating climate action criteria and priorities into the budget process to ensure that climate action remains part of the conversation throughout the budget cycle. While there are many competing demands on a limited City budget, integrating climate action criteria into the budget process will:
    - Highlight opportunities where climate action can help meet the goals of other divisions.
    - Recognize deliberate steps to increase mitigation or adaptation efforts among City divisions.
    - Identify gaps and opportunities for alignment across projects.
- Recognizing that the annual budget is a reflection of City priorities, ensure that the annual City budget signals the City's commitment to climate action.

STRATEGY 5. Prioritize climate action across the organization.

Priority Actions

IM-5-A	The City Manager will host the first biannual Climate Roundtable.
IM-5-B	Form a Climate Action Committee to coordinate activities across the municipal organization, consisting of Climate Action Leads from each City division.
IM-5-C	Renew the City's commitment to the actions recommended in the City of Flagstaff Resiliency and Preparedness Study, adopted by City Council in 2012.

STRATEGY 6. Incorporate climate priorities into the budget process.

Priority Actions

IM-6-A	Each division will identify efforts that support resiliency and greenhouse gas mitigation during the annual budget review process, strategic planning, and workplan implementation.
IM-6-B	The City Manager's office will ensure that climate action is prioritized and used as a criterion in budget team decision making.
IM-6-C	The City Manager's proposed budget, presented during the annual budget review process, will incorporate a report on climate mitigation and adaptation projects that are funded in existing workplans or will be incorporated into workplans for the fiscal year.
IM-6-D	In preparation for the annual budget process, identify Capital Improvement Program projects that will mitigate the City's vulnerability to climate change impacts.
IM-6-E	To capitalize on existing programmatic infrastructure, take steps to expand existing programs such as residential energy efficiency rebates, Home Energy Efficiency 101 workshops, Neighborhood Sustainability Grants, and Climate Ambassador programming.

Municipal Organization Climate Action Planning

During the first year of Plan implementation, the City of Flagstaff will identify how its own activities contribute to the achievement of Plan goals, ensuring the City is incorporating both climate mitigation and adaptation into its operations.

- The City is committed to reducing its greenhouse gas emissions to reduce the pace of global climate change and contribute to the achievement of this Plan's overarching goals. The City must recognize how the activities of the municipality contribute to climate change.
- The City must prepare for how climate change will impact its ability to serve residents. Building local resiliency against risk from climate variability and climate change within the municipal organization will help ensure continued prosperity. To assist this process, the City will update the 2012 City of Flagstaff Resiliency and Preparedness Study to analyze how the municipal organization can be better prepared for anticipated climate changes.

These efforts will be centered through a municipal planning process, to build capacity within the organization. Each division will complete a three-part process:

- Education and capacity building: Review the potential impacts of climate change, analyze the division's impact on greenhouse gas emissions, and identify vulnerabilities.
- Climate action assessment: Describe how the division's activities relate to and align with the Plan; identify mitigation and adaptation actions that the division will take.
- Integration into division budgets: Provide a report detailing how each budget item will affect greenhouse gas emissions and align with the Plan.

STRATEGY 7. Develop a City-wide Climate Plan integration process.

Priority Actions

IM-7-A	Continue to track municipal greenhouse gas emissions and publish a greenhouse gas inventory, which will be widely disseminated among City staff.
IM-7-B	Update the City of Flagstaff Resiliency and Preparedness Study to recognize evolving scientific understanding of climate change risks and identify how City vulnerabilities have changed.
IM-7-C	Implement a municipal planning process that focuses on education and capacity building, climate action assessment, and integration into division budgets.
IM-7-D	Create a data management plan for the organization to integrate climate-related considerations into the work of all divisions.

The 2012 Resiliency and Preparedness Study

The seven recommendations of this study will help the City prepare for climate-related impacts.

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.
6. Incorporate resiliency as a priority during City planning efforts.
7. Allocate resources to adapt City operations to climate change, including ongoing assessment of vulnerability and risk.

Required Staff Capacity for Climate Action Coordination

Dedicated staff are required to ensure that climate action and adaptation efforts are continually incorporated into existing City operations, policy development, and community partnerships. This may include the creation of additional staff to manage the implementation, tracking, and reporting of the strategies and actions and to coordinate with City staff across divisions and external stakeholders.

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 presented through the budget processes.

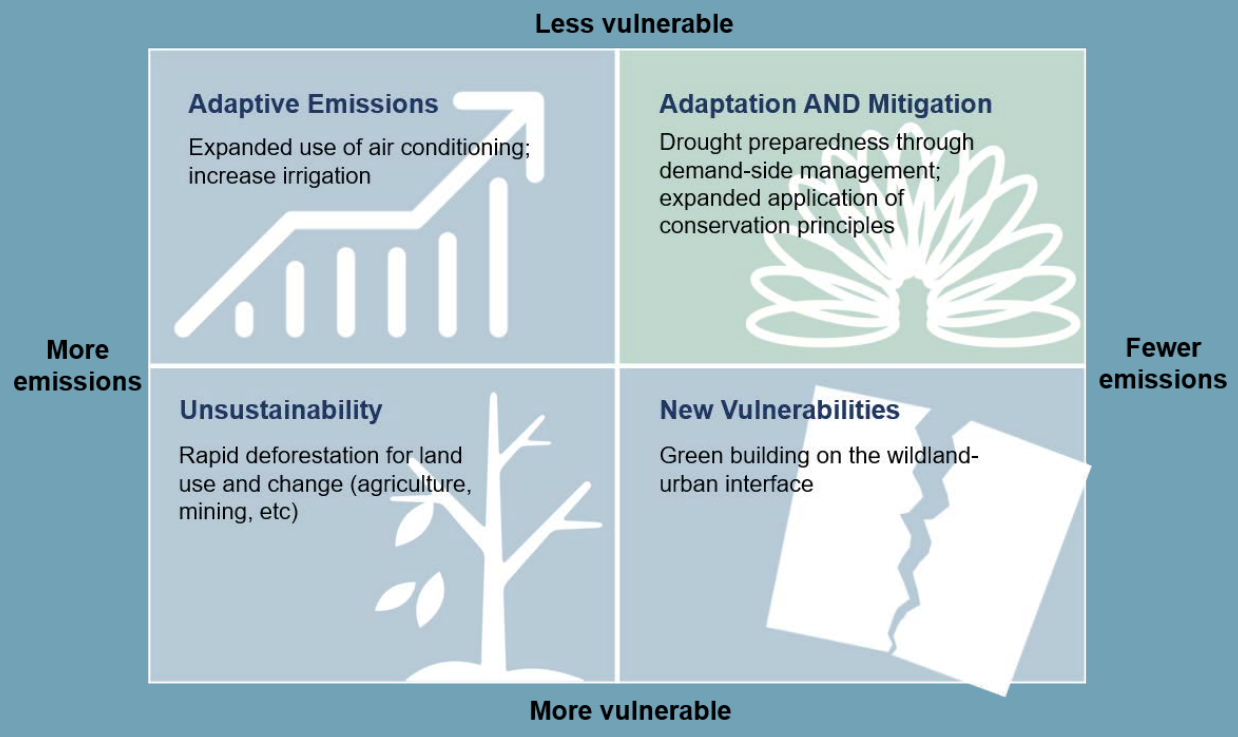
STRATEGY 8. Ensure staff capacity exists to implement the Plan.

Priority Action

IM-8-A	Evaluate staffing needs to address the priorities identified in the Plan, and provide adequate resources to implement the Plan.

Incorporating vulnerability and emissions into decision-making

This 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).



Expanding Community Capacity

To reach more people, the City must foster climate change conversations throughout the community: at community gardens, schools, churches, and dinner tables. Climate leaders surround us in Flagstaff, whether they are formally recognized Master Recyclers or those who pass down traditions of produce canning, sewing, or walking with their family to school.

To expand the climate change conversation and inspire action, we need to support current and future climate leaders within the community, while celebrating those who take climate action daily.

The City will work with community partners to implement or enhance the following programs that encourage learning among neighbors:

- **Climate ambassadors**. The City will develop a Climate Ambassadors Program to equip Flagstaff community members with the skills and resources to discuss climate change and climate action with their neighbors. It will include a workshop series to review climate change resources, bring in guest speakers, and help participants practice their "pitch" for climate action. This program will be modeled after successful climate ambassador programs in other U.S. cities.
- **Youth climate education and action.** The City will continue to support climate education and youth climate action through climate curricula in schools, the Climate Action Challeng,e and the Flagstaff 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, while encouraging and celebrating student-led climate action.
- **Climate leadership training.** This program will support individuals throughout the community in taking climate action. It will equip leaders to effectively discuss climate change, identify risks to their industries, and develop practical solutions. Potential partners include NAU and the Greater Flagstaff Chamber of Commerce. The training will have tracks for different audiences, including internal City of Flagstaff staff, business leaders, and City partners**.**
- **Neighborhood Sustainability Grants.** The Neighborhood Sustainability Grants seek to foster community partnerships that promote sustainable and healthy lifestyles. Grant projects focus on one of the following priority areas: promoting economic, environmental, and social sustainability; local food systems; alternative transportation; reducing waste, water, and energy conservation; or enhancing existing programs that build community knowledge and empowerment.
- **Climate Action Working Groups.** The City will establish working groups, made up of community members, City staff, or a combination of both, to tackle specific implementation topics. Examples include climate and equity, climate change and public health, building electrification, and accelerating electric vehicle adoption.
- **Resilient Neighborhood Groups.** Organizing within neighborhoods can help residents prepare for energy disruptions, disasters, and other emergencies. Resilient Neighborhood Groups build on the community's existing strengths, identify vulnerabilities, and bring neighbors together.

STRATEGY 9. Support community leadership on climate action.

Priority Actions

IM-9-A	Develop Climate Ambassadors and climate leadership training programs.
IM-9-B	Strengthen efforts to support youth climate education and action.
IM-9-C	Create community working groups as needed to tackle challenging implementation topics or undertake work where greater community collaboration is needed.

