

2018 Greenhouse Gas Emissions Reduction Report

A summary report
prepared for



City of Phoenix
April 2020

Acknowledgements

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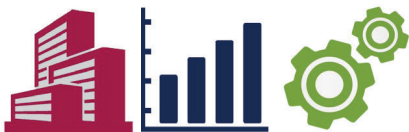
We would like to recognize the financial support from the City of Phoenix's Aviation, Public Works, Water and Transit Departments. In addition, we wish to acknowledge the numerous city departments' staff for supplying the data needed to produce the 2018 Greenhouse Gas Emissions Inventory for Government Operations.

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.

“Between 2005 and 2018, the Arizona-New Mexico regional electricity grid became less GHG intensive by 22%. A less GHG intensive regional electricity grid has led to the reduction of emissions by 88,028 MT CO₂e

City efforts to build and purchase solar power has led to a reduction of 10,414 MT CO₂e, of which 9,116 MT CO₂e resulted from solar power projects developed by the Water Services Department. The City now generates 3.4% of all electricity consumed by government operations”

Excerpt from the City of Phoenix 2018 Greenhouse Gas Emissions Inventory for Government Operations



2018 City of Phoenix Greenhouse Gas Emissions Reductions Summary Report

Prepared by the ASU Rob and Melani Walton Sustainability Solutions Service and the NAU School of Informatics, Computing and Cyber systems

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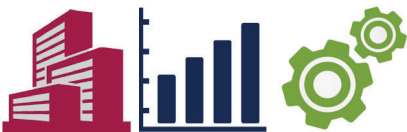
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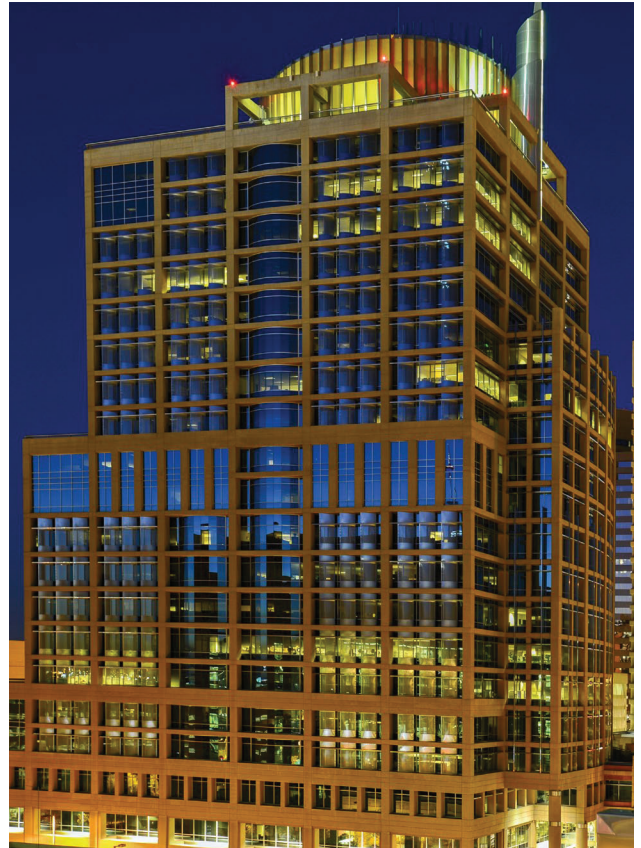


Background

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 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 showed that Phoenix exceeded this goal. In 2017, Phoenix updated its government operations GHG emissions reduction goal to 40% below 2005 levels by 2025. In 2020, Phoenix became a member of C40 Cities and adopted the goal of achieving net zero carbon by 2050. The City of Phoenix 2018 Greenhouse Gas Emissions Inventory for Government Operations provides updated information for tracking progress toward the 2050 goal.



Phoenix has a long history of partnership with ASU's Global Sustainability Solutions Services to assess its current standing by conducting a GHG emissions inventory update. This partnership allows for a continuity and familiarity with municipal operations data that increases the quality of the emissions inventory. The inventory compared emissions from 2005 and 2018 created by city operations as a means of evaluating the effectiveness of Phoenix's continued emissions reduction efforts to date. This report revealed the sources of Phoenix's GHG emissions and identified areas where city efforts have made the largest impact. Tracking emissions over time allows Phoenix to evaluate the effectiveness of its emissions reduction policies and programs. Furthermore, the inventory provides a platform for Phoenix to develop best practices continuing to reduce its carbon footprint.

