



City of Phoenix



CLIMATE ACTION PLAN

2021 EDITION
EXECUTIVE SUMMARY



SEPTEMBER 27, 2021

LETTER FROM THE MAYOR



Phoenicians have a unique understanding of our relationship with our environment. Here in the heart of the Sonoran Desert, we know intimately the importance of wise water management, living with resilience to extreme heat, and the joys and dangers of our monsoon season. While we are not naïve to the immense challenges posed by a warming climate, Phoenicians look with bold vision toward the future. In 2015 voters declared their commitment to making Phoenix the most sustainable desert city on the planet.

This Climate Action Plan outlines actions necessary to achieve this vision, charting the path to carbon neutrality and zero waste by 2050 or sooner. It is data-driven and uses the bi-annual greenhouse gas emissions inventory conducted in partnership with Arizona State University to establish baseline emission levels and track progress. It is designed as a living document, able to continuously respond to the ever-changing and unique needs of our city through regular updates. The effectiveness of the actions outlined in this plan will be analyzed and modeled with the support of C40 Cities, a global network of leading cities working to mitigate climate change.

I'd like to acknowledge the enormous time and energy that city staff across departments have dedicated to this project, with special thanks to the Office of Environmental Programs for leading the effort and driving collaboration among departments and external stakeholders. Phoenix is proud to have dedicated public servants who are committed to our shared success. We also appreciate the time, ideas,



and feedback contributed by residents and other stakeholders. The effectiveness of this plan depends on the continued commitment of all collaborators, both within the City of Phoenix and throughout the community.

Climate action is not only a public health and environmental imperative—it is central to ensuring equity and accessibility, modernizing our economy, fostering new jobs and talent in response to emerging markets, and ensuring Phoenix remains competitive. Companies in Phoenix are establishing climate goals and developing the technologies that will power a low-carbon, zero waste economy. We are poised to drive the development of solutions that will support the global paradigm shift to a more sustainable world.

Our city got its name from the symbolism of 'rising from the ashes' of an ancient civilization, the Hohokam people, who irrigated this land with canals that serve as the foundation for the canal system we depend on today. This valley has long been home to resilient and enterprising people, and I believe Phoenix has the ingenuity and courageous spirit to honor this legacy and create a better city, and a better world, for future generations to come.

Phoenix Mayor Kate Gallego

ACKNOWLEDGMENTS

Thank you to the climate liaisons who contributed their efforts, expertise, and leadership to help create the first community-wide climate action plan for all Phoenix.

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Arizona Department of Transportation
Arizona Public Service
Arizona State University
Bureau of Reclamation
City of Peoria
City of Tucson
First Southern Baptist Church
Grand Canyon University
Greater Phoenix Economic Council
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

Technical Assistance

C40 Cities

Special thanks to Joe Gibbs, Retired

Thank you to Joe Gibbs, retired Air Quality Specialist, who devoted many years of public service in the city of Phoenix and Arizona Department of Environmental Quality. Joe initiated many programs that have improved the life of the residents of Phoenix. We want to recognize Joe and thank him for all the climate-related work he did previously that has allowed us to reach completion of a climate action plan for all Phoenix.

Special thanks to Peggy Taylor

Thank you for your contributions as a graphic artist to the plan's community outreach efforts.

EXECUTIVE SUMMARY

Phoenix is a modern desert city with a unique backstory of human ingenuity and the harnessing of natural resources to sustain life, dating back thousands of years to the Hohokam. For Phoenix to continue to rise and thrive, we need a data-driven guidebook to address and overcome resource challenges and climate threats. This Climate Action Plan will lead the way, providing an actionable framework for growth and development, while building a strong, equitable, and resilient city.

Phoenix (“city”) is the fifth largest city in the U.S. and part of the fastest growing county in the nation. It is ranked as the 4th most desirable city for millennials and the 11th best city to start a business. Its residents enjoy 300 days of sunshine and have access to the largest municipal park system in the nation consisting of 48,000 acres of parks and preserves. The Phoenix economy is strong. With direction from Mayor Gallego and the City Council and solid fiscal management, the city realized a \$158 million surplus in 2021.

To add to these successes, Phoenix voters supported an ambitious vision in the 2015 General Plan **to become the most sustainable desert city on the planet**. A sustainable city improves the quality of life for everyone while allowing nature to thrive.