Operationalizing Equity

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.

Equity will be considered throughout the Plan implementation process through the following practices:

- **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.
- **Use the "operationalizing equity checklist" when implementing actions.**

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.

The most effective climate initiatives achieve greenhouse gas emissions reductions, reduce vulnerabilities, and serve disadvantaged communities. Taking climate action can create opportunities for underserved communities and accelerate the penetration of market-based solutions. For example, some cities have begun selling used electric fleet vehicles to members of their communities to ensure lower-cost electric vehicles are available to a wider spectrum of the community.

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 Plan implementation, and efforts will be made to anticipate and address any such impacts or burdens as they arise.

Equity Implementation

The following steps will ensure that the above considerations are incorporated into Plan implementation.

STRATEGY 10. Integrate equity considerations into Plan implementation.

Priority Actions

IM-10-A	Establish a climate and equity working group to build partnerships in the community, identify community needs, determine barriers to participation, recommend ways to make climate action events more accessible to residents, and ensure that Plan implementation follows the nine key equity considerations in the operationalizing equity checklist.

IM-10-B	Conduct a community-wide needs assessment to understand how needs are being met and how climate change affects neighborhoods differently.
IM-10-C	Incorporate equity indicators into monitoring and evaluation processes.
IM-10-D	Create opportunities for youth to be actively involved in decision-making and climate action.
IM-10-E	Engage community members from all income levels, races and ethnicities, political persuasions, and neighborhoods in Plan outreach efforts.

OPERATIONALIZING EQUITY CHECKLIST

Below are **key equity considerations and questions** that Flagstaff will 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.[1]

- **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-owned, women-owned, 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?

Accountability and Reporting

ACCOUNTABILITY

Accountability will be ensured through consistent and transparent reporting to the community and the Sustainability Commission, which will monitor implementation progress.

To support Plan implementation and accountability, the City should join the Global Covenant of Mayors for Climate & Energy. 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.

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.

Reporting

The City of Flagstaff has been annually monitoring and reporting both municipal and community greenhouse gas emissions since 2008. 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.

Regular reporting will ensure transparency and continued progress. City staff will measure progress on key performance indicators and report to the community regularly. 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.

Evaluation

The Sustainability Commission will evaluate the progress of Plan implementation on an annual basis, through review of the annual Climate Action and Adaptation Plan progress report. 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 actions based on local circumstances and new technologies.

STRATEGY 11. Report regularly to the community on greenhouse gas emissions and climate action.

Priority Actions

IM-11-A	Continue to update and publish greenhouse gas emissions inventories for both the City of Flagstaff municipal organization and the Flagstaff community.
IM-11-B	Develop a Climate Action and Adaptation Progress Report to report to the community on an annual basis, including progress on plan actions and key performance indicators.
IM-11-C	Create an online dashboard to illustrate progress on 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.
IM-11-D	Coordinate with the Community Development Division to ensure key performance indicators from this Plan are aligned with existing metrics used for annual reporting on the Flagstaff Regional Plan.
IM-11-E	Provide an annual update to the public on Plan implementation through an annual event held during the Flagstaff Festival of Science.

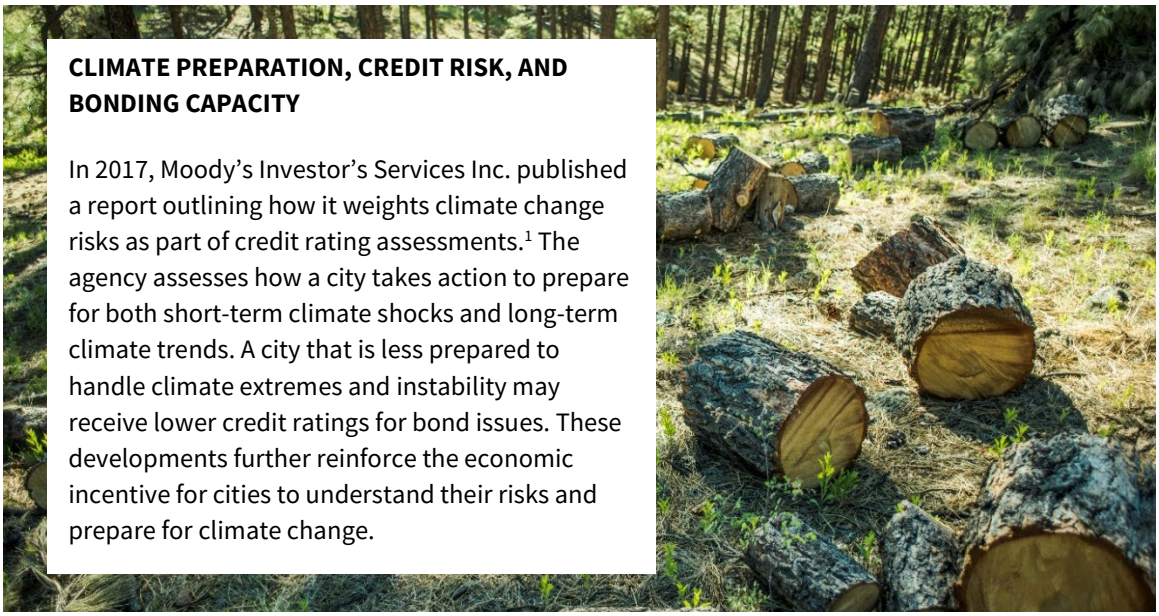
Funding

Financial investments are necessary to prepare Flagstaff for climate change. 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.

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 could be substantial. Cost savings could 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.



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.[1] 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.

- **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.[2] 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 could 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.[3]
  - Implement a utility tax on fossil fuel energy that reflects the social costs of emissions.
- **A climate action tax.** A climate action tax, if approved by Flagstaff voters, would fund climate action. Climate action taxes are often modeled off the City of Boulder's landmark Climate Action Plan tax, passed by Boulder voters in both 2007 and 2015. Climate action taxes raise revenue for climate action programs. In Boulder, tax revenue funds energy advising services and rebates for residents, energy efficiency requirements for rental properties, and energy pilot programs, among other initiatives.
- **Collaborative projects**. City staff can identify projects that align with both climate goals and community investment goals, and work to maximize the adaptation and mitigation benefits. Economic Vitality currently supports projects that achieve both climate and economic goals such as the Innovate Waste Challenge and the adaptive reuse program.
- **External funding opportunities.** The City of Flagstaff, local businesses, and individuals should pursue state and federal incentives and external funding programs. A list of these programs is included in the Information Sources section on page 61.
- **Neighborhood Sustainability Grants.** These grants, funded by the City of Flagstaff and overseen by the Sustainability Commission, can catalyze climate action in the community. This small program could be expanded and linked more closely to climate action and mitigation.

STRATEGY 12. Create climate action funding proposals through the budget process.

Priority Action

IM-12-A	Develop a funding proposal that supports the success of Plan implementation, which will be considered by the City Manager's Office and the City Council as part of the annual budget process.

FUNDING TENSIONS

The strategies and actions of this Plan will require funding over the entire course of implementation, creating another competing demand on the limited City budget. Yet the costs must be weighed against the long-term consequences of inaction.

This Plan will not be implemented right away or all at once. It will take time, money, and ongoing work with the community. To ensure that this Plan does not add undue financial burdens for Flagstaff's low-income communities, Flagstaff must employ creative funding sources and take advantage of evolving markets and technology.

Much of Flagstaff's greenhouse gas emissions mitigation will be achieved by working *with* the solar and electric vehicle markets, and not against them. The City can help residents take advantage of tax credits, remove regulations inhibiting new technology, and help with up-front financing. Investing in change at key leverage points, such as during construction, reduces the cost of action. Many investments are low-cost or require only staff time, yet can have a significant impact. Flagstaff will need to embrace innovation and get creative.

This Plan overlaps with many other City plans; identifying common goals should be the highest priority. Close collaboration will highlight when seemingly unrelated projects have climate impacts, or where small investments can yield large returns. While climate action is a long-term, complicated endeavor, creative solutions will ensure that the benefits outweigh the costs.

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 address climate change. To continue leveraging community engagement, the City will sustain outreach efforts in person and online through the following methods:

- **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.
- **Recognizing leadership.** The City can host a climate awards program to showcase businesses, schools, and homeowners that are taking innovative climate action. The Flagstaff community can also recognize elder wisdom embedded in communities and those community members who are unsung experts in resource conservation, whether by necessity or tradition. Promoting success stories demonstrates what is possible, increases awareness and provides recognition, accelerating community progress.
- **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.

- **Community events.** Engaging with a wider audience of Flagstaff residents will require having conversations with people outside of climate-specific events. Climate advocates, City staff, and partners should utilize existing community events as an opportunity to discuss climate action with the general public and provide updates on the Plan. Examples include First Friday events, the Flagstaff Festival of Science, and the County Fair.
- **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.

STRATEGY 13. Communicate with the public and maintain momentum for implementation.

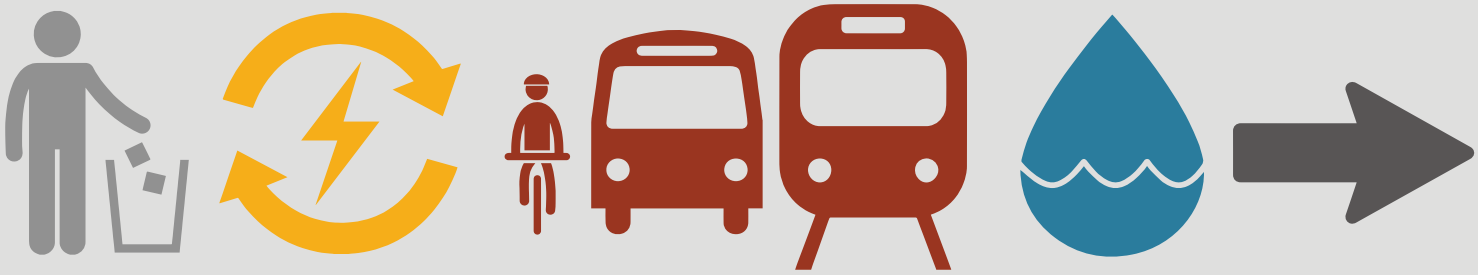
Priority Action

IM-13-A	Create a comprehensive framework that identifies diverse outreach methods.

