CITY OF PHOENIX

CLIMATE ACTION PLAN FRAMEWORK FOR PUBLIC INPUT

October 2020

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LETTER FROM MAYOR

Phoenix a leader

Excited to see all department plans come together to contribute to the plan

Purpose of the Framework

To hear from our community, residents and businesses about action they would like to see in our city.

ACKNOWLEDGEMENTS

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Grand Canyon University
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Maricopa County Flood Control
Mr. Bults Inc.
Pueblo Grande Museum
Resource Innovation Campus
Salt River Project
Secretary of State's Office
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers

Special thanks to Joe Gibbs, Retired

Thanks to Joe Gibbs, retired Air Quality Specialist who devoted many years to the City of Phoenix and the ADEQ to initiate programs that make our city better. We want to recognize Joe and thank him for all the work he did to help make this plan a reality.

EXECUTIVE SUMMARY

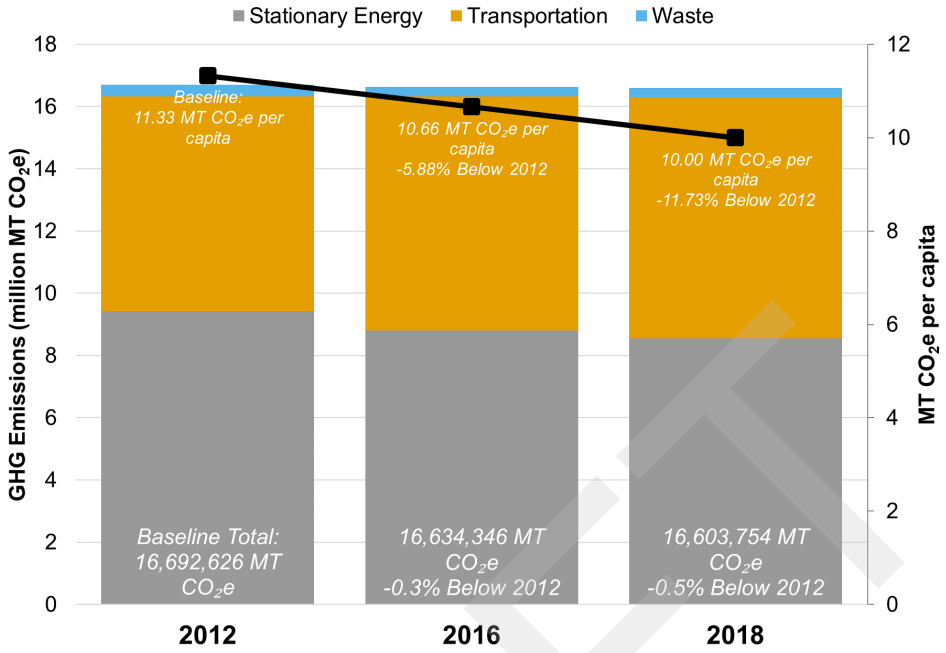
The City of Phoenix (city) has developed this climate action plan framework to seek public and stakeholder input on potential content for its Climate Action Plan. The purpose of the proposed plan is to address the challenges posed by climate change and to help make Phoenix the most sustainable desert city on Earth. Phoenix recently became a member of the C40 Cities Climate Leadership Group, a network of the world's major cities committed to addressing climate change. **As a C40 city, Phoenix is committing to a target of net-zero greenhouse gas (GHG) emissions by 2050 and to conform to the Paris Agreement.** The Paris Agreement is an ambitious effort to keep global average temperature rise below 2 degrees Celsius (C) or 3.6 degrees Fahrenheit (F) above pre-industrial levels, and to limit temperature rise to 1.5 degrees C or 2.7 degrees F.

Additionally, this plan will increase the city's resilience through mitigation and adaptation actions. Mitigation actions are those that reduce GHG emissions, while adaptation actions address the change in climate and adapting to it. This opportunity to develop a plan comes after Phoenix just experienced the hottest summer on record, a drier than normal monsoon season and smoke-filled skies from wildfires within Arizona and all along the West Coast. Events like these are predicted to increase in frequency over the coming decades.

The city has completed community-scale greenhouse gas emissions inventories for 2012, 2016 and 2018 using the Global Protocol for Community-Scale GHG Emission Inventories (GPC). The GPC categorizes GHG emissions into three sectors: Stationary Energy, Transportation and Waste. The Stationary Energy Sector includes GHG emissions that occur from energy used in residential buildings, commercial buildings and facilities, manufacturing industries, agriculture, forestry and fishing energy use, and electricity transmission and distribution energy losses. GHG emissions from the Stationary Sector continue to decrease as the electricity grid increasingly relies on natural gas and renewable sources. The Transportation Sector includes GHG emissions from commercial and civil aviation, on-road transportation, non-road vehicle use, freight and light rail. GHG emissions from this sector continue to increase along with population growth, with the majority of emissions resulting from the use of gasoline-fueled vehicles. The Waste Sector includes GHG emissions from solid waste disposal, the biological treatment of waste (composting), and wastewater treatment. The GHG emissions from waste have decreased over time with the installation of landfill gas capture systems and decreasing emissions from decommissioned landfills.

In 2018, GHG emissions were 16,603,754 metric tons of carbon dioxide equivalents (CO_2e), down 0.5% from the baseline year of 2012. This decrease occurred during a period where the city's population grew 12% and the metro area economy grew 26%. Per capita emissions have decreased from 11.33 MT CO_2e in 2012 to 10.00 MT CO_2e in 2018.

As actions are proposed, they will be evaluated for their effectiveness at reducing GHG emissions. These reductions will be modeled to determine those actions that will accelerate the reduction in emissions in the near future and determine the most effective pathway to net-zero GHG emissions by 2050.



Phoenix GHG emissions by sector.

Emissions reductions will be targeted in the following sectors:

Stationary Energy

Electricity and natural gas provide the energy that lights buildings, cools our homes and businesses, and powers industry. Together, these power sources comprise 52 percent of GHG emissions in Phoenix. Most of the electricity that is used in Phoenix comes from combustion of fossil fuels, like natural gas and coal. Maximizing renewable sources of energy will help reduce these emissions.

Primary Goals:

- Carbon neutral electricity by 2050.
- Net positive new construction by 2050 in terms of both energy use and the embodied energy in building materials.

Transportation

Forty-six percent of GHG emissions in Phoenix are from transportation. These GHG emissions are increasing as the population grows and the city is built out to accommodate this growth. Over one-third of all GHG emissions in Phoenix are from gasoline-fueled vehicles. Developing communities and transportation infrastructure that provide modes of travel other than the single occupancy, fossil-fueled vehicle will decrease GHG emissions.

Primary Goals:

- Launch an electric vehicle public education & awareness campaign and incentive program in partnership with utilities by 2022.

- Carbon-neutral transportation by 2050 through electrification of transportation and the use of carbon neutral fuels, such as hydrogen and biodiesel.
- Achieve 40% mode share of more sustainable modes of transportation such as walking, biking, transit and car-share.

Waste

Most residential and commercial waste ends up in landfills, left to decompose over decades, producing methane—a greenhouse gas 28 times more potent than carbon dioxide. Phoenix residents generate more than one million tons of solid waste each year. Although a small source of GHG emissions for Phoenix, at two percent, work will be done to reduce these emissions by diverting waste from the landfills and capturing the resulting methane gas.

Primary Goals:

- Divert 40% of waste by 2020.
- Incubate new businesses at the Resource Innovation Campus that can accelerate the move to a circular economy.
- Zero Waste by 2050 through waste reduction and diversion of materials from the landfill for use in the circular economy.

Phoenix Resilience

This climate action plan will also include adaptation actions to address events and issues residents experience every day related to air quality, access to healthy foods, heat, and water security.

Primary Goals:

- Increase air quality by promoting activities that reduce emissions of ozone precursors.
- Create a local food system to increase access to affordable, healthy, and local food.
- Complete pilot certification of Phoenix as a HeatReady City by 2022.
- Engage in water conservation and infrastructure projects to ensure water security.

Equity and Engagement

The City strives to improve quality of life for Phoenix residents through the efficient delivery of outstanding public services. In so doing, the city endeavors to be respectful of equity and diversity and be responsive to community needs. The City continually works to engage more, listen more, and be more transparent in delivery of public services.

Primary Goals:

- Increase community input from underserved communities by engaging with residents and organizations that are trusted by underserved communities to seek community input on major policy and budget decisions made by City Council.

Next Steps

Pathway to Net-Zero Modeling

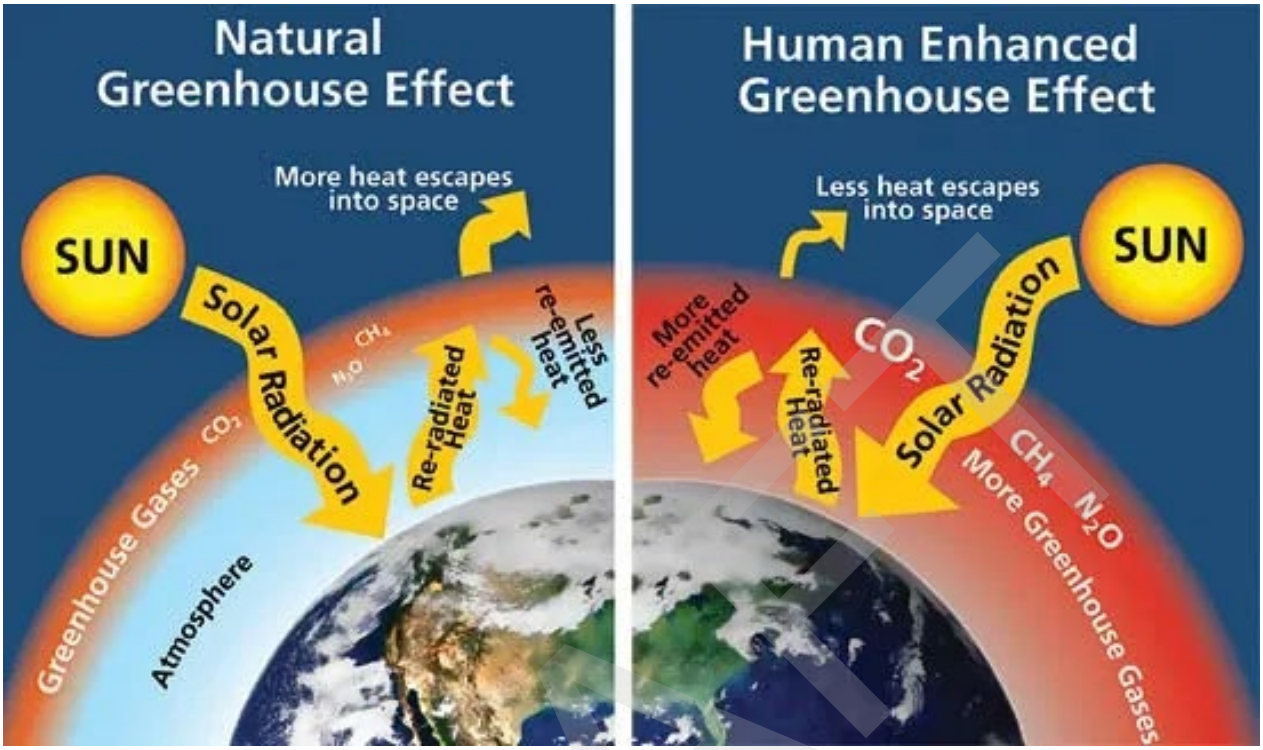
Actions will be evaluated using the C40 Pathways model. The model will assist in determining those measures that will result in GHG emissions reductions. This model will be used to propose different action scenarios that can then be evaluated for cost-effectiveness and provide decision-makers the opportunity to select the actions most suited to reducing GHG emissions in Phoenix.

Primary Goals:

- Determine which actions will accelerate GHG emissions reductions by 2030.
- Determine most effective pathway to reach net-zero GHG emissions by 2050.

2021 Update

The city will continually engage residents and businesses to determine priorities, needs, and opportunities. This will especially be true for 2021. Plans will consider the pandemic and whether in-person, virtual engagements or mix of both will be most appropriate.

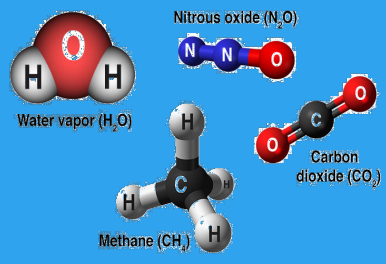


(Source: National Park Service)

Greenhouse Gases

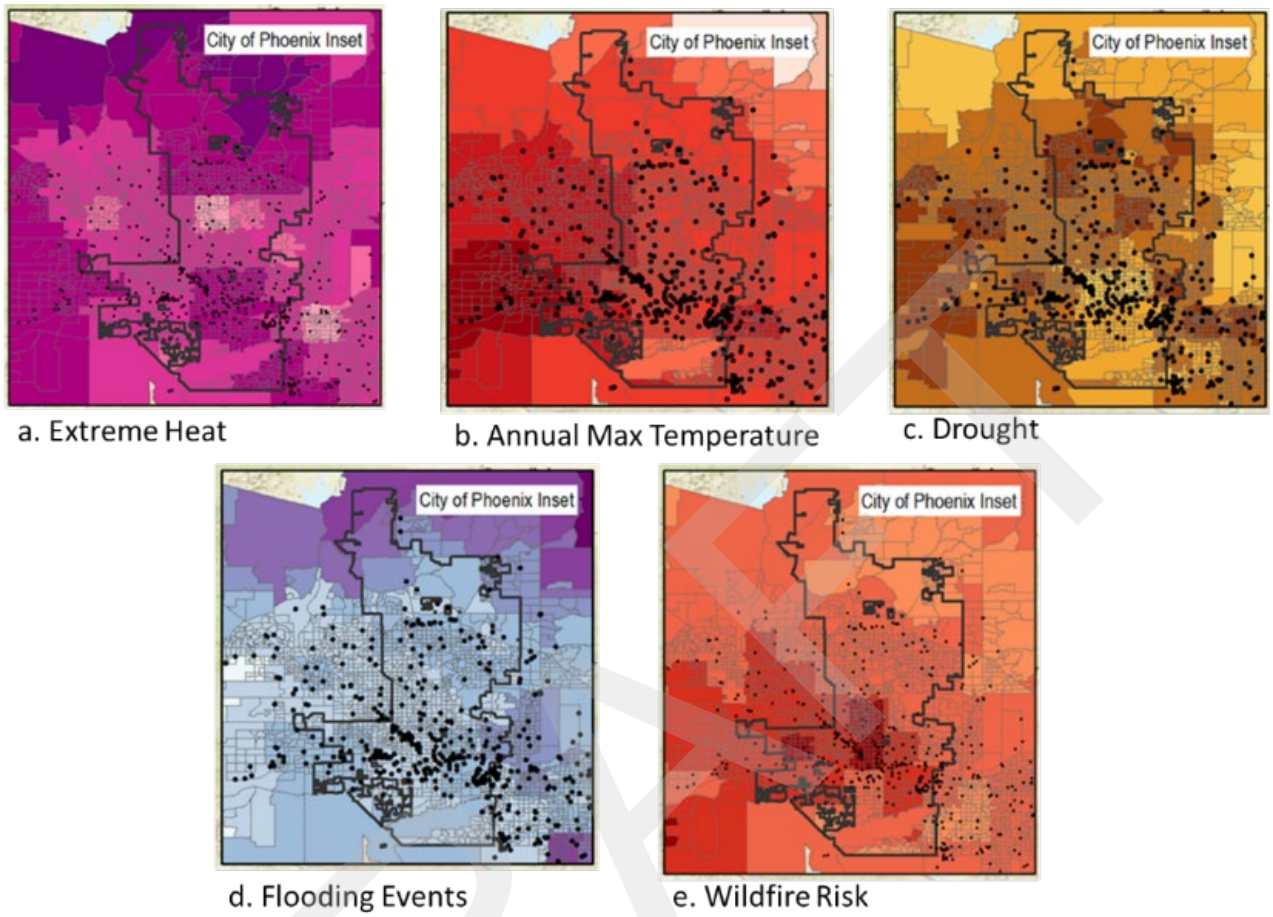
GHG emissions from human activities have increased dramatically over the past century and a half. These emissions, primarily the burning of fossil fuels for electricity, heating, and transportation, are accelerating climate change. Sunlight warms the atmosphere containing GHGs and the surface of the Earth. GHGs absorb the heat and make the Earth suitable to sustain life. With an increase in GHG concentrations from human activities, more heat is absorbed and retained, rather than being released back into space.

GHGs include water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and fluorinated gases.



This changes our climate, affecting infrastructure, public health, and management of natural resources.

Climate Hazard Assessment



Maps of the city of Phoenix showing waste sites and facilities (black dots) and areas of the city that will have an increased risk (darker shaded areas) by inaction (business as usual emissions) in the following areas: a. Extreme Heat, b. Annual Maximum Temperatures, c. Drought, d. Flooding Events, and e. Wildfire Risk.

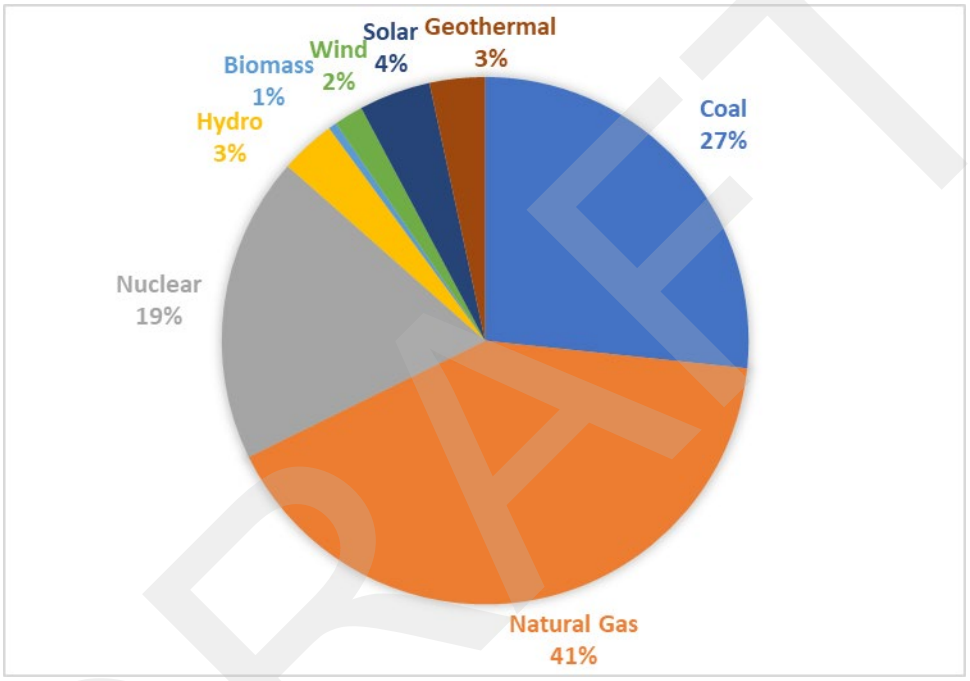
Recent global human-caused emissions of GHGs are the highest in history and their effects on climate are already being observed. Surface-water availability has declined during droughts that have been caused in part by human-caused GHG emissions. Higher temperatures are creating a “hot drought” in the Colorado River Basin and scientists predict that its flows may diminish by as much as 25 percent in the future - a significant problem for Phoenix, other cities, Indian communities, major industries, and agricultural users, all of whom depend on water from the Colorado River.

In addition, Arizona’s average monsoon rainfall is expected to be reduced by 30-40 percent by the end of the century. Exposure to hotter temperatures and longer heat waves has increased heat-associated deaths in Arizona. During high-ozone, pollution-advisory days, mortality risk is increased if concurrent with a heat wave. Extreme heat, drought, heavy-precipitation events, and increased wildfires in Arizona will be significantly exacerbated by climate change. The predicted GHG emissions vary over a wide range and are dependent upon socio-economic development and global climate policy.

