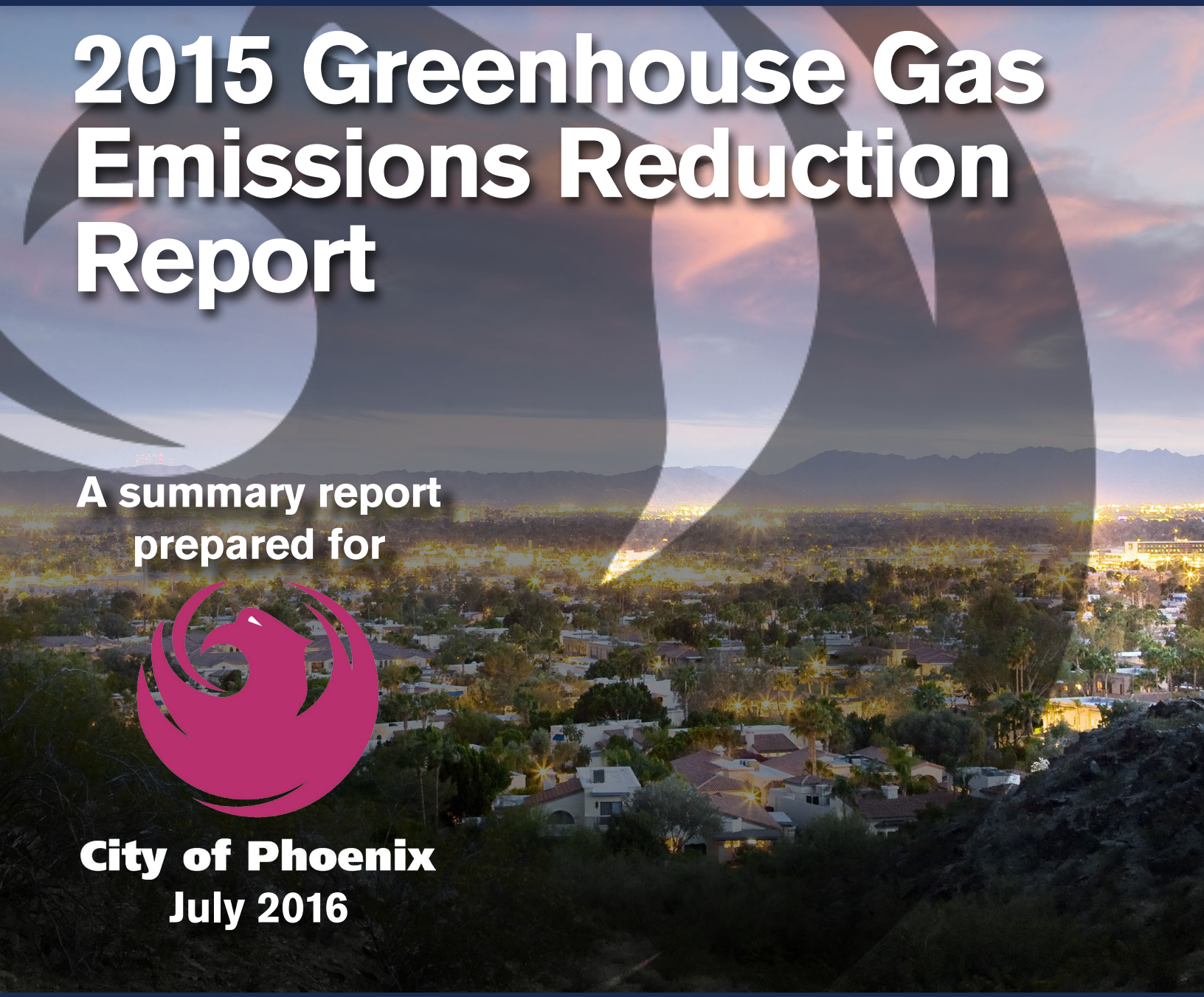
Walton Sustainability Solutions Initiatives

ARIZONA STATE UNIVERSITY

2015 Greenhouse Gas Emissions Reduction Report



A summary report prepared for

City of Phoenix

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sustainabilitysolutions.asu.edu

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In addition, we wish to acknowledge the numerous city departments' staff for supplying the 2015 emissions-related data needed to update the 2005 report originally produced by ICLEI – Local Governments for Sustainability.

