MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

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Definitions and Acronyms

Acronym or Abbreviation	Definitions
ASU	Arizona State University
AZDHS	Arizona Department of Health Services
CCAP	Comprehensive Climate Action Plan
CDC	The Centers for Disease Control and Prevention
CEJST	Climate and Economic Justice Screening Tool
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COG	Council of Governments
CPRG	Climate Pollution Reduction Grants
DEMA	Arizona Department of Emergency and Military Affairs
DOT	U.S. Department of Transportation
EHE	Extreme Heat Event
EI	Emissions Inventory
EPA	Environmental Protection Agency
EV	Electric Vehicle
FUDS	Formerly Used Defense Sites
GHG	Greenhouse Gas
HFCs	Hydrofluorocarbons
HS	High School
HVAC	Heating, Ventilation, and Air Conditioning
ICE	Internal Combustion Engine
IRA	2022 Inflation Reduction Act
kWh	Kilowatt-hour
LED	Light Emitting Diode
LIDAC	Low Income Disadvantaged Communities
MAG	Maricopa Association of Governments
MCAQD	Maricopa County Air Quality Department
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
$MTCO_2e$	Metric Tons of Carbon Dioxide Equivalents
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NF_3	Nitrogen Trifluoride
NOIP	Notice of Intent to Participate
O_3	Ground Level Ozone
Pb	Lead
PDEQ	Pima Department of Environmental Quality

PFCs	Perfluorocarbons
PM	Particulate Matter
PM-10	Particulate matter with diameters 10 micrometers and smaller
PM-2.5	Particulate matter with diameters 2.5 micrometers and smaller
RMP	Risk Management Plan
SF_6	Sulfur Hexafluoride
SO_2	Sulfur Dioxide

Introduction

CPRG Overview

On March 1, 2023, the Environmental Protection Agency (EPA) announced the availability of $250 million in planning grants to reduce climate pollution and build clean energy economies. This funding was part of the $5 billion Climate Pollution Reduction Grants (CPRG) program funded through the 2020 Inflation Reduction Act. The EPA CPRG program is split into two phases, a planning phase and an implementation phase. In the planning phase, eligible entities were able to seek funding from EPA in a noncompetitive process to develop plans to reduce greenhouse gas (GHG) emissions. Eligible regions for the planning grants included all 50 states, the District of Columbia and Puerto Rico, each of the 67 most populous metropolitan areas in the country, and territory and Native nation governments. Included in the most populous metropolitan areas was the Phoenix-Mesa-Chandler metropolitan statistical area (MSA), which includes all of Maricopa County, Arizona and Pinal County, Arizona. Under the newly created Clean Air Act section 137(d)(1), entities who were eligible to participate in the CPRG Planning Grant program included states, Native nations, municipal governments, councils of governments (COG), and air pollution control agencies. On September 20, 2023, EPA announced the availability of $4.6 billion across two grant competitions for the implementation phase of the CPRG program. This included $4.6 billion for a general competition[1] and $300 million for a tribes and territory only competition[2].

The Maricopa Association of Governments (MAG) is a COG and metropolitan planning organization (MPO) that provides a forum for local governments to work together on issues that affect the lives of everyone in the greater Phoenix, Arizona region. MAG is a COG that represents 27 cities and towns, three Native nations, Maricopa County, and portions of Pinal County. Members include representatives from the incorporated cities and towns in Maricopa County as well as the City of Maricopa, Town of Florence, Maricopa County, Pinal County, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Fort McDowell Yavapai Nation, and the Arizona Department of Transportation. Figure 1 below contains a map of MAG members' Municipal Planning Areas. MAG is a regional agency that conducts planning and makes policy decisions in a number of core areas. These include safe and smart travel, the economy and growth, environment and sustainability, and improving quality of life.

On April 26, 2023, the MAG Regional Council authorized MAG to submit a Notice of Intent to Participate (NOIP) in the CPRG Planning Grant program as the lead planning agency for the Phoenix-Mesa-Chandler MSA. On April 26, 2023, MAG submitted a NOIP to EPA for the CPRG Planning Grant program. On May 30, 2023, MAG submitted a program application for the CPRG Planning Grant program. On July 26, 2023, EPA notified MAG that it has been selected to serve as lead planning organization for the CPRG Planning Grant program for the Phoenix-Mesa-Chandler MSA. On August 9, 2023, the MAG Management Committee recommended approval of amendments and modifications to the MAG Fiscal Year 2024-2025 Biennial Unified Planning Work Program and Budget to accept the CPRG Planning Grant program funds. On August 23, 2023, the MAG Regional Council approved amendments and modifications to the MAG Fiscal Year 2024-2025 Biennial Unified Planning Work Program and Budget to accept the CPRG

[1] U.S. Environmental Protection Agency. Climate Pollution Reduction Grants Program: Implementation Grants General Competition. Notice of Funding Opportunity. EPA-R-OAR-CPRGI-23-07. Revised January 16, 2024.
[2] U.S. Environmental Protection Agency. Climate Pollution Reduction Grants Program: Implementation Grants Competition for Tribes and Territories. Notice of Funding Opportunity. EPA-R-OAR-CPRGT-23-09. Revised December 15, 2023.

Planning Grants funds. In addition to MAG receiving CPRG Planning Grant program funds, the following entities in Arizona also received funds:

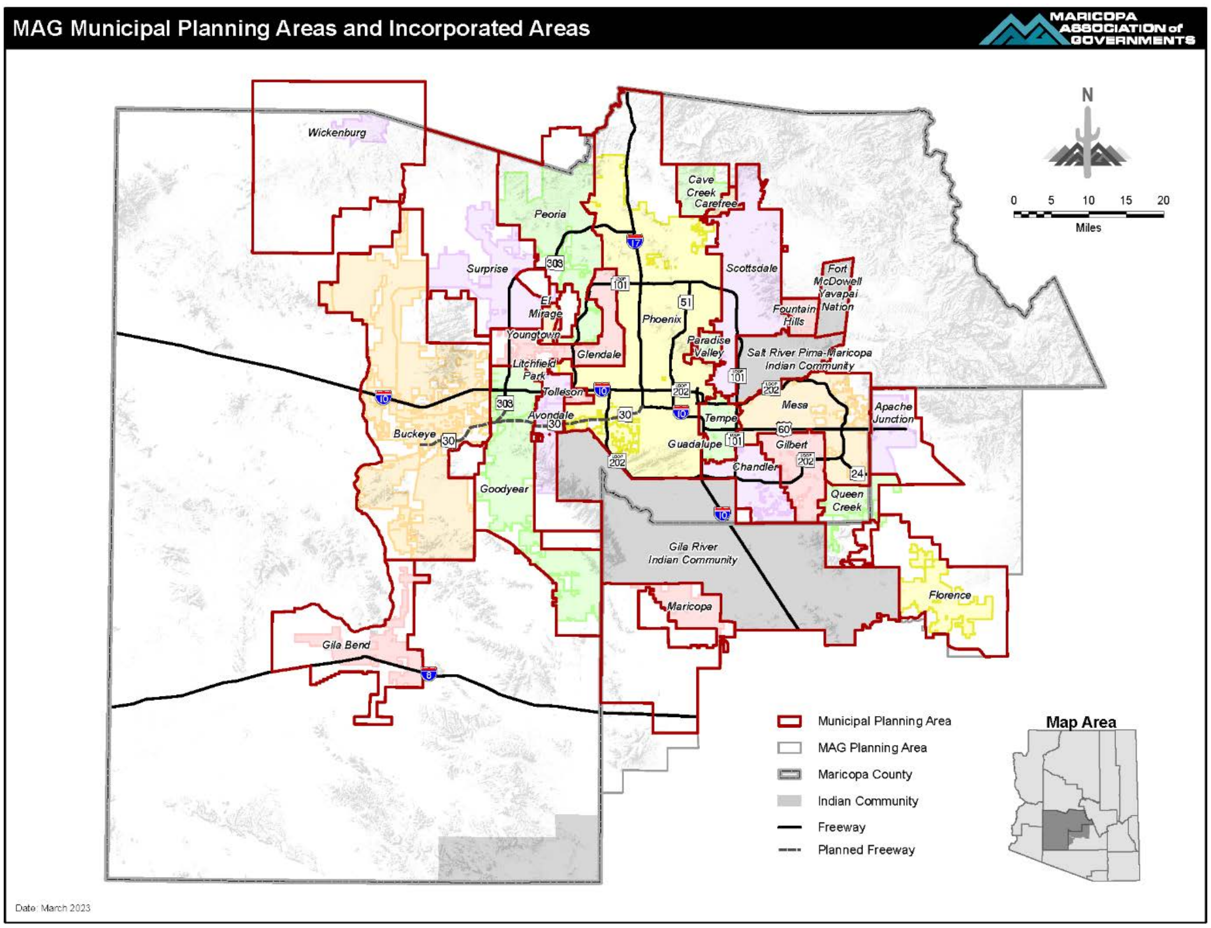
- State of Arizona – Arizona Governor's Office of Resiliency
- Pima Department of Environmental Quality (PDEQ) – Tucson, AZ MSA
- Gila River Indian Community
- Salt River Pima-Maricopa Indian Community
- Navajo Nation

Under the CPRG Planning Grant program, planning grant recipients are required to develop and submit three deliverables over the course of the four-year program period:

1. A Priority Climate Action Plan (PCAP), due March 1, 2024;
2. A Comprehensive Climate Action Plan (CCAP), due July 21, 2025; and,
3. A Status Report, due July 21, 2027.

This document is intended to fulfill the PCAP deliverable obligation for the Phoenix-Mesa-Chandler MSA (hereinafter referred to as the "Maricopa-Pinal County region") under the EPA CPRG Planning Grant program.

Figure 1: MAG Municipal Planning Areas and Incorporated Areas



PCAP Deliverable Overview

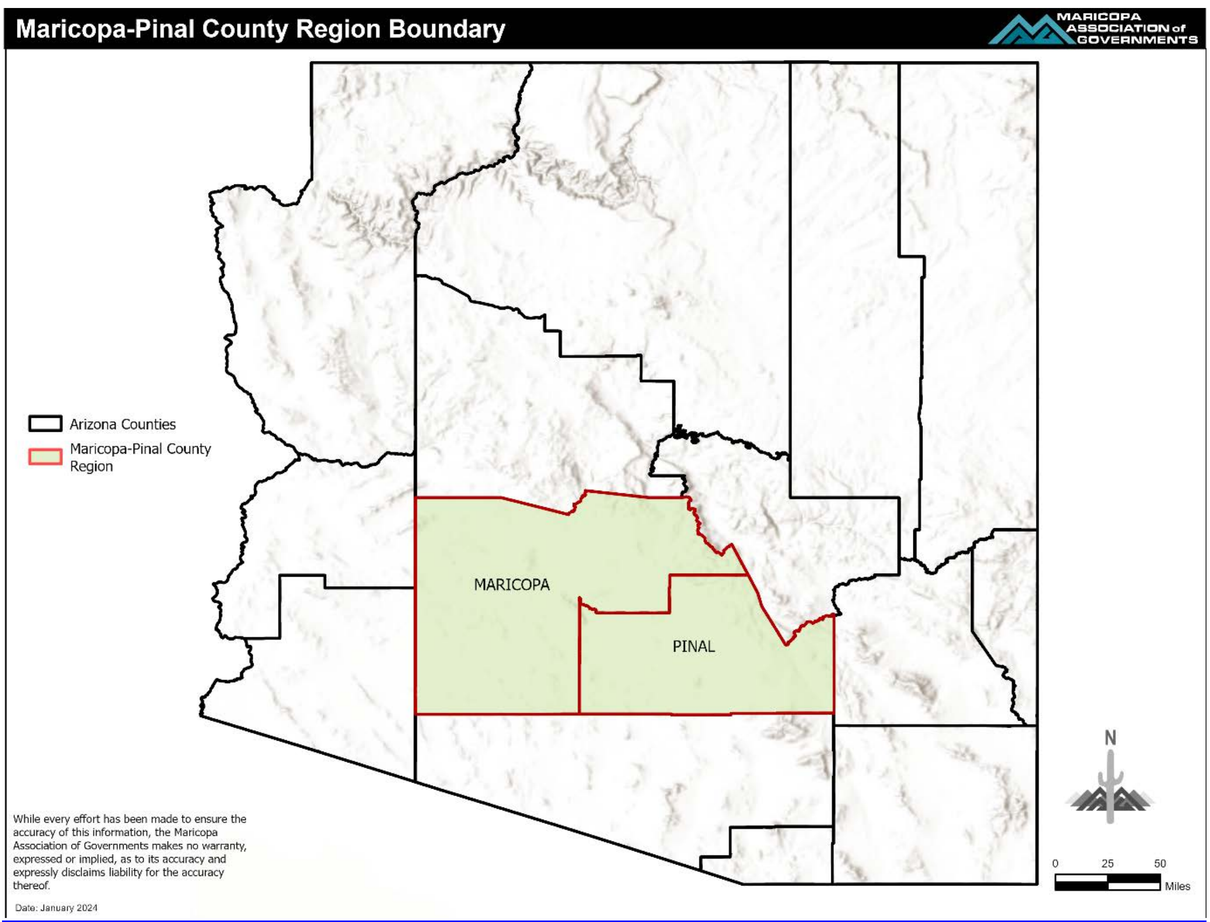
The initial deliverable for the CPRG Planning Grant program is the Priority Climate Action Plan (PCAP). For the PCAP, planning grant recipients are required to include:

- A GHG emissions inventory (EI) for the region;
- A priority list of quantified GHG emission reduction measures;
- A Low Income/Disadvantaged Communities (LIDAC) benefits analysis;
- A review of authority to implement measures included in the PCAP.

Scope of the PCAP

This PCAP covers the Maricopa-Pinal County region including Native nation lands located within those boundaries. The Maricopa-Pinal County region is approximately 14,569 square miles of land area which is larger than the land area of the State of Maryland.[3] Based on 2020 Arizona Office of Economic Opportunity population estimates, the Maricopa-Pinal County region has a total population of 4,864,924.[4] Figure 2 below shows a map of the Maricopa-Pinal County region geographic boundary.

Figure 2: Maricopa-Pinal County Region Boundary



[3] U.S. Census Data Profile, Maricopa County, AZ and Pinal County, AZ. https://data.census.gov/profile.
[4] Arizona Office of Economic Opportunity. *State, County, Place Level July 1 Population Estimates Estimates for 1980-2023.* https://www.azcommerce.com/oeo/population/population-estimates/.

Existing Climate Action Plans and Greenhouse Gas Emissions Inventories

Within the Maricopa-Pinal County region there are many existing climate action and sustainability plans that showcase the region's history and dedication to conserving the region's environment and addressing climate threats. Some of the existing climate action and sustainability plans, and greenhouse gas inventories that helped inform the development of this PCAP include:

- City of Avondale, Community Sustainability plan, 2022;
- City of Mesa, Climate Action Plan for a Sustainable Community, 2022;
- City of Peoria, Sustainable Peoria Plan, 2022;
- City of Phoenix, Climate Action Plan, 2021;
- City of Scottsdale, Draft Sustainability Plan, 2022;
- City of Tempe, Climate Action Plan, 2022;
- Gila River Indian Community, Climate Profile for the Gila River Indian Community, 2017[5];
- Fort McDowell Yavapai Nation, Climate Profile for the Fort McDowell Yavapai Nation, 2017[6];
- MCAQD, Maricopa County 2020 Community GHG EI, 2023;
- MCAQD, Pinal County 2020 Community GHG EI, 2024;
- Pinal County, Comprehensive Plan, 2019.

Community Engagement

In order to ensure that the PCAP for the Maricopa-Pinal County region included meaningful involvement from all residents and stakeholders in the region, MAG engaged in a robust stakeholder process in accordance with the EPA-MAG CPRG planning grant agreement.[7] This included:

- Creation of a program website for dissemination of program materials, updates, and events[8];
- Creation of a public email listserv for program updates and engagement opportunities;
- Creation of a regional stakeholder contact list which was used for CPRG outreach efforts;
- Creation of social media toolkits for municipal public information officers to enhance CPRG outreach effort;
- Presentations on CPRG planning efforts at municipal and local interest or community-based organizations;
- Holding bi-monthly status updates through the MAG Resiliency, Open Space, Sustainability, and Environment (ROSE) workgroup for program updates and community feedback;
- Advertisement and facilitation of four community CPRG open house events in and near LIDAC communities within the region (in-person and virtual);
    - Glendale Civic Center on December 4, 2023;
    - Cesar Chavez Community Center in Phoenix on December 11, 2023;
    - Eloy Town Hall on December 13, 2023;
    - Mesa Community College on December 16, 2023;

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[5] Meadow, A., S. LeRoy, V. A. Small, J. Weiss, M. Black, M. A. Crimmins, and D. B. Ferguson (2017) Climate Profile. Native Nations Climate Adaptation Program; University of Arizona. www.ccass.arizona.edu/nncap.

[6] Meadow, A., J. Weiss, S. LeRoy, V. A. Small, M. Black, and D. Ferguson (2017) Climate Profile for the Fort McDowell Yavapai Nation. Native Nations Climate Adaptation Program; University of Arizona. www.ccass.arizona.edu/nncap.

[7] U.S. Environmental Protection Agency, Grant Agreement, 5D-98T77101-0, July 21, 2023.

[8] MAG, Climate Pollution Reduction Grant Program. https://azmag.gov/Programs/Environmental/CPRG.

    - Virtual Open House (December 4, 2023 through December 22, 2023) (English and Spanish Options).
- Coordination and resource sharing with the Arizona Governor's Office of Resiliency and other CPRG Planning Grant recipients.

In addition to the above stakeholder engagement activities, MAG was also able to leverage responses to a MAG Regional Environmental Challenges Survey that was conducted in Fall of 2023. This survey focused on obtaining feedback from residents of Maricopa and Pinal counties to identify community values and priorities related to building resiliency, including reducing emissions that contribute to local air quality concerns. MAG received a total of 1,972 responses. Results from the 2023 MAG Regional Environmental Challenges Survey are contained in Appendix C.

Lastly, during the development of the PCAP for the Maricopa-Pinal County region, MAG received recommendations in the form of comment letters from the following entities:

- American Lung Association Arizona
- Zero Food Waste Coalition
- Southwest Energy Efficiency Project
- The Farmlink Project
- Multi-Organization Comment Letter 1:
    - American Lung Association, Arizona Alliance for Retired Americans, Arizona Climate Action Coalition, Arizona Interfaith Power & Light, Arizona Partnership for Healthy Communities, Arizona Public Interest Research Group (Arizona PIRG) Education Fund, Arizonans for a Clean Economy, Ceres, Chispa Arizona, Climate Cabinet Action, Elders Climate Action - Arizona Chapter, Environment Arizona Research & Policy Center, Keep Sedona Beautiful Inc., LISC Phoenix, Local First Arizona, Mi Familia Vota, Moms Clean Air Force, Arizona Physicians for Social Responsibility (Arizona Chapter), Pinnacle Prevention, Plug In America, Poder Latinx, Rural Arizona Action, Sierra Club - Grand Canyon (Arizona) Chapter, Solar United Neighbors, Southwest Energy Efficiency Project (SWEEP), Tierra Strategy, VetsFWD, Vote Solar, Western Grid Group, Western Resource Advocates, Wildfire: Igniting Community Action to End Poverty in Arizona.
- Multi-Organization Comment Letter 2:
    - Arizona Public Interest Research Group (Arizona PIRG) Education Fund, Plug In America, Sierra Club-Grand Canyon (Arizona) Chapter, Southwest Energy Efficiency Project (SWEEP), and Western Resource Advocates.

Information received from the public during the development of the plan was collected, tabulated, and distributed to eligible entities in the region who indicated interest in applying for EPA CPRG Implementation Grants. Further documentation on MAG's CPRG PCAP community engagement efforts are detailed in Appendix B.

Greenhouse Gas Emissions Inventory

The Maricopa-Pinal County region is uniquely prepared to address climate pollution given the historic investments that have been made by county, municipal, and Native nation agencies within the region for climate action planning. By leveraging existing regional emissions inventory data, MAG has prepared the 2020 Maricopa-Pinal County Region Greenhouse Gas Emissions Inventory for use in the Maricopa-Pinal County Region PCAP and for CPRG Implementation Grant applications by eligible entities. The inventory uses a base emissions inventory year of 2020[9] and includes regional GHG emission estimates from the following sectors:

1. Mobile Combustion (Transportation)
2. Electric Power Consumption
3. Solid Waste (Landfills)
4. Stationary Combustion
5. Agriculture and Land Management
6. Imported Water Electricity Use
7. Wastewater Treatment
8. Livestock (Cattle)
9. Manufacturing Gases

In addition, MAG quantified tree carbon sequestration benefits from the community or urban forestry category. Both net GHG emissions (gross anthropogenic GHG emissions minus tree carbon sequestration) and net per capita GHG emissions (net GHG emissions divided by total population) have been included in the inventory. The 2020 Maricopa-Pinal County Region GHG EI covers anthropogenic emission estimates for carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) which have been converted to a uniform carbon dioxide equivalent (CO_2e) basis. Sector based regional GHG emissions have been allocated to municipalities, unincorporated areas, and Native nations to provide an understanding of local carbon footprints.

In 2020, the Maricopa-Pinal County region generated approximately 53,392,143 metric tons of carbon dioxide equivalents ($MTCO_2e$). The dominant GHGs generated by the Maricopa-Pinal County region are CO_2, methane (CH_4), and nitrous oxide (N_2O). Within the Maricopa-Pinal County region, community forestry removed approximately 21,736 $MTCO_2e$ from the atmosphere in 2020, resulting in a net greenhouse gas emissions of 53,370,407 $MTCO_2e$. The three largest sources of GHG emissions in 2020 are mobile sources, electric power consumption, and stationary fuel combustion, which collectively account for 91% of the gross GHGs generated by the Maricopa-Pinal County region. 2020 per capita net greenhouse gas emissions for the region are estimated to be 10.97 $MTCO_2e$. Figure 3 and Table 1 below summarize 2020 Maricopa-Pinal County region GHG emissions by source category.

In order to generate Native nation estimates, MAG allocated 2020 Maricopa-Pinal County region GHG emission estimates to Native nations in the region based on direct data, population, land use, or land cover as appropriate for each sector. In 2020, the Maricopa-Pinal County region Native nations generated approximately 236,238 $MTCO_2e$. Within the Maricopa-Pinal County region, Native nation

[9] An emissions inventory base year of 2020 was selected to align with existing county level greenhouse gas emissions inventory data and to align with the triennial EPA National Emissions Inventory (NEI) for which 2020 is the most recent available year.

community forestry removed approximately 30 $MTCO_2e$ from the atmosphere in 2020, resulting in a net greenhouse gas emissions of 236,207 $MTCO_2e$. The three largest sources of Maricopa-Pinal County region Native nation GHG emissions in 2020 are mobile sources, electric power consumption, and agriculture and land management emissions (nitrogen fertilizer use), which collectively account for 86% of the gross GHGs generated by the Maricopa-Pinal County region Native nations. 2020 per capita net greenhouse gas emissions for the region Native nations are estimated to be 10.0 $MTCO_2e$. Figure 4 and Table 2 below summarize 2020 Maricopa-Pinal County region Native Nation GHG emissions by source category.

Figure 3: 2020 Maricopa-Pinal County Region Greenhouse Gas Emissions by Source Category.

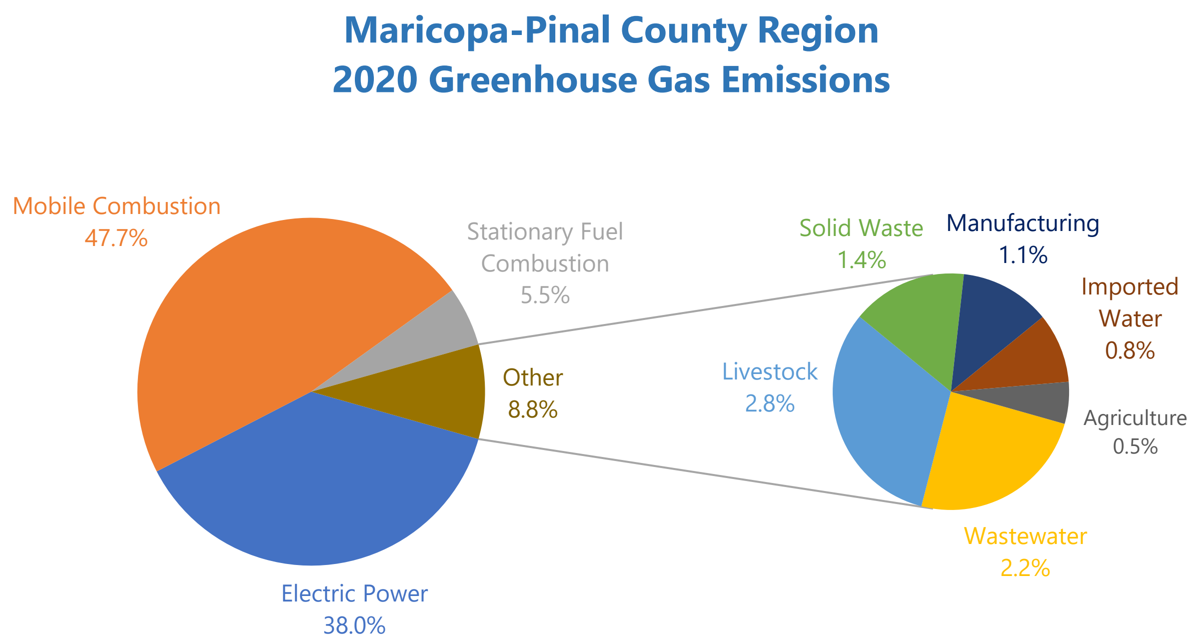

Table 1: 2020 Maricopa-Pinal County Region Greenhouse Gas Emissions by Source Category.

Source Category	GHG Emissions $MTCO_2e$	GHG Emissions Percentage
Electric Power Consumption	20,305,197	38.0%
Mobile Combustion	25,446,411	47.7%
Stationary Fuel Combustion	2,953,090	5.5%
Wastewater	1,154,683	2.2%
Livestock (Cattle)	1,495,868	2.8%
Solid Waste	741,710	1.4%
Manufacturing Gases	579,756	1.1%
Imported Water	446,854	0.8%
Agriculture and Land Management	268,575	0.5%

Figure 4: 2020 Maricopa-Pinal County Region Native Nation Greenhouse Gas Emissions by Source Category.

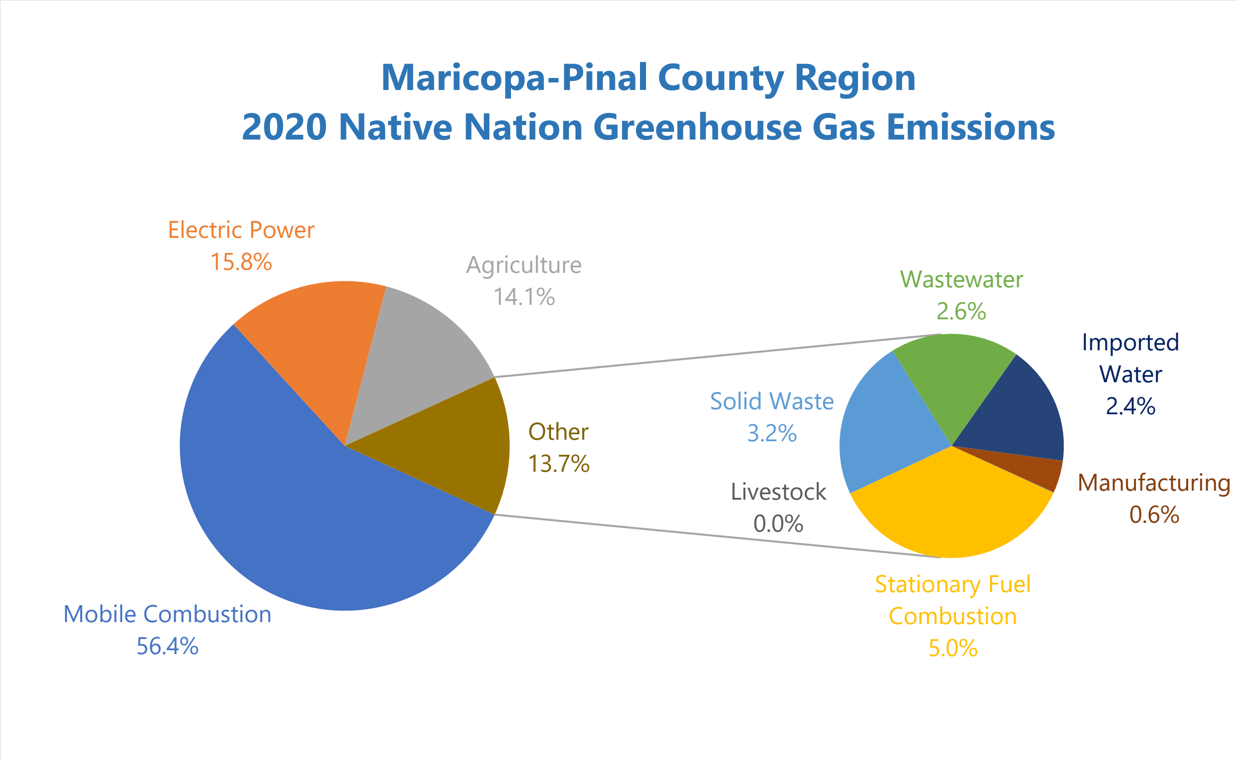

Table 2: 2020 Maricopa-Pinal County Region Native Nation Greenhouse Gas Emissions by Source Category.

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	37,443	15.8%
Mobile Combustion	133,155	56.4%
Stationary Fuel Combustion	11,707	5.0%
Wastewater	6,030	2.6%
Livestock (Cattle)	22	0.0%
Solid Waste	7,473	3.2%
Manufacturing Gases	1,506	0.6%
Imported Water	5,603	2.4%
Agriculture and Land Management	33,298	14.1%

Further information on the scope, methodology, and results of the Maricopa-Pinal County Region 2020 Greenhouse Gas Emissions Inventory can be found in the Emissions Inventory Technical Support Document included as Appendix A of this plan.

Priority Greenhouse Gas Emission Reduction Measures

The measures identified in this section are identified as "priority measures" in accordance with EPA CPRG Planning Grant guidance. Per CPRG Planning Grant guidance, PCAP priority measures should be focused on implementation ready measures that can provide near term GHG emission reductions. EPA classifies near-term as the period between 2025 and 2030 and long-term as the period between 2030 and 2050. For the CPRG Implementation Grant competitions, the performance period for awards is up to five years. The measures included in this section do not represent all available GHG emission reduction and carbon sink enhancement measures.[10] For the CPRG CCAP, a "full suite" of implementation measures will be analyzed to meet the locally developed GHG emission reduction targets. The selection of priority measures for the Maricopa-Pinal County region PCAP was informed by a review of the following criteria:

1. Review of 2020 Maricopa-Pinal County GHG emissions inventory;
2. Review of community priorities and feedback from PCAP outreach;
3. Consideration of GHG emission reductions;
4. Reductions in criteria air pollutants;
5. Benefits to LIDACs;
6. Receipt of notification from an eligible entity or a coalition of eligible entities within the region that they intend to implement or apply for implementation funds for a specific emission reduction program, policy, or project.[11]

Priority measures cover the electric power, transportation, buildings (e.g., stationary combustion), solid waste, and wastewater sectors which account for 94.8% of 2020 Maricopa-Pinal County region GHG emissions. Priority measures are organized by sector[12] with additional details on the following information:

- Measure Description;
- Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions;
- Implementing Agency or Agencies;
- Review of Authority to Implement;
- Implementation Schedule and Milestones;
- Geographic Location;
- Metrics for Tracking Progress;
- LIDAC Benefits.

[10] *See* Appendix A, Attachment B for more information on potential GHG emission reduction opportunities for the Maricopa-Pinal County region.
[11] EPA CPRG Planning Grant guidance states that PCAP priority measures should be measures that the lead organization plans to "implement directly and/or in partnership with collaborating agencies as described in their workplan". (pg. 52) MAG is not pursuing CPRG Implementation Grant funds at this time and has relied upon notification from eligible entities in the region which programs, policies, or projects they may want to lead.
[12] Sectors correspond to the "major sectors responsible for GHG emissions" as described in EPA's CPRG Implementation Grants General Competition Notice of Funding Opportunity.

Electric Power Sector

Measure 1. Renewable Energy Generation at Municipal and Other Public Facilities

Measure Description

This measure will fund the deployment of renewable energy generation systems, which may include solar and hydropower energy generation systems at municipal and public facilities. Projects may include installation of photovoltaic panels at municipal facilities, like airports and landfills, and other public facilities like community colleges. Projects may also include the installation of micro-hydropower generation systems in a water system. For 2020, the electric power consumption source sector generated 20,305,197 $MTCO_2e$ or 38.0% of total regional GHG emissions. For 2020, Native nation electric power consumption source sector generated 37,443 $MTCO_2e$ or 15.8% of total regional Native nation emissions.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	18,900	20
2030 -2050	85,700	170

Implementing Agency or Agencies

1. City of Avondale, City of Phoenix, Maricopa County; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority required by implementing agencies.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: complete site selection and design phase.	Construction phase Begins: construction and installation of renewable energy systems begins.	Construction phase continues. Begin to see some systems come online.	Construction phase Continues.	Construction phase Complete and 100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

kWh of clean electricity generated;
kWh of clean energy consumed.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.

    - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
    - CEJST Energy Burden: Energy Cost.
    - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Creation of high-quality jobs and workforce development opportunities.
    - CEJST Workforce Development Burden.
    - Justice40 Training and Workforce Development.

Measure 2. Development of Microgrids

Measure Description

This measure supports, funds, and/or will incentivize the development of renewable energy microgrids at the local and community levels. Projects may include the installation of solar and battery systems at municipal facilities that could also double as resilience hubs such as community centers and libraries. For 2020, the electric power consumption source sector generated 20,305,197 $MTCO_2e$ or 38.0% of total regional GHG emissions. For 2020, the Native nation electric power consumption source sector generated 37,443 $MTCO_2e$ or 15.8% of total regional Native nation emissions.

Estimate of GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
By 2030	800	1
By 2050	4,700	10

Implementing Agency or Agencies

1. City of Tempe; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority required by implementing agencies.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: complete site selection and design phase.	Construction phase Begins: installation of solar panels, batteries and retrofitting begins.	Construction phase continues.	Construction phase Continues.	Construction phase Complete and 100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

kWh of clean electricity generated;
kWh of clean energy consumed;
kWh of energy savings from retrofits.

LIDAC Benefits

- Establishment of community microgrids.
  - Justice40 Clean Energy and Energy Efficiency: Establishment of community microgrids.
- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.
  - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased resilience of the electricity grid and reduced energy costs.
  - CEJST Energy Burden: Energy Cost.
  - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Increased climate resilience and improved public access to services and critical resources in times of emergency.
  - CEJST Climate Change Burden.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

Transportation Sector (Including Nonroad Equipment)

Measure 1. Public Fleet Electrification, Public Fleet Charging Infrastructure, and Publicly Available Charging Infrastructure Development

Measure Description

This measure incentivizes the installation of electric vehicle (EV) charging infrastructure for public fleets and publicly available charging and funds the transition of public fleets from fossil fuel-powered vehicles to EVs. Projects include the procurement of light-, medium-, and heavy-duty service municipal and other public entity vehicles along with public transit vehicles, like the bus fleet. Workforce development will be included in this measure with the development of programs to address EV maintenance and charging station installation, beginning with current employees. For 2020, the mobile combustion source sector generated 25,446,411 $MTCO_2e$ or 47.7% of total regional GHG emissions. For 2020, Native nation mobile combustion source sector generated 133,155 $MTCO_2e$ or 56.4% of total 2020 regional Native nation GHG emissions.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	60,000	560
2030 -2050	208,000	1,500

Implementing Agency or Agencies

1. City of Mesa, City of Phoenix, City of Tempe, Maricopa County, State of Arizona, Valley Metro; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority required by implementing agencies.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: finalize fleet electrification plans for each government agency that identifies appropriate vehicles, fleet and/or publicly accessible charging locations, infrastructure requirements, workforce training requirements, and implementation schedules. Procurement strategy: begin to procure vehicles based on availability, bulk procurement strategies, and infrastructure construction schedule. Charging infrastructure construction phase begins: installation of charging stations and associated electrical infrastructure. Workforce development begins: training and certification of workforce to operate and maintain electric vehicles and associated charging infrastructure begins.	Continue vehicle procurement, charging infrastructure construction, and workforce development.	Continue vehicle procurement, charging infrastructure construction, and workforce development.	Continue vehicle procurement, charging infrastructure construction, and workforce development.	Procurement, construction, and workforce development phase complete and 100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Electricity used for charging stations (kWh);

- Number of vehicles that are transitioned to electric vehicles;
- Vehicle miles traveled by electric vehicles;
- Number of charging stations installed;
- Number of employees trained.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
    - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Increased public access to electric vehicle chargers.
    - Justice40 Clean Transportation: Access to affordable electric vehicles, charging stations, and purchase programs.
- Access to clean, high-frequency bus transportation.
    - Justice40 Clean Transportation: Access to clean, high-frequency transportation.
- Reduced noise pollution.
    - CPRG LIDAC Technical Guidance – Reduced noise pollution.
- Creation of high-quality jobs and workforce development opportunities.
    - CEJST Workforce Development Burden.
    - Justice40 Training and Workforce Development.

Measure 2. Zero Emission Vehicle Incentives (Residential & Commercial Fleets)

Measure Description

This measure incentivizes the transition from fossil fuel powered vehicles to zero emission vehicles. Rebates, grants, or other incentives will be offered to residents or commercial entities to purchase zero emission vehicles. These incentives may include providing funding for electrical infrastructure assessments and infrastructure installation for businesses and governments, as well as establishing a low-income EV carshare service in underserved neighborhoods. For 2020, the mobile combustion source sector generated 25,446,411 $MTCO_2e$ or 47.7% of total regional GHG emissions. For 2020, the Native nation mobile combustion source sector generated 133,155 $MTCO_2e$ or 56.4% of total 2020 regional Native nation GHG emissions.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	7,200	220
2030 -2050	14,300	890

Implementing Agency or Agencies

1. City of Phoenix, Valley Metro; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

May require partnerships with businesses and ride sharing companies.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: identify neighborhoods for low-income EV carshare service, begin to conduct electrical infrastructure assessments for government agencies and businesses to identify suitable locations for charging station installations.	Implementation phase: begin providing EV carshare service and continue electrical infrastructure assessments.	Implementation phase: continue providing EV carshare service and continue electrical infrastructure assessments.	Implementation phase: continue providing EV carshare service and continue electrical infrastructure assessments.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Electricity used for charging stations (kWh);
- Vehicle miles traveled by electric vehicles;
- Number of trips taken in EV carshare services;
- Number of charging stations installed.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
    - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Increased public access to electric vehicle purchase programs.
    - Justice40 Clean Transportation: Access to affordable electric vehicles, charging stations, and purchase programs.
- Reduced noise pollution.
    - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Measure 3. Active Transportation Network Infrastructure Investments

Measure Description

This measure funds active transportation network upgrades. Active transportation is walking, bicycling, using small-wheeled vehicles, or a micro-mobility device. Implementation examples include increasing the number of bike lanes, expanding cool corridors/walking paths, and increasing e-mobility accessibility. Possible projects may incorporate green stormwater infrastructure principles to manage stormwater, through the deployment of permeable pavement technologies, rainwater harvesting systems, and the protection and expansion of green spaces. For 2020, the mobile combustion source sector generated 25,446,411 $MTCO_2e$ or 47.7% of total regional GHG emissions. For 2020, the Native nation mobile combustion source sector generated 133,155 $MTCO_2e$ or 56.4% of total 2020 regional Native nation GHG emissions.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	500	10
2030 -2050	2,000	30

Implementing Agency or Agencies

1. City of Phoenix; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority required by implementing agencies.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: site selection and design phase are completed. Begin construction phase: installation of walkways, green storm infrastructure, and other improvements.	Construction phase completed.	100% implementation.	100% implementation.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Number of miles of walking path and bike lanes added;
- Gallons of water used or saved for the expansion of greenspaces.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.

- Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
  - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
  - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Improvement in public transportation accessibility, reliability, and options.
  - CEJST Transportation Burden: Transportation Barriers.
  - Justice40 Clean Transportation: Increased bicycle and walking paths.
- Protection and expansion of green spaces and community beautification.
  - CEJST Housing Burden: Lack of green space.
- Reduction in localized surface air temperatures and increase in local shade.
  - Justice40 Climate Change: Increased urban heat island effect mitigation benefits.
- Reduced noise pollution.
  - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Measure 4. Electrification of Commercial and Governmental-Owned Lawn Mowers

Measure Description

This measure funds programs to incentivize the purchase of electric lawn and garden equipment. Projects may include implementing a voucher program to offset the cost of purchasing a zero emission, commercial electric lawnmower and installing battery charging stations. For 2020, the mobile combustion source sector generated 25,446,411 $MTCO_2e$ or 47.7% of total regional GHG emissions. For 2020, the Native nation mobile combustion source sector generated 133,155 $MTCO_2e$ or 56.4% of total 2020 regional Native nation GHG emissions.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	9,400	3,100
2030 -2050	24,300	7,800

Implementing Agency or Agencies

1. Maricopa County; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority is required.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Electrification phase begins: identification of commercial and governmental-owned lawn and garden equipment and electrification begins.	Electrification phase continues.	Electrification phase continues.	Electrification phase continues.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

Number of Equipment transitioned to electricity.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased diesel motor emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure.
- Reduced noise pollution.
    - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Commercial and Residential Buildings Sector

Measure 1. Energy Efficiency Upgrades for Municipal Operations

Measure Description

This measure supports the deployment of energy efficiency upgrades for municipal operations. Projects may include, but are not limited to:

- LED lighting upgrades;
- Replacement of commercial appliances;
- Facility retrofit programs;
- Emergency generator replacement;
- Energy management control systems upgrades, including installation of variable speed drives;
- Upgrade condensing water filtration in increase efficiency of cooling plant chillers;
- Installation of laundry disinfection systems to eliminate the requirement for hot water disinfection cycles;
- Installation of electrically commutated motors on refrigeration unit evaporator coils;
- Energy audits;
- Recommissioning/retro-commissioning.

For 2020, the electric power consumption source sector and the stationary fuel combustion source sector generated 20,305,197 $MTCO_2e$ (38.0%) and 2,953,090 $MTCO_2e$ (5.5%), respectively. For 2020, the Native nation electric power consumption source sector and stationary fuel combustion source sector generated 37,443 $MTCO_2e$ (15.8%) and 11,707 $MTCO_2e$ (5.0%), respectively.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	17,200	20
2030 -2050	41,000	80

Implementing Agency or Agencies

1. Maricopa County, City of Mesa, City of Phoenix; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority is required.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: complete facility selection, identify energy efficiency upgrades and begin building upgrades.	Building upgrades continue.	Building upgrades continue.	Building upgrades continue.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Electricity use reductions (kWh);
- Natural gas use reductions (therms).

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.
    - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
    - CEJST Energy Burden: Energy Cost.
    - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Creation of high-quality jobs and workforce development opportunities.
    - CEJST Workforce Development Burden.
    - Justice40 Training and Workforce Development.

Measure 2. Weatherization Assistance Programs (Residential and Commercial)

Measure Description

This measure funds residential and commercial building weatherization projects and specific replacement programs, like a low- and moderate-income heating, ventilation, and air conditioning (HVAC) replacement program, and workforce expansion through training and certification programs. For 2020, the electric power consumption source sector and the stationary fuel combustion source sector generated 20,305,197 MTCO_2e (38.0%) and 2,953,090 MTCO_2e (5.5%), respectively. For 2020, the Native nation electric power consumption source sector and stationary fuel combustion source sector generated 37,443 MTCO_2e (15.8%) and 11,707 MTCO_2e (5.0%), respectively.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	7,700	10
2030 -2050	23,400	40

Implementing Agency or Agencies

1. Maricopa County, City of Phoenix; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority is required.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Expansion phase: continue and expand existing weatherization assistance programs, including workforce development to ensure implementation.	Implementation phase continues.	Implementation phase continues.	Implementation phase continues.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Number of homes/businesses retrofitted;
- Energy savings;
- Energy cost savings;
- Number of trainings or certifications completed.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
  - CEJST Energy Burden: Energy Cost.
- Decreased home repair and improvement costs.
  - CEJST Housing Burden: Housing Cost
- Improved housing quality, comfort, and safety.
  - Justice40 Affordable and Sustainable Housing: Improved housing quality and safety and enhanced public health.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

Measure 3. Electrification of Municipal, Commercial, and Residential Buildings

Measure Description

This measure supports and/or incentivizes the conversion of fossil fueled or wood burning building equipment to electric equipment. Projects may focus on the replacement of woodburning fireplaces with electric fireplaces or similar initiatives. For 2020, the electric power consumption source sector and the stationary fuel combustion source sector generated 20,305,197 $MTCO_2e$ (38.0%) and 2,953,090 $MTCO_2e$ (5.5%), respectively. For 2020, the Native nation electric power consumption source sector and stationary fuel combustion source sector generated 37,443 $MTCO_2e$ (15.8%) and 11,707 $MTCO_2e$ (5.0%), respectively.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	1,200	20
2030 -2050	6,300	70

Implementing Agency or Agencies

1. Maricopa County; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority is required.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Program design: plan building electrification program and begin implementation.	Implementation phase continues.	Implementation phase continues.	Implementation phase continues.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Number of fireplace replacements;
- Number of fossil fueled building equipment transitioned to electric equipment.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Improved indoor air quality.
  - Justice40 Affordable and Sustainable Housing: Improved indoor air pollution.
- Improved housing quality, comfort, and safety.
  - Justice40 Affordable and Sustainable Housing: Improved housing quality and safety and enhanced public health.
- Improved energy efficiency.
  - Justice40 Clean Energy and Energy Efficiency: Increased energy efficiency programs and resources.

Waste, Water, and Sustainable Materials Management Sector

Measure 1. Food Waste Diversion for Biogas Capture from Landfills and Wastewater Treatment Plants for Renewable Energy Generation

Measure Description

This measure will further the implementation and/or expansion of vegetative and food waste diversion programs to support the collection of generated biogas from the food waste for processing and use as a source of renewable energy. For 2020, the solid waste source sector and wastewater treatment source sector generated 741,710 $MTCO_2e$ (1.4%) and 1,154,683 $MTCO_2e$ (2.2%), respectively. For 2020, the Native nation solid waste source sector and wastewater treatment source sector generated 7,473 $MTCO_2e$ (3.2%) and 6,030 $MTCO_2e$ (2.6%), respectively.

Estimate of Near-term and Long-term GHG and Criteria Pollutant Emission Reductions

Date Range	CO_2e Emission Reductions (metric tons)	CAP Emission Reduction (metric tons)
2025- 2030	22,000	N/A
2030 -2050	184,000	N/A

Implementing Agency or Agencies

1. City of Mesa, City of Phoenix; OR
2. Local jurisdictions, counties, or Native nations.

Review of Authority to Implement

No additional authority is required.

Implementation Schedule and Milestones

Year 1	Year 2	Year 3	Year 4	Year 5
Planning phase: complete wastewater treatment plant facility design and modular system design, coordinate food waste sources and diversion program planning.	Begin construction of the food waste processing facility, bio slurry receiving station and add additional biogas treatment capacity at the wastewater treatment plant. Begin implementation of modular anaerobic systems.	Continue construction of the food waste processing facility, bio slurry receiving station and add additional biogas treatment capacity at the wastewater treatment plant. Continue implementation of modular anaerobic systems.	Finish construction and begin implementation of regional food waste collection and processing program. Treatment of additional biogas generated at the wastewater treatment plant to pipeline quality standards for injection of renewable natural gas into natural gas utility. Continue implementation of modular anaerobic systems.	100% implementation.