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.

INFORMATION SOURCES

EXTERNAL FUNDING OPPORTUNITIES

Federal incentives and programs

- Residential renewable energy and efficiency tax credits: http://www.energystar.gov/taxcredits
- Business Energy Investment Tax Credit for renewable energy: https://www.energy.gov/savings/business-energy-investment-tax-credit-itc
- Federal Energy Management Program for federal agency energy efficiency (FEMP): https://www.energy.gov/eere/femp/federal-energy-management-program
- Fannie Mae Green Financing: https://www.fanniemae.com/multifamily/green-initiative-financing.
- Rural Energy for America Program: Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants; Energy Audit & Renewable Energy Development Assistance Grants: https://www.rd.usda.gov/programs-services/all-programs/energy-programs
- FHA PowerSaver Loan Program: https://www.energy.gov/savings/fha-powersaver-loan-program.
- Federal Tax Credit for Electric Vehicles: https://www.fueleconomy.gov/feg/taxevb.shtml
- FEMA Hazard Mitigation Assistance: https://www.fema.gov/hazard-mitigation-assistance
- Natural Resource Conservation Service Programs: Conservation Stewardship Program; Environmental Quality Incentives Program; Water Bank Program and Agricultural Management Assistance: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/

Arizona and APS programs

- Renewable Energy Production Tax Credit: https://azdor.gov/tax-credits/renewable-energy-production-tax-credit
- Multifamily Energy Efficiency Program: https://www.aps.com/en/business/savemoney/by-business-type/Pages/multifamily.aspx
- APS Residential Energy Efficiency Rebate Program: https://www.aps.com/en/residential/savemoneyandenergy/your-options/Pages/home.aspx
- Energy Star Homes Program for Builders: https://www.aps.com/en/ourcompany/doingbusinesswithus/constructioncorner/Pages/energy-star-homes-program-for-builders.aspx
- APS Business rebates: https://www.aps.com/en/business/savemoney/businesssolutions

External Funding Opportunities

- Keeling Curve Prize and the Urban Sustainability Director's Network micro-grant funding

REFERENCES

[1] Climate change is forecast to heighten US exposure to economic loss placing short- and long-term credit pressure on US states and local governments." *Moody's Investors Service. November 28th 2017. https://www.moodys.com/research/Moodys-Climate-change-is-forecast-to-heighten-US-exposure-to--PR_376056.*

[2] "Climate Programs." *The City of Flagstaff Arizona*. http://flagstaff.az.gov/1732/Climate City Council Climate Action section.

[3] See Watsonville's Ordinance creating 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

This Plan was created by the Flagstaff community, for the Flagstaff community. Meaningful conversations with residents helped shape the goals and strategies discussed in this Plan.

STRATEGIES AND ACTIONS

The following sections detail the **strategies and actions** the City and community will need to 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.

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

By 2100, Flagstaff communities are likely to face:

HIGH VULNERABILITY

Overall declines in forest health and widespread forest loss due to wildfires, drought, pests, and invasive species.

HIGH VULNERABILITY

Larger, more frequent stand-replacing wildfires.

MEDIUM-HIGH VULNERABILITY

Larger, more frequent flooding after wildfires. More floods in general.

HIGH VULNERABILITY

More beetle infestations and invasive species due to warmer, drier conditions.

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's legally designated 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 legally protected legally designated open space within city limits	Maintain at 3,069 acres through 2030
Legally designated open space funding per acre	Identify and fund management at $100 per acre of legally designated open space by 2050

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

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

CORRESPONDING STRATEGIES
Strategy 2. Improve forest management through collaboration with regional partners.
Strategy 3. Educate the public on forest health risk and fire prevention.

GOAL

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

KEY PERFORMANCE INDICATORS	TARGET
Development of a municipal strategy for identifying and utilizing climate-adapted native plants	Creation of a strategy by 2020

CORRESPONDING STRATEGIES
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.

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.
NE-1-C	Integrate leave no trace into City programming, including Open Space, Parks and Recreation and the Flagstaff Fire Department programs.

Other Actions

NE-1-D	Increase funding for the procurement and management of legally designated open spaces.
NE-1-E	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-F	Offer education, assistance, and incentives to private property owners to control invasive plant and weed species on their land.

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

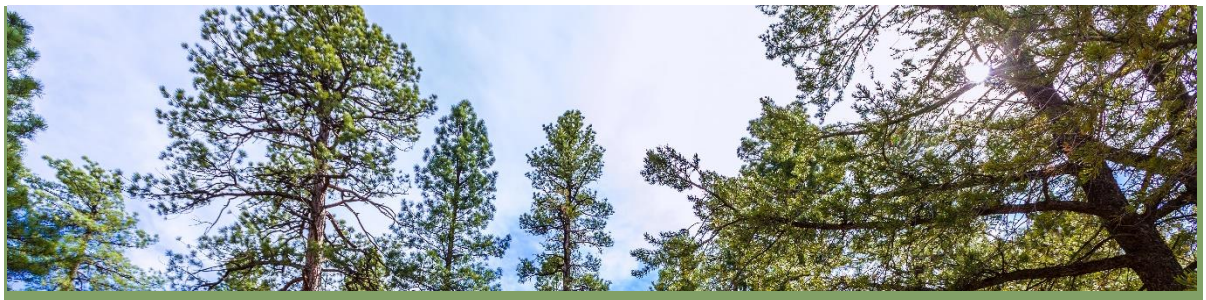
New collaborations and funding are needed to ensure that we can achieve the desired forest health outcomes.

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, non-profit 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.

NATURAL ENVIRONMENT TENSIONS

Proponents of land conservation and affordable housing have rarely seen common ground they may occupy. These two interests are often pitted against one another in development agreements and among scarce funding opportunities. Both parties are experiencing unprecedented challenges to protecting places and providing for people.

The accelerating growth and fragmentation of protected open spaces is one of the greatest challenges to the preservation of natural areas. Every year, millions of acres of woodlands and natural areas are developed. The results too often have produced fragmented wildlife habitats, loss of a sense of place, disruption to critical ecosystems, and excessive stormwater discharge into wetlands and waterways.

All the while, the gap continues to widen between wages and housing costs. Housing prices are accelerating faster than wage increases, exacerbating the housing shortage for low- and moderate-income community members, including our teachers and police officers. In 2018, the National Low Income Housing Coalition ranked the State of Arizona as having the 25th highest hourly wage needed to afford a two-bedroom rental in the nation.[1] According to the analysis, a renter must make $18.46 per hour to afford a two-bedroom rental; at the 2017 minimum hourly wage, that would necessitate a 70-hour work week.

Sustainable communities have good jobs, adequate housing, and a strong sense of place derived from local natural and cultural resources. How does a community move forward? There are promising trends for conservation-based affordable housing and strategies for forging more creative partnerships between land conservation and affordable housing. By addressing community needs for housing and natural resource protection together and engaging community members in the process, conservation-based affordable housing developments can generate new public and political support. The best examples reflect the need for connections to ensure the strategic protection of conservation areas, are appropriate to the conservation intent, and are located to least disturb resources while being near jobs, services, and transit opportunities.

1 "Out of Reach: The High Cost of Housing". National Low Income Housing Coalition. 2018. https://nlihc.org/sites/default/files/oor/OOR_2018.pdf.

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

Incorporating low-water native plants and climate-adapted native plants 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.

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.

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

By 2100, Flagstaff communities are likely to face:

HIGH VULNERABILITY

Reduced water availability and increased demand are expected to accelerate the need to develop new water supply projects.

MEDIUM-HIGH VULNERABILITY

More wildfire, drought, and flooding are likely to impair water quality.

HIGH VULNERABILITY

More wildfire and flooding is likely to significantly damage natural and human-made water infrastructure.

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 the face 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 for both potable and reclaimed water will be established through the 2020 Water Resources Master Plan update	
Affordability and accessibility indicators and targets for both potable and reclaimed water will be assessed through the 2019 Water Rate Study	

CORRESPONDING STRATEGIES
Strategy 2. Improve ecosystem management for protection of water resources.
Strategy 4. Maximize passive and active community rainwater infiltration.

GOAL

Conserve community water resources by maximizing water efficiency and supporting innovations in water resources, including within stormwater, groundwater, surface water, and reuse systems.

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
Per-capita reclaimed 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
Total annual reclaimed water usage (million gallons)	Targets will be set through the Water Conservation Strategic Plan process

CORRESPONDING STRATEGY
Strategy 3. Continue to support water conservation efforts across the Flagstaff community.

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

CORRESPONDING STRATEGY
Strategy 1. Improve water infrastructure and expand water reuse

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	Incorporate enhanced energy efficiency and smart controls into water production and wastewater treatment designs on new projects and upgrades of existing equipment.
WR-1-C	Increase the efficiency of municipal irrigation systems and practices.
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.

Other Actions

WR-1-E	Evaluate the viability and costs of new advanced reclaimed water treatment technologies to increase water quality for potable reuse.
WR-1-F	Create a Water Resources Master Plan to ensure a long-term sustainable and secure supply when faced with climate-related hazards.
WR-1-G	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 forests and ecosystems 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 and protecting recharge zones in perpetuity.

Other Actions

WR-2-B	Evaluate landscape and stormwater codes for suitability with projected changes in temperature and precipitation, and how effectively the codes support the development of green infrastructure.

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.

WATER RESOURCES TENSIONS

A reliable water supply is essential to maintaining our community's economic vitality and overall sustainability. However, climate change poses threats to Flagstaff's water supply that will require us to make difficult decisions as we work to provide water security for the community. The majority of Flagstaff's water is sourced from aquifers, underground water sources that are maintained (recharged) through the gradual melting of snowpack. Climate change will shift more of Flagstaff's precipitation from snowpack to rain, which could decrease aquifer recharge.