Finally, we would like to thank city of Phoenix employees, residents and business owners, who are on the ground supporting the city's efforts and who are working toward reducing their own greenhouse gas emissions. It may seem like we have a long way to go, but as this report proves - we can make a difference.

"Fugitive CH_4 emissions from landfills were reduced by 45% due to the installation of advanced landfill gas capture systems at the Skunk Creek and SR-85 landfills. This percent reduction was the most significant of any city emissions sector.

Estimated as 90% collection efficient, the SR-85 landfill avoids a significant amount of fugitive methane emissions. Landfill gas collection at the other city landfills is estimated to be at a level of at least 75% efficiency."

Excerpt from the city of Phoenix 2015 Greenhouse gas Emissions Inventory for Goverrnent Operations

Foreword

As a city and as a region, our economic future depends on our resilience and preparedness for climate change. The actions we take today will have a lasting impact on the quality of life for future generations. Today, more than ever, we can see the potential effects of climate change and greenhouse gases on our planet. The flooding, drought, wildfires, and longer periods of extreme temperatures have become more commonplace and align with scientists' predictive impacts of higher greenhouse gas levels.

If we hope to reverse the effects of climate change on our planet, it's up to cities to lead the way. That's exactly what we are doing in Phoenix. Controlling greenhouse gas emissions is essential to maintaining a safe, secure, and resilient environment for all Phoenix residents. Using more renewable fuels and energy will certainly reduce our energy bills, improve air quality, and help those with preexisting respiratory conditions. It will also boost our ability to attract and retain high-performing companies and jobs, and protect our city's credit rating.

In 2008, the city of Phoenix sought to reduce its greenhouse gas footprint by 5% below 2005 levels by the year 2015. By 2012 we already had achieved a 7.2% reduction, so we then set a more ambitious goal of 15% reduction by 2015. I am very pleased to announce that, as this report shows, we have met that goal - achieving a 15.6% reduction below 2005 levels. This reduction reflects the innovative, can-do spirit of city staff and residents to make Phoenix more sustainable.

Phoenix has authored one of the best sustainability turnaround stories in the nation, but let's not stop there. Together, we can make an even greater impact - not just for ourselves, but for the future of our children and grandchildren. This report details our work to reduce emissions associated with city operations. Now it's time to expand our focus to involve the entire Phoenix community and lead the way to the sustainable city our future generations deserve.

Greg Stanton

Mayor

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Background

In 2008, Phoenix City Council adopted the following goal:

Reduce greenhouse gas emissions from city operations to 5% below the 2005 levels by 2015

In 2012, three years ahead of schedule, Phoenix exceeded its goal with a reduction of 7.2%. In response to this accelerated reduction curve and to continue to position itself as a national leader, the Phoenix City Council adopted a new goal to reduce greenhouse gas (GHG) emissions to 15% below 2005 levels by 2015.

Completion of the city of Phoenix 2015 Greenhouse Gas Emissions Inventory for Government Operations shows that ***Phoenix has again exceeded its goal and reduced GHG emissions by 15.6%*** between 2005 and 2015.

Phoenix partnered with ASU's Global Sustainability Solutions Services to assess its current standing by conducting a GHG emissions inventory update. The inventory compared city emissions from 2005 and 2015 created by city operations as a means of evaluating the effectiveness of Phoenix's continued emissions reduction efforts to date.

This report revealed the largest contributors to Phoenix's GHG emissions and identified areas where city efforts have made the largest impact. Tracking emissions over time will allow Phoenix to evaluate the effectiveness of its emissions reduction policies and programs. Furthermore, the inventory provides a platform for Phoenix to develop best practices for reducing its carbon footprint.

Phoenix reduced its emissions in almost every category.

2015 Overall Findings
15.6% decrease - *15.6% beyond Phoenix's original 2015 Goal*
206,095 MT CO_2e avoided since 2005

City Action Highlights
Advanced landfill gas capture systems (48,367 MT CO_2e reduction)
Water Services solar power generation (27,999 MT CO_2e reduction)
Energy efficiency measures in over 45 city buildings (17,281 MT CO_2e reduction)
Biodiesel and ethanol alternative fuel programs (12,855 MT CO_2e reduction)

Background

Milestones

Due to their regional boundaries and shared resources, cities have a natural potential to be sustainable. Over the years, Phoenix has become increasingly involved in finding sustainable solutions that make the city more resilient.