The Phoenix City Council adopted the 2050 Sustainability Goals that set long-term outcomes necessary to fulfill this vision, and now, this Climate Action Plan (CAP) proposes actions to put Phoenix on a path to achieving the ambitious, long-term 2050 goals. In 2020, the city joined C40 Cities Climate Leadership Group, a network of the world’s major cities committed to addressing climate change. C40 has asked leading cities to commit to stop any rise in emissions after 2020 as well as achieve carbon emissions reductions by 2030 to help curb global emissions and to limit temperature rise to 1.5 degrees Celsius or 2.7 degrees Fahrenheit.

GHG Emissions decreased from 2012 to 2018 while our population and the economy grew.

Climate action planning is not new to Phoenix. Phoenix has invested \$600 million in climate actions in recent years including:

- \$30 million in LED Streetlight project replacing 100,000 streetlights
- \$16.9 million in a state-of-the-art compost facility
- \$25 million in a biogas facility
- \$30 million in retrofits underway to reduce energy use in city buildings
- \$530 million in transit since 2016 under the Phoenix Transportation Plan (T2050) for extended bus and paratransit operating hours, and increased local bus frequency to every 30 minutes or less citywide
- 45 miles of cool pavement installed—more than any other city in the world

These actions and others have resulted in a decrease in per capita greenhouse gas (GHG) emissions from 2012 to 2018, which is significant because this occurred when the city’s population grew 12% and the metro area economy grew 26%. The goals identified in the plan will help prepare for the effects of climate change and put the city on a path to reduce GHG emissions by a minimum of 50% by 2030 and to achieve net-zero emissions by 2050.

This Climate Action Plan was developed based on public and stakeholder input on the Climate Action Plan Framework and Draft Climate Action Plan. It separates the goals and actions into the categories of energy, transportation, waste and resilience. Highlighted below are significant goals identified in the plan for the city to achieve the vision:

Significant Climate Actions Included in This Report:

1. Create an **inclusive and equitable city**, prioritizing investments in previously underserved communities, proactively seeking community input on all major climate policy and related budget decisions and embedding equity in all climate actions.
2. Lead by example by transitioning **city operations electrical use to carbon neutral by 2030** through energy use reduction and implementation of local and utility scale solar projects.
3. Reduce community carbon emissions from buildings, transportation, and waste to move toward becoming a **carbon neutral city by 2050**.
4. **Support increased energy efficiency, renewable energy and new electric vehicle charging requirements in building codes**, to achieve carbon neutral buildings city-wide by 2050 with all new construction being net-positive in both energy and materials by 2050.
5. Attract businesses that turn **waste into resources** and create a thriving Resource Innovation Campus by 2030 to put the city on the path to zero waste by 2050.
6. Support and prepare for **280,000 electric vehicles in the city by 2030** and rapidly expand bus and High Capacity Transit (Light Rail and Bus Rapid Transit) to achieve **carbon neutral transportation by 2050**.
7. Support new **land use and development tools**, such as the Walkable Urban Code, to prioritize people arriving by walking, biking, or using transit, thereby reducing dependence on gasoline-fueled single occupancy vehicles; particularly within and connecting to **Transit Oriented Development Districts, Village Cores and Centers** by the year 2050.
8. Become a top tier **Heat-Ready City by 2025**—implementing the Tree and Shade Master Plan by 2030 and building a network of **200 “cool corridors” by 2050**.
9. Continue to lead internationally in water stewardship – providing a **clean and reliable 100-year water supply**.
10. Create and maintain a **healthy, sustainable, equitable, and thriving local food system** with healthy, affordable and culturally appropriate food for all Phoenix residents by 2050.
11. Significantly improve air quality in the region to **meet federal air quality standards**.