Geographic Location

- Maricopa-Pinal County region.

Metrics for Tracking Progress

- Biogas generated (therms);
- Tons of food waste diverted from landfill.

LIDAC Benefits

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
    - CEJST Energy Burden: Energy Cost.
- Deployment of clean energy.
    - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Reduced food waste sent to landfills.
    - Justice40 Climate Change: Reductions of greenhouse gas emissions.

Low Income Disadvantaged Communities Benefits Analysis

The implementation of the priority emission reduction measures contained in this plan will not only provide reductions in greenhouse gas emissions but will also provide benefits to local communities including low-income and disadvantaged communities (LIDACs) in the region. Many of the priority emission reduction measures included in this plan contain co-benefits that will be realized by local communities near where the measures are implemented. Examples of these co-benefits include benefits from reductions in emissions of criteria air pollutants such as fine particulate matter (PM-2.5) and ground level ozone (O_3) concentrations which contribute to a wide variety of adverse health effects. These adverse health effects include inflammation and damage to airways, an increase in the frequency of asthma attacks, premature death in people with heart or lung disease, and nonfatal heart attacks. The Maricopa-Pinal County region currently contains areas designated by the EPA as nonattainment under the National Ambient Air Quality Standards (NAAQS) for lead (Pb), sulfur dioxide (SO_2), coarse particulate matter (PM-10), fine particulate matter (PM-2.5), and O_3. Reductions in criteria air pollutant emissions will have the added benefit of helping the region attain the NAAQS which has both public health and economic benefits for the region. Co-benefits of the priority emission reduction measures include:

- Improved air quality and improved public health due to reduced air pollution;
- Increased regional resiliency to extreme weather events;
- Establishment of community microgrids;
- Improved public access to services and critical resources in times of emergency;
- Decreased energy usage and decreased energy costs;
- Decreased home repair and improvement costs;
- Improved housing quality, comfort, and safety;
- Improved indoor air quality;
- Improved energy efficiency;
- Reduction of exposure to harmful transportation-related emissions;
- Access to affordable electric vehicles, charging stations, and purchase programs;
- Improvement in public transportation accessibility, reliability, and options;
- Reduced food waste sent to landfills;
- Protection and expansion of green spaces and community beautification;
- Reduction in localized surface air temperatures and increase in local shade coverage;
- Increased bicycle and walking paths;
- Reduced noise pollution;
- Creation of high-quality jobs and workforce development opportunities.

Identification of LIDACs

For the purposes of the EPA CPRG program, a LIDAC is any community that is identified as being disadvantaged by the Climate and Economic Justice Screening tool (CEJST) and the EPA's Environmental Justice Screening and Mapping Tool (EJScreen). The CEJST is a federal tool that identifies disadvantaged census tracts across the nation, including the Maricopa-Pinal County region. Based on the CEJST tool, a census tract is categorized as disadvantaged if it meets the thresholds for at least one of the tool's categories of burden, or if they are on land within the boundaries of Federally Recognized Tribes. The categories of burden within the CEJST tool are climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.

Initially for the CPRG program, EPA's CPRG guidance[13] recommended the use of the CEJST for identification of LIDAC communities. Subsequently, this recommendation was revised in EPA's LIDAC technical guidance[14] to recommend inclusion of EJScreen supplemental indexes.[15] For purposes of the identifying LIDAC communities for the IRA, EPA created a GIS file geodatabase, the EPA IRA Disadvantaged Communities Map, that combines the two tools' outputs into a single file geodatabase feature class. However, while the combined file adds additional areas (additional 2.8% land area for Maricopa-Pinal County region vs. CEJST) by virtue of using additional indexes, the combined file geodatabase feature class does not include CEJST or EJScreen datasets on indicators, race/ethnicity, income, and other relevant environmental and economic data. Therefore, for this LIDAC analysis MAG has primarily relied upon the CEJST to incorporate relevant environmental and socioeconomic data. However, a map of the expanded EPA IRA Disadvantaged Communities Map is included in Figure 6 below to show additional areas for CPRG CCAP community outreach and for CPRG implementation grant application consideration.

Of the 991 census tracts identified for the Maricopa-Pinal County region in the CEJST dataset, 289 tracts are identified as having exceeded at least one threshold criteria. The 2020 Maricopa-Pinal County region population residing in a census tract that is identified as disadvantaged in the CEJST is 1,347,164 people or 28.3% of the total regional population. A map of CEJST disadvantaged census tracts for the Maricopa-Pinal County region can be found in Figure 5 below.

Table 3 below shows the number of census tracts in the Maricopa-Pinal County region that fall into each of the CEJST burden categories by indicator. A map of areas designated nonattainment for criteria air pollutants in the Maricopa-Pinal County region is shown in Figure 7 below. A map book of CEJST disadvantaged areas within the Maricopa-Pinal County region by incorporated cities is provided in Appendix D. A list of CEJST disadvantaged communities within the Maricopa-Pinal County region by census tract ID numbers is provided in Appendix E .

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[13] U.S. Environmental Protection Agency. Climate Pollution Reduction Grants Program: Formula Grants for Planning. Program Guidance for States, Municipalities, and Air Pollution Control Agencies. March 1, 2023.
[14] U.S. Environmental Protection Agency. Climate Pollution Reduction Grants Program: Technical Reference Document for States, Municipalities and Air Pollution Control Agencies. Benefits Analyses: Low-Income and Disadvantaged Communities. April 27, 2023.
[15] U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation. July 2023.

Figure 5: CEJST Burdened Census Tracts for the Maricopa-Pinal County Region

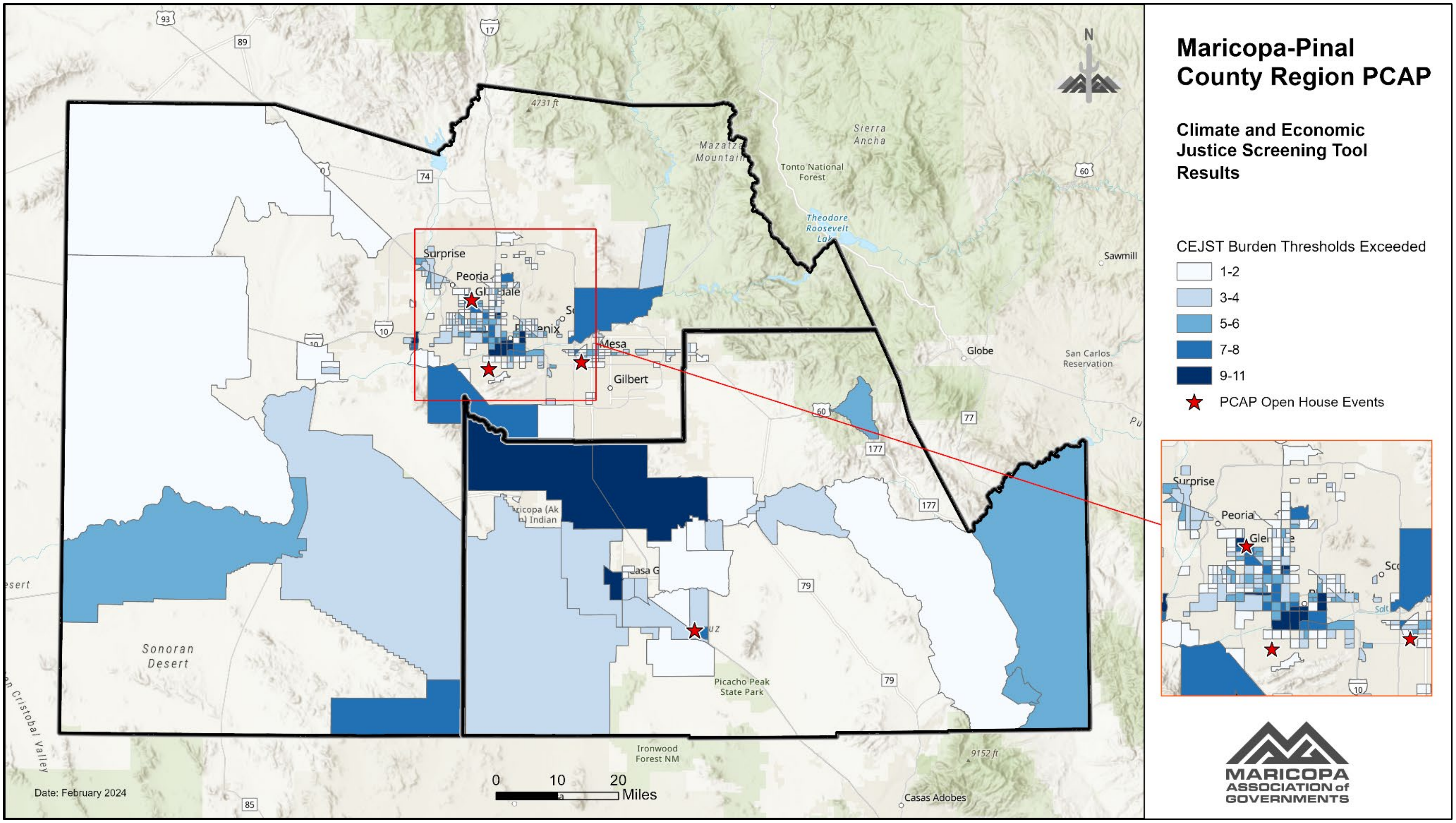


Figure 6: Comparison of CEJST and EPA IRA Disadvantaged Communities Data.

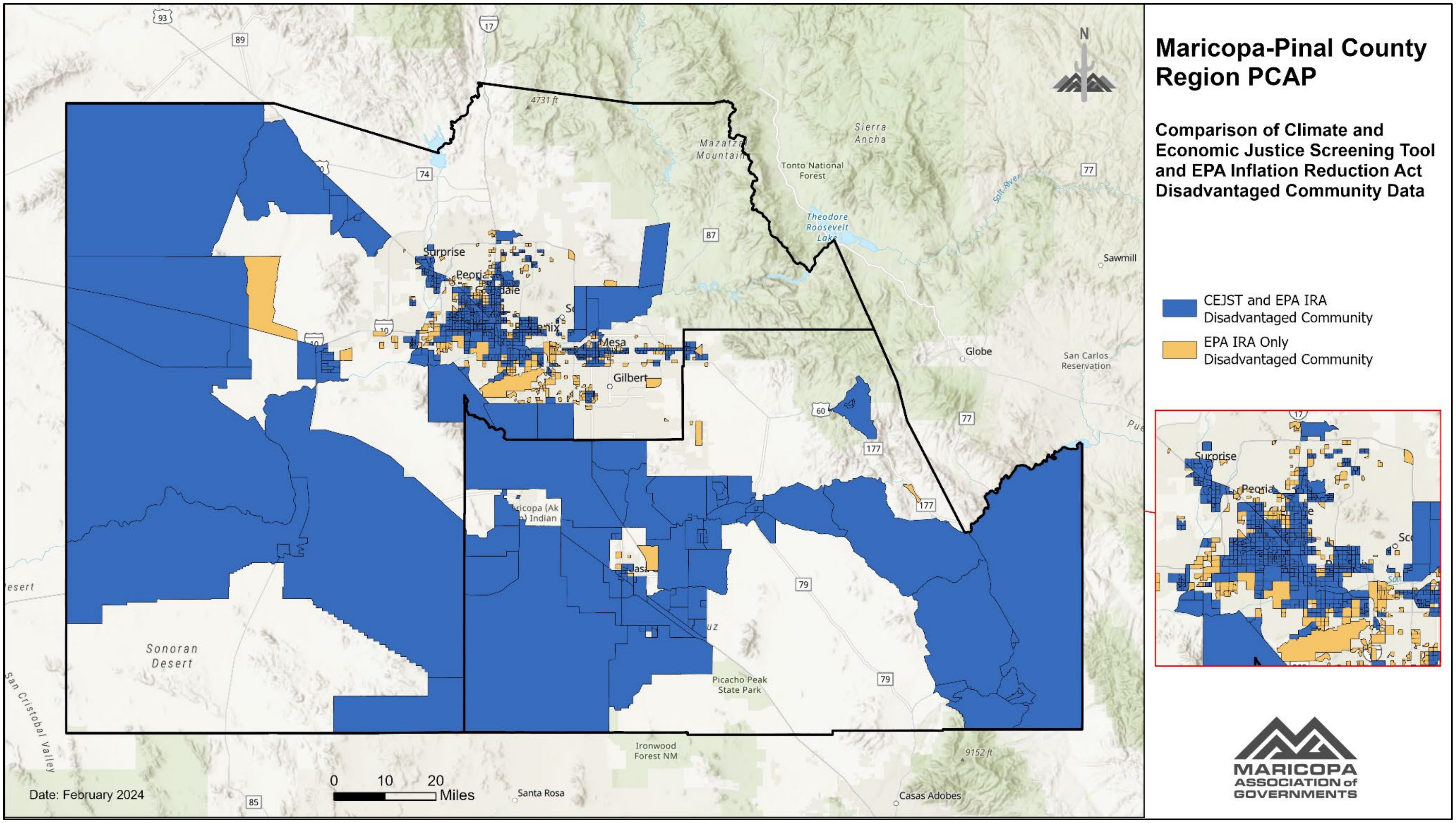


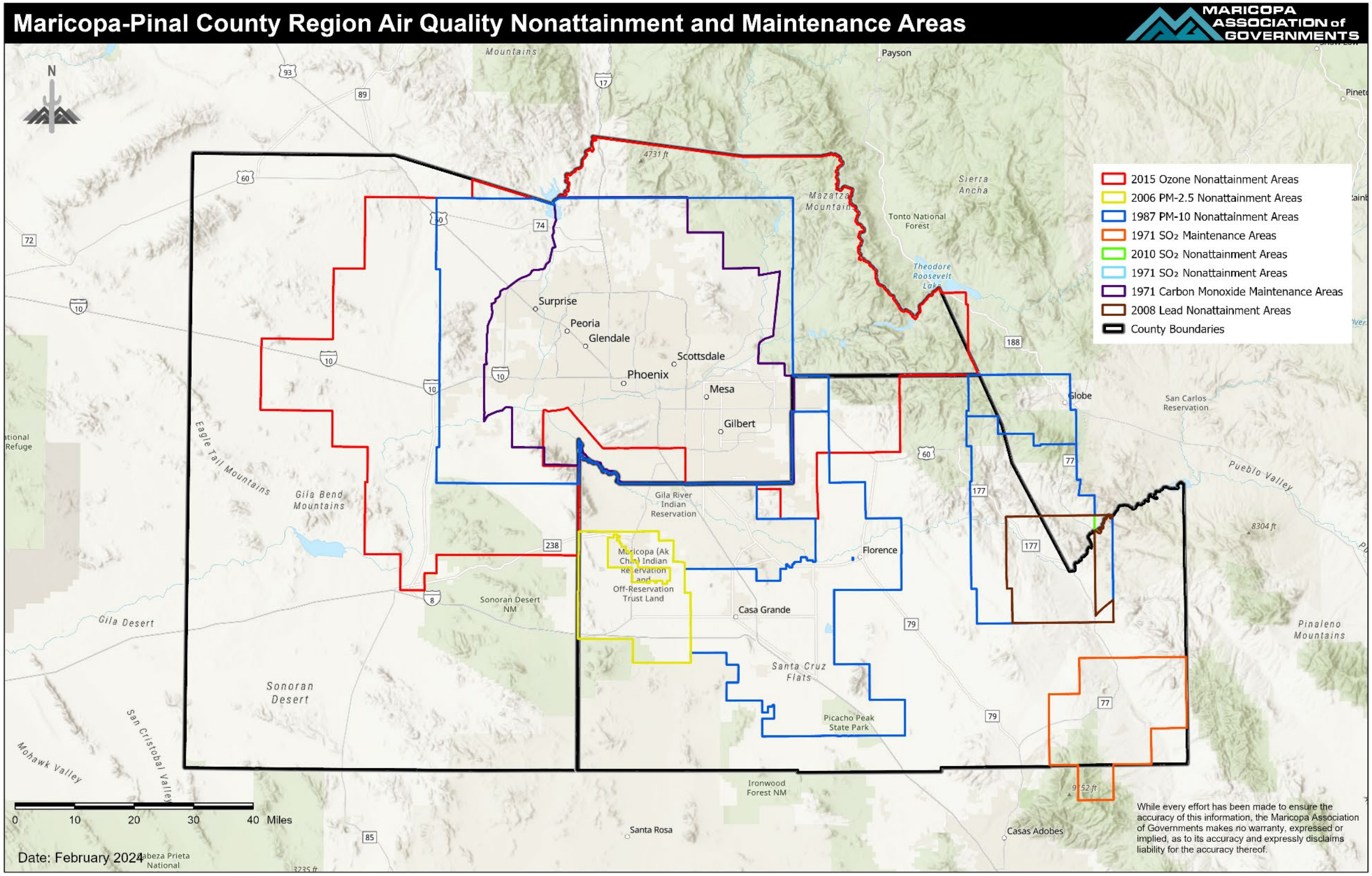
Table 3: CEJST Results for the Maricopa-Pinal County Region by Burden Category and Burden Indicator

Burden Category	Burden Indicator	Census Tract Count*	Population Total*
Climate Change	Greater than or equal to the 90th percentile for expected agriculture loss rate and is low income?	22	108,271
Climate Change	Greater than or equal to the 90th percentile for expected building loss rate and is low income?	2	4,244
Climate Change	Greater than or equal to the 90th percentile for expected population loss rate and is low income?	0	0
Climate Change	Greater than or equal to the 90th percentile for share of properties at risk of flood in 30 years and is low income?	8	32,392
Climate Change	Greater than or equal to the 90th percentile for share of properties at risk of fire in 30 years and is low income?	50	221,749
Energy	Greater than or equal to the 90th percentile for energy burden and is low income?	35	118,654
Energy	Greater than or equal to the 90th percentile for PM-2.5 exposure and is low income?	0	0
Transportation	Greater than or equal to the 90th percentile for diesel particulate matter and is low income?	104	499,732
Transportation	Greater than or equal to the 90th percentile for DOT transit barriers and is low income?	21	100,492
Transportation	Greater than or equal to the 90th percentile for traffic proximity and is low income?	50	219,016
Housing	Tract experienced historic underinvestment and remains low income	6	10,060
Housing	Greater than or equal to the 90th percentile for housing burden and is low income?	71	325,834
Housing	Greater than or equal to the 90th percentile for share of the tract's land area that is covered by impervious surface or cropland as a percent and is low income? (Greenspace)	27	106,103
Housing	Greater than or equal to the 90th percentile for homes with no kitchen or indoor plumbing and is low income?	35	148,057
Housing	Greater than or equal to the 90th percentile for lead paint, the median house value is less than 90th percentile and is low income?	0	0
Legacy Pollution	There is at least one abandoned mine in this census tract and the tract is low income?	0	0
Legacy Pollution	There is at least one Formerly Used Defense Site (FUDS) in the tract and the tract is low income?	4	35,777
Legacy Pollution	Greater than or equal to the 90th percentile for proximity to hazardous waste facilities and is low income?	21	70,648
Legacy Pollution	Greater than or equal to the 90th percentile for proximity to superfund sites and is low income?	13	53,616
Legacy Pollution	Greater than or equal to the 90th percentile for proximity to RMP sites and is low income?	71	329,179
Water and Wastewater	Greater than or equal to the 90th percentile for leaky underground storage tanks and is low income?	20	80,688
Water and Wastewater	Greater than or equal to the 90th percentile for wastewater discharge and is low income?	20	80,688
Health	Greater than or equal to the 90th percentile for asthma and is low income?	48	215,341
Health	Greater than or equal to the 90th percentile for diabetes and is low income?	42	151,806
Health	Greater than or equal to the 90th percentile for heart disease and is low income?	35	134,845

Health	Greater than or equal to the 90th percentile for low life expectancy and is low income?	36	146,213
Workforce Development	Greater than or equal to the 90th percentile for low median household income as a percent of area median income and has low high school (HS) attainment?	79	321,871
Workforce Development	Greater than or equal to the 90th percentile for households in linguistic isolation and has low HS attainment?	71	344,973
Workforce Development	Greater than or equal to the 90th percentile for low median household income as a percent of area median income and has low HS attainment?	47	236,961
Workforce Development	Greater than or equal to the 90th percentile for households at or below 100% federal poverty level and has low HS attainment?	94	420,743

***** *Because a census tract can exceed multiple indicators, the CEJST results in Table 3 should not be summed for census tract count or population to avoid double counting and overestimation.*

Figure 7: Maricopa-Pinal County Region Air Quality Nonattainment and Maintenance Areas



Climate Impacts and Risks

Household Energy Burden

Household energy burden is defined by the U.S. Department of Energy as "the percentage of gross household income spent on energy costs".[16] Low-income households are estimated to have three times higher energy burdens (i.e., home energy bills or costs) when compared to non-low-income households. In the Maricopa-Pinal County region, 35 of the 289 disadvantaged census tracts are identified as exceeding the CEJST threshold for energy burden. The census tracts identified as disadvantaged due to energy burden have a 2021 population of 118,654 people, or 2.5% of the total regional population. In the Maricopa-Pinal County region, 279 of the 289 disadvantaged census tracts are also identified as low-income. The census tracts identified as low income have a 2021 population of 862,837 people, or 18.1% of the total regional population. Factors that can influence higher energy burdens by low-income households include:

- Use of higher cost fuels (e.g. propane);
- Older and less energy efficient homes;
- Less efficient heating and cooling equipment;
- A greater percentage of low-income households are renters.

Implementation of the priority emission reduction measures contained in this plan can benefit LIDACs through:

- Increased access to household weatherization programs;
- Increased access to heating and cooling system upgrades;
- Increased access to household energy efficiency upgrades;
- Increased access to energy technologies such as solar photovoltaic systems.

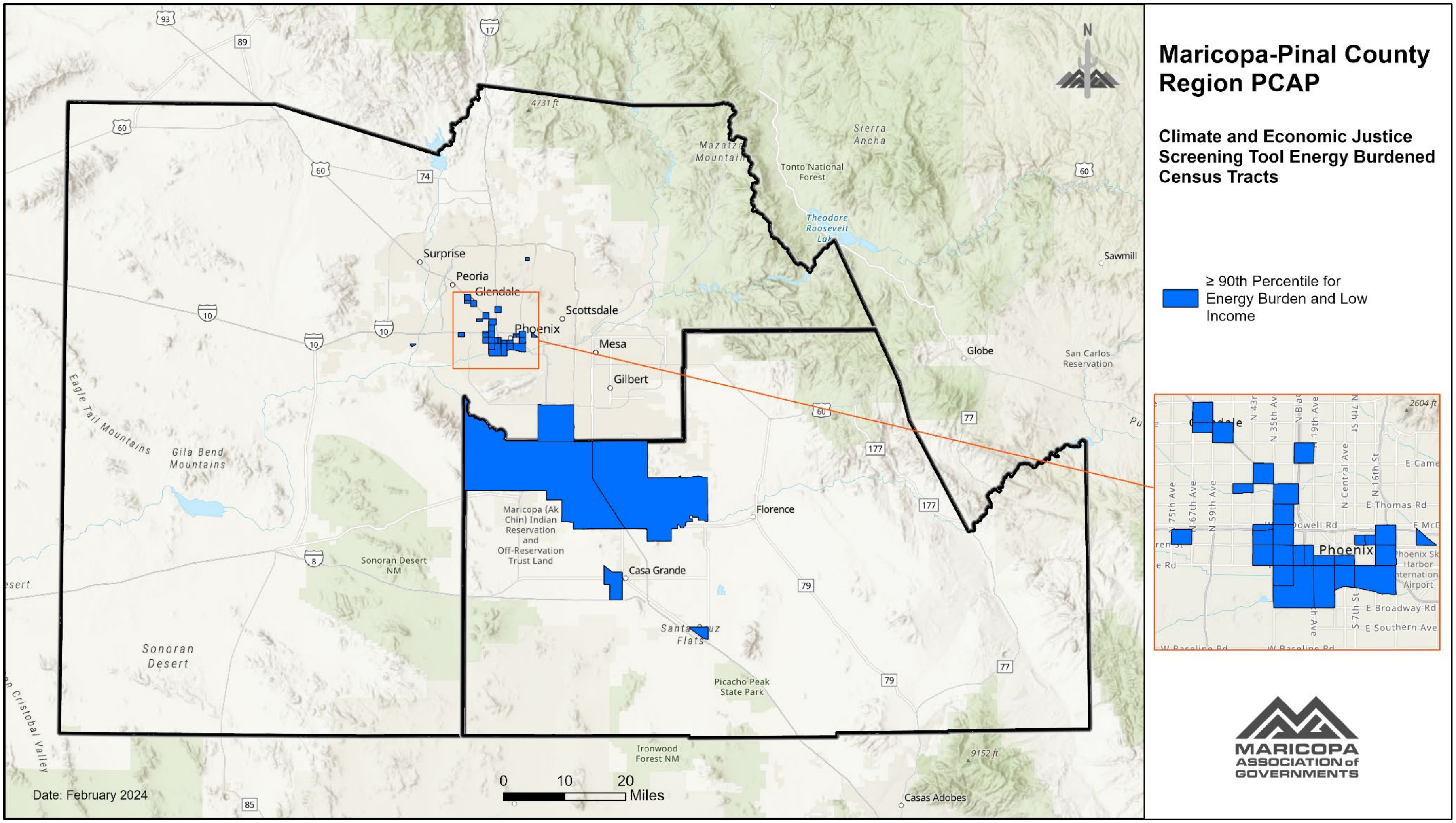
Figure 8 below shows a map of the census tracts within the Maricopa-Pinal County Region that are identified as meeting or exceeding the 90th percentile for energy burden. Table 4 below shows the race and ethnicity characteristics of populations in Maricopa-Pinal County region energy burdened census tracts compared to regional population averages.

Table 4: CEJST Energy Burdened Census Tracts by Race/Ethnicity in the Maricopa-Pinal County Region

Race/Ethnicity	Energy Burdened Census Tract Average	Regional Average	Difference (+/-)
Black or African American alone	6.8%	4.8%	2.0%
American Indian / Alaska Native	7.5%	2.0%	5.4%
Asian	2.7%	3.5%	-0.8%
Native Hawaiian or Pacific	0.0%	0.1%	-0.1%
White	12.1%	55.9%	-43.7%
Hispanic or Latino	69.3%	29.6%	39.7%
Other Races	12.2%	5.7%	6.5%

[16] U.S. Department of Energy. State and Local Solution Center. Low-Income Community Energy Solutions. https://www.energy.gov/scep/slsc/low-income-community-energy-solutions.

Figure 8: CEJST Energy Burdened Census Tracts for the Maricopa-Pinal County Region



Traffic Proximity and Diesel Particulate Matter Exposure

LIDACs can be disproportionately affected by traffic proximity and at increased risk for diesel particulate matter (PM) exposure. While proximity to roads can provide access to social and economic resources, the traffic proximity indicator in the CEJST is designed to identify areas that may experience negative impacts from proximity to high volume road segments. This includes an increased risk for asthma exacerbation and cardiovascular and heart disease.[17]

In the Maricopa-Pinal County region, 50 of the 289 disadvantaged census tracts are identified as exceeding the CEJST threshold for traffic proximity. In the Maricopa-Pinal County region, 104 of the 289 disadvantaged census tracts are identified as exceeding the CEJST threshold for diesel PM exposure. These census tracts have a 2021 population of 564,771 people, or 11.9% of the total regional population. For the census tracts identified in the CEJST as exceeding the indicator threshold for traffic proximity, the 2021 population is on average 56.6% Hispanic or Latino compared to the rest of the census tracts in the Maricopa-Pinal County region which on average are 29.6% Hispanic or Latino. The census tracts identified in the CEJST as exceeding the indicator threshold for traffic proximity are all identified as being disadvantaged and low income. Similarly for diesel PM exposure, LIDACs are disproportionately affected. Diesel PM are the solid particles that come from the exhaust of a diesel motor including diesel equipment, vehicles, buses, and trains. The highest concentrations of diesel PM are found near freeways and railyards.[18] According to the CDC, current evidence indicates exposure to diesel particulate matter can cause respiratory inflammation, acute coronary syndrome, and may lead to the development of certain kinds of cancer.[19] For the census tracts identified in the CEJST as exceeding the indicator threshold for diesel PM, the 2021 population is on average 67.8% Hispanic or Latino compared to the rest of the census tracts in the Maricopa-Pinal County region which on average are 29.6% Hispanic or Latino. The census tracts identified in the CEJST as exceeding the indicator threshold for diesel PM are all identified as being disadvantaged and low income.

Implementation of the priority emission reduction measures contained in this plan can benefit LIDACs through:

- Reduced traffic;
- Reductions in criteria air pollutants along roads;
- Replacement of diesel vehicles with alternative fuel vehicles.

Figure 9 below shows a map of the census tracts within the Maricopa-Pinal County Region that are identified as meeting or exceeding the 90th percentile for traffic proximity, diesel PM exposure, or both categories. Table 5 and Table 6 below show the race and ethnicity characteristics of populations in Maricopa-Pinal County region traffic proximity burdened census tracts and Diesel PM burdened census tracts compared to regional population averages, respectively.

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[17] U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation. July 2023.
[18] California Office of Environmental Health Hazard Assessment. CalEnviroScreen. Diesel Particulate Matter. https://oehha.ca.gov/calenviroscreen/indicator/diesel-particulate-matter.
[19] U.S. Center for Disease Control. Agency for Toxic Substances and Disease Registry. Environmental Justice Indicators. https://www.atsdr.cdc.gov/placeandhealth/eji/indicators.html.

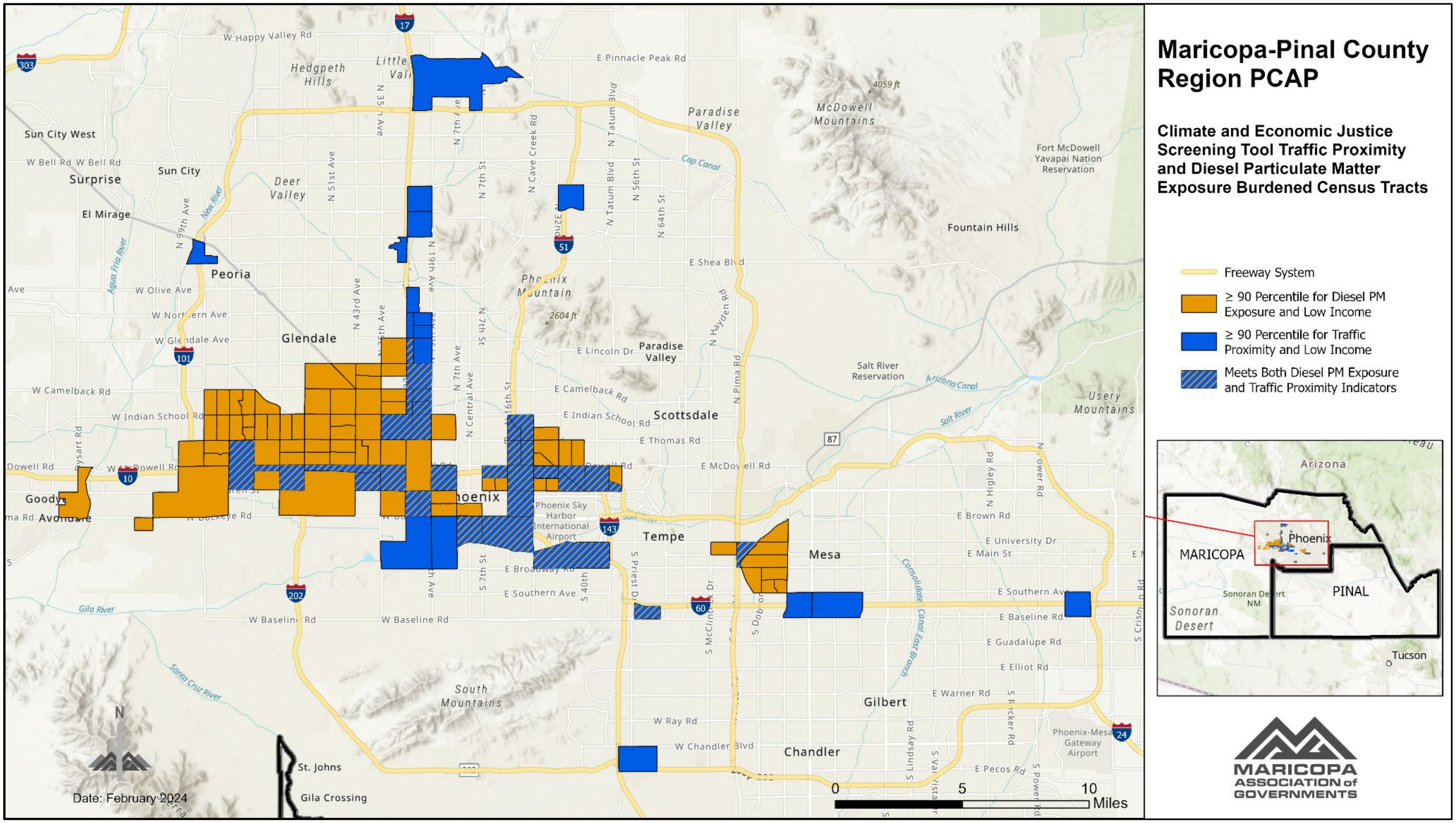
Table 5: CEJST Traffic Proximity Burdened Census Tracts by Race/Ethnicity

Race or Ethnicity	Traffic Proximity Burdened Census Tract Average	Regional Average	Difference (+/-)
Black or African American alone	8.7%	4.8%	3.9%
American Indian / Alaska Native	2.4%	2.0%	0.4%
Asian	2.1%	3.5%	-1.4%
Native Hawaiian or Pacific	0.2%	0.1%	0.1%
White	26.1%	55.9%	-29.8%
Hispanic or Latino	56.6%	29.6%	27.0%
Other Races	11.9%	5.7%	6.2%

Table 6: CEJST Diesel Particulate Matter Exposure Burdened Census Tracts by Race/Ethnicity

Race or Ethnicity	Diesel Particulate Matter Burdened Census Tract Average	Regional Average	Difference (+/-)
Black or African American alone	7.4%	4.8%	2.6%
American Indian / Alaska Native	2.3%	2.0%	0.3%
Asian	1.5%	3.5%	-1.9%
Native Hawaiian or Pacific	0.2%	0.1%	0.1%
White	17.8%	55.9%	-38.1%
Hispanic or Latino	67.8%	29.6%	38.2%
Other Races	18.4%	5.7%	12.7%

Figure 9: CEJST Traffic Proximity and Diesel Particulate Matter Exposure Burdened Census Tracts for the Maricopa-Pinal County Region



Workforce Development

One of the prime goals of the Justice40 Initiative is to promote training and workforce development related to climate, clean energy, and other related categories. In order to identify LIDAC communities that could benefit from this enhanced workforce development, the CEJST tool uses the following indicators to determine if a census tract experiences a workforce development burden:

Table 7: CEJST Workforce Development Burden Category

Burden Category	Environmental, climate, or other burdens	Socioeconomic burden
Workforce development*	1. Linguistic isolation ≥ 90th percentile OR 2. Low median income ≥ 90th percentile OR 3. Poverty ≥ 90th percentile OR 4. Unemployment ≥ 90th percentile	High school education < 10%

**Must meet at least one environmental burden AND one socioeconomic burden.*

In the Maricopa-Pinal County Region, 163 of 991, or 16.4%, of census tracts in the CEJST are identified as experiencing a workforce development burden. These census tracts have a 2021 population of 772,769 people, or 16.2% of the total regional population.

Implementation of the priority emission reduction measures contained in this plan can benefit LIDACs through:

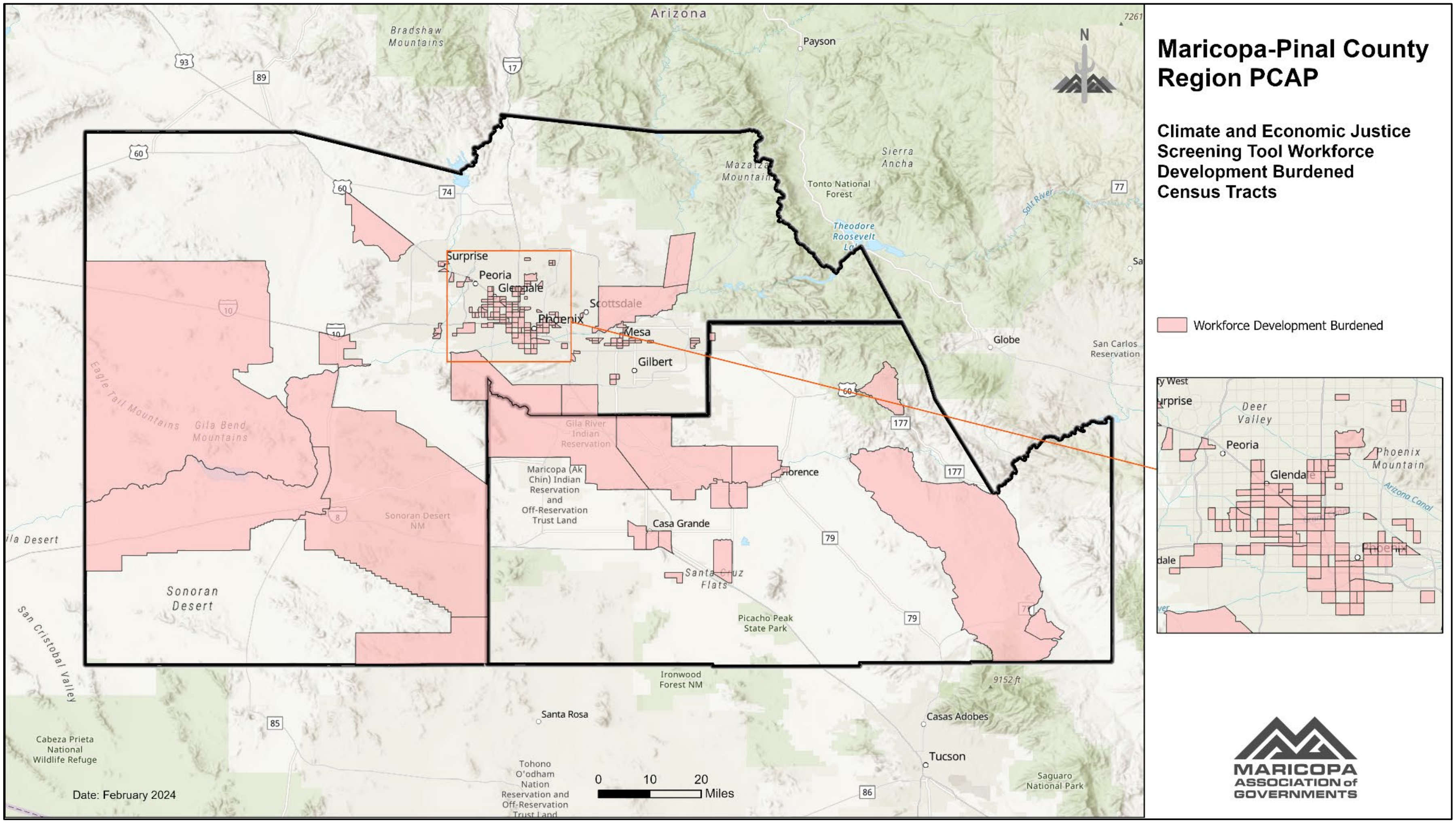
- Increased access to jobs from workforce development opportunities;
- Increased access to training opportunities;
- Reduced traffic;
- Increased access to transit alternatives.

Figure 10 below shows a map of the census tracts within the Maricopa-Pinal County Region that exceed at least one workforce development threshold. Table 8 below shows the race and ethnicity characteristics of populations in Maricopa-Pinal County region workforce development burdened census tracts compared to regional population averages.

Table 8: CEJST Workforce Development Burdened Census Tracts by Race/Ethnicity

Race or Ethnicity	Workforce Development Burdened Census Tract Average	Regional Average	Difference (+/-)
Black or African American alone	6.7%	4.8%	1.9%
American Indian / Alaska Native	5.4%	2.0%	3.4%
Asian	1.9%	3.5%	-1.6%
Native Hawaiian or Pacific	0.1%	0.1%	0.0%
White	25.4%	55.9%	-30.5%
Hispanic or Latino	57.6%	29.6%	28.0%
Other Races	11.9%	5.7%	6.2%

Figure 10: CEJST Workforce Development Burdened Census Tracts for Maricopa-Pinal County Region.



Extreme Heat and Urban Heat Islands

Currently, the CEJST does not include environmental indicators for extreme heat and urban heat island effects. However, EPA has acknowledged the link between extreme heat, urban heat islands, and equity[20,21] which will only be exacerbated by rising temperatures and the increased frequency of extreme heat events (EHE). According to EPA and the Centers for Disease Control and Prevention (CDC), as more greenhouse gases are emitted into the atmosphere, heat waves will become "more common, more severe, and longer lasting".[22] In addition, the EPA and CDC indicate that as EHE become more prevalent, scientists expect an "increase in deaths and illnesses from heat, particularly among vulnerable populations, such as children, the elderly, economically disadvantaged groups, and those with chronic health conditions made worse by heat exposure."[23] According to the Maricopa County Department of Public Health's 2022 Heat Deaths Report, African Americans and American Indians are overrepresented among heat deaths in Maricopa County given their county population proportion.[24]

For the Maricopa-Pinal County Region, the Arizona Department of Emergency and Military Affairs (DEMA) 2023 State of Arizona Hazard Mitigation Plan identifies that Arizona's Central Region[25] is considered the most vulnerable region of the state to EHE. This is due to "relatively high temperatures, lower densities of shade-producing vegetation, the highest population density, and the significant impacts associated with urban heat island effects in the Phoenix Metropolitan area".[26] From 2012 to 2022 the Arizona Department of Health Services (AZDHS) reported 5,198 heat caused and heat related deaths in Arizona with 60.1% being attributed to Arizona's Central Region. In addition to heat deaths, the Maricopa-Pinal County region also experiences a high number of heat related illness emergency department visits. Figure 11 and Figure 12 below show the heat related illness emergency department visits in 2023 for Maricopa County and Pinal County, respectively.[27]

In 2023, Phoenix set a record for the most 110°F days in a single year at 54 days. In July 2023, Phoenix set the record for the hottest month on record for a U.S. city at 102.7°F.[28] For the urban heat island effect (e.g., urban air temperature minus rural air temperature), the Arizona State University (ASU) Arizona State Climate Office reports that Phoenix has one of the largest urban heat island magnitudes in the world with up to a 10°-14°F temperature difference between urban and rural.[29]

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[20] U.S. Environmental Protection Agency, *supra* note *14.*
[21] U.S Environmental Protection Agency. Heat Islands. Heat Islands and Equity. https://www.epa.gov/heatislands/heat-islands-and-equity.
[22] U.S. Environmental Protection Agency. Climate Change and Extreme Heat What You Can Do to Prepare. October 2016.
[23] *Id.*
[24] Maricopa County Department of Public Health Division of Epidemiology and Informatics. 2022 Heat Deaths Report. June 2023. https://www.maricopa.gov/ArchiveCenter/ViewFile/Item/5652.
[25] Arizona Central Region is classified by AZ DEMA as Maricopa, Pinal, and Gila counties.
[26] Arizona Department of Emergency and Military Affairs. 2023 State of Arizona Hazard Mitigation Plan. Pg. 93. https://dema.az.gov/sites/default/files/2023-11/SHMP_2023_Final.pdf.
[27] Arizona Department of Health Services. Heat Related Illness Dashboard. https://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/heat-safety/index.php#heat-dashboard.
[28] Arizona State University. Arizona State Climate Office. August 1 , 2023. https://twitter.com/AZStateClimate/status/1686348632998686721.

[29] Arizona State University. Arizona State Climate Office. The Urban Heat Island. https://azclimate.asu.edu/urban-heat-island.

Implementation of the priority emission reduction measures contained in this plan can benefit LIDACs through:

- Reductions in greenhouse gas emissions;
- Protection and expansion of green spaces and community beautification;
- Reduction in localized surface air temperatures and increase in local shade.

Figure 11: AZDHS Heat Related Illness Emergency Department Visits in 2023 for Maricopa County.