2018 Overall Findings

15.4% decrease from 2005

110,442 MT CO₂e decrease in annual emissions since 2005

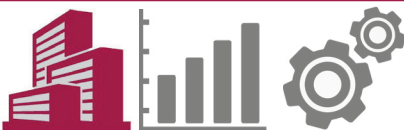
City Action Highlights

Advanced landfill gas capture systems (22,342 MT CO₂e reduction)

Water Services solar power generation (9,116 MT CO₂e reduction)

Energy efficiency measures like completed installation of nearly 100,000 LED street lights and traffic signals (10,090 MT CO₂e reduction)

Biodiesel and CNG alternative fuel programs prevented 22,064 MT CO₂e of GHG emissions



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Background

Ongoing Projects

Sustainable Food Systems

- 2015 – Healthy food system goal adopted into the General Plan, PlanPHX.
- 2020 – City Council approved the 2025 Phoenix Food Action Plan to promote a healthy, sustainable, equitable, and thriving local food system with healthy food for all.

Buildings and Facilities

- Increasing renewable energy to city operations
- Partnerships with APS/SRP
 - APS Solar Generation Facility – 10 MW
 - Lake Pleasant Solar Generation Facility – 7.5 MW
- \$30 million in building retrofits to increase building efficiency by 20%.
- First city to adopt International Energy Conservation Code's 2018 International Building Code

City Vehicle Fleet

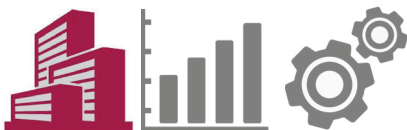
- Alternative Fuel Programs:
 - City Vehicle Fleet continues to transition liquid natural gas and diesel to less GHG-intensive compressed natural gas and biogenic fuels.
 - Public Works, in partnership with Mr. Bults Inc. (MBI), were the recipients of a United States Environmental Protection Agency Diesel Emissions Reduction Act (DERA) grant to replace heavy duty diesel refuse trucks. This project will be implemented using \$1,000,000 in DERA grant funding combined with \$2,194,693 in cost-share funds from Public Works and MBI to replace diesel refuse trucks. This project will replace 9 Class 8 diesel refuse trucks, and 1 MBI long haul refuse truck, with model year 2019 Class 8 trucks powered by compressed natural gas engines certified to meet the California Air Resources Board's most stringent optional low NO_x emission standard.
- Construction of PHX Sky Train, electrically powered, at PHX Sky Harbor to be completed by 2022 is reducing need for fleet powered by compressed natural gas.

Water

- Colorado River Drought Contingency Plan: Phoenix Water Services effectively negotiated in the Arizona implementation of the Colorado River Drought Contingency Plan to maintain protection of existing priority system for Colorado River water in Central Arizona and system conservation in the plan.
- Water Loss Committee: The efforts of the Department's Water Loss Committee resulted in a reduction of our Lost and Unaccounted for Water reported to the Arizona Department of Water Resources of nearly one billion gallons year over year.
- Construction of the Drought Pipeline Project to begin in Fall 2020 to be able to provide water to North Phoenix as the drought persists and CAP limits are imposed.
- Partnered with Ameresco to construct a \$25 million facility to treat and sell biogas, which contains natural gas, from 91st Wastewater Treatment Plant.

Solid Waste

- Reimagine Phoenix:
 - 2017 – Construction of state-of-the-art \$15 million compost facility to divert organic waste.
 - 2019 – Partnered with Stardust Building Supplies to pursue deconstruction rather than demolition to divert materials from the landfill.
 - 2020 – 36% of solid waste is being diverted from landfills with goal of 40% by end of 2020.



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Background

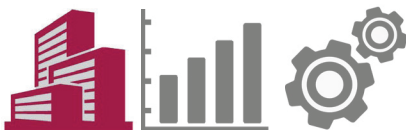
Ongoing Projects (continued)

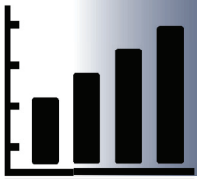
Heat Ready City

- 2018 – Established first-of-its-kind Heat Ready Program that was recognized in the Bloomberg Philanthropies Mayors Challenge Champion City program.
- Citizen Forester Program 2.0 – The Volunteer Office led the relaunch of the Citizen Forester Program certifying 20 Citizen Foresters and planting more than 200 trees this year. The program continues to grow with support from an AmeriCorps VISTA member working in the City Manager's Office and a \$50,000 Phoenix IDA grant to fund community led heat-mitigation projects to support HeatReady Phoenix.
- We're Cool 2019 – Volunteer Phoenix led the fourth annual We're Cool campaign, in partnership with the Human Services Department and the Office of Homeland Security and Emergency Management, to connect low-income communities to cooling centers, heat safety information and support during the summer months with the help of 400 youth volunteers.
- 2020 – Planning and Development writing zoning code to ensure trees are planted and maintained.