Valley of the Sun Clean Cities Coalition
- When? 1997
- What? Advocates for and participates in clean domestic energy practices

Tree & Shade Master Plan
- When? 2010
- What? Directs programs, policies, and infrastructure that achieve an average 25% tree canopy coverage by 2030

Energize Phoenix
- When? 2010
- What? Creates a 10 square mile model of urban efficiency along the light rail by facilitating residential and commercial energy saving behaviors and building upgrades

Reinvent Phoenix
- When? 2012
- What? Creates sustainability plans for five districts, which act as pilot projects for innovative policies, infrastructure, and programs

Reimagine Phoenix
- When? 2013
- What? Educates residents and businesses, develops partnerships and creates solid waste programs to divert 40% or trash from landfills by 2020

Measuring Emissions

What's The Source?

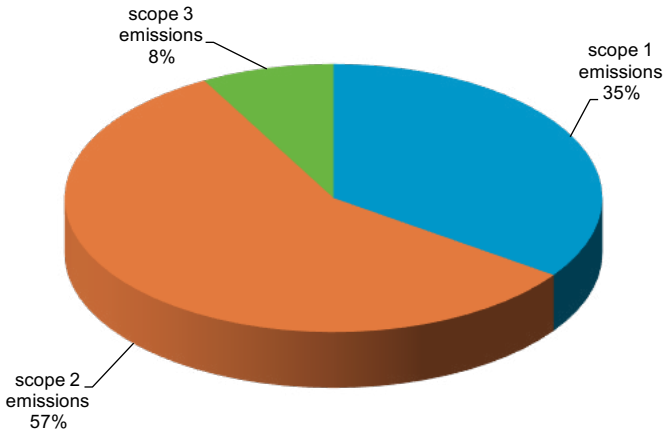
The city of Phoenix 2015 Greenhouse Gas Emissions Inventory for Government Operations identified sources of greenhouse gas emissions in city operations by both scope and sector.

Scope 1 emissions are those generated directly by city operations.

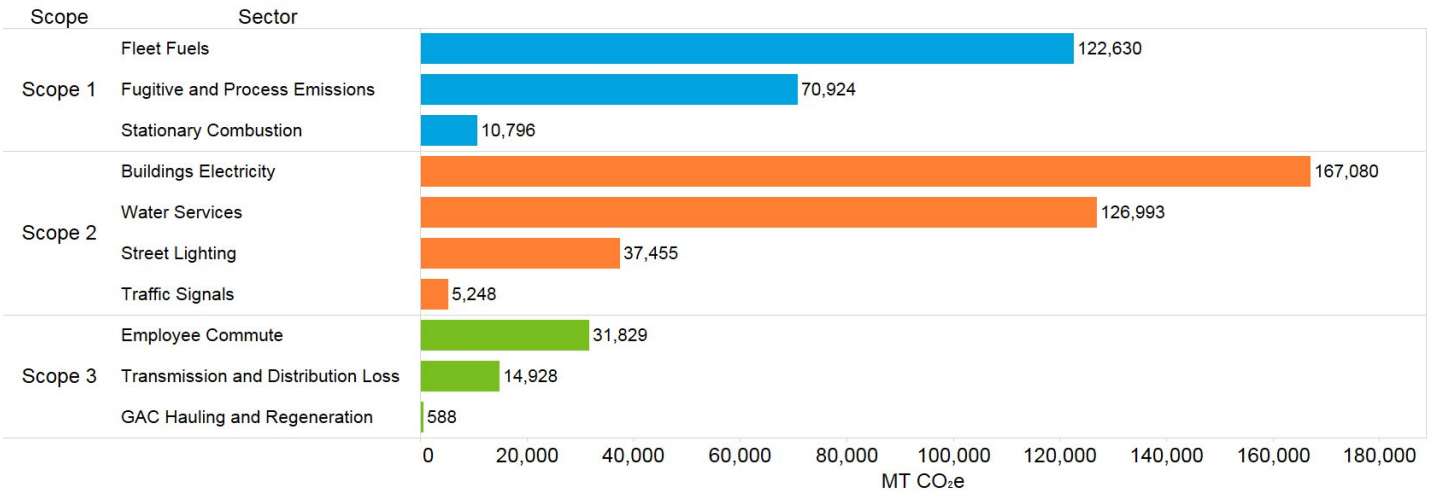
Scope 2 and 3 emissions are indirect sources of emissions from activities related to city operations but not owned or controlled by Phoenix.