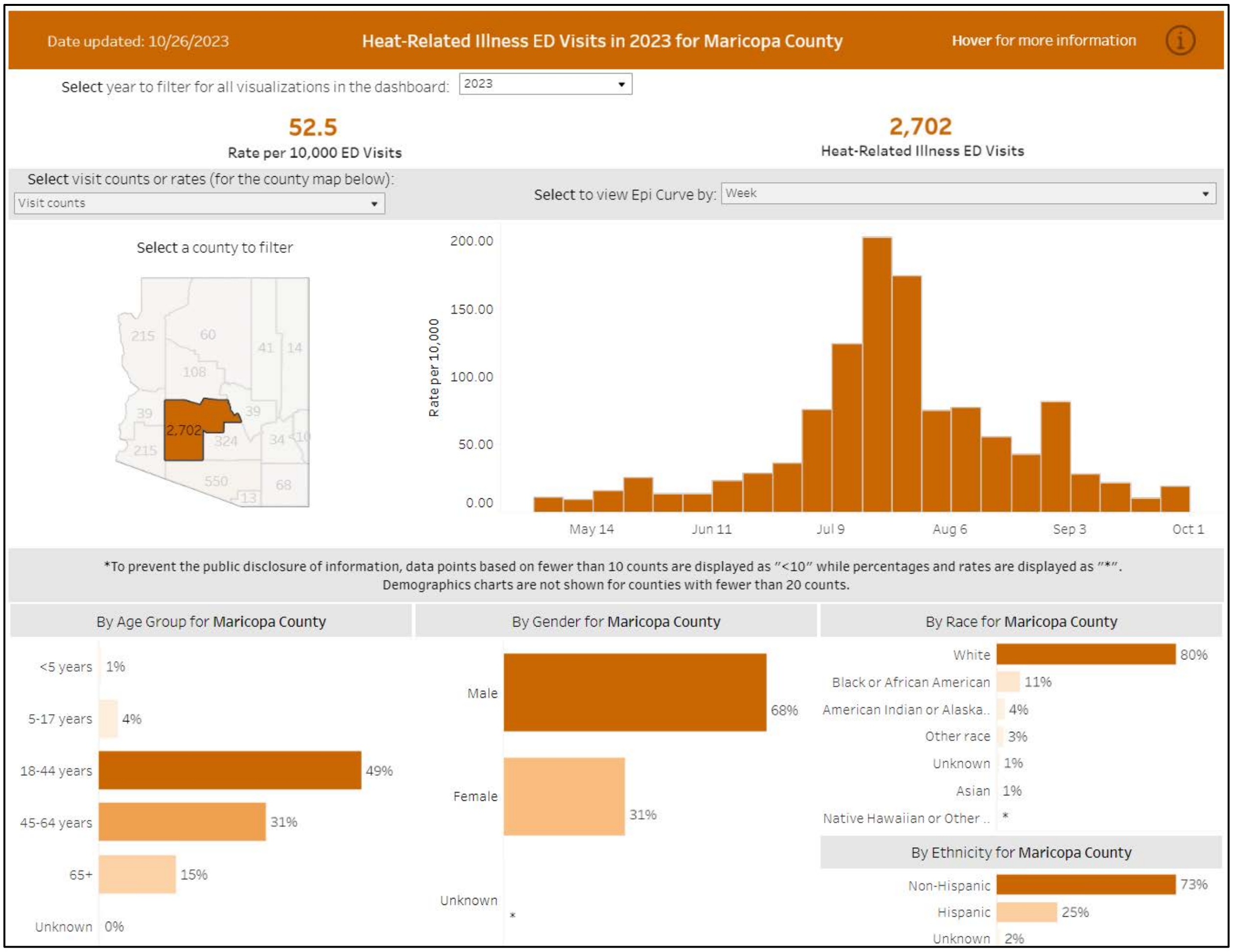
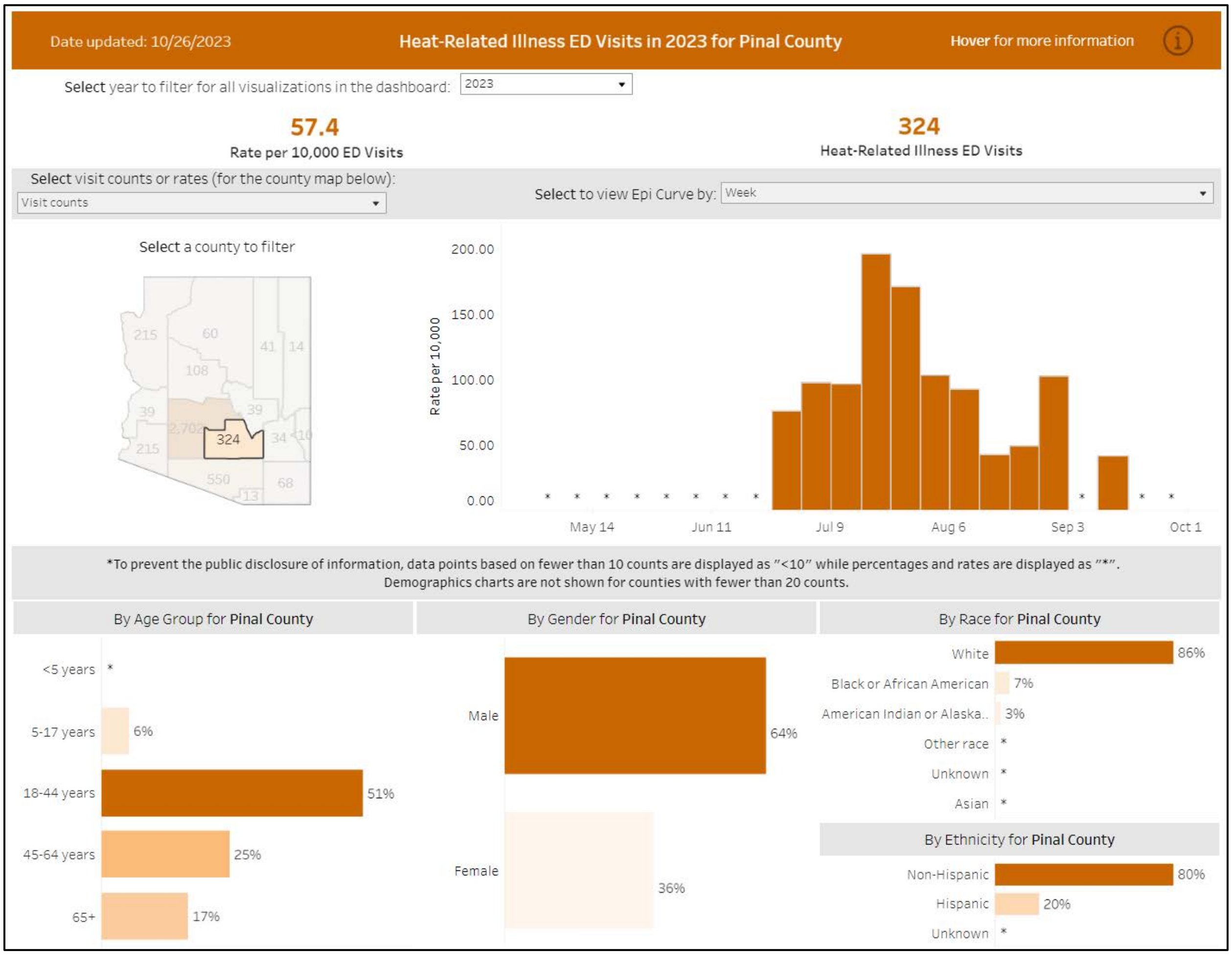


Figure 12: AZDHS Heat Related Illness Emergency Department Visits in 2023 for Pinal County.



Drought Risks

Currently, the CEJST does not include environmental indicators for drought. According to the U.S. Drought Monitor, portions of Maricopa and Pinal counties are experiencing severe drought to abnormally dry conditions. A map of the U.S. Drought Monitor for Arizona is shown in Figure 13 below. According to the Arizona DEMA 2023 State of Arizona Hazard Mitigation Plan, portions of the Maricopa-Pinal County region have a long-term drought outlook that range from Extreme to Abnormally Dry.[30] A map of Arizona's long-term drought outlook is shown below in Figure 14.[31] Climate risks for drought are expected to be equally distributed across people and sub-population groups in the Maricopa-Pinal County region.

Implementation of the priority emission reduction measures contained in this plan can help mitigate drought risks through green stormwater infrastructure projects which can reduce water use through rainwater harvesting systems and protection of greenspaces.

Figure 13: U.S. Drought Monitor Map for Arizona (February 1, 2024).

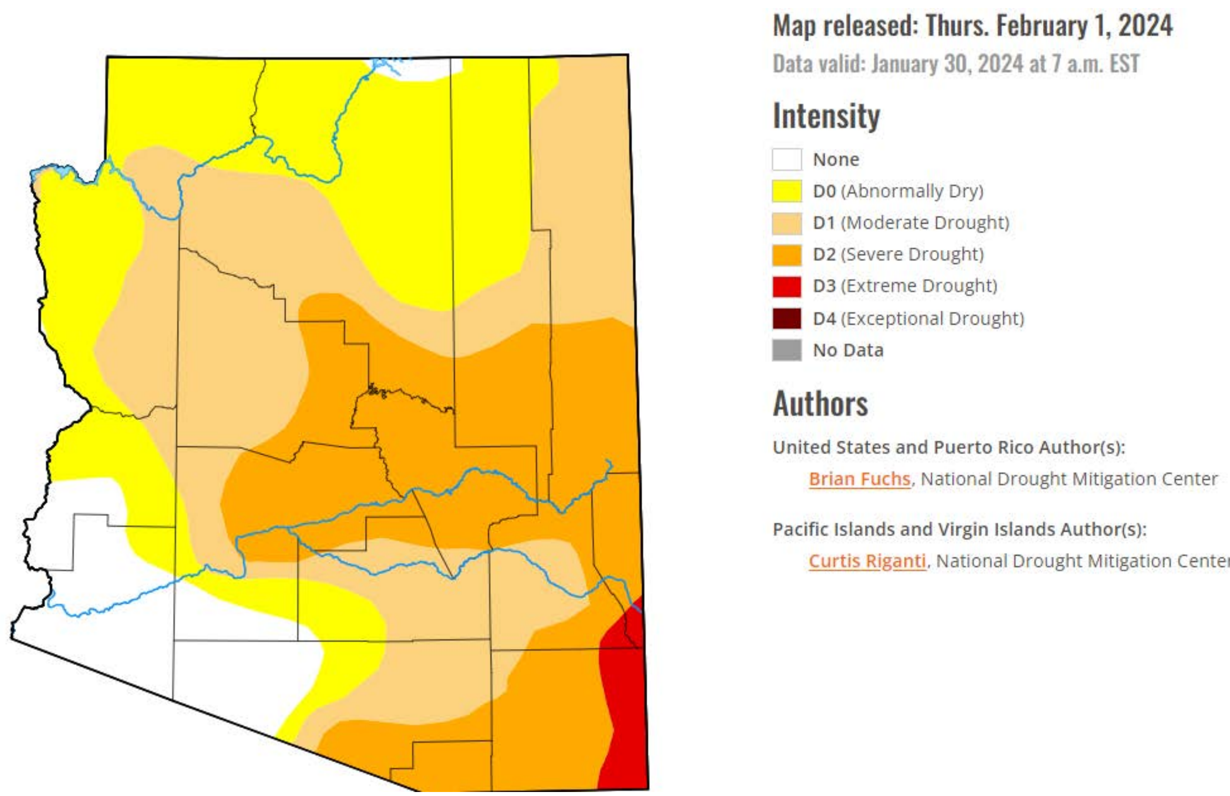


Image Credit: University of Nebraska-Lincoln, US. Department of Agriculture, National Drought Mitigation Center, 2024.

[30] *Id.*
[31] Arizona Drought Monitoring Technical Committee. Quarterly Drought Status Update: October-December 2023. January 17, 2024.

Figure 14: Arizona Long-Term Drought Outlook (2023).

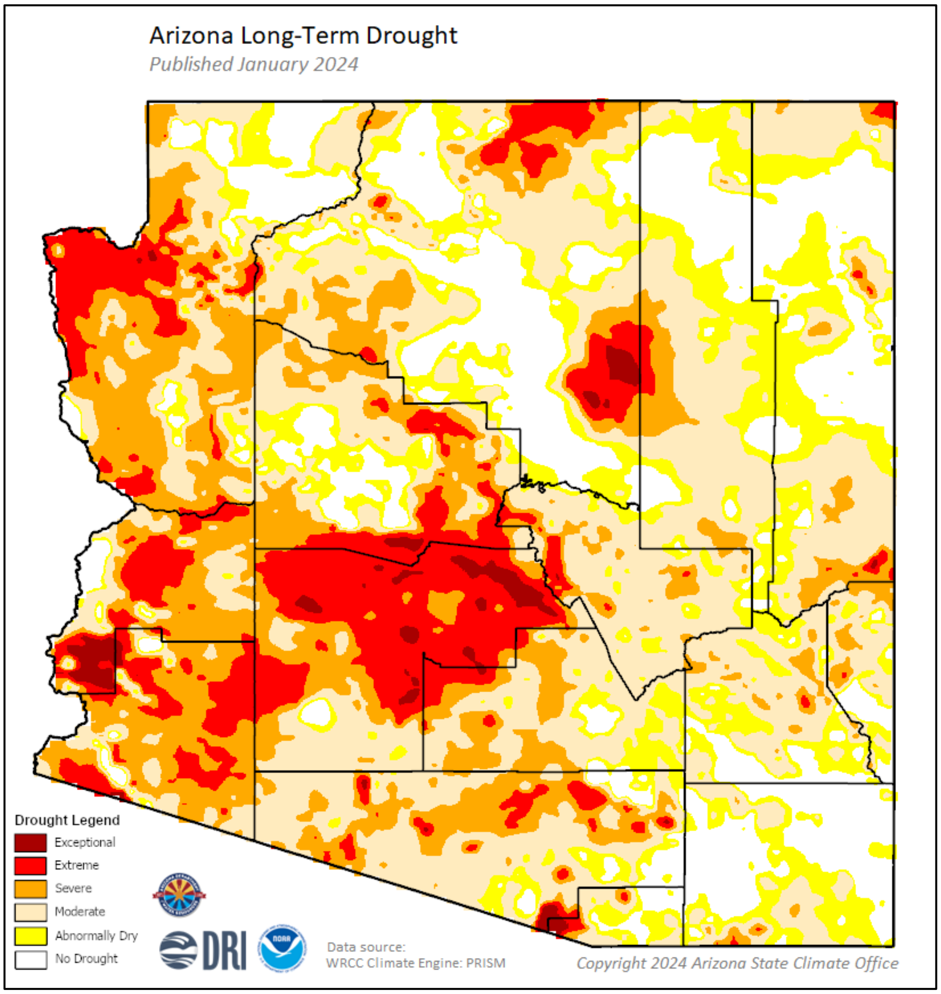


Image Credit: Arizona State Climate Office and Arizona Drought Monitoring Technical Committee, 2024.

LIDAC Community Engagement

The EPA CPRG PCAP requirements for the LIDAC Benefits Analysis are to conduct meaningful community engagement and to advance the goals of the Justice40 Initiative set forth in Executive Order 14008, which aims to deliver 40 percent of the overall benefits of federal investments to historically disadvantaged communities. In order to ensure that MAG's community engagement efforts for the Maricopa-Pinal County region PCAP included targeted outreach to LIDACs, MAG contracted with LaneTerralever to identify open house locations in or near LIDACs, distribute targeted doorhangers to LIDACs surrounding the open house locations, develop in person and virtual content for the open houses, as well as support the open house events with bi-lingual multimedia feedback instruments and translation services. For the Maricopa-Pinal County region PCAP, MAG hosted open house events at the following locations:

- Glendale Civic Center on December 4, 2023;
- Cesar Chavez Community Center in Phoenix on December 11, 2023;
- Eloy Town Hall on December 13, 2023;
- Mesa Community College on December 16, 2023;
- Virtual Open House (December 4, 2023 through December 22, 2023) (English and Spanish Options).

These events were publicized in the following manners:

- Door Hangers targeted at zip codes that correspond to CEJST disadvantaged census tracts near the event locations (English and Spanish);
- Email notifications (e.g., CPRG email list, intergovernmental representatives, and community organization list);
- MAG CPRG webpage and MAG homepage spotlight;
- MAG social media (e.g., Facebook, Instagram, X) (English and Spanish);
- MAG member agencies email and social media outreach through public information officers;
- Local news (e.g., web and radio coverage).

Feedback and input received from the public during the open house events was collected, tabulated, and distributed to eligible entities in the region who indicated interest in applying for EPA CPRG Implementation Grants. This included event summaries in both English and Spanish, as well as pivot tables and charts of community feedback that was filterable by municipality based on zip codes. More information on the community engagement activities undertaken as part of the Maricopa-Pinal County PCAP development can be found in Appendix B.

Figure 15 below shows a map of the PCAP open house events overlayed on the Maricopa-Pinal County region CEJST results. Figure 16 below shows an example of the door hangers that were distributed to LIDACs near the open house events. Figure 17 below shows an example of the PCAP virtual open house content.

Figure 15: Maricopa-Pinal County Region Priority Climate Action Plan Open House Events

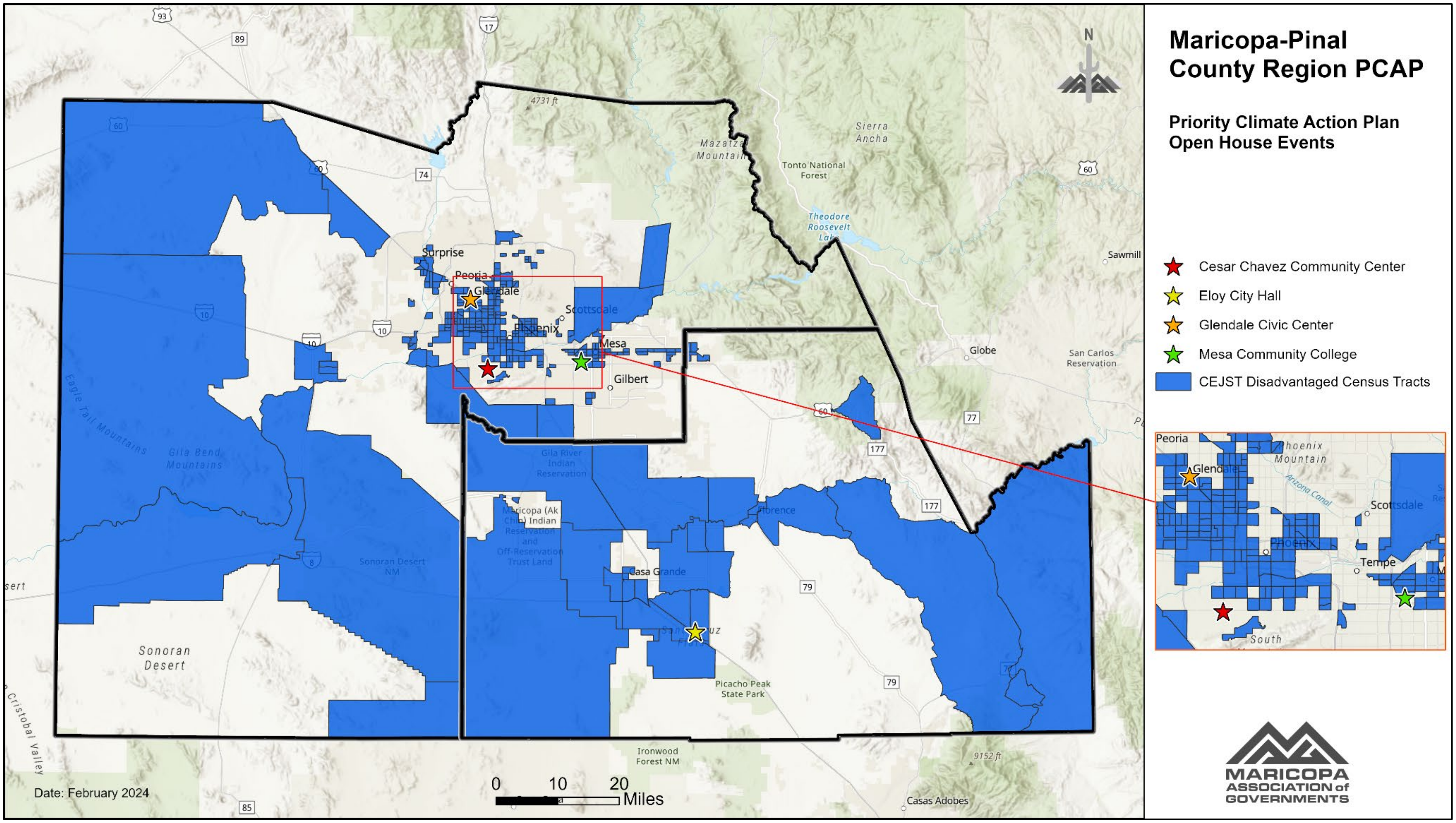
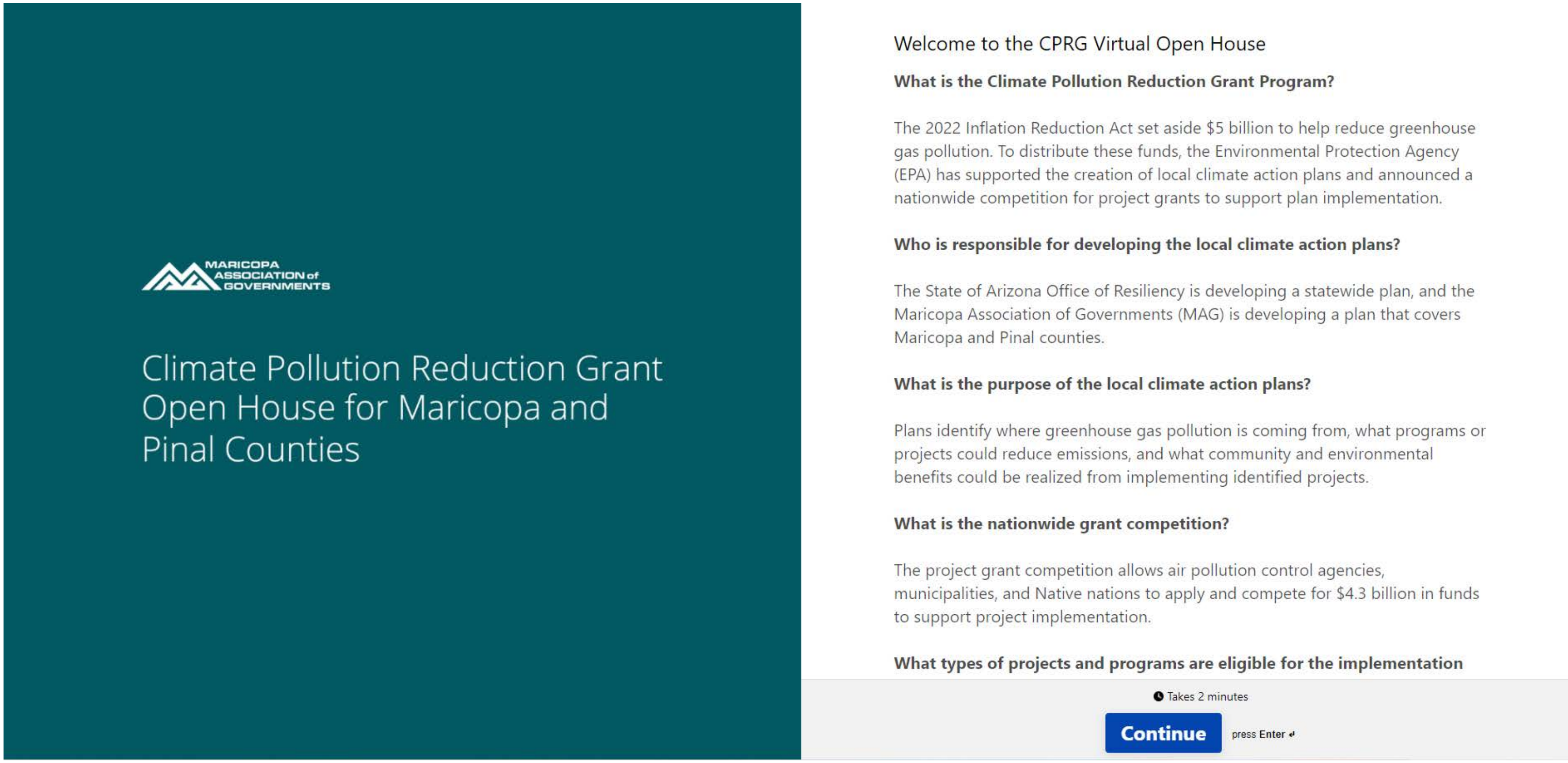


Figure 16: Maricopa-Pinal County Region PCAP Open House Door Hangers

Figure 17: Maricopa-Pinal County Region Virtual Open House Opportunity.



Anticipated Impacts of Priority Measures on LIDACs

Each measure in this PCAP provides overall GHG reductions, additional co-benefits either directly or indirectly, as well as positive impacts to LIDAC areas. Below is a list of the anticipated benefits from the implementation of the priority emission reduction measures in this plan and any associated CEJST categories of burden[32], Justice40 Initiative benefits[33], or CPRG LIDAC technical guidance benefits[34].

Renewable Energy Generation at Municipal and Other Public Facilities

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.
  - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
  - CEJST Energy Burden: Energy Cost.
  - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

Development of Microgrids

- Establishment of community microgrids.
  - Justice40 Clean Energy and Energy Efficiency: Establishment of community microgrids.
- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.
  - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased resilience of the electricity grid and reduced energy costs.
  - CEJST Energy Burden: Energy Cost.
  - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Increased climate resilience and improved public access to services and critical resources in times of emergency.
  - CEJST Climate Change Burden.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

[32] Climate and Economic Justice Screening Tool. Methodology: Categories of Burden. https://screeningtool.geoplatform.gov/en/methodology.
[33] Executive Office of the President, Office of Management and Budget, Interim Implementation Guidance for the Justice40 Initiative, M-21-28, issued on July 20, 2021.
[34] Environmental Protection Agency. Climate Pollution Reduction Grants Program: Technical Reference Document for States, Municipalities and Air Pollution Control Agencies. Benefits Analyses: Low income and Disadvantaged Communities. April 27, 2023.

Public Fleet Electrification and Publicly Available Charging Infrastructure Development

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
    - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Increased public access to electric vehicle chargers.
    - Justice40 Clean Transportation: Access to affordable electric vehicles, charging stations, and purchase programs.
- Access to clean, high-frequency bus transportation.
    - Justice40 Clean Transportation: Access to clean, high-frequency transportation.
- Reduced noise pollution.
    - CPRG LIDAC Technical Guidance – Reduced noise pollution.
- Creation of high-quality jobs and workforce development opportunities.
    - CEJST Workforce Development Burden.
    - Justice40 Training and Workforce Development.

Zero Emission Vehicle Incentives

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
    - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Increased public access to electric vehicle purchase programs.
    - Justice40 Clean Transportation: Access to affordable electric vehicles, charging stations, and purchase programs.
- Reduced noise pollution.
    - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Active Transportation Network Infrastructure Investments

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased vehicle tailpipe emissions.
    - CEJST Transportation Burden: Diesel Particulate Matter Exposure, Traffic Proximity.
    - Justice40 Clean Transportation: Reduction of exposure to harmful transportation-related emissions.
- Improvement in public transportation accessibility, reliability, and options.
    - CEJST Transportation Burden: Transportation Barriers.
    - Justice40 Clean Transportation: Increased bicycle and walking paths.
- Protection and expansion of green spaces and community beautification.

- CEJST Housing Burden: Lack of green space.

- Reduction in localized surface air temperatures and increase in local shade.
  - Justice40 Climate Change: Increased urban heat island effect mitigation benefits.
- Reduced noise pollution.
  - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Electrification of Commercial and Governmental-Owned Lawn and Garden Equipment

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Decreased diesel motor emissions.
  - CEJST Transportation Burden: Diesel Particulate Matter Exposure.
- Reduced noise pollution.
  - CPRG LIDAC Technical Guidance – Reduced noise pollution.

Energy Efficiency Upgrades for Municipal Operations

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Deployment of clean energy.
  - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
  - CEJST Energy Burden: Energy Cost.
  - Justice40 Affordable and Sustainable Housing: Reduced housing cost burden.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

Weatherization Assistance Programs

- Improved air quality and improved public health due to reduced air pollution.
  - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
  - Justice40 Climate Change: Reductions of local air pollutants.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
  - CEJST Energy Burden: Energy Cost.
- Decreased home repair and improvement costs.
  - CEJST Housing Burden: Housing Cost
- Improved housing quality, comfort, and safety.
  - Justice40 Affordable and Sustainable Housing: Improved housing quality and safety and enhanced public health.
- Creation of high-quality jobs and workforce development opportunities.
  - CEJST Workforce Development Burden.
  - Justice40 Training and Workforce Development.

Electrification of Municipal, Commercial, and Residential Buildings

- Improved air quality and improved public health due to reduced air pollution.

    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Improved indoor air quality.
    - Justice40 Affordable and Sustainable Housing: Improved indoor air pollution.
- Improved housing quality, comfort, and safety.
    - Justice40 Affordable and Sustainable Housing: Improved housing quality and safety and enhanced public health.
- Improved energy efficiency.
    - Justice40 Clean Energy and Energy Efficiency: Increased energy efficiency programs and resources.

Food Waste Diversion for Biogas Capture from Landfills and Wastewater Treatment Plants for Renewable Energy Generation

- Improved air quality and improved public health due to reduced air pollution.
    - CEJST Health Burden: Asthma, Diabetes, Heart Disease, Low Life Expectancy.
    - Justice40 Climate Change: Reductions of local air pollutants.
- Increased regional resiliency to extreme weather events and reduced municipal energy costs.
    - CEJST Energy Burden: Energy Cost.
- Deployment of clean energy.
    - Justice40 Clean Energy and Energy Efficiency: Deployment of clean energy.
- Reduced food waste sent to landfills.
    - Justice40 Climate Change: Reductions of greenhouse gas emissions.

Review of Authority to Implement

Under the EPA CPRG Planning Grants program, each PCAP must include a review of authority to identify if the planning grant recipient or collaborating partners have existing regulatory or statutory authority to implement the applicable priority GHG emissions reduction measures. For this PCAP MAG has relied upon notifications from eligible entities within the region for identification of specific emission reduction programs, policies, and projects they may seek to implement. Within those notifications, MAG requested an identification of any additional authority that may be necessary to implement the applicable measure or group of measures.[35] However, while MAG has relied upon these notifications for this review of authority, there are many eligible entities within the region including counties, air pollution control agencies, municipalities, and Native nations who may have different existing authority. Any eligible entity wishing to pursue funding for a CPRG Implementation Grant should consult their local laws, rules, and ordinances to see if additional authority is necessary for an applicable PCAP priority GHG emissions reduction measure. Please see Table 9 below for a review of PCAP priority emissions reduction measures and Table 10 for a list of identified statutory prohibitions that are applicable to many eligible entities in the region. None of the measures included in the PCAP priority emissions reduction measures violate the statutes outlined in Table 10.

Table 9: Review of Authority for Priority GHG Emissions Reduction Measures

Priority Measure	Review of Authority
Renewable Energy Generation at Municipal and Other Public Facilities	No additional authority required by implementing agencies.
Development of Microgrids	No additional authority required by implementing agencies.
Public Fleet Electrification and Publicly Available Charging Infrastructure Development	No additional authority required by implementing agencies.
Zero Emission Vehicle Incentives (Residential & Commercial Fleets)	May require partnerships with businesses and share riding companies.
Active Transportation Network Infrastructure Investments	No additional authority required by implementing agencies.
Electrification of Commercial and Governmental-Owned Lawn and Garden Equipment	No additional authority required by implementing agencies.
Energy Efficiency Upgrades for Municipal Operations	No additional authority required by implementing agencies.
Weatherization Assistance Programs (Residential and Commercial)	No additional authority required by implementing agencies.
Electrification of Municipal, Commercial, and Residential Buildings	No additional authority required by implementing agencies.
Food Waste Diversion for Biogas Capture from Landfills and Wastewater Treatment Plants for Renewable Energy Generation	No additional authority required by implementing agencies.

[35] *See* Appendix G for a compilation of notifications and comments received by MAG for consideration in the PCAP.

Table 10: Statewide Prohibitions Applicable to Greenhouse Gas Emissions Reduction Measures

Regulation or Statute Topic	Arizona Administrative Code (A.A.C.) or Arizona Revised Statute (A.R.S.) Citation
Prohibition on state agencies to adopt or enforce a state or regional program to regulate the emission of greenhouse gases for the purposes of addressing changes in atmospheric temperature.	A.R.S § 49-191
Prohibition on restricting a person's or entity's ability to use the services of a utility provider that is capable and authorized to provide utility service at a person's or entity's property.	A.R.S. § 9-810
Prohibition on building energy use benchmarking and reporting.	A.R.S. § 9-500.36
Prohibition on restricting the use or sale of a vehicle based on the vehicle's energy source.	A.R.S. § 28-145

Next Steps

CPRG Implementation Grants Competitions

General Competition

Applications for EPA's CPRG Implementation Grants General Competition are due by April 1, 2024.[36] EPA anticipates awarding approximately 30 to 115 grants ranging between $2 million and $500 million under the general competition. Grant applications must only seek funding to implement GHG emission reduction programs, policies, or measures identified in an appropriate PCAP created under a CPRG planning grant. CPRG Planning Grants were awarded to the following Arizona entities:

- State of Arizona – Arizona Governor's Office of Resiliency;
- Maricopa Association of Governments (MAG) – Phoenix-Mesa-Chandler MSA;
- Pima Department of Environmental Quality (PDEQ) – Tucson, AZ MSA;
- Gila River Indian Community;
- Salt River Pima-Maricopa Indian Community;
- Navajo Nation.

Tribes and Territories Only Competition

Applications for EPA's CPRG Implementation Grants Tribes and Territories Competition are due by May 1, 2024.[37] EPA anticipates awarding approximately 25 to 100 grants ranging between $1 million and $25 million under the tribes and territories competition. Grant applications must only seek funding to implement GHG emission reduction programs, policies, or measures identified in an appropriate PCAP created under a CPRG planning grant. Tribes and territories have until April 1, 2024 to submit CPRG Planning Grant PCAPs. CPRG Planning Grants were awarded to the following Arizona Native nations:

- Gila River Indian Community;
- Salt River Pima-Maricopa Indian Community;
- Navajo Nation.

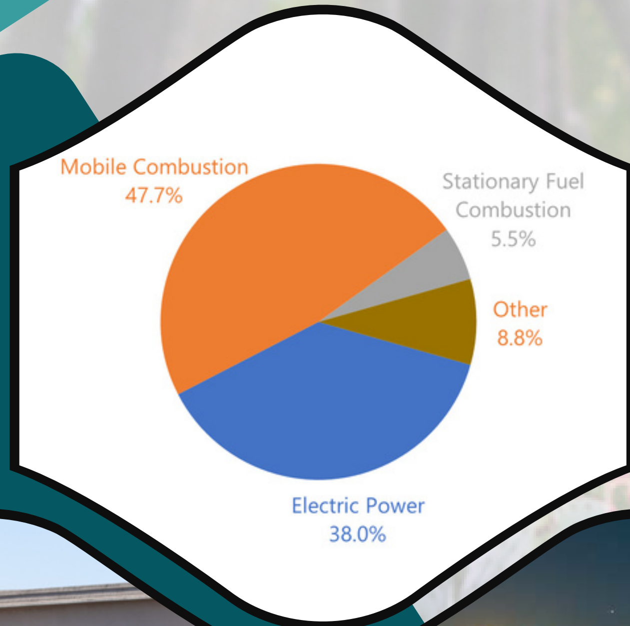
CPRG Planning Grant Program

The next deliverable under the EPA CPRG Planning Grant is a comprehensive climate action plan (CCAP). This plan is due on July 21, 2025 and must include the following elements:

- A comprehensive GHG inventory;
- Near term and long term GHG emissions projections;
- Near term and long term GHG emissions reduction targets;
- Quantified GHG reduction measures for all measures;
- A benefits analysis for the full geographic scope and population covered by the plan;
- A low-income and disadvantaged communities benefits analysis;
- A review of authority to implement;
- A plan to leverage other federal funding; and,
- A workforce planning analysis

[36] U.S. Environmental Protection Agency, *supra* note *1.*
[37] U.S. Environmental Protection Agency, *supra* note 2.

MAG will continue to engage with the community on this important endeavor and has committed to holding eight community outreach meetings for the development of the CCAP. MAG will continue to hold regular stakeholder update meetings to share program updates and solicit input from the community on plan development. To stay up to date on CCAP planning efforts, please visit www.azmag.gov/Programs/Environmental/CPRG.



MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix A: Maricopa-Pinal County Region 2020 Greenhouse Gas Emissions Inventory

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

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Introduction

In 2023, the Maricopa Association of Governments (MAG) was selected by the U.S. Environmental Protection Agency (EPA) as the lead planning organization for the Maricopa-Pinal County region under EPA's Climate Pollution Reduction Grants (CPRG) program. Under the first phase of the CPRG program, MAG has developed a priority climate action plan (PCAP) which includes, among other elements, a greenhouse gas (GHG) emissions inventory (EI) for the region.

For the 2024 Maricopa-Pinal County PCAP, MAG has selected 2020 as the base emissions inventory year to align with existing inventory efforts already undertaken by the Maricopa County Air Quality Department (MCAQD) and to align with the triennial EPA National Emissions Inventory (NEI). Using existing local and federal datasets, MAG has compiled a Maricopa-Pinal County region specific GHG EI which includes estimates for nine different source categories: mobile combustion, electric power consumption, solid waste, stationary fuel combustion, agriculture, imported water, wastewater treatment, livestock, and manufacturing gases. In addition, MAG has also compiled carbon dioxide (CO_2) sequestration data from community forestry within the Maricopa-Pinal County region. From these estimates, net greenhouse gas emissions (gross anthropogenic emissions minus tree carbon sequestration) were generated and allocated to municipalities, unincorporated areas, and Native nations. A map of municipalities and Native nations within the Maricopa-Pinal County region is show in Figure 1 below.

In 2020, the Maricopa-Pinal County region generated approximately 53,392,143 metric tons of carbon dioxide equivalents ($MTCO_2e$). The dominant GHGs generated by the Maricopa-Pinal County region are CO_2, methane (CH_4), and nitrous oxide (N_2O). Within the Maricopa-Pinal County region, community forestry removed approximately 21,736 $MTCO_2e$ from the atmosphere in 2020, resulting in a net greenhouse gas emissions of 53,370,407 $MTCO_2e$. The three largest sources of GHG emissions in 2020 are mobile sources, electric power consumption, and stationary fuel combustion, which collectively account for 91% of the gross GHGs generated by the Maricopa-Pinal County region. 2020 per capita net greenhouse gas emissions for the region are estimated to be 10.97 $MTCO_2e$. Figure 2 and

Table 1 below summarize 2020 Maricopa-Pinal County region GHG emissions by source category. Figure 3 below summarizes Maricopa-Pinal County region electric power consumption GHG emissions by economic sector. Figure 4 summarizes Maricopa-Pinal County region mobile source GHG emissions by mobile source category.

In order to generate Native nation estimates, MAG allocated 2020 Maricopa-Pinal County region GHG emission estimates to Native nations in the region based on direct data, population, land use, or land cover as appropriate for each sector. In 2020, the Maricopa-Pinal County region Native nations generated approximately 236,238 $MTCO_2e$. Within the Maricopa-Pinal County region, Native nation community forestry removed approximately 30 $MTCO_2e$ from the atmosphere in 2020, resulting in a net greenhouse gas emissions of 236,207 $MTCO_2e$. The three largest sources of Maricopa-Pinal County region Native nation GHG emissions in 2020 are mobile sources, electric power consumption, and agriculture and land management emissions (nitrogen fertilizer use), which collectively account for 86% of the gross GHGs generated by the Maricopa-Pinal County region Native nations. 2020 per capita net greenhouse gas emissions for the region Native nations are estimated to be 10.0 $MTCO_2e$. Figure 5 and Table 2 below summarize 2020 Maricopa-Pinal County region Native Nation GHG emissions by source category.

Figure 1: Map of Municipalities and Native Nations within the Maricopa-Pinal County Region

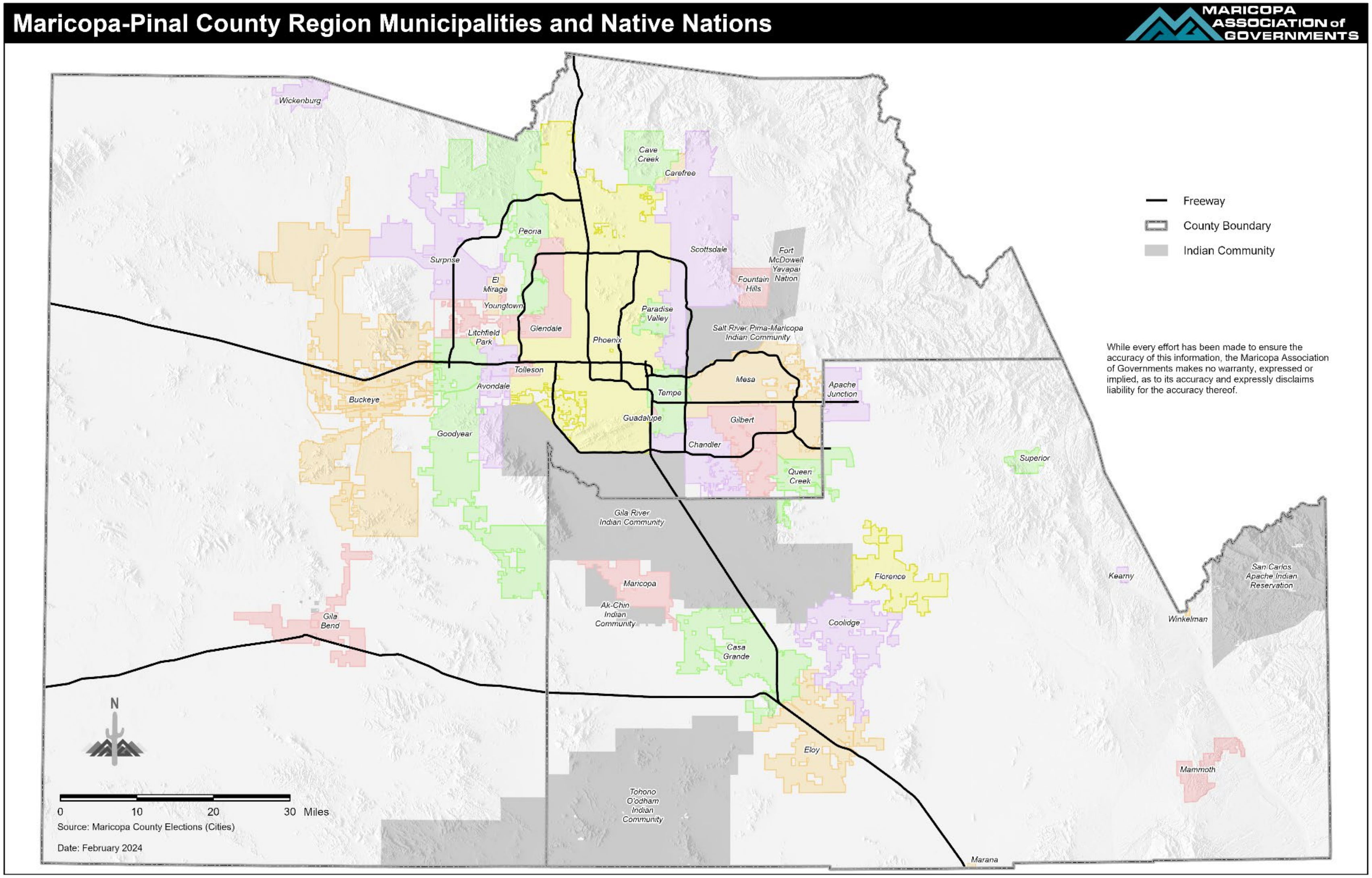

Figure 2: Maricopa-Pinal County Region 2020 Greenhouse Gas Emissions by Source Category.

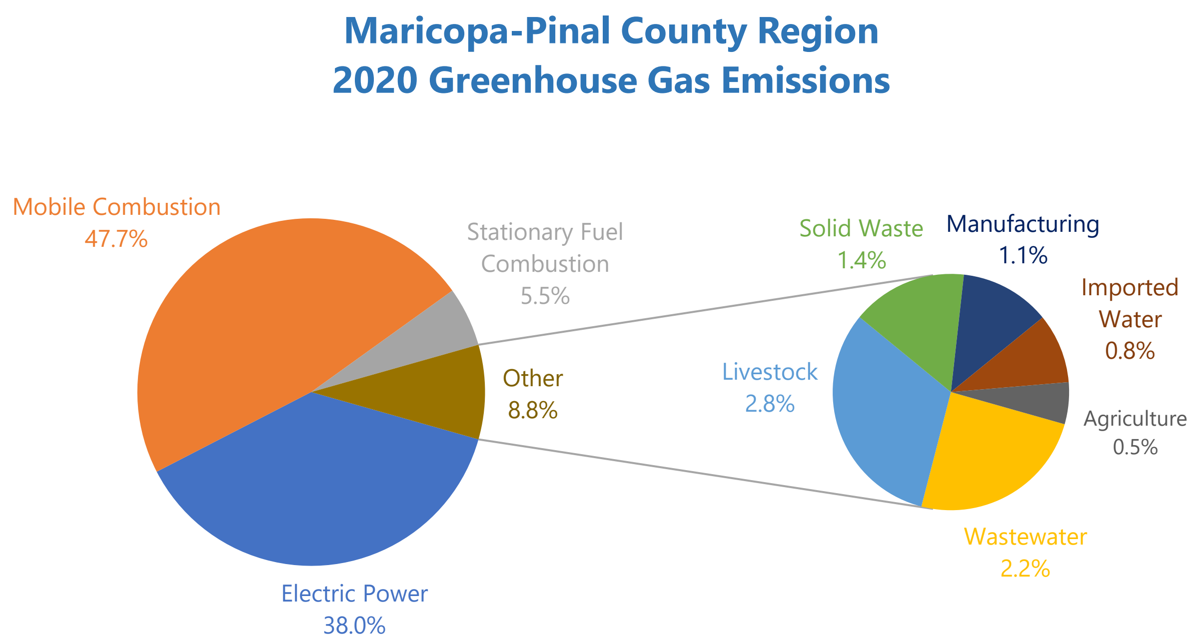

Table 1: Maricopa-Pinal County Region 2020 Greenhouse Gas Emissions by Source Category.

Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	20,305,197	38.0%
Mobile Combustion	25,446,411	47.7%
Stationary Fuel Combustion	2,953,090	5.5%
Wastewater	1,154,683	2.2%
Livestock (Cattle)	1,495,868	2.8%
Solid Waste	741,710	1.4%
Manufacturing Gases	579,756	1.1%
Imported Water	446,854	0.8%
Agriculture and Land Management	268,575	0.5%

Figure 3: Maricopa-Pinal County Region 2020 Electric Power Consumption GHG Emissions by Economic Sector.

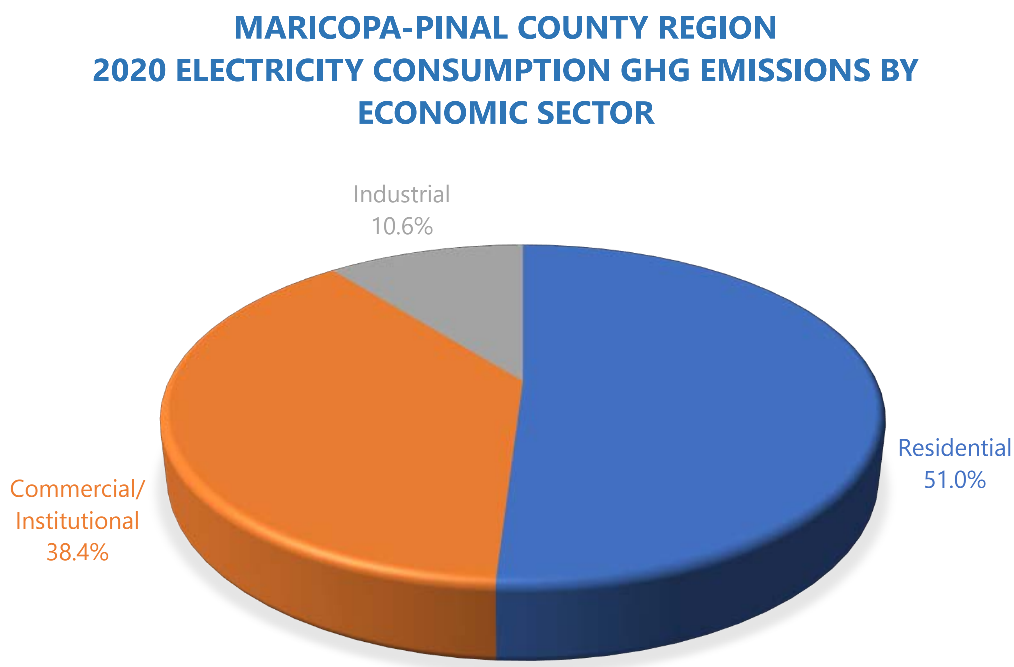

Figure 4: Maricopa-Pinal County Region 2020 Mobile Source GHG Emissions by Mobile Source Category.