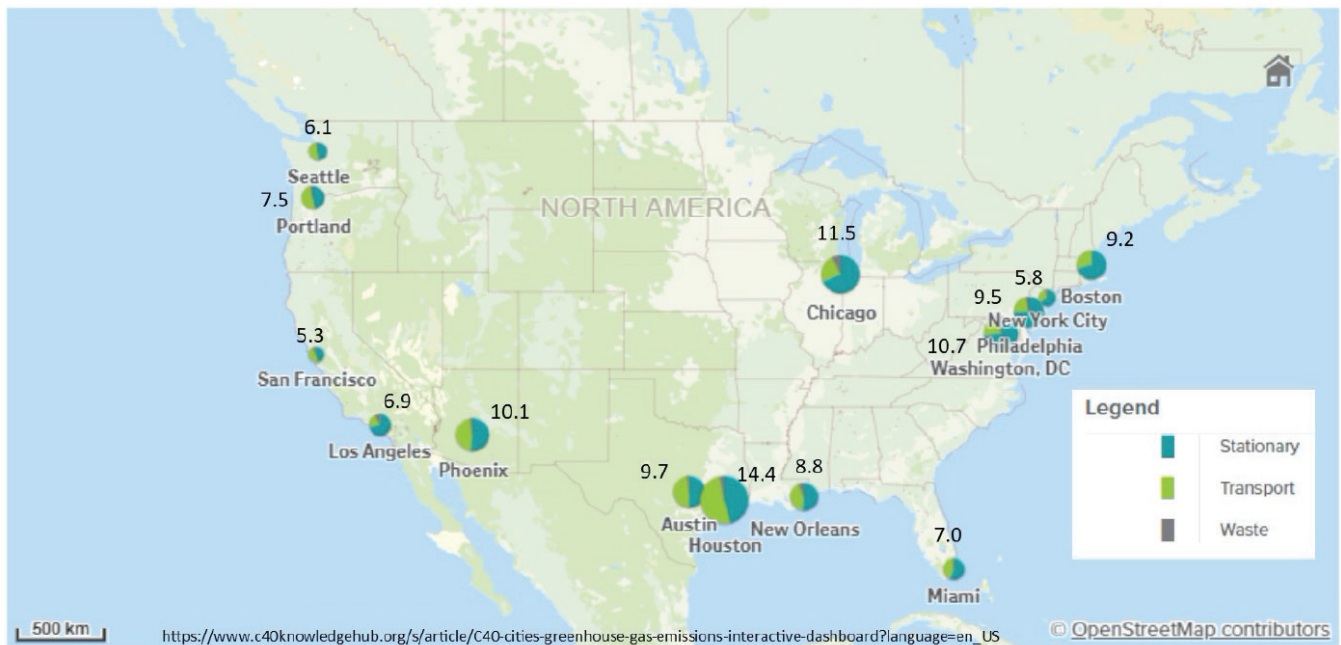
The Pathway to Carbon Neutral by 2050

Phoenix has accomplished many initiatives, programs, and projects that have led to GHG reductions and provided social, economic and environmental benefits. This plan details those accomplishments and maps out actions, some underway now and some proposed, that will reduce GHG emissions in Phoenix. Many actions described in this plan aim at strengthening community resilience and growth. This Plan is dynamic: it is built on community input and data. Because the plan’s very foundation relies on new information, this plan will be updated at least every other year as new information is available, technological innovations are made, and market conditions change.

GHG EMISSIONS IN PHOENIX

The city has completed GHG inventories for both city operations and community wide for several years. The most recent inventory for 2018 showed that GHG emissions were 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 also decreased from 2012 to 2018. The map below shows the per capita emissions in large American cities.

Per Capita Emissions Per Year, C40 Cities (US) June 10, 2021



GHG emissions are inventoried in three sectors: Stationary Energy, Transportation and Waste. The latest inventory from 2018 showed the following:

- **THE STATIONARY ENERGY SECTOR – 51% OF GHG EMISSIONS.**

GHG emissions 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 decreases dependence on fossil fuels and increasingly relies on renewable sources.

- **THE TRANSPORTATION SECTOR - 47% OF GHG EMISSIONS.**

GHG emissions occur from commercial and civil aviation, on road transportation, non-road vehicle use, freight and light rail. **GHG emissions from the Transportation Sector continue to increase along with population growth**, with the majority of emissions resulting from the use of gasoline-fueled vehicles.

- **THE WASTE SECTOR – 2% OF GHG EMISSIONS.**

GHG emissions occur from solid waste disposal, the biological treatment of waste (composting), and wastewater treatment. **The GHG emissions from the Waste Sector have decreased over time** with the installation of landfill gas capture systems and decreasing emissions from decommissioned landfills.