Transportation Initiatives

- Connected Phoenix
 - Added 2.4 million service miles
 - 16.5 miles of light rail have been constructed
 - 37 RAPID buses have been ordered for use in 6 routes
 - 122 improved shelters installed to replace older shelters.
 - 61 transit shelters installed at bus stops that previously had no shade.
 - 49 bus stops have been improved in line with ADA requirements.
 - 567 solar lighting kits installed on new and existing transit shelters
- New Bus and Dial-A-Ride Vehicles – In 2019, Public Transit added 26 new buses and 25 Dial-a-Ride vehicles to its fleet to replace aging buses. The department adds new vehicles each year to modernize the fleet, which in turn provides the region's bus passengers with an overall more efficient and dependable bus service, as well as vehicles that are more fuel efficient and include the latest clean fuel technology.
- eScooter Pilot Program Launch – The Street Transportation Department launched the Downtown Shared eScooter Pilot Program to provide a micro-mobility solution for our residents and visitors.
- Parking Protected Bicycle Lanes – The Street Transportation Department installed the City's first and second parking protected bicycle lanes through the Accelerated Pavement Maintenance Program.
- Street Landscape Improvements – 700 trees planted along with increased service levels and irrigation audits for street landscaping and irrigation maintenance, which will result in reduced water consumption, save money and help make Phoenix streets more walkable.
- Liberty Lane Street Improvements – A 4.5-foot buffer was added to the bike lanes on Liberty Lane, creating more space between motor vehicles and bicyclists/pedestrians, resulting in improved safety for all users of the roadway.
- 2015 – Adopted Walkable Urban Code, an urban and transit-oriented zoning code
- 2020 – The Grand Canalscape, a nearly 12-mile continuous multimodal trail system from Glendale to Tempe, was completed.





Measuring Emissions

What's The Source?

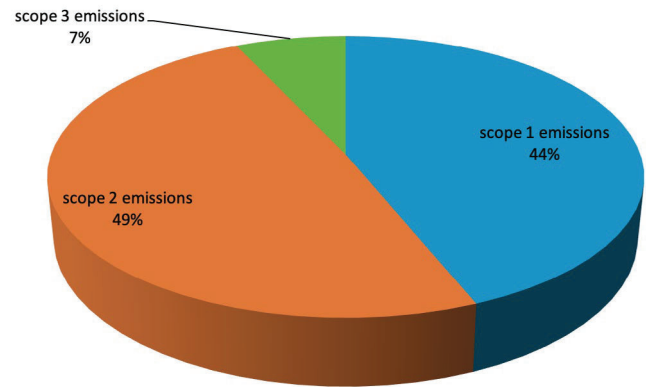
The City of Phoenix 2018 Greenhouse Gas Emissions Inventory for Government Operations identified sources of greenhouse gas emissions in city operations by both scope and sector.

Scope 1 emissions are those generated directly by city operations.

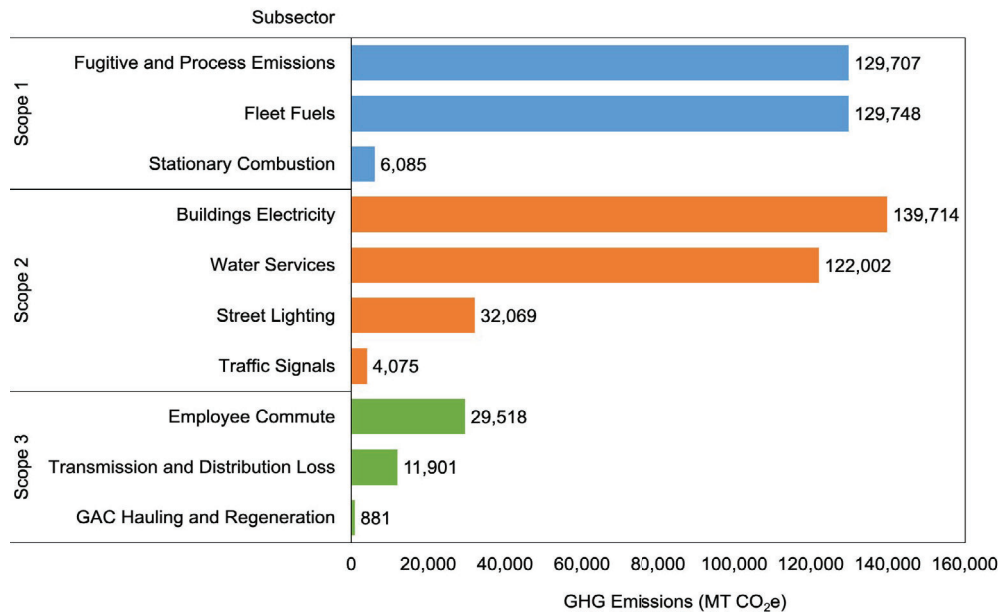
Scope 2 and 3 emissions are indirect sources of emissions from activities related to city operations but not owned or controlled by Phoenix.