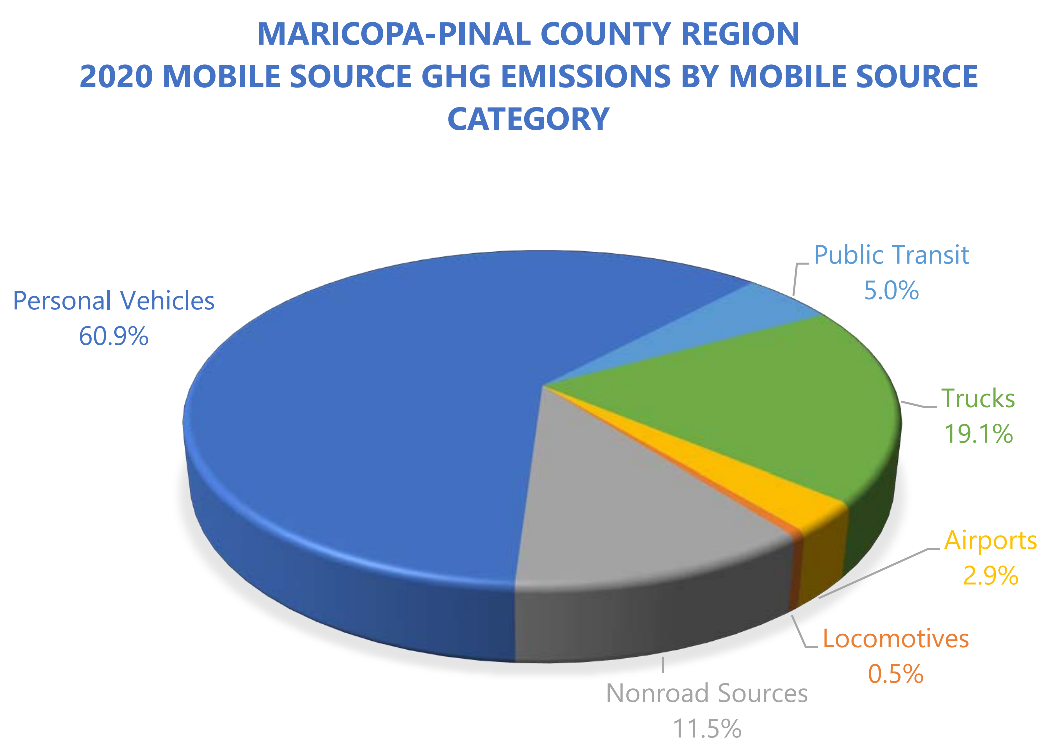

Figure 5: Maricopa-Pinal County Region 2020 Native Nation Greenhouse Gas Emissions by Source Category.

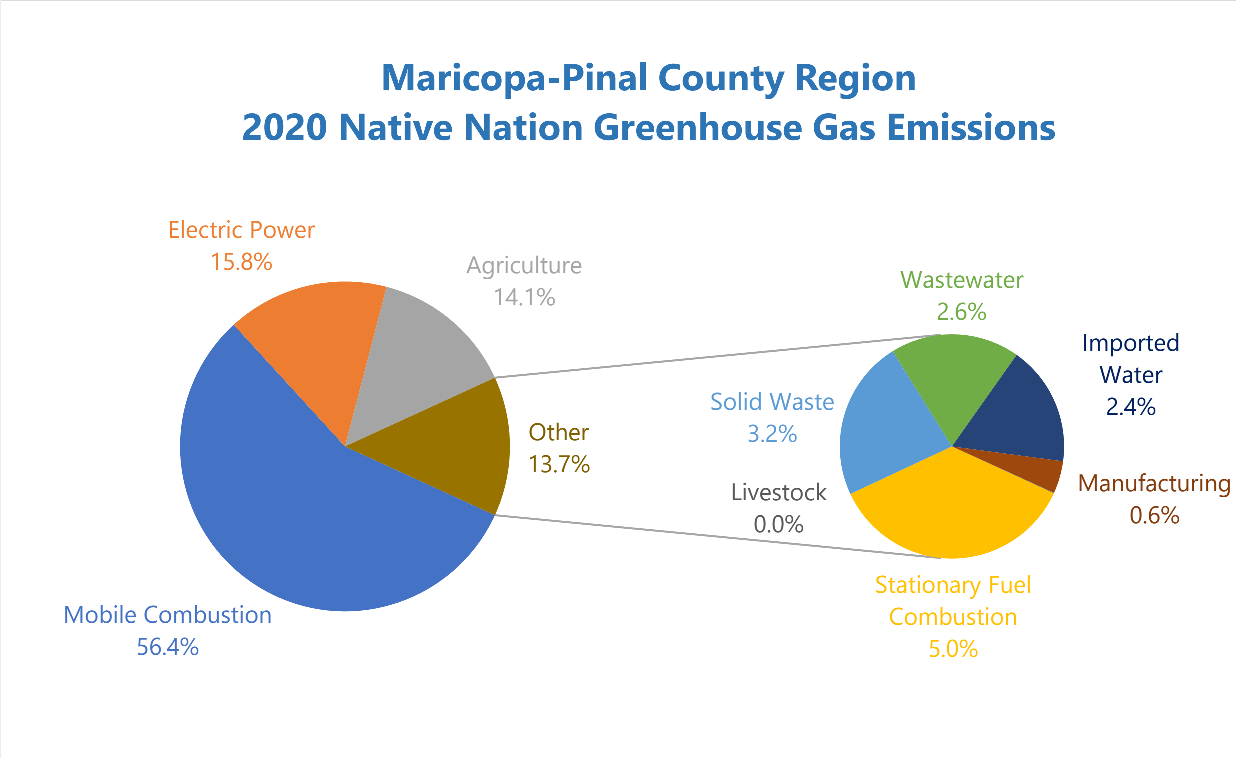

Table 2: Maricopa-Pinal County Region 2020 Native Nation Greenhouse Gas Emissions by Source Category.

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	37,443	15.8%
Mobile Combustion	133,155	56.4%
Stationary Fuel Combustion	11,707	5.0%
Wastewater	6,030	2.6%
Livestock (Cattle)	22	0.0%
Solid Waste	7,473	3.2%
Manufacturing Gases	1,506	0.6%
Imported Water	5,603	2.4%
Agriculture and Land Management	33,298	14.1%

Emissions Inventory Methodology

In accordance with EPA CPRG program requirements, MAG developed a quality assurance project plan (QAPP) for the development of GHG emissions inventories for the Maricopa-Pinal County region. The *Quality Assurance Project Plan for the Climate Pollution Reduction Grant Program for the Phoenix-Mesa-Chandler MSA (*Maricopa-Pinal County Region CPRG QAPP) details project-specific quality assurance, quality control, and technical activities for the generation, collection, and use of environmental data. The Maricopa-Pinal County Region CPRG QAPP was approved by EPA on November 3, 2023. The Maricopa-Pinal County Region CPRG QAPP is included as Attachment A to this report.

In this report, MAG quantifies GHG emissions for the Maricopa-Pinal County region during the 2020 calendar year using the following data sources in accordance with the approved QAPP:

- MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory (2023);
- MCAQD Pinal County 2020 Community Greenhouse Gas Emissions Inventory (2024);
- EPA Local Greenhouse Gas Inventory Tool (LGGIT).

Mobile Combustion (Transportation)

MAG generated 2020 GHG emission estimates for mobile combustion from federal air quality models and data sources. 2020 county-level mobile combustion emissions for Maricopa County and Pinal County were estimated using the EPA Motor Vehicle Emission Simulator (MOVES3), the Aviation Environment Design Tool (AEDT v. 3e) for airport emissions, and the 2020 National Emissions Inventory (NEI) for locomotive emissions.

Table 3 shows the GHG emissions from each mobile combustion source category. The dominant source type for 2020 mobile combustion emissions are personal vehicles which generated 15,501,958 $MTCO_2e$ or 60.9% of total regional mobile combustion GHG emissions.

Table 3: Maricopa-Pinal County Region 2020 Mobile Combustion Greenhouse Gas Emissions.

Mobile Source	GHG Emissions ($MTCO_2e$)	GHG Emissions (% of Total Mobile)
Airports	742,833.9	2.9%
Locomotives	137,856.3	0.5%
Nonroad Sources	2,913,669.0	11.5%
Personal Vehicles	15,501,957.7	60.9%
Public Transit	1,279,999.1	5.0%
Trucks	4,870,095.2	19.1%
Total	**25,446,411.2**	**100.0%**

Table 4 shows the GHG emissions from onroad sources by vehicle type. The dominant source category for 2020 onroad emissions are passenger trucks which generated 9,155,160 $MTCO_2e$ or 36.0% of total regional mobile combustion GHG emissions. Table 5 shows the GHG emissions from nonroad sources by vehicle category. The dominant source category for 2020 nonroad emissions is construction equipment which generated 2,024,022 $MTCO_2e$ or 8.0% of total regional mobile combustion GHG emissions.

Table 4: Maricopa-Pinal County Region 2020 Onroad Greenhouse Gas Emissions.

Source Type	GHG Emissions ($MTCO_2e$)	GHG Emissions (% of Total Mobile)
Combination Long-haul Truck	1,596,565.0	6.3%
Combination Short-haul Truck	507,531.0	2.0%
Intercity Bus	1,213,771.1	4.8%
Light Commercial Truck	100,321.6	0.4%
Motor Home	85,586.7	0.3%
Motorcycle	82,925.8	0.3%
Passenger Car	6,178,284.8	24.3%
Passenger Truck	9,155,160.4	36.0%
Refuse Truck	45,976.5	0.2%
School Bus	29,935.1	0.1%
Single Unit Long-haul Truck	136,181.6	0.5%
Single Unit Short-haul Truck	2,483,519.5	9.8%
Transit Bus	36,292.9	0.1%
Total	**21,652,052.0**	**85.1%**

Table 5: Maricopa-Pinal County Region 2020 Nonroad Greenhouse Gas Emissions.

Source Type	GHG Emissions ($MTCO_2e$)	GHG Emissions (% of Total Mobile)
Agriculture	77,953.9	0.3%
Commercial	210,297.5	0.8%
Construction	2,024,021.8	8.0%
Industrial	327,508.4	1.3%
Lawn/Garden	232,324.1	0.9%
Pleasure Craft	10,716.7	0.0%
Railroad Maintenance	1,288.6	0.0%
Recreational	29,558.0	0.1%
Total	**2,913,669.0**	**11.5%**

Table 6 shows the GHG emissions from airports. Airport estimates include GHG emissions from takeoff, landing, and touch and go operations within the region. The dominant source category for 2020 airport emissions is Sky Harbor Airport with 289,790 $MTCO_2e$ or 1.1% of total regional mobile combustion GHG emissions.

Table 6: Maricopa-Pinal County Region 2020 Airport Greenhouse Gas Emissions.

Source Type	GHG Emissions ($MTCO_2e$)	GHG Emissions (% of Total Mobile)
Airports		
Ak-Chin	875.0	0.0%
Arizona Soaring	667.0	0.0%
Buckeye	4,880.0	0.0%
Casa Grande	8,372.8	0.0%
Chandler	22,522.1	0.1%
Coolidge	2,914.8	0.0%
Deer Valley	52,461.5	0.2%
Eloy	1,511.3	0.0%
Falcon Field	48,244.1	0.2%
Gila Bend	2,097.3	0.0%
Glendale	11,219.5	0.0%
Goodyear	15,534.7	0.1%
Kearny	141.8	0.0%
Luke Air Force Base	122,588.4	0.5%
Phoenix-Mesa Gateway	51,957.0	0.2%
Pinal Airpark	52,130.0	0.2%
Pleasant Valley	540.0	0.0%
San Manuel	998.5	0.0%
Scottsdale	45,147.1	0.2%
Sky Harbor	289,790.0	1.1%
SkyRanch	353.0	0.0%
Stellar	5,399.2	0.0%
Wickenburg	2,488.8	0.0%
Total	**742,833.9**	**2.9%**

Table 7 shows the GHG emissions from locomotives. The dominant source type for 2020 locomotive emissions is Class 1 Linehaul with 111,444.1 $MTCO_2e$ or 0.4% of total regional mobile combustion GHG emissions.

Table 7: Maricopa-Pinal County Region 2020 Locomotive Greenhouse Gas Emissions.

Source Type	GHG Emissions ($MTCO_2e$)	GHG Emissions (% of Total Mobile)
Amtrak	4,521.1	0.0%
Class 1 Linehaul	111,444.1	0.4%
Class 2 and 3 Linehaul	7,904.0	0.0%
Commuter Rail	0.0	0.0%
Railyards	13,987.1	0.1%
Total	**137,856.3**	**0.5%**

Native Nation Mobile Combustion GHG Emissions

In order to estimate Native nation GHG emissions from mobile combustion, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[1] For 2020, Native nation mobile combustion generated 132,735 $MTCO_2e$ or 56.4% of total 2020 regional Native nation GHG emissions. 2020 Maricopa-Pinal County region Native nation mobile combustion GHG emission estimates are provided in Table 8 below.

Table 8: Maricopa-Pinal County Region 2020 Native Nation Mobile Combustion GHG Emissions.

Native Nation	Mobile Combustion GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	5,951.6	4.5%
Gila River Indian Community (Maricopa Portion)	18,513.9	13.9%
Salt River Pima-Maricopa Indian Community	32,661.9	24.6%
Tohono O'odham Nation (Maricopa Portion)	2,193.2	1.7%
Ak Chin Indian Community	6,135.6	4.6%
Gila River Indian Community (Pinal Portion)	64,158.6	48.3%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	3,119.7	2.4%
Native Nation Total	**132,734.6**	**100.0%**

[1] Population estimates for Native nations derived from the 2020 U.S. Census.

Electric Power Consumption

MAG relied upon GHG emission estimates for electric power consumption from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. MCAQD relied upon electricity use data provided by Arizona Public Service (APS) and Salt River Project (SRP). In addition to electricity use data, MCAQD also quantified emissions of sulfur hexafluoride (SF_6) for the electric power consumption sector. SF_6 is a GHG which is used in "circuit breakers, gas-insulated substations and other switchgear".[2] For 2020, there were no SF_6 emissions for Pinal County. After reviewing U.S. Energy Information Administration data[3], MAG supplemented MCAQD estimates for residential and commercial electricity use data for the City of Mesa which services a small number of customers in the City of Mesa downtown area. For 2020, the electric power source category generated 20,305,197 $MTCO_2e$ or 38.0% of total regional GHG emissions.

Table 9 shows the 2020 Maricopa-Pinal County region GHG emissions from electric power consumption and utility sulfur hexafluoride use by municipality and economic sector.

Table 9: Maricopa-Pinal County Region 2020 Electrical Power Consumption Greenhouse Gas Emissions.

Jurisdiction	Greenhouse Gas Emissions ($MTCO_2e$)			Emissions by Economic Sector (% of Municipality Total)		
	Electricity Use	SF_6	Total	Residential	Commercial	Industrial
Apache Junction (Maricopa Portion)	971	4	975	93.0%	7.0%	0.0%
Avondale	250,977	1,080	252,057	66.1%	33.5%	0.3%
Buckeye	276,053	1,188	277,241	68.6%	27.3%	4.1%
Carefree	20,897	90	20,987	68.5%	31.4%	0.1%
Cave Creek	126,501	544	127,046	79.6%	19.9%	0.6%
Chandler	2,122,136	9,132	2,131,268	30.1%	28.7%	41.2%
El Mirage	82,327	354	82,681	76.7%	19.5%	3.7%
Fountain Hills	115,054	495	115,549	76.0%	23.9%	0.1%
Gila Bend	47,890	206	48,096	9.8%	13.4%	76.8%
Gilbert	949,526	4,086	953,612	66.1%	32.0%	1.9%
Glendale	996,111	4,287	1,000,398	62.7%	35.1%	2.2%
Goodyear	408,225	1,757	409,982	46.0%	46.1%	7.9%
Guadalupe	11,828	51	11,879	60.7%	39.3%	0.0%
Litchfield Park	107,081	461	107,542	73.9%	24.3%	1.8%
Mesa	2,022,750	8,704	2,031,454	53.4%	37.3%	9.3%
Paradise Valley	154,585	665	155,250	73.9%	26.1%	0.0%
Peoria	642,892	2,767	645,659	68.6%	30.1%	1.3%
Phoenix	6,335,818	27,265	6,363,083	46.7%	47.2%	6.1%
Queen Creek (Maricopa Portion)	161,563	695	162,258	74.5%	25.4%	0.0%

[2] U.S. Environmental Protection Agency, Sulfur Hexafluoride (SF_6) Basics, April 14, 2023.

[3] U.S. Energy Information Administration, Annual Electric Power Industry Report, Form EIA-861, 2020.

Scottsdale	1,636,677	7,043	1,643,720	57.4%	40.4%	2.1%
Surprise	424,751	1,828	426,579	71.2%	26.9%	1.9%
Tempe	1,114,718	4,797	1,119,515	32.3%	50.9%	16.8%
Tolleson	220,557	949	221,506	5.1%	35.2%	59.7%
Wickenburg	22,769	98	22,867	62.0%	36.5%	1.5%
Youngtown	17,896	77	17,973	66.9%	32.9%	0.2%
Maricopa Unincorporated	877,103	3,774	880,877	63.7%	33.1%	3.1%
Apache Junction (Pinal Portion)	125,024	-	125,024	66.6%	18.9%	14.5%
Casa Grande	223,860	-	223,860	45.9%	31.0%	23.1%
Coolidge	26,429	-	26,429	59.4%	33.6%	7.0%
Eloy	42,079	-	42,079	30.4%	49.4%	20.2%
Florence	66,842	-	66,842	43.9%	55.2%	0.9%
Hayden	-	-	-	N/A	N/A	N/A
Kearny	5,217	-	5,217	69.1%	30.9%	0.0%
Mammoth	103	-	103	93.5%	6.5%	0.0%
Marana	-	-	-	N/A	N/A	N/A
Maricopa	113	-	113	92.0%	8.0%	0.0%
Queen Creek (Pinal Portion)	26,401	-	26,401	73.5%	15.0%	11.5%
Superior	9,464	-	9,464	50.8%	23.1%	26.1%
Winkelman	33	-	33	22.9%	77.1%	0.0%
Pinal Unincorporated	549,578	-	549,578	60.8%	22.7%	16.5%
Maricopa County Total	**19,147,657**	**82,397**	**19,230,053**	**50.7%**	**39.0%**	**10.3%**
Pinal County Total	**1,075,143**	**-**	**1,075,143**	**56.4%**	**27.2%**	**16.5%**
Maricopa-Pinal County Region Total	**20,222,800**	**82,397**	**20,305,197**	**51.0%**	**38.4%**	**10.6%**

Native Nation Electric Power Consumption GHG Emissions

In order to estimate Native nation GHG emissions for electric power consumption, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[4] In the case of the Pinal County portion of the Gila River Indian Community, MCAQD was able to obtain electricity use data from SRP which was used in lieu of population fractions. For 2020, Native nation electric power consumption generated 37,443 MTCO$_2$e or 15.8% of total regional Native nation emissions. 2020 Maricopa-Pinal County region Native nation electric power consumption GHG emission estimates are provided in Table 10 below.

[4] 2020 U.S. Census, *supra* note 1.

Table 10: Maricopa-Pinal County Region 2020 Native Nation Electric Power Consumption GHG Emissions.

Native Nation	Electric Power GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	3,197.1	8.5%
Gila River Indian Community (Maricopa Portion)	9,945.2	26.6%
Salt River Pima-Maricopa Indian Community	17,545.1	46.9%
Tohono O'odham Nation (Maricopa Portion)	1,178.2	3.1%
Ak Chin Indian Community	3,013.4	8.0%
Gila River Indian Community (Pinal Portion)	1,129.9	3.0%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	1,434.0	3.8%
Native Nation Total	**37,442.9**	**100.0%**

Solid Waste (Landfills)

MAG relied upon GHG emission estimates for solid waste from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. MCAQD relied upon solid waste data from the EPA Facility Level Information on GreenHouse gases Tool (FLIGHT). For the City of Chandler landfill, MCAQD obtained landfill parameters via data request and calculated GHG emissions using EPA's LGGIT. For 2020, the Solid Waste source sector generated 741,710 $MTCO_2e$ or 1.4% of total regional GHG emissions.

Table 11 shows the GHG emissions from the solid waste source sector by solid waste disposal facility and county.

Table 11: Maricopa-Pinal County Region 2020 Solid Waste Greenhouse Gas Emissions.

Solid Waste Disposal Facility	Solid Waste GHG Emissions	
	$MTCO_2e$	%
Butterfield Station Facility	21,195	2.9%
Cave Creek Landfill	20,416	2.8%
City of Chandler Landfill	534	0.1%
City of Glendale Landfill	53,848	7.3%
City of Phoenix - Skunk Creek Landfill	21,815	2.9%
City of Phoenix 27th Ave Landfill	13,287	1.8%
Lone Cactus Landfill	66,252	8.9%
Northwest Regional Landfill	114,321	15.4%
Queen Creek Landfill	57,058	7.7%
Salt River Landfill	55,091	7.4%
Southwest Regional Landfill	52,711	7.1%
SR 85 Landfill	49,826	6.7%
Apache Junction Landfill	68,624	9.3%
Cactus Landfill	15,224	2.1%
Casa Grande Landfill	59,682	8.0%
Durham Regional Landfill	36,542	4.9%
Ironwood Landfill	27,139	3.7%
Sierra Estrella Landfill	8,145	1.1%
Maricopa County Total	**526,354**	**71.0%**
Pinal County Total	**215,356**	**29.0%**
Maricopa-Pinal County Region Total	**741,710**	**100.0%**

Native Nation Sold Waste GHG Emissions

In order to estimate Native nation solid waste GHG emissions, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[5] For 2020, Native nation solid waste disposal facilities generated

[5] 2020 U.S. Census, *supra* note 1.

7,473 $MTCO_2e$ or 3.2% of total regional Native nation emissions. 2020 Maricopa-Pinal County region Native nation solid waste GHG emission estimates are provided in Table 12 below.

Table 12: Maricopa-Pinal County Region 2020 Native Nation Solid Waste GHG Emissions.

Native Nation	Solid Waste GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	137.1	1.8%
Gila River Indian Community (Maricopa Portion)	426.6	5.7%
Salt River Pima-Maricopa Indian Community	752.6	10.1%
Tohono O'odham Nation (Maricopa Portion)	50.5	0.7%
Ak Chin Indian Community	542.1	7.3%
Gila River Indian Community (Pinal Portion)	5,305.7	71.0%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	258.0	3.5%
Native Nation Total	**7,472.7**	**100.0%**

Stationary Combustion

For stationary combustion, MAG relied upon GHG emission estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The stationary combustion estimates used in these reports were developed using 2020 fuel use data from the EPA Institutional, Commercial, and Industrial (ICI) tool and the EPA Residential Heating Tool, which were both developed for the 2020 NEI. These fuel consumption values were then multiplied by natural gas, distillate oil, and liquified petroleum gas (LPG) emission factors derived from the EPA LGGIT. For 2020, the stationary combustion source category generated 2,953,090 $MTCO_2e$ or 5.5% of total regional GHG emissions.

Table 13 shows the 2020 GHG emissions from stationary combustion for the Maricopa-Pinal County region by economic sector. Table 14 shows 2020 GHG emissions from stationary combustion for the Maricopa-Pinal County region by fuel type.

Table 13: Maricopa-Pinal County Region 2020 Stationary Combustion GHG Emissions by Economic Sector.

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total Regional Stationary Combustion GHG Emissions (%)
Residential	1,329,481	45.0
Commercial	1,051,879	35.6
Industrial	571,730	19.4
Total	**2,953,090**	**100.0**

Table 14: Maricopa-Pinal County Region 2020 Stationary Combustion GHG Emissions By Fuel Type.

Category	GHG Emissions ($MTCO_2e$)	Percent of Total Regional Stationary Combustion GHG Emissions (%)
Commercial Distillate Oil	3,623.6	0.1
Commercial Liquefied Petroleum Gas	108,035.3	3.7
Commercial Natural Gas	940,220.5	31.8
Industrial Distillate Oil	95,753.8	3.2
Industrial Liquefied Petroleum Gas	39,626.5	1.3
Industrial Natural Gas	436,349.2	14.8
Residential Distillate Oil	781.9	0.0
Residential Liquefied Petroleum Gas	76,014.8	2.6
Residential Natural Gas	1,252,683.9	42.4
Total	**2,953,089.5**	**100.0**

Native Nation Stationary Combustion GHG Emissions

In order to estimate Native nation stationary combustion GHG emissions, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[6] For 2020, Native nation stationary fuel combustion generated 11,707 $MTCO_2e$ or 5.0% of total regional Native nation emissions. 2020 Maricopa-Pinal County region Native nation stationary combustion GHG emission estimates are provided in Table 15 below.

Table 15: Maricopa-Pinal County Region 2020 Native Nation Stationary Combustion GHG Emissions.

Native Nation	Stationary Fuel Combustion GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	728.6	6.2%
Gila River Indian Community (Maricopa Portion)	2,266.4	19.4%
Salt River Pima-Maricopa Indian Community	3,998.4	34.2%
Tohono O'odham Nation (Maricopa Portion)	268.5	2.3%
Ak Chin Indian Community	394.7	3.4%
Gila River Indian Community (Pinal Portion)	3,862.6	33.0%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	187.8	1.6%
Native Nation Total	**11,707.1**	**100.0%**

[6] 2020 U.S. Census, *supra* note 1.

Agriculture and Land Management

For agriculture and land management GHG emission estimates, MAG's initial GHG emission estimates relied on the methodology detailed in the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The 2020 nitrogen fertilizer GHG emission estimates used in these reports were developed using a linear regression model developed by MCAQD using a 2021 U.S. Geologic Survey (USGS) study that estimated county-level nitrogen fertilizer use.[7] Using the linear regression model, MCAQD derived 2020 farm and non-farm nitrogen fertilizer usage estimates. MCAQD subsequently used land use emission factors from the EPA LGGIT to estimate N_2O GHG emissions for farm and non-farm categories using the estimated totals from the linear regression models and assuming 100% synthetic fertilizer usage for the counties. With these county-level farm and non-farm GHG emission estimates, MCAQD allocated emissions to municipalities using county tax assessor land use data for parcels in Maricopa and Pinal counties. However, the MCAQD Community GHG reports do not allocate emissions for Native nations and these areas are not included in the tax parcel GIS database. For the 2024 Maricopa-Pinal County Region PCAP, MAG elected to substitute the tax parcel land use data used by MCAQD to allocate farm fertilizer use estimates with 2020 MAG Land Use Data for Maricopa and Pinal counties, which has complete coverage of the region. This substitution allows MAG to further allocate MCAQD Unincorporated Area farm nitrogen fertilizer GHG emission estimates to Native nation areas.[8] Due to a lack of suitable data for estimating Native nation non-farm nitrogen fertilizer GHG emissions, MAG retained the MCAQD tax parcel data and non-farm methodology and did not estimate Native nation non-farm GHG emissions.[9] For 2020, the agriculture and land management source category generated 268,575 $MTCO_2e$ or 0.5% of total regional GHG emissions.

Table 16 shows the 2020 GHG emissions from agriculture and land management for the Maricopa-Pinal County region by fertilizer use type.

Table 16: Maricopa-Pinal County Region 2020 Agriculture and Land Management GHG Emissions.

Fertilizer Use Type	GHG Emissions ($MTCO_2e$)
Non-Farm	4,375
Farm	264,200
Total	**268,575**

Native Nation Agriculture and Land Management GHG Emissions

In order to estimate Native nation agriculture and land management GHG emissions, MAG elected to substitute the tax parcel land use data used by MCAQD to allocate farm fertilizer use with 2020 MAG Land Use Data for Maricopa and Pinal counties. Due to a lack of suitable data for estimating Native

[7] USGS. 2021. Estimates of County-Level Nitrogen and Phosphorus from Fertilizer and Manure from 1950 through 2017 in the Conterminous United States. Open-File Report 2020-1153. https://pubs.er.usgs.gov/publication/ofr20201153

[8] Existing Land Use for Maricopa and Pinal Counties, Arizona, 2020. https://geodata-azmag.opendata.arcgis.com/datasets/AZMAG::existing-land-use-for-maricopa-and-pinal-counties-arizona-2020/about

[9] More information on MCAQD's methodology for allocating farm and non-farm nitrogen fertilizer use emissions can be found in the 2024 Maricopa-Pinal County Region Priority Climate Action Plan Emissions Inventory Public Data File and MCAQD's 2020 Maricopa County 2020 Community GHG EI reports, pg. 20.

nation non-farm nitrogen fertilizer GHG emissions, MAG retained the MCAQD tax parcel data and non-farm methodology and did not estimate Native nation non-farm GHG emissions. For 2020, Native nation agriculture and land management source category generated 33,298 $MTCO_2e$ or 14.1% of total regional Native nation GHG emissions. 2020 Maricopa-Pinal County region Native nation agriculture and land management GHG emission estimates are provided Table 17 in below.

Table 17: Maricopa-Pinal County Region 2020 Native Nation Agriculture and Land Management GHG Emissions.

Native Nation	Agriculture and Land Management GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	1,400.9	4.2%
Gila River Indian Community (Maricopa Portion)	7,998.9	24.0%
Salt River Pima-Maricopa Indian Community	5,929.4	17.8%
Tohono O'odham Nation (Maricopa Portion)	16.0	0.0%
Ak Chin Indian Community	6,112.6	18.4%
Gila River Indian Community (Pinal Portion)	10,931.3	32.8%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	909.4	2.7%
Native Nation Total	**33,298.4**	**100.0%**

Imported Water Electricity Use

MAG relied upon GHG emission estimates for imported water electricity use from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. In these reports, MCAQD used data provided by the Central Arizona Project (CAP) to generate GHG emission estimates of imported water electricity use for Maricopa and Pinal counties.[10] For 2020, CAP reported that it delivered 1,167,489 Acre-Feet of water to Maricopa and Pinal counties which used a total of 1,379,559 MWh for delivery. In addition, GHG emissions from electricity used to pump CAP water into Maricopa and Pinal counties were estimated by CAP to be 714.1 lbs. CO_2e/MWh. Using this emission factor, for 2020, the imported water electricity use source category generated 446,854 $MTCO_2$e or 0.8% of total regional GHG emissions.

Table 18 shows the GHG emissions from 2020 imported water electricity use in the Maricopa-Pinal County region.

Table 18: Maricopa-Pinal County Region 2020 Imported Water Electricity Use GHG Emissions.

Emission Data	Values	Units
Water Imported to Maricopa County	610,980	Acre-Feet
Energy Usage	846,980	Megawatt-Hours (MWh)
Carbon Intensity of Energy Generation	714.1	lbs. CO_2e/MWh
Maricopa County GHG Emissions	274,346	$MTCO_2$e
Water Imported for use in Pinal County	556,509	Acre-Feet
Energy Usage	532,579	Megawatt-Hours (MWh)
Carbon Intensity of Energy Generation	714.1	lbs. CO_2e/MWh
Pinal County GHG Emissions	172,508	$MTCO_2$e
Maricopa-Pinal County Region GHG Emission Total	**446,854**	**$MTCO_2$e**

Native Nation Imported Water Electricity Use GHG Emissions

In order to estimate Native nation imported water electricity use GHG emissions, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[11] For 2020, Native nation imported water electricity use generated approximately 5,604 $MTCO_2$e or 2.4% of total regional Native nation GHG emissions. 2020 Maricopa-Pinal County region Native nation GHG emission estimates from imported water electricity use are provided in Table 19 below.

[10] Central Arizona Project, MCAQD Pinal County Public records request response, August 28, 2023 and Central Arizona Project, MCAQD Maricopa County Public records request response, March 27, 2023.
[11] 2020 U.S. Census, *supra* note 1.

Table 19: Maricopa-Pinal County Region 2020 Native Nation GHG Emission Estimates for Imported Water Electricity Use.

Native Nation	Imported Water GHG Emissions	
	MTCO2e	%
Fort McDowell Yavapai Nation	71.5	1.3%
Gila River Indian Community (Maricopa Portion)	222.4	4.0%
Salt River Pima-Maricopa IC	392.3	7.0%
Tohono O'odham Nation (Maricopa Portion)	26.3	0.5%
Ak Chin Indian Community	434.3	7.8%
Gila River Indian Community (Pinal Portion)	4,250.1	75.8%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	206.7	3.7%
Native Nation Total	**5,603.5**	**100.0%**

Wastewater Treatment

For wastewater treatment, MAG relied upon GHG emission estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The wastewater treatment GHG emission estimates used in these reports were developed through the use of the EPA LGGIT combined with an online survey conducted by MCAQD of local wastewater treatment facilities to acquire model parameters. From the online survey data, MCAQD was able to estimate wastewater sewer and septic system GHG emissions using the EPA LGGIT.[12] For 2020, wastewater treatment yielded 1,002,446 $MTCO_2e$ for 88.1% of the regional population. For 2020, septic systems generated 152,237 $MTCO_2e$ for 11.9% of the regional population. For 2020, the wastewater treatment source category generated 1,154,683 $MTCO_2e$ or 2.2% of total regional GHG emissions. Table 20 below shows the 2020 Maricopa-Pinal County region wastewater GHG emissions by wastewater type and county.

Table 20: Maricopa-Pinal County Region 2020 Wastewater GHG Emissions

Wastewater Type	Wastewater Emissions ($MTCO_2e$)	Percent of Total Regional Wastewater Emissions (%)
Maricopa County Wastewater Treatment	904,484.2	78%
Maricopa County Septic System	132,494.1	11%
Pinal County Wastewater Treatment	97,962.2	8%
Pinal County Septic System	19,742.5	2%
Maricopa-Pinal County Region Total	**1,154,682.9**	**100%**

Native Nation Wastewater Treatment GHG Emissions

In order to estimate Native nation wastewater treatment GHG emissions, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas and Pinal County Unincorporated Areas based on Native nation population estimates.[13] For 2020, Native nation wastewater treatment generated 6,030 $MTCO_2e$ or 2.6% of total regional Native nation emissions. 2020 Maricopa-Pinal County region Native nation wastewater treatment GHG emission estimates are provided in Table 21 below.

[12] Further information on MCAQD's methodology can be found in the MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, pg. 16. September 2023. https://www.maricopa.gov/5593/Greenhouse-Gas-Emissions-Inventory

[13] 2020 U.S. Census, *supra* note 1.

Table 21: Maricopa-Pinal County Region 2020 Native Nation Wastewater Treatment GHG Emissions.

Native Nation	Wastewater GHG Emissions	
	$MTCO_2e$	%
Fort McDowell Yavapai Nation	270.2	4.5%
Gila River Indian Community (Maricopa Portion)	840.5	13.9%
Salt River Pima-Maricopa Indian Community	1,482.8	24.6%
Tohono O'odham Nation (Maricopa Portion)	99.6	1.7%
Ak Chin Indian Community	296.3	4.9%
Gila River Indian Community (Pinal Portion)	2,899.9	48.1%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	141.0	2.3%
Native Nation Total	**6,030.2**	**100.0%**

Livestock (Cattle)

For cattle livestock GHG emission estimates, MAG's initial calculations relied on the methodology detailed in the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports for livestock methane emissions. MCAQD calculated livestock methane emissions based on the 2017 population of beef and dairy cattle reported by the National Agricultural Statistics Service (NASS) as a proxy for 2020 data which was not available at the time. MCAQD generated livestock GHG emission estimates using the revised emissions factors from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Table 10.11 (Updated) for North America Regional Characteristics.[14] MCAQD then utilized county assessor tax parcel land use data to allocate livestock methane emissions to municipalities and unincorporated areas and converted to CO_2e utilizing AR-4 GWP values. In order to stay consistent with updates to the Agriculture and Land Management source category emission estimates, for the 2024 Maricopa-Pinal County Region PCAP, MAG elected to substitute the tax parcel land use data used by MCAQD to allocate livestock emissions use estimates with 2020 MAG Land Use Data for Maricopa and Pinal counties. In addition, MAG has updated the methane GWP value from AR-4 to AR-5 (e.g., 25 to 28 for CH_4). For 2020, the livestock source category generated 1,495,868 $MTCO_2e$ or 2.8% of total regional GHG emissions.

Table 22 below shows the 2020 Maricopa-Pinal County Region Livestock GHG emissions by cattle type.

Table 22: Maricopa-Pinal County Region 2020 Livestock GHG Emissions

Cattle Type	GHG Emissions ($MTCO_2e$)
Dairy Cattle	1,472,624
Beef Cattle	23,244
Total	**1,495,868**

Native Nation Livestock GHG Emissions

In order to estimate Native nation livestock GHG emissions, MAG elected to substitute the tax parcel land use data used by MCAQD to allocate livestock emissions use estimates with 2020 MAG Land Use Data for Maricopa and Pinal counties. For 2020, only Ak Chin Indian Community had land use identified as dairy/feedlot within the Pinal County portion of the region (0.001 km^2). For 2020, the Native nation livestock sector generated 22.4 $MTCO_2e$ or 0.0% of total regional Native nation GHG emissions.

[14] Further information on MCAQD's methodology can be found in the MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, pg. 17. September 2023. https://www.maricopa.gov/5593/Greenhouse-Gas-Emissions-Inventory

Manufacturing Gases

MAG relied upon GHG emission estimates for manufacturing gases from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. MCAQD relied upon the EPA FLIGHT tool to gather on site manufacturing gas usage for semiconductor manufacturers in Maricopa County. For 2020, there were no semiconductor manufacturers in Pinal County that reported manufacturing gas data to the EPA FLIGHT tool. Examples of GHGs used in semiconductor manufacturing include methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), hydrofluoroethers (HFEs), and other fully fluorinated (OFF) GHGs. 2020 GHG emissions from manufacturing gases were allocated to municipalities, nonincorporated areas, and Native nations according to population, under the premise that the facilities represent a regional economic resource that extends beyond the jurisdiction where the facility is located.[15] For 2020, the manufacturing gases category generated 579,756 $MTCO_2e$ or 1.1% of total regional GHG emissions.

Table 23 shows the GHG emissions from semiconductor manufacturing gases by gas. Table 24 Shows GHG emissions from manufacturing gases by semiconductor manufacturer.

Table 23: Maricopa-Pinal County Region 2020 Manufacturing Gases by Gas.

Manufacturing Gases	Manufacturing Gases GHG Emissions	
	$MTCO_2e$	%
CH_4	-	0.0%
N_2O	53,595	9.2%
SF_6	90,019	15.5%
NF_3	83,762	14.4%
HFCs	64,929	11.2%
PFCs	276,213	47.6%
HFEs	9	0.0%
OFF GHGs	11,229	1.9%
Total	**579,756**	**100.0%**

[15] Further information on MCAQD's methodology for allocating manufacturing gas emissions by population can be found in the MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, pg. 17. September 2023. https://www.maricopa.gov/5593/Greenhouse-Gas-Emissions-Inventory.

Table 24: Maricopa-Pinal County Region 2020 Manufacturing Gases GHG Emissions by Semiconductor Manufacturer.

	CH_4	N_2O	SF_6	NF_3	HFCs	PFCs	HFEs	OFF	Total
				($MTCO_2e$)					
INTEL CORPORATION - Ocotillo Campus	-	50,958	51,886	201,882	78,842	70,124	5,300	6	458,998
Microchip Technology Inc.	-	2,259	3,719	9,287	5,317	5,038	5,503	-	61,123
NXP Semiconductors Chandler Site	-	378	9,324	35,044	5,860	8,600	426	3	59,635
Total	**-**	**53,595**	**64,929**	**276,213**	**90,019**	**83,762**	**11,229**	**9**	**579,756**

Native Nation Manufacturing Gases GHG Emissions

In order to estimate Native nation manufacturing gases GHG emissions, MAG further allocated GHG emission estimates for Maricopa County Unincorporated Areas based on Native nation population estimates.[16] 2020 GHG emissions from manufacturing gases were allocated to Native nations based on population, under the premise that the facilities represent a regional economic resource that extends beyond the jurisdiction where the facility is located.[17] For 2020, there were no semiconductor manufacturers in Pinal County that reported manufacturing gas data to the EPA FLIGHT tool, so no manufacturing gas emissions were allocated to Native nations in Pinal County. Native nation manufacturing gases generated 1506 $MTCO_2e$ or 0.6% of total regional Native nation emissions. 2020 Maricopa-Pinal County region Native nation GHG emissions from manufacturing gases are provided in Table 25 below.

[16] 2020 U.S. Census, *supra* note 1.

[17] Further information on MCAQD's methodology for allocating manufacturing gas emissions by population can be found in the MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, pg. 17. September 2023. https://www.maricopa.gov/5593/Greenhouse-Gas-Emissions-Inventory.

Table 25: Maricopa-Pinal County Region 2020 Native Nation Manufacturing Gases GHG Emissions.

Native Nation	Manufacturing Gases GHG Emissions MTCO$_2$e	Manufacturing Gases GHG Emissions %
Fort McDowell Yavapai Nation	151.1	10.0%
Gila River Indian Community (Maricopa Portion)	469.9	31.2%
Salt River Pima-Maricopa Indian Community	829.0	55.1%
Tohono O'odham Nation (Maricopa Portion)	55.7	3.7%
Ak Chin Indian Community	0.0	0.0%
Gila River Indian Community (Pinal Portion)	0.0	0.0%
San Carlos Apache Tribe (Pinal Portion)	0.0	0.0%
Tohono O'odham Nation (Pinal Portion)	0.0	0.0%
Native Nation Total	**1,505.6**	**100.0%**

Community Forestry

MAG generated tree cover carbon sequestration estimates for the 2020 Maricopa-Pinal County Region GHG EI. MAG relied upon the USDA National Land Cover Database (NLCD) to obtain tree cover GIS data files for Maricopa and Pinal counties. MAG used GIS tools to clip the 2020 MAG land use data for Maricopa and Pinal counties to municipal boundaries and summarized the area for each land use category. MAG then processed the NLCD tree cover data to remove raster grid cells with missing data and used a GIS zonal statistics tool to compute an average tree cover for each land use category in each clipped region. MAG then computed tree cover for residential, commercial/institutional, and industrial sectors using a weighted average of tree covers for each land use category in the sector. Lastly, the sector areas and tree cover percentages were entered into the EPA LGGIT to compute the $MTCO_2e$ for carbon sequestration for each sector. For 2020, community forestry in the Maricopa-Pinal County region sequestered 21,736 $MTCO_2e$.

Table 26 shows the 2020 Maricopa-Pinal County region carbon sequestration estimates from community forestry by jurisdiction.

Table 26: Maricopa-Pinal County Region 2020 Community Forestry Carbon Sequestration by Jurisdiction.

Jurisdiction	Total ($MTCO_2e$)
Apache Junction (Maricopa Portion)	0.1
Avondale	300.2
Buckeye	224.2
Carefree	122.1
Cave Creek	126.6
Chandler	1,151.0
El Mirage	21.5
Fountain Hills	243.5
Gila Bend	-
Gilbert	1,470.5
Glendale	751.3
Goodyear	206.8
Guadalupe	1.6
Litchfield Park	102.6
Mesa	1,904.2
Paradise Valley	986.6
Peoria	566.0
Phoenix	6,013.0
Queen Creek (Maricopa Portion)	192.4
Scottsdale	2,296.9
Surprise	190.9
Tempe	667.7
Tolleson	65.7
Wickenburg	158.3

Youngtown	7.9
Maricopa County Unincorporated areas	1,585.4
Apache Junction (Pinal Portion)	17
Casa Grande	32
Coolidge	5
Eloy	1
Florence	1
Hayden	0
Kearny	4
Mammoth	5
Marana	0
Maricopa	46
Queen Creek (Pinal Portion)	12
Superior	23
Winkelman	0
Pinal County Unincorporated areas	2,234
Pinal County Total	**2,379**
Maricopa County Total	**19,357.0**
Maricopa-Pinal County Region Total	**21,735.8**

Native Nation Community Forestry Carbon Sequestration

In order to generate Native nation community forestry carbon sequestration estimates, MAG utilized the same methodology described in the Community Forestry section to derive tree cover estimates for Native nation areas in the region. These tree cover estimates were then entered into the EPA LGGIT to generate carbon sequestration estimates for community forestry in Native nations. For 2020, Native nation community forestry in the Maricopa-Pinal County region sequestered 30.4 $MTCO_2e$. 2020 Maricopa-Pinal County region Native nation carbon sequestration estimates from community forestry are provided in Table 27 below.

Table 27: Maricopa-Pinal County Region 2020 Native Nation Community Forestry Carbon Sequestration

Native Nation	Residential ($MTCO_2e$)	Commercial/ Institutional ($MTCO_2e$)	Industrial ($MTCO_2e$)	Total ($MTCO_2e$)
Fort McDowell Yavapai Nation	9.8	0.8	-	10.6
Gila River Indian Community (Maricopa Portion)	-	0.8	0.0	0.8
Salt River Pima-Maricopa Indian Community	0.7	16.0	-	16.7
Tohono O'odham Nation (Maricopa Portion)	-	-	-	-
Ak Chin Indian Community	0.1	-	-	0.1
Gila River Indian Community (Pinal Portion)	0.1	1.6	-	1.7
San Carlos Apache Tribe (Pinal Portion)	0.5	-	-	0.5
Tohono O'odham Nation (Pinal Portion)	-	-	-	-
Native Nation Total	**11.1**	**19.3**	**0.0**	**30.4**

Emissions Inventory Quality Assurance Review

Overview

In order to conform to the Maricopa-Pinal County Region CPRG QAPP, MAG has conducted a quality assurance (QA) review of the data sources and estimation techniques used in the development of this emissions inventory. More information on the procedures and required quality control (QC) checks can be found in the MAG CPRG. The following sections detail the approved QC procedures, and any necessary explanations of why local factors may differ from state or national averages.

In addition to the QC procedures, Maricopa-Pinal County Region CPRG QAPP requires that MAG provide a listing of emissions reductions options for each sector. MAG has compiled a list of metropolitan statistical area (MSA) specific emission reduction opportunities from local, state, and national resources which is attached as Attachment B to this report.

Mobile Combustion Review

For mobile combustion GHG emission estimates, MAG relied upon estimates derived from federal data sources and tools. These include the EPA Motor Vehicle Emission Simulator (MOVES3) with local inputs, the Aviation Environment Design Tool (AEDT v. 3e) for airport emissions, and the 2020 National Emissions Inventory (NEI) for locomotive emissions. For mobile combustion, MAG compared local average miles per year to MOVES3 default average miles per year and compared local average miles per gallon to MOVES3 average miles per year. The results of the Maricopa County mobile combustion QC review can be found in Table 28 and Table 29.[18] The results of the Pinal County mobile combustion QC review can be found in Table 30 and Table 31.[19]

Mobile Combustion - Explanation of Deviation

Comparison of GHG emission estimates using local MOVES model parameters and MOVES defaults showed variance between the estimates. For the deviation between local average miles/year and the MOVES3 default, the deviation is caused by differences in vehicle source type population parameters. For MAG's MOVES3 model runs, MAG relied upon vehicle registration data provided by the Arizona Department of Transportation (ADOT). Vehicle source type population parameters were calculated by applying the MOVES3.1 default splits among passenger cars, passenger trucks, commercial light trucks, and heavy-duty trucks to the combined vehicle population of light duty vehicles (LDV), light duty trucks (LDT), and heavy-duty trucks (HDV) of ADOT vehicle registration data. Source type population for motorcycles and buses were directly obtained from MC and BUS population of ADOT vehicle registration data, respectively. Since the CO_2 emissions calculations for both Maricopa and Pinal counties are based on ADOT vehicle classification data, the comparison of local parameters and MOVES3 defaults show such deviation. MAG has elected to retain the current 2020 Maricopa-Pinal County region mobile combustion GHG emission estimates due to having local vehicle registration data and in order to preserve historic regional GHG emission estimate comparisons which have all used ADOT vehicle population classifications.

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[18] Coefficient variance and signed bias statistics were calculated using EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls.
[19] MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, *supra* note 18.

For the differences between local avg miles/yr. and MOVES3 defaults, deviations may be caused by conversions of MOVES3 default parameters. Currently, MOVES3 does not provide avg miles/gal but does provide miles/btu. To develop MOVES3 QC estimates, MAG used btu/gal conversion factors of 120,286 btu/gal for gasoline and 137,381 btu/gal for diesel fuel. MAG will continue to investigate the differences between the calculated MOVES3 default values and MAG local parameters. MAG local parameters were retained for the development of the 2020 Maricopa-Pinal County region onroad GHG emission estimates to stay consistent with the use of local MOVES model parameters.

Table 28: Comparison of Maricopa County 2020 estimate of average miles travelled per year and MOVES3 default values.