The city envisions a continual review, engagement, and revision process for climate action planning, using the best and latest data to guide this process, and continually improving the city's Pathway to Zero. At a minimum, these actions and plan will be reviewed every two years at the same time as the city updates its municipal operations and community-scale GHG-emissions inventories. Depending on the results of the inventories, the GHG emissions reduction pathway model will be revised. Based on the updated model and the continual input from the community and city departments, adjustments will be made to the plan to ensure that the city will achieve its goal of becoming a net-zero GHG-emissions city by 2050.

STATIONARY ENERGY SECTOR (SES) GOALS

According to the 2018 GHG Community Inventory, 51 percent of GHG emissions in Phoenix come from the stationary energy sector. Electricity and natural gas provide the energy that lights buildings, cools our homes and businesses and powers industry. Currently, most of the electricity that is used in Phoenix comes from combustion of fossil fuels, like natural gas and coal. Generation of electricity from these fuel types releases GHGs that contribute to climate change. Maximizing energy efficiency and using renewable sources of energy will reduce the community's emissions.



2018 Resource mix for Phoenix electricity grid. (Source U.S. EPA AZNM WECC Southwest eGRID Subregion.)

2050 GOAL

All buildings will be powered with net-zero GHG sources of energy. All new buildings will be "net-positive" in terms of energy and materials. At the community scale, we will enhance 15 compact centers where the services are provided locally. Residents will be able to live, work and play, all within walking or biking distance.

QUICKSTART ACTION EXAMPLES

Action SES1.5: Install solar panels on carports at 7 affordable housing sites for a total of 872 kW by 2021.

Action SES2.1: Replace 100 percent of high-demand lighting fixtures with LED by 2022 in water and wastewater facilities.

Action SES2.2: Continue to replace 50 HVAC units per year until all units that use R-22 refrigerant are replaced.

Action SES3.1: Continuation of Weatherization Assistance Program to serve 180 homes per year.

SHORT, MID AND LONG-TERM GOALS

Goal SES1: Add 5 MW of new solar projects at city owned buildings by 2025.

Goal SES2: Conduct investment-grade energy audits at city facilities and perform deep-energy retrofits based on those audits to lower total energy use in city-owned and operated buildings 25 percent from 2010 levels by 2025.

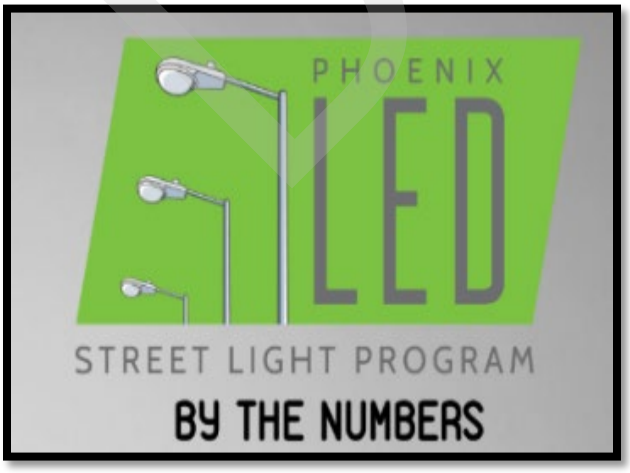
Goal SES3: Increase outreach to community to assist and/or implement energy-efficiency upgrades to existing buildings by developing three new community-wide conservation and renewable-energy programs by 2025.

Goal SES4: Promote development of community-energy projects, including microgrids, that improve the sustainability and resilience of the surrounding community's electricity grid.

Goal SES5: Design and construct all new buildings to Living Building Challenge, Net Positive Design, or equivalent design standards by 2050.

Goal SES6: Obtain electricity from an electricity grid that is net-zero by 2050.

Key Achievement



LED Streetlight Conversion

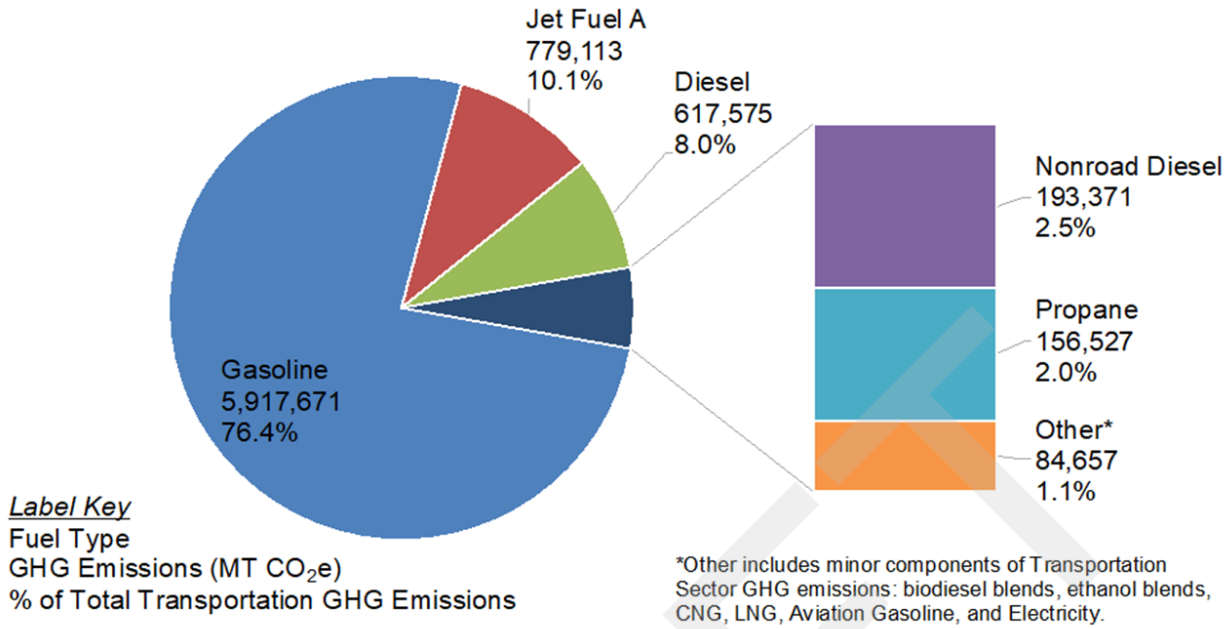
The city replaced all of its about 100,000 existing streetlight fixtures with energy-efficient, light-emitting diode (LED) fixtures. The new fixtures feature a 2,700-kelvin LED, the city's new color standard for streetlights. **By converting approximately 100,000 streetlights to LED, the city estimates it will save approximately $3.5 million in annual energy costs and reduce streetlight electricity use by up to 53 percent**. LED streetlights also offer maintenance savings and come with a 10-year warranty.

TRANSPORTATION SECTOR (TS) GOALS

A well-connected city drives innovation. Cities must provide a transportation system that gets residents to where they want to go without needing to jump into a car alone or to travel long distances to get to their destination. Currently, GHG emissions from transportation are increasing as the population grows and the city is built out to accommodate this growth. **Currently, 36 percent of all GHG emissions in Phoenix are from gasoline-fueled vehicles**. To become a net-zero GHG-emissions city, significant reductions need to be made in this sector through development of communities and transportation infrastructure that allows for modes of travel other than the single occupancy, fossil-fueled vehicle. This can be achieved by designing Complete Streets to accommodate multimodal travel, an increase in consumption of non-conventional fuels or alternative fuels and eventual transition to vehicles powered by electricity or other carbon-free fuel. In addition, efforts must be made to limit trips when possible, without affecting economic growth. By pursuing these goals, Phoenix can reduce its GHG emissions from transportation by 2050.

2050 GOAL

All forms of transportation will be fueled with net-zero GHG sources of energy. Make walking, cycling, and transit commonly used, enjoyed, and accessible for every Phoenix neighborhood, including our disabled community. This goal will result in 90% of the population living within one-half mile of transit, and projects 40% of the population will choose to commute by walking, biking, transit or car share.



GHG emissions by fuel type from the 2018 GHG emissions inventory.

QUICKSTART ACTION EXAMPLES

Action TS1.4: Complete Key Corridor Master Plan by 2021.

Action TS2.1: Complete transition of the Public Transit fixed route fleet to 100% alternative fuel by 2020.

Action TS3.3: Complete construction of the Phoenix Sky Train® by 2022.

SHORT, MID AND LONG-TERM GOALS

Goal TS1: Design and retrofit streets for all users as outlined in the Complete Streets Policy, a transportation system that will encourage multiple modes of transportation, including active transportation, as part of everyday life for all residents.

Goal TS2: Increase the use of alternative fuels (i.e., fuels other than gasoline and diesel).

Goal TS3: Increase the adoption and rollout of electric vehicles and electric-vehicle charging stations.

Goal TS4: Reduce the number of vehicle trips taken, while maintaining a thriving economy.

Key Achievement

Transportation T2050

Transportation 2050 (T2050) is a 35-year initiative to improve streets and transit service, including bus service and light-rail construction, throughout the city. The approval of Proposition 104 by voters in 2015 resulted in a 0.7 percent sales tax that replaced a 0.4 percent sales tax. This is supplemented with federal and county funds, passenger fares and other sources. Approximately 86 percent of funds are dedicated to public transit and approximately 14 percent to streets. Through T2050, Phoenix's arterial-street maintenance cycle will be cut nearly in half, from 65 years to 33 years. T2050 will provide an estimated $240 million for major street-improvement projects, such as new bridges and new roads, to help connect and complete the city's roadway network. Transit improvements entail tripling the number of light rail miles in Phoenix by adding 42 miles of high-capacity corridors to the Valley's current 20-mile light-rail line. In addition to new light-rail corridors, T2050 will build out the majority of the city's bus service network and introduce new bus rapid-transit corridors.

WASTE AS A RESOURCE (WR) GOALS

2050 Goal

Phoenix will create zero waste through participation in the Circular Economy where recycled materials are repeatedly used in products, instead of using raw materials.

Most residential and commercial waste ends up in landfills, left to decompose over decades, producing methane—a GHG 28 times more potent than carbon dioxide. Phoenix residents discard approximately one million tons of solid waste each year. This waste, along with the waste already in the landfills, produced approximately 304,000 metric tons of CO_2e per in 2018—an amount equivalent to emissions from 65,700 cars.

Technologies, such as methane gas capture systems, are used to decrease the amount of GHG gases released to the atmosphere, but ultimately, limiting the amount of waste that enters the landfills is the best way to reduce or eliminate GHG emissions from waste.

QUICKSTART ACTION EXAMPLES

Action WR1.3: Complete Recycled Asphalt Pavement project by 2025.

Action WR2.2: Complete SR-85 Landfill gas capture project by 2025.

Action WR3.2: Increase number of Green Organic Roll Off Pulls by 5 percent annually.

SHORT, MID AND LONG-TERM GOALS

Goal WR1: Implement programs to increase the reuse and recovery of waste materials and promote social and economic value.

Goal WR2: Reduce GHG emissions resulting from the degradation of waste by increasing landfill gas capture.

Goal WR3: Increase waste-diversion participation by all residents and businesses.

Goal WR4: Transition to green alternatives from environmentally hazardous materials.

Goal WR5: Expand brownfield redevelopment along the Rio Salado in Phoenix.

Key Achievement

Oops or Shine on? Program

“Oops or Shine on?” provide residents feedback on what can and cannot be recycled. In 2019, the Public Works Zero Waste Team interacted with approximately 23,500 community members through outreach programs, including tours of facilities and presentations to schools, businesses, and neighborhoods. City of Phoenix employees participate in a yearly recycling competition to increase awareness about proper recycling.

FINANCIAL GREEN SUSTAINABILITY INITIATIVES

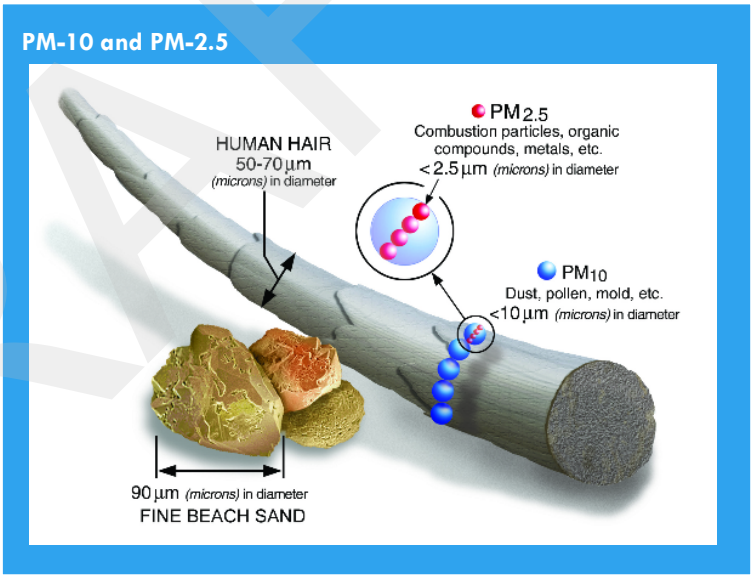
The city of Phoenix manages nearly $2.3 billion to cover its financial responsibilities and invests these funds in compliance with all state and federal regulations as well as the city's investment policy. The current investment policy includes:

- Safeguarding public funds;
- Ensuring liquidity necessary to support city operations and capital programs; and,
- Earning a rate of return.

In accordance with the city's Investment Policy, the city has invested $27.2 million in green bonds fully backed by the United States government. Currently the city of Phoenix does not have any investments in fossil fuel companies. The city is actively monitoring green bond opportunities that meet the criteria stated in the Investment Policy.

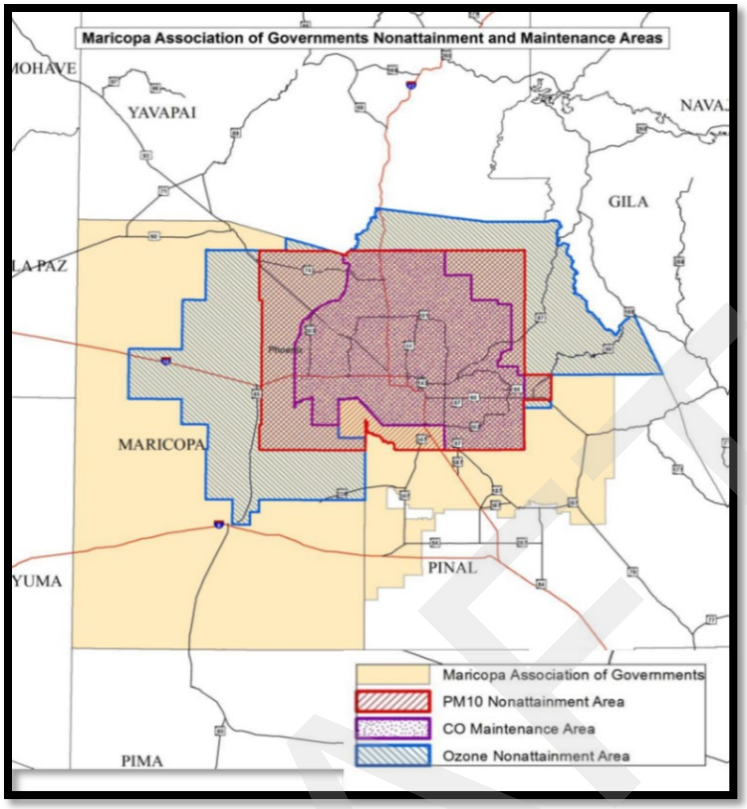
AIR QUALITY (AQ) GOALS

Poor air quality impacts every resident in the city of Phoenix. The federal Clean Air Act (CAA) requires Arizona to create a state implementation plan (SIP) aimed at meeting National Ambient Air Quality Standards (NAAQS) for including carbon monoxide, ozone, particulate matter with a diameter smaller than 10 micrometers (PM-10), particulate matter with a diameter smaller than 2.5 micrometers (PM-2.5), lead, nitrogen dioxide, and sulfur dioxide.



These air quality standards must be met within the Maricopa Attainment Area, which includes the city of Phoenix (see map below). Of course, air is not contained by city limits so actions directed at improving air quality must be considered at a regional level. Phoenix partners with other governmental entities, including Maricopa County Air Quality Department (MCAQD), Arizona Department of Environmental Quality (ADEQ), and Maricopa Association of Governments (MAG) to work toward meeting these standards.

As a C40 City, Phoenix will work toward meeting World Health Organization (WHO) air quality standards for particulate matter, nitrogen dioxide, ozone, and sulfur dioxide. This will be done by including relevant top pollution-reducing actions into the plan, which includes expanding public transit, increasing active transport options, modeling air pollution reduction as a result of actions, and monitoring air quality.



2050 GOAL

Phoenix will achieve a level of air quality that is healthy for humans and the environment. Air quality will meet or exceed U.S. EPA NAAQS and WHO standards, and will achieve a visibility index of good or excellent on 90 percent of days or more.

QUICKSTART ACTION EXAMPLES

Action AQ1.1: Obtain a new DERA grant by 2025.

Action AQ2.1: Ensure city-owned vacant lots remain stabilized.

SHORT, MID AND LONG-TERM GOALS

Goal AQ1: Decrease ozone precursor emissions, including nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs) from municipal vehicles by 10% by 2025.

Goal AQ2: Decrease emissions of dust/particulate matter (PM-10 and PM-2.5).

Key Achievement

City of Phoenix Dust Reduction Task Force

In 2011, the City of Phoenix was experiencing high levels of particulate air pollution. This dust contributed to the infamous "brown cloud," increased risk for individuals with respiratory diseases, and continued high levels would have led to a loss of billions of dollars in Federal funding for streets and highway projects needed throughout the region. To address this class of pollutants, the City Manager established the Dust Reduction Task Force, which consisted of various city departments. The Task Force produced detailed maps of targeted areas, changes to City Code for dust reduction, an enforcement strategy for the Code focused on education, dust awareness, response training for staff, and various multimedia items for outreach. An example of the work being conducted to reduce dust creation is seen in the before and after photographs of the surface stabilization on the shoulders of Broadway Avenue. Many residents use the shoulders of this street and the surface was stabilized to allow continued use by residents and limit the formation of dust. Due to the success of the Task Force, Maricopa Association of Governments has recognized Phoenix as a regional leader and the Task Force as a model for other cities in the region.

Before and after of surface stabilization on the shoulders of Broadway Avenue.

LOCAL FOOD SYSTEM (LFS) GOALS

The food system produces and delivers food from a farm or producer to the consumer. A healthy food system increases Phoenix resident's ability to access healthy, affordable food – food that is fresh, nutritious, and grown without harming its producers or our environment. A healthy food system contributes to economic growth, health, and community by:

- Encouraging consumers to grow their own food and providing opportunities for urban farmers to sell their food locally.
- Supporting all options for furthering access to healthy food including community gardens, urban farms, farmers markets, community supported agriculture, healthy food retailers, and new innovative means.

- Creating a strong community network of successful and culturally appropriate businesses that produce, process, cook, transport, and sell food with the goal of preventing food loss and waste.

The goals and actions identified here are included in the 2025 Phoenix Food Action Plan that was approved by Phoenix City Council in March 2020. Implementation of the actions identified is scheduled for completion no later than December 2025.

2050 GOAL

Maintain a healthy, sustainable, equitable, and thriving local food system.

QUICKSTART ACTION EXAMPLES

Action LFS 2.2: Incorporate agriculture, food processing, and distribution into existing and future economic development plans by 2020.

Action LFS 3.1: Update codes and ordinances where appropriate to eliminate barriers and encourage developing a healthy food infrastructure, including food waste diversion by 2021.

Action LFS 3.3: Complete an inventory of city-owned parcels as opportunities for urban agriculture, focused on food deserts within irrigation districts by mid-2021.

Action LFS 5.2: Convene local food producers with city staff, leaders, and elected officials to build trust and understanding by 2020.

Action LFS 5.4: Complete a GHG Emissions Inventory for the local food system, defined as Maricopa County by 2023.

SHORT, MID AND LONG-TERM GOALS

Goal LFS1: All people living in Phoenix should have enough to eat and have access to affordable, healthy, local, and culturally appropriate food.