One option for our future water supply is to drill deeper wells into aquifers to access water stored further below the surface. This process would require extensive infrastructure development and would use energy to pump water from deeper below the earth's surface.

A second option is to expand development onto Red Gap Ranch, an area 40 miles east of Flagstaff with access to the C-aquifer, the area's largest and deepest underground water source. While this option ensures access that would increase the City's groundwater resource capacity, pumping and transportation infrastructure would be needed to deliver water to Flagstaff, including a 40-mile pipeline and booster stations to bring the water up 2,000 feet of elevation to the city. The water at Red Gap Ranch is slightly saltier than Flagstaff's current water supply and may need treatment before consumption, a process that would further increase energy use for the production of this water.

A third option is the "One Water" framework, which considers all of the water sources in an area—drinking water, wastewater, storm water, groundwater, and reclaimed water—as a single resource that must be managed accordingly. Establishing this framework would enable Flagstaff to assess and plan for future challenges and opportunities in water management. It would also allow for increased use of reclaimed water, which lessens demand on water sources. However, this framework would require difficult community and municipal discussions of current water management systems and would involve new infrastructure development to accommodate the framework's implementation.

Flagstaff's current water supply is also subject to higher demand as the city's population and visitation increase. Adjusting current water management to include future demand will require the City to seek out new innovative solutions and consider the cost of building new infrastructure as well as the associated long-term greenhouse gas emissions. As Flagstaff considers future water security and its climate goals, the City will have to weigh the emissions, financial implications, and long-term resiliency associated with various water sources and management strategies.

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.
WR-3-E	Create a repair loan program for City customers to encourage repairs to aging water infrastructure in homes and businesses.

Other Actions

WR-3-F	Increase participation in water conservation incentives and rebates for indoor and outdoor water use efficiency, as recommended by the City's 2019 Water Conservation Strategic Plan.
WR-3-G	Advance building codes to remove barriers to composting toilets and tank-to-toilet systems.

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.

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 Section 402 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.

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, and free Home Energy Efficiency 101 workshops for renters and homeowners.
- 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	TARGET
Greenhouse gas emissions from heating, cooling and powering buildings	Reduce emissions from 2016 baseline: 15% by 2025 28% by 2030 54% by 2040 80% by 2050

Greenhouse gas emissions from heating, cooling and powering buildings, by building sector	Reduced emissions from 2016 baseline: **Industrial**: 15% by 2025 / 80% by 2050 **Commercial**: 15% by 2025 / 80% by 2050 **Residential**: 15% by 2025 / 80% by 2050
Natural Gas usage, by building sector	Reduced usage from 2016 baseline: **Industrial:** 15% by 2030 / 25% by 2050 **Commercial:** 17% by 2030 / 30% by 2050 **Residential:** 20% by 2030 / 40% by 2050
Proportion of newly constructed residential and commercial buildings that are ENERGY STAR, LEED-certified, and Coconino County Sustainable Building Programs buildings	20% of annual permits by 2025
Proportion of newly constructed residential buildings that are net-zero energy homes	50% by 2025
Flagstaff building code	Adoption of the most efficient, most recent building code
Energy efficiency retrofits of existing rental and owner-occupied residential homes	500 homes by 2025
Participating households in City energy efficiency programming, including workshops	1,000 households by 2025
SMARTregs	Initiation by 2020 50% of rentals participating by 2025

CORRESPONDING STRATEGY

Strategy 1. Improve energy efficiency in all sectors.
Strategy 3. Manage energy demand and consumption in residential, commercial, and industrial sectors, to reduce greenhouse gas emissions.

Goal

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

KEY PERFORMANCE INDICATORS	TARGET
Proportion of municipal electricity use from renewables (%)	2017: 5.4% 100% by 2025
Proportion of community electricity use from renewables (%)	18% by 2025 35% by 2030 68% by 2040 100% by 2050

CORRESPONDING STRATEGY
Strategy 2. Expand renewable energy generation and use.

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	*Target to be established once benchmark data is available*

CORRESPONDING STRATEGY
Strategy 2. Expand renewable energy generation and use.

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.
E-1-I	Work with partners to develop a specific plan for an aggressive building electrification program to decrease reliance on combustion fuels.

Other Actions

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.
E-1-O	Introduce a policy that rewards builders who go beyond energy efficiency code requirements or obtain 3rd-party certification for green building performance, such as LEED certification, with lower City fees and expedited review.

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.

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.

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 100. 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.

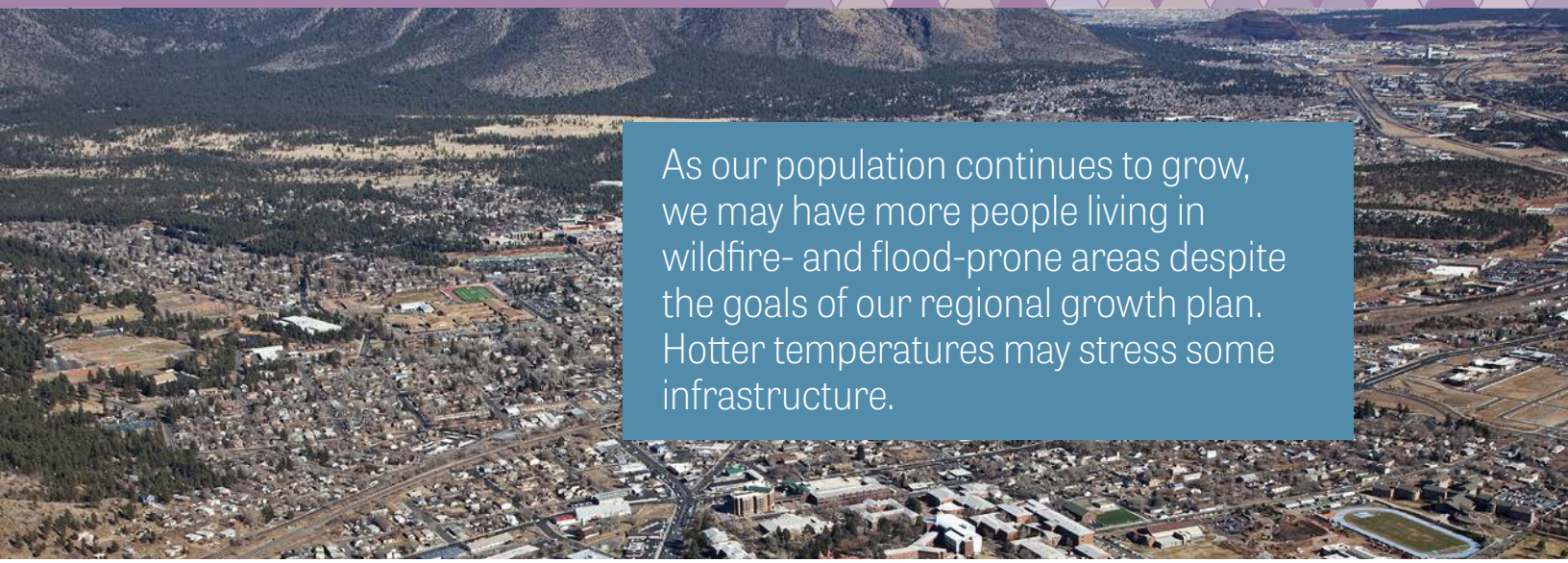
Transportation and Land Use

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.



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

By 2100, Flagstaff communities are likely to face:

MEDIUM VULNERABILITY

Wildfires and hotter, drier conditions may make healthy, open space more difficult to sustain.

MEDIUM-LOW VULNERABILITY

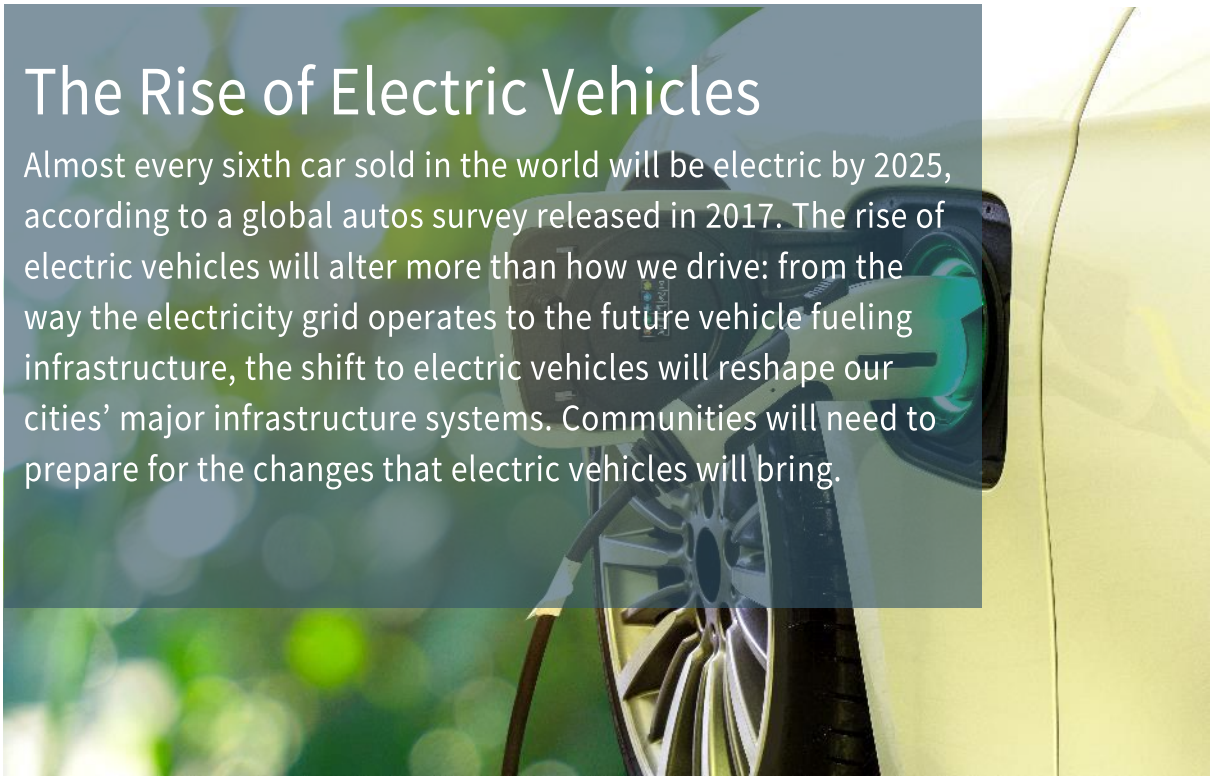
Greater population density is planned away from wildfire- and flood-prone areas, with more city parks and open space to provide shade.