Vehicle Type	Local Avg Miles/yr.	QC Avg Miles/yr. (MOVES 3.1 Default)	MPY Statistics
Passenger Car (Gasoline)	16,136,183,192	14,785,227,776	Signed Bias
Passenger Truck (Gasoline)	16,251,917,701	15,819,420,672	+67.53%
Heavy-duty (Gasoline)	532,830,893	299,278,571	
Motorcycle (Gasoline)	212,391,010	227,596,656	Variance
Passenger Car (Diesel)	109,573,327	106,681,640	82.05%
Passenger Truck (Diesel)	1,345,468,622	605,269,376	
Heavy-duty (Diesel)	2,763,680,545	2,689,989,993	

Table 29: Comparison of Maricopa County 2020 estimate of average miles per gallon by vehicle type and MOVES3 default values.

Vehicle Type	Local Avg Miles/gal	QC Avg Miles/gal (MOVES 3.1 Default)	MPG Statistics
Passenger Car (Gasoline)	26.2	25.5	Signed Bias
Passenger Truck (Gasoline)	20.1	19.5	+11.44%
Heavy-duty (Gasoline)	8.5	7.9	
Motorcycle (Gasoline)	25.2	23.6	Variance
Passenger Car (Diesel)	28.0	28.5	13.72%
Passenger Truck (Diesel)	16.5	17.6	
Heavy-duty (Diesel)	8.4	7.0	

Table 30: Comparison of Pinal County 2020 estimate of average miles travelled per year and MOVES3 default values.

Vehicle Type	Local Avg Miles/yr.	QC Avg Miles/yr. (MOVES 3.1 Default)	MPY Statistics
Passenger Car (Gasoline)	1,410,021,758	1,381,206,016	Signed Bias
Passenger Truck (Gasoline)	1,531,253,139	1,764,903,936	+/-92.02%
Heavy-duty (Gasoline)	57,952,590	39,476,548	
Motorcycle (Gasoline)	20,965,609	24,555,620	Variance
Passenger Car (Diesel)	11,719,380	9,965,980	120.09%
Passenger Truck (Diesel)	197,513,754	67,527,248	
Heavy-duty (Diesel)	515,662,572	472,446,351	

Table 31: Comparison of Pinal County 2020 estimate of average miles per gallon by vehicle type and MOVES3 default values.

Vehicle Type	Local Avg Miles/gal	QC Avg Miles/gal (MOVES 3.1 Default)	MPG Statistics
Passenger Car (Gasoline)	27.4	26.9	Signed Bias
Passenger Truck (Gasoline)	20.1	20.6	+/-7.19%
Heavy-duty (Gasoline)	9.0	8.5	
Motorcycle (Gasoline)	24.3	23.4	Variance
Passenger Car (Diesel)	28.6	30.0	10.03%
Passenger Truck (Diesel)	16.7	18.9	
Heavy-duty (Diesel)	7.2	7.0	

Electric Power Consumption Review

For electric power GHG emission estimates, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The electric power estimates used in these reports were created using data supplied by local electric utility companies Arizona Public Service (APS) and Salt River Project (SRP). After a review of Energy Information Administration (EIA) Form EIA-861 data for 2020, MAG supplemented the MCAQD calculations for the City of Mesa with additional City of Mesa Electric Utility usage data. For Pinal County estimates, MCAQD was not able to obtain electricity use data from Trico Electric Cooperative which services a small portion of the county. As Form EIA-861 data is only resolved at the utility level and not the county level, estimates for Trico Electric Cooperative energy were unavailable from national datasets and were not included in the emissions inventory.

Calculations for the electric power sector utilize the same calculations as the "Electricity Location Based Calc" spreadsheet from the EPA LGGIT.[20] For the electricity use quality check, MAG compared the local energy consumption data to county-level projections using the Department of Energy (DOE) State and Local Planning for Energy (SLOPE) tool. The results for Maricopa County and Pinal County can be found in Table 32 and Table 33, respectively.

Table 32: Maricopa County 2020 Electric Power Consumption GHG Emissions Quality Check.

Power Consuming Sector	Local Estimate (MWh)	QC Estimate based on SLOPE (MWh)	Statistics
Residential	25,169,289.7	20,990,795.4	Signed Bias (%) -32.39
Commercial	19,367,655.7	24,571,184.4	
Industrial	5,114,175.7	7,259,943.7	Variance (%) 81.55

Table 33: Pinal County 2020 Electric Power Consumption GHG Emissions Quality Check.

Power Consuming Sector	Local Estimate (MWh)	QC Estimate based on SLOPE (MWh)	Statistics
Residential	1,571,848.1	1,801,201.4	Signed Bias -117.08%
Commercial	757,387.4	2,888,239.3	
Industrial	458,681.4	2,160,074.3	Variance 113.28%

[20] Arizona-New Mexico Western Electricity Coordinating Council (AZNM WECC) Southwest Subregion Output Emission Rate for CO_2e of 0.386 $MTCO_2e$/MWh.

Electric Power Consumption - Explanation of Deviation

Comparison of electric power consumption data from local electric utilities to DOE SLOPE projected energy consumption data showed a high level of variance between the estimates. A key reason for this difference is that MAG relied upon actual 2020 use data where the DOE SLOPE tool relies upon model projections from a 2016 baseline. According to the DOE SLOPE tool documentation, model estimates for residential, commercial, and industrial categories comes from American Community Survey data, Census Business Patterns data, and Annual Survey of Manufactures data.[21] Given that the DOE SLOPE estimates are derived using a top-down methodology and are based on 2016 projections, MAG has chosen to rely upon the supplemented MCAQD estimates that are based on 2020 local electric utility data and 2020 Form EIA-861 data. MAG will continue to investigate the discrepancy between local estimates and national estimates in future CPRG plans.

[21] State and Local Planning for Energy (SLOPE) Tool – Business-as-Usual Electricity and Natural Gas Consumption and Expenditure Projections, retrieved on 1/14/2024 from https://maps.nrel.gov/slope/about.

Solid Waste Review

For solid waste GHG emission estimates, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The solid waste estimates used in these reports were developed using the EPA Facility Level Information on GreenHouse gases Tool (FLIGHT). For the City of Chandler landfill, MCAQD obtained landfill parameters via data request and calculated GHG emissions using EPA's LGGIT. As federal datasets, tools, and emission factors were primarily used, the only variance between local estimates and national estimates is the inclusion of City of Chandler Landfill data. As the City of Chandler Landfill does not have a national estimate to compare against, no further QC procedures are required for this category.

Stationary Combustion Review

For stationary GHG emission estimates, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. The stationary combustion estimates used in these reports were developed using 2020 fuel use data from the EPA Institutional, Commercial, and Industrial (ICI) tool and the EPA Residential Heating Tool, which were both developed for the 2020 NEI. These fuel consumption values were then multiplied by natural gas, distillate oil, and liquified petroleum gas emission factors derived from the EPA LGGIT. As federal datasets, tools, and emission factors were used for stationary combustion GHG emissions estimates, no further QC procedures are required for this category.

Agriculture and Land Management Review

For agriculture and land management GHG emission estimates, MAG reviewed state and federal resources in an attempt to identify a suitable QC dataset to compare local estimates against. After a review of available data, MAG was unable to identify a suitable alternative federal dataset for county-level fertilizer use outside the currently used 2021 USGS study. All other identified datasets either covered only a subset of field crops or did not have recent data available. A review of commercial fertilizer purchase data from the EPA also lacked recent data. In addition, the EPA fertilizer purchase data trends did not correlate with annual Arizona agricultural exports using USDA Economic Research Service (ERS) cash receipts estimates data. Given that the local estimates rely upon a federal data source and utilize emission factors from the EPA LGGIT, no further QC procedures were undertaken for this source category. MAG will continue to investigate additional state and federal resources for county-level estimates of fertilizer use for the CPRG comprehensive climate action plan (CCAP) deliverable and future updates to the Maricopa-Pinal County region GHG EI.

Imported Water Electricity Use Review

For imported water GHG emission estimates, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. In these reports, MCAQD used data provided by the Central Arizona Project (CAP) to generate GHG emission estimates of imported water electricity use for Maricopa and Pinal counties. MCAQD used the county-level water delivery data combined with CAP provided electricity use data and a unique $MTCO_2e$ emission factor (714.1 lbs. CO_2e/MWh) estimated by CAP in order to develop county-level imported water electricity use GHG emission estimates. In order to compare the MCAQD estimates against other federal estimates, MAG used the EPA LGGIT tool to estimate GHG emissions from imported water electricity use through use of the CAP water delivery data. Based on a comparison of local and national estimates, there is variance between the two estimation techniques as shown in Table 34 below.

Table 34: Maricopa-Pinal County 2020 Imported Water Electricity Use GHG Emissions Quality Review.

Sector	Local Estimate (Metric Tons CO_2e)	QC Estimate based on LGGIT (Metric Tons CO_2e)	Statistics
Imported Water for Maricopa County	274,345.6	430,058.2	Signed Bias (%) -108.44
Imported Water for Pinal County	172,507.8	391,717.0	Variance (%) 111.16

Imported Water – Explanation of Deviation

Comparison of local GHG emission estimates using CAP provided estimates to EPA LGGIT estimates showed a high level of variance between the estimates. The two principal variables that cause the difference in emission estimates are the differences in the "energy intensity of water" factor and the lbs. CO_2e per MWh factor. In the EPA LGGIT, EPA derives an energy of intensity of water factor in kWh/MG by using an average of southern California water system electricity use data from a 2006 California Energy Commission publication.[22] However, for the Maricopa and Pinal County emission estimates, CAP was able to provide 2020 electricity use data which, when divided by the total amount of water delivered, resulted in substantially lower "energy intensity of water" factors. Secondly, in the EPA LGGIT, EPA includes CO_2, CH_4 and N_20 emission factors in lbs./MWh which when combined with water usage data, "energy intensity of water" factors, and AR-5 GWPs produces GHG emission estimates for imported water electricity use. These electricity emission factors for CO_2, CH_4, and N_20 are derived from 2020 data for the AZNM eGRID subregion. However, for the local estimates, CAP provided CAP specific electricity emission factors that account for their unique energy mix portfolio. This includes a higher than regional average use of hydroelectric energy to deliver water to the region. As a result of having local data that reflects the actual operations of the water delivery provider, MAG has elected to utilize the MCAQD and CAP GHG emission estimates for imported water electricity use for the 2020 Maricopa-Pinal County Region GHG EI. MAG will continue to investigate the discrepancy between local estimates and national estimates in future CPRG plans.

[22] California Energy Commission (CEC). 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission. CEC-500-2006-118.

Wastewater Treatment Review

For wastewater treatment GHG emission estimates, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. In these reports, MCAQD used data developed through the use of the EPA LGGIT combined with an online survey conducted by MCAQD of local wastewater treatment facilities to acquire model parameters. In order to compare the MCAQD estimates against other federal estimates, MAG used EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State* report. MAG accessed Arizona specific wastewater treatment estimates from the EPA report which were divided by state population totals to develop $MTCO_2e$/person ratios. These ratios were then multiplied by the county population totals to estimate county-level wastewater treatment GHG emissions. Based on a comparison of local and national estimates, there is variance between the two estimation techniques as shown in Table 35 below.

Table 35: Maricopa-Pinal County Region 2020 Wastewater Treatment GHG Emissions Review.

Sector	Local Estimate (Metric Tons CO_2e)	QC Estimate[23] (Metric Tons CO_2e)	Statistics
Wastewater Treatment Maricopa County	1,036,978.3	473,074.9	Signed Bias (%) +260.3
Wastewater Treatment Pinal County	117,704.6	45,660.0	Variance (%) 217.12

Wastewater – Explanation of Deviation

Comparison of local GHG emission estimates for the wastewater treatment source category using federal estimates showed a high level of variance between the estimates. The primary difference between the datasets is that the local estimate relied upon local model parameters using EPA's LGGIT, while the federal estimate is based on a national calculation for wastewater treatment GHG emissions which was allocated to an individual person level via 2020 U.S. Census population estimates. In addition, the local estimates consider the county specific mix of GHG emissions generated by both wastewater treatment plants and septic systems. Conversely, the national wastewater treatment estimates derived using population fractions do not consider county-specific proportions of populations served by wastewater treatment plants or using septic systems. Lastly, examining wastewater treatment GHG emissions generated at the national level are estimated to account for 2.2% of total 2020 U.S. GHG Emissions. Using the local estimation method, wastewater treatment GHG emissions generated at the regional level are estimated to account for 2.2% of total 2020 Maricopa-Pinal County Region GHG Emissions. As a result of having local data that reflects the actual operations of the wastewater treatment plants and that the calculations were performed using EPA's LGGIT methodology, MAG has elected to utilize the local estimates for wastewater treatment GHG emissions for the 2020 Maricopa-Pinal County Region GHG EI. MAG will continue to investigate the discrepancy between local estimates and national estimates in future CPRG plans.

[23] QC estimate derived from EPA's annual Inventory of U.S. Greenhouse Gas Emissions and Sinks by State report for the State of Arizona.

Livestock Review

For cattle livestock GHG emission estimates, MAG's initial calculations relied on the methodology detailed in the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports for livestock methane emissions. MCAQD calculated livestock methane emissions based on the 2017 population of beef and dairy cattle reported by the National Agricultural Statistics Service (NASS) as a proxy for 2020 data which was not available at the time. MCAQD generated livestock GHG emission estimates using the revised emissions factors from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Table 10.11 (Updated) for North America Regional Characteristics.[24] MCAQD then utilized tax parcel land use data to allocate livestock methane emissions to municipalities and unincorporated areas and converted to CO_2e utilizing AR-4 GWP values. MAG has updated the methane GWP value from AR-4 to AR-5 (e.g., 25 to 28 for CH_4) and changed to MAG 2020 Land Use data for allocations. Currently, the EPA LGGIT does not have default calculations for livestock GHG emissions. As federal datasets and international emission factors were used for livestock GHG emission estimates, no further QC procedures are required for this category.

[24] Further information on MCAQD's methodology can be found in the MCAQD Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, pg. 17. September 2023. https://www.maricopa.gov/5593/Greenhouse-Gas-Emissions-Inventory

Manufacturing Gases Review

For GHG emission estimates from manufacturing gases, MAG relied upon estimates from the MCAQD Maricopa and Pinal County 2020 Community GHG EI reports. MCAQD relied upon the EPA FLIGHT tool to gather on site manufacturing gas usage for semiconductor manufacturers in Maricopa County. For 2020, there were no semiconductor manufacturers in Pinal County that reported manufacturing gas data to the EPA FLIGHT tool. As federal datasets, tools, and emission factors were used for GHG emission estimates from the manufacturing gases source category, no further QC procedures are required for this category.

Community Forestry Review

For community forestry, MAG generated tree cover carbon sequestration estimates for the 2020 Maricopa-Pinal County Region GHG EI. MAG relied upon the USDA National Land Cover Database (NLCD) to obtain tree cover GIS data files for Maricopa and Pinal counties. MAG processed this data using GIS tools to compute community forestry land estimates by municipality and for Native nation areas. These tree cover estimates were entered into the EPA LGGIT to generate carbon sequestration estimates for the region. As federal datasets, tools, and emission factors were used for carbon sequestration estimates from community forestry, no further QC procedures are required for this category.

Attachment A

Quality Assurance Project Plan for the Climate Pollution Reduction Grant Program for the Phoenix-Mesa-Chandler MSA

Maricopa Association of Governments
October 2023

Quality Assurance Project Plan for the Climate Pollution Reduction Grant Program for the Phoenix-Mesa-Chandler MSA

Maricopa Association of Governments

October 2023

1. Project Management (Group A)

1.1. Title and Approval Page

Quality Assurance Project Plan for
Quality Assurance Project Plan for the Climate Pollution Reduction Grant Program
for the Phoenix-Mesa-Chandler MSA

Prepared by:
Maricopa Association of Governments
302 N 1st Ave #300
Phoenix, Arizona, 85003

Prepared for:
US EPA Region 9
75 Hawthorne Street
San Francisco, CA, 94105

09/06/2023

APPROVALS:

MAG Project Manager: Elias Toon Date: 10/19/2023

Elias Toon

MAG QA Manager: Shantel Oviedo-Wyke Date: 10/19/2023

USEPA Region 9 Grants Project Officer: Ryder Freed Date:

Ryder Freed Digitally signed by Ryder Freed Date: 2023.11.03 11:48:09 -07'00'

USEPA Region 9 Quality Assurance Manager: Audrey Johnson Date:

Audrey L Johnson Digitally signed by Audrey L Johnson Date: 2023.10.25 12:00:11 -07'00'

QAPP Revision History

Revision No.	Description	Author	Date
0	Original Version	Elias Toon	10/19/2023

1.2. Table of Contents

List of Tables

List of Exhibits

Abbreviations

CAA	Clean Air Act
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
MAG	Maricopa Association of Governments
NEI	EPA's National Emissions Inventory
OAR	EPA Office of Air and Radiation
PCAP	Priority Climate Action Plan
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance
POR	EPA Project Officer's Representative
PWP	Project Work Plan
QA	Quality Assurance

QAM	Quality Assurance Manager
QAMD	Quality Assurance Manager Delegate
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCC	Quality Control Coordinator
LGGIT	Community - GHG Inventory Tool (provided by the EPA)
TL	Task Leader

1.3. Distribution List

This section presents the primary staff who will be working on the project. These staff will be identifying existing[1] data resources for evaluation and potential use under the project or serving in project-specific roles for implementing the Quality Assurance Project Plan (QAPP). The listing in **Table 1.1** includes staff responsible for implementing independent internal quality management steps and staff serving in external oversight roles.

This QAPP and, as applicable, all major deliverables relying on existing data will be distributed to the staff presented in **Table 1.1**. Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP will be maintained in the project files under the *S:\Air Quality\EliasT\CPRG\Quality_Management\QAPP*.

Table 1.1 QAPP Distribution List

Name	Organization	Role
Ryder Freed	US EPA, Region 9	EPA Project Officer (PO) or PO Representative (POR)
Audrey Johnson	US EPA, Region 9	EPA Quality Assurance Manager or Delegate
Amy St. Peter	MAG	Grantee Sr. Approver, Deputy Executive Director
Elias Toon	MAG	Grantee Project Manager, Air Quality PM
Shantel Oviedo-Wyke	MAG	Grantee Quality Assurance Manager
Technical Leads	MAG	Grantee Technical Staff[2]

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the MAG Project Manager (PM) and Quality Assurance Manager (QAM). Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

Elias Toon is the MAG PM and will provide senior-level oversight as needed. The PM is responsible for MAG's technical and financial performance as well as maintaining communications with the EPA to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures; managing oversight and conduct of project activities including allocation of resources to specific tasks; ensuring that quality procedures are incorporated into all aspects of the project; developing, conducting, and/or overseeing QA plans as necessary; ensuring that any corrective actions are implemented; operating project activities within the documented and approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

[1] The term "existing data" is defined by the EPA's *Environmental Information Quality Policy* (CIO 2105.3) as "… data that have been collected, derived, stored, or reported in the past or by other parties (for a different purpose and/or using different methods and quality criteria). Sometimes referred to as data from other sources." The term "secondary data" may also be used to describe "existing data" in historical EPA quality-related documents.
[2] Technical Leads will be assigned by the MAG PM as necessary. For work done under this project, technical leads may include persons with expertise in the local residential, commercial, and industrial activities. Technical leads may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors.

The MAG PM will complete or assign a technical lead (TL) for each technical task with instructions to complete a baseline emissions inventory for the sector(s) under the task, to develop options for potential emissions reductions with estimated reductions per option, and to develop uncertainty estimates for each reduction estimate. Any assigned TL is responsible for the day-to-day technical activities under their assigned task, including planning, reporting, and controlling of technical and financial resources allocated to the task by the PM. Accordingly, each TL is primarily responsible for implementing the Quality Program and this QAPP on task-level assignments.

Task-level management system. For each of the major deliverables under each task, an assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the QA Manager (or delegate) for review and approval. Each TL is responsible for ensuring that quality procedures are implemented at the task level and for maintaining the official, approved, task-level QAPP content. Each TL will discuss any concerns about quality or any proposed revisions to task-level QAPP content with the QA Manager (or delegate) to identify, resolve, or preclude problems or to amend task-level plans, if necessary. In addition, each TL will work with the MAG PM and the QA Manager to identify and implement quality improvements. The MAG PM is responsible for ensuring the consistency of similar or related QA measures across tasks, and the TLs are responsible for overseeing task-level work performed by technical staff and providing assurance that all required QA/QC procedures are being implemented.

Project-level management system. Tasks are expected to proceed concurrently, in parallel. The PM will maintain close communications with each TL and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The PM is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO or POR, who provides the EPA's primary oversight function for this project at EPA OAR/ EPA R9 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from TLs and assigned MAG technical staff) will be responsible for consulting with the EPA PO or POR, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

The QA Manager, Shantel Oviedo-Wyke, is responsible for overseeing the quality system, monitoring and facilitating QA activities on tasks, and generally helping the MAG PM and TLs understand and comply with EPA QA requirements. They will not be involved in data collection or analyses, which is in a separate division from MAG's Administration Division. At the request of the MAG PM, Ms. Oviedo-Wyke is responsible for conducting periodic independent audits of this project's QA program, Ms. Oviedo-Wyke will produce written documentation of the audit results and recommendations.

In addition, QC functions will be carried out by other technical staff and will be carefully monitored by the PM, who will work with the QA Manager to oversee this plan and implement quality improvements. For work done under this project, technical staff may include persons with expertise in the local residential, commercial, and industrial activities. Technical staff may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors. The PM will ensure that technical staff do not review work in a QA capacity for which they were a primary or contributing author. **Exhibit 1** presents the organizational chart for the project.

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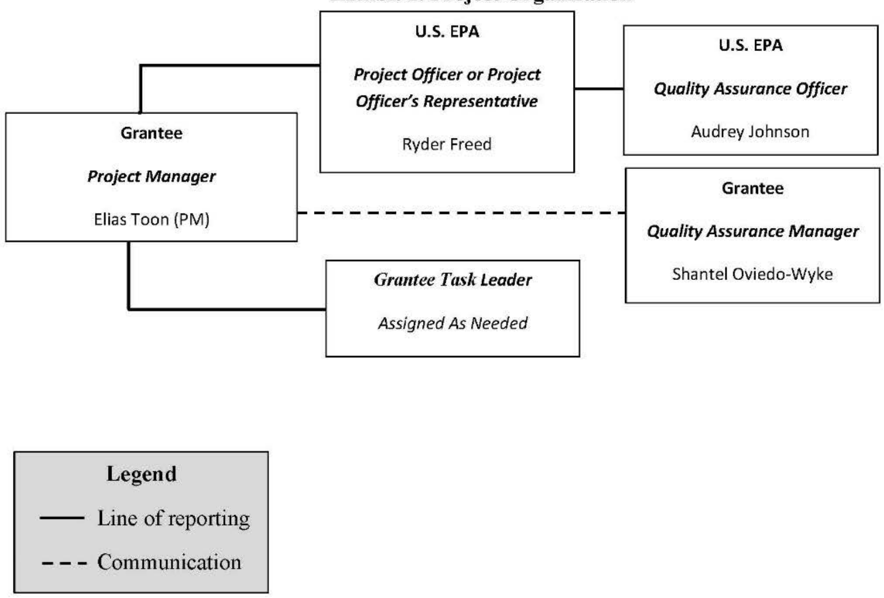
Exhibit 1. Project Organization[3,4]



[3] Under the EPA's QAPP standard (CIO 2105-S-02.0, section 3) the organization chart must also identify any contractor relationships relevant to environmental data operations.
[4] Technical Leads will be assigned by the MAG PM as necessary. For work done under this project, technical leads may include persons with expertise in the local residential, commercial, and industrial activities. Technical leads may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors.

1.5. Problem Definition / Background

Under this project, MAG will identify, evaluate, and utilize existing data resources[5] to develop a local inventory of the major sources of greenhouse gas (GHG) emissions within the Phoenix-Mesa-Chandler MSA and use that inventory data to develop a climate action plan. This QAPP focuses on the handling of environmental information under sector-specific tasks by technical staff charged with completing the following subtasks <u>in a future planning project implemented in accordance with this QAPP</u>:

1. Develop a comprehensive GHG inventory for the largest sources within each sector,
2. Develop options for reducing emissions within each sector,
3. Develop estimates or ranges of estimates for reductions achievable under each option,
4. Develop uncertainty analyses for each option's emissions reduction estimate, and
5. Present these analyses and options in technical reports consistent with the deliverables required under the CPRG planning grants.

The GHG inventory may utilize the EPA's Local – GHG Inventory Tool (LGGIT),[6] facility-specific GHG data published by the EPA in the Facility Level Information on Greenhouse gases Tool (FLIGHT),[7] data reported to the EPA's Greenhouse Gas Reporting Program (GHGRP),[8] EPA's National Emissions Inventory (NEI),[9] DOE's State and Local Planning for Energy (SLOPE) Platform,[10] the Global Protocol for Community-Scale (GPC) Greenhouse Gas Inventories,[11] the Local Government Operations (LGO) Protocol,[12] and/or 3rd party data or tools, together with any independent, sector-specific estimates prepared by MAG, the Maricopa County Air Quality Control Department (MCAQD), the Pinal County Air Quality Control District (PCAQCD), or the Arizona Governor's Office of Resiliency. The FLIGHT and GHGRP datasets can be downloaded and filtered by state, city, county, and/or zip code. Any independent local or MSA estimates or ratios (e.g., electricity usage per customer by customer class) will be compared to corresponding federal, state, or local estimates for validation, as available. Significant differences between primary estimates and validation estimates will be evaluated and discussed in the inventory report with the underlying data and methodologies used for the estimates. As applicable, the local inventory will include the following sources and gases (divided into the Residential, Commercial/Institutional, Industrial, and Energy Generation sectors):

[5] EPA, *Environmental Information Quality Policy*, CIO 2105.3, 03/07/2023 (p. 8) provides common examples of environmental information used to support the EPA's mission at https://www.epa.gov/system/files/documents/2023-04/environmental_information_quality_policy.pdf.

[6] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool

[7] Facility Level Information on Greenhouse gases Tool (FLIGHT) at https://ghgdata.epa.gov/

[8] https://www.epa.gov/ghgreporting/data-sets

[9] https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-ne

[10] https://www.energy.gov/scep/slsc/state-and-local-planning-energy-slope-platform

[11] https://ghgprotocol.org/ghg-protocol-cities

[12] https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf

Source Categories	***Greenhouse Gases (across all sectors)***
1. Mobile Combustion 2. Stationary Combustion 3. Electricity Consumption 4. Solid Waste 5. Urban Forestry 6. Agriculture & Land Management 7. Water Use 8. Waste Generation 9. Wastewater Treatment	carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases (F-gases) including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)

The EPA LGGIT has two modules: the Local Government Operations Module is specific to municipal governments and evaluating GHG emissions by their departments, and the Community Module, which could also include local government information. The LGGIT User Guides state the two modules are companion tools, and any totals estimated in the Government Operations Module can be included in the Community Module. For example, a county could use the Community Module and incorporate data from the Government Operations Modules completed by the cities within the county. Grantees using both modules should conduct a quality check to ensure that emissions do not get double-counted. This template is based on the Community Module.

1.5.1. Rationale for Selection of Sectors

For each sector included in the local inventory, **Table 1.2** briefly describes why the sector was included in the inventory and the relative significance of the sector in terms of the magnitude of air emissions from existing inventories, the associated geographic distribution of the sources, and recent trends in readily available activity data for the source category.

Table 1.2 Rationale for Sector Selection

Sectors Included in Inventory	Rationale for Including in GHG Inventory
Mobile combustion	Transportation activities were the largest source (29 percent) of total U.S. greenhouse gas emissions in 2021. From 1990 to 2021, transportation CO_2 emissions from fossil fuel combustion increased by 19 percent. Transportation activities occur in all communities.
Electricity consumption	The electric power sector accounted for 25 percent of total U.S. greenhouse gas emissions in 2021. Power generation and/or consumption occurs among all communities.
Urban forestry[13]	This sector includes fluxes of carbon from activities such as converting forests to agricultural use and practices that remove CO_2 from the atmosphere and store it in long-term carbon sinks like forests. In 2021, the net CO_2 removed from the atmosphere by natural and working lands was 12% of total U.S. greenhouse gas emissions. Between 1990 and 2021, total carbon sequestration in this sector decreased by 14%, primarily due

[13] Under international GHG inventory protocols this category is called "Land use, land-use change, and forestry."

	to a decrease in the rate of net carbon accumulation in forests, as well as an increase in CO_2 emissions from urbanization.
Agriculture & land management	Agriculture accounted for about 10 percent of U.S. greenhouse gas emissions in 2021, and agricultural soil management was the largest source of N_2O emissions. Enteric fermentation was the largest source of CH_4 emissions.
Stationary combustion (including for commercial and residential heating)	In 2021, the commercial and residential sectors accounted for 7 and 6 percent of total U.S. greenhouse gas emissions, respectively. Emissions from the commercial and residential sectors have increased since 1990. Total residential and commercial greenhouse gas emissions, including direct and indirect emissions, in 2021 have increased by 2% since 1990. In 2021, an increase in heating degree days (0.5 percent) increased energy demand for heating in the residential and commercial sectors, however, a 1.8 percent decrease in cooling degree days compared to 2020 reduced demand for air conditioning in the residential and commercial sectors.
Solid waste and waste generation	This sector includes landfills, composting, and anaerobic digestion. Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9 percent of total U.S. greenhouse gas emissions.
Wastewater treatment	Wastewater treatment, both domestic and industrial, was the third largest anthropogenic source of N_2O emissions in 2021, accounting for 5.2 percent of national N_2O emissions and 0.3 percent of total U.S. greenhouse gas emissions. Emissions from wastewater treatment increased by 6.1 MMT CO_2e (41.6 percent) since 1990 as a result of growing U.S. population and protein consumption.
Water	This sector includes indirect emissions associated with the electricity used to deliver water to local communities. Emissions related to the distribution of water may be captured in the stationary combustion sector as well.

1.5.2. Decisions to be Made

The EPA's recommended tool for local GHG inventories (the LGGIT) covers categories of GHG emissions by source category (e.g., mobile combustion, stationary combustion, electricity consumption, solid waste, etc.). The LGGIT provides many default values to facilitate developing local estimates using methods consistent with the Global Protocol for Community-Scale GHG Emissions.[14] There are four primary decisions to be made under each task of this project for each source category, and the PM or TL will be charged with the following decisions:

1. Determine (for each major activity) if the LGGIT estimate, a different federal estimate or tool, or a non-federal estimate should be used for the local GHG baseline estimate.
2. Determine the best options for reducing emissions of air pollution and achieving the following Congressional objectives under the Inflation Reduction Act:
   a. Reduce climate pollution while supporting creation of good jobs and lowering energy costs for families.
   b. Accelerate work addressing environmental injustice and empowering community driven solutions in overburdened neighborhoods.
   c. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.
3. Develop an estimate or a range of estimates for reductions achievable under each option.

[14] https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

4. Estimate the uncertainty of the emissions reduction estimate(s) or ranges under each option.

1.5.3. Actions to be Taken, Action Limits, and Expected Outcomes

Initially, local estimates will be derived using the LGGIT tool for each source category. Subsequently, the community may elect to supplement estimates derived using the LGGIT with estimates for each source category from existing local inventories, existing local activity data, or from other EPA or state resources. Calculated estimates derived from local activity data will be compared to federal datasets and/or downscaled state estimates for validation. The rationale for including any emissions estimates that show significant discrepancies from state or federal estimates will be documented in the community's GHG inventory report along with the underlying data and calculation methodology.

When identifying the best options for reducing air pollution, the PM or TL will consider the activities affecting the largest numbers of families, business establishments, recreation areas, and schools. Options may include potential reductions in task-level activities impacting nonattainment areas and impacting residential, commercial, and school districts near the largest sources of air pollution. MAG expects that each task will produce up to 10 options for sector-specific emissions reduction projects for further consideration by management and policymakers.

1.5.4. Reason for Project

The baseline GHG inventory and options analyses developed under this local community project will be utilized by MAG and MAG Member Agencies for planning purposes to support the Phoenix-Mesa-Chandler MSA's development of the following three CPRG planning deliverables:

- The Phoenix-Mesa-Chandler MSA's **Priority Climate Action Plan** (PCAP), which is due March 1, 2024. This plan will include near-term, implementation-ready, priority GHG reduction measures and is a prerequisite for any implementation grant.
- The Phoenix-Mesa-Chandler MSA's **Comprehensive Climate Action Plan** (CCAP), which is due in 2025 (later for tribes and territories). This plan will review all sectors that are significant GHG sources or sinks, and include both near- and long-term GHG emission reduction goals and strategies.
- The Phoenix-Mesa-Chandler MSA's **Status Report** on progress towards goal, which is due in 2027 (not applicable to tribes or territories). This progress report will include updated analyses, plans, and next steps for key metrics.

This QAPP describes in detail the necessary QA and QC requirements and technical activities that will be implemented to ensure the baseline GHG inventory and the sector-specific emissions reduction options are reliable for the PCAP and CCAP. As necessary, revisions to the QA and QC requirements defined in this QAPP will be updated in the 2027 Status Report.

1.5.5. Relevant Clean Air Act Mandates and Authorizations

The inventory produced under this project will support the deliverables required under EPA's Climate Pollution Reduction Planning Grants. The inventory will be used to evaluate opportunities for reducing GHG emissions from all major-emitting sources including both mobile source categories and stationary source categories. This project will include the fundamental research necessary to evaluate and plan new programs (and amendments to existing Clean Air Act [CAA] programs) for reducing emissions from fossil fuel combustion activities. Many activities in the GHG inventory (and subsequent emissions reductions options analyses) include major sources of criteria and toxic pollutants. Accordingly, the purpose of this project (to evaluate and plan for reductions in GHG emissions, including reductions from usage or production of fossil fuels) is also consistent with the following statutory mandates and authorizations under Clean Air Act Title I:

- ***§ 7403. Research, investigation, training, and other activities***
  (a) Research and development program for prevention and control of air pollution
  The Administrator shall establish a national research and development program for the prevention and control of air pollution ….
    (1) conduct, and promote the coordination and acceleration of, research, investigations ... and studies related to the causes ... extent, prevention, and control of air pollution;
    (2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities ….
  (b) Authorized activities of Administrator in establishing research and development program
  In carrying out the provisions of [paragraph (a)] the Administrator is authorized to–
    (1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;….
    (2) make grants to air pollution control agencies ... for purposes ... in subsection (a)(1) ….

- ***§ 7404. Research related to fuels and vehicles***
  (a) Research programs; grants; ….
  The Administrator shall give special emphasis to research and development into new and improved methods, having industry-wide application, for the prevention and control of air pollution and control of air pollution resulting from the combustion of fuels... he shall–
    (1) conduct and accelerate research programs directed toward development of improved , cost-effective techniques for–
      (A) control of combustion byproducts of fuels, ….
      (B) improving efficiency of fuels combustion so as to decrease atmospheric emissions ….

- ***§ 7405. Grants for support of air pollution planning and control programs***
  (a) Amounts; limitations; assurances of plan development capability.
  (1)(A) The Administrator may make grants to air pollution control agencies ... in an amount up to three-fifths of the cost of implementing programs for the prevention and control of air pollution …. For the purpose of this section, "implementing" means any activity related to the planning, developing, establishing, carrying out, improving, or maintaining of such programs….
  (C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 7410 ... grants under subparagraph (A) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

1.5.6. Information Provided by the EPA under § 7403(b)(1)

Under authority of CAA § 7403(b)(1) the EPA has provided the following resources to ensure reliable air emissions inventories are produced to support plans for reducing emissions.

- Agency-wide Quality Program Documents
- Quality Assurance-specific Directives
  - CIO 2105.3 – Environmental Information Quality Policy, April 10, 2023
  - CIO 2105-P-01.3 – Environmental Information Quality Procedure, March 7, 2023
  - CIO 2105-S-02.0 – EPA's Environmental Information QA Project Plan (QAPP) Standard
  - EPA Regional Sites for Quality Management Plans and Guidance:

- Region 1
- Region 2
- Region 3
- Region 4
- Region 5
- Region 6
- Region 7
- Region 8
- Region 9
- Region 10

- QA Guidance
  - EPA QA/G-4 – *Guidance on Systematic Planning Using Data Quality Objectives Process*
  - EPA QA/G-5 – *Guidance for Quality Assurance Project Plans*

MAG will utilize these resources, as applicable, to ensure evaluation of existing data and utilization of those data are consistent with the EPA's relevant directives and guidance.

1.6. Project / Task Description

A planned schedule of deliverables for the technical tasks (Tasks 1-5) for GHG inventory QAPPs is presented in **Tables 2.1** through **2.5**. The work to be performed under this project involves preparing a local GHG emissions inventory for the Phoenix-Mesa-Chandler MSA. The organization of the work is based on the use of the EPA's Local – GHG Inventory Tool (LGGIT)[15] under the following sector-specific tasks:

Task 1: Local inventory of mobile combustion GHG emissions.

Task 2: Local inventory of electric power consumption (indirect) GHG emissions.

Task 3: Local inventory of solid waste GHG emissions.

Task 4: Local inventory of GHG emissions from other sectors.

- 4.1 Stationary combustion
- 4.2 Agriculture and land management
- 4.4 Waste generation
- 4.5 Water
- 4.6 Wastewater treatment

Task 5: Local inventory of urban forestry resources.

For each sector-specific task, **Tables 2.1–2.5** provide descriptions of multiple different options that may be used to generate the deliverables for the Pinal County portion of the MSA. The different options reflect data that has been or may be developed at the local, state, and national levels. Each option will be evaluated for suitability under the task with preference given to locally developed estimates first (Option 1), state developed estimates second (Option 2), and nationally developed estimates third (Option 3). This order of preference between local, state, and national estimates should provide the most representative inventory as locally developed estimates are being used as the primary data source for the Maricopa County portion of the MSA.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	**Schedule**
Task 1. Mobile Combustion (Transportation)	
For Maricopa County Portion of MSA 1. The PM or TL will download and review the *Maricopa County 2020 Community Greenhouse Gas Emissions Inventory* for suitability as an existing data resource for completion of Task 1. 2. In the GHG inventory report or in a separate report based on the GHG inventory, MAG will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task:	Within 90 days of QAPP approval by EPA.

[15] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool .

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors.	
For Pinal County Portion of MSA (Option 1) 1. The PM or TL will engage with the Maricopa County Air Quality Department and/or the Pinal County Air Quality Control District to obtain and review any Pinal County specific GHG emission inventories that the department may have/produce that may be suitable for Task 1. 2. In the GHG inventory report or in a separate report based on the GHG inventory, MAG will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.	.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). <u>For Pinal County Portion of MSA (Option 2)</u> 1. The PM or TL will engage with the Arizona Governor's Resiliency Office to obtain and review any Pinal County specific GHG emission inventories developed under the EPA CPRG program for the State of Arizona that may be suitable for Task 1. 2. In the GHG inventory report or in a separate report based on the GHG inventory, MAG will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors. <u>For Pinal County Portion of MSA (Option 3)</u> 1. The PM or TL will assign staff to download the EPA's Local – GHG Inventory Tool (LGGIT) at https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool and use that tool to estimate emissions from mobile combustion sources. 2. Staff will read the [Introduction] worksheet and the [Read Me] worksheet to become familiar with the organization of the tool and the tool's terminology. Staff will become familiar with Rows 42 through 59 of the [Read Me] sheet that reflect a brief	

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
summary of the steps necessary to complete the calculations for each sector. Additionally, staff can reference the LGGIT User's Guide for the Community Module that is included within the downloaded zip file. 3. Staff will complete the four (4) initial setup steps on the [Control Sheet]. 4. Staff will review Chapter 7 - Transportation in the GPC GHG Emissions Inventories, and/or Chapter 7 - Vehicle Fleet in the LGO Protocol. Staff will obtain from a state or local motor vehicle agency, the most recent listing of vehicles registered at addresses located in the local community or MSA including (as available) year-manufactured, make, model, body style, fuel, and description. 5. In the LGGIT: Community Module [community_ghg_inventorytool.xlsm], staff will use the [Mobile-Entry] sheet to load the community's or MSA's population of fossil-fueled motor vehicles. Staff will prepare an aggregated listing (i.e., listing of sets of vehicles with counts by vehicle type, model, year, and fuel) for all of registered vehicles and an estimate of the average fuel consumed for each set of similar vehicles. 6. The PM, TL, or QAM will assign a staff member who did not support steps 1-5 of this task to complete a QC review. Staff will independently review the original source data for all inputs and supporting calculations used to populate the [Mobile-Detail Calcs] sheet. Staff will also complete an independent review of all inputs to the LGGIT and complete independent calculations for at least 2 types of vehicles (as directed by the PM or TL) on the [Mobile-Detail Calcs] sheet. The assigned QC staff member will also be directed to compare the LGGIT-based estimate to the estimate published in the EPA's National Emissions Inventory (NEI) and available using the *Data Queries* tool at https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries. This NEI query tool provides national, state, county, and tribal emissions estimates for mobile sources. 7. In the GHG inventory report or in a separate report based on the GHG inventory, MAG will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate.	

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors.	

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
For Maricopa County Portion of MSA 1. The PM or TL will download and review the *Maricopa County 2020 Community Greenhouse Gas Emissions Inventory* for suitability as an existing data resource for completion of Task 2. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the	Within 90 days of QAPP approval by EPA.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
community to an affected source under the option that emits toxic air pollutants. <u>For Pinal County Portion of MSA (Option 1)</u> 1. The PM or TL will engage with the Maricopa County Air Quality Department and/or the Pinal County Air Quality Control District to obtain and review any Pinal County specific GHG emission inventories that the department may have/produce that may be suitable for Task 2. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. <u>For Pinal County Portion of MSA (Option 2)</u> 1. The PM or TL will engage with the Arizona Governor's Resiliency Office to obtain and review any Pinal County specific GHG emission inventories developed under the EPA CPRG program for the State of Arizona that may be suitable for Task 2. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:	

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
a. The specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. For Pinal County Portion of MSA (Option 3) 1. The PM or TL will assign a staff member to use the EPA's LGGIT tool [community_ghg_inventorytool.xlsm] and to verify that the four (4) initial steps required on the [Control Sheet] have been completed. 2. Staff will review Chapter 6.5 - Calculating Emissions from Grid-Supplied Energy Consumption in the GPC GHG Emissions Inventories, and/or Chapter 6.2 - Electricity Use in the LGO Protocol. 3. Staff will obtain total electricity consumption data for the community or MSA from one or more of the following local, state, or federal resources to be used for the baseline estimate or QC validation of the baseline estimate: a. Summaries of metered consumption obtained from the local electric utilities that serve the community or MSA by customer class. b. EIA Form 861 data published by the DOE and available at https://www.eia.gov/electricity/data/eia861/.[16] c. The State and Local Planning for Energy (SLOPE) model datasets available at https://maps.nrel.gov/slope/about. Note these data are published as electricity usage in the units of MMBtu/year for the entire county. Estimates are provided for residential, commercial, and institutional customer classes. These data will be	

[16] Use of Form 861 may introduce double counting for the Phoenix -Mesa-Chandler MSA if power generated in Pinal County was used in Maricopa County. Rationale and deviations from Form 861 data will be included in the report for this sector.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	

converted to kilowatt-hours per year prior to entry into the LGGIT tool. The projections available in this tool (for future years) may also be used for estimating emissions reductions associated with options listed for the electric utility sector.

4. Staff will use the [Electricity-Entry] sheet of the EPA's LGGIT tool. Staff will read the explanation of the *Data Entry & Calculations* starting in cell A3. Staff will enter the data for each chosen entity. These entities may be of any scale as chosen by the grantee (e.g., the entire community by sector; individual building, such as a commercial or institutional facility; or a set of similar facilities (e.g., a group of similar residential units). For groups of similar units, when entering the *Unit Description* in cell C10 of the [Electricity-Entry] sheet, staff will include in the description the number of units that were included when the *electricity purchased (kWh)* value was summed or otherwise calculated for entry into cell C16. Staff will document in the inventory each calculation with associated units of measure for each record added on the [Electricity-Entry] sheet in a manner similar to the following example:

A	B	C		D
Count of Units in Set	**Set Description**	**Avg. Annual kWh Used (per Unit)**		**Annual Usage (All Units)**
1000	Single-family home	750 kWh	=	750,000 kWh
		(Single-family home) (1 Year)		Year

Staff will document the source of the MW-hr usage per customer entered in column C.

5. Staff will determine if EIA Form 861 at https://www.eia.gov/electricity/data/eia861/ includes one of the following types of data that may be useful for estimating or validating the usage per customer entered in column C of step 2:
   a. The community's or MSA's total electricity usage. (See ***Attachment 1*** for some of the service territories included under EIA Form 861),
   b. The service territory or territories that include the community or MSA. (See the EIA Form 861 file entitled [Service_Territory_2020.xlsx] for a listing of the utilities that serve each county in the United States,
   c. A service territory adjacent to the community or MSA with similar usage patterns that may be comparable to the community's or MSA's estimate, or
   d. Make a determination that there are no data under EIA Form 861 that are relevant to estimating or validating local usage per customer in column C of step 2.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	

6. If the community locates EIA 861 electricity data relevant to estimating or validating local usage, staff will include in the inventory the following values from EIA Form 861 to reflect electricity usage per customer most similar to local usage:

EIA 861 Column Name	EIA Form 861 Value
Year of Data	
Utility Name	
Utility Number	
State	
BA Code	
Residential Sales (MW-hrs)	
Residential Customers	
Commercial Sales (MW-hrs)	
Commercial Customers	
Industrial Sales (MW-hrs)	
Industrial Customers	
Transportation Sales (MW-hrs)	
Transportation Customers	

7. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:
   a. The specific source categories and activities affected by the proposed option.
   b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate.
   c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate.
   d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.
   e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment).
   f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
community to an affected source under the option that emits toxic air pollutants.	

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
For Maricopa County Portion of MSA 1. The PM or TL will download and review the *Maricopa County 2020 Community Greenhouse Gas Emissions Inventory* for suitability as an existing data resource for completion of Task 3. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. For Pinal County Portion of MSA (Option 1) 1. The PM or TL will engage with the Maricopa County Air Quality Department and/or the Pinal County Air Quality Control District to obtain and review any Pinal County	Within 90 days of QAPP approval by EPA.

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
specific GHG emission inventories that the department may have/produce that may be suitable for Task 3. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. <u>For Pinal County Portion of MSA (Option 2)</u> 1. The PM or TL will engage with the Arizona Governor's Resiliency Office to obtain and review any Pinal County specific GHG emission inventories developed under the EPA CPRG program for the State of Arizona that may be suitable for Task 3. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate.	

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	
For Pinal County Portion of MSA (Option 3) 1. The PM or TL will assign technical staff to develop estimates for this source using the LGGIT's [Solid Waste_Control] and [Solid Waste-Entry] worksheets. (The [Solid Waste-Entry] worksheet only provides locations to enter data after the [Solid Waste-Control] worksheet is populated.) 2. Staff will review Chapter 8 - Waste in the GPC GHG Emissions Inventories, and/or Chapter 9 - Solid Waste Facilities in the LGO Protocol. 3. On the LGGIT's [Solid Waste_Control] worksheet, staff will enter the total number of landfills in the community, the landfill name, whether or not the landfill has a landfill gas (LFG) collection system, and if the LFG collection system is partial or comprehensive (definitions are provided). 4. On the [Solid Waste_Entry] sheet, staff will enter the following data per landfill type: a. For landfills without a LFG collection system, staff will obtain and enter the annual quantities of waste deposited into the landfill for the life of the landfill, and the opening and closing years of the landfill. The instructions then provide the option to click on a link that takes you to the LGO Protocol Landfill Emissions Tool, where this data is entered. b. For landfills with a comprehensive LFG collection system, staff will obtain and enter the annual amount of landfill gas collected. c. For landfills with a partial LFG collection system, staff will obtain and enter the annual amount of landfill gas collected and the ratio of uncollected surface area over the collected surface area.	