The sectors—buildings and facilities, city vehicle fleet, wastewater treatment, solid waste, employee commuting, granulated activated carbon (GAC) hauling, and regeneration for water treatment—make the findings more relevant to Phoenix's policy making and project management.

Municipal Operations by Scope, 2015



Total GHG emissions related to city of Phoenix operations in 2015 was 588,153 MT CO_2e emissions.



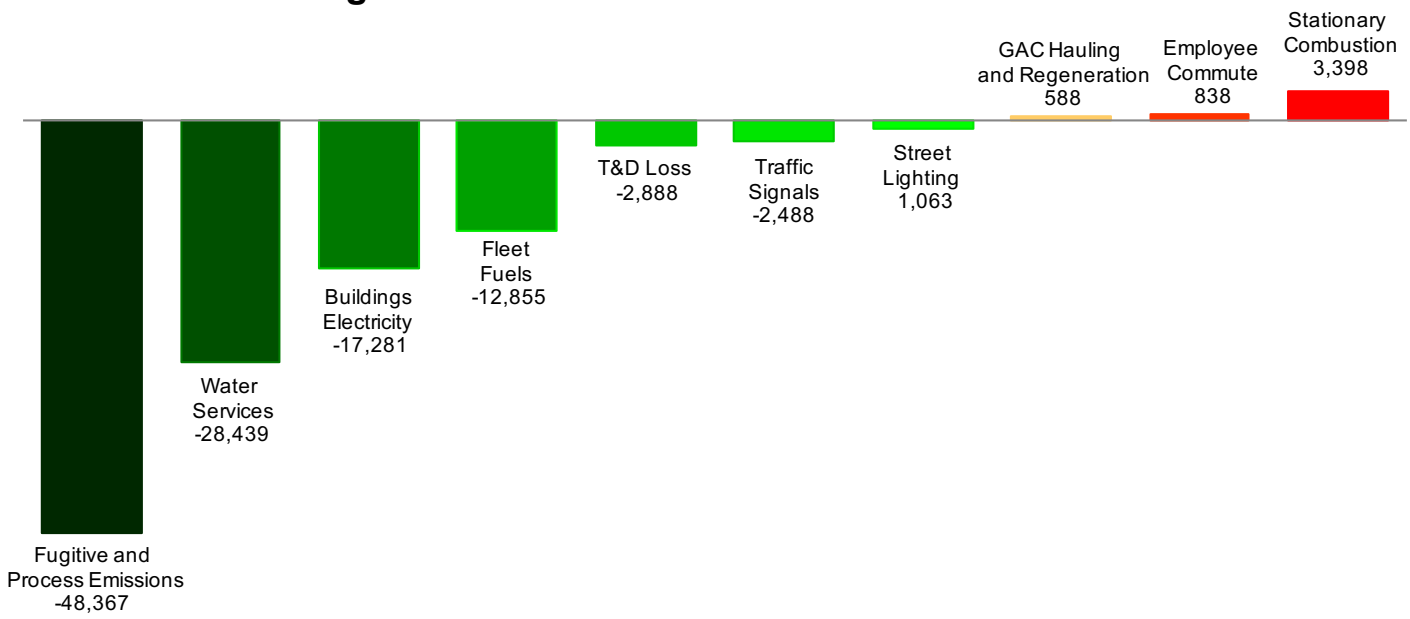
[GHG emissions are measured as metric tons of carbon dioxide equivalent or MT CO_2e. This is consistent with the established international standard for comparison of the global warming potential of different GHGs relative to CO_2e.]

Measuring Emissions

Significant Reductions

In 2005, a baseline GHG emissions inventory was conducted. Between 2005 and 2015, emissions decreased by 15.6%, from 696,709 to 588,153 metric tons CO_2e. The 2015 inventory update enables Phoenix to evaluate its progress in lowering emissions from its operations.