Goal LFS2: Businesses that produce, process, distribute, and sell local and healthy food should be recognized as integral to the economy and encouraged to grow and thrive in Phoenix.

Goal LFS3: Growing food in Phoenix and the region should be easy and valued, for personal or business use.

Goal LFS4: Food-related waste should be prevented, reused, or recycled via sustainable food production practices that maintain a healthy environment.

Goal LFS5: Develop food policies and actions that address local and global challenges posed by climate change, urbanization, political and economic crises, population growth and other factors.

Key Achievement

Maricopa County Food System Coalition

The city is a founding member of the Maricopa County Food System Coalition (MarCo) established in 2015. Several organizations focused on improving the local food system gathered to explore the viability of creating a food policy council/coalition for the region. The city's Office of Environmental Programs was eager to learn and listen to stakeholders to better understand the challenges faced in providing access to healthy food for everyone living in Phoenix. Coincidentally, the two groups of stakeholders came together, and the city committed to help create the coalition. The city continues to have a strong relationship with MarCo and has successfully won a grant award to complete a Community Food Assessment for Maricopa County, the first of its kind. The data collected was integral to the city's own Food Action Plan and continues to provide valuable information to educate others on the importance of an equitable, healthy, thriving, and sustainable local food system.

HEAT (H) GOALS

Climate change is leading to increases in average temperatures and increased possibilities of severe prolonged heat waves. Extreme heat can have dangerous and deadly health consequences, including heat stress, illness, and heatstroke.

Phoenix is in the northeastern Sonoran Desert. On average, Phoenix has 110 days each year with a high temperature over 100 degrees F and 19 days with high temperatures exceeding 110 degrees F. July and August of 2020 were the hottest on record, and the summer of 2020 saw 54 days over 100 degrees F, breaking the previous record of 26 days. Unlike many other U.S. cities that only have a small percentage of homes with air conditioning, almost all dwellings in Phoenix have some form of mechanical cooling, making it more prepared overall for heat waves and extreme-heat events than many other cities.

However, heat does not affect all residents equally--outdoor workers, those experiencing homelessness and other vulnerable populations, such as low-income residents living in poorly

insulated homes are more impacted by heat. Successful heat programs and policies must address this disparity and focus on those most vulnerable.

2050 GOAL

Reduce urban heat-island effect through green infrastructure as well as doubling the current tree and shade canopy to 25 percent. Have all residents within a five-minute walk from a park or open space by adding new parks or open space in underserved areas, adding 150 miles of paths, greenways, and bikeways throughout the city, and transforming an additional 150 miles of canals into vibrant public space.

QUICKSTART ACTION EXAMPLES

Action H1.2: Complete walkshed mapping tool pilot by 2020.

Action H2.6: Provide shade at all 4,050 bus stops by 2025.

Action H4.2: Complete street cool seal pilot project by 2025.

Action H5.1: Complete pilot certification as a HeatReady City by 2022.

SHORT, MID AND LONG-TERM GOALS

Goal H1: Create a network of cool corridors in vulnerable communities to facilitate movement from residents' homes to their places of employment, education and play.

Goal H2: Increase shade provided by trees or constructed shade in parks, streets and rights-of-way.

Goal H3: Provide resources and services to residents to manage heat.

Goal H4: Increase the use of high albedo, or reflective, materials in infrastructure projects.

Goal H5: Develop HeatReady certification for cities.

Key Achievement

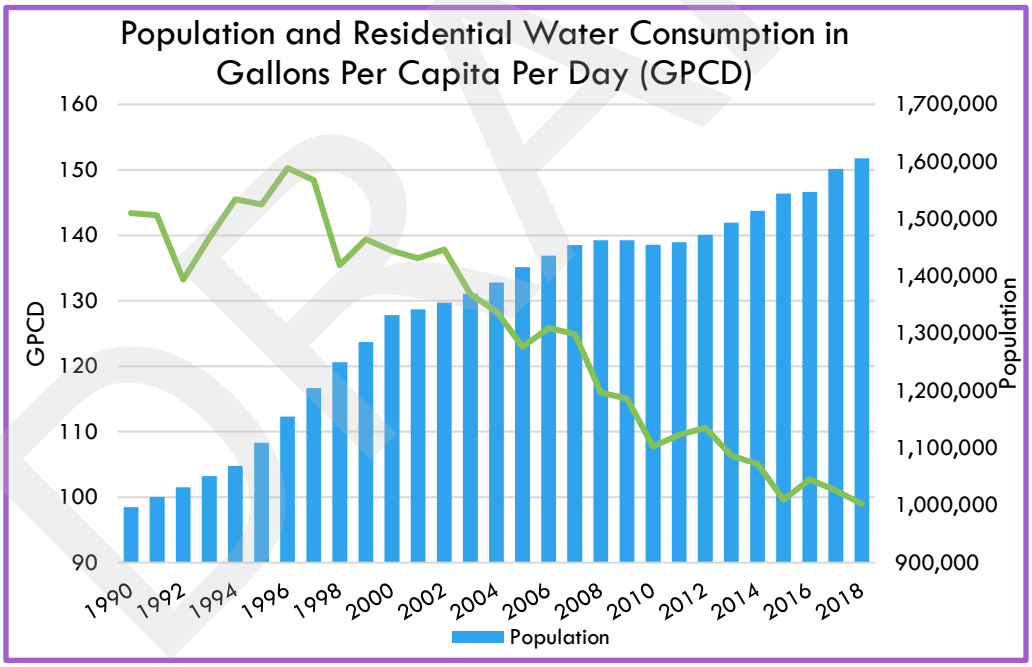
Heat Relief Network

In 2005, after a weeklong heat wave that resulted in about 30 deaths in the homeless population, the Maricopa Association of Governments (MAG) created the Heat Relief Network. The Heat Relief Network is a regional partnership between MAG, local municipalities, nonprofit organizations, the faith-based community, and businesses. Each year, MAG coordinates mapping of the Heat Relief Network, a network of partners providing hydration stations, refuge locations, and water-donation sites throughout Metropolitan Phoenix

with the goal of educating the community about heat dangers and preventing heat-related illnesses and deaths among vulnerable populations.

WATER (W) GOALS

The city's Water Services Department is more than 110 years old and is responsible for treating and distributing tap water to 1.7 million customers daily. Today, it also manages the city's sewer system and handles wastewater treatment operations for 2.5 million residents in five valley cities. Infrastructure includes 7,000 miles of water lines, 5,000 miles of sewer lines, eight treatment plants, 50,000 fire hydrants, and 90,000 manholes. Phoenix's water and sewer rates are among the lowest of comparable-sized cities nationwide. Our tap water supply is secure due to decades of planning and multiple water sources. The city reuses nearly all its wastewater on crops, wetlands, and energy production. Moving forward, the city's water and wastewater utilities are committed to energy efficiency that will pave the way to accomplishing their immediate, mid-term, and future goals in sustainability and emission reductions. We are taking action to increase water security and mitigate GHG emissions by banking water, using wastewater, increasing renewable sources of energy to power the water treatment processes, and capturing GHG emissions from these processes.



2050 GOAL

Provide a clean and reliable 100-year water supply.

QUICKSTART ACTION EXAMPLES

Action W1.2: Complete construction of Drought Pipeline Project by 2025.

Action W5.1: Implement Greater Phoenix Green Infrastructure and Low Impact Development Details for Alternative Stormwater Management handbook by 2025.

SHORT, MID AND LONG-TERM GOALS

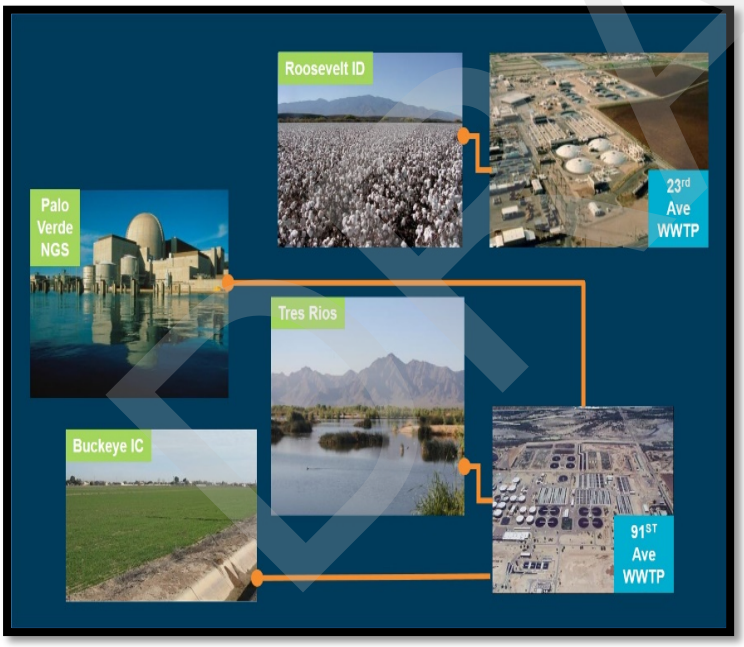
Goal W1: Identify and implement infrastructure projects to ensure water security.

Goal W2: Improve conservation of water resources by improving stormwater management, optimizing water use, conducting water audits, and utilizing wastewater.

Goal W3: Increase outreach and provide programs to residents and businesses to reduce water use.

Goal W4: Reduce GHG emissions from water and wastewater treatment by capturing biogas from treatment processes and increasing renewable sources of energy.

Key Achievement



Sustainability Bond Sale for Colorado River Resiliency Projects

On March 26, 2020, the city of Phoenix issued its first-ever sale of Sustainability Bonds. The bonds will fund Colorado River resiliency-related projects by the Water Services Department. One of these resiliency projects includes building a pipeline supplying North Phoenix residents (approximately 400,000 people) that are served exclusively by Colorado River water treated at two water treatment plants. The proposed 66-inch pipeline will be used to alleviate the effects of drought, by ensuring that water supplies from the Salt and Verde Rivers are available to North Phoenix during future shortage on the Colorado River.

EQUITY AND ENGAGEMENT

The city strives to improve quality of life for Phoenix residents through the efficient delivery of outstanding public services. In so doing, the city endeavors to be respectful of equity and diversity and responsive to community needs. The city continually works to engage more, listen more, and be more transparent in delivery of public services.

Climate change impacts every aspect of the Phoenix community. Every action the city takes has some degree of climate impact associated with it, therefore, every action is a climate action. The city's commitment to include equity principles in its plans and actions plays an integral role in all phases of development and implementation of this climate action plan and requires partnerships and dialogue with Black, Indigenous and people of color (BIPOC) and other groups.

Continuing to engage, listen, and learn is integral to continued improvement of the Climate Action Plan. In consideration of the limitations presented by the Coronavirus pandemic, the city will use appropriate means to present the plan for continued community engagements to further amend and improve the plan throughout 2021.

Plan for Ongoing Community Engagement

Continual and active community engagement is essential to successful climate planning. Community engagement for this climate action planning process will strive to be purposeful, inclusive and respectful of the needs of the community. At times, this engagement may be more intensive than at others and includes engagement conducted for an individual element of the plan, such as Cool Pavements, Walkable Urban Code, or Trees and Shade. Engagement will continue beyond 2020 and will include virtual and in person workshops and meetings; webinars and seminars to provide information virtually; online surveys and a comprehensive online presence.

This community engagement aims ***to inform, engage and be responsive to*** the community. At any given time, the City has numerous projects underway, in planning stages, and in construction and implementation. It is a difficult to keep up with all the activity that occurs daily in a city as large as Phoenix. The city's community engagement can always improve.

Phoenix will, as part of its Climate Planning:

- endeavor to post more to social media about projects,
- advise in timely fashion methods of feedback for specific city activities, and
- promote success stories from the city.

While the city is committed to keeping the community informed, itis also vital ***to listen*** and ***to consult*** with the community. Phoenix is committed to listen, actively, though workshops, meetings, one on one meetings, and surveys.

Identifying Stakeholders

We are all stakeholders in climate action planning. Identifying individuals who can share lived experience, expert knowledge, insight, and connections to the community at large will be an ever-evolving process. Engaging a diverse set of stakeholders offers greater range of innovation and greater potential for achieving these goals. Phoenix will continue to engage those stakeholders in a process that is transparent and equitable.

Pathway to Net-Zero Modeling in Communities

GHG emissions are not produced equally by all residents of Phoenix. To ensure that GHG reductions are equitable across the different communities in Phoenix, emissions inventories will be developed across different communities. These inventories will be combined with proposed GHG emissions reduction community-specific actions and will be evaluated using a model to assist residents in determining the pathway most appropriate for their own communities.

ACRONYM LIST

APS	Arizona Public Service
AR	IPCC Assessment Report (Numbered 2 through 5)
ASU	Arizona State University
AZNM	Arizona and New Mexico eGRID Subregion
B20 BiodieseL	Contains up to 20% biodiesel
BEV	Battery Electric Vehicle
BPEV	Batter Plugin Electric Vehicle
CH_4	Methane
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent Emissions
E54	Fuel containing 54% ethanol
E85	Fuel containing 85% ethanol
eGRID	EPA's Emissions and General Resource Integrated Database
EPA	U.S. Environmental Protection Agency
EV	Electric Vehicle
FERC	Federal Energy Regulatory Commission
FTE	Full-time equivalent
GGE	Gasoline Gallon Equivalent
GHG	Greenhouse Gas
GPC	Global Protocol for Community-Scale GHG Emission Inventories
GWP	Global Warming Potential
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MT	Metric Tons
MWh	Megawatt-hour
NAU	Northern Arizona University
NERC	North American Electric Reliability Corporation
N_2O	Nitrous Oxide
SRP	Salt River Project
TRP	Trip Reduction Program
WECC	Western Electricity Coordinating Council
WWTP	Wastewater Treatment Plant

STATIONARY ENERGY

2018 International Energy Conservation Code adoption – Planning and Development Department

On July 6, 2018, the Phoenix City Council adopted the 2018 International Energy Conservation Code (2018 IECC), which is a model code that establishes minimum design and construction requirements for energy efficiency. 2018 IECC has prescriptive and performance-based provisions for both residential and commercial construction for energy efficiency that are used to address minimum requirements for heating, ventilating and cooling, lighting, water heating, and power usage for appliances and building systems. The program is overseen by the Planning & Development Department. The City is committed to keeping the City building codes current to maximize energy efficiency and water conservation.

23rd Ave WWTP Power Redundancy Study – Water Services Department

During the 23rd Ave WWTP Power Redundancy study, Phoenix partnered with APS to install a microgrid that would serve both the city's power redundancy needs and APS's long-term goals. A microgrid is a local energy grid that can disconnect from the traditional grid and function autonomously without disrupting operations. In times of crisis, this capability is important to the continued operation of water and wastewater treatment plants. During these times, the microgrid can use its own local energy generation from solar energy generation systems, emergency generators or an on-site battery system. Once the crisis is resolved, the microgrid can then be connected to the traditional grid. This is also useful if energy generation in the surrounding community is disrupted and can provide resiliency and stability to the grid. As part of the installation, Tier 2 generators were replaced with more stringently regulated Tier 4 generators which will significantly reduce emissions.

Choice Neighborhoods Energy-Efficient Housing – Housing Department

As part of the Choice Neighborhoods redevelopment of the Edison-Eastlake Community, a community-driven redevelopment effort will include a “LEED for Neighborhood Design (LEED ND) Master Plan and architectural guidelines to create “Enterprise Green Communities” (a green building certification program administered through enterprisecommunity.org) to provide a new mixed-income, energy efficient housing development that will become a showcase of sustainable development. The Aeroterra Community is a HOPE VI redevelopment project that replaced obsolete public housing units with mixed-income energy efficient, Enterprise Green Communities certified buildings with solar panels. In addition, APS Multifamily Solar Program Partnership will see new carports and solar panels be installed at Monroe Gardens, Fillmore Gardens, Marcos de Niza Apartments, Monroe Gardens, Summit Apartments, Sunnyslope Manor and Washington Manor Apartments.

Economic Development Programs – Neighborhood Services Department

Through NSD's Economic Development Programs, NSD offers business assistance and financial incentives to stimulate commercial development. The Management Technical Assistance (MTA) Program offers small business owners the opportunity to work with experienced consultants to enhance their business operations at no cost.

Emergency Housing Rehabilitation Program – Neighborhood Services Department

The Emergency Housing Rehabilitation program, which includes Emergency Home Repair and Remodel, the Hardship Assistance Program, and the HOME Program, has assisted over 425 residential structures, most in dire life-threatening situations, ensuring safe and healthy houses to maintain healthy and safe homes to live in. The Lead Hazard Control and Healthy Homes Program has assisted over 200 eligible residential structures reducing lead hazards to ensure safe areas for children under 6 years of age, grow and develop in healthy and safe households. The Community/Housing Development Section has hit amazing goals with the completion of 126 new build homes under the South Phoenix Village Single-Family Infill Redevelopment Project. These single-family houses have been built with the highest expectation of energy efficiency and sustainability results in mind.

Emerging Technologies Program – Public Works Department

Services are provided to departments to reduce energy consumption and determine project feasibility and cost savings. As part of this initiative, the Emerging Technologies program looks at new and innovative ways to save energy and reduce GHG emissions by evaluating technologies that reduce cooling loads in a facility, lower utility demand, provide more efficient building envelopes, and create an overall cost savings with a positive effect on the environment.

Energy Use Reduction – Aviation Department

The Aviation Department reduced energy use by 17.28 percent between 2009 and 2018 to meet the Better Building Challenge adopted by the City of Phoenix. (Note: PHX Sky Train® is not included, as it was not in service in 2009). ASHRAE Level II Energy Audits completed in 2015 were the basis of the Strategic Energy Management Plan and additional Investment Grade Energy Audits have been done. Plans to update the Aviation Department Design and Construction Services - Design Standards will focus on procuring more energy efficient equipment during new construction. Recent projects include: New HVAC control system with optimization at 44th St. Sky Train Station® Chiller Plant; Variable Frequency Drive Installation for Condenser Pumps at the Rental Car Center. Conversion to LED: North Runway and high-speed turn-offs, Terminal 4 Departure /Arrival street lighting and High-Profile Parking Lot light, at East Economy

Garages A & B, and the Terminal 4 Garage.

Energy Use Reduction – Phoenix Convention Center

Phoenix Convention Center (PCC) staff began evaluating potential areas for energy reduction improvements in 2015. Partnering with APS to capture the benefit of its Rebate Program, PCC has completed seventeen projects of which thirteen were eligible for rebates. Over the past 5 years our electrical staff and contractors have replaced or upgraded lamps and lighting equipment, saving approximately $700,000, reducing usage by 1.84M kWh, and earning rebates totaling $170,000. Based upon the US Energy Information Administration's annual average for residential electricity usage, the PCC reduced its electricity usage equivalent to that of 170 homes. From stairwells, garages, meeting rooms and food court area over 7,725 lightbulbs and lighting fixtures have been installed, all while planning, ordering materials and completing projects around event activity, other priority facility requests, routine and preventative maintenance tasks. Based upon a recently completed energy audit, the Phoenix Convention Center will continue to implement energy reduction materials and systems over the next 2-5 years.

LED Streetlighting and Traffic Signals Conversion – Street Transportation Department

The Street Transportation Department replaced approximately 100,000 existing streetlight fixtures with energy-efficient light-emitting diode (LED) fixtures. Over time the full LED streetlight conversion initiative will reduce streetlight electricity use by up to 53 percent and save approximately $3.5 million in annual energy costs. LED streetlights also offer maintenance savings and come with a ten-year warranty.

The city began testing LED energy efficient streetlights in 2007 throughout various locations. In 2013 the city adopted LED technology as the new standard for all public roadway lighting, then in 2015 began planning a citywide effort to convert all streetlights to LED. After an extensive public input process, in 2016, the City Council revised the City's standard kelvin level for streetlights from 4,000 kelvin to 2,700 kelvin, which is considered a “warmer” color temperature. (A light bulb’s color temperature indicates what the look and feel of the light produced will be. The color temperature of a light bulb is measured in degrees of kelvin on a scale from 1,000 to 10,000.) The new 2,700 kelvin LED lights may appear brighter at the source; however, they do not increase the measurable light levels on the street, compared to those produced by the high-pressure sodium light fixtures that were in place.