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	**Schedule**
Task 3. Solid Waste (Landfills)	
5. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	**Schedule**
Task 4. Inventory of GHG Emissions for Other Sources	
For Maricopa County Portion of MSA 1. The PM or TL will download and review the *Maricopa County 2020 Community Greenhouse Gas Emissions Inventory* for suitability as an existing data resource for completion of Task 4. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. For Pinal County Portion of MSA (Option 1) 1. The PM or TL will engage with the Maricopa County Air Quality Department and/or the Pinal County Air Quality Control District to obtain and review any Pinal County specific GHG emission inventories that the department may have/produce that may be suitable for Task 4. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.	Within 90 days of QAPP approval by EPA.

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	

e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment).

f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.

For Pinal County Portion of MSA (Option 2)

1. The PM or TL will engage with the Arizona Governor's Resiliency Office to obtain and review any Pinal County specific GHG emission inventories developed under the EPA CPRG program for the State of Arizona that may be suitable for Task 4.
2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:
   a. The specific source categories and activities affected by the proposed option.
   b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate.
   c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate.
   d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.
   e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment).
   f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.

For Pinal County Portion of MSA (Option 3)

1. The PM or TL will assign the primary technical staff member(s) to use the EPA's LGGIT tool and the following worksheets to develop the primary estimates for other sectors.

Other Sources	LGGIT Worksheet(s)
Stationary combustion	[Stationary-Entry] [Stationary-Data] [Stationary-Calcs]
Agriculture & land management	[Agriculture & Land Management]

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	**Schedule**
Task 4. Inventory of GHG Emissions for Other Sources	

Water	[Water]
Wastewater treatment	[Wastewater-Control] [Wastewater-Entry] [Wastewater-Calcs]
Waste generation (disposal external to community's geopolitical boundary)	[Waste Production]

2. After the primary LGGIT calculations are complete, the PM, TL or QAM will assign a QC staff member to complete the following steps:
    a. Review the original source(s) of data for all inputs to the LGGIT tool.
    b. Validate that values from original source(s) were correctly entered into the primary LGGIT tool.
    c. Populate a blank version of the LGGIT tool with the inputs in a QC version.
    d. Compare the outputs of the primary version of the LGGIT versus the QC version of the LGGIT.
    e. Compare source listing LGGIT's [Summary-Emissions] sheet to previous inventories published by community or by neighboring or similar communities to determine if any major sources of GHGs were omitted from the inventory.
    f. Document findings and submit findings to the PM, TL and QAM for resolution.
    g. Document steps taken to resolve any findings.
3. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:
    a. The specific source categories and activities affected by the proposed option.
    b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate.
    c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate.
    d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.
    e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment).
    f. A description of any benefits that the option will impart to communities with

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	**Schedule**
Task 4. Inventory of GHG Emissions for Other Sources	
known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	**Schedule**
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
For Maricopa County Portion of MSA 1. The PM or TL will download and review the *Maricopa County 2020 Community Greenhouse Gas Emissions Inventory* for suitability as an existing data resource for completion of Task 5. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation. For Pinal County Portion of MSA (Option 1) 1. The PM or TL will engage with the Maricopa County Air Quality Department and/or the Pinal County Air Quality Control District to obtain and review any Pinal County specific GHG emission inventories that the department may have/produce that may be suitable for Task 5. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment).	Within 90 days of QAPP approval by EPA.

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation. For Pinal County Portion of MSA (Option 2) 1. The PM or TL will engage with the Arizona Governor's Resiliency Office to obtain and review any Pinal County specific GHG emission inventories developed under the EPA CPRG program for the State of Arizona that may be suitable for Task 5. 2. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation. For Pinal County Portion of MSA (Option 3) 1. The PM or TL will assign technical staff to develop estimates for this sector using the LGGIT's [Urban_Forestry] worksheet. 2. In order to estimate the areas of land with similar percentages of tree cover, staff will use a web-based mapping application to develop a listing of tree-covered tracts of land (i.e., polygons) with the following attributes:	

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	**Schedule**
Task 5. Urban Forestry (Natural Working Lands and Forestry)	

a. Identifier describing area (e.g., Area 1 between Crooked Creek and boundary).
b. Sector (residential, commercial/institutional, industrial, energy generation)
c. Total area in square kilometers (km^2).
d. Percentage of area with tree cover based on local estimate.

3. For each sector, staff will calculate weighted percentage tree cover using **Equation 1.**

Equation 1 for weighted percentage of tree cover for a sector:

$$\frac{\sum_{i=1}^{i=30}(km^2\ of\ area\ i)(\%\ tree\ cover\ of\ area\ i)}{\sum_{i=1}^{i=30}(km^2\ i)}$$

Where:

i = 1 to 30	Designates 30 tree covered areas in a sector on local lands.
km^2 of area i	The measured area (in square kilometers) of area i.
% tree cover of area i	The estimated percentage of tree cover for area i.
$\sum_{i=1}^{i=30}(km^2\ i)$	The denominator is the total combined area of all 30 areas within the sector.

4. For each sector on the LGGIT's [Urban Forestry] worksheet staff will enter total area for the sector in column C rows 11 through 14 and enter weighted % tree cover in Column D.
5. For the two sectors with the largest areas of tree cover, the QAM will assign a QC staff member who did not support steps 1 through 4, to develop independent estimates and to complete the following QC steps:

   a. Review the original source(s) of data for all inputs to the primary LGGIT tool.
   b. Validate correct entry of values from original source(s) into the primary LGGIT.
   c. Populate a blank version of the LGGIT tool with the inputs in a QC version.
   d. Compare the primary outputs of the LGGIT versus the QC version of the LGGIT.
   e. Compare the listing of resources by sector on the LGGIT's [Summary-Emissions] sheet to previous inventories published by the locality or by neighboring or similar localities to identify any major discrepancies.
   f. Document findings and submit findings to the PM, TL, and QAM for resolution.
   g. Document steps taken to resolve any findings.

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
6. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation.	

1.7. Quality Objectives / Criteria

The primary objectives for this project are to develop reliable inventories for each of the GHG-emitting sectors in the Phoenix-Mesa-Chandler MSA and to identify options for reducing emissions from those sectors. Accordingly, all quality objectives and criteria are aligned with these objectives. The quality system used for this project is the joint responsibility of the MAG PM, Task Leaders, and QA Manager. As discussed in section 1.4, an organizationally independent QA Manager will maintain oversight of all required measures in this QAPP. QC functions will be carried out by technical staff and will be carefully monitored by the responsible Task Leaders, who will work with the QA Manager to identify and implement quality improvements. All activities under this project will conform to this QAPP.

1.7.1. Data Quality, Management, and Analyses

For this project, MAG will use a variety of QC techniques and criteria to ensure the quality of data and analyses. Data of known and documented quality are essential components for the success of the project, as these data will be used to inform the decision-making process for the PCAP and CCAP as discussed in Section 1.5.4. The table in **Appendix A** lists by task the specific QC techniques and criteria that are part of this QAPP.

The data quality objectives and criteria for this project are accuracy, precision, bias, completeness, representativeness, and comparability. *Accuracy* is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias). *Precision* is a measure of how reproducible a measurement is or how close a calculated estimate is to the actual value. *Bias* is a systematic error in the method of measurement or calculation. If the calculated value is consistently high or consistently low, the value is said to be biased. Our goal is to ensure that information and data generated and collected are as accurate, precise, and unbiased as possible within project constraints. It is not anticipated that this project will include primary data collection. Generally, existing data and tools provided by the EPA and other qualified sources will be used for project tasks. A subject matter specialist familiar with technical reporting standards (such as a permit writer or compliance engineer with knowledge of the community's facilities operating in the sector) will be used to QA all data utilized for developing the local GHG inventory. MAG will verify the accuracy of all data by checking for logical consistency among datasets. All existing environmental data shall meet the applicable criteria defined in CFR and associated guidance, such as the validation templates provided in the *EPA QA Handbook Volume II*.

Uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific project activity being evaluated.

When available, data originally gathered using published methods whose applicability, sensitivity, accuracy, and precision have been fully assessed, such as EPA reference methods, will be preferred and considered to be of acceptable quality. Project decisions may be adversely impacted if, for example, existing data were used in a manner inconsistent with the originator's purpose. Metadata can be described as the amount and quality of information known about one or more facets of the data or a dataset. It can be used to summarize basic information about the data (e.g., how, why, and when the existing data were collected), which can make working with specific data or datasets easier and provides the user with more confidence. Metadata are valuable when evaluating existing data, as well as when planning for collection primary data that may be required in the future. However, the effort needed to locate and obtain original source materials can be costly. Accordingly, a graded approach to planning will be applied and ongoing discussions with the EPA will be held to determine what magnitude and rigor of QA effort are appropriate and affordable for the project.

For the data analysis completed under this project, analytical methods will be reviewed to ensure the approach is appropriate and calculations are accurate. Spreadsheets will be used to store data and complete necessary analyses. Design of spreadsheets will be configured for the intended use. All data and methodologies specific to each analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

The draft inventory will be evaluated for GHG-emitting-sector and geographic completeness. MAG will utilize the framework of sectors in the EPA's LGGIT tool, previous local inventories, or previous inventories completed by similar communities to ensure that the inventory prepared under this project includes all major GHG-emitting sectors. To ensure the inventory is geographically complete, the draft inventory will also be submitted for review by MAG staff within the community who are familiar with all activities subject to local or federal standards issued under Title I of the CAA to ensure that all major-emitting, local activities are included in the inventory.

Representativeness is a qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. MAG will use the most complete and accurate information available to compile representative data for the community's GHG-emitting activities.

Data comparability is a qualitative term that expresses the measure of confidence that one dataset can be compared to another and can be combined for the decision(s) to be made. MAG will compare datasets when available from different sources to check for the quality of the data. This QA step will also ensure that any highly correlated datasets or indicators are identified. Supporting data, such as information on reference methods used and complete test reports, are important to ensure the comparability of emissions data.

1.7.2. Document Preparation

All documents produced under this project will undergo internal QC review, as well as technical review and an editorial review, prior to submission to the EPA PO. QC will be performed by an engineer, scientist, or economist, as appropriate, with sufficient knowledge. The technical reviewer will review the document for accuracy and integrity of the technical methodologies, analyses, and conclusions.

An editorial review of all final documents will be performed. Editors will verify clarity, spelling, and grammatical correctness, and ensure documents are free of typographical errors. Editors will verify that references are cited correctly. This will include a comparison against the original documents.

The *QC Documentation Form* (**Appendix B**) will be used to track the approval process. The form must be completed and signed for all document deliverables. The signatures required include those of the TL and technical and editorial reviewers. Completion of this form certifies that technical review, editorial review, and all required QC procedures have been completed to the satisfaction of the TL and QAM or QCC. Copies of these signed forms will be maintained in the project files.

1.8. Special Training / Certifications

All MAG staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. MAG staff serving in the QAM role under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities. The PM and all TLs under this project will have completed an online training course on air emissions inventories on the Air Knowledge website at https://airknowledge.gov/EMIS-SI.html.

No additional technical training is required unless otherwise specified in this section for the following tasks:

- Task 1 – No additional technical training
- Task 2 – No additional technical training
- Task 3 – No additional technical training
- Task 4 – No additional technical training
- Task 5 – No additional technical training

If training is required for new staff or for particular segments of the GHG inventory, the PM in coordination with the associated TL will identify available training resources for the inventory segment and incorporate the required training into the project schedule.

1.9. Documents and Records

MAG will document in electronic form (and/or hard copy) QC activities for this project. The TL is responsible for ensuring that copies of all completed QC forms, along with other QA records (including this QAPP), will be maintained in the project files. Project files will be retained by MAG for 6 years after July 01, 2023. The types of documentation that will be prepared for this project include:

- Planning documentation (e.g., QAPP)
- Implementation documentation (i.e., Review/Approval Forms and QC records)
- Assessment documentation (i.e., audit reports and independent calculations).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the *QC Documentation Form* shown in **Appendix B**. This form will document the completion of the QC techniques planned for use on this project as listed in the table in **Appendix A**. One or more completed versions of these forms, as necessary, will be maintained in the project files. The types of documents and activities for which QC will be conducted and documented may include raw data, data from other sources such as data bases or literature, data entry into the LGGIT tool, calculations necessary to transform raw data into forms required for LGGIT entry, and comparisons of primary estimates with QC estimates.

Technical reviews will be used along with other technical assessments (i.e., QC checks) and QA audits to corroborate the scientific defensibility of any data analyses. A technical review (i.e., internal senior review) is a documented critical review of a specific technical work product. It is conducted by subject matter experts who are collectively equivalent (or senior) in technical expertise to those who performed the work. Given the nature of the deliverables under this project, a technical review is an in-depth assessment of the assumptions, calculations, extrapolations, alternative interpretations, and conclusions in technical work products. Technical review of proposed methods and associated data will be documented in the *QC Documentation Form* shown in **Appendix B**. The form will include the reviewer's charge, comments, and corrective actions taken.

Additionally, MAG has developed and instituted document control mechanisms for the review, revision, and distribution of QAPPs. Each QAPP has a signed approval form, title page, table of contents, and an EPA-approved document control format (see header at top of the page). The distribution list for this QAPP was presented in **Table 1.1**. During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list, as well as to any additional staff supporting this project. Any revision to the QAPP will be documented in a QAPP addendum, approved by the same signatories to this QAPP, and circulated to everyone on the distribution list by the MAG PM.

At this time, MAG does not know if the project will collect or handle personally identifiable information (PII) subject to the Privacy Act of 1974. However, if during the course of this project technical staff determine that PII is required to support project objectives, MAG will meet all requirements of the Privacy Act of 1974. **Appendix C** indicates the status of our determination regarding applicability of the Privacy Act of 1974 under this project.

2. Existing Data Acquisition and Management Protocols (Group B)

2.1. Sampling Process Design

2.1.1. Need and Intended Use of Data Used

As indicated in **Tables 2.1 – 2.5**, a wide range of data for a diverse set of GHG-emitting activities is necessary to prepare a local inventory. Existing data resource may include sector-specific or facility-specific GHG emissions estimates, emissions factors, or activity data for use with emissions factors. The experimental design for this inventory project relies on the EPA's LGGIT tool together with independent estimates prepared by MAG assigned QC staff. Existing data resources (including but not limited to data from previously completed inventories) will be utilized to develop GHG emissions estimates that are comparable to the LGGIT estimates. Subsequently, estimates for each source category will be compared to available federal or state data by assigned QC staff.

2.1.2. Identification of Data Sources and Acquisition

The following data sources will be evaluated for use under each task to develop estimates for the major-emitting sectors in the Phoenix-Mesa-Chandler MSA or for use in validation of estimates:

- Task 1:
  - Vehicle registration data from the Arizona Department of Transportation
  - State or federal averages on vehicle miles traveled and miles per gallon from the U.S. Department of Transportation.
  - National Emissions Inventory (NEI) county-level estimates for mobile sources.
- Task 2:
  - U.S. Department of Energy's (DOE's) SLOPE Platform which reports county-level electricity usage in million British thermal units.
  - DOE's EIA Form 861 which reports sub-county-level usage in MWh and customer counts as reported by the different distribution utilities operating within each county.
  - Electricity consumption by customer class obtained directly from local utility providers.
- Task 3:
  - Number of community landfills and information on landfill gas (LFG) collection systems, as applicable, from local solid waste management authorities.
  - Landfill emissions data reported to the EPA's GHGRP.
- Task 4:
  - Data published by the EPA under the Greenhouse Gas Reporting Program for fossil fuel consumption by customer class from local utility provider(s).
  - County-level natural gas consumption data from DOE's SLOPE Platform;
  - Wastewater management data from local water utilities.
- Task 5:
  - Area calculations from web-based map applications.
  - Tree cover estimates from local surveys or forestry databases.

2.2. Quality Control

All data operations conducted for this project will involve existing, non-direct measurement data. All data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use. In addition to reviewing and assessing the data collected, all data entered into spreadsheets and all calculations completed for analyses will be reviewed by a senior technical QC reviewer. The QC reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The QC reviewer will also confirm all data were entered correctly and that calculations are complete and accurate. Calculations will be checked by repeating each calculation, independently, and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for the draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

Where calculations are required to assess the data/datasets, QC calculations will be performed using computer spreadsheets and calculators to reduce typographical or translation errors–mathematical/ statistical calculations are performed using spreadsheets or software programs with predefined formulas and functions. MAG will ensure that any manipulations performed on the data/dataset were done correctly. Such calculations could involve statistical checks to look for data outliers. One approach, for example, that may be used to identify outliers or unusual data points is sorting a datasheet for one or more data variables. This approach is a simple but effective way to highlight unusually high or low values. Graphing data using boxplots, histograms, and scatterplots is another method that may be used to identify gaps in the data (missing data), outliers, or unusual data points. Another approach that may be used is the use of Z-scores, which can quantify the unusualness of an observation when data follow a normal distribution. A Z-score for a particular value indicates the number of standard deviations above and below the mean that the value falls. For example, a Z-score of 2 indicates that an observation is two standard deviations above the average while a Z-score of -2 indicates the value is two standard deviations below the mean. A Z-score of zero represents a value that equals the mean. As appropriate, we will also use hypothesis tests to find outliers, or an interquartile range (IQR) to calculate boundaries for what constitutes minor and major outliers. The methods used will be driven by the scale and type of data. MAG will determine outlier detection methods to be used based on the initial review of the data. Identified outliers will be highlighted to the PM, TL, QAM, or delegate with options for treatment.

2.3. Non-direct Measurements for GHG Inventory and Options Identification

All data operations conducted on this project will involve existing, non-direct measurement data. All existing data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use.

Consistent with the EPA's QA requirements, this QAPP describes the procedures that will be used to ensure the selection of appropriate data and information to support the goals and objectives of this project. Specific elements addressed by this QAPP include:

- Identifying the sources of existing data,
- Presenting the hierarchy for data selection,
- Describing the review process and data quality criteria,
- Discussing quality checks and procedures should errors be identified, and
- Explaining how data will be managed, analyzed, and interpreted.

Data presented in the GHG inventory will be traced to its source (e.g., database input and output). Key resources include data collected by the EPA (e.g., GHGRP data), and data from EPA-approved data sources (e.g., Department of Energy and other federal data sources). These sources may include primary literature (i.e., peer-reviewed journal articles and reports) or databases. We may also use approved existing sources (e.g., handbooks, databases). Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. When peer-reviewed literature or EPA-approved data sources cannot be used, we will document any significant limitations to the data sources used.

We will document information regarding each dataset and our rationale/selection criteria for selecting the data sources used in the inventory. The TL will be responsible for overseeing and confirming the selection of the data for the project tasks.

Table 3.1 provides a hierarchy for data quality when identifying and reviewing available sources of data and information. When evaluating data resources, efforts will be made to identify and select data sources that most closely conform to the highest ranked criteria. Data quality metrics and documentation may not be provided by each source, and as necessary, we may consult with subject matter experts from permitted facilities or trade associations operating in the Phoenix-Mesa-Chandler MSA to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by MAG and project advisors to ensure that the data represent full-scale designs and commercial processes, and that they are applicable to economic and regulatory conditions in the United States. MAG will document data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data; the review will include examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The MAG PM or TL is responsible for verifying the usability of data and related information.

Table 3.1 Existing Data Quality Ranking Hierarchy

Quality Rank	Source Type
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

MAG will work with EPA to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the vintage and quality of the data (based on peer review). The quality of the data will consider the credibility of the source, and the QA documentation provided by the data source. Senior technical staff will also evaluate the availability of alternative datasets, suitability of the selected data for the intended purpose, and agreement with LGGIT estimates.

MAG will use the Secondary Data Quality Ranking Hierarchy when identifying and reviewing available sources of data and information. The source types in **Table 3.1** appear in the order in which they are likely to meet the data quality criteria. For example, federal government data are more likely to be from a credible source, thoroughly reviewed, suitable, available, and representative, and any exceptions to these data criteria are likely to be noted in the government data, providing transparency. Data from individuals are expected to be less reliable, not peer reviewed, and may not be suitable or representative of local activities.

If it is determined that data meeting the fourth (i.e., conference proceedings and other trade literature: non peer-reviewed) or fifth (i.e., individual estimates such as personal communications with vendors) level compose the best or only available data source, the TL will include in the inventory a description of these data with associated limitations for review and approval by the PM and QAM.

These measures of data quality will be used to judge if the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will include in the inventory a discussion for review and approval by the PM and QAM explaining how emissions estimates that relied on such data compare to LGGIT estimates.

We will also consider, for example, the age (i.e., date of the source dataset) and the representativeness of the data and will include in the inventory report for review and approval by the PM and QAM any quality concerns or uncertainties introduced with use of these data, such as data gaps or inconsistencies with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the inventory report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, that the data are current, and that the data are descriptive of similar processes within the Phoenix-Mesa-Chandler MSA. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine if data are missing or confusing and if they meet secondary-use quality objectives.

Key screening criteria will be used to screen the sources identified. The MAG TL will provide oversight to the screening process to ensure sources collected are the most relevant and meet quality requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted out of the information sources to develop the required output for each of the project tasks.

2.3.1. Criteria for Accepting Existing Data for Intended Use

The criteria for determining if the data are acceptable for use in developing the local inventory will be based on a comparison of the primary emissions estimates to independent emissions estimate produced using the EPA's LGGIT or other reliable sources of activity data. While some differences between the primary calculations and independent calculations are expected, differences of more than 5 percent must be accompanied by an explanation subject to approval by the PM and QAM prior to using the estimate in the community's inventory.

2.3.2. Criteria for Options Identification

Review of activities under each task and identification of options for emissions reductions to be considered by policymakers will be based on the following criteria:

1. Quantity of reductions in emissions of climate pollution under the option.
2. Number of jobs likely to be created by the option.
3. Environmental justice benefits of the project including the number of people living in overburdened neighborhoods that will benefit from the option.
4. Quantity of reductions in criteria and toxic air pollutants that can be achieved by option.
5. Number of people living, working, recreating, and going to school in the area(s) benefiting from the option.

2.4. Data Management

Data management procedures include file storage and file transfer. All project and data files will be stored on MAG project servers. Files will be organized and maintained by the PM or TL in folders by project, task, and function, including a system of file labeling to ensure version control. Any files containing confidential business information will be stored on secure computers. The PM or TL will make sure that staff are trained and adhere to the project file organization and version control labeling to ensure that files are placed in consistent locations. All files will be backed up each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Typically, records will be archived once the project is completed. Record retention times will be based on contractual and statutory requirements or will follow MAG practices for storing materials of up to 2 years after the end of the period of performance (POP). Multiple project staff are granted access rights to the archived file system for each project. Records may be retrieved from archived file system by the TL, PM, or other project staff with access during the records retention period. As soon as allowed by applicable regulations or the grant agreement, records will be destroyed according to MAG policies and procedures. For any sensitive information that is gathered under the project, MAG's policy is consistent with EPA–recommended methods of destruction, which include degaussing, reformatting, or secure deletion of electronic records; physical destruction of electronic media; recycling; shredding; incineration; and pulping. Should the grant specify some other manner of disposition (e.g., transfer to the client), MAG will comply with that directive. As noted above, MAG has developed a file naming convention/nomenclature for electronic file tracking and record keeping. Foremost, all files must be given a short but descriptive name. For those records and files gathered or provided to MAG, the filename may include the identification of "original" in its filename.

Similarly, files that have undergone a review by an independent, qualified person will include, at the end of the filename, the initials of the reviewer or the suffix "rev" (in lieu of initials) if more than one reviewer reviewed the file, along with the date reviewed and version number, as a way to track which staff person(s) reviewed the file and when. Filenames of draft versions will follow an incremental, decimal numbering system. More specifically, each successive draft of a document is numbered sequentially from version 0.1, 0.2, 0.3… until a final version is complete. Final versions will be indicated by whole numbers (e.g., version 1.0). Final versions of documents that undergo revisions will be labeled version X.1 for the first set of revisions. While the document is under review, subsequent draft versions will increase incrementally (e.g., 1.2, 1.3, 1.4) until a revised final version is complete (e.g., version 2.0).

In the event data retrieval is requested and to prevent loss of data, all draft and final file versions will be retained electronically—that is, superseded versions will not be deleted.

Note that changes made to deliverables will be documented using the software's *track changes* feature, which allows a user to track and view all changes that are made to the document version. All deliverable reviews will be documented in a QC Documentation Form (see **Appendix B**) for the project. This form will be maintained in the project files.

For this project, it is not anticipated that any special hardware or software will be used. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work (described in **Tables 2.1 – 2.5)** for this project.

3. Assessment and Oversight (Group C)

MAG is committed to preparing a comprehensive and reliable inventory of GHG emissions for the Phoenix-Mesa-Chandler MSA. Under this project our senior management team has dedicated the necessary resources to ensure we deliver an inventory that can be relied upon for future policy decisions. Accordingly, under this project, we will concurrently implement existing quality management systems that MAG has previously utilized for submissions to the EPA under Title I of the Act where task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the EPA PO's and QAM's expectations for handling and producing deliverables that reflect high-quality environment data. This section discusses Elements C1 (assessments and response actions) and C2 (reporting) applicable to this project.

3.1. Assessments and Response Actions

The QA program includes periodic review of data files and draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The PM or TL will provide day-to-day oversight of the quality system. Periodic project file reviews will be carried out by the QA Manager, at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The QAM will ensure that problems found during the review are brought to the attention of the PM or TL and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The PM, TLs and QA Manager are responsible for determining if the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the Pm or TL and, if necessary, with direction from the QA Manager or PM, as appropriate. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or TL, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the QA Manager and discussed with the PM or TL as needed. Depending on the severity of the deficiency, the TL may consult the QA Manager and stop work until the cited deficiency is resolved. Deficiencies identified and their resolution will be documented in monthly project reports, as applicable. The QA Manager and PM or TL will comply and respond to all internal and EPA audits on the project, as needed. The QA Manager will produce a report outlining any corrective actions taken.

3.2. Reports to Management

The periodic progress reports (to the EPA PO) required in the grant agreement will be reviewed by the PM and the PM's manager (Tim Franquist, Environmental Division Director) to ensure the project is meeting milestones and that the resources committed to the project are sufficient to meet project objectives. These periodic progress reports will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including any QA/QC issues. Reports to the EPA will be drafted by the TL or other project staff familiar with project activities during the reporting period.

Any QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned TL and the PM or QAM as appropriate. All significant findings will be included in monthly reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA's PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the TL), prior to submitting to the PM. The PM will conduct a final review of the report before transmitting the progress report to the EPA PO, and the PM's manager will be cc'd on all progress reports.

4. Data Validation and Usability (Group D)

4.1. Data Review, Verification, Validation

All work conducted under this project will be subject to technical and editorial review. When existing data for the same GHG-emitting activity are available from multiple sources, the background information documents will be reviewed for all sources to determine the dataset that is the most representative of local operations. Additionally, the inventory report will include the vintage of the existing data resource and preference will be given to the most recent dataset that is representative of similar GHG-emitting local activities. Reviews will be conducted by an independent, qualified person—or a person not directly involved in the production of the deliverable. The term "validation" refers to whether the data meet the QAPP-defined user requirements while the term "verification" refers to whether conclusions can be correctly drawn from the data. The quality of data used and generated for the project will be reviewed and verified at multiple levels by the project team. This review will be conducted by the MAG TL or a senior technical reviewer with specific, applicable expertise. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all units of measure will be checked for consistency. Any potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These corrections will be documented in project records. These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will document these findings in the inventory along with corrective actions or use of alternative data sources.

4.2. Verification and Validation Methods

As a standard operating procedure, all data (retrieved and generated) will be verified and validated through a review of data files by an independent, qualified technical staff member (i.e., someone other than the document originator), and ultimately, the MAG TL. A checklist of QC activities for deliverables under this project is provided as **Appendix A**. Forms for documenting QC activities and review of deliverables are included in **Appendix B**. Documentation of calculations will be included in spreadsheet work products and in supporting memoranda, as appropriate.

The TL is responsible for day-to-day technical activities of tasks, including planning, data gathering, documentation, reporting, and controlling technical and financial resources. The TL is the primary person responsible for quality of work on tasks under this project and will approve all-related plans and reports. These reports will be transmitted by the TL to the QAM for final review and approval.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Reviews of analyses will include a thorough evaluation of content and calculated values. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all measurement units will be checked for consistency. Any potential issues identified through this review process will be evaluated, errors corrected, and analysis repeated using the corrected data. All corrections will be documented in project records.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Typical data verification reviews can include checks of the following:

- Data sources are clearly documented,
- Calculations are appropriately documented,

- All relevant assumptions are clearly documented,
- Conclusions are relevant and supported by results,
- Text is well-written and easy to understand.

The documented review process will be stored with deliverables for the project. For the narrative describing the methodologies used for the inventory, all comments on drafts will be clearly and concisely summarized including a description of how substantive issues raised by commenters were resolved.

As discussed in Section 1.7, QC objectives include verification that data in database tables are stored and transferred correctly, algorithms call data correctly, units are internally consistent, and reports pull the required data. These data management issues will be addressed as part of the QC checks of data acquisition and document preparation.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work as described in Section 1.6 for this project.

4.3. Reconciliation with User Requirements

All data (retrieved and generated) and deliverables in this project will be analyzed and reconciled with project data quality requirements. To ensure deliverables meet user requirements, the TL or senior technical lead will review all data and deliverables throughout the project to ensure that the data, methodologies, and tools used meet data quality objectives, are clearly conveyed, and represent sound and established science.

MAG will review each project with the EPA at the planning stage to ensure the approach is fundamentally sound and will meet the project objectives. The TL or senior technical lead will evaluate data continuously during the life term of the project to ensure they are of sufficient quality and quantity to meet the project goals. Prior to submission of draft and final products, the TL or senior technical lead will make a final assessment to determine if the objectives have been fulfilled in a technically sound manner. Assumptions made in preparing project analyses will be clearly specified in the inventory.

As discussed in Section 1.7.1, uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific inventory activity being evaluated.

5. References

EPA, Chief Information Officer's Policy Directive on Information Technology / Information Management available at EPA IT/IM Directive: Environmental Information Quality Policy, Directive # CIO 2105.3

EPA, *Chief Information Officer's Policy Directive on Information Technology / Information Management: Quality Assurance Project Plan (QAPP) Standard*, Directive # CIO 2105-S-02.0. Available at https://www.epa.gov/irmpoli8/quality-assurance-project-plan-qapp-standard. Accessed on 7/24/2023.

EPA, EPA-454/B-17-001, *Quality Assurance Handbook for Air Pollution Measurement Systems, Ambient Air Quality Monitoring Program, Volume II*. Available at https://www3.epa.gov/ttnamti1/files/ambient/pm25/qa/Final%20Handbook%20Document%201_17.pdf. Accessed on 6/23/2023.

EPA, Fact Sheet: Areas where differences between state GHG inventories and the EPA's Inventory of U.S. GHG Emissions and Sinks by State: 1990-2020 estimates may occur. Available at https://www.epa.gov/system/files/documents/2022-03/fact-sheet-differences-epa-and-offical-state-ghgi.pdf. Accessed on 6/23/2023.

EPA, US GHG Inventory by State. Available at https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals. Accessed on 6/23/2023.

EPA, GHG Reporting Program Facility-level Local Information. Available at https://ghgdata.epa.gov/ghgp/main.do. Accessed on 7/18/2023.

EPA, Data reported to EPA's Greenhouse Gas Reporting Program (GHGRP) at https://www.epa.gov/ghgreporting/data-sets

EPA, National Inventory at https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021

EPA, Publications, Tools, and Data for State, Local, and Tribal Governments at https://www.epa.gov/statelocalenergy/publications-tools-and-data-state-local-and-tribal-governments. Accessed on 7/27/2023.

EPA, Fuel heating values and CO2 emission factors at eCFR :: 40 CFR Part 98 -- Mandatory Greenhouse Gas Reporting

EPA, Global warming potentials at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A?toc=1

USDA, Forest Service at https://www.fs.usda.gov/research/treesearch/62418

US DOT, Federal Highway Administration Transportation Statistics at https://www.fhwa.dot.gov/policyinformation/statistics/2021/vm1.cfm

Appendix A: Check Lists of Quality Control Activities for Deliverables

Tasks and Deliverables	Quality Control Procedures

Task 1. Mobile Combustion (Transportation)

Local inventory of GHG emissions from mobile sources with documentation of the following QC activities:

(1) narrative report describing data sources and QC measures for data acquisition steps,

(2) description of methodology and QC measures for validated proper implementation of methodology, and

(3) documentation of QAPP implementation.

(4) listing of emissions reductions options are present with documentation of rationale for each option.

1. Comparison of local estimate of average miles travelled per year and average miles per gallon (by vehicle type) versus state and national averages.

Vehicle Type	Local Avg Miles/yr	QC Avg Miles/yr	MPY Statistics*	Local Avg Miles/gal	QC Avg Miles/gal	MPG Statistics
Passenger Car (Gasoline)			Signed Bias ±X.XX%		24.1	Signed Bias ±X.XX%
Passenger Truck (Gasoline)			Variance Y.YY%		18.5	Variance Y.YY%
Heavy-duty (Gasoline)					10.1	
Motorcycle (Gasoline)					50	
Passenger Car (Diesel)					32.4	
Passenger Truck (Diesel)					22.1	
Heavy-duty (Diesel)					13.0	

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the LGGIT value taken as the audit value.

2. For any values used in local inventory that differ from the state average MPY or the national average MPG by more than 5%, MAG will provide an explanation of why local factors may differ from state or national averages.

3. Ensure the GWPs used for the local estimate and the LGGIT estimate are on the same basis. The LGGIT tool uses AR5 GWP (e.g., methane GWP = 28).

4. Review by TL or senior technical reviewer—analytical methods / results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.

5. Editor review—verify or remediate draft deliverables to ensure clear, error-free writing.

Task 2. Electric Power Consumption

<table>
<tr><th>Tasks and Deliverables</th><th>Quality Control Procedures</th></tr>
<tr>
<td>Local inventory of GHG emissions from electric power consumption with documentation of the following QC activities:

(1) narrative report describing data sources and QC measures for data acquisition steps,

(2) description of methodology and QC measures for validated proper implementation of methodology, and

(3) documentation of QAPP implementation.

(4) listing of emissions reductions options are present with documentation of rationale for each option.</td>
<td>1. Compare (a) the local estimate in inventory versus (b) data from SLOPE[17], state averages, or other data resources available from DOE such as Form EIA 861 data. Use a table similar to the table below to assess precision and bias of the local estimates versus estimates derived from SLOPE, state averages, or representative EIA 861 data, if available:
<table>
<tr><th>Power Consuming Sector</th><th>Initial Local Estimate (Metric Tons CO_2e)</th><th>QC Estimate based on SLOPE or Form 861 (Metric Tons CO_2e)</th><th>Statistics*</th></tr>
<tr><td>Residential</td><td></td><td></td><td rowspan="5">Signed Bias ±X.XX%

Variance Y.YY%</td></tr>
<tr><td>Commercial</td><td></td><td></td></tr>
<tr><td>Industrial</td><td></td><td></td></tr>
<tr><td>Transportation</td><td></td><td></td></tr>
<tr><td>Other</td><td></td><td></td></tr>
</table>
* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

2. SLOPE data are provided in million British thermal units (MMBtu's) of electricity usage, EIA 861 usage data are provided in megawatt-hours (MWh), but the LGGIT inputs for electricity usage must be in kilowatt-hours (kWh). When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.

3. Ensure the GWPs used for the local estimate and the independent estimate are on the same basis.

4. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate.

5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate)

6. Editor review—writing is clear, free of grammatical and typographical errors.</td>
</tr>
</table>

[17] National Renewable Energy Laboratory. "[Data Set Title (e.g., Battery Storage Capital Costs)]," *State and Local Planning for Energy*, accessed 7/22/2023, https://maps.nrel.gov/slope.

Tasks and Deliverables	Quality Control Procedures
Task 3. Solid Waste (Landfills)	
Local inventory of GHG emissions from landfills with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Comparison of (a) independent local inventory *versus* (b) landfill data from FLIGHT. Alternatively, FLIGHT data may be used as opposed to local data. Use a table similar to the table below to assess precision and bias of the local inventory versus QC estimates:

Solid Waste (Landfills)	Initial Local Estimate (Metric Tons CO_2e)	FLIGHT Data (Metric Tons CO_2e)	Statistics* for Area Comparisons
North Elm Landfill			Signed Bias ±X.XX%
East Hill Landfill			
Landfill No. 1 (closed)			Variance Y.YY%
…			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

2. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
3. Ensure the GWPs used for the local estimate and independent estimate are on the same basis.
4. Ensure data are appropriate for intended use, data are complete and representative and current, data sources are documented, analytical methods are appropriate, and calculations are accurate. Include any QC findings and reconciliation.
5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate)
6. Editor review—writing is clear, free of grammatical and typing errors.

Tasks and Deliverables	Quality Control Procedures

Task 4. GHG Emissions for Other Sources

Tasks and Deliverables:

Local inventory of GHG emissions from the community's other sources with documentation of the following QC activities:

(1) narrative report describing data sources and QC measures for data acquisition steps,

(2) description of methodology and QC measures for validated proper implementation of methodology, and

(3) documentation of QAPP implementation.

(4) listing of emissions reductions options are present with documentation of rationale for each option.

Quality Control Procedures:

1. Comparison of (a) local emissions estimates in inventory *versus* (b) available federal or state estimates for the same source categories (e.g. SLOPE, FLIGHT, etc.).
2. For any values used in local inventory that are inconsistent with federal or state values, the table below will be utilized to assess precision and bias of the local inventory versus the federal or state estimates:

Other Sectors	Initial Local Estimate (Metric Tons CO_2e)	QC Estimate (Metric Tons CO_2e)	Statistics*
Stationary combustion			Signed Bias ±X.XX% Variance Y.YY%
Agriculture & land management			
Waste generation			
Water			
Wastewater treatment			
Other			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

3. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
4. Ensure the GWPs used for the local estimate and independent estimate are on the same basis.
5. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate.
6. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of detail appropriate.
7. Editor review: writing is clear, free of grammatical and typographical errors.

Appendix B. QC Documentation Form

Maricopa Association of Governments

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverables meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance Project Plan and/or according to direction from the EPA PO.

Client:	EPA Region 9
Grant Number:	98T77101
EPA Project Officer:	Ryder Freed
Project Number:	<internal project number>
Project Name:	<internal project name>
Grantee Org. Project Manager:	Elias Toon

QA Form Details

Item Number	**File Name**	**Deliverable Description**	**Date Sent to Client**	**Deliverable Status (Draft/Final)**	**Document Originator**	**QA Review Information**							
						Review Type	**Reviewer Name**	**Date of Review**	**Summary of Review Findings**	**Have findings been resolved?**	**Originator Signature**	**Reviewer Signature**	**File Location**
01						*Technical*				*Yes/No*			
02						*Technical*				*Yes/No*			

Maricopa Association of Governments

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverables meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance Project Plan and/or according to direction from the EPA PO.

Client:	EPA Region 9
Grant Number:	98T77101
EPA Project Officer:	Ryder Freed
Project Number:	1
Project Name:	Maricopa-Pinal County Region Priority Climate Action Plan: 2020 Greenhouse Gas Emission Inventory Technical Support Document
Grantee Org. Project Manager:	Elias Toon

QA Form Details

Item Number	File Name	Deliverable Description	Date Sent to Client	Deliverable Status (Draft/Final)	Document Originator	QA Review Information						
						Review Type	Reviewer Name	Date of Review	Summary of Review Findings	Have findings been resolved?	Originator Signature and Reviewer Signature	File Location
01	Draft Maricopa-Pinal County Region GHG EI TSD.docx	EI TSD	1/19/24	Draft	PM	Technical	Alison Walker	1/26/24	Grammar and editorial edits. Clarifications on methodology for livestock and urban forestry calculations. Improvements to Manufacturing gas allocation explanations. Clarifications to Native nation boundaries.	Yes	Originator Elias Toon Reviewer Alison Walker	S:\Air Quality\EliasT\EPA Climate Pollution Reduction Grants\4_PCAP\5_Draft Plan\Reviews
02	Draft Maricopa-Pinal County Region GHG EI TSD.docx	EI TSD	1/28/24	Draft	PM	*Technical/QAM*	Shantel Oviedo-Wyke	1/30/24	-Confirm Table 8 numbers, pg. 8. -Address blank boxes in Table 9, pg. 10 & on Table 23, pg. 20. -Address documentation of some QAPP deliverables for each option in Appendix B (i.e., explanation of air toxics, # people living in nonattainment areas where the option would reduce emissions, a description of benefits that	Yes	Originator Elias Toon	S:\Air Quality\EliasT\Internal MAG CPRG PCAP EI Review

Item Number	File Name	Deliverable Description	Date Sent to Client	Deliverable Status (Draft/Final)	Document Originator	QA Review Information						
						Review Type	Reviewer Name	Date of Review	Summary of Review Findings	Have findings been resolved?	Originator Signature and Reviewer Signature	File Location
									the option will impart to communities with known environmental injustice issues, and, for Community Forestry, # of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected…). -Include rationale with each emissions reduction option in Appendix B.		Reviewer SOW	
03	Maricopa-Pinal County Region GHG EI TSD.docx	EI TSD	2/14/24	Final	PM	*QAM*	Shantel Oviedo-Wyke	2/14/24	N/A	Yes	Originator Elias Toon SOW Reviewer	S:\Air Quality\EliasT\Final Maricopa-Pinal County Region Priority Climate Action Plan

Attachment B

Maricopa-Pinal County Region Greenhouse Gas Emission Reduction Funding Opportunities

Maricopa Association of Governments
January 2024

MARICOPA ASSOCIATION of GOVERNMENTS

Identification of GHG Emission Reduction Measures for the Maricopa-Pinal County Region

Table 36: GHG Emission Reduction Measure Identification for the Maricopa-Pinal County Region

Sector	GHG Emission Reduction Measure Description	Source
Buildings	Adoption and implementation of the most up-to-date building energy codes or stretch codes for new commercial and residential buildings	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Implementation of a clean heat standard	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Incentive programs for implementation of end-use energy efficiency measures in existing government-owned, commercial, and residential buildings	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Incentive programs for the purchase of certified energy-efficient appliances, heating and cooling equipment, lighting, and building products to replace inefficient products	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Programs and policies to promote electrification of government-owned, commercial, and residential buildings	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Programs and policies to accelerate the incorporation of efficient electric technologies and electric vehicle charging at new single-family, multi-unit, or affordable residential buildings and commercial buildings, including building codes related to electric vehicle charging	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Implementation of a building energy performance management program for government-owned buildings	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Implementation of a new benchmarking and building performance standards	EPA CPRG Program: Implementation Grants General Competition NOFO
Buildings	Programs to promote recovery and destruction of high-global warming potential (GWP) hydrofluorocarbons (HFCs) used in existing appliances, air conditioning systems, and commercial chillers	EPA CPRG Program: Implementation Grants General Competition NOFO

Buildings	Building Retrofits and Energy Efficiency Measures: reduction in energy used in homes and businesses that can come from improving building envelopes, increased fuel efficiency, and fuel switching. Actions can be additive, e.g. transitioning traffic signals and streetlights to LED, along with a less GHG intensive electricity grid, reduced the associated GHG emissions by 62%.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Buildings	Increase Energy Efficiency through Incentive Programs	Conveners Network State Climate Plan Summaries (June 2023)
Buildings	Increase Energy Efficiency through Building Codes	Conveners Network State Climate Plan Summaries (June 2023)
Buildings	Encourage Electrification	Conveners Network State Climate Plan Summaries (June 2023)
Buildings	Prioritize Affordability and Equity for EJ Communities	Conveners Network State Climate Plan Summaries (June 2023)
Buildings	Reduce Gas Infrastructure and Consumption of Fossil Gas	Conveners Network State Climate Plan Summaries (June 2023)
Buildings	Require a walkable, connected street network	EPA Local Government Climate and Energy Strategy Series: Smart Growth
Buildings	Reduce required infrastructure through compact building design	EPA Local Government Climate and Energy Strategy Series: Smart Growth
Buildings	Encourage a mix of uses	EPA Local Government Climate and Energy Strategy Series: Smart Growth
Buildings	Create a range of housing opportunities and choices	EPA Local Government Climate and Energy Strategy Series: Smart Growth
Buildings	Provide a variety of transportation choices	EPA Local Government Climate and Energy Strategy Series: Smart Growth

Buildings	Require a walkable connected street network	EPA Local Government Climate and Energy Strategy Series: Smart Growth
Buildings	Install solar energy generation systems on city housing neighborhoods	City of Phoenix Climate Action Plan (2021)
Buildings	Replace lighting in municipal operations with light emitting diodes (LEDs) to reduce electricity consumption.	City of Phoenix Climate Action Plan (2021)
Buildings	Double the solar energy generation systems installed on city-owned infrastructure	City of Phoenix Climate Action Plan (2021)
Buildings	Replace heating, ventilation, and air conditioning (HVAC) equipment units to increase energy efficiency and phase out R-22 refrigerant	City of Phoenix Climate Action Plan (2021)
Buildings	Use Energy Management Plans to identify opportunities to reduce energy use and cost at city-owned facilities	City of Phoenix Climate Action Plan (2021)
Buildings	Install solar energy generation systems at Aviation Department properties, including Phoenix Sky Harbor International Airport.	City of Phoenix Climate Action Plan (2021)
Buildings	Provide services and products to enhance and promote the provision of safe, efficient, sustainable and affordable residences and neighborhoods.	City of Phoenix Climate Action Plan (2021)
Buildings	Install microgrids in city-owned facilities that serve the city's redundancy needs and utilities long-term energy goals.	City of Phoenix Climate Action Plan (2021)
Buildings	Update zoning and other codes and streamline permitting processes for green/sustainable construction and renewable energy (solar) projects to reduce barriers for consumers.	City of Phoenix Climate Action Plan (2021)
Buildings	Design and construct all city of Phoenix municipal operations facilities to Living Building Challenge, Net Positive Design, or equivalent design standards by 2050.	City of Phoenix Climate Action Plan (2021)
Buildings	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.	City of Phoenix Climate Action Plan (2021)
Buildings	Develop programs that improve building energy efficiency, with a goal of net-zero GHG emission energy use.	City of Mesa Climate Action Plan (2022)