Changes in GHG Emissions Between 2005 and 2015



Top Sectors

Fugitive and Process Emmissions

Increase of the efficiency of Phoenix landfill gas collection systems prevented 48,367 MT CO_2e from being released into the atmosphere.

Water Services

Onsite solar power generation avoided 28,439 MT CO_2e of emissions from electricity consumption by Water Services.

Buildings and Facilties

Renewable energy programs including an increase in onsite solar power generation produced a reduction of 17,281 MT CO_2e.

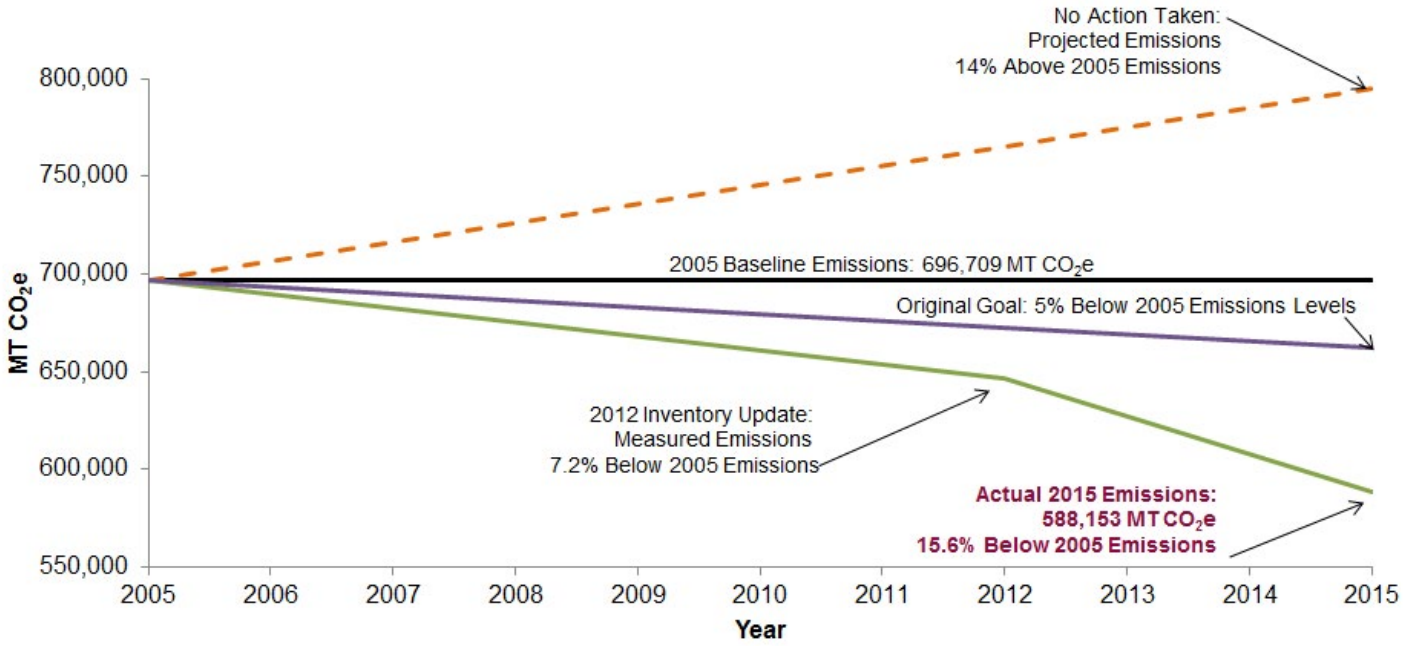
City Vehicle Fleet

Transition from liquid natural gas and diesel to less carbon-intensive CNG and B20 fuels decreased Phoenix fleet emissions by 12,855 MT CO_2e, or 9.5%.

[Note: due to corrections in methodology, the 2005 total increased from 618,682 metric tons CO_2e to 696,709 metric tons CO_2e.]

Measuring Emissions

Where Are We Headed?



Although Phoenix has met and surpassed its original goal, the city continues to implement several projects that will further reduce GHG emissions. This will allow the city to offset future GHG emissions due to anticipated population growth as well as maintain the highest quality of life in the city and the region.

Through these measures, and by actively working to reduce GHG emissions from local governmental operations, Phoenix has avoided the emission of 206,095 MT CO_2e. This reduction is the difference between projected business-as-usual and actual, measured 2015 GHG emissions.