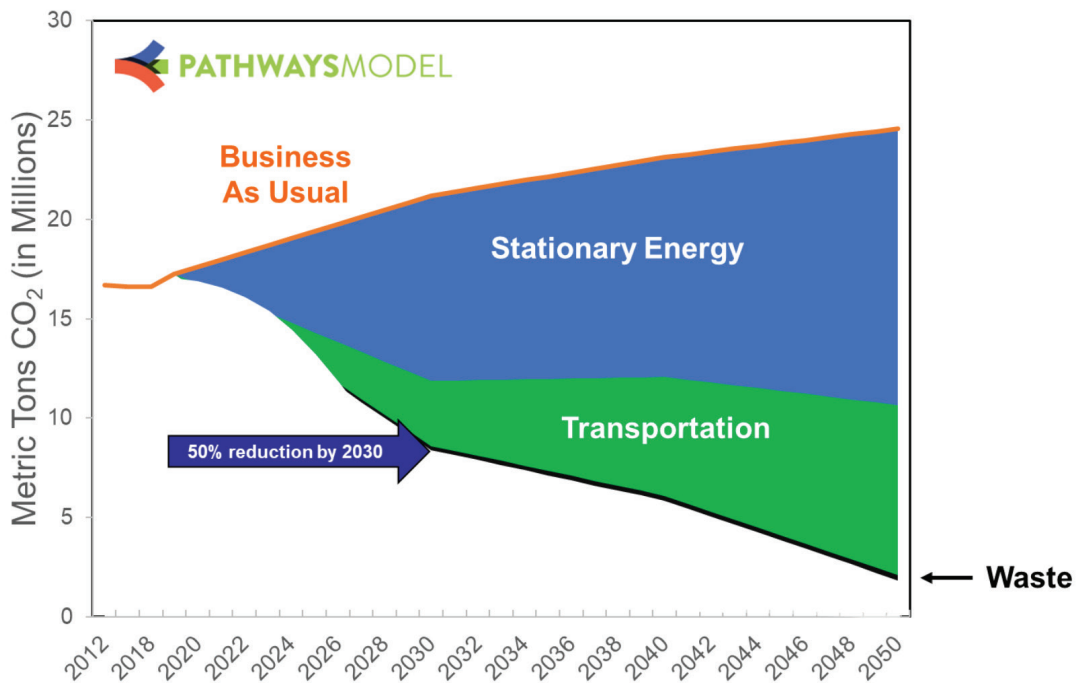
GHG reductions have been estimated using Phoenix data in C40's Pathways model. According to C40 guidance, the city used the most recent GHG inventory and expected population and economic growth to set a baseline or "Business as Usual (BAU)" GHG emissions scenario. The city then modeled planned and proposed climate action strategies and expected market changes to estimate potential GHG emissions reductions by sector.

Actions modeled in stationary energy include electric utilities' grid decarbonization and solar goals and a national executive order to have a carbon pollution-free electricity sector no later than 2035 along with increased use of green gas to power businesses and homes.

Reductions in the transportation sector result from increased investment in a regional active transportation (walking and cycling) network, increased public transit options, and a national executive order to increase sales of electric vehicles, including hydrogen fuel cell electric vehicles, to 50% of all new sales by 2030.

Waste sector reductions result from continued efforts to reduce waste city-wide along with EPA goals to increase recycling to 50% by 2030 and to reduce food loss and food waste by 50% of 2010 values by 2030.

Currently, the city is on track to achieve a 50% GHG emissions reduction (below its 2018 baseline of 16,603,754 MT CO₂e) by 2030 and will strive to go beyond that toward achieving net-zero emissions by 2050.



C40 Pathways model showing 50% reduction in greenhouse gas emissions by 2030 as a result of city's actions as described above and outlined in this plan.

Getting Beyond 50% GHG Emissions Reductions by 2030

The city has identified 50% emissions reductions and seeks to go beyond as possible. This will require collaboration from business, residents, and other government agencies, advancements in technology, market improvements, and potential changes in policy or state legislation to occur. The city has initiated regional discussions with other cities, local and state agencies, nonprofit organizations, and academic institutions to explore partnerships to address climate challenges, such as heat and air quality. Phoenix will continue to develop new partnerships, advocate for policies at the municipal, state, and federal level that will address our challenges, and engage and incorporate community input regularly and often.