Buildings	Improve energy performance in less efficient buildings with periodic, cost effective and incremental energy efficiency improvements.	City of Mesa Climate Action Plan (2022)
Buildings	Weatherize City buildings in need of energy efficiency improvement. Pair with strategies like electric vehicle charging, energy storage, and fuel switching.	City of Mesa Climate Action Plan (2022)
Buildings	Promote use of established home energy rating system for all single-family home so potential buyers and renters can make informed decisions.	City of Mesa Climate Action Plan (2022)
Buildings	Partner with local utilities and non-profit organizations to weatherize homes and multifamily dwellings for those with the largest risk of the negative effects of climate change. Extend partnerships to commercial facilities to help small business stay ahead of potentially rising energy costs and climate challenges.	City of Mesa Climate Action Plan (2022)
Buildings	Develop a tree and shade master plan that will be part of the evaluation of walkable connections and promote carbon sequestration.	City of Mesa Climate Action Plan (2022)
Buildings	Develop a plan with recommendations for strategic placement of trees and structured shade.	City of Mesa Climate Action Plan (2022)
Buildings	Install solar canopy parking structures in parking lots.	City of Mesa Climate Action Plan (2022)
Buildings	Collaborate with community partners to ensure a healthy urban forest.	City of Mesa Climate Action Plan (2022)
Buildings	Develop an energy performance and heat resilience program that provides a path to weatherize less efficient homes and businesses.	City of Mesa Climate Action Plan (2022)
Buildings	Conduct Comprehensive Retrofits for Local Governments, Schools, and Non-Profit Buildings to be more Energy Efficient.	Multi-Organization PCAP Comment Letter to MAG (2024)
Buildings	Incentivize Small Business Electrification.	Multi-Organization PCAP Comment Letter to MAG (2024)
Buildings	Adopt Low-to-Zero-Energy and Green Building Codes and Practices That Prioritize New Construction of Affordable Housing.	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Buildings	Expand Funding for Voluntary Industrial Decarbonization Demonstration Projects.	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)

Buildings	Improve Outreach and Opportunities for Energy Efficiency Retrofits and Appliance Electrification Projects.	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Buildings	Green Codes and Standards (GSI IgCC Adoption)	City of Tempe Climate Action Plan Update (2022)
Buildings	Adopt a Tempe Green Construction Code for private development	City of Tempe Climate Action Plan Update (2022)
Buildings	Adopt a Resilient Tempe Master Plan and Utility Feasibility Study	City of Tempe Climate Action Plan Update (2022)
Buildings	Adopt building codes that reduce barriers to install electric vehicles	City of Tempe Climate Action Plan Update (2022)
Buildings	Adopt Solar ready building codes	City of Tempe Climate Action Plan Update (2022)
Electric Power	Renewable portfolio standards and/or clean electricity standards	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Energy efficiency portfolio standards	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Emission trading systems (e.g., cap-and-trade programs) and carbon pricing measures	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	GHG performance standards for electric generating units	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Installation of renewable energy and energy storage systems on municipal facilities	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Programs to support smart-grid and/or behind-the-meter technologies to reduce power losses, reduce peak demand, and enable consumer participation in distributed generation	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Targeted incentives for installation of renewable energy and energy storage systems on commercial and residential buildings, such as net metering, tax credits, rebates, and streamlined interconnection standards	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Policies and measures to streamline permitting for renewable energy projects	EPA CPRG Program: Implementation Grants General Competition NOFO

Electric Power	Development of distributed or community-scale renewable energy generation, microgrids, or vehicle-to-grid infrastructure in disadvantaged communities, including remote and rural regions	EPA CPRG Program: Implementation Grants General Competition NOFO
Electric Power	Grid Decarbonization: decreasing emissions related to energy generation by transitioning to renewable sources of energy like solar, hydropower and wind. Nuclear is included in Phoenix's plan, although not typical.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Electric Power	Implement or Strengthen Renewable Portfolio Standards	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Join a Carbon Market	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Invest in Regional Transmission Upgrades	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Support Distributed Energy Resources	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Include Renewables in Utility Resource Plans	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Allow Securitization to Retire Fossil-Fuel Generation Plants	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Incentivize Energy Efficiency Across Utilities	Conveners Network State Climate Plan Summaries (June 2023)
Electric Power	Increase renewable and clean energy resources.	City of Phoenix Climate Action Plan (2021)
Electric Power	Leverage the city's purchasing power to procure 100% renewable electricity for municipal operations.	City of Phoenix Climate Action Plan (2021)
Electric Power	Reduce per capita energy consumption by 10% relative to 2016	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Increase installations of solar energy to 20% of owner-occupied homes by 2030	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Work with utilities to promote energy efficiency improvements for existing residential and commercial properties and educate property owners on existing incentives	City of Scottsdale Sustainability Plan (Draft 2022)

Electric Power	Improve compliance with energy and green construction codes for new buildings, additions, and remodeling	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Investigate ways to expand battery storage capacity for renewable energy installations	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Employ a city-wide energy management system and track city energy use	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Dedicate staff resources to managing energy programs	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Conduct energy audits for 50% of existing of all buildings	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Expand solar generation on city facilities	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Continue to convert streetlight systems, park lighting, and other civic lighting to LED technology for energy efficiency and lower maintenance costs	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Join utility green power programs	City of Scottsdale Sustainability Plan (Draft 2022)
Electric Power	Accelerate the use of carbon-free, renewable energy supplies that come from hydroelectric, solar, biogas, wind, and other innovative technologies in local utility energy portfolios.	City of Mesa Climate Action Plan (2022)
Electric Power	Expand on-site renewable energy generation and storage capacity to support resilience in the community.	City of Mesa Climate Action Plan (2022)
Electric Power	Subscribe to and advocate for utility scale renewable energy projects that provide energy for the community.	City of Mesa Climate Action Plan (2022)
Electric Power	Support community-based renewable energy initiatives.	City of Mesa Climate Action Plan (2022)
Electric Power	Use verified and proven carbon offsets where renewable energy options are not feasible.	City of Mesa Climate Action Plan (2022)
Electric Power	Invest in resilient energy sources and infrastructure.	City of Mesa Climate Action Plan (2022)
Electric Power	Advocate for resilient energy supplies for the community.	City of Mesa Climate Action Plan (2022)

Electric Power	Educate community on the value of energy efficiency and the transition to carbon-free energy.	City of Mesa Climate Action Plan (2022)
Electric Power	Fund Virtual Power Plant Demonstration Projects with Equitable Benefits.	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Electric Power	Self-Generation Incentive Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Electric Power	Resilient Energy Hubs	City of Tempe Climate Action Plan Update (2022)
Electric Power	Resilience Hub Operating Standards	City of Tempe Climate Action Plan Update (2022)
Industrial	Standards addressing GHG emissions from industrial facilities and from energy production sectors, including emissions from industrial process heat and industrial processes	EPA CPRG Program: Implementation Grants General Competition NOFO
Industrial	Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization	EPA CPRG Program: Implementation Grants General Competition NOFO
Industrial	Programs to support or incentivize GHG reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements	EPA CPRG Program: Implementation Grants General Competition NOFO
Industrial	Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel	EPA CPRG Program: Implementation Grants General Competition NOFO
Industrial	Increase Energy Efficiency	Conveners Network State Climate Plan Summaries (June 2023)
Industrial	Low-Carbon Fuels and Feedstocks	Conveners Network State Climate Plan Summaries (June 2023)
Industrial	Procurement of Low-Carbon Products	Conveners Network State Climate Plan Summaries (June 2023)
Industrial	Carbon Management	Conveners Network State Climate Plan Summaries (June 2023)

Industrial	Electrification of Industrial Processes and Equipment	Conveners Network State Climate Plan Summaries (June 2023)
Industrial	Climate Tech Finance	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	Natural Gas Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	F-gas Reduction Incentive Program (FRIP)	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	UCAIR Grant Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	New Technology Implementation Grant (NTIG) Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	EPA Center for Corporate Climate Leadership	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Industrial	Database of State Incentives for Renewables & Efficiency (DSIRE)	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Natural and Working Lands	Incentive programs to fund electric agricultural equipment technologies	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Policies to promote improved forest management to enhance carbon stocks on forested land	EPA CPRG Program: Implementation Grants General Competition NOFO

Natural and Working Lands	Urban afforestation and green infrastructure programs and projects	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Restoration of degraded lands (e.g., brownfields, mine reclamation) and forested lands to enhance carbon sequestration	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Policies to enhance carbon stocks in coastal estuaries, such as wetlands and mangroves.	EPA CPRG Program: Implementation Grants General Competition NOFO
Natural and Working Lands	Protect and restore sensitive ecosystems	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Optimize biogenic carbon capture	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Support carbon storage and ecosystem services through forest product markets and management	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Invest in additional research and modeling to understand carbon flux	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Promote soil-health and climate-smart agricultural and agroforestry practices	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Improve water management and watershed health	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Conserve and expand urban forests and green spaces	Conveners Network State Climate Plan Summaries (June 2023)
Natural and Working Lands	Encourage connectivity of natural area open spaces, scenic corridors, developed open spaces, and open drainage easements	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Update Community Services master plan goals related to parks, open spaces, and proximity for households	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Identify long term maintenance funding	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Develop plans to reduce invasive species and increase awareness of best management practices for invasive species management and connection to wildfire concerns	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Support Native Plant Ordinance and its enforcement	City of Scottsdale Sustainability Plan (Draft 2022)

Natural and Working Lands	Develop guidelines on the use of non-chemical and less-toxic pest management strategies	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Develop sustainability-aligned Design Guidelines, supporting native ecosystems and desert biodiversity	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Maintain tree inventory and encourage thoughtful planning relative to low water tree planting	City of Scottsdale Sustainability Plan (Draft 2022)
Natural and Working Lands	Invest in the urban forest, including appropriate plant selection, irrigation and care.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Protect natural open space and conserve native wildlife, plants, and natural areas.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Manage areas to support resilient ecosystems and biodiversity.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Support resilient ecosystems through selection of desert adapted trees and plants that will thrive in the anticipated climate of 2030.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Protect natural resources and conserve natural areas.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Build agriculture (farms, processing, distribution and sales) into land use planning.	City of Mesa Climate Action Plan (2022)
Natural and Working Lands	Support local agriculture education programs.	City of Mesa Climate Action Plan (2022)
Transportation	Programs to increase the share of electric light-, medium-, and heavy-duty vehicles, and to expand electric vehicle charging infrastructure	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Electrification requirements for state, municipal, territorial, and tribal vehicle, transit, or equipment fleets	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Transportation pricing programs that reduce vehicle miles traveled (VMT), such as parking pricing and congestion and road pricing	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Policies to support transportation management incentive programs to reduce vehicle trips or travel and expand transit use, such as van-pool programs, ridesharing, transit fare subsidies, and bicycle facilities	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	New or expanded transportation infrastructure projects to facilitate public transit, micro-mobility, car sharing, bicycle, and pedestrian modes	EPA CPRG Program: Implementation Grants General Competition NOFO

Transportation	Incentive programs to purchase zero-emission vehicles and equipment to replace older heavy-duty diesel vehicles and equipment	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Programs to increase efficiency and reduce GHG emissions at ports and freight terminals, such as vehicle or equipment idle reduction, vessel-speed reduction, equipment electrification, and shore power	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Update building and zoning codes to encourage walkable, bikeable, and transit-oriented development	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Encourage mode shift from private vehicles to walking, biking, and public transportation (e.g., complete streets, bike share programs, bike storage facilities, low-speed electric bicycle subsidies, public transit subsidies)	EPA CPRG Program: Implementation Grants General Competition NOFO
Transportation	Cycling/Walking: improvements to the active transportation network include increased number of bike lanes, cool corridors/walking paths, and e-mobility accessibility.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Transportation	Public Transit: investments in public transit include light rail expansion, bus rapid transit corridors, and transitioning the bus fleet to zero emission, whether battery electric or fuel cell electric.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Transportation	Personal EVs: onroad motor gasoline combustion is the single largest source of GHG emissions comprising 35% of all GHG emissions in Phoenix. Installation of publicly available electric vehicle charging stations, financial incentives for purchase of an EV and charging equipment, or improvements to the electricity grid to manage the additional load would all be beneficial.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Transportation	Expand Low-Carbon Transportation Options and/or Aim to Reduce VMT	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	EVSE Deployment or Network Expansion Goals	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Fleet Electrification Goals or Incentives	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Reduce the Carbon Intensity of Fuels	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Targets for ZEV Adoption and Market Share	Conveners Network State Climate Plan Summaries (June 2023)

Transportation	Equity Strategies or Equity Goals	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Specific Funding Mechanisms for Transportation Investments	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	References or Adopted ACT	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	References or Adopted ACC2	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Explicit VMT-Reduction Targets or Goals	Conveners Network State Climate Plan Summaries (June 2023)
Transportation	Make public transportation available and encourage its use	EPA Local Government Climate and Energy Strategy Series: Transportation Control Measures
Transportation	Encourage bicycling and walking	EPA Local Government Climate and Energy Strategy Series: Transportation Control Measures
Transportation	Expand commuter choices	EPA Local Government Climate and Energy Strategy Series: Transportation Control Measures
Transportation	Develop transportation management improvements	EPA Local Government Climate and Energy Strategy Series: Transportation Control Measures
Transportation	Use value pricing to encourage drivers to factor full cost of transportation into their decisions	EPA Local Government Climate and Energy Strategy Series: Transportation Control Measures
Transportation	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.	City of Phoenix Climate Action Plan (2021)
Transportation	Create a network of multi-use paths along the existing canal network in Phoenix.	City of Phoenix Climate Action Plan (2021)
Transportation	Develop a series of corridors with a strong emphasis on active transportation and connections to high-capacity transit corridors.	City of Phoenix Climate Action Plan (2021)

Transportation	Support the development of communities that prioritize walking, biking, and using transit as part of the city's ongoing Transit Oriented Development efforts.	City of Phoenix Climate Action Plan (2021)
Transportation	All of the city of Phoenix fleet will be fueled by alternative fuels, including electricity.	City of Phoenix Climate Action Plan (2021)
Transportation	Complete construction of the PHX Sky Train®.	City of Phoenix Climate Action Plan (2021)
Transportation	Increase EV Infrastructure development in single-family, multi-family and commercial properties through incentives and building codes.	City of Phoenix Climate Action Plan (2021)
Transportation	Develop community outreach and EV engagement campaign and EV Roadmap Action Plan.	City of Phoenix Climate Action Plan (2021)
Transportation	Implement equity principles into EV policies and programs.	City of Phoenix Climate Action Plan (2021)
Transportation	Increase EV charging infrastructure installations on city managed/owned properties.	City of Phoenix Climate Action Plan (2021)
Transportation	Replace the light-duty municipal internal combustion engine city fleet with EVs where operationally feasible.	City of Phoenix Climate Action Plan (2021)
Transportation	Increase EV adoption by the public to achieve 50% of new car sales to be EV by 2030.	City of Phoenix Climate Action Plan (2021)
Transportation	Install electric vehicle charging stations for nonroad equipment on City of Phoenix Aviation properties.	City of Phoenix Climate Action Plan (2021)
Transportation	Establish a policy that promotes teleworking for city of Phoenix municipal operations.	City of Phoenix Climate Action Plan (2021)
Transportation	Expand bus service network and service hours and introduce new bus rapid transit corridors as part of T2050.	City of Phoenix Climate Action Plan (2021)
Transportation	Increase the number of light rail miles in Phoenix by adding high-capacity corridors across the city as part of T2050.	City of Phoenix Climate Action Plan (2021)
Transportation	Transition to digital communications with residents, where possible, without a decrease in the level of service provided.	City of Phoenix Climate Action Plan (2021)
Transportation	Make job training for city of Phoenix employees available in a digital format.	City of Phoenix Climate Action Plan (2021)

Transportation	Require pedestrian/bicycle access through/adjacent to all open spaces to promote mobility	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Modify the street network to safely include active transportation modes	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Improve the maintenance of the existing trail system (which includes private property)	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Fill in the trail system gaps to increase safety and connectivity	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Replace and widen our existing multi-use path system to address increased usage	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Develop a micro-transit system tailored to community needs	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Ensure adequate resources to maintain and upgrade our transportation network	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Increase frequency of transit service where needed and make necessary regional system connections to reduce automobile use and provide travel options	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Increase the walkability of neighborhoods	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Achieve a Platinum Bicycle Friendly Community designation from the League of American Bicyclists	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Provide more education on bicycle safety	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Use Complete Streets as the framework for the transportation system and eliminating unneeded vehicular lanes	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Provide access to a shared use path within a ¼ mile for all residences	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Double number of EV charging stations to 6005 by 2030	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Develop a financially sustainable plan to replace city fleet vehicles and buses with EVs	City of Scottsdale Sustainability Plan (Draft 2022)

Transportation	Create an EV charging policy and master plan	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Foster program to expand the use of e-bicycles for commute trips	City of Scottsdale Sustainability Plan (Draft 2022)
Transportation	Increase access to healthy transportation options, like active transportation (walking, biking), carpooling, public transit, and next generation mobility, with goal to reduce vehicle miles traveled in single occupant vehicles.	City of Mesa Climate Action Plan (2022)
Transportation	Develop an electric vehicle charging master plan for deployment of charging infrastructure at City sites, such as parks, libraries and rights-of-way, with special attention to neighborhoods where charging infrastructure is not available.	City of Mesa Climate Action Plan (2022)
Transportation	Work collaboratively with the community on strategies that will increase electric vehicle charging infrastructure-ready homes and businesses.	City of Mesa Climate Action Plan (2022)
Transportation	Advocate for access to electric vehicles for low-income people.	City of Mesa Climate Action Plan (2022)
Transportation	Accelerate the installation of infrastructure for electric vehicles and renewable natural gas vehicles.	City of Mesa Climate Action Plan (2022)
Transportation	Enhance comfortable, walkable connections to public facilities, parks, and neighborhood-level services. Promote compact, healthy, livable land use patterns.	City of Mesa Climate Action Plan (2022)
Transportation	Provide transit options and transportation networks, such as electric vehicles charging stations, for longer trips.	City of Mesa Climate Action Plan (2022)
Transportation	Convert gasoline and diesel-powered powered equipment, such as landscaping and construction equipment, to electric or low-emission fuels.	City of Mesa Climate Action Plan (2022)
Transportation	Identify shading strategies for key pedestrian networks, including transit stops.	City of Mesa Climate Action Plan (2022)
Transportation	Reduce the number of unshaded transit stops through the use of trees or structural shade elements.	City of Mesa Climate Action Plan (2022)
Transportation	Municipal Fleet Electrification	American Lung Association Arizona, PCAP Comment Letter to MAG (2024)

Transportation	Expanded EV Infrastructure	American Lung Association Arizona, PCAP Comment Letter to MAG (2024)
Transportation	Transition to Local Government Light-Duty Electric Fleets.	Multi-Organization PCAP Comment Letter to MAG (2024)
Transportation	Transition to Medium -and-Heavy-Duty (MHD) Electric Vehicles	Multi-Organization PCAP Comment Letter to MAG (2024)
Transportation	Provide incentives to lower the upfront cost of light-duty and MHD electric vehicles such as buses, waste management vehicles, cargo and passenger vans, and other large vehicles.	Multi-Organization PCAP Comment Letter to MAG (2024)
Transportation	Coordinate and Accelerate EV Charging Infrastructure.	Multi-Organization PCAP Comment Letter to MAG (2024)
Transportation	Expand Maricopa County’s Mowing Down Pollution Program.	Multi-Organization PCAP Comment Letter to MAG (2024)
Transportation	Electric Vehicle Adoption	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Transportation	Set Ambitious Goals for Municipal EV Adoption in Operations While Expanding Public Charging Infrastructure.	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Transportation	Reduce Passenger Vehicle Miles Traveled	Southwest Energy Efficiency Project, PCAP Comment Letter to MAG (2024)
Transportation	Governor's Aloha+ Challenge	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Alabama Saves	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)

Transportation	Energy Innovation Grant Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Clean Cars 4 All	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	The Carl Moyer Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Idle Free Salt Lake City	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Clean Vehicle Rebate Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Clean Transportation	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Municipal Zero-Emission Vehicle Rebate and Infrastructure Grant	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Low Carbon Fuel Production Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Charge NY	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Seaport and Rail Yard Areas Emission Reduction Program (SPRY)	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)

Transportation	Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Diesel Emissions Reduction Act (DERA)	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Transportation	Transportation Demand Management	City of Tempe Climate Action Plan Update (2022)
Transportation	Mobility Hubs	City of Tempe Climate Action Plan Update (2022)
Transportation	Increase transit frequency on key routes	City of Tempe Climate Action Plan Update (2022)
Transportation	Advocate for regional and federal funding for Bus Rapid Transit (BRT) and Streetcar extension	City of Tempe Climate Action Plan Update (2022)
Waste, Water, and Sustainable Materials Management	Standards and incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use or destruction	EPA CPRG Program: Implementation Grants General Competition NOFO
Waste, Water, and Sustainable Materials Management	Programs and incentives to reduce or divert waste (including food and/or yard waste) through improved production practices, improved collection services, and increased reuse or recycling rates	EPA CPRG Program: Implementation Grants General Competition NOFO
Waste, Water, and Sustainable Materials Management	Programs and incentives to reduce GHG emissions associated with plastics production, use, and waste management	EPA CPRG Program: Implementation Grants General Competition NOFO

Waste, Water, and Sustainable Materials Management	Programs to expand composting and bio-digestion infrastructure to reduce GHG emissions and increase beneficial use of organic waste	EPA CPRG Program: Implementation Grants General Competition NOFO
Waste, Water, and Sustainable Materials Management	Policies and programs to reduce construction and demolition waste through building reuse, deconstruction, and material diversion and reuse	EPA CPRG Program: Implementation Grants General Competition NOFO
Waste, Water, and Sustainable Materials Management	Installation of renewable energy and energy efficiency measures at wastewater treatment facilities	EPA CPRG Program: Implementation Grants General Competition NOFO
Waste, Water, and Sustainable Materials Management	Biogas Capture: capture of landfill gas or wastewater plant emissions, like at the 91st Ave WWTP, will be necessary to be able to meet net-zero goals in the future.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Waste, Water, and Sustainable Materials Management	Waste Diversion: composting and recycling of plastics and metals leading to decreased emissions from the landfill.	City of Phoenix: Top GHG Reduction Opportunities Estimated Using C40 Cities Pathways
Waste, Water, and Sustainable Materials Management	Increase recycling, composting, and waste diversion	Conveners Network State Climate Plan Summaries (June 2023)

Waste, Water, and Sustainable Materials Management	Optimize energy-recovery from landfills/wastewater	Conveners Network State Climate Plan Summaries (June 2023)
Waste, Water, and Sustainable Materials Management	Increase renewable natural gas production and incentivize markets	Conveners Network State Climate Plan Summaries (June 2023)
Waste, Water, and Sustainable Materials Management	Install solar energy generation systems at landfills.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Install solar energy generation systems at water and wastewater treatment plants.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	The majority of new garbage trucks will be replaced with cleaner burning options such as compressed natural gas (CNG) or electric as they become available.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Reuse recycled asphalt in street pavement pilot program	City of Phoenix Climate Action Plan (2021)

Waste, Water, and Sustainable Materials Management	Continue to identify and collect waste materials to recycle	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Continue to implement reuse programs to eliminate waste by reusing items previously identified as waste.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Continue to implement waste reduction programs at the two material recovery facilities, including a composting facility that recovers organic waste.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Use the Adaptive Reuse Program to continue to assist with streamlining the process and steps required to repurpose existing buildings for new business uses.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Capture and reuse methane as vehicle fuel as part of the Landfill Gas Recovery Project at SR-85 Landfill.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Continue to utilize methane capture systems on active and decommissioned landfills to oxidize methane that is produced to reduce GHG emissions potential.	City of Phoenix Climate Action Plan (2021)

Waste, Water, and Sustainable Materials Management	Continue to utilize methane capture systems on active and decommissioned landfills to oxidize methane that is produced to reduce GHG emissions potential.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Increase organic diversion from the landfill.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Increase the number of existing buildings that are repurposed instead of demolished.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Continue using vegetable-based inks that are formulated to reduce solvents.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Use digital communication or recycled paper when possible.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Update Sustainable Purchasing Policy to be applicable city-wide in future city contracts.	City of Phoenix Climate Action Plan (2021)

Waste, Water, and Sustainable Materials Management	Increase the cleanup and redevelopment of brownfields in the Rio Reimagined Project area.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	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.	City of Phoenix Climate Action Plan (2021)
Waste, Water, and Sustainable Materials Management	Achieve 100% automated metering water infrastructure across the city	City of Scottsdale Sustainability Plan (Draft 2022)
Waste, Water, and Sustainable Materials Management	Remove non-functional/non-recreational turf at city facilities	City of Scottsdale Sustainability Plan (Draft 2022)
Waste, Water, and Sustainable Materials Management	Incentivize turf removal and improvements to irrigation equipment	City of Scottsdale Sustainability Plan (Draft 2022)
Waste, Water, and Sustainable Materials Management	Retrofit all municipal irrigation systems to smart controllers	City of Scottsdale Sustainability Plan (Draft 2022)

Waste, Water, and Sustainable Materials Management	Collaborate with designers, engineers and contractors to use alternative materials and coatings hold less heat and that more effectively dissipate heat.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Promote the use of green infrastructure and stormwater management.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Install efficient fixtures and equipment.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Install efficient fixtures and equipment.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Enhance incentives for customers to use water efficiently outdoors.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Provide water customers with detailed information about planting, caring for and the value of desert-adapted trees and landscaping. Encourage limiting grass to areas that have recreational value.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Conduct audits, install leak detection and replace water cooled equipment with efficient air-cooled equipment.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Collaborate with utilities and the community to develop a water use efficiency performance program, including incentives, so that less efficient users understand how to make periodic, cost-effective, incremental water efficiency improvements, indoors and out.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Encourage the use of rainwater in the landscape areas by implementing green infrastructure and low impact development strategies that use rainwater on-site to reduce potable water use, reduce urban heat affect and improve air quality.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Look for opportunities in new City projects, parks, roads and buildings, as illustrated in the Low Impact Development Toolkit and the Greater Phoenix Green Infrastructure and Low Impact Development Details for Alternative Stormwater Management.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Reduce stormwater pollution by installing stormwater quality retrofit pilot projects on three City sites. Coordinate flood control with water quality projects.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Invest in resilient water infrastructure projects to maintain resilient water supplies.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Implement strategies and infrastructure that optimize reuse and underground water storage.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Replace chemicals and materials identified as GHG and VOC emitters with alternatives in construction, maintenance, and operations.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Select products with low supply chain emissions.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Purchase products sourced locally.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Implement mindful purchasing for capital projects, maintenance projects and standard operations.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Expand options for reuse and recovery of hard to recycle materials.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Develop initiatives that support a circular economy framework and engage the community on upstream solutions to reduce waste.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Reuse, repair, refurbish, repurpose equipment and materials whenever possible and look into alternative markets for reuse.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Strategically set up waste stream systems that beneficially use waste that is not reusable or recyclable to create power from waste.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Reduce waste by converting heavy duty fleet and CNG powered vehicles to low-emission, renewable natural gas vehicles.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Work with local organizations to support local businesses that have similar goals.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Use the Recycle Right Wizard search tool available at MesaRecycles.org and on the MesaNow app.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Expand education and outreach for sustainable purchasing guidelines.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Increase long-term landfill sustainability.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Advance multi-family and commercial recycling.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Turn waste into a resource and promote upstream solutions to reduce waste.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Support low-carbon food production, distribution, and ecosystems. In addition to mitigating climate impacts, this strategy will support biodiversity.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Support sustainable urban growth that includes equitable access to local food systems.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Support a strong community network of successful and culturally diverse businesses that produce, process, cook, transport, and sell foods with the goal of preventing food loss and waste.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Optimize waste operations that create energy and compost from waste.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Incorporate sustainable growth, agriculture, food processing and distribution into existing and future economic development initiatives.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Encourage backyard gardens and urban gardens (for personal use or business).	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Support sustainable urban growth that includes equitable access to local food systems.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Support a strong community network of successful and culturally diverse businesses that produce, process, cook, transport, and sell foods with the goal of preventing food loss and waste.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Encourage farmers markets, promote local gardening and sales.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Build local food purchases into procurement policies.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Partner with local organizations such as Local First Arizona, to provide technical assistance to business owners.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Provide economic development support for local food businesses.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Identify “food deserts” in Mesa, map available parcels, work with nonprofits, and remove barriers to filling the gaps.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Limit food waste by removing obstacles for efficient systems, partner with food banks and grocery stores.	City of Mesa Climate Action Plan (2022)

Waste, Water, and Sustainable Materials Management	Optimize waste operations that create energy and compost from waste. Lead by example - Food Waste to Energy project.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Work with Phoenix Metro partners to determine which reduction actions will reduce GHG emissions from the production, processing and delivery of food.	City of Mesa Climate Action Plan (2022)
Waste, Water, and Sustainable Materials Management	Organic Waste Bans	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Food Donation Requirements	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Mandatory Reporting Laws	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Disposal Surcharge Fees	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)

Waste, Water, and Sustainable Materials Management	Liability Protections for Food Donation	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Tax Incentives for Food Donation	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Food Safety Guidance for Food Donation	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Permitting and Zoning for Composting and Anaerobic Digestion Facilities	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Recycling Food Scraps into Animal Feed	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Compost Procurement	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)

Waste, Water, and Sustainable Materials Management	Incentivize Compost Application	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Date Labeling	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Food Waste Reduction in K-12 Schools	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Climate and Solid Waste Plans	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Government Support for Food Waste Reduction	Zero Food Waste Coalition, State Policy Toolkit, PCAP Comment Letter to MAG (2023)
Waste, Water, and Sustainable Materials Management	Food Production Investment Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)

Waste, Water, and Sustainable Materials Management	Greenhouse Gas Reduction Loan Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Waste, Water, and Sustainable Materials Management	Water Energy Grant Program	Maricopa County Air Quality Department, Examples of Emission Reduction Programs (2023)
Waste, Water, and Sustainable Materials Management	Green Codes and Standards (GSI Adoption)	City of Tempe Climate Action Plan Update (2022)

Maricopa-Pinal County Region GHG Emission Reduction Measures for Public Feedback

Transportation Sector

Emission Source Examples

Passenger cars, long-haul trucks, short-haul trucks, locomotives, and aircraft emissions.

Emission Reduction Opportunities

Zero Emission Vehicle Incentives (Residential & Commercial Fleets) This measure incentivizes the transition from fossil fuel powered vehicles to zero emission vehicles. Rebates, grants, or other incentives could be offered to residents or commercial entities to purchase zero emission vehicles.
EV Charging Infrastructure Incentives (Residential & Commercial) This measure incentivizes the installation of EV charging infrastructure. Rebates, grants, or other incentives could be offered to residents or commercial entities for the installation of EV chargers.
Public Fleet Electrification This measure funds the transition of public fleets from fossil fuel powered vehicles to electric vehicles. An implementation example could be the conversion of municipal heavy-duty bus fleets or light-duty service vehicles to electric vehicles.
Public Charging and Fueling Infrastructure Deployment This measure funds the installation of public charging and fueling infrastructure. An implementation example could be the installation of EV chargers and alternative fuel stations for public use.
Active Transportation Network Infrastructure Investments This measure funds active transportation network upgrades. Active transportation is walking, bicycling, using small-wheeled vehicles, or a mobility device. Implementation examples include increasing the number of bike lanes, expanding cool corridors/walking paths, and increasing e-mobility accessibility.
Transportation Demand Management This measure funds programs to expand or inform traveler choices. Examples of TDM include rideshare, vanpools, senior shuttles, transit pass subsidies, and remote/hybrid work schedules, and land use zoning.
Electrification of Lawn and Garden Equipment (Residential and Commercial) This measure funds programs to electrify lawn and garden equipment. An implementation example is to provide incentives for replacing gasoline powered residential and commercial lawn and garden equipment with electric equipment.

Industrial Sector

Emission Source Examples

Construction equipment, emergency generators, cement production, and iron & steel production.

Emission Reduction Opportunities

Energy Efficiency Incentives (Industrial) This measure supports or incentivizes implementation of energy efficiency measures in industry. Implementation examples include waste heat utilization, energy audits, and equipment upgrades.
Energy Use Reductions and Improvements to Industrial Processes This measure supports or incentivizes GHG emission reductions through reduced energy use and improved industrial processes. Implementation examples include electrification of equipment, use of low carbon fuels, and use of renewable energy.
Clean Energy Hub This measure funds the establishment of a clean energy hub within the region. A clean energy hub is a typically a community-based organization with experience in clean energy, energy efficiency, and workforce and economic development. Clean energy hubs typically support residents, businesses and communities and ensure they have access to clean energy resources and jobs.

Buildings Sector

Emission Source Examples

Combustion of fossil fuels for heating/cooking, organic waste sent to landfills, wastewater sent to water treatment facilities, and refrigerant leaks.

Emission Reduction Opportunities

Adoption of Green Energy Code (Residential and Commercial) This measure funds the adoption of the latest building energy codes for residential and commercial buildings at the municipal level. Measure would apply to new construction builds.
Voluntary Building Performance Standards and Incentives This measure supports or incentivizes GHG emission reductions through the establishment of voluntary building performance standards. Implementation examples include rebates, grants or funding schemes to meet or exceed the voluntary building performance standard.
Weatherization Assistance Programs (Residential and Commercial) This measure funds residential and commercial building weatherization projects and energy audits. Implementation examples include free or subsidized access to home energy audits and free or subsidized access to weatherization upgrades (e.g., window sunscreens, insulation, air duct sealing).
Energy Efficient Building Product Incentives (Residential and Commercial) This measure funds the replacement of inefficient building products with certified energy-efficient products. Implementation examples include rebates, grants, or funding schemes to replace appliances, heating and cooling equipment, lighting, and building products with certified energy efficient products.
Refrigerant Recovery Programs (Residential and Commercial) This measure supports or incentivizes the recovery and destruction of refrigerants used in residential and commercial building products. Implementation examples include the development of a refrigerant management program or incentives for registration, monitoring, and repair/replacement of leaking refrigerant products.
Electrification of Municipal, Commercial, and Residential Buildings This measure supports or incentivizes the conversion of fossil fueled building equipment to electric equipment. Implementation examples include rebates, grants, or funding schemes to replace gas furnaces or boilers with electric heat pump HVAC systems.

Natural and Working Lands Sector

Emission Source Examples

Fertilizer application for crop production, livestock production, fossil fuel powered agricultural equipment, stormwater runoff, and agricultural burns.

Emission Reduction Opportunities

Electrification of Agricultural Equipment This measure supports or funds the electrification of fossil fuel powered agricultural equipment. Implementation examples include electrifying tractors, farm vehicles, and irrigation/fertilizer/spraying systems.
Improvements to Fertilizer Technologies and Techniques This measure supports or funds the reduction of GHG emissions from fertilizer application. Implementation examples include programs to support fertilizer demand reduction efforts through support and incentives.
Urban Afforestation/Increase Tree Canopy Cover This measure supports or funds urban afforestation programs and projects. Implementation examples include programs to increase municipal tree canopy cover or programs that incentivize the planting of shade trees for residential and commercial buildings.
Green Stormwater Infrastructure This measure funds programs or projects to boost green stormwater infrastructure (e.g., infrastructure that handles stormwater runoff). Implementation examples include the deployment of permeable pavement technologies, rainwater harvesting systems, and the protection of green spaces. These measures reduce GHG emissions from wastewater treatment facilities and rainwater pumps.
Protection of Natural and Working Lands This measure funds programs or projects to protect, enhance, or restore natural and working lands. Implementation examples include grants to support local agriculture, restoration of brownfields to enhance carbon sequestration, and protection of sensitive ecosystems.

Waste and Water Sector

Emission Source Examples

Landfills, waste collection, wastewater treatment facilities, and building construction/demolition.

Emission Reduction Opportunities

Programs for Recycling, Composting, and Food/Yard Waste Diversion This measure supports the implementation or expansion of recycling, composting and food/yard waste diversion programs. An implementation example is the deployment of free or subsidized curbside green waste (e.g., grass clippings, twigs, shrubs) containers.
Programs for Repair, Reuse and Repurposing of Materials This measure supports materials reuse and waste reduction, reducing energy use for manufacture, transportation and disposal of material. Implementation examples include funding a regional reuse center with a workforce development focus, funding programs that repair, reuse, and repurpose items, and programs to support organizations to design materials so they can be recycled and repurposed.
Biogas Capture from Landfills and Wastewater Treatment Plants This measure supports the collection of biogas from landfills and wastewater treatment plants. An implementation example is the collection of biogas from a municipal landfill for flaring or energy production.
Renewable Energy and Energy Efficiency at Wastewater Treatment Plants This measure supports the deployment of renewable energy generation systems and energy efficiency upgrades at wastewater treatment plants. Implementation examples include the deployment of solar energy generation systems or electrification of sludge transportation vehicles.
Renewable Energy Generation at Landfills This measure funds the deployment of renewable energy generation systems at landfills. An implementation example is the installation of a solar energy generation system at a municipal landfill.

Electric Power Sector

Emission Source Examples

Combustion of coal, natural gas, and oil for electricity generation, transmission, and distribution purposes.

Emission Reduction Opportunities

Procurement of Renewable Energy for Municipal Operations This measure supports the procurement of renewable electricity for municipal operations. An implementation example is joining a utility green power purchasing program for municipal energy usage.
Energy Efficiency Upgrades for Municipal Operations This measure supports the deployment of energy efficiency upgrades for municipal operations. An implementation example is the replacement of inefficient lighting with LEDs at public parks.
Development of Microgrids This measure supports, funds, or incentivizes the development of renewable energy microgrids at the local and community levels. An implementation example is the development of a renewable energy microgrid to provide power to community housing developments.
Renewable Energy Generation at Municipal Facilities This measure funds the deployment of renewable energy generation systems at municipal facilities. An implementation example is the installation of solar energy generation systems and energy storage systems at municipal facilities.
Renewable Energy Generation Incentives (Residential and Commercial) This measure supports and incentivizes the deployment of renewable energy generation systems at residential and commercial facilities. An implementation example is the development of a residential rebate program for the installation of solar energy generation systems.

Example GHG Emission Reduction Measure Quantification Methods

Table 37: GHG Emission Reduction Measure Quantification for the Maricopa-Pinal County Region

Emission Reduction Option[25]	Source Sector	Description	GHG Emission Reduction ($MTCO_2$)[26]	Criteria Emission Reduction (Metric Tons)	Source
Light Duty Vehicle (LDV) (Gasoline) to LDV Electric Vehicle (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	58.7	0.65	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
Light Duty Truck (LDT) (Gasoline) to LDT (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	74.6	0.63	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.

[25] MAG was unable to obtain quantitative data related to the amount of air toxics reduced by potential emission reduction measures. MAG will continue to work with EPA and the local community to identify sources of air toxic emission reduction estimates for the CPRG CCAP.

[26] Provided emission reduction values are subject to uncertainty based on the particular model or set of parameters used to generate the estimate. These estimates primarily rely upon federal tools and resources. Where possible, model and tool assumptions have been provided and are focused on Arizona specific parameters. In addition, multiple values for the same type of measures have been provided based on different tools or datasets. These represent the range of uncertainty and exact values will depend on project specific parameters. Eligible entities wishing to use these values should review the parameters described and compare estimates from different models where appropriate.

Buses (Gasoline) to Buses (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	281.1	5.06	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
Heavy Duty Vehicle (HDV) (Gasoline) to HDV (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	179.4	1.22	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
LDV (Diesel) to LDV (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	65.9	0.87	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
LDT (Diesel) to LDT (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	102.0	0.57	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.

Buses (Diesel) to Buses (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	260.1	1.10	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
HDV (Diesel) to HDV (EV)	Transportation	Benefits of purchasing EV versus gasoline vehicle. Assume 2024 fuel economy, 11,500 MPY, and 15-year usage.	243.4	0.76	U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Estimated U.S. Average Vehicle Emissions Rates per Vehicle-by-Vehicle Type Using Gasoline and Diesel, Table 4-43.
Level 2 Electric Vehicle Supply Equipment (EVSE) (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	2.5	0.01	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
DC Fast Charge (DCFC) EVSE (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	10.8	0.06	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Hydrogen Fueling Infrastructure (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	118.4	1.18	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.

Propane Fueling Infrastructure (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	-1.3	-0.23	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Compressed Natural Gas (CNG) Fueling Infrastructure (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	91.9	-10.74	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
LNG Fueling Infrastructure (Low Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	25.7	-4.76	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Level 2 EVSE (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	5.0	0.03	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
DCFC EVSE (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	23.2	0.13	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Hydrogen Fueling Infrastructure (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	236.9	2.35	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.

Propane Fueling Infrastructure (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	-2.6	-0.46	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
CNG Fueling Infrastructure (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	183.8	-21.48	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
LNG Fueling Infrastructure (Moderate Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	51.4	-9.51	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Level 2 EVSE (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	8.3	0.05	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
DCFC EVSE (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	43.1	0.24	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Hydrogen Fueling Infrastructure (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	473.7	4.71	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.

Propane Fueling Infrastructure (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	-5.1	-0.93	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
CNG Fueling Infrastructure (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	367.6	-42.95	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
LNG Fueling Infrastructure (High Utilization)	Transportation	Annual emission reductions from installation of charging and fueling infrastructure (1 unit). Arizona parameters.	102.9	-19.03	U.S Department of Energy, Argonne National Laboratory, AFLEET Charging and Fueling Infrastructure Emissions Tool. Version 1.1 released 4/3/2023.
Electric School Bus Deployment	Transportation	Annual emission reductions from deployment of one EV school bus. EV year is "2023", ICE replace is "New". Location of EV Deployment is "Arizona".	30.7	0.03	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition
Electric Transit Bus Deployment	Transportation	Annual emission reductions from deployment of one EV transit bus. EV year is "2023", ICE replace is "New". Location of EV Deployment is "Arizona".	163.7	0.20	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition

Distributed Rooftop Solar (PV) Deployment	Buildings; Electric Power	Annual emissions change from 1 MW of distributed rooftop solar (Photovoltaic). Arizona.	1062.5	0.72	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition
Utility Solar (PV) Deployment	Electric Power	Annual emissions change from 1 MW of utility solar (Photovoltaic). Arizona.	1257.4	0.85	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition
Industrial Energy Efficiency	Industrial; Electric Power	Annual emissions change from 1 GWh of industrial energy efficiency (evenly spread throughout year). Arizona.	5.2	0.00	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition
Onshore Wind Deployment	Buildings; Electric Power	Annual emissions change from 1 MW of onshore wind deployment. Arizona.	1296.4	0.81	U.S. EPA, Avoided Emissions and Generation Tool (AVERT) Web Edition, Accessed January 2024. https://www.epa.gov/avert/avert-web-edition
Landfill Natural Gas Electricity Generation Project	Waste and Water; Electric Power	Annual emissions reductions from an LNG electricity generation project. 3 MW size. (Methane and CO_2)	34700.0	N/A	U.S. EPA, Local Government Climate and Energy Strategy Series, Landfill Gas Energy, 2012.
Direct Use Landfill Natural Gas Energy Project	Waste and Water; Electric Power	Annual emissions reductions from a direct use LNG energy project. 1,000 scfm. (Methane and CO_2)	32300.0	N/A	U.S. EPA, Local Government Climate and Energy Strategy Series, Landfill Gas Energy, 2012.

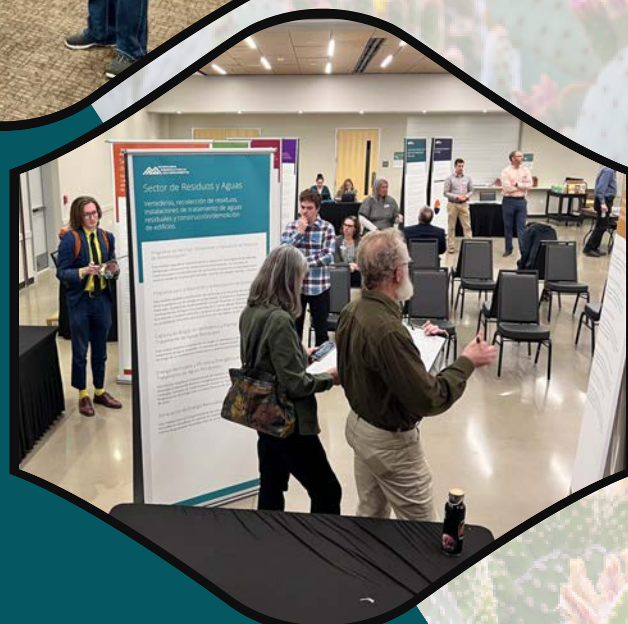
Weatherization Assistance Program	Buildings	Annual CO_2 emission reduction per weatherized home.	1.0	N/A	U.S. DOE, Weatherization Assistance Program factsheet. https://www1.eere.energy.gov/wip/pdfs/wap_factsheet.pdf
Replace Gasoline Vehicle with EV Vehicle	Transportation	Annual CO_2e emission difference between vehicle type. Assumptions are Arizona, 11,579 VMT, 2022 electricity fuel mix.	10445.0	N/A	U.S. Department of Energy, Alternative Fuels Data Center, Electricity Sources and Fuel-Cycle Emissions Tool, 2024.
Replace Gasoline Vehicle with Plug-in-Hybrid Vehicle	Transportation	Annual CO_2e emission difference between vehicle type. Assumptions are Arizona, 11,579 VMT, 2022 electricity fuel mix.	8217.0	N/A	U.S. Department of Energy, Alternative Fuels Data Center, Electricity Sources and Fuel-Cycle Emissions Tool, 2024.
Replace Gasoline Vehicle with Hybrid Vehicle	Transportation	Annual CO_2e emission difference between vehicle type. Assumptions are Arizona, 11,579 VMT, 2022 electricity fuel mix.	5696.0	N/A	U.S. Department of Energy, Alternative Fuels Data Center, Electricity Sources and Fuel-Cycle Emissions Tool, 2024.
Plant an urban tree	Community Forestry	Metric tons of CO_2 per urban tree planted (over 10 years).	0.06	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Number of urban tree seedlings grown for 10 years. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

Energy efficiency upgrade	Buildings; Electric Power	Emission reduction from electricity reduction per MWh. Assumption is U.S. National weighted CO_2 marginal emission rate, 2019 data.	0.7	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Electricity reductions (kilowatt-hours) https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Gasoline Use Reduction	Transportation	Emission reduction from reductions in gasoline use. Units in $MTCO_2$/gallon.	8.89E-03	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Gallons of gasoline consumed. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Diesel Use Reduction	Transportation	Emission reduction from reductions in diesel use. Units in $MTCO_2$/gallon.	1.02E-02	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Gallons of diesel consumed. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

Gasoline-powered passenger vehicles per year	Transportation	Annual $MTCO_2e$ reduced from replacement of gasoline powered passenger car. 2020 Fuel economy, 11520 VMT.	4.5	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Gasoline-powered passenger vehicles per year. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Passenger Vehicle VMT Reduction	Transportation	Emission reduction in $MTCO_2e$/mile. 2020 combined fuel economy of 22.9 mpg for LDV and LDT.	3.90E-04	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Miles driven by the average gasoline-powered passenger vehicle. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Switching incandescent bulbs to LED bulbs	Buildings	Energy reductions in $MTCO_2e$/bulb replaced. Assume 43 watt incandescent to 9w LED, 3 hours per day use, 365 days per year. 47.1 kWh per year per incandescent, 9,9 kWh per LED per year.	2.64E-02	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Number of incandescent bulbs switched to light-emitting diode bulbs. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

Landfill Diversion	Waste and Water	Emission reduction from waste recycled instead of landfilled. Per short ton diverted.	2.9	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Tons of waste recycled instead of landfilled. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.
Wind Turbine	Electric Power	Per wind turbine installed. National averages. MTCO2/year/wind turbine installed. 1.82 MW wind turbine size.	3596.0	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Number of wind turbines running for a year. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.
Landfill Diversion	Waste and Water	Emission reduction from waste recycled instead of landfilled. Per 25-gallon trash bag diverted.	2.31E-02	N/A	U.S. EPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Trash bags of waste recycled instead of landfilled. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

Composting Organic Waste	Waste and Water	Avoided methane emissions from not landfilling the waste plus the avoided GHG emissions associated with fertilizer production minus the compost fugitive emissions. $MTCO_2e$/short ton of mixed organic waste.	0.3	N/A	California Air Resource Board. Calculation of the Lifecycle Greenhouse Gas Emissions Reduction Benchmark for the Organic Waste Reductions Regulation. January 2022. https://ww2.arb.ca.gov/sites/default/files/2022-01/Benchmark-Calculation.pdf



MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix B: CPRG Open Houses for Maricopa and Pinal Counties

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

MARICOPA ASSOCIATION OF GOVERNMENTS

MAG Climate Pollution Reduction Grants (CPRG) & Priority Climate Action Plan (PCAP)

PHASE ONE: WRAP-UP REPORT

Overview

The Maricopa Association of Governments (MAG) has been chosen to participate in the EPA's Climate Pollution Reduction Grants (CPRG) program and lead the process of creating and implementing a regional plan to reduce greenhouse gas emissions and other air pollutants, including ozone.