Low-Income Weatherization Assistance Program – Neighborhood Services Department

The City of Phoenix Neighborhood Services Department (NSD) focuses on preserving, enhancing and engaging Phoenix neighborhoods and helping residents to access city services and programs, which includes programs to decrease energy consumption and other sustainability goals. This includes implementing weatherization activities, performing housing repair and rehabilitation for qualified low-income applicants, performing lead remediation on eligible structures, building new affordable and efficient residential structures, assisting in keeping neighborhoods safe and desirable by removal of graffiti and blight, and providing resources for those in need. In the past five years, the

Low-Income Weatherization Assistance Program has provided energy efficiency assistance to over 500 residential structures, including single family block/wood framed homes, mobile homes, and multifamily properties.

Neighborhood Commercial Revitalization Programs – Neighborhood Services Department

The Neighborhood Commercial Revitalization (NCR) programs provide grant opportunities to improve the curb appeal of commercial property. APS and SRP both have extensive programs to subsidize energy efficiency improvements for residential, commercial, and industrial customers. The programs are designed to provide financial incentives to customers, to incentivize them to curtail demand especially during the utilities' coincident peak times (mid- and late-summer afternoons and evenings in Phoenix), and to thereby provide benefits to the utility and to other customers. Both utilities include incentives to install energy conserving devices, energy demand management equipment, and demand response programs.

Solar Energy Generation Systems at Phoenix Sky Harbor International Airport – Aviation Department

Placing solar energy generation systems on city-owned facilities, like the Phoenix Sky Harbor International Airport, provide a great opportunity to take advantage of the large amounts of space available. Section 512 of the FAA Modernization and Reform Act (FMRA) encourages Department of Transportation to consider grants for projects that increase the efficiency of airport power sources, including solar energy generation systems. Two examples of large solar energy generation systems on Aviation property are the installations at the Rental Car Center (RCC) and the East Economy Parking Garages. These provide 4.1 MW and 1.29 MW of power, respectively, and were completed in 2011. According to the 2017 Aviation Department Strategic Energy Management Plan, the solar panels at RCC generate about 43 percent of the total RCC energy consumption. In 2019, a 580 KW solar array was installed at the Consolidated Office Building. Possible future solar energy system installations are being considered through a partnership with APS or through solar service agreements (SSA). However, there are limits to the amount of solar energy generation systems that can be placed due to regulations from the Federal Aviation Administration, to minimize glare caused by the panels that can affect airport operations.

Solar Energy Program – Public Transit Department

Placing solar energy generation systems on city-owned facilities, like parking lots, provides a great opportunity to take advantage of the large amounts of space available above the vehicles while also providing shade. There are many of these systems in place around the city, including installations at Burton Barr Library, conferencing facilities, office buildings, parking garage structures, and other facilities. In addition, many of these solar energy generation systems are located at Park-and-Ride facilities. Park-and-Ride facilities are parking lots with public transport connections that allow residents the opportunity to leave their vehicles and head to points of interest by bus, light rail or carpool for the rest of the trip. All new Park-and-Rides built by the Public Transit Department will have solar panels, water conserving fixtures, extensive

landscaping and shade structures (including covered parking). All Public Transit Department Park-and-Rides built after 2003 have solar panels. All park-and-rides have covered vehicle parking. Public Transit owns 8 park-and-rides; 4 of the 8 have solar panels. The City of Phoenix Solar Energy Program has a goal of putting into place an additional 5 MW of behind the meter solar capacity by 2025, which includes parking infrastructure.

Solar Power Facility at the Lake Pleasant WWTP – Water Services Department

The largest solar energy generation installation on any city property is the 7.5 MW solar power facility at the Lake Pleasant WWTP that was completed in 2013 in partnership with SunPower Corp. through an SSA. The installation is on 30 acres and has 22,936 solar panels saving $4.2 in cost savings over the 20-year life of the system. The overall reduction of GHG emissions was primarily due to the on-site solar power generation by Water Services.

TRANSPORTATION

Comprehensive Bicycle Master Plan – Street Transportation Department

Phoenix City Council adopted the Comprehensive Bicycle Master Plan in November 2014. This plan will help develop a comprehensive bicycle network that is fully connected with the Phoenix community and other transportation networks. Bicycle facilities already exist in Phoenix and represent only a small fraction of the nearly 5,000 miles of street network in the city. The Comprehensive Bicycle Master Plan is intended to make Phoenix a part of the regional bicycle network throughout the metropolitan area through coordination with MAG and ADOT. The plan also provides new policies for bicycle facility design, traffic control practices and facilities at destinations, such as parking or shower facilities.

Fleet replacement – Aviation, Police, Public Transit, Public Works Departments

Phoenix Sky Harbor International Airport (PHX) has received two grants from the Federal Aviation Administration to develop electric ground support equipment infrastructure to promote use of electric vehicles on airport.

Public Works is participating in the U.S. Environmental Protection Agency (EPA) national Cleaner Trucks Initiative, a program that aims to establish more stringent emissions standards to reduce nitrogen oxide (NOx) and other pollutants from heavy-duty truck engines. Phoenix has been at the forefront of cleaner air initiatives, demonstrated by Public Works' commitment to replacing its fleet of diesel-engine solid waste trucks with CNG-fueled ones. The Public Works Department was recently awarded $1 million in Diesel Emissions Reduction Act (DERA) grants by EPA to replace some of the department's diesel-fueled trucks. The grant money will be combined with matching funds of $2.1 million from Public Works and its private partner, Mr. Bults Inc., to purchase nine new solid waste collection trucks and one long-haul truck fueled by

compressed natural gas (CNG) to replace old, diesel-fueled vehicles. Public Works has 153 solid waste trucks using CNG fuel; 59 of those use low NOx CNG. The department's long-range plan is to fuel 97.5% of its 250 solid waste trucks with CNG by 2024, as part of department's commitment to sustainability.

Grand Canalscape – Street Transportation

In 2020, the City of Phoenix opened the initial 12 miles of shared use path along the Grand Canal in Central Phoenix from Interstate 17 to the city of Tempe. With limited resources and a growing city that requires alternative mobility improvements for a vital transportation network, the City of Phoenix Street Transportation Department partnered with the Salt River Project (SRP) to create a safe and continuous commuter route for bicycle and pedestrian traffic along the Grand Canal bank from the city of Tempe to Interstate 10.

The overall goal of the Grand Canalscape was two-fold. The primary intent was to develop a continuous low-stress active transportation route for bicycle and pedestrian traffic along the Grand Canal bank. This shared use path provides safe and convenient walking and biking access between neighborhoods, transit corridors, local employment, shopping, education and recreation centers. The route also includes safe crossing facilities at arterial and collector street/trail intersections. The secondary intent of this project is to re-integrate the canals into the surrounding communities by incorporating public art, landscaping in areas of opportunity, and neighborhood access points to the path which provide better visibility, access, and ultimately appreciation of the extensive canal system in the Phoenix area.

These projects will provide a safe route for bicycle and pedestrian traffic away from arterial streets and integrate the canals into the surrounding communities through improved access, public art and landscaping – with the goal of increasing usage and appreciation of one of our unique assets, the canal system in the Phoenix area. The designs, lessons learned, and experience gathered during this project provide a blueprint for further development of the Grand Canal along with other canals in the system such as the Western and Highline canals. The next segments will be under design in late 2020 with implementation by late 2023.

PHX Sky Train® – Aviation Department

Providing a vital transit link to the region, the automated PHX Sky Train® connects travelers between the METRO Light Rail 44th Street and Washington stop and the airport. The PHX Sky Train® people-mover system allows one of the country's busiest airports to alleviate roadway congestion and enhance customer service. The initial 1.9-mile- long PHX Sky Train® segment transports users to Phoenix Sky Harbor's East Economy Lot and Terminals 3 and 4 in less than 5 minutes. This convenient multi-modal connection improves ridership on the METRO Light Rail by both the traveling public and airport employees, further connecting our community with sustainable transportation options. Currently under construction, the final phase of the PHX Sky Train® will add 2.5 miles of guideway and connect to the Rental Car Center, completing the circuit and allowing the airport to retire its CNG bus fleet to the Rental Car Center. Completion of the final segment of the PHX Sky Train® in 2022 and construction of the West Ground

Transportation Center at PHX will reduce an additional 69,000 metric tons CO2e per year.

Reinvent PHX – Planning and Development

Reinvent PHX is a collaborative partnership committed to developing walkable, opportunity-rich communities connected to light rail. Five Transit oriented development (TOD) districts were identified and sustainability, health impact, and economic assessments were produced to create action plans for each district through district steering committees. This process establishes a new, transit-oriented model for urban planning and development along the city's light rail system.

Transportation 2050 – Public Transit Department

Transportation 2050 (T2050) is a 35-year initiative to improve streets and transit service, including bus service and light rail construction, throughout the city. The approval of Proposition 104 by voters in 2015 resulted in a 0.7 percent sales tax that replaced a 0.4 percent sales tax. This is supplemented with federal and county funds, passenger fares and other sources. Approximately 86 percent of funds are dedicated to public transit and approximately 14 percent to streets. Plan elements are decided through public outreach and recommendations from the Citizens Transportation Committee, the Transportation, Infrastructure and Innovation City Council Subcommittee, and ultimately by City Council. Outreach activities occur throughout the year for the planning and development of new bus routes and extensions; high-capacity transit options, such as light rail and bus rapid transit; building and improving roads; creating bike lanes; and installing ADA ramps. The citizen-led committee is composed of transportation experts and community advocates and addresses a wide array of concerns expressed by residents who drive, bike, walk and ride transit service.

Voluntary Airport Low Emissions Program – Aviation Department

More than 100 fuel-driven ground support equipment units - belt loader, bag tugs, aircraft pushbacks - have been retired and replaced with electric units by the airlines at Phoenix Sky Harbor International Airport.

Phoenix Sky Harbor International Airport (PHX) has requested and received two grants from the Federal Aviation Administration under the Voluntary Airport Low Emissions (VALE) program to develop electric ground support equipment charging infrastructure. Forty charging stations have been installed by the Airport and additional infrastructure will be installed in future terminal construction projects. In support of the Airport's grant request, Southwest, Airlines, American Airlines and United Airlines have retired and replaced 100 fuel-powered units with electric models.

Other examples of air quality improvements made by the Aviation Department include the Trip Fee Program, in which drivers of alternate fuel vehicles receive a discount, and Cell Phone Lots where drivers wait for arriving friends and loved ones. Both initiatives reduce airport roadway congestion and air pollution from vehicles circling airport grounds while waiting for passengers.

Aircraft ground policies at PHX, such as the use of “one engine taxi” when aircraft move off the airfield after landing, reduces emissions while aircraft are on the ground. The 2019 conversion from turf to desert landscaping decreased emissions from mowing and gas-powered trimming while saving 5 million gallons of water annually in lawn maintenance.

Walkability – Street Transportation Department, Office of Arts & Culture

Passage is a collaborative, multi-faceted work of public art that completes the series of improvements the Street Transportation team began in 2003 to improve pedestrian comfort and trail connectivity in the South Mountain community. The first project in the series was the 2005 Baseline Road Public Art Project (with Ten Eyck Landscape Architects), which improved the multi-use trail system of the area and added shade enhancements for transit riders along the Baseline corridor. The second was the 2009 Zanjero’s Line - Highline Canal Public Art Project (also with Ten Eyck Landscape Architects), improving four miles of trail and crossings on the historic irrigation lateral along the base of South Mountain. Passage bolsters South Mountain Community Library’s connection to its surroundings by fusing poetry and place with public art. It combines “acoustic” chairs, plaza enhancements, poetry trellises and a new pedestrian crossing of the Western Canal. The library plaza and trellis enhancements were developed in partnership with the South Mountain Community College District and Phoenix Library Department. The final project component is a new bridge across the Western Canal. It was designed to link the library and South Mountain Community College campus with the Arizona Agribusiness and Equine Center commercial complex to the south. The immovable wheels flanking the bridge entrances are a visual play on the history of movable bridges that once spanned the Salt River Valley canals. The bridge was designed by Harries and Heder with percent-for-art funds administered by the Phoenix Office of Arts and Culture Public Art Program. It was built using Federal transportation enhancement moneys administered by the Phoenix Street Transportation Department. Combined with the public art of plaza and walkway, it strengthens pedestrian pleasures and access in a community of increasingly connected trails.

Walkable Urban (WU) Code – Planning and Development

As part of the Reinvent PHX project, a new urban and transit-oriented zoning code, the Walkable Urban (WU) Code, was adopted by City Council on July 1, 2015 (Ordinance G-6047). The Walkable Urban (WU) Code is Chapter 13 of the City of Phoenix Zoning Ordinance. The code regulates development in proximity to light rail stations and is envisioned to replace existing zoning for properties within the Interim Transit-Oriented Zoning Overlay Districts (TOD-1 and 2, Sections 662 & 663 of the Zoning Ordinance).

Zero Emission Vehicle Program – Public Works Department

The City fleet accomplishes this through the Zero Emission Vehicle program. This program also benefits the city by reducing fuel costs associated with the motor pool program.

WASTE

Brownfields Land Recycling Program – Office of Environmental Programs and Community and Economic Development Department

The Phoenix Brownfields Land Recycling Program provides financial and technical assistance for brownfields cleanup and redevelopment city-wide. To date, more than $330 million in private investment has restored more than 320 acres of previously contaminated and has created or maintained approximately 3,000 jobs.

In 2020, the City of Phoenix received a $600,000 Brownfields Assessment Coalition grant for the Rio Reimagined Project with the cities of Avondale, Tempe, and ASU. The target area for the grant is within 1.0 mile of the Salt River (Rio Salado), Agua Fria and Gila Rivers within the cities of Tempe, Phoenix and Avondale, Arizona.

Green Business Leader Program – Public Works Department

The Phoenix Green Business Leader Program, initiated in 2017, recognizes Phoenix businesses that are passionate about sustainability. Once certified as a Green Business, businesses receive many different marketing benefits including a window decal to display in their business, invitation to an annual recognition event, and a plaque recognizing their excellence. Businesses can achieve higher certifications by completing more sustainable actions. Higher certifications also come with more benefits.
The program initially focused on waste diversion-related activities such as recycling or composting. To improve the program and provide additional value to Phoenix businesses, the Public Works Department partnered with the Water Services Department, the Office of Sustainability, and the Office of Environmental Programs in 2019 to expand the GBL program to recognized businesses for efforts around water conservation, energy efficiency and sustainable purchasing, in addition to waste diversion. The expansion also includes a three-tiered certification system of green, gold or platinum level, depending on the number of sustainable actions a business achieves within their business practices.

Number of Certified Green Businesses: 103

- 43 Platinum Certifications
- 16 Gold Certifications
- 44 Green Certifications

The City launched the Diversion Tracking Tool in mid-2018 which measures waste diversion related to Green Businesses. The cumulative tonnage from 14 of the 103 that record their tonnage:

- 5,295 tons recycled
- 12 tons composted
- 54 tons donated

Green Organics Residential Collection Program – Public Works Department

Through the Green Organics Residential Collection program, organic material, like yard trimmings, untreated wood, tree fruit, and cactus, is collected from residential properties. Currently, there are six green organic material collection routes collecting residential organic material each week. This organic material is then transported to the 27th Avenue Compost Facility to be processed.

Make Ready Program – Public Works Department

Make Ready has been actively recycling auto parts for the past four years including body panels, interior components, lighting, engines, transmissions, control units and accessories. For fiscal year 19-20 Make Ready has reused $120,000 worth of parts in the first 11 months and expects to close out the year at over $130,000. Using recycled parts from the City fleet saves the money in parts purchasing and reduces the demand for those parts, which in turn reduces production and decreases landfill waste. Due to the age of the City's fleet, older units can be maintained and provide services to both internal and external customers.

Oops or Shine on? Recycling Program – Public Works Department

The Phoenix Public Works Department implemented a new recycling program that gives residents individualized feedback on what can and cannot be recycled. The city launched a pilot program with 1,200 households in southeast Phoenix with historically high contamination. The city monitors data from each recycling route to determine which neighborhoods have the highest contamination rates. At the beginning of the program, about 72 percent of residents had recycling contamination and received an "Oops" tag. At the end of the program, five weeks later, 73 percent of residents received "Shine on" tags.

Recycling contamination significantly impacts the success of a recycling program and contaminated materials end up in the landfill. Phoenix has an average recycling contamination rate of 30 percent. Unclean food containers, lawn clippings, old clothes, wooden items and greasy pizza boxes cannot be recycled, yet people regularly put these items in their recycling bins. Other non-recyclables, such as plastic bags and wrappings, can cause mechanical malfunctions that slow down the sorting process.

Reclaimed Asphalt Pavement Project – Street Transportation Department

Reusing materials increases the rate of waste diversion and may bring cost savings and reductions in GHG emissions. One of the largest costs of street paving operations is the cost of materials. These costs may be reduced by reusing the asphalt. The Reclaimed Asphalt Pavement (RAP) Project is assessing the cost effectiveness and performance utilizing different proportions of RAP on Phoenix streets as part of traditional paving materials. Phase II was recently completed, which involved performance tests on a road section within the city. An estimated 10 percent reduction in GHG emissions per mile is possible through this program

Reimagine Phoenix – Public Works Department

In 2013, the Phoenix City Council adopted the goal of diverting 40 percent of trash from the landfill by the year 2020. In April 2016, this goal was expanded to Zero Waste by 2050. To achieves these goals, the Public Works department implemented the Reimagine Phoenix Initiative with a focus on new programs, enhanced education and community outreach and public/private partnerships.

One way the City is accomplishing this goal is by developing the Resource Innovation Campus (RIC) on underutilized City property at the 27th Avenue Sold Waste Campus site, located between 27th Avenue and 35th Avenue south of Lower Buckeye and north of the Salt River as a hub for innovators building Phoenix's circular economy and generating economic development. The RIC Master Plan identifies parcels of land that the City may choose to lease out for development in support of the initiative. In 2017, the City opened the Envision-Silver certified compost facility that can process up to 55,000 tons at the RIC. The facility goes hand in hand with the City's Green Organics curbside bin program implemented in 2016 that is designed to divert residential green waste from the landfill.

Two material recovery facilities (MRF), process roughly 169,000 tons of recyclables per year. In FY 2019-20, a $4.5 million investment was made for infrastructure upgrades to one of these MRF's. The upgrades to the North Gateway Transfer Station MRF were completed to improve recovery of materials and to meet new quality specifications required by the recyclables market. For example, the facility receives more cardboard than newspaper than it did 10 years ago. The retrofit has improved the capture rate of recyclables, decreased contamination in outbound bales, and increased production speed. The upgrade has improved the capture rate of recyclables, decreased contamination in outbound bales, and increased production speed. By including new technologies like optical sorters in the upgrade, we are now estimated to capture 70% more plastic bottles, 41% more cardboard, 54% more paper and 52% more aluminum at the North Gateway MRF.

The Reimagine Phoenix Initiative not only educates residents on the importance of waste reduction but demonstrates how trash can be viewed in a different light – as resources that have value. In 2017, the City of Phoenix was honored at the C40 cities Bloomberg Philanthropies Awards ceremonies in the Cities4ZeroWaste category. In addition, in 2018, Reimagine Phoenix was also recognized as a Finalist at The Circulars 2018, an initiative of the World Economic Forum and The Forum of Young Global Leaders, for The Award for Circular Economy Public Sector.