THE VISION: 2050 GOALS



GREENHOUSE GAS EMISSIONS REDUCTIONS GOALS:



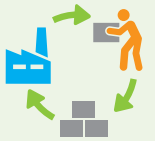
Stationary Energy

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.



Transportation

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.



Waste as a Resource

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

RESILIENCY GOALS:



Air Quality

Phoenix will achieve a level of air quality that is healthy for humans and the environment. Air quality will meet U.S. EPA National Ambient Air Quality Standards and World Health Organization standards, and will achieve a visibility index of good or excellent on 90% of days or more.



Heat

Reduce urban heat-island effect through green infrastructure as well as doubling the current tree and shade canopy to 25%. 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.



Local Food System

Maintain a healthy, sustainable, equitable, and thriving local food system with healthy, affordable, culturally appropriate food for all residents.



Water

Provide a clean and reliable 100-year water supply.

THE PATH FORWARD: GREENHOUSE GAS EMISSIONS REDUCTIONS GOALS

Stationary Energy Sector (SES)

- Goal SES1:** Achieve net-zero GHG emissions for municipal operations electricity use by 2030 through renewable energy projects, energy efficiency upgrades, and utility partnerships.
- Goal SES2:** Support energy-efficiency upgrades to existing buildings throughout the city by developing three new community-wide conservation and renewable-energy programs including educational programs and incentives to conserve energy by 2025.
- Goal SES3:** Promote development of community-wide energy projects, including microgrids, that improve the sustainability and resilience of the surrounding community's electricity grid.
- Goal SES4:** Design and construct all new buildings within the city to Living Building Challenge, Net-Positive Design, or equivalent design standards by 2050.
- Goal SES5:** Support policies and projects that help shape an electricity grid that is net-zero GHG emissions by 2050.

Transportation Sector (TS)

- Goal TS1:** Implement the city's Complete Streets Policy and Active Transportation program to encourage multiple modes of transportation, particularly within and connecting to Transit Oriented Development Districts, Village Cores and Centers.
- Goal TS2:** Increase the community-wide use of low carbon fuels (i.e., fuels other than gasoline and diesel).
- Goal TS3:** Rapidly accelerate electric vehicle (EV) adoption in the community and expand publicly accessible EV charging infrastructure throughout the city to result in 50% of all vehicle sales being electric vehicles by 2030.
- Goal TS4:** Reduce the percentage of single occupant vehicle trips taken to 60% of all trips, through land use and transportation investments that encourage walkable and transit oriented communities while maintaining a thriving economy.

Waste as a Resource (WR)

- Goal WR1:** Implement programs to reduce waste, increase the reuse, recycling and recovery of waste materials and promote social and economic value.
- Goal WR2:** Reduce GHG emissions resulting from the degradation of waste by capturing landfill gas and converting 100% of the methane (up to 1,500 SCFM) from the SR 85 landfill into renewable natural gas as a substitute for fossil natural gas. Have contract executed and facility constructed and operational by March 2023.
- 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.
- Goal WR6:** Reduce GHG from water and wastewater treatment by capturing biogas from treatment processes and increasing renewable sources of energy.

THE PATH FORWARD: RESILIENCY GOALS

Air Quality (AQ)

Goal AQ1: Meet U.S. EPA National Ambient Air Quality Standards (NAAQS).

Local Food System (LFS)

Goal LFS1: All people living in Phoenix will 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 will be recognized as integral to the economy and encouraged to grow and thrive in Phoenix.

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

Goal LFS4: Food-related waste will 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.

Heat (H)

Goal H1: Create a network of 100 cool corridors in vulnerable communities by 2030 to facilitate movement of people walking, biking and using transit, particularly within and connecting to Transit Oriented Development Districts, Village Cores, and Centers.

Goal H2: Increase shade provided by trees or constructed shade in 'flatland parks' (not preserves) and street rights-of-ways to achieve a 25% tree and shade canopy in pedestrian areas by 2030, prioritizing communities most vulnerable to heat, particularly within and connecting to Transit Oriented Development Districts, Village Cores, and Centers.

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 in partnership with ASU by 2025.

Water (W)

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 to 155 GPCD by 2030.