MEDIUM VULNERABILITY

Hotter temperatures may increase energy costs and stress infrastructure.

MEDIUM VULNERABILITY

Hotter temperatures may increase energy costs and make summer cooling out of reach for many households.



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	TARGET
Greenhouse gases from transportation in Flagstaff	Reduce by 30% by 2030

CORRESPONDING STRATEGIES
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 4. Encourage efficient driving practices.
Strategy 5. Manage transportation demand and reduce the frequency with which people drive alone.

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 (%)	75% of sedans and SUVs by 2035 50% of medium and heavy-duty vehicles by 2035

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

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	*Target to be established*
Mileage of City bike lanes	*Target to be established*
Bike parking corrals	*Target to be established*

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

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
Percent of households living within ¾ mile of public transit	*Target to be established*
Percent of households living within a 10-minute walk of a neighborhood park	*Target to be established*

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

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*

CORRESPONDING STRATEGY
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.

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	The City will support a city-wide, ongoing discussion about density and its implications, with clear objectives and deliverables that align specifically with the Climate Plan. Community workshops and discussion forums will cover trade-offs and opportunities, while continuous educational opportunities will review the cost of free parking and other land use issues.
TLU-1-H	Request transportation demand management plans for large developments, to support transportation choices and reduce parking needs.
TLu-1-I	Incorporate climate action and adaptation criteria into entitlement reviews.

Other Actions

TLU-1-J	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-K	Promote infill growth while protecting the beauty of the city and natural areas.
TLU-1-L	Plan and develop a connected system of parks, open spaces, and trails throughout Flagstaff.
TLU-1-M	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-N	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.
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 to accelerate the adoption of electric vehicles, such as modest mid-stream incentives for car dealers to sell electric vehicles, a sales tax rebate, bulk purchasing, and incentives for visitors to rent efficient vehicles.
TLU-3-I	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-J	Work with leading figures—such as elected officials, Northern Arizona University leaders, and business leaders—to commit to visibly switching to electric vehicles.

Other Actions

TLU-3-K	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-L	Partner with private entities, such as APS, to prepare electricity infrastructure for electric vehicle charging demand.
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.

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.

TRANSPORTATION AND LAND USE TENSIONS

Growth in Flagstaff is raising important questions about how to balance development and community values. The adage "up or out" is often used to describe two choices: Flagstaff can grow out towards the edges of the city or grow up with taller buildings and greater density in already-developed areas. (Density is defined as the number of housing units per acre.)

Greater density and mixed uses lead to more housing and destinations in a limited area, shorter travel times, an increased ability to support transit, and less room for car storage. This Plan encourages greater density and mixed uses because it ultimately leads to reduced greenhouse gas emissions and stronger, more resilient neighborhoods.

Yet as Flagstaff has seen, record growth, an influx of large apartment buildings, and tensions around upward growth and density have also drawn controversy and dominated community conversations. Some of those who once wanted "up" for environmental reasons now see drawbacks, as infill development and reduced parking introduce challenges. While reducing parking spaces in a building might lower rents, it can also cause some residents to park on the street, reducing parking availability for others. Green space may feel scarce as buildings grow taller and closer to the street. Large buildings that replace older homes can change views from the sidewalk, while also adding more residents to an area that can already feel crowded.

At the same time, mixed-use, dense development can also create great neighborhoods, enabling seniors and students to forego car ownership, providing pocket parks, and supporting walkable places, like Flagstaff's own downtown. These neighborhoods are more resilient due to the social connections they create, their support of a greater number of transportation options, and the ability to meet more needs in a smaller place.

Flagstaff's ability to grow sustainably hinges on getting new, denser development right – so that it is acceptable to the community and feels integrated into its neighborhoods. Mixed-use buildings and multi-family housing are generally more water-, energy-, and transportation-efficient, making them critical climate action tools.

There are techniques in this Plan, as well as the High Occupancy Housing Plan, that seek to reduce the negative impacts of density and reduced parking. Providing car-share and bike-share services can reduce the need for car ownership, creating less traffic for everyone else. Developments can add small public spaces that become community assets or locate on bus lines to provide access to services. Innovative technology can help ease this transition, while conversations among community members can create compromises that build stronger neighborhoods.

The Flagstaff community can acknowledge the tensions inherent in sustainable development, while beginning to chart a part forward. Truly sustainable growth serves the community rather than detracts from it, while ensuring our ability to meet aggressive climate action goals.

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.

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.

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.

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.

VISION:

In 2030, governments, residents, tourists, and businesses are thoughtful material consumers and managers who minimize waste generation and optimize waste diversion.

GOALS, TARGETS, AND INDICATORS

Goal

Reduce greenhouse gas emissions associated with material consumption.

KEY PERFORMANCE INDICATOR	TARGET
Change in consumption-based GHG emissions (MTCO2e)	*Begin measuring indicator by 2021. Target to be established after the consumption-based GHG emissions inventory is complete.*

CORRESPONDING STRATEGIES
Strategy 2. Support sustainable and accessible production and consumption.
Strategy 4. Improve data collection on consumption, waste, and diversion.
Strategy 5. Increase local food production through partnerships and policies.

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. *Long-term target to be established based on a long-term materials management plan to be drafted by 2021.*

CORRESPONDING STRATEGY
Strategy 2. Support sustainable and accessible production and consumption.

Goal

Increase diversion of waste from the landfill.

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

CORRESPONDING STRATEGY
Strategy 1. Increase waste diversion.

Goal

Optimize landfill management to minimize greenhouse gas emissions.

KEY PERFORMANCE INDICATOR	TARGET
Methane capture from landfill (%)	*Anticipated start date for construction of landfill gas collection and control systems is 2023.*

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

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.
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.
WC-2-D	Increase resources for existing City food systems programming including community gardens, food policy, and food waste prevention.
WC-2-E	Establish a robust food recovery program to support community members and protect against disruptions, including working with food rescue organizations and commercial kitchens.

Other Actions

WC-2-F	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-G	Update and enforce the City sustainable purchasing policy, incorporating restrictions on the purchase of Styrofoam and bottled water for staff use.
WC-2-H	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.

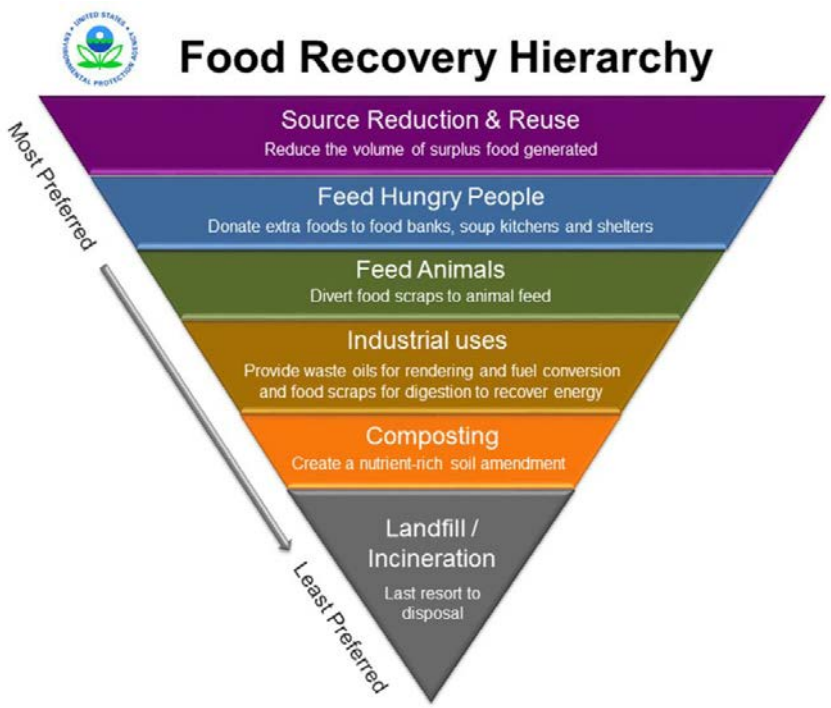
Current gaps in available waste and consumption data reduce the effectiveness of waste reduction efforts.

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.



The EPA Food Recovery Hierarchy can be used in food recovery programming and takes into account reducing both greenhouse gas emissions and waste in the food system.

WASTE AND CONSUMPTION TENSIONS

How Flagstaff residents produce, buy, and consume food has significant ramifications for the community's greenhouse gas emissions. These emissions are released at every stage of our food's lifecycle—from the growing of food on farms with heavy fossil fuel inputs, to transportation of food across the world and onto our plates, to the disposal of uneaten food and scraps in landfills.

A major source of preventable emissions is in the amount of food that goes uneaten. Forty percent of food grown in the U.S. is not consumed, with the majority being wasted at the household level. Through changes in shopping, cooking, and storing habits, residents can reduce the amount of food they waste. Restaurants and grocery stores can also be more efficient by sourcing only the amount of food that they can sell, or directly dispersing expiring goods to food-insecure members of the community through local shelters or food banks.

Another way to reduce the climate impacts of our food is by shifting our consumption habits. A diet rich in fresh fruits and vegetables produces fewer carbon emissions and has the added benefit of being healthier than a diet higher in meat and processed foods. These food choices have a far greater impact on an individual's carbon footprint than their food source. For example, for the average American household, shifting consumption habits of eating red meat and dairy to other protein sources for one day a week has the same impact as buying all locally produced food.[1]

While solutions to decreasing Flagstaff's food-associated emissions exist, changing food habitats can be personally difficult. Food is a large part of culture and people often identify what they eat with who they are. Asking individuals to change what and how they consume food will require culturally sensitive messaging and communication.