As diversion rates increase, efforts continue to be made to decrease the emissions associated with getting waste to the landfill. Solid Waste trucks pick up and haul waste throughout Phoenix to bring it to one of the two transfer stations. The trash then is loaded onto semi- trucks and continues to its destination at the SR-85 landfill, making that trip over one hundred times per day. Most new garbage trucks, where possible, that are purchased are operating using compressed natural gas (CNG) as fuel. The use of natural gas produces less nitrogen oxides and particulate matter, leading to an increase

in air quality. Out of 250 solid waste trucks, 153 use CNG, with a goal to replace most garbage trucks to CNG by 2030. Through the Environmental Protection Agency Diesel Emissions Reduction Act (DERA), a $1 million grant was provided to Phoenix Public Works and Mr. Bults Inc. to purchase CNG fueled solid waste collection vehicles.

As part of the Reimagine Phoenix Initiative, the Public Works Department partnered with Community and Economic Development Department to implement an economic development approach to engage with entrepreneurs and manufacturers to develop Phoenix's circular economy. Based on the results of a Waste Characterization study, the City issued a Request for Innovators (RFI) in 2015 designed to identify what items in the waste stream may have value to manufacturers and innovators. Based on the results of the RFI, the City issued a series of Requests for Proposals (RFP) to match items in the City's waste and recycling streams to create economic development opportunities and support the use those items as feedstock to develop products. In addition to engaging the private sector, the City and Arizona State University established the Resource Innovation and Solutions Network (RISN) partnership to advance collaboration, research, innovation and application of waste resources to create economic value and drive a sustainable circular economy.

Rio Salado Habitat Restoration Project - Parks and Recreation, Water Service Department, Office of Environmental Programs

The Rio Salado Habitat Restoration Project is 40 years in the making and the first of its kind in the desert southwest. Phoenix Rio Salado is a community-inspired plan to restore part of the once-flowing Salt River from a blighted corridor into an environmental and recreational amenity for the community. Phoenix Rio Salado is a 595-acre area located two one-miles south of downtown Phoenix and north of South Mountain Park near Central Avenue at the Salt River. Thousands of residents and many government agencies were involved with shaping and funding this habitat resource that spans five miles in length from 19th Avenue to 24th Street. The landscape incorporates lush marshy wetlands of which 90% of these types of habitats have been lost in Arizona since the 1900's, native cottonwood and varieties of willows, which are among North America's rarest forest type and Mesquite woodlands or bosques as they are referred to, are the fourth rarest plant community of 104 types identified in the United States other native-desert plants. All plant material was contract grown and required seed collection of within a 1/2 mile of the Salt River to ensure true seed source to restore the environment of Rio Salado.

The Rio Reimagined Project, which is a vision to revitalize the Rio Salado (Salt River), Aqua Fria and Gila Rivers, and the region by transforming over 45 miles of the river stretching from the Salt River Pima Maricopa Indian Community at the eastern most boundary to the City of Buckeye to the west and encompassing more than 78,000 acres.

Transition to Electronic Delivery from Paper-Based – City Clerk Department

The City Clerk Department has focused on eliminating paper-based workflows wherever possible and implemented methods of engaging and servicing customers more efficiently with environmentally friendly service delivery methods. Electronic delivery of information and other tools will be implemented for the upcoming November 2020 Mayor and Council Election. For the candidate nomination petition process, the City Clerk

Department offered candidate packet information online. This is more cost effective and provides candidates and other interested parties access to the most up-to-date information daily. Increased resources are available to our November 2020 Mayor and Council candidates through a partnership with the Secretary of State's Office (SOS). City Clerk Department worked with the SOS to modify the SOS's E-QUAL (electronic candidate nomination petition system) for use by local candidates for the November 2020 election. This system allows candidates to collect the required nomination signatures online minimizing the need for distribution of paper nomination petitions in person.

Additionally, in December 2012, the Department implemented the Campaign Finance e-filing system that allows candidates and Political Action Committees to submit campaign finance reports online. Working with ITS, the City Clerk Department implemented the ability to accept contracts and other documents electronically using Adobe Sign or similar software to obtain electronic signatures. Implementation of this electronic process minimizes the strain on natural resources by decreasing the use of paper, ink printers and other resources thereby minimizing the overall environmental impact and making the document routing process more efficient and economical.

More recently, the City Clerk Department in conjunction with ITS implemented a new eComments and Request to Speak system that allows residents to provide comments and submit requests to speak on Council agenda items electronically, giving them an alternative to in-person participation at Council meetings. This system not only minimizes the environmental impact of the need for physical appearance at City Council Meetings, it also offers an additional opportunity to enhance citizen engagement in public meetings.

The City Clerk Department's commitment to offering electronic services allows the Department to provide services to more customers in an efficient manner while continuing to meet and sustain environmental goals.

AIR QUALITY

Dust Reduction Task Force - Neighborhood Services, Parks and Recreation, Planning and Development, Police, Public Information Office, Public Works, Street Transportation, and Water Services Departments, Office of Environmental Programs

In 2011, the city of Phoenix was experiencing high levels of particulate air pollutants. This dust contributed to the infamous "brown cloud," increased risk for individuals with respiratory diseases, and continued high levels would had led to a loss in billions of dollars of Federal funding for streets and highway projects needed throughout the Valley. To address this class of pollutants, the City Manager established the Dust Reduction Task Force, which consisted of various City Departments, including Neighborhood Services, Office of Environmental Programs, Parks and Recreation, Planning and Development, Police, Public Information Office, Public Works, Street Transportation, and Water Services. Due to the success of the Task Force, Maricopa

Association of Governments has recognized Phoenix as a regional leader and the Task Force as a model for other Valley cities.

An integrated, comprehensive high-risk dust advisory strategy was developed to implement a consistent city-wide response procedure and increase outreach to residents. The Task Force produced detailed maps of targeted areas, changes to City Code for dust reduction, an enforcement strategy for the Code focused on education, dust awareness, response training for staff, and various multimedia items for outreach. An example of the work being conducted to reduce dust creation is seen in the before and after photographs of the surface stabilization on the shoulders of Broadway Avenue. Many residents utilize the shoulders of this street and the surface was stabilized to allow continued use by residents and limit the formation of dust.

The work done by the Task Force was in partnership with various regional entities. ADEQ produces high-risk dust advisories that are used to prepare for dust events and adjust City work schedules. MCAQD assists by providing air quality monitor data that is used to assess the effectiveness of the program.

Trip Reduction Program – Office of Environmental Programs

Arizona does have ozone reducing programs in place that include, partly, a Trip Reduction Program (TRP), lawn garden tool replacement, voluntary vehicle repair, industry control measures, alternative fuel stations, idle reduction program and local fuel blends to decrease vehicle emissions. City employees participate in the Trip Reduction Program with the goal to decrease the number of trips taken, especially trips taken in a single occupancy vehicle. In 2019, 25 million miles of commuting were reduced, preventing 143 tons of pollution, solely by city of Phoenix employees.

Many activities have changed or halted since COVID-19. As a result, the number of trips taken by residents has decreased. Teleworking has allowed some to work from home, when possible. Approximately 3,000 of the 15,000 City of Phoenix employees have been teleworking during the pandemic. Altogether, this results in decreased emissions from passenger vehicles and, more noticeably on a personal level, less traffic.

LOCAL FOOD SYSTEM

2025 Phoenix Food Action Plan – Office of Environmental Programs, Community and Economic Development, Housing, Parks and Recreation, Planning and Development, Public Works, Neighborhood Services, Water Services

Phoenix has made a healthy food system a priority. In March 2020, Phoenix City Council supported this effort, and approved the 2025 Phoenix Food Action Plan (2025 FAP) that outlines short term goals, strategies and actions to achieve access to healthy food for everyone in Phoenix by 2050. As the actions outlined are implemented along with the collection of new data, technology improvements and continued collaboration with stakeholders, OEP expects to develop an updated plan in 2025-2026 that continues

movement toward the 2050 goal. The plan was developed with an interdepartmental team and external stakeholders, including residents most impacted by food insecurity.

Brownfields to Healthfields Initiative – Office of Environmental Programs

Phoenix has recognized there is an opportunity to cleanup and redevelop brownfields that directly impact public health through the reuse of these sites for food and healthcare assets. The Brownfields to Healthfields (B2H) Initiative targets areas with inadequate health care, food deserts, and designated infill incentive, neighborhood initiative, and redevelopment areas. Focusing on these areas within Phoenix addresses sustainable and equitable development, in addition to building upon existing brownfields efforts. To date, 10 properties have been cleaned up and redeveloped as urban farms, community gardens, school gardens, farmer's market, and a food hub. The work was initiated as a result of award of a $400,000 community-wide brownfields assessment grant from the U.S. Environmental Protection Agency in 2015. The impact of this project results in improved community health due to the elimination of exposure to hazardous substances and creation of opportunities for improved access to healthcare and healthy foods, which positively impacts environmental and health equity.

Maricopa County Food System Coalition Partnership – Office of Environmental Programs

The City is a founding member of the Maricopa County Food System Coalition (MarCo) established in 2015. Several organizations focused on improving the local food system gathered to explore the viability of creating a food policy council/coalition for the region. The City's Office of Environmental Programs was eager to learn and listen to stakeholders to better understand the challenges faced in providing access to health food for everyone living in Phoenix. Coincidentally, the two groups of stakeholders came together, and the City committed to help create the coalition. The City continues to have a strong relationship with MarCo and has successfully won a grant award to complete a Community Food Assessment for Maricopa County, the first of its kind. The data collected was integral to the city's own Food Action Plan and continues to provide valuable information to educate others on the importance of an equitable, healthy, thriving, and sustainable local food system.

South Phoenix Food Action Plan – Office of Environmental Programs

The importance of understanding the food system at a neighborhood level, particularly areas that faced high rates of food insecurity was important, which includes the South Phoenix area. Through a grant received the U.S. Environmental Protection Agency (EPA) Local Foods, Local Places program, OEP was able to conduct a two-day workshop in South Phoenix to identify challenges and opportunities for improving the food system in the South Mountain Village Planning Area. Community outreach for this work was focused on engaging residents that were most impacted by food insecurity and hunger, including low income populations and people of color**. A food-focused Community of Practice** made up of women of color was initiated to develop a greater understanding of food challenges and to establish collaborative relationships for making improvements. The results of the Local Foods, Local Places workshop and community engagement was a South Phoenix-specific

Food Action Plan that details recommended actions targeted for the unique and rich history of this geographic area. This place-based plan was included in the city-wide plan and was approved by Phoenix City Council for implementation as well.

Phoenix Food Day & Healthfest - Office of Environmental Programs

Phoenix has hosted the annual Phoenix Food Day & Healthfest event since 2013 to change the way people look at food and to promote healthy eating, to teach residents how to grow food, cooking, nutrition, and the importance of overall well-being. Since 2019, Phoenix has partnered with the Junior of Phoenix to add a Healthfest component to the event, adding health screenings, and fitness activities. The event is hosted for 2-3 years in a community that is experiencing food insecurity and is challenged with access to healthy food in partnership with schools, local business and other institutions. More than 14,000 adults and kids educated and 160 partners engaged.

HEAT

Cool (Energy Star) Roofs – Public Works Department

Roofs are exposed to sunlight during the day and absorb heat. By using a coating on the roofs, the amount of sunlight reflected is increased. Coating the roof reduces the amount of energy needed to cool the building, reducing GHG emissions. Cool (Energy Star) Roofs is the standard for all departments that work with the Public Works Department (PWD) to handle their roof replacement, as well as for those buildings owned by PWD. This type of roof has been implemented for PWD owned buildings since 2005.

Heat Relief Network – Human Services Department, Communications Office, Library Department

In 2005 after a weeklong heat wave that resulted in about 30 deaths in the homeless population the Maricopa Association of Governments (MAG) created the Heath Relief Network. The Heat Relief Network is a regional partnership between MAG, local municipalities, nonprofit organizations, the faith-based community, and businesses. Each year, MAG coordinates the mapping of the Heat Relief Network, a network of partners providing hydration stations, refuge locations, and water donation sites throughout the Valley with the goal of educated about heat dangers, preventing heat-related illnesses and deaths among vulnerable populations (people experiencing homelessness, older and/or disabled adults, homebound persons).

The types of locations the network lists are heat refuge which offers a place to cool down, hydration stations where you can receive bottled water only, donation sites where you can donate water, toiletries, and cash for other site to use, and hydration station and heat refugee locations offering both water and a place to cool down. Heat relief sites in Phoenix include Phoenix libraries, recreation centers, and senior centers. There are also heat relief sites at the Salvation Army - Phoenix Maryvale Corps, Phoenix Citadel Corps, Phoenix Kroc Center, Family Services Center offices.

Right Tree, Right Place training – Parks and Recreation Department

Increasing the tree canopy of the urban forest requires planting more trees. “Right tree right place” is considered for each new tree placement. The right tree should be a drought-tolerant tree that is ideally a native species. The right tree will also emit lower amounts of volatile organic compounds which are precursors to ozone. The right place will be a place where the tree can fully mature without disturbing powerlines, right of ways, or damaging other infrastructure. Recently, in order to increase the success rate of planting, a method was piloted to use tall pots to increase the number of plants that survive.

Summer Safety Campaign – Communications Office, Parks and Recreation, Fire, Human Services, and Public Works Departments

Each summer, the Communications Office promotes Summer Safety via a dedicated website, social media and traditional media coverage. This is a comprehensive program that provides heat- and water-safety information across departments, including Parks and Recreation, Fire, Human Services, Public Works, among others. We also conduct outreach to our most vulnerable communities, such as people experiencing homelessness and home-bound seniors. This involves handing out printed cooling center maps and heat-safety materials directly to those in need during extreme heat events.

During the past six years, the City has increased coordinated outreach and communications related to rising urban temperatures. Electronic communications will likely continue to be the preferred method for sharing information in the future. There is still a need for printed materials. We have communicated to communities across the city related to climate change and extreme heat with materials in Spanish and engagement from the Spanish-language media. Research from Arizona State University and data from Maricopa County Department of Public Health show that low-income areas often have the least amount of tree shade to mitigate the urban heat island effect and reduce CO2 levels. We continue to provide general messaging and provide targeted messages specific to areas. One example is the extreme heat outreach. We utilized heat data and transit data to determine areas with the greatest need for heat relief during extreme weather events.

Take a Hike. Do it Right. - Parks and Recreation Department

More than 200 hikers annually are rescued from City of Phoenix desert and mountain parks and preserves. The City created a simple checklist of general hiking tips, including hiking during the early morning or evening hours; always hydrate before, during and after a hike; monitor the local forecast and understand that all trail difficulty ratings are raised one level when the temperature is 100 degrees or warmer. In 2019 the City of Phoenix Parks and Recreation Board implemented a rule stating dogs are prohibited on City of Phoenix hiking trails when the temperature is 100 degrees or warmer.

Tree and Shade Master Plan – Parks and Recreation, Street Transportation Departments

The Tree and Shade Master Plan is the product of the Tree and Shade Task Force, a multi-department committee led by the Parks and Recreation Department. The Master Plan was adopted by the City Council on January 5, 2010 with a vision to double the average tree and shade canopy by 2030 to 25%. Although many actions were taken related to education and awareness campaigns and development of resources, the number of trees planted in the early years was limited given the context of the great recession. However, after a groundswell of community support, City Council dedicated $450,000 in additional tree funding leading to 4,000 trees now being planted annually on City streets, parks and rights of way.

The Tree and Shade Master Plan implementation is supported by over $5 million in annual funding to City departments as part of a City-wide program that includes the following initiatives:

- **The Urban Forestry Roundtable** established in 2019 by the City of Phoenix, American Forests and Arizona Sustainability Alliance, is represented by over 30 entities including non-profits, community groups, and city and county representatives united under the following vision: "*Over the next five years, we will work collaboratively to improve tree care and planting in Metro Phoenix in ways that will measurably mitigate urban heat island, improve local air quality and prioritize environmental and social justice outcomes through municipal and private investment in trees — particularly in vulnerable neighborhoods currently lacking tree canopy.*"
- The **Urban Forest Implementation Team (UFIT)** is a working group of city staff from all departments to coordinate tree plantings efforts city wide and monitor progress toward the goal to double the tree and shade canopy. Departments include Streets, Parks, Neighborhood Services, Planning & Development, the Office of Sustainability, and the Office of Environmental Programs. The programs represented by them include:
    - **The Citizen Forester Program**—providing training and education to volunteers to help in the planting and care of trees in the community.
    - **Love Your Block**—managed by Neighborhood Services organizes community planting events in neighborhoods and provides mini grants for neighborhood beautification.
    - **The Tree Donation Program,** newly launched in 2020, will work with the residents and businesses to fund specific tree planting projects in the community—particularly streets and parks to create cool corridors in vulnerable communities.
    - **The Tree Zoning Ordinance Update** will enhance the care and protection of trees and add enforcement of the ordinate to ensure trees planted as part of new developments will be maintained and retained in perpetuity.
    - **The Parks Tree planting program** which is seeking to ensure all City parks have a minimum 25% shade canopy. The Parks department seeks partnerships to plant 1500 trees each year in City parks.

- **The Streets Tree Planting Program** has dedicated funding to plant an average of 1000 trees per year in City streets supplemented by additional plantings as part of Major Capital improvements.

The Environmental and Sustainability Commission (EQSC) formed an Urban Heat Island and Tree and Shade Subcommittee (UHITS) in 2018 to develop recommendations for addressing Urban Heat and to make recommendation on the implementation of the Phoenix 2010 Tree and Shade Masterplan. The UHITS subcommittee, comprised of community experts submitted recommendations focused on trees to the EQSC in early 2020. In Fall 2020, the UHITS will reconvene to focus on Urban Heat Island.

New Bus Shade Shelter for Phoenix Transit System – Street Transportation Department

The Phoenix Public Transit Department set out a goal to provide shade at all bus stops in the City – 4,050 bus stops as part of the 35-year transit and street improvement plan-Transportation 2050 (T2050). The issue of bus stop shade is not easily solved in a cost-effective manner. The City's right-of-way and the Americans with Disabilities Act (ADA) regulatory requirements for compliant and accessible bus stops limit options. The issue is the 'quality' of the shade provided across the summer heat. The west-facing bus stops create the biggest challenge. These shade and accessibility challenges made it uncomfortable for transit riders waiting for bus service and could potentially decrease ridership.

The Public Transit Department with Friends of Transit, an Arizona nonprofit public transit advocacy group, offered a contest to Arizona State University (ASU) students to design a bus shelter that prioritized shade and accessibility. Students from the ASU Industrial Design Program collaborated with staff to create a bus shelter that provides shade at any time of day with individual seating, mobility vehicle alcoves and vandal proof materials. The partnership not only aligned with the bus shelter goals in T2050 but also provided students the opportunity to apply their design skills to real-world issues. The ASU-student inspired concept has been designed by a professional engineer. Protypes have been built but none of this design have been manufactured for use.

Green Infrastructure/Low Impact Development – Planning and Development Department, Street Transportation Department, Water Services Department, Office of Environmental Programs

The City of Phoenix recently partnered in the development of a handbook for Green Infrastructure/Low Impact Development (GI/LID) in the Phoenix Metro Area. The effort was led by Arizona State University's Sustainable Cities Network and the City of Scottsdale. Other partners included the Arizona Department of Environmental Quality, the Flood Control District of Maricopa County, and the cities of Apache Junction, Glendale, Goodyear, Mesa, Tempe, Avondale, Gilbert, and Peoria. The result was a handbook providing standard details and specifications for ten GI/LID features that the partners thought would be of most interest in the Phoenix Metro Area. This handbook was an important step for GI/LID in Phoenix and was approved by the City's Development Advisory Board for use by the Planning and Development Department to

streamline approvals for voluntary use by private developers outside of street right-of-way. The Planning and Development Department is currently working on incorporating the handbook into their review and approval processes. The City of Phoenix Street Transportation Department is also currently working to include a subset of the design details in an update to the street design guidelines. A previously completed triple bottom line cost benefit analysis for Phoenix (completed in 2018 and available online here: https://www.phoenix.gov/oep/Stormwater.