As Phoenix continues to grow, it also has an opportunity to work with neighboring cities and make a global impact. The challenge is formidable and cannot be met overnight. Infrastructure will have to change, technologies developed, and policies enacted, but Phoenix embraces the challenge and invites other municipalities in the Valley to join it.

ONGOING PROJECTS

Alternative Fuel Program Expansion
Convert additional fleet vehicles to alternative fuels, such as biodiesel and ethanol

Streetlight and Traffic Light Retrofitting
Conversion 2,258 streetlights and all traffic lights to LED lighting

SR-85 and Skunk Creek Landfill Biogas Projects
Capture of methane gasses with efficiencies as high as 90%

Solar Power Installations
Installation of solar power systems at Sky Harbor, Lake Pleasant Water Treatment and other facilities to generate 15.3 MW of power

Actions

2050 Environmental Sustainability Goals

On April 12, 2016, the city of Phoenix adopted a new set of Environmental Sustainability Goals to be achieved by 2050 defined by “Improving quality of life for all while enhancing nature.”

Through extensive public outreach and collaboration across municipal departments, goals were assigned to seven distinct categories:

1. TRANSPORTATION

Transit in every Phoenix neighborhood

90% of residents within 10-minute walk of transit

40% of commutes by walking, biking, transit and car-share

2. WASTE

Zero Waste through participation in the Circular Economy

40% waste diversion by 2020

3. BUILDINGS AND LAND USE: Reduce community carbon emissions by 80-90% with the longer term 2060 goal of becoming a carbon-neutral city.

25% tree and shade canopy

New buildings are Net Positive in energy and materials

15 vibrant Urban Villages

4. WATER STEWARDSHIP

Maintain a clean and reliable 100 year supply of water

5. PARKS, PRESERVES AND OPEN SPACES

Parks or Greenways in every neighborhood

Everyone within a 5-minute walk to a Park or Greenway

300 miles of pathways and walkable vibrant canals

6. CLEAN AIR

Out-perfrom Federal clean air standards

Excellent or good visibility on 90% of days

7. LOCAL FOOD SYSTEMS

Eliminate food deserts

Develop thriving, vibrant and equitable food systems

Actions

ASU Proposed Measures

The city of Phoenix's momentum can be built upon by continuing to take bold actions to identify the sources of emissions in Phoenix, evaluate the effectiveness of climate action programs, and prepare vulnerable city resources and populations for continued growth and climate change impacts.

The authors of this report propose five measures, which can be used by Phoenix government and the community to lower emissions and create a resilient metropolitan region.

1. Set new GHG Emissions Reductions Goal for Municipal Operations

The city of Phoenix has achieved its 2015 GHG emissions reductions goal for municipal operations. Therefore, Phoenix should evaluate current operations and set new GHG emissions reductions goals for 2020, 2030 and beyond looking toward the 2060 Carbon Neutrality Goal.

2. Create GHG Reduction Targets Aligned with 2050 Sustainability Targets

The city of Phoenix should set internal GHG emissions reduction targets for commuting, waste diversion, and new building construction that correlate with the 2050 Sustainability Goals by developing programs to reduce commuting by single occupancy vehicles, achieve zero waste in municipal operations, and ensure new Phoenix buildings are Net Positive.

3. Complete a Community GHG Emissions Inventory

A community-scale GHG emissions inventory would ensure that the city of Phoenix's efforts are effective, encourage collaboration across Phoenix and identify additional opportunities for reducing emissions in residential, commercial, and industrial areas. A community-scale GHG emissions inventory would provide a baseline for the Phoenix's carbon neutrality goals.

4. Conduct a GHG Emissions Inventory of City Purchasing

GHG emissions are not contained by city boundaries. Phoenix should be cognizant of the GHG emissions impacts of its purchasing decisions to bolster and increase the impact of sustainable purchasing policies. A GHG emissions inventory of municipal purchasing would allow Phoenix to reduce the financial and environmental costs of purchasing.

5. City GHG Emissions Dashboard

Transparency and accountability are critical in ensuring that emissions reduction efforts remain active. As the city of Phoenix develops robust data on its GHG emissions, it should pursue developing an online GHG dashboard to present the results of emissions inventories in an easily accessible way for city staff, other municipalities and the public.