1 "Food-Miles and the Relative Climate Impacts of Food Choices in the United States." Weber, C. L. & Matthews, S. H. Environmental Science Technology. 2008. DOI: 10.1021/es702969f.

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.

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.

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.

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

By 2100, Flagstaff communities are likely to face:

MEDIUM VULNERABILITY

More periods of poor air quality due to larger and more frequent wildfires.

MEDIUM VULNERABILITY

More extreme heat days (>90°F) could increase risk of heat-related illness.

LOW VULNERABILITY

Increased exposure to allergens is possible as spring grows warmer and more dry weather increases dust.

MEDIUM-LOW VULNERABILITY

More frequent extreme events could increase risk of mental health issues.

MEDIUM-LOW VULNERABILITY

Increased exposure to valley fever and West Nile virus is possible as the warm season lengthens. Existing response resources may be adequate.

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

CORRESPONDING STRATEGIES
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.

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

CORRESPONDING STRATEGY
Strategy 4. Improve the resiliency of public infrastructure.

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	*Target to be established after neighborhood-level climate risks are assessed*

CORRESPONDING STRATEGIES
Strategy 1. Identify and target support for at-risk populations.
Strategy 5. Prepare for changing risks to public health due to climate change.

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.
PH-3-D	Support the development of neighborhood resiliency groups.
PH-3-E	Provide information on what residents can do to reduce their carbon footprints and how their households can be more resilient.

Other Actions

PH-3-F	Increase information available to community members regarding increased risk of health impacts due to climate change.

PUBLIC HEALTH TENSIONS

Climate change affects different groups in different ways. In some cases, climate change threatens cultures, communities, and social fabric. The indigenous communities of the Southwest face particularly high vulnerabilities, according to the National Climate Assessment.[1]

A May 2018 Public Radio International report covered the story of sheep herder Lorraine Herder, a woman living on Black Mesa, a remote area of the Navajo reservation in Northern Arizona, northeast of Flagstaff.[2] Lorraine is part of a livestock-raising tradition that is under threat from climate change.

"My mom was a sheep herder all her life, so I've been with the sheep ever since I was a little girl, and it means a lot to me," Herder says. "I wanted to live that life, you know, living off the land." However, rising temperatures and shrinking water sources on the Navajo reservation are a major threat to these important Navajo cultural traditions. "The drought makes it difficult for us," Herder says, and adds, "The biggest challenge is finding water for our livestock right now. We're the last few shepherds out here."

Scientists studying the impact of global warming on the Navajo Nation are noticing major changes in the environment. "The amount of surface water flowing in streams on the Navajo Nation has declined by about 98 percent over the 20th century," says Dr. Margaret Redsteer, a scientist at the US Geological Survey in Flagstaff, Arizona. The effects of climate change have taken a major toll on families who have lived on their ancestral Navajo land for generations. Many residents already live without running water, making the situation even more difficult.

This story highlights how those populations with the fewest greenhouse gas emissions—and that thus contribute the least to climate change—are often the most affected. This inequity is true both internationally and within communities. Poorer nations are more vulnerable to climate change impacts, especially shifts in agriculture that threaten food supply and access.[3,4] Low-income households, which have lower carbon footprints, will likely struggle more to adapt to change.[5,6] In addition, low-income communities are often located in areas with greater exposure to climate change threats (e.g., natural hazards like flooding), placing those communities at increased risks with limited resources.[6] While many such communities have practiced sustainability for generations, climate change threatens their tradition and culture. This persistent imbalance compels Flagstaff to consider equity and vulnerabilities when considering climate change and taking action.

1 "Indigenous Peoples." National Climate Assessment. https://nca2014.globalchange.gov/highlights/report-findings/indigenous-peoples. 2 "Navajo women struggle to preserve traditions as climate change intensifies." PRI. https://www.pri.org/stories/2018-05-25/navajo-women-struggle-preserve-traditions-climate-change-intensifies. 3 "The distributional impact of climate change on rich and poor countries." Mendelsohn, et al. https://doi.org/10.1017/S1355770X05002755. 4 The World Bank. "Shock Waves: Managing the Impacts of Climate Change on Poverty." https://doi.org/10.1596/978-1-4648-0673-5. 5 "Income inequality and carbon consumption: evidence from environmental Engel curves." The London School of Economics and Political Science. http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2017/11/Working-Paper-285-Sager.pdf. 6 The World Bank. "Shock Waves: Managing the Impacts of Climate Change on Poverty." https://doi.org/10.1596/978-1-4648-0673-5

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.
PH-5-B	Initiate a working group on public health and climate change, including participation from the Coconino County Public Health Services District (CCPHSD), the City of Flagstaff, and NAU, among others.

Other Actions

PH-5-C	Increase collaboration to evaluate the interaction between the built environment and disease vectors like mosquitos.
PH-5-D	Study how the changing ecosystem around Flagstaff contributes to increased risk of disasters.
PH-5-E	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

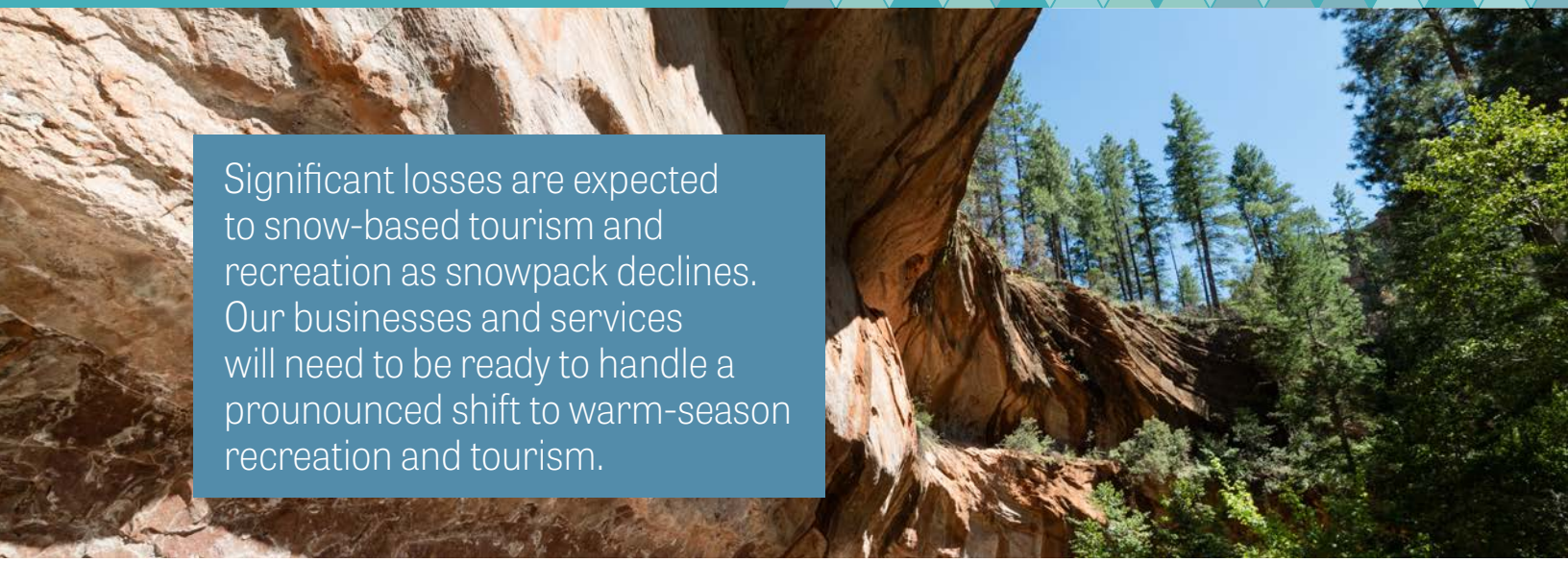
Economic Prosperity and Recreation refers to community and economic health, including opportunities to reduce emissions and help the community's business, tourism, and recreational sectors prepare for climate change.

BACKGROUND INFORMATION

While climate change will impact all sectors of the local economy, by preparing for change, the Flagstaff community can adapt to changing conditions while creating a stronger community and greater shared prosperity. Businesses can help lead the way in this transition through creativity, innovation, and resiliency.

Changing conditions will affect recreation for both residents and visitors alike. To prepare for low-snow years, Flagstaff will need to continue to diversify its tourism activities and businesses. Conversely, rising temperatures in Central Arizona can lead to increased visitation to Northern Arizona in the summer months. In the late spring and early summer, drought and an increased risk of wildfire can lead to forest closures and reduced access to the local forests, which residents and visitors depend on for recreation, spiritual connection, mental health, and physical fitness. Preparing for these changes can help the City to foster a vibrant economy, foster community health, and benefit from visitation.

Visitation and recreation 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.



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 prounounced shift to warm-season recreation and tourism.

Tourism and Recreation
Vulnerability to Climate Change

By 2100, Flagstaff communities are likely to face:

MEDIUM-HIGH VULNERABILITY

Significant snowpack loss may reduce winter recreation and tourism.

MEDIUM-LOW VULNERABILITY

More wildfire, drought, or extreme heat may temporarily reduce recreation and tourism in summer, spring, and fall.

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	TARGET
Identification of threats to current industries from climate change and opportunities for new industries	Conduct a study by 2020

CORRESPONDING STRATEGY
Strategy 1. Accelerate the transformation to a low-carbon economy that minimizes emissions and can effectively adapt as the climate changes.