WATER

Ameresco, Inc. Partnership – Water Services Department

Biogas that is produced as a result of treatment at the wastewater treatment plants contains methane. As part of the city's pledge to be a sustainable and cost-effective utility, a renewable energy project at 91st Avenue Wastewater Treatment Plant treats, transfers and sells biogas as a renewable green energy commodity. Through the Sub-Regional Operating Group's partnership with Ameresco, SROG is expected to reduce the equivalent of 44,671 metric tons of CO_2e per year. The green benefit from this carbon reduction is roughly equal to taking 70,452 cars off the road for one year.

Cooling Tower System Upgrades – Water Services and Aviation Departments

Water used by cooling towers to remove heat from buildings can account for as much as half of all water use in some commercial buildings in the Southwest, exasperated by the high mineral content of regional water. At Sky Harbor Airport's Terminal 4, the water meter that provides make-up water for the cooling towers is one of Phoenix's highest volume water meters. A pilot project was completed to install a system that softens the make-up water increases the cycles of concentration and reduces water use by 20 percent. Furthermore, using a mixed oxidant generator system eliminates the use of harsh biocide chemicals, needed for these closed loop systems, that are both dangerous and expensive.

Reducing water usage has saved power, which helps diminish the city's overall carbon footprint. Initial estimates inferred that the water savings would be 10,000,000 gallons per year. It has been over two years since the project was concluded, and the results are in with more than 31.500,000 gallons of water and thousands of pounds of water treatment chemicals saved in 2019. The project was so successful that the systems are now a standard central plant design, and similar systems have been installed at the Terminal 3 Central Plant and Rental Car Center Central Plant. The cost savings of these upgrades are achieved by the elimination of purchasing biocide chemicals, reduced water use, and increased system life. A principal factor of this type of system is that it can be scaled up or down in size to accommodate almost any size cooling tower.

Drought Pipeline Project – Water Services Department

The project is building a pipeline supplying North Phoenix residents (approximately 400,000 people) that are served exclusively by Colorado River water treated at two water treatment plants. The proposed 66-inch pipeline will be used to alleviate the effects of drought, by ensuring that water supplies from the Salt and Verde Rivers are

available to north Phoenix during future shortage on the Colorado River. Sustainability bonds are funding the project.

HOA Audit Program – Water Services Department

Homeowners Associations (HOA) use water to maintain common landscaped areas, which can lead to high costs and high water usage to keep the areas looking attractive. Up to 70 percent of water used by residents is for outdoor watering. Phoenix piloted a HOA Audit Program that conducted nine audits of outdoor water use within common areas managed by HOAs. Based on that pilot, the potential average savings for the HOAs that volunteered to participate was 4.5 million gallons per year if they implemented the recommendations from the audit. The program will be expanded from pilot to ongoing program by increasing the number of inspections from nine to 40.

Internal Water Efficiency Task Force – Water Services Department

A city-wide Internal Water Efficiency Task Force was created to monitor water used by municipal operations. Water meter inventories were recorded for city-owned facilities. The efficiency of water using devices for each facility was measured and pipelines were inspected for leaks and repairs were made to any that were identified. An evaluation of the irrigation at all facilities was completed to identify leaks, broken drip or sprinkler heads and unused stations. The department worked with the landscape company to ensure leaks were repaired, replacement of missing/broken drips and sprinkler heads and capping off unused stations. In addition, grass was removed from some facilities to create a xeriscape at appropriate facilities, decreasing the amount of water needed for irrigation. As a result of the task force, water use dropped 46.5 million gallons reducing costs, energy use and GHG emissions in the process.

Sustainability Bond Sale for Colorado River Resiliency Projects - Finance and Water Services Departments, Office of Sustainability

On March 26, 2020, the City of Phoenix issued its first-ever sale of Sustainability Bonds. The bonds will fund Colorado River resiliency related projects by the Water Services Department. This transaction was priced in the wake of one of the greatest economic downturns since the Great Depression and amidst a tumultuous municipal bond market due to the COVID-19 pandemic. However, as noted by Morgan Stanley, the "sustainability designation did assist with the marketing and achieving of strong results for the City's sale." The sale resulted in the sustainability bonds being 4.4 times oversubscribed compared with 4.1 times for the non-sustainability bonds that were priced in the same transaction. Furthermore, over half of the sustainability bond orders were placed by ESG investors or by investors influenced by the sustainability designation. Leaders throughout the financial industry used this sale by the City of Phoenix as an example of the resurgence of the municipal bond market. Given these positive results doing the challenging market, the City intends to continue and grow its Green and Sustainability Bond program.

ATTACHMENT 2 – ACTIONS MATRIX

STATIONARY ENERGY (SE)

QUICK START ACTIONS (Examples)

Action SES1.5: Install solar panels on carports at 7 affordable housing sites for a total of 872 kW by 2021.

Action SES2.1: Replace 100 percent of high-demand lighting fixtures with LED by 2022 in water and wastewater facilities.

Action SES2.2: Continue to replace 50 HVAC units per year until all units that use R-22 refrigerant are replaced.

Action SES3.1: Continuation of Weatherization Assistance Program to serve 180 homes per year.

GOAL SES1	Add 5MW of renewable energy on city-properties by 2025.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
SES1.1	**Continue to install solar energy generation systems on city-owned parking infrastructure.** Place solar energy generation systems on city-owned parking lots to take advantage of the large amounts of space available above the vehicles while also providing shade, including Park-and-Ride facilities. Public Transit owns 8 park-and-rides; 4 of the 8 have solar panels.	Public Works Department, Public Transit Department	Office of Sustainability, Valley Metro, APS, SRP	Ongoing, Long-term
Pending Actions				
SES1.2	**Install solar energy generation systems at landfills.** Landfills are potential candidates for placing large solar energy generation systems. The Skunk Creek landfill, now decommissioned and dormant as an unused brownfield, has been identified as a location for a future City park and/or where a 60-80 MW solar array could be sited. The SR-85 landfill has an existing 10 MW solar field operated by Arizona Public Services (APS) and other portions of the 2650-acre landfill site are amenable to additional solar projects. This effort would provide the benefit at the decommissioned landfill sites that currently have no immediate plans of reuse or revitalization to produce clean energy.	Public Works Department	APS	Ongoing, Long-term
SES1.3	**Install solar energy generation systems at Aviation Department properties, including Phoenix Sky Harbor International Airport.** Solar energy generation systems at Sky Harbor International Airport currently produce 5.97 MW. Possible future solar energy system installations are being considered through a partnership with APS or through solar service agreements (SSA).	Aviation Department	APS	Ongoing, Long-term
SES1.4	**Install solar energy generation systems at water and wastewater treatment plants.** Installation of solar energy generation systems at water and wastewater treatment plants are being considered similar to the Solar Power Facility at the Lake Pleasant WWTP that produces 7.5 MW of solar power facility and was completed in 2013 in partnership with SunPower Corp. through an SSA.	Water Services Department	SunPower Corp.	Ongoing, Long-term
SES1.5	**Install solar energy generation systems on Choice Neighborhoods redevelopment properties and other affordable housing neighborhoods.** Housing developments will include new mixed-income, energy efficient housing development with solar power generation that will become a showcase of sustainable development as part of the Choice Neighborhoods Energy-Efficient Housing and APS Multifamily Solar Program Partnership Programs. This comprehensive redevelopment plan will replace 577 obsolete public housing units with 1,011 mixed income energy-efficient units.	Housing Department		Ongoing, Long-term

GOAL SES2	Conduct investment-grade energy audits at city facilities and perform deep-energy retrofits based on those audits to lower total energy use in city-owned and operated buildings 25 percent from 2010 levels by 2025.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
SES2.1	**Replace lighting in municipal operations with light emitting diodes (LEDs) to reduce electricity consumption.** Replacing incandescent and fluorescent lighting in municipal operations with LEDs results in lower electricity consumption and longer lifetime of the device.	Public Works, Convention Center, Police, Information Technology Services, Water Services and Aviation Departments		Ongoing, Short-term

SES2.2	**Replace heating, ventilation, and air conditioning (HVAC) equipment units to increase energy efficiency and phase out R-22 refrigerant.** The Montreal Protocol requires the U.S. to reduce its consumption of HCFCs by 99.5 percent necessitatiting that equipment utilizing refrigerants be phased out. 300 HVAC units using this R-22 refrigerant have been replaced and 634 units need to be replaced.	Public Works Department		Short-term
SES2.3	**Use Energy Management Plans to identify opportunities to reduce energy use and cost at city-owned facilities.** As part of the facilities maintenance program, an energy management program (EMP) is used that includes ongoing energy audits to identify opportunities to reduce energy use and cost.	All Departments		Ongoing, Short-term

Pending Actions				
SES2.4	**Emerging Technologies Program research on new and innovative ways to save energy for municipal operations.** Investigate new and innovative ways that save energy by evaluating technologies that reduce cooling loads in a facility.	Public Works Department	Office of Sustainability	Short-term
SES2.5	**Participate in Energy Service Contracts that provide energy efficiency improvements in City of Phoenix facilities located downtown.** The Energy Service Contract program is a performance-based energy services contract that allows multiple energy conservation measures to be implemented and paid for over time by the savings achieved from the combination of those measures.	Office of Sustainability	Convention Center, Public Works, Police, Water Services, Aviation Departments	Short-term

GOAL SES3	**Increase outreach to community to assist and/or implement energy-efficiency upgrades to existing buildings by developing three new community-wide conservation and renewable-energy programs by 2025.**			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
SES3.1	**Provide services and products to enhance and promote the provision of safe, efficient, sustainable and affordable residences and neighborhoods.** Focus on preserving, enhancing and engaging Phoenix neighborhoods and helping residents to access city services and programs to decrease energy consumption and other sustainability goals through the Emergency Housing Rehabilitation Program. The Weatherization Assistance Program provides services to 180 units per year; the Lead Hazard Control Program provides services to 55 units per year; the Housing Rehab Program provides services to 275 units per year.	Neighborhood Services Department	APS, SRP	Ongoing, Short-term

Pending Actions				
SES3.2	**Attract sustainable and inclusive businesses by developing entrepreneurship and leadership programs to achieve 2050 goals.** Create, launch and lead a new business attraction strategy designed to recruit both national and international low and post-carbon companies to the City of Phoenix. Develop an inclusive entrepreneurship program that addresses the systemic barriers to wealth generation and small business formation, serves communities most impacted by the effects of climate change and supports and promotes the growth of entrepreneurs and innovators developing business models around climate action.	Community and Economic Development Department	Arizona State University, Arizona State Workforce Board, Maricopa County Community College	Short-term

GOAL SES4	**Promote development of community-energy projects, including microgrids, that improve the sustainability and resilience of the surrounding community's electricity grid.**			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
SES4.1	**Install microgrids in city-owned facilities that serve the City's redundancy needs and utilities long-term energy goals.** During the 23rd Ave WWTP Power Redundancy study, Phoenix partnered with APS to install a microgrid that would serve both the city's power redundancy needs and APS's long-term goals. Additional power redundancy studies will be conducted at different facilities. Microgrids will be installed at those facilities identified to show a benefit to the power redundancy needs at those locations.	Water Services Department	APS	Ongoing, Short-term

GOAL SES5	Design and construct all new buildings to Living Building Challenge, Net Positive Design, or equivalent design standards by 2050.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
SES5.1	**Update zoning and other codes and streamline permitting processes for green/sustainable construction projects to reduce barriers for consumers.** Updating zoning and other planning and development codes to promote green/sustainable construction projects to match internationally recognized sustainability codes. Currently, compliance with the 2012 International Green Construction Code is voluntary. A study of options for ordinances for electric vehicle charging stations and associated infrastructure is being conducted. Future adoption of code amendments that enhance water conservation and energy efficiency code requirements based upon the 2021 I-codes is being considered. Permit processes for solar photovoltaic residential system installations are being streamlined and a remote inspection program for residential construction to reduce inspection trips is being put into place.	Planning and Development Department		Short-term
SES5.2	**Design and construct all City of Phoenix municipal operations facilities to Living Building Challenge, Net Positive Design, or equivalent design standards by 2050.** The Living Building Challenge is an international sustainable building certification program that promotes the most advanced measurement of sustainability in the built environment. On July 6, 2018, the Phoenix City Council adopted the 2018 International Energy Conservation Code (2018 IECC), which is a model code that establishes minimum design and construction requirements for energy efficiency. Phoenix is currently in the plan review stage for construction of the city's first net-zero building in collaboration with the Sonoran Studio.	Planning and Development Department		Long-term
SES5.3	**Develop incentives and standards to foster private sector developments that meet or exceed the Living Building Challenge, Net Positive Design, or equivalent design standards by 2050.** New incentives to foster private sector developments that meet or exceed the Living Building Challenge, Net Positive Design, or equivalent design standards, are necessary to spur innovation, create showcase projects, and build capacity in the industry. Planning and Development will work with industry to accelerate high-performance building in the region.	Planning and Development Department	All Departments	Long-term

GOAL SES6	Obtain electricity from an electricity grid that is net-zero by 2050.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
SES6.1	**Increase renewable and clean energy resources.** APS and SRP are the utilities that serve Phoenix and the surrounding areas. By 2030, APS set a goal to achieve a resource mix that is 65 percent clean energy, with 45 percent coming from renewable energy by 2030. APS has also announced a goal to deliver 100 percent clean, carbon-free electricity by 2050. SRP set a goal to reduce the amount of carbon dioxide emissions emitted per megawatt-hour by 62 percent from 2005 levels by 2035 and by 90 percent by 2050.	APS, SRP	Office of Sustainability	Long-term
SES6.2	**Leverage the City's purchasing power to procure 100 percent renewable electricity for City of Phoenix municipal operations.** Municipal operations are responsible for 3.8 percent of Phoenix's total GHG emissions from electricity use as of the 2018 GHG emissions inventory. To demonstrate leadership, the City had committed to procure 100 percent renewable electricity for municipal operations by 2050. An initial project with SRP will provide 10.7 MW of electricity generated from utility-scale solar farms.	Office of Sustainability	APS, SRP	Long-term

TRANSPORTATION SECTOR (TS)

QUICK START ACTIONS *(Examples)*

Action TS1.5: Complete Key Corridor Master Plan by 2021.

Action TS2.1: Complete transition of the Public Transit fixed route fleet to 100% alternative fuel by 2020.

Action TS3.3: Complete construction of the Phoenix Sky Train® by 2022.

GOAL TS1	**Design and retrofit streets for all users as outlined in the Complete Streets Policy, a transportation system that will encourage multiple modes of transportation, including active transportation, as part of everyday life for all residents.**			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
TS1.1	**Expand bus service network and service hours, and introduce new bus rapid transit corridors as part of T2050.** The bus service network is being expanded to include an additional 75 miles of RAPID routes. Six potential bus rapid transit corridors are being evaluated to identify three potential corridors for the foundation network. Service hours have been increased to match light rail operating hours, with increased frequency on high-demand routes to every 15-minutes.	Public Transit Department	Street Transportation Department	Ongoing, Long-term
TS1.2	**Triple the number of light rail miles in Phoenix by adding 42 miles of high capacity corridors across the city as part of T2050.** Light rail corridors are being constructed to connect the city. 42 miles of light rail will be added to the already existing 20 miles of light rail.	Public Transit Department	Street Transportation Department	Ongoing, Long-term
TS1.3	**Increase bike lane mileage in the City of Phoenix and ensure the bicycle network is connected and comfortable for riders of all ages and abilities.** Bicycling promotes a healthy lifestyle and has significantly lower emissions and requires much less infrastructure than a motor vehicle. Phoenix City Council adopted the Comprehensive Bicycle Master Plan in November 2014. This plan will help develop a comprehensive bicycle network that is fully connected with the Phoenix community and other transportation networks. There are 1,065 miles of bi-directional bike lanes with a goal of 1,995 miles by 2050. In addition to the Comprehensive Bicycle Master Plan, the T2050 Mobility Improvements subprogram was established to improve neighborhood mobility through the construction of new sidewalks and multi-modal connectivity through the provision of new bicycle facilities.	Street Transportation Department	ADOT, MAG	Ongoing, Long-term
Pending Actions				
TS1.4	**Create a network of multi-use paths along the existing canal network in Phoenix.** The canal network is used to transport water throughout Phoenix and provides an opportunity to incorporate alternative mobility improvements along its banks. In 2020, Phoenix opened the initial 12 miles of shared use path along the Grand Canal in Central Phoenix from Interstate 17 to the city of Tempe. This shared use path provides safe and convenient walking and biking access between neighborhoods, transit corridors, local employment, shopping, education and recreation centers. The next segments will be under design in late 2020 with implementation by late 2023. 45 percent of canals have paved paths. By 2050, 90 percent of canals will have paved and connected paths, with crossings at major streets or barriers.	Street Transportation Department	ADOT, MAG, SRP	Ongoing, Long-term
TS1.5	**Develop a series of corridors with a strong emphasis on active transportation and connections to high-capacity transit corridors.** Two city-wide initiatives, the Key Corridor Master Plan (KCMP) and Active Transportation Plan, currently underway will help develop a more robust bicycle and pedestrian network throughout the 15 villages in Phoenix.	Street Transportation Department	MAG	Ongoing, Long-term

TS1.6	**Develop communities that are walkable and have access to light rail as part of Reinvent PHX.** Reinvent PHX is a collaborative partnership committed to developing walkable, opportunity-rich communities connected to light rail. Five Transit oriented development (TOD) districts were identified and sustainability, health impact, and economic assessments were produced to create action plans for each district through district steering committees. The total acreage of expanded infill development within TOD areas is 403 acres. 707 affordable housing units have been developed within the TOD areas. Over seven miles of bike lanes have been added to TOD areas.	Planning and Development Department	Community and Economic Development, U.S. Department of Housing and Urban Development, Arizona State University, Vitalyst Health Foundation	Ongoing, Long-term

GOAL TS2	Increase the use of alternative fuels (i.e., fuels other than gasoline and diesel).			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
TS2.1	**All City of Phoenix fleet will be fueled by alternative fuels or GHG net-zero fuels, including electricity.** The city fleet will continue to transition to alternative fuels with lower GHG emissions and then to GHG net-zero fuels. Currently, 62 percent of the fuel used by the fleet is alternative fuel.	Public Works, Public Transit, Aviation, Police Departments		Ongoing, Long-term
TS2.2	**All new garbage trucks will be replaced with trucks powered by compressed natural gas.** As part of cleaner air initiatives, diesel-engine solid waste trucks are being replaced with CNG-fueled ones improving air quality and reducing GHG emissions. By 2030, the majority of existing garbage trucks will be replaced with cleaner burning CNG-fueled trucks or electric vehicle garbage truck options as they become available. The Solid Waste Field Services division uses a fleet of alternative fuel equipment to collect, reuse and recycle green organics, and bulk trash from approximately 400,000 residential customers each week and uses 100% alternative fuel, with 150 units using CNG, and 60 of which use ultra-low NOx CNG engines, out of a total of 234 units.	Public Works Department		Ongoing, Medium-term
Pending Actions				
TS2.3	**Advocate for state and local regulations that promote alternative fuel sales in the Phoenix metropolitan area.** Alternative fuels are fuels that are not fossil fuels. These fuels are used in place of fossil fuels to decrease GHG emissions. It is important to advocate for further local GHG emissions reductions from state and local regulations that promote alternative fuel sales in the Phoenix metropolitan area.	Government Relations Departments	ADEQ	Short-term

GOAL TS3	Increase the adoption and rollout of electric vehicles and electric-vehicle charging stations.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
TS3.1	**Purchase electric vehicles when possible for the City of Phoenix Motor Pool.** Replacing vehicles powered by conventional fuels with electric vehicles is important to reducing GHG emissions.	Public Works Department	All City Departments, Mayors Climate Purchasing Collaborative	Long-term
TS3.2	**Install electric vehicle charging stations for nonroad equipment on City of Phoenix Aviation properties.** Using VALE grants, the Aviation Department is developing electric ground support equipment infrastructure at Phoenix Sky Harbor International Airport. Teaming with the airlines, over 100 fuel-driven ground support equipment units have been retired and replaced with electric units. Forty electric charging stations have been installed and additional infrastructure will be installed in future terminal construction projects.	Aviation Department	Airlines, Maricopa County	Short-term
Pending Actions				
TS3.3	**Complete construction of the Phoenix Sky Train®.** The automated PHX Sky Train® connects travelers between the METRO Light Rail 44th Street and Washington stop and the airport. 1.9 miles have been completed with 2.5 additional miles scheduled for completion by 2022.	Aviation Department		Short-term

TS3.4	**Advocate for state and local regulations that incentivize that new vehicle sales in the Phoenix metropolitan area be battery-electric or plug-in electric vehicles.** Federal tax credits are available for some all-electric and plug-in hybrids models. Policy support at the state and local levels is needed to increase sales of electric vehicles	Govermental Relations Department	Office of Sustainability, MAG, Maricopa County, APS, SRP	Short-term

GOAL TS4	**Reduce the number of trips taken, while maintaining a thriving economy.**			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
TS4.1	**Utilize reciprocal agreements with private haulers and other municipal entities to reduce trips and distance traveled hauling garbage to transfer stations and landfill.** The Solid Waste Field Services division has reciprocal agreements with private haulers and other municipal entities that provide economic and increased service efficiency for the solid waste operation. These agreements have saved approximately 200,000 miles of travel.	Public Works Department		Short-term
TS4.2	**Transition to digital communications with residents, where possible, without a decrease in the level of service provided.** A transition to digital communications will decrease GHG emissions by eliminating the need for printed materials and their distribution. It is important to consider residents who may not be able to receive communications digitally.	Communications Office		Long-term
Pending Actions				
TS4.3	**Establish a policy that promotes teleworking for City of Phoenix municipal operations.** Maricopa County Ordinance P-7 Travel Reduction Program requires a reduction of the amount of travel performed in a single occupancy vehicle by using alternative forms of travel. Teleworking is an important element of a travel reduction plan and should be established for City of Phoenix employees where possible. It is also important to incentivize and promote teleworking for all employers, regardless of size.	Human Resources Department	Maricopa County	Short-term
TS4.4	**Make job training for City of Phoenix employees available in a digital format.** Providing job training in a digital format reduces GHG emissions. These reductions may come from reduced amount of travel to a training facility, reduction of space dedicated to training, and printing of training materials. Using Coronavirus Aid, Relief, and Economic Security (CARES) Act funds, a learning management system is being developed that will provide virtual learning opportunities with access to a large database of training material that will reduce in-person facilitation of training and reduced hard copy of training materials.	Human Resources Department	Information Technology Services Department	Short-term

WASTE AS A RESOURCE (WR)

QUICK START ACTIONS *(Examples)*

Action WR1.3: Complete Recycled Asphalt Pavement project by 2025.