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.

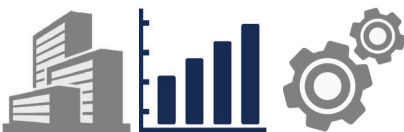
Government Operations by Scope, 2018

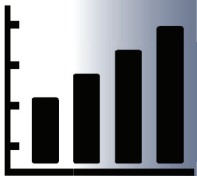


Total GHG emissions related to City of Phoenix operations in 2018 was 605,701 MT CO₂e emissions.



[GHG emissions are measured as metric tons of carbon dioxide equivalent or MT CO₂e. This is consistent with the established international standard for comparison of the global warming potential of different GHGs relative to CO₂e.]

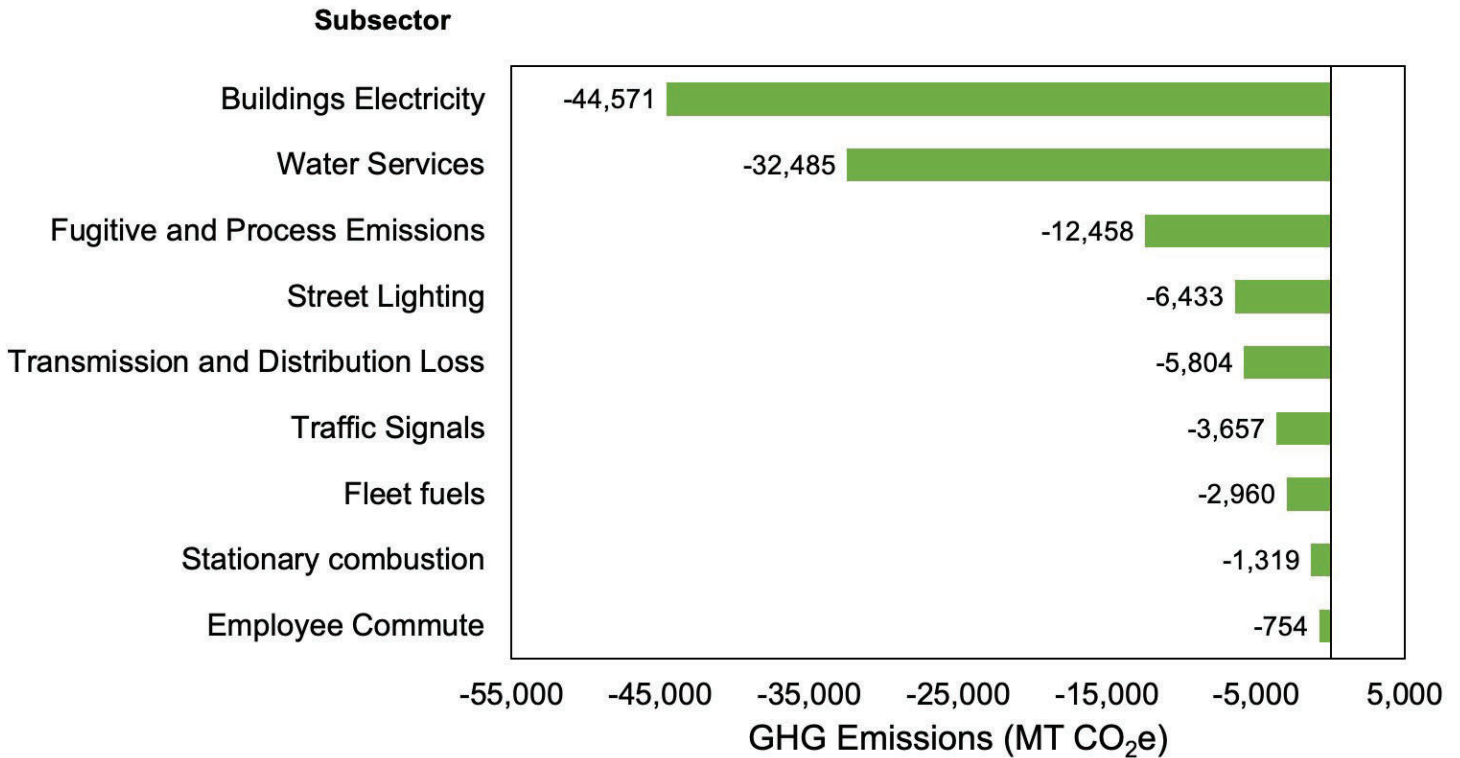




Measuring Emissions

Significant Reductions

In 2005, a baseline GHG emissions inventory was conducted. Between 2005 and 2018, emissions decreased by 15.4%, from 716,143 to 605,701 metric tons CO₂e. The 2018 inventory update enables Phoenix to evaluate its progress towards lowering emissions from its operations to reach the goal of net zero by 2050.



Top Sectors

Fugitive and Process Emissions

Increased landfill gas collection efficiency helped decrease fugitive and process emissions by 12,458 MT CO₂e from being released into the atmosphere.

Water Services

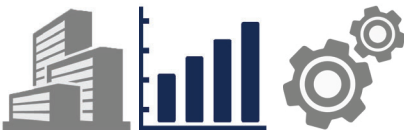
Onsite solar power generation by Water Services has reduced GHG emissions from electricity consumption by 9,116 MT CO₂e.

Buildings and Facilities

GHG emissions from Buildings & Facilities have fallen 89,347 MT CO₂e.

City Vehicle Fleet

Transition from liquid natural gas and diesel to less carbon-intensive CNG and B20 fuels helped decrease fleet emissions by 2,960 MT CO₂e, or 2.2%.





Actions

Recommended Measures

The City of Phoenix's momentum can be built upon by continuing to take bold actions to identify and reduce the sources of emissions in Phoenix, update and evaluate the effectiveness of mitigation programs, and prepare vulnerable city resources and populations for continued growth to create a resilient metropolitan region. The following are recommended measures that can be accomplished in consultation with the City and its departments, under the leadership of the City Council and the City Manager's Office.

1. Meet new GHG Emissions Reductions Goal for Municipal Operations

The City of Phoenix achieved its 2015 GHG emissions reductions goal for municipal operations. Therefore, Phoenix should evaluate current operations and work to meet the goal set for 2025 and beyond looking toward the 2050 Carbon Neutrality Goal.

2. Conduct a Consumption-Based GHG Emissions Inventory