Goal

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

KEY PERFORMANCE INDICATOR	TARGET
Identification of methods for ecosystem monitoring to assess impacts of recreation and climate change	Initiation of study by 2021

CORRESPONDING STRATEGY

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

Goal

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

KEY PERFORMANCE INDICATOR	TARGET
Emissions from water and energy use at City parks and recreation facilities, per acre or per square foot	Maintain 2017 levels by 2030

CORRESPONDING STRATEGY

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

A CIRCULAR ECONOMY

A circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails decoupling economic activity from the consumption of finite resources, and is based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

A circular economy framework can be used to build economic, natural and social capital and resilience and a low-carbon economy.[1]

1 www.ellenmacarthurfoundation.org/circular-economy/concept

STRATEGIES AND ACTIONS

STRATEGY 1. Accelerate the transformation to a low-carbon economy that minimizes 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. Climate considerations should be integrated into core economic decision processes, through systematic change to policy and assessment tools, performance indicators, risk models, and reporting requirements.

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.
EPR-1-H	Focus business development efforts on businesses that have lower impacts on natural resources.

Other Actions

EPR-1-I	Promote circular economy principles through education campaigns and roundtables with business leaders focused on the opportunities that a circular economy provides.
EPR-1-J	Ensure companies that are considering locating here are well-informed about how well local resources are matched to their demands.
EPR-1-K	Continue to support diversification of the tourism sector to accommodate year-round travel and activities.
EPR-1-L	Encourage visitor-focused businesses to implement programs that reduce resource consumption.

ECONOMIC PROSPERITY AND RECREATION TENSIONS

In 2017, Flagstaff was the 14th most-visited city in the United States with nearly 5 million visitors. These visitors contributed $500 million to the local economy and supported an estimated 8,000 jobs.[1] By 2050, visitation to Flagstaff and northern Arizona is projected to reach 9.5 million people annually.[2] Nearby outdoor recreation facilities such as national monuments, forests and parks, Arizona Snowbowl, and Lowell Observatory drive Flagstaff's tourism economy.

The impacts of climate change threaten the Flagstaff area's surrounding natural resources. Projections of decreased snowpack will impact winter recreation and tourism, while increases in summer temperatures, drier conditions, and wildfire risk to ponderosa pine forests could alter visitation during spring, summer, and fall. As cities in central Arizona experience increasingly extreme summer temperatures, more individuals may visit Flagstaff to seek refuge from the summer heat.

Flagstaff's economic dependency on at-risk natural resources and tourism creates a point of contention as our community seeks to become more sustainable. As visitation increases, so will the need to maintain and enhance infrastructure. For example, higher visitor demand and vehicle travel in our national forests may require more frequent road maintenance and increase greenhouse gas emissions. Increased tourism during hotter months may increase stress on water resources.[3] Invaluable cultural resources are at risk of vandalism as visitation surges.[4] Finally, with more individuals visiting Flagstaff and purchasing seasonal homes, affordable housing demands will increase pressure on low-income communities.

Despite these vulnerabilities, visitation is an important driver of the Flagstaff economy and contributes significantly to quality of life in Flagstaff. As this Plan is implemented, careful consideration will need to be made when addressing goals of decreasing greenhouse gas emissions, maintaining a rich economy, balancing visitation with natural resource conservation, and taking equitable climate action.

1 "Fiscal Year 2017 Annual Report and Fiscal Year 2018 Marketing Plan" Flagstaff Convention & Visitors Bureau. 2018. https://en.calameo.com/read/0050207463ae8c6e9e959 .
2 "Flagstaff Regional Plan 2030: 2016 annual Report" City of Flagstaff. 2017. https://www.flagstaff.az.gov/2936/Flagstaff-Regional-Plan-2030. 3 R. H. Bark, "Assessment of climate change on local economies." Sonoran Institute and Lincoln Institute of Land Policy. 2009. https://www.lincolninst.edu/sites/default/files/pubfiles/bark-wp09rb2-full_0.pdf . 4 "Flagstaff Open Space 2018 Annual Year in Review." City of Flagstaff Sustainability Program. 2018.

Related Action

TLU-3-H	Introduce local incentives to accelerate the adoption of electric vehicles, such as modest mid-stream incentives for car dealers to sell electric vehicles, a sales tax rebate, bulk purchasing, and incentives for visitors to rent efficient vehicles.

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	Enhance 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 legally designated open spaces.

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 Legally Designated 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.

Job opportunities associated with adaptation to climate change.

Climate Risk	Action / Job	Job Type
Forest Fire	Thinning / burning	Forestry
Flooding	Drainage stabilization	Hydrologists, earth-movers, etc.
	Strengthen riparian corridors	Ecologists, foresters, etc.
Drought	Retrofit with efficient/smart plumbing and water catchment / reuse systems	Plumbers, construction workers
Increased temperatures	Retrofit buildings for passive solar	Construction workers
	Tree planting to increase shade	Landscapers, arborists, parks management
GHG Concentrations	Install renewable energy systems	Electricians
	Energy audits and retrofits	Energy auditors, contractors
	Land restoration	Ecologists, biologists, geologists
Community destabilization	Neighborhood association, business, non-profit and community coordination	Community organizing

Source: "Forest and Water Climate Adaptation: A Plan for the Santa Fe Watershed." http://www.santafewatershed.org/sfwa/wp-content/uploads/2014/02/Santa-Fe-Watershed-Forest-Water-Climate-Adaptation-Plan-Final2.pdf

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

Cost	**Very Low:** Less than $50,000 **Low:** $50,000 to $1,000,000 **Medium:** $1,000,000 to $7,000,000 **High:** More than $7,000,000
Timeframe	**Shorter-term actions** (2019-2025) may be: ▲ Relatively easy and quick to implement ▲ Precursors for other additional actions **Longer-term actions** (2026 to 2030) may be: ▲ More difficult or time-intensive to implement ▲ Contingent upon new funding sources, preliminary research, or coordination with partner entities ▲ Less important to get started early (e.g., lower priority/ranking action) ▲ A logical follow-on to a shorter-term action
Lever	**Policy:** a new requirement or formal adoption of a plan **Infrastructure:** development or changes to physical structures (e.g., bike lanes, solar panels) **Information/Education:** development of informational materials, education and outreach programs, community engagement **Management:** changes in day-to-day management practices

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
IMPLEMENTATION STRATEGY									
STRATEGY 1. Reinforce organizational commitments to climate action.									
IM-1-A	Join the Global Covenant of Mayors.	Both	Low		Sustainability Section	City		Ongoing	Policy
IM-1-B	Update the City of Flagstaff greenhouse gas emissions goals to match the goals of this Plan.	Mitigation	Low		Sustainability Section	City		Long Term	Management
IM-1-C	Develop a climate mitigation and adaptation decision matrix to be integrated into City plan creation and updates, including the regional plan, zoning code, and engineering standards.	Both	Low		Sustainability Section	City		Long Term	Policy
IM-1-D	Establish financing systems that facilitate investments, emergency funds and cash-flow availability to develop climate adaptation initiatives.	Both	Medium		Sustainability Section, Budget Team	City		Long Term	Management
STRATEGY 2. Establish a foundation for successful Plan implementation.									
IM-2-A	Refine targets for all goals in the first six months of implementation.	Both	Low		Sustainability Section	City		3 Months	Policy
IM-2-B	Create detailed blueprints for the implementation of each Plan strategy, in the first six months of implementation.	Both	Low		Sustainability Section	City		6 Months	Policy
IM-2-C	Host a community conversation on the Global Warming of 1.5° C special report by the Intergovernmental Panel on Climate Change, to identify if City goals should be refined.	Mitigation	Low		Sustainability Section	City and community		Short Term	Education
IM-2-D	Identify how city codes complement this Plan and identify areas that may need minor and major modifications.	Both	Low		Sustainability Section, Community Development	City		Short Term	Management
STRATEGY 3. Include climate action in Council priorities.									
IM-3-A	Identify goals for the upcoming City Council term that will support Plan implementation.	Both	Low		City Council	City		Short Term	Management

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
IM-3-B	Identify City Council budgetary priorities to support Plan implementation.	Both	Low		City Council	City		Long Term	Policy
IM-3-C	Identify state and federal legislative priorities that support the goals of the Plan and enable implementation of Plan strategies and actions.	Both	Low		City Council	City	State of Arizona	Long Term	Policy

STRATEGY 4. Utilize the Sustainability Commission to oversee and promote the Plan.

IM-4-A	Review the Climate Action and Adaptation Plan progress report annually to assess the effectiveness of Plan implementation.	Both	Low		Sustainability Commission	City		Ongoing	Management
IM-4-B	As part of the annual budget process, make recommendations to the City Manager's Office for areas to prioritize in the City Manager's proposed budget.	Both	Low		Sustainability Commission	City		Long Term	Management

STRATEGY 5. Prioritize climate action across the organization.

IM-5-A	The City Manager will host the first biannual Climate Roundtable.	Both	Low		City Manager's Office	City		Short Term	Management
IM-5-B	Form a Climate Action Committee to coordinate activities across the municipal organization, consisting of Climate Action Leads from each City division.	Both	Low		City Manager's Office	City		Long Term	Management
IM-5-C	Renew the City's commitment to the actions recommended in the City of Flagstaff Resiliency and Preparedness Study, adopted by City Council in 2012.	Adaptation	Low	Resiliency	City Manager's Office	City		Long Term	Policy

STRATEGY 6. Incorporate climate priorities into the budget process.

IM-6-A	Each division will identify efforts that support resiliency and greenhouse gas mitigation during the annual budget review process, strategic planning and workplan implementation.	Both	Low		City Manager's Office	City		Ongoing	Management

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
IM-6-B	The City Manager's office will ensure that climate action is prioritized and used as a criterion in budget team decision-making.	Both	Low		City Manager's Office	City		Long Term	Management
IM-6-C	The City Manager's proposed budget, presented during the annual budget review process, will incorporate a report on climate mitigation and adaptation projects that are funded in existing workplans or will be incorporated into workplans for the fiscal year.	Both	Low		City Manager's Office	City		Long Term	Policy
IM-6-D	In preparation for the annual budget process, identify Capital Improvement Program projects that will mitigate the City's vulnerability to climate change impacts.	Adaptation	Low		City Manager's Office	City			Management
IM-6-E	To capitalize on existing programmatic infrastructure, take steps to expand existing programs such as residential energy efficiency rebates, Home Energy Efficiency 101 Workshops, Neighborhood Sustainability Grants, and Climate Ambassador programming.	Both	Low		City Manager's Office	City		Ongoing	Policy

STRATEGY 7. Develop a City-wide Climate Plan integration process.