Action WR2.2: Complete SR-85 Landfill gas capture project by 2025.

Action WR3.2: Increase number of Green Organic Roll Off Pulls by 5 percent annually.

GOAL WR1	Implement programs to increase the reuse and recovery of waste materials and promote social and economic value.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
WR1.1	**Continue to identify and collect waste materials to recycle.** Programs are in place to recycle used fluorescent lamps, tires, batteries and steel, which can generate revenue. In fiscal year 2019-2020, 27,343 tires and 10,350 batteries were recycled. Approximately 1,100 tons of steel is recycled annually. In addition, Household Hazardous Waste (HHW) disposal events are held for customers so that this waste may be properly handled and processed.	Public Works Department		Ongoing, Long-term
WR1.2	**Continue to implement reuse programs to eliminate waste by reusing items previously identified as waste.** Waste materials are identified and collected for reuse. The Make Ready program reuses auto parts reducing waste sent to the landfill and saving over $120,000 in fiscal year 2019-2020.	Public Works Department		Ongoing, Long-term
WR1.3	**Continue to implement waste reduction programs at the two material recovery facilities, including a composting facility that recovers organic waste.** Material recovery facilities (MRFs) are specialized facilities that receive, separate, and prepare recyclable materials for sale. Phoenix has two MRFs, one at the North Gateway Transfer Station and one at the 27th Avenue Transfer Station. The city's composting facility was opened in 2017 and is a key component of Reimagine Phoenix. Phoenix processes roughly 169,000 tons of recyclables and 55,000 tons of organic waste per year at these facilities.	Public Works Department		Ongoing, Long-term
Pending Actions				
WR1.4	**Reuse recycled asphalt as street pavement.** The Reclaimed Asphalt Pavement (RAP) Project is assessing the cost effectiveness and performance using different proportions of RAP on Phoenix streets as part of traditional paving materials. Phase II was recently completed, which involved performance tests on a road section within the city. If pilot is successful, this process will be applied on city streets.	Street Transportation Department	Arizona State University	Medium-term

GOAL WR2	Reduce GHG emissions resulting from the degradation of waste by increasing landfill gas capture.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
WR2.1	**Continue to utilize methane capture systems on active and decommissioned landfills to oxidize methane that is produced to** Landfill gas capture systems are utilized at SR-85, the City's only active landfill, and decommissioned landfills, including Skunk Creek, 27th Avenue, Deer Valley, 19th Avenue, and Del Rio landfills. These systems capture methane gas that is produced by decomposing waste and is combusted to produce a less GHG intensive gas.	Public Works Department		Short-term
Pending Actions				
WR2.2	**Capture and reuse methane as vehicle fuel as part of the Landfill Gas Recovery Project at SR-85 Landfill.** State Route 85 (SR-85) Landfill is Phoenix's only active landfill and receives over one million tons of waste per year from Phoenix and other sources. The waste decomposes and produces landfill gas that is roughly half methane and half carbon dioxide. A project will be developed in the future to capture the landfill gas and use it as fuel.	Public Works Department		Short-term

GOAL WR3	Increase waste-diversion participation by all residents and businesses.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
WR3.1	**Provide outreach and feedback to residents what can and cannot be recycled through presentations to schools and communities.** The Zero Waste team provides education on proper recycling, including group tours of the city's North Gateway Transfer Station and MRF, educational presentations to schools, neighborhood and community meetings, and hosting informational booths at community events. In 2019, the Public Works Zero Waste team interacted with approximately 23,500 community members.	Public Works Department		Ongoing, Short-term
Pending Actions				
WR3.2	**Increase resident participation in the Green Organics Residential program and recycling program.** Waste diversion efforts include diversion of organic materials. Through the Green Organics Residential Collection program, organic material, like yard trimmings, untreated wood, tree fruit, and cactus, is collected from residential properties. Currently, there are six green organic material collection routes collecting residential organic material each week. This organic material is then transported to the 27th Avenue Compost Facility to be processed.	Public Works Department		Short-term
WR3.3	**Increase number of businesses that participate in the Phoenix Green Business Leader Program that recognizes Phoenix businesses that have sustainable practices, including increased waste diversion.** The Green Business Leader (GBL) program started in 2017 as part of the Reimagine Phoenix initiative to create public-private partnerships to further waste diversion in the City. In 2019, the GBL program expanded to recognize businesses for efforts around water conservation, energy efficiency and sustainable purchasing, in addition to waste diversion. There are more than 100 certified Green Businesses, that in total have diverted over 5,000 tons of waste.	Public Works Department	Office of Sustainability, Office of Environmental Programs, Water Services Department	Ongoing, Short-term
WR3.4	**Increase number of businesses that participate in the "green tenant" program at Sky Harbor International Airport.** As part of the Aviation Department Sustainability Management Plan Update, a voluntary "Green Tenant" program is being developed to encourage greater collaboration between the Aviation Department and airport tenants on airport sustainability goals. Aviation Department met the waste diversion goal of 40 percent in 2019, a year earlier than targeted.	Aviation Department	Airport Tenants	Ongoing, Short-term
WR3.5	**Increase the number of existing buildings that are repurposed instead of demolished.** In addition to reuse of materials, it is important to reuse buildings through the Adaptive Reuse Ordinance where existing buildings are repurposed. There are eleven adaptive reuse projects underway in Eastlake-Garfield, four in Midtown, nine in Uptown, and two in Gateway.	Planning and Development		Ongoing, Long-term

GOAL WR4	Transition to green alternatives from environmentally hazardous materials.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
WR4.1	**Utilize vegetable-based inks that are formulated to reduce solvents.** Volatile organic compounds are chemicals that evaporate quickly and are precursors to ozone. One way to limit their use is to transition to vegetable-based inks that are formulated to minimize and, in some cases, eliminate the use of volatile organic compounds as much as possible.	City Clerk Department	State of Arizona	Short-term
WR4.2	**Use digital communication or recycled paper when possible.** To decrease the production of waste from paper-based transactions and communications, digital communications will replace paper-based communications. If paper is still necessary, the paper that is used should contain recycled content.	Communications, City Clerk, Human Resources		Ongoing, Short-term

GOAL WR5	Expand brownfield redevelopment along the Rio Salado in Phoenix.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
WR5.1	**Increase the cleanup and redevelopment of brownfields in the Rio Reimagined Project area.** The Rio Reimagined Project encompasses more than 78,000 acres and 1,189 potential brownfields. Cleaning up and reuse of these properties brings community, economic, and environmental benefits. The Rio Salado, Agua Fria and Gila Rivers will be revitalized by reconnecting the community with the river and be a catalyst for economic growth. Utilize resoures obtained through a U.S. EPA grants	Office of Environmental Programs, Community & Economic Development Department	U.S. EPA, ADEQ, ASU, Cities of Avondale & Tempe	Medium-term

AIR QUALITY (AQ)

QUICK START ACTIONS *(Examples)*

Action AQ1.1: Obtain a new DERA grant by 2025.

Action AQ2.1: Ensure city-owned vacant lots remain stabilized.

GOAL AQ1	Decrease ozone precursor emissions, including NOx and VOCs from municipal vehicles by 10% by 2025.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
AQ1.1	**Use Diesel Emissions Reductions Act (DERA) grants to transition to cleaner burning vehicles.** The Public Works Department was recently awarded $1 million in Diesel Emissions Reduction Act (DERA) grants by the US Environmental Protection Agency (EPA) to replace some of the department's diesel-fueled trucks. The grant money will be combined with matching funds of $2.1 million from Phoenix Public Works and its private partner, Mr. Bults Inc., to purchase nine new solid waste collection trucks and one long-haul truck fueled by CNG to replace old, diesel-fueled vehicles.	Public Works	U.S. EPA, Mr. Bults, Inc.	Ongoing, Short-term
AQ1.2	**Continue to colloborate with regional entities to address ozone precursor emissions.** The city collaborates with various regional entities to focus on how best to reduce ozone throughout the metropolitan area, including the MAG, MCAQD, ADEQ, and other valley cities. The City is a member of the MAG Technical Air Quality Committee, the Maricopa County Clean Air Council, and the ADEQ Air Quality Coalition.	Office of Environmental Programs	MAG, MCAQD, ADEQ	Ongoing, Short-term
Pending Actions				
AQ1.3	**Determine the air quality improvements from actions completed from changes in the transportation sector.** Calculate the reduction in ozone precursor emissions from transportation resulting from the the various actions being undertaken by the different departments.	Office of Environmental Programs	All Departments	Ongoing, Short-term

GOAL AQ2	Decrease emissions of dust/particulate matter (PM-10 and PM-2.5).			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
AQ2.1	**Continue to stabilize and maintain surfaces to reduce PM-10 emissions.** The largest sources of PM-10 are from unpaved roads and paved roads. Much of the efforts to decrease PM-10 have been focused on stabilizing these surfaces and maintaining them with the use of street sweepers. The city has stabilized streets, lots and alleys, and conducted outreach activities to ensure that residents would become of methods to prevent the formation of dust. The city of Phoenix has paved or stabilized over 500 miles of alleys since 2012 as part of the Five Percent Plan.	Street Transportation Department	Office of Environmental Programs	Ongoing, Short-term
AQ2.2	**Promote activities that reduce emissions of PM-2.5.** Particulate matter with a diameter of 2.5 micrometers or smaller (PM-2.5) is primarily soot from burning activities, but also comes from vehicle exhaust. Efforts to reduce PM-2.5 include retrofitting fireplaces and improvements in vehicle exhaust systems.	Office of Environmental Programs	MAG, MCAQD, ADEQ, EPA	Ongoing, Short-term

LOCAL FOOD SYSTEMS (LFS)

QUICK START ACTIONS *(Examples)*

Action LFS2.2: Incorporate agriculture, food processing, and distribution into existing and future economic development plans by 2020.

Action LFS3.1: Update codes and ordinances where appropriate to eliminate barriers and encourage developing a healthy food infrastructure, including food waste diversion by 2021.

Action LFS3.3: Complete an inventory of city-owned parcels as opportunities for urban agriculture, focused on food deserts within irrigation districts by mid-2021.

Action LFS5.2: Convene local food producers with city staff, leaders, and elected officials to build trust and understanding by 2020.

Action LFS5.4: Complete a GHG Emissions Inventory for the local food system, defined as Maricopa County by 2023.

NOTE: The goals and actions identified in the Local Food Systems section are from the 2025 Phoenix Food Action Plan adopted in March 2020 by Phoenix City Council with implementation by 2025.

GOAL LFS1 — **All people living in Phoenix should have enough to eat and have access to affordable, healthy, local, and culturally appropriate food.**

Pending Actions		City Lead	Partnerships	Timeframe
LFS1.1	**Incorporate agriculture, food processing, and distribution into existing and future land use plans. Collaborate with key partners to facilitate new opportunities for urban-scale gardens, farms, gleaning, and distribution systems.** PlanPHX emphasizes the importance of residents having access to healthy food and sets measures for access within a ¼-mile. Policies that are supportive of food access should be integrated into future redevelopment, transit-oriented, and other land use plans. Explore criteria for various transportation, tree and shade, urban heat island and similar projects that create safe and convenient connections between residential neighborhoods and healthy food assets. Study the impacts of local food production on food equity and social justice for low income communities.	Office of Environmental Programs	Planning and Development Department	Short-term June 2021
LFS1.2	**Use existing financial resources for food production and infrastructure. Pursue grants and other funding opportunities that will enhance the community's access to healthy foods.** Identify funding resources available through private sector, government, and philanthropic sources. It is important to determine the viability of using current funding mechanisms available from the City that can be used for food system improvements. Collaborate with key partners to facilitate new opportunities for urban-scale gardens, farms, gleaning, and distribution systems.	Office of Environmental Programs	Governmental, philanthropic and place-based funders	Short-term December 2020
LFS1.3	**Partner with schools and others to support and promote education for youth and adults.** Support education and awareness on all aspects of the food system and create opportunities to create or enhance urban agriculture, health and nutrition education for youth, adults, and seniors. Collaborate with state and county agencies working with school districts in Phoenix and support Farm to Table programs in schools.	Office of Environmental Programs	City of Phoenix Youth & Education Office, Phoenix School Districts, Nonprofits, community & grassroot organizations	Short-term Ongoing
LFS1.4	**Promote existing healthy food assets, such as farmers markets, grocery stores, retail, community gardens, farms, etc.** Focus on efforts to address challenges within communities with limited access to fresh healthy food, followed by a city-wide approach to planning for food access for all communities. identify existing food and farm assets within food desert areas, such as the South Phoenix and Maryvale communities. Develop asset maps that are accessible by residents thought a variety of communication tools, including online mapping, apps, social media with written resources available at city libraries, community centers, and recreations centers.	Office of Environmental Programs	Community and Economic Development Department	Short-term December 2020

GOAL LFS2 — **Businesses that produce, process, distribute, and sell local and healthy food should be recognized as integral to the economy and encouraged to grow and thrive in Phoenix.**

Pending Actions		City Lead	Partnerships	Timeframe
LFS2.1	**Recognize food production as a highest and best use of land.** Phoenix has the potential to be an agricultural technology innovation hub, with a focus on farming that is water efficient, restorative and adaptable to the arid climate and high temperatures. Coordination with internal and external economic development professionals will be done to evaluate the economic development potential of the food system as a local industry cluster. Create opportunities to connect food production businesses with available land. Continue to collaborate with academic partners to establish an agriculture technology initiative.	Office of Environmental Programs	Community and Economic Development Department; University of Arizona, Arizona State University	Short-term June 2021

LFS2.2	**Incorporate agriculture, food processing, and distribution into existing and future economic development plans.** Assist agricultural entrepreneurs and existing food-related businesses and identify financial and technical resources and the most effective means to make those resources available. Develop comprehensive, user-friendly information on the requirements of food production, processing, and distribution businesses that is available from the city and through partners.	Office of Environmental Programs	Municipal/Regional/State Economic Development Organizations (EDOs)	Short-term June 2021
LFS2.3	**Establish a local food buying preference in future City contracts and include in current Sustainable Purchasing Policy.** Develop appropriate contract language that can be incorporated into City contracts for the purchase of local food. Coordination with internal departments to develop guidelines and language, and potentially set procurement goals. Provide healthy, local produce to city employees through a Community Supported Agriculture (CSA) program and pilot in downtown City facilities initiated. Explore the development of heathy procurement guidelines for City events and facilities.	Office of Environmental Programs	Finance Department	Short-term June 2021
LFS2.4	**Partner with stakeholders to support and promote a Buy Local Food campaign.** Educate and engage residents on the benefits of purchasing locally-produced food. Develop a Buy Local Food Campaign in collaboration with partners, such as Local First Arizona Foundation and others. Partnership opportunities with grocers to further promote Buy Local will be established or enhanced.	Office of Environmental Programs	Local First Arizona Foundation, MarCo, Local Food Producers; Grocers	Short-term December 2021

GOAL LFS3	**Growing food in Phoenix and the region should be easy and valued whether for personal use or for business.**			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
LFS3.1	**Update codes and ordinances where appropriate to eliminate barriers and encourage developing a healthy food infrastructure.** Existing zoning codes will be further clarified to clearly identify which zoning classifications and requirements are needed for various agricultural and food production uses, commercial and residential, including, hydroponic, aquaponics, growing inside structures, and for burgeoning uses, such as rooftop and building-integrated agriculture. Identify and update/amend appropriate sections of the zoning code to clearly identify zoning districts in which agricultural land uses are permitted. Develop definitions for agricultural land uses. Develop streamlined processes for agricultural zoning. Explore the development of an "Agritainment" zoning districts, and zoning incentive models (density, PAD district, similar zoning options) that encourages set asides of land for food production.	Office of Environmental Programs	Planning and Development Department; local food producers, and businesses	Short-term December 2021
LFS3.2	**Explore development of agriculture community land trusts and/or preservation mechanisms.** Various mechanisms that could be used in concert with nonprofit and private partnerships to preserve land for food production will be identified, as well as best practices of other cities. Existing city policies impacting agricultural land uses will be reviewed. Recommendations will be made for new or modifications to existing policies.	Office of Environmental Programs	Community and Economic Development, Real Estate, Water Services, Planning and Development Departments; MarCo, Arizona Community	Short-term December 2020
LFS3.3	**Explore the use of City-owned parcels as opportunities for urban agriculture, focused on food deserts within irrigation districts.** Develop, with City departments, guidelines on how to lease/buy city owned land for food production, including establishing appropriate minimum length of lease terms feasible for agriculture. Adopt policies allowing the use of park land and other city-owned land, where feasible and appropriate, for food production. An inventory of land potentially available for agricultural use will be created, including Brownfields. Upon identification of available city-owned land located in food desert and irrigation district areas, a Request for Proposal for agricultural development may be issued.	Office of Environmental Programs	Parks and Recreation, Public Works, Water Services, and Real Estate Departments	Short-term June 2021

LFS3.4	**Support the growth of land uses that contribute to a healthy and sustainable food system (i.e. grocery stores, community gardens, urban farms and other urban agriculture elements).** In addition to city-owned land, there is the opportunity to support efforts to expand urban food production on residential, commercial and institutional properties. Support and encourage collaboration between public and private sectors and small/medium sized farms, food-hubs, mobile markets, co-ops, community and back-yard gardens. Establish community commercial kitchens and/or use existing commercial kitchens. Explore opportunities to work with vacant schools with kitchens to use as a training and economic development resource will be performed.	Office of Environmental Programs	Planning & Development, Community and Economic Development Departments, GPEC, school districts	Short-term December 2021
LFS3.5	**Use existing and explore new job training resources, where feasible, and partner with others to provide training opportunities.** A cornerstone in a sustainable local food system is the development of career pathways in farming. Support programs focused on training future farmers and collaborate with partners and institutions, such as the University of Arizona Cooperative Extension of Maricopa County. Identify other potential partners with a focus on providing training for new farmers. Facilitate business training programs for farmers to gain more marketing knowledge and expertise. Explore city policies that support the creation of agricultural employment training opportunities to further promote job creation in the agriculture sector.	Office of Environmental Programs	City of Phoenix Workforce Development, Maricopa Community Colleges, University of Arizona	Short-term June 2022