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. By conducting this consumption-based inventory, the GHG emissions resulting from the production, shipping, use, and disposal of items and services purchased by the City can be included in resulting municipal operations emissions inventories to gain a better picture of the GHG emissions. This information can then be used to make decisions to reduce the financial and environmental costs of city purchasing.

3. Create a City of Phoenix GHG Emissions Dashboard

Transparency and accountability are critical in ensuring that emissions reduction efforts remain active. As the City continues to develop robust data on its GHG emissions, it should pursue developing an online GHG dashboard to be displayed on the City's Open Data portal to present the results of emissions inventories in an easily accessible way for city staff, other municipalities and the public.

4. Update the Phoenix Climate Action Plan by the end of 2020

In 2020, the City of Phoenix became a C40 city. By the end of 2020, the City must have a climate action plan that aligns with the Paris Agreement. This requires that a pathway to an emissions neutral city by 2050 must be transparently created that also includes mitigation and adaptation goals with progress reported through Carbon Disclosure Project, among others.

5. Adaptation and Mitigation Technologies Pilot Program

Design pilot programs to address different climate change effects, ranging from multimodal transit studies to creation of clean air zones. Phoenix can introduce technologies, such as direct air capture systems in locations with higher air pollution that will eliminate air pollutants, including carbon dioxide. This will allow the City to investigate the costs and benefits of each pilot program and be able to scale up successful, cost-effective programs throughout the city.

6. Regional Resiliency Plan

Develop a plan that will address greenhouse gas emissions and increase the resilience of the greater Phoenix metropolitan area through regional coordination under the Maricopa Association of Governments. Regional cooperation will lead to increased economic opportunities by leveraging public and private investments that can be used to ensure long-term economic growth. The plan will also build public awareness of the climate-related risks and allow for improved collaboration to seek solutions that will work for all members of the community.