IM-7-A	Continue to track municipal greenhouse gas emissions and publish a greenhouse gas inventory, improving dissemination to City staff.	Mitigation	Low		Sustainability Section	City		Ongoing	Policy
IM-7-B	Update the City of Flagstaff Resiliency and Preparedness Study to recognize evolving scientific understanding of climate change risks and identify how City vulnerabilities have changed.	Adaptation	Low	Resiliency	Sustainability Section	City		Long Term	Policy
IM-7-C	Implement a municipal planning process that focuses on education and capacity building, climate action assessment, and integration into division budgets.	Both	Low		Sustainability Section	City		Long Term	Policy
IM-7-D	Create a data management plan for the organization to integrate climate-related considerations into the work of all divisions.	Both			Sustainability Section, IT				

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
STRATEGY 8. Ensure staff capacity exists to implement the Plan.									
IM-8-A	Evaluate staffing needs to address the priorities identified in the Plan, and provide adequate resources to implement the Plan.	Both	Low		City Manager's Office	City		Short Term	Management
STRATEGY 9. Support community leadership on climate action.									
IM-9-A	Develop Climate Ambassadors and climate leadership training programs.	Both	Low	Resiliency	Sustainability Section	City and community	NAU, CCC, FUSD	Long Term	Management
IM-9-B	Strengthen efforts to support youth climate education and action.	Both	Low	Resiliency	Sustainability Section	City and community	NAU, CCC, FUSD	Long Term	Management
IM-9-C	Create community working groups as needed to tackle challenging implementation topics or undertake work where greater community collaboration is needed.	Both	Low	Resiliency	Sustainability Section	City and community		Short Term	Management
STRATEGY 10. Integrate equity considerations into Plan implementation.									
IM-10-A	Establish a climate and equity working group to build partnerships in the community, identify community needs, determine barriers to participation, recommend ways to make climate action events more accessible to residents, and ensure that Plan implementation follows the nine key equity considerations in the operationalizing equity checklist.	Both	Low	Resiliency	Sustainability Section	City		Short Term	Management
IM-10-B	Conduct a community-wide needs assessment to understand how needs are being met and how climate change affects neighborhoods differently.	Adaptation	Low	Equity	Sustainability Section	City		Long Term	Management
IM-10-C	Incorporate equity indicators into monitoring and evaluation processes.	Both	Low	Equity	Sustainability Section	City		Ongoing	Management
IM-10-D	Create opportunities for youth to be actively involved in decision-making and climate action.	Both	Low	Resiliency	Sustainability Section	City and community	NAU, CCC, FUSD	Short Term	Management
IM-10-E	Engage community members from all income levels, races and ethnicities, political persuasions, and neighborhoods in Plan outreach efforts.	Both	Low	Quality of Life	Sustainability Section	City and community		Short Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
STRATEGY 11. Report regularly to the community on greenhouse gas emissions and climate action.									
IM-11-A	Continue to update and publish greenhouse gas emissions inventories for both the City of Flagstaff municipal organization and the Flagstaff community.	Mitigation	Low		Sustainability Section	City		Ongoing	Policy
IM-11-B	Develop a Climate Action and Adaptation Progress Report to report to the community on an annual basis, including progress on plan actions and key performance indicators.	Both	Low		Sustainability Section	City		Ongoing	Information
IM-11-C	Create an online dashboard to illustrate progress on 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.	Both	Low		Sustainability Section	City and community		Ongoing	Information
IM-11-D	Coordinate with the Community Development Division to ensure key performance indicators from this Plan are aligned with existing metrics used for annual reporting on the Flagstaff Regional Plan.	Both	Low		Sustainability Section	City		Ongoing	Information
IM-11-E	Provide an annual update to the public on Plan implementation, through an annual event held during the Flagstaff Festival of Science.	Both	Low	Resiliency	Sustainability Section	City and community		Ongoing	Information
STRATEGY 12. Create climate action funding proposals through the budget process.									
IM-12-A	Develop a funding proposal that supports the success of Plan implementation, which will be considered by the City Manager's Office and the City Council as part of the annual budget process.	Both	Low		Sustainability Section	City		Ongoing	Policy
STRATEGY 13. Communicate with the public and maintain momentum for implementation.									
IM-13-A	Create a comprehensive framework that identifies diverse outreach methods.	Both	Low	Resiliency	Sustainability Section	City		Ongoing	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
NATURAL ENVIRONMENT									
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
NE-1-C	Integrate leave no trace into City programming, including Open Space, Parks and Recreation and the Flagstaff Fire Department programs.	Adaptation	Low	Environment	Sustainability Section	City	Coconino County	Short Term	
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, non-profit 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	TIME-FRAME	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	TIME-FRAME	LEVER
STRATEGY 5: Proactively manage for expected ecosystem transitions, including the potential threats to ponderosa pine forests.									
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	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
WR-1-C	Increase the efficiency of municipal irrigation systems and practices.	Mitigation	Medium	City Budget	Water Services	City		Ongoing	

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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.	Adaptation	Medium	Resiliency	Water Services	City		Short Term	

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 and protecting recharge zones in perpetuity.	Adaptation	Low	Environment	Water Services	City	NAU	Long Term	Management

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
WR-3-E	Create a repair loan program for City customers to encourage repairs to aging water infrastructure in homes and businesses.	Mitigation	Medium	Economy	Water Services	City	Development community	Medium term	

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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 Section 402 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
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

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
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
E-1-I	Work with partners to develop a specific plan for an aggressive building electrification program to decrease reliance on combustion fuels.	Mitigation	Low		Sustainability Section	City	Development community	Short Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
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 and community	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

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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	Mediu m	Economy	Sustainability Section	City and community	APS	Short Term	Education
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. Advance 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	Mediu m	Equity, Quality of Life	Community Development	City and community	Development community	Long Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
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	The City will support a city-wide, ongoing discussion about density and it's implications, with clear objectives and deliverables, that align specifically with the Climate Plan. Community workshops and discussion forums will discuss trade-offs and opportunities, while continuous educational opportunities will review the cost of free parking and other land use issues.	Both	Low	Resiliency	Community Development and Sustainability Section	City and community	Non-profit organizations	Short Term	Information
TLU-1-H	Request transportation demand management plans for large developments, to support transportation choices and reduce parking needs.	Mitigation	Low	Public Health	Community Development and Sustainability Section	City	Development community	Short Term	

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
TLU-1-I	Incorporate climate action and adaptation criteria into entitlement reviews.	Both	Low		Community Development and Sustainability Section	City	Development community	Short Term	

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
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

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

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
TLU-3-F	Educate City staff on best practices to respond to and support the transition to electric vehicles within the community.	Mitigation	Low	Public Health	Sustainability Section, Fleet Services	City	APS, car dealerships	Short Term	Education
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.	Mitigation	Low	Economy, Public Health	Sustainability Section	City and community	APS, car dealerships	Short Term	Communicati on
TLU-3-H	Introduce local incentives to accelerate the adoption of electric vehicles, such as modest mid-stream incentives for car dealers to sell electric vehicles, a sales tax rebate, bulk purchasing, and incentives for visitors to rent efficient vehicles.	Mitigation	Low	Economy, Public Health	Sustainability Section	City	Car dealerships	Short Term	Policy
TLU-3-I	Encourage car-free living by attracting additional electric vehicle car-sharing businesses to Flagstaff, providing incentives to ensure accessibility to residents in all neighborhoods.	Mitigation	Low	Economy, Public Health	Economic Vitality	City		Short Term	Policy
TLU-3-J	Work with leading figures—such as elected officials, Northern Arizona University leaders, and business leaders—to commit to visibly switching to electric vehicles.	Mitigation	Low	Public Health	Sustainability Section	City	NAU, Coconino County, Business Community	Short Term	Leadership

STRATEGY 4. Encourage efficient driving practices.

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

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
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

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
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,	Short Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
							business community		

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
WC-2-D	Increase resources for existing City food systems programming including community gardens, food policy and food waste prevention.	Both	Low	Public Health	Sustainability Section	City	Waste and consumption organizations, schools	Short Term	Infrastructure and Education
WC-2-E	Establish a robust food recovery program to support community members and protect against disruptions, including working with food rescue organizations and commercial kitchens.	Both	Low	Public Health	Sustainability Section	City and community	Waste and consumption organizations, restaurants	Short Term	Infrastructure and Education

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	Mitigation	High	Resiliency	Solid Waste Section	City		Long Term	Infrastructure

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
	capture, biofuel development, and waste-to-energy technologies.								

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

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

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
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
PH-3-D	Support the development of neighborhood resiliency groups.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County	Short Term	Organizing
PH-3-E	Provide information on what residents can do to reduce their carbon footprint and how their households can be more resilient.	Both	Low	Public Health	Sustainability Section	City and community	Coconino County	Short Term	Information

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
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
PH-5-B	Initiate a working group on public health and climate change, including participation from the Coconino County Public Health Services Department (CCPHSD), the City of Flagstaff, and NAU, among others.	Adaptation	Low	Public Health	Sustainability Section	City and community	Coconino County, NAU, Healthcare providers	Short Term	Policy

ACTION ID	DESCRIPTION	ADAPTATION OR MITIGATION	COST	CO-BENEFITS	LEAD ENTITY	CITY OR COMMUNITY	POTENTIAL PARTNERS	TIME-FRAME	LEVER
ECONOMIC PROSPERITY AND RECREATION									
STRATEGY 1. Accelerate the transformation to a low-carbon economy that minimizes 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	TIME-FRAME	LEVER
EPR-1-H	Focus business development efforts on businesses that have lower impacts on natural resources.	Both	Low		Economic Vitality	City and community		Short Term	Management

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	Enhance 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 Legally Designated 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	Mediu m	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