GOAL LFS4	**Food-related waste should be prevented, reused, or recycled. Sustainable food production practices that maintain a healthy environment are desired.**			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
LFS4.1	**Update codes and ordinances to clarify food waste diversion, i.e., composting opportunities.** Providing clear and understandable codes and ordinances to clarify food waste diversion, such as composting, is essential to a thriving local food system. This includes identifying and updating/amending appropriate sections of the zoning code to clearly identify zoning requirements for composting opportunities.	Office of Environmental Programs	Planning and Development, Public Works Department, MarCo, Business	Short-term December 2021
LFS4.2	**Support and promote methods to prevent edible food from entering the waste stream.** A key factor in preventing food waste is to provide means for edible food to be consumed. In the United States an estimated 30-40% of food goes uneaten and ends up in landfills, further contributing to greenhouse gas emissions. Creating opportunities to provide edible food to those that don't have enough to eat involves collaborating with stakeholders to identify solutions. Opportunities for collaboration with other stakeholders involved in the prevention of food waste and food rescue will be evaluated.	Office of Environmental Programs	Public Works Department; MarCo, Waste Not, restaurants, institutions	Short-term December 2020
LFS4.3	**Promote and support sustainable practices in all areas of the food system.** The food economy is an integral contributor to the overall economic vitality of the City. Business opportunities are varied, from agricultural entrepreneurs, catering, restaurants, food trucks, mobile markets, retail, such as neighborhood bodegas or convenience stores, and for backyard gardeners to sell their produce. Identifying and providing business resources, including water and energy efficiency, regenerative agricultural practices, and safe food handling are keys to creating a sustainable food economy. Continue working toward development of a Sustainable Food Economy Accelerator for entreprenuers. identify mechanisms to assist food-related businesses, including technical assistance and financial resources.	Office of Environmental Programs	Community and Economic Development, ASU, Cities within Maricopa County	Short-term June 2022

GOAL LFS5	Develop food policies and actions that address local and global challenges posed by climate change, urbanization, political and economic crises, population growth and other factors.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
LFS5.1	**Research policies and actions that plan for future shocks related to changing population growth, hazards, economic conditions and climate.** Conduct research on best practices and explore ways to integrate food system resiliency within existing and future hazard mitigation, emergency response, and or resilience planning efforts. OEP would serve as the lead for food systems in future resilience planning. Coordination with City Departments and external stakeholders will identify opportunities for food system integration.	Office of Environmental Programs	Stakeholders from within all aspects of the local food system.	Short-term December 2021
LFS5.2	**Convene local food producers with city staff, leaders, and elected officials to build trust and understanding.** Create opportunities and collaborate with stakeholders to identify solutions for providing edible food to those that don't have enough to eat.	Office of Environmental Programs	Phoenix elected officials and city departments, Local First Arizona Foundation, local food producers	Short-term December 2020 and Ongoing
LFS5.3	**Explore funding opportunities from federal, state, and philanthropic organizations for food system activities and staff.** Identify and submit for funding opportunities from federal, state, and philanthropic organizations for food system activities and staff. Resources to conduct recommended actions will be needed. Obtaining funding from all feasible and available resources will be paramount to the success of achieving the goals, strategies and actions identified.	Office of Environmental Programs	Potential funders	Short-term Ongoing
LFS5.4	**Complete a GHG Emissions Inventory for the local food system, defined as Maricopa County.** Complete a GHG emissions inventory of the local food system, that is Maricopa County, to determine which reduction actions will be necessary to reduce the GHG emissions from the production, processing and delivery of food across Phoenix and the region.	Office of Environmental Programs	MarCo; University of Arizona, NRDC, ICLEI, ASU	Short-term December 2023

HEAT (H)

QUICK START ACTIONS *(Examples)*

Action H1.2: Complete walkshed mapping tool pilot by 2020.

Action H2.7: Provide shade at all 4,050 bus stops by 2025.

Action H4.2: Complete street cool seal pilot project by 2025.

Action H5.1: Complete pilot certification as a HeatReady City by 2022.

GOAL H1	Create a network of cool corridors in vulnerable communities to facilitate movement from residents' homes to their places of employment, education and play.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
H1.1	**Update Phoenix's Walkable Urban Code to include additional heat mitigation actions.** The Walkable Urban Code regulates development in proximity to light rail stations. Additional heat mitigation actions are being considered to be included in the code, along with the current shade requirements.	Planning and Development Department		Short-term
H1.2	**Develop walkshed mapping tool to identify key pedestrian corridors and priority routes for adding shade in vulnerable neighborhoods and increase shade provided by trees or constructed shade.** A next generation Walkshed mapping tool, based on the principles of a model developed by Harvard students studing in Phoenix, is being developed in partnership with ASU to identify key pedestrian corridors and priority routes for adding shade in vulnerable neighborhoods. The tool considers zero car households, proximity to schools, shopping and transit, and identified the most likely routes or "walkshed" that pedestrians would likely take in a given neighborhood. The tool is being piloted in 2020 and will be used to select corridors for implementing priority tree and shade elements.	Office of Sustainability	ASU	Short-term
H1.3	**Construct cool corridors in vulnerable communities.** The urban heat island effect can be reduced locally by creating cool corridors. These corridors would provide cooling through shaded walkways, green spaces and sources of water to aid against the heat. The cool corridors would be placed where the walkshed mapping tool identified the greatest need of a walkway in vulnerable communities to facilitate movement from residents' homes to work, school, and play.	Planning and Development Department	Street Transportation Department	Short-term

GOAL H2	Increase shade provided by trees or constructed shade in parks, streets and rights-of-way.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
H2.1	**Continue to implement the Tree and Shade Master Plan to establish 25% tree and shade canopy city-wide by 2030.** The Tree and Shade Master Plan launched in 2010 with a vision to double the tree and shade canopy by 2030 to 25%. The Tree and Shade Master Plan implementation is supported by over $5 million in annual funding to City departments as part of a City-wide program with 4000 trees now being planted annually on City streets, parks and rights of way.	Street Transportation and Parks and Recreation Departments	Office of Sustainability, Planning and Development Department	Medium-term
H2.2	**Increase tree and shade canopy of parks by 30% by 2030.** The Parks and Recreation Department plans to plant 1500 trees annually. As of summer, 2020, 131 parks currently meet the 25% canopy coverage; with 29 parks that are in process to meet the goal.	Parks and Recreation Department		Medium-term
H2.3	**Educate City staff on proper tree care, including Right Tree, Right Place training, and the use of tall pots to help establish plants.** Increasing the tree canopy of the urban forest requires that the right trees are planted in the right place for long-term growth. Recently, in order to increase the success rate of planting, a method was piloted to use tall pots to increase the number of plants that survive.	Parks & Recreation Department	Street Transportation Department, Office of Sustainability, AmeriCorps VISTA	Short-term
H2.4	**Maintain and update tree database for entire Phoenix Parks system.** Using TreeKeeper software, trees will be tracked as they are planted and removed, along with the estimated value of the trees and estimated environmental benefits.	Parks and Recreation Department	TreeKeeper	Short-term

H2.5	**Plant trees in Choice Neighborhoods, with an emphasis on targeted areas in the most recent urban heat island maps.** The Choice Neighborhoods Initiative (CNI) is a grant from Housing and Urban Development to transform distressed neighborhoods and public housing into mixed-income neighborhoods linking housing improvements with appropriate services, schools, public assets, transportation, and access to jobs. As part of the transformation, the neighborhoods will attempt to retain the trees already in place in addition to adding more green space, when possible.	Housing Department	Neighborhood Services and Planning and Development Departments	Short-term
H2.6	**Implement Project sunBLOCK, which includes permanent and temporary pubic art microclimates.** Project sunBLOCK is composed of permanent and temporary public art microclimates that lower the intense heat confronting pedestrians along key corridors in two of Central Phoenix's hottest neighborhoods. The project brings community, artists, designers and environmental specialists together to create designs that both visually and physically cool transit stops and surrounding streetscapes.	Arts and Culture Department	Public Transit Department	Short-term

Pending Actions

H2.7	**Increase shade at public transit stops in the City.** An overarching goal of the T2050 plan was to provide all residents in the City with accessible transit and build ridership. Within that goal is the element to provide shade at all bus stops in the City – 4,050 bus stops by 2025. Currently, 2,680 of those bus stops have constructed shade structures.	Public Transit Department		Short-term
H2.8	**Coordinate and track the planting of trees to achieve the 25% tree and shade canopy goal.** At the direction of the Phoenix City Council, the Environmental Quality and Sustainability Commission (EQSC) created the Urban Heat Island/Tree and Shade Subcommittee (UHITS) with the purpose to evaluate, analyze and recommend policies to address the issues surrounding Urban Heat and to advance implementation of the Phoenix Tree and Shade Master Plan.	Environmental Quality and Sustainability Commission	Office of Environmental Programs and Office of Sustainability	Short-term

GOAL H3 **Provide resources and services to residents to manage heat.**

Ongoing Actions		City Lead	Partnerships	Timeframe
H3.1	**Educate the community on proper planting and care for trees through the Citizen Forester Program.** Increasing the tree canopy throughout the city will require community participation. Education on how to properly plant and care for trees is provided through the Citizen Forester program. Citizen Foresters advocate for trees by promoting best practices regarding proper tree planting and maintenance techniques, while supporting community efforts to achieve tree and shade canopy goals. Residents can become certified as Citizen Foresters and assist in the planting and care of the urban forest.	Parks and Recreation Department	Office of Sustainability, AmeriCorps VISTA, HandsOn Greater Phoenix	Short-term
H3.2	**Engage with healthcare professionals through the Park Rx program to make parks and green spaces more accessible.** Park Rx is a cost-effective approach to combining healthcare professionals and local park and community resources to change healthcare practices and community ownership of neighborhood assets.	Parks & Recreation Department	Street Transportation, Neighborhood Services, Library Departments, AZ Dept of Forestry and Fire Management, Maricopa County Department of Public Health, Honor Health	Short-term

H3.3	**Continue to participate in the Heat Relief Regional Network.** The Heat Relief Regional Network is a regional partnership of the Maricopa Association of Governments (MAG), municipalities, nonprofit organizations, the faith-based community, and businesses. The Heat Relief Regional Network works with 137 partner organizations to provide water, resources and wellness checks in communities alongside an education and awareness campaign each summer focusing on vulnerable communities. The number of heat related deaths in the county has risen in each of the last four years with nearly 200 heat related deaths in 2019.	City of Phoenix	MAG	Short-term

Pending Actions

H3.4	**Plant trees in neighborhoods with an emphasis on targeted areas in the most recent urban heat island maps.** Work with communities and partners to identify and develop cool assets in vulnerable communities such that all residents in those communities will be within a quarter mile of a cooling asset. The program will leverage the City's weatherization program, to provide energy upgrades to low income housing in these neighborhoods and seek grant funding to support deep engagement with the community and the construction of new cooling elements.	Office of Sustainability	Neighborhood Services Department	Short-term

GOAL H4 **Increase the use of high albedo, or reflective, materials in infrastructure projects.**

Ongoing Actions		City Lead	Partnerships	Timeframe
H4.1	**Continue to implement the Cool (Energy Star) Roofs on city-owned buildings.** Coating the roof reduces the amount of energy needed to cool the building, reducing GHG emissions. Cool (Energy Star) Roofs is the standard for all departments that work with the Public Works Department (PWD) to handle their roof replacement, as well as for those buildings owned by PWD. This type of roof has been implemented for PWD owned buildings since 2005.	Public Works Department		Short-term

Pending Actions

H4.2	**Complete cool pavement pilot program and expand program to areas where it would be most effective.** A Cool Pavement pilot is currently underway in eight Phoenix neighborhoods and one city park. Phoenix wants to test the cool pavement material to see whether it is effective at reducing temperatures in Phoenix desert climate.	Street Transportation Department	Office of Sustainability, ASU	Short-term
H4.3	**Be a living laboratory to test cool materials for use in Infrastructure projects.** Be a living laboratory to test new materials that could mitigate urban heat island when implemented at scale. Many promising materials are coming on the market yet their performance in high temperature conditions, their durability and the overall economics need further study. For example, ASU is currently evaluating a new material from 3M that reflects heat as long wave radiation while cooling the underlying surface.	Office of Sustainability	ASU	Medium-term

GOAL H5 **Develop HeatReady certification for Cities.**

Pending Actions		City Lead	Partnerships	Timeframe
H5.1	**Pilot HeatReady certification in partnership with ASU.** Where more than 2000 cities including Phoenix have achieved "StormReady" certification by the National Weather Service, ASU in partnership with the City are seeking to pilot a HeatReady certification program—identifying the policies, programs and governance framework and scorecard to assist cities in preparing for increasing temperatures and heat waves. With Phoenix being the epicenter of research related to heat and a hotbed of heat-related programs, ASU and the City are seeking to develop HeatReady to allow it to become a national or international certification program.	Office of Sustainability	ASU	Short-term

H5.2	**Expand HeatReady Certification nationally or internationally.** After piloting and refining HeatReady Certification in Arizona, ASU and the City are seeking to test HeatReady nationally and internationally to increase its functionality and shared learnings and, more importantly, its impact. C40 and the Global Cool Cities Alliance have both expressed interest in becoming the global verification and certification body once the certification tool reaches maturity.	Office of Sustainability	ASU, C40, National Weather Service, Global Cool Cities Alliance	Short-term

WATER (W)

QUICK START ACTIONS *(Examples)*

Action W1.2: Complete construction of Drought Pipeline Project by 2025.

Action W2.4: Implement Greater Phoenix Green Infrastructure and Low Impact Development Details for Alternative Stormwater Management handbook by 2025.

GOAL W1	Identify and implement infrastructure projects to ensure water security.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
W1.1	**Continue to bank water, which is storing water underground for use at a later date.** Arizona is a leader in water banking, the practice of storing water underground to be used later. Millions of acre-feet of water have been banked in Central Arizona aquifers through the Arizona Water Banking Authority. The water that is delivered to residents comes from renewable surface water supplies, so that groundwater can be saved for the future. In addition, a water-sharing agreement with Tucson will continue, where Phoenix will store some of its unused Colorado River water in aquifers in Tucson. In times of shortage, Tucson will give Phoenix some of its Colorado River water allocation in exchange for this stored water.	Water Services Department	City of Tucson, Arizona Water Banking Authority	Short-term
Pending Actions				
W1.2	**Design and construct additional infrastructure to provide a reliable water supply to 1.7 million customers.** The Drought Pipeline Project will provide Salt and Verde River water supplies to areas of the City that are currently entirely dependent on Colorado River water. The project is essential to the economic health and vitality of Phoenix. This sustainability project will ensure all residents have access to safe, reliable, clean drinking water during the future times of shortage on the Colorado River. This project will be financed using sustainability bonds, a result of the recent development of the Green and Sustainability Bond Framework. This will result in loan service cost savings.	Water Services Department	Street Transportation and Finance Departments	Short-term

GOAL W2	Improve the conservation of water resources by improving stormwater management, optimizing water use, conducting water audits, and utilizing wastewater.			
Ongoing Actions		**City Lead**	**Partnerships**	**Timeframe**
W2.1	**Improve stormwater drainage capacity and reduce backup surging at Phoenix Sky Harbor International Airport.** Phoenix Sky Harbor International Airport, located at the end of the Camelback Mountain south watershed, will improve stormwater drainage efficiency by performing preventative maintenance that will improve capacity and reduce backup surging preventing flooding and contamination of the stormwater runoff.	Aviation Department	Water Services and Finance Departments	Short-term
W2.2	**Identify and implement water saving measures on City of Phoenix facilities and processes.** A city-wide Internal Water Efficiency Task Force was created to monitor water used by municipal operations to identify and implement water saving measures. As a result of the task force, water use dropped 46.5 million gallons. On-going tracking of water usage in Parks and Aviation Departments is possible by a GIS program developed by Water Services Department.	Water Services Department	All Departments	Short-term
Pending Actions				
W2.3	**Implement successful Phoenix Sky Harbor International Airport commercial cooling tower system upgrade program in other processes throughout City of Phoenix and encourage commercial and industrial adoption of process.** Cooling towers are one of Phoenix's highest volume water uses.The Cooling Tower System Upgrade was successfully completed reducing water use by 20 percent. This cooling water treatment system was also installed as part of the Terminal Modernization Project and a system is now being installed in the Rental Car Center. Future opportunities are being investigated for municipal operations and commercial use.	Aviation Department		Short-term

W2.4	**Implement the use of the Greater Phoenix Green Infrastructure and Low Impact Development Details for Alternative Stormwater Management.** The Greater Phoenix Green Infrastructure and Low Impact Development Details for Alternative Stormwater Management is a handbook that provides technical standard details and specifications (TSDS) to be used for low impact development to members of the design, planning and development communities in Maricopa County. These TSDS will primarily be used on right of way projects and can be implemented in private projects. Using the handbook will result in environmental benefits, water conservation, urban heat reduction, improvement in public health and additional green spaces.	Planning and Development Department, Water Services Department, Office of Environmental Programs	MAG, ADEQ, ASU	Short-term

GOAL W3	Increase outreach and provide programs to residents and businesses to reduce water use.			
Actions to be Completed		**City Lead**	**Partnerships**	**Timeframe**
W3.1	**Expand existing SRP program that subsidizes cost of irrigation controllers for residential use.** Water conservation has always been part of Phoenix's strategy to maintain a 100-year water supply. Residents are encouraged to adopt xeriscape landscaping with efficient irrigation controllers through a program that subsidizes the cost of smart irrigation controllers for residential use. Expanding this program will reduce water use and lower costs for residents.	Water Services Department	SRP	Short-term
W3.2	**Expand Toilet Retrofit Program to include a low-income program and other incentives.** To conserve water, the feasibility of a new toilet retrofit program is being evaluated. The elements that the program will contain are a low-income program that includes toilet and professional installation at no cost to customer and a flat rebate program to all customers that purchase and install a low flow toilet that uses 1.28 gallons per flush.	Water Services Department		Short-term
W3.3	**Expand the Homeowners Association Audit Program.** Homeowners Associations (HOA) use water to maintain common landscaped areas, which can lead to high costs and high water usage to keep the areas looking attractive. Up to 70 percent of water used by residents is for outdoor watering. Phoenix piloted a HOA Audit Program that conducted nine audits of outdoor water use within common areas managed by HOAs. Based on that pilot, the potential average savings for the HOAs that volunteered to participate was 4.5 million gallons per year if they implemented the recommendations from the audit. The program will be expanded from pilot to ongoing program by increasing the number of inspections from nine to 40.	Water Services Department		Short-term

GOAL W4	Reduce greenhouse gas emissions from water and wastewater treatment by capturing biogas from treatment processes and increasing renewable sources of energy.			
Pending Actions		**City Lead**	**Partnerships**	**Timeframe**
W4.1	**Identify water and wastewater facilities where biogas can be treated, transferred and sold as a renewable green energy commodity. Investigate other opportunities for biogas capture.** Renewable energy projects provide biological sources of natural gas, which can displace natural gas from fossil fuel sources. Biogas that is produced as a result of treatment at the wastewater treatment plants contains methane. As part of the city's pledge to be a sustainable and cost-effective utility, a renewable energy project at 91st Avenue Wastewater Treatment Plant treats, transfers and sells biogas as a renewable green energy commodity. The city will investigate other opportunities for biogas capture at other water and wastewater treatment facilities.	Water Services Department	Ameresco, Inc.	Short-term