The EPA's CPRG program provides $5 billion for states, local governments, tribes, and territories to compete for funds to tackle climate pollution and deliver cleaner air.

Phase One of this project focused on engaging key stakeholders and a fully represented civilian population in providing feedback regarding what matters most when creating a climate plan.

Priority issues expressed in Phase One will be compiled and can be used by eligible entities as the basis for submitting specific grant requests to the EPA.

This report outlines those efforts.

Initiatives

- Town Halls
- Hybrid Online Event
- Awareness & Promotion
- Information Management

Town Hall Meetings

In order to solicit community feedback across a fully represented civilian population, MAG consulted the Climate & Economic Justice Screening Tool (CEJST) to identify low-income and disadvantaged communities (LIDAC) within the Phoenix-Mesa-Chandler metropolitan statistical area (MSA). From this consultation, MAG selected four locations across the MSA to hold public CPRG PCAP town hall events in alignment with the federal Justice40 initiative:

- West Valley - Glendale Civic Center - Monday 12/4 from 6pm - 7:30pm
- South Phoenix - Cesar Chavez Community Center - Monday 12/11 from 6pm - 7:30pm
- Eloy - Eloy City Hall - Wednesday, 12/13 from 5pm - 7:30pm

- East Valley - Mesa Community College - Saturday, 12/16 from 10am - 11:30am

Awareness & Promotion

The series of Town Hall Meetings were promoted via a combination of door hangers in key zip codes surrounding the event location, social media posts, outreach to community partners and partner newsletters and their social media outlets. In addition, MAG developed bilingual social media toolkits for the public town hall events which provided public information officers and community leaders with example text and graphics for community outreach.

Goal of the Door Hanger

- Inform people about the MAG Climate Pollution Reduction Grants (CPRG) program and the Priority Climate Action Plan (PCAP) for the Phoenix-Mesa-Chandler MSA.
- Let community residents know the importance of their feedback/ priorities.
- Invite community residents to the Town Hall events to learn more and share their priorities.
- Drive people to the landing page for specific event location and general information about the initiative.

The zip codes for the door hangers were chosen to align with the Town Hall locations, focusing on CEJST LIDACs. This was to ensure participation and equal opportunity.

A total of 5,000 door hangers were distributed in the following zip codes:

Glendale Civic Center	Mesa Community College	Eloy City Hall	Cesar Chavez Center
85035	85201	85141	85040
85033	85281	85131	85009
85017	85210	85123	85339
85015	85202	85193	85034
85301	85256	—	85007

Town Hall Events Overview

Each Town Hall event included eight pop-up banners representing a summary of the Climate Pollution Reduction Grant (CPRG) program, greenhouse gas (GHG) emission inventory information, and example CPRG funding opportunities broken down into key emission source sectors. An example of the banners can be found in Attachment A to this appendix (Appendix B).

Individual Event Highlights

1. Glendale Civic Center

- Address: 5750 West Glenn Drive, Glendale, AZ 85301
- Date: Monday, December 4, 2023
- Time: 6pm - 7:30pm
- Participants: 11
- Spanish-speaking participants: 0
- Key zip codes: 85353, 85021, 85025, 85379, 85018, 85033, 85233, 85303, 85037, 85375
- Written feedback: 11
- Audio comments: 3

Overall Priorities Expressed by Guests

1. Establishing energy-efficient public transport options with routes servicing unincorporated areas.
2. Increase urban afforestation and awareness about recycle and repair options to reduce waste.
3. Providing infrastructure for charging electric vehicles in convenient locations, creating attractive options for personal vehicles.

2. Cesar Chavez Community Center

- Address: 7858 South 35th Avenue, Laveen Village, AZ 85339
- Date: Monday, December 11, 2023
- Time: 6pm - 7:30pm
- Participants: 10
- Spanish-speaking participants: 1
- Key zip codes represented: 85018, 85282, 85007, 85041, 85004, 85339.
- Written feedback: 7
- Audio comments: 5 (one in Spanish)

Overall Priorities Expressed by Guests

1. Modernize agricultural practices and increase sustainable agriculture education to minimize environmental impact.
2. Expand carbon-neutral transportation networks with accessible EV charging stations and improved public transit.
3. Implement mandatory green building codes and initiate a countywide composting program to minimize waste and emissions.

3. Eloy City Hall Highlights

- Address: 595 C Street, Suite 101, Eloy, AZ 85131
- Date: Wednesday, December 13, 2020
- Time: 5pm - 7:30pm
- Participants: 10
- Spanish-speaking participants: 0
- Key zip codes represented: 85210, 85122, 85131.
- Written feedback: 7
- Audio comments: 3

Overall Priorities Expressed by Guests

1. Invest in hybrid vehicle charging infrastructure by expanding hybrid vehicle charging facilities in Arizona to foster sustainable transportation.
2. Enhance waste management systems to mitigate odors and emissions and explore business opportunities in methane repurposing.
3. Modernize the power grid, incentivize residential solar panel installation, and implement environmental investments for a healthier ecosystem and climate impact mitigation.

4. Mesa Community College Highlights

- Address: 1833 West Southern Avenue, Mesa, AZ 85202
- Date: Saturday, December 16, 2023
- Time: 10am - 11:30am
- Participants: 21
- Spanish-speaking participants: 0
- Key zip codes represented: 85225, 85142, 85203, 85087, 85147, 85260, 85268, 85207, 85016, 85034, 85201, 85282, 85022, 85281, 85255.
- Written feedback: 17
- Audio comments: 6

Overall Priorities Expressed by Guests

1. Emphasize the development of programs that lower building emissions, with a special focus on expanding weatherization assistance to help residents across different income levels decrease their energy consumption and environmental impact.
2. Accelerate the transition to electrified transportation, including public vehicle fleets and charging infrastructure, and promote the electrification of lawn and garden equipment to reduce overall pollution levels.
3. Implement a statewide composting initiative to address methane emissions and establish community resilience hubs to ensure safety during extreme weather events and grid outages.

Virtual Open House Online Event

In addition to the in-person event, MAG also hosted an Online Open House utilizing the platform Typeform. A link to the results can be found here. The information replicated that of the in-person meetings and gave participants the same opportunity to identify their key priorities.

Results: 1,072 views, 516 starts and 275 submissions (53.3% completion rate).

Information Management

The key to successful Town Hall sessions was transparent communication in both English and Spanish in order to solicit and facilitate actionable public opinion.

Through the use of eight pop-up banners, MAG provided an overview of the EPA's Climate Pollution Reduction Grant (CPRG) program and how MAG has been engaged to take the lead in creating and implementing a regional plan to reduce greenhouse gas emissions and other air pollutants.

Text on the pop-up banners was presented in both English and Spanish, showcasing the six key sectors the program could impact. The banners were placed strategically at six “stations” around the room, facilitating ease of navigation and collaboration with the MAG staff members and a Spanish facilitator to address any questions or concerns.

Finally, participants were encouraged to leave audio comments, questions or concerns at the last station.

The following are the six Key Sectors and potential areas of focus along with the cumulative priorities across in-person and online ballots:

Transportation Sector:	**Priorities**
- Zero Emission Vehicle Incentives Residential & Commercial Fleets	2
- EV Charging Infrastructure Incentives Residential & Commercial	
- Public Fleet Electrification	3
- Public Charging and Fueling Infrastructure Deployment	
- Active Transportation Network Infrastructure Investments	1
- Transportation Demand Management	
- Electrification of Lawn and Garden Equipment Residential & Commercial	
Industrial Sector:	
- Energy Efficiency Incentives Industrial	
- Energy Use Reductions and Improvements to Industrial Processes	
- Clean Energy Hub	1
Building Sector:	
- Adoption of Green Energy Code Residential and Commercial	2
- Voluntary Building Performance Standards and Incentives	
- Weatherization Assistance Programs Residential and Commercial	1
- Energy Efficient Building Product Incentives Residential and Commercial	3
- Refrigerant Recovery Programs Residential and Commercial	
- Electrification of Municipal, Commercial, and Residential Buildings	
Natural and Working Lands Sector:	
- Electrification of Agricultural Equipment	
- Improvements to Fertilizer Technologies and Techniques	
- Urban Afforestation/Increase Tree Canopy Cover	1
- Green Stormwater Infrastructure	
- Protection of Natural and Working Lands	2
Waste and Water Sector:	
- Programs for Recycling, Composting, and Food/Yard Waste Diversion	1
- Programs for Repair, Reuse, and Repurposing of Materials	2

- Biogas Capture from Landfills and Wastewater Treatment Plants
- Renewable Energy and Energy Efficiency at Wastewater Treatment Plants
- Renewable Energy Generation at Landfills

Electric Power Sector:

- Procurement of Renewable Energy for Municipal Operations
- Energy Efficiency Upgrades for Municipal Operations
- Development of Microgrids 2
- Renewable Energy Generation at Municipal Facilities
- Renewable Energy Generation Incentives Residential and Commercial 1

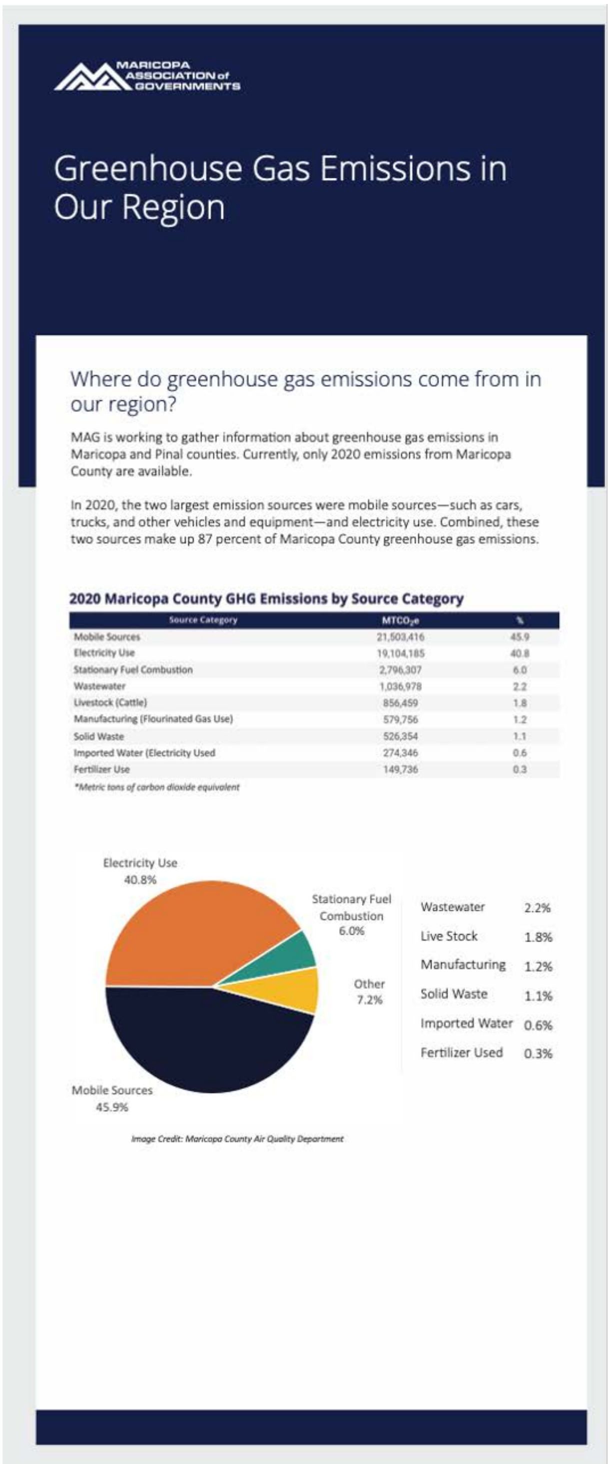
Attachment A

1. Door Hanger
2. Banners
3. Event Summaries
4. Individual Sessions and Online Session by Date and Zip Code

Door Hanger

A link to the door hanger can be found here.

Banners



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Greenhouse Gas Emissions in Our Region

Where do greenhouse gas emissions come from in our region?

MAG is working to gather information about greenhouse gas emissions in Maricopa and Pinal counties. Currently, only 2020 emissions from Maricopa County are available.

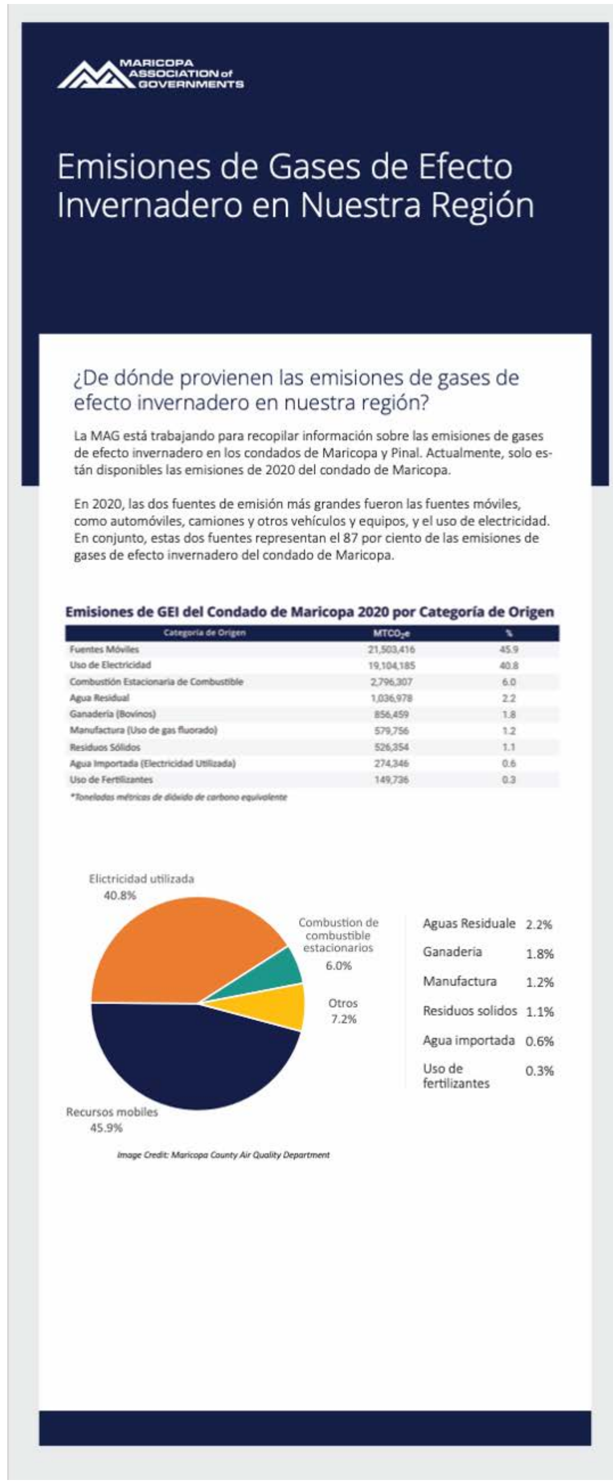
In 2020, the two largest emission sources were mobile sources—such as cars, trucks, and other vehicles and equipment—and electricity use. Combined, these two sources make up 87 percent of Maricopa County greenhouse gas emissions.

2020 Maricopa County GHG Emissions by Source Category

Source Category	$MTCO_2e$	%
Mobile Sources	21,503,416	45.9
Electricity Use	19,104,185	40.8
Stationary Fuel Combustion	2,796,307	6.0
Wastewater	1,036,978	2.2
Livestock (Cattle)	856,459	1.8
Manufacturing (Flourinated Gas Use)	579,756	1.2
Solid Waste	526,354	1.1
Imported Water (Electricity Used	274,346	0.6
Fertilizer Use	149,736	0.3

**Metric tons of carbon dioxide equivalent*

Image Credit: Maricopa County Air Quality Department



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Emisiones de Gases de Efecto Invernadero en Nuestra Región

¿De dónde provienen las emisiones de gases de efecto invernadero en nuestra región?

La MAG está trabajando para recopilar información sobre las emisiones de gases de efecto invernadero en los condados de Maricopa y Pinal. Actualmente, solo están disponibles las emisiones de 2020 del condado de Maricopa.

En 2020, las dos fuentes de emisión más grandes fueron las fuentes móviles, como automóviles, camiones y otros vehículos y equipos, y el uso de electricidad. En conjunto, estas dos fuentes representan el 87 por ciento de las emisiones de gases de efecto invernadero del condado de Maricopa.

Emisiones de GEI del Condado de Maricopa 2020 por Categoría de Origen

Categoría de Origen	$MTCO_2e$	%
Fuentes Móviles	21,503,416	45.9
Uso de Electricidad	19,104,185	40.8
Combustión Estacionaria de Combustible	2,796,307	6.0
Agua Residual	1,036,978	2.2
Ganadería (Bovinos)	856,459	1.8
Manufactura (Uso de gas fluorado)	579,756	1.2
Residuos Sólidos	526,354	1.1
Agua Importada (Electricidad Utilizada)	274,346	0.6
Uso de Fertilizantes	149,736	0.3

**Toneladas métricas de dióxido de carbono equivalente*

Image Credit: Maricopa County Air Quality Department

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Buildings Sector

Combustion of fossil fuels for heating/cooking, organic waste sent to landfills, wastewater sent to water treatment facilities, and refrigerant leaks.

Adoption of Green Energy Code
Residential and Commercial

This measure funds the adoption of the latest building energy codes for residential and commercial buildings at the municipal level. Measure would apply to new construction builds.

Voluntary Building Performance Standards and Incentives

This measure supports or incentivizes GHG emission reductions through the establishment of voluntary building performance standards. Implementation examples include rebates, grants or funding schemes to meet or exceed the voluntary building performance standard.

Weatherization Assistance Programs
Residential and Commercial

This measure funds residential and commercial building weatherization projects and energy audits. Implementation examples include free or subsidized access to home energy audits and free or subsidized access to weatherization upgrades (e.g., window sunscreens, insulation, air duct sealing).

Energy Efficient Building Product Incentives
Residential and Commercial

This measure funds the installation of public charging and fueling infrastructure. An implementation example could be the installation of EV chargers and alternative fuel stations for public use.

Refrigerant Recovery Programs
Residential and Commercial

This measure supports or incentivizes the recovery and destruction of refrigerants used in residential and commercial building products. Implementation examples include the development of a refrigerant management program or incentives for registration, monitoring, and repair/replacement of leaking refrigerant products.

Electrification of Municipal, Commercial, and Residential Buildings

This measure supports or incentivizes the conversion of fossil fueled building equipment to electric equipment. Implementation examples include rebates, grants, or funding schemes to replace gas furnaces or boilers with electric heat pump HVAC systems.

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Sector de la Construcción

Combustión de combustibles fósiles para calefacción/cocina, residuos orgánicos enviados a vertederos, aguas residuales enviadas a instalaciones de tratamiento de agua y fugas de refrigerante.

Adopción del Código de Energía Verde
Residencial y Comercial

Esta medida financia la adopción de los últimos códigos de energía para edificaciones residenciales y comerciales a nivel municipal. La medida se aplicaría a nuevas construcciones.

Estándares Voluntarios de Rendimiento para la Construcción e Incentivos

Esta medida respalda o incentiva la reducción de emisiones de gases de efecto invernadero mediante el establecimiento de estándares voluntarios de rendimiento de construcción. Ejemplos de implementación incluyen reembolsos, subvenciones o esquemas de financiamiento para cumplir o superar el estándar voluntario de rendimiento de construcción.

Programas de Asistencia para la Climatización
Residencial y Comercial

Esta medida financia proyectos de climatización para construcciones residenciales y comerciales, así como auditorías energéticas. Ejemplos de implementación incluyen acceso gratuito o subsidiado a auditorías energéticas en el hogar y acceso gratuito o subsidiado a mejoras en la climatización (por ejemplo, pantallas solares para ventanas, aislamiento, sellado de conductos de aire).

Incentivos para Productos de Construcción Eficientes en Energía | Residencial y Comercial

Esta medida financia la sustitución de productos de construcción ineficientes por productos certificados eficientes en energía. Ejemplos de implementación incluyen reembolsos, subvenciones o esquemas de financiamiento para reemplazar electrodomésticos, equipos de calefacción y refrigeración, iluminación y productos de construcción por productos certificados eficientes en energía.

Programas de Recuperación de Refrigerantes
Residencial y Comercial

Esta medida respalda o incentiva la recuperación y destrucción de refrigerantes utilizados en productos de edificación residenciales y comerciales. Ejemplos de implementación incluyen el desarrollo de un programa de gestión de refrigerantes o incentivos para el registro, monitoreo y reparación/reemplazo de productos de refrigerante que presenten fugas.

Electrificación de Edificaciones Municipales, Comerciales y Residenciales

Esta medida respalda o incentiva la conversión de equipos de edificaciones alimentados por combustibles fósiles a equipos eléctricos. Ejemplos de implementación incluyen reembolsos, subvenciones o esquemas de financiamiento para reemplazar calderas o calentadores de gas con sistemas de HVAC de bomba de calor eléctrica.

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Sector de Residuos y Aguas

Vertederos, recolección de residuos, instalaciones de tratamiento de aguas residuales y construcción/demolición de edificios.

Programas de Reciclaje, Compostaje y Desviación de Residuos de Alimentos/Jardín

Esta medida respalda la implementación o expansión de programas de reciclaje, compostaje y desviación de residuos de alimentos/jardín. Un ejemplo de implementación es la distribución de contenedores gratuitos o subsidiados para residuos verdes en la acera (por ejemplo, recortes de césped, ramitas, arbustos).

Programas para la Reparación y la Reutilización de Materiales

Esta medida respalda la reutilización de materiales y la reducción de residuos, disminuyendo el uso de energía en la fabricación, transporte y disposición de materiales. Ejemplos de implementación incluyen financiar un centro regional de reutilización con enfoque en el desarrollo de la fuerza laboral, financiar programas que reparen y reutilicen artículos, y programas para apoyar a las organizaciones en el diseño de materiales para que puedan ser reciclados y reutilizados.

Captura de Biogás en Vertederos y Plantas de Tratamiento de Aguas Residuales

Esta medida respalda la recolección de biogás en vertederos y plantas de tratamiento de aguas residuales. Un ejemplo de implementación es la recolección de biogás de un vertedero municipal para su quema o producción de energía.

Energía Renovable y Eficiencia Energética en Plantas de Tratamiento de Aguas Residuales

Esta medida respalda la implementación de sistemas de generación de energía renovable y mejoras de eficiencia energética en plantas de tratamiento de aguas residuales. Ejemplos de implementación incluyen la implementación de sistemas de generación de energía solar o la electrificación de vehículos de transportación de cieno.

Generación de Energía Renovable en Vertederos

Esta medida financia la implementación de sistemas de generación de energía renovable en vertederos. Un ejemplo de implementación es la instalación de un sistema de generación de energía solar en un vertedero municipal.

Waste and Water Sector

Landfills, waste collection, wastewater treatment facilities, and building construction/ demolition.

Programs for Recycling, Composting, and Food/Yard Waste Diversion

This measure supports the implementation or expansion of recycling, composting and food/yard waste diversion programs. An implementation example is the deployment of free or subsidized curbside green waste (e.g., grass clippings, twigs, shrubs) containers.

Programs for Repair, Reuse, and Repurposing of Materials

This measure supports materials reuse and waste reduction, reducing energy use for manufacture, transportation and disposal of material. Implementation examples include funding a regional reuse center with a workforce development focus, funding programs that repair, reuse, and repurpose items, and programs to support organizations to design materials so they can be recycled and repurposed.

Biogas Capture from Landfills and Wastewater Treatment Plants

This measure supports the collection of biogas from landfills and wastewater treatment plants. An implementation example is the collection of biogas from a municipal landfill for flaring or energy production.

Renewable Energy and Energy Efficiency at Wastewater Treatment Plants

This measure supports the deployment of renewable energy generation systems and energy efficiency upgrades at wastewater treatment plants. Implementation examples include the deployment of solar energy generation systems or electrification of sludge transportation vehicles.

Renewable Energy Generation at Landfills

This measure funds the deployment of renewable energy generation systems at landfills. An implementation example is the installation of a solar energy generation system at a municipal landfill.

Industrial Sector

Construction equipment, emergency generators, cement production, and iron & steel production.

Energy Efficiency Incentives Industrial

This measure supports or incentivizes implementation of energy efficiency measures in industry. Implementation examples include waste heat utilization, energy audits, and equipment upgrades.

Energy Use Reductions and Improvements to Industrial Processes

This measure supports or incentivizes GHG emission reductions through reduced energy use and improved industrial processes. Implementation examples include electrification of equipment, use of low carbon fuels, and use of renewable energy.

Clean Energy Hub

This measure funds the establishment of a clean energy hub within the region. A clean energy hub is a typically a community-based organization with experience in clean energy, energy efficiency, and workforce and economic development. Clean energy hubs typically support residents, businesses and communities and ensure they have access to clean energy resources and jobs.

Sector Industrial

Equipo de construcción, generadores de emergencia, producción de cemento y producción de hierro y acero.

Incentivos para la Eficiencia Energética Industrial

Esta medida respalda o incentiva la implementación de medidas de eficiencia energética en la industria. Ejemplos de implementación incluyen la utilización de calor residual, auditorías energéticas y actualizaciones de equipos

Reducción del Consumo de Energía y Mejoras en los Procesos Industriales

Esta medida respalda o incentiva la reducción de emisiones de gases de efecto invernadero mediante la disminución del consumo de energía y la mejora de los procesos industriales. Ejemplos de implementación incluyen la electrificación de equipos, el uso de combustibles de bajo carbono y el uso de energía renovable.

Centro de Energía Limpia

Esta medida financia el establecimiento de un centro de energía limpia dentro de la región. Un centro de energía limpia es típicamente una organización comunitaria con experiencia en energía limpia, eficiencia energética y desarrollo económico y de la fuerza laboral. Los centros de energía limpia generalmente respaldan a residentes, empresas y comunidades, asegurando que tengan acceso a recursos de energía limpia y empleos.

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Climate Pollution Reduction Grant Open House for Maricopa and Pinal Counties

What is the Climate Pollution Reduction Grant Program?

The 2022 Inflation Reduction Act set aside $5 billion to help reduce greenhouse gas pollution. To distribute these funds, the Environmental Protection Agency (EPA) has supported the creation of local climate action plans and announced a nationwide competition for project grants to support plan implementation.

Who is responsible for developing the local climate action plans?

The State of Arizona Office of Resiliency is developing a statewide plan, and the Maricopa Association of Governments (MAG) is developing a plan that covers Maricopa and Pinal counties.

What is the purpose of the local climate action plans?

Plans identify where greenhouse gas pollution is coming from, what programs or projects could reduce emissions, and what community and environmental benefits could be realized from implementing identified projects.

What is the nationwide grant competition?

The project grant competition allows air pollution control agencies, municipalities, and Native nations to apply and compete for $4.3 billion in funds to support project implementation.

What types of projects and programs are eligible for the implementation competition?

The EPA is looking for greenhouse gas emission reduction projects in transportation, industry, electric power, buildings, natural and working lands, and waste and materials management sectors.

How can I contribute to this process?

MAG has gathered information related to potential projects that could reduce emissions in our region. Your feedback on strategies or investments that are important to you will help inform plan development and help local agencies identify priority projects.

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Subvención de Reducción de Contaminación Climática Jornada de Puertas Abiertas para los Condados de Maricopa y Pinal

¿En qué consiste el Programa de Subvenciones para la Reducción de la Contaminación Climática (CPRG, por sus siglas en inglés)?

La Ley de Reducción de la Inflación de 2022 destinó $5 mil millones para ayudar a reducir la contaminación por gases de efecto invernadero. Para distribuir estos fondos, la Agencia de Protección Ambiental (EPA, por sus siglas en inglés) ha respaldado la creación de planes de acción climática locales y ha anunciado una competencia nacional para otorgar subvenciones de proyectos que respalden la implementación del plan.

¿Quién es responsable de desarrollar los planes de acción climática locales?

La Oficina de Resiliencia del Estado de Arizona está desarrollando un plan a nivel estatal y la Asociación de Gobiernos de Maricopa (MAG, por sus siglas en inglés) está desarrollando un plan que abarca a los condados de Maricopa y Pinal.

¿Cuál es el propósito de los planes de acción climática locales?

Los planes identifican de dónde proviene la contaminación por gases de efecto invernadero, qué programas o proyectos podrían reducir las emisiones y qué beneficios comunitarios y ambientales podrían obtenerse de la implementación de los proyectos identificados.

¿En qué consiste la competencia nacional de subvenciones?

La competencia de subvenciones permite a las agencias de control de la contaminación del aire, los municipios y las naciones nativas presentar solicitudes y competir por $4.3 mil millones en fondos para respaldar la implementación de proyectos.

¿Qué tipos de proyectos y programas son elegibles para la competencia de implementación?

La EPA busca proyectos de reducción de emisiones de gases de efecto invernadero en los sectores de transporte, industria, energía eléctrica, edificaciones, tierras naturales y de trabajo, y gestión de residuos y materiales.

¿Cómo puedo contribuir a este proceso?

La MAG ha recopilado información relacionada con proyectos potenciales que podrían reducir las emisiones en nuestra región. Sus opiniones sobre las estrategias o inversiones que son importantes para usted ayudarán a informar el desarrollo del plan y a que las agencias locales identifiquen los proyectos que sean una prioridad.

Electric Power Sector

Combustion of coal, natural gas, and oil for electricity generation, transmission, and distribution purposes.

Procurement of Renewable Energy for Municipal Operations

This measure supports the procurement of renewable electricity for municipal operations. An implementation example is joining a utility green power purchasing program for municipal energy usage.

Energy Efficiency Upgrades for Municipal Operations

This measure supports the deployment of energy efficiency upgrades for municipal operations. An implementation example is the replacement of inefficient lighting with LEDs at public parks.

Development of Microgrids

This measure supports, funds, or incentivizes the development of renewable energy microgrids at the local and community levels. An implementation example is the development of a renewable energy microgrid to provide power to community housing developments.

Renewable Energy Generation at Municipal Facilities

This measure funds the deployment of renewable energy generation systems at municipal facilities. An implementation example is the installation of solar energy generation systems and energy storage systems at municipal facilities.

Renewable Energy Generation Incentives
Residential and Commercial

This measure supports and incentivizes the deployment of renewable energy generation systems at residential and commercial facilities. An implementation example is the development of a residential rebate program for the installation of solar energy generation systems.

Sector de Energía Eléctrica

Combustión de carbón, gas natural y petróleo para fines de generación, transmisión y distribución de electricidad.

Adquisición de Energía Renovable para Operaciones Municipales

Esta medida respalda la adquisición de electricidad renovable para las operaciones municipales. Un ejemplo de implementación es unirse a un programa de compra de energía verde de servicios públicos para el uso de energía municipal.

Mejoras de Eficiencia Energética para Operaciones Municipales

Esta medida respalda la implementación de mejoras de eficiencia energética para las operaciones municipales. Un ejemplo de implementación es la sustitución de iluminación ineficiente por LEDs en parques públicos.

Desarrollo de Microrredes

Esta medida respalda, financia o incentiva el desarrollo de microrredes de energía renovable a nivel local y comunitario. Un ejemplo de implementación es el desarrollo de una microrred de energía renovable para suministrar energía a desarrollos de viviendas comunitarias.

Generación de Energía Renovable en Instalaciones Municipales

Esta medida financia la implementación de sistemas de generación de energía renovable en instalaciones municipales. Un ejemplo de implementación es la instalación de sistemas de generación de energía solar y sistemas de almacenamiento de energía en instalaciones municipales.

Incentivos para la Generación de Energía Renovable
Residencial y Comercial

Esta medida respalda e incentiva la implementación de sistemas de generación de energía renovable en instalaciones residenciales y comerciales. Un ejemplo de implementación es el desarrollo de un programa de reembolsos residenciales para la instalación de sistemas de generación de energía solar.

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Natural and Working Lands Sector

Fertilizer application for crop production, livestock production, fossil fuel powered agricultural equipment, stormwater runoff, and agricultural burns.

Electrification of Agricultural Equipment

This measure supports or funds the electrification of fossil fuel powered agricultural equipment. Implementation examples include electrifying tractors, farm vehicles, and irrigation/fertilizer/spraying systems.

Improvements to Fertilizer Technologies and Techniques

This measure supports or funds the reduction of GHG emissions from fertilizer application. Implementation examples include programs to support fertilizer demand reduction efforts through support and incentives.

Urban Afforestation/Increase Tree Canopy Cover

This measure supports or funds urban afforestation programs and projects. Implementation examples include programs to increase municipal tree canopy cover or programs that incentivize the planting of shade trees for residential and commercial buildings

Green Stormwater Infrastructure

This measure funds programs or projects to boost green stormwater infrastructure (e.g., infrastructure that handles stormwater runoff). Implementation examples include the deployment of permeable pavement technologies, rainwater harvesting systems, and the protection of green spaces. These measures reduce GHG emissions from wastewater treatment facilities and rainwater pumps.

Protection of Natural and Working Lands

This measure funds programs or projects to protect, enhance, or restore natural and working lands. Implementation examples include grants to support local agriculture, restoration of brownfields to enhance carbon sequestration, and protection of sensitive ecosystems.

Sectore de Tierras Naturales y de Trabajo

Aplicación de fertilizantes para la producción de cultivos, la producción ganadera, equipos agrícolas alimentados por combustibles fósiles, la escorrentía de aguas pluviales y las quemas agrícolas.

Electrificación de Equipos Agrícolas

Esta medida respalda o financia la electrificación de equipos agrícolas alimentados por combustibles fósiles. Ejemplos de implementación incluyen la electrificación de tractores, vehículos agrícolas y sistemas de riego/fertilización/aspersión.

Mejoras en Tecnologías y Técnicas de Fertilizantes

Esta medida respalda o financia la reducción de emisiones de gases de efecto invernadero derivadas de la aplicación de fertilizantes. Ejemplos de implementación incluyen programas para respaldar esfuerzos de reducción de la demanda de fertilizantes a través de apoyo e incentivos.

Forestación Urbana/Aumento de la Cobertura Arbórea

Esta medida respalda o financia programas y proyectos de forestación urbana. Ejemplos de implementación incluyen programas para aumentar la cobertura arbórea municipal o programas que incentivan la plantación de árboles de sombra para edificaciones residenciales y comerciales.

Infraestructura Verde para Aguas Pluviales

Esta medida financia programas o proyectos para potenciar la infraestructura verde para aguas pluviales (por ejemplo, infraestructura que maneja el escurrimiento de aguas pluviales). Ejemplos de implementación incluyen la implementación de tecnologías de pavimentos permeables, sistemas de recolección de agua de lluvia y la protección de espacios verdes. Estas medidas reducen las emisiones de gases de efecto invernadero de las instalaciones de tratamiento de aguas residuales y las bombas de agua de lluvia.

Protección de Tierras Naturales y de Trabajo

Esta medida financia programas o proyectos para proteger, mejorar o restaurar tierras naturales y de trabajo. Ejemplos de implementación incluyen subvenciones para apoyar la agricultura local, la restauración de áreas industriales abandonadas para mejorar la captura de carbono y la protección de ecosistemas sensibles.

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Transportation Sector

Passenger cars, long-haul trucks, short-haul trucks, locomotives, and aircraft emissions.

Zero Emission Vehicle Incentives
Residential & Commercial Fleets

This measure incentivizes the transition from fossil fuel powered vehicles to zero emission vehicles. Rebates, grants, or other incentives could be offered to residents or commercial entities to purchase zero emission vehicles.

EV Charging Infrastructure Incentives
Residential & Commercial

This measure incentivizes the installation of EV charging infrastructure. Rebates, grants, or other incentives could be offered to residents or commercial entities for the installation of EV chargers.

Public Fleet Electrification

This measure funds the transition of public fleets from fossil fuel powered vehicles to electric vehicles. An implementation example could be the conversion of municipal heavy-duty bus fleets or light-duty service vehicles to electric vehicles.

Public Charging and Fueling Infrastructure Deployment

This measure funds the installation of public charging and fueling infrastructure. An implementation example could be the installation of EV chargers and alternative fuel stations for public use.

Active Transportation Network Infrastructure Investments

This measure funds active transportation network upgrades. Active transportation is walking, bicycling, using small-wheeled vehicles, or a mobility device. Implementation examples include increasing the number of bike lanes, expanding cool corridors/walking paths, and increasing e-mobility accessibility.

Transportation Demand Management

This measure funds programs to expand or inform traveler choices. Examples of TDM include rideshare, vanpools, senior shuttles, transit pass subsidies, and remote/hybrid work schedules, and land use zoning.

Electrification of Lawn and Garden Equipment
Residential & Commercial

This measure funds programs to electrify lawn and garden equipment. An implementation example is to provide incentives for replacing gasoline powered residential and commercial lawn and garden equipment with electric equipment.

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Sector de Transporte

Emisiones de automóviles de pasajeros, camiones de larga distancia, camiones de corta distancia, locomotoras y de aeronaves.

Incentivos para Vehículos de Emisión Cero
Residenciales y Flotas Comerciales

Esta medida incentiva la transición de vehículos con motor de combustibles fósiles a vehículos de emisión cero. Se podrían ofrecer reembolsos, subvenciones u otros incentivos a residentes o entidades comerciales para la compra de vehículos de emisión cero.

Incentivos para Infraestructura de Carga de Vehículos Eléctricos | Residenciales y Comerciales

Esta medida incentiva la instalación de infraestructura de carga para vehículos eléctricos (EV). Se podrían ofrecer reembolsos, subvenciones u otros incentivos a residentes o entidades comerciales para la instalación de cargadores de EV.

Electrificación de Flotas Públicas

Esta medida financia la transición de las flotas públicas de vehículos con motor de combustibles fósiles a vehículos eléctricos. Un ejemplo de implementación podría ser la conversión de flotas municipales de autobuses pesados o vehículos de servicio liviano a vehículos eléctricos.

Despliegue de Infraestructura Pública de Carga y Combustible

Esta medida financia la instalación de infraestructura pública de carga y de combustible. Un ejemplo de implementación podría ser la instalación de cargadores de EV y estaciones de combustible alternativo de uso público.

Inversiones en Infraestructura de Red de Transporte Activo

Esta medida financia mejoras en la red de transporte activo. El transporte activo incluye caminar, andar en bicicleta, usar vehículos de ruedas pequeñas o dispositivos de movilidad. Ejemplos de implementación incluyen aumentar el número de carriles para bicicletas, ampliar corredores o senderos para caminar y aumentar la accesibilidad de la e-movilidad (movilidad en transporte eléctrico).

Gestión de la Demanda de Transporte

Esta medida financia programas para expandir o informar las opciones de desplazamiento. Ejemplos de gestión de la demanda incluyen viajes compartidos, furgonetas compartidas, transporte para personas mayores, subsidios para pases de tránsito y horarios de trabajo remotos/híbridos, y zonificación de uso del suelo.

Electrificación de Equipos de Jardinería y Césped
Residencial y Comercial

Esta medida financia programas para electrificar equipos de jardinería y césped. Un ejemplo de implementación sería proporcionar incentivos para reemplazar equipos de jardinería y césped residenciales y comerciales con motor de gasolina por equipos eléctricos.

The final versions of the banners can be found here.

An image of the banners at one of the events can be found here.

Event Summaries
Glendale Open House - Glendale Civic Center
English & Spanish PDFs:

- English
- Spanish

Event Overview:
Address: 5750 W Glenn Dr, Glendale, AZ 85301
Date: Monday, December 4, 2023
Time: 6:00pm - 7:30pm
Participants: 11
Written Feedback: 11

Making Homes Energy Efficient:
Residents expressed the need for assistance to make their homes more energy efficient. Weatherization helps keep homes cool without high costs, but many can't afford the updates needed. There's a call for financial support for those struggling to pay their utility bills, especially in older homes.

Transportation Improvements:
People want better transportation options like more electric buses and bike paths. The current system doesn't meet their needs, and cars contribute to pollution. They suggested using the grant for transportation demand management and an active transportation network.

Greening the City:
There's enthusiasm for urban afforestation, which involves planting more trees to beautify and improve the air quality of city spaces currently filled with dirt and trash.

Recycling and Repair Programs:
Community members would like more opportunities to recycle and repair items rather than throw them away. They believe in reusing and fixing things like cars and household items to reduce waste.

Public Transit for Unincorporated Areas:
Some areas, particularly in the West Valley like Sun City West and Anthem, lack public transportation, which hits the senior community hard. There's a strong push for the grant to

fund public transit options in these regions.

Innovative Transportation Solutions:
There's a desire for innovative, energy-efficient transit options, such as autonomous electric vehicles. Additionally, the installation of charging stations in public areas would encourage the use of electric and hybrid vehicles.

Overall Priorities:
The main priorities are:
1. Establishing energy-efficient public transport options with routes servicing unincorporated areas.
2. Increase urban afforestation and awareness on recycle and repair options to reduce waste.
3. Providing infrastructure for charging electric vehicles in convenient locations, creating attractive options for personal vehicles.

The community believes that with the new federal funding, these priorities can significantly improve the quality of life, particularly in terms of transportation and air quality.

Resumen del Evento:
Dirección: 5750 W Glenn Dr, Glendale, AZ 85301
Fecha: Lunes, 4 de Diciembre de 2023
Hora: 6:00pm - 7:30pm
Participantes: 11
Comentarios Escritos: 11

Haciendo que los hogares sean energéticamente eficientes:
Los residentes expresaron la necesidad de asistencia para hacer que sus hogares sean más eficientes energéticamente. La climatización ayuda a mantener los hogares frescos sin costos altos, pero muchos no pueden pagar las actualizaciones necesarias. Hay un llamado para ayuda financiera para aquellos que batallan por pagar sus facturas de servicios públicos, especialmente en casas antiguas.

Mejoras en el transporte:
La gente quiere mejores opciones de transporte, como más autobuses eléctricos y carriles para

bicicletas. El sistema actual no satisface sus necesidades y los automóviles contribuyen a la contaminación. Sugirieron utilizar la subvención para la gestión de la demanda de transporte y una red de transporte activa.

Reverdecer la ciudad:
Hay entusiasmo por la forestación urbana, que implica plantar más árboles para embellecer y mejorar la calidad del aire de los espacios de la ciudad que actualmente están llenos de tierra y basura.

Programas de reciclaje y reparación:
A los miembros de la comunidad les gustaría contar con más oportunidades para reciclar y reparar artículos en lugar de tirarlos. Creen en la reutilización y reparación de cosas como automóviles y artículos domésticos para reducir los desechos.

Transporte público para áreas no incorporadas:
Algunas áreas, especialmente en West Valley como Sun City West y Anthem, carecen de transporte público, lo que afecta duramente a la comunidad de personas mayores. Hay un fuerte impulso para que la subvención financie las opciones de transporte público en estas regiones.

Soluciones de transporte innovadoras:
Existe el deseo de opciones de transporte innovadoras y energéticamente eficientes, como los vehículos eléctricos autónomos. Además, la instalación de estaciones de carga en áreas públicas fomentaría el uso de vehículos eléctricos e híbridos.

Prioridades generales:
Las prioridades principales son:
1.Establecer opciones de transporte público energéticamente eficientes con rutas que den servicio a áreas no incorporadas.
2. Aumentar la forestación urbana y la concienciación sobre las opciones de reciclaje y reparación para reducir los residuos.
3. Proporcionar infraestructura para la carga de vehículos eléctricos en lugares convenientes, creando opciones atractivas para vehículos personales.

La comunidad cree que, con los nuevos fondos federales, estas prioridades pueden mejorar significativamente la calidad de vida, particularmente en términos de transporte y calidad del aire.

Cesar Chavez Community Center Open House Event

English & Spanish PDFs:

- English
- Spanish

Event Overview:

Address: 7858 S 35th Ave, Laveen Village, AZ 85339

Date: Monday, December 11, 2023

Time: 6:00pm - 7:30pm

Participants: 10

Written Feedback: 7

Summary of Additional Community Feedback on Grant Usage

Support for Sustainable Agriculture:

Citizens suggest investing in modern farming equipment, like no-till tractors, to reduce carbon emissions and improve soil health. They also believe farmers should receive education on renewable practices to foster environmentally friendly agriculture.

Transportation for All:

There's a strong call to ensure that the benefits of transportation improvements reach everyone, not just those who can afford electric cars like Teslas. People stressed the importance of making public transport and other sustainable options accessible to those with less financial resources.

Active and Sustainable Transportation Networks:

Priority is given to creating networks that encourage walking and other carbon-neutral ways of moving around, reducing reliance on cars. It's suggested that federal funds should focus on establishing these networks for a more climate-friendly community.

Green Building Standards:

The community is interested in making green building practices mandatory, rather than voluntary, to ensure a level playing field. They want all construction to adhere to high environmental standards to prevent subpar building practices.

Expansion of Electric Vehicle (EV) Charging Infrastructure:
While the state highways are seeing an increase in EV chargers, residents express a need for more chargers within cities, especially for those living in apartments without private charging options.

Waste Management and Composting:
After witnessing the amount of waste produced, there's an appeal for a comprehensive composting program to manage yard and food waste, aiming to reduce methane emissions from landfills.

Electrification of New Buildings:
There's concern over the continued use of gas infrastructure in new buildings. Residents support regulations requiring new constructions to be electric, seeing it as a cost-saving measure in the pursuit of net-zero goals.

Inclusive and Immediate Action on Climate Change:
Finally, the community voices a passionate plea for inclusive action that benefits everyone, especially the vulnerable Latino community. They emphasize the urgency of implementing advanced, accessible technology to address climate change and protect the planet, stating that there's no other home and that action must be taken immediately.

Overall Priorities:
The main priorities are:

1. Modernize agricultural practices and increase sustainable agriculture education to minimize environmental impact.
2. Expand carbon-neutral transportation networks with accessible EV charging stations and improved public transit.
3. Implement mandatory green building codes and initiate a countywide composting program to minimize waste and emissions.

This summary reflects the community's desire for immediate and inclusive action toward a more sustainable future, highlighting the importance of education, infrastructure, and equitable access to resources.

Resumen del evento:

Dirección: 7858 S 35th Ave, Laveen Village, AZ 85339

Fecha: lunes 11 de diciembre de 2023

Horario: 6:00pm - 7:30pm

Participantes: 10

Comentarios Escritos: 7

Resumen de comentarios adicionales de la comunidad sobre el uso de subvenciones

Apoyo a la agricultura sostenible:
Los ciudadanos sugieren invertir en equipos agrícolas modernos, como tractores sin labranza, para reducir las emisiones de carbono y mejorar la salud del suelo. También creen que los agricultores deberían recibir educación sobre prácticas renovables para fomentar la agricultura respetuosa con el medio ambiente.

Transporte para todos:
Hay un fuerte llamado para asegurar que los beneficios de las mejoras en el transporte lleguen a todos, no solo a aquellos que pueden pagar vehículos eléctricos como Teslas. Las personas enfatizan la importancia de hacer que el transporte público y otras opciones sostenibles sean accesibles para aquellos con menos recursos financieros.

Redes de transporte activas y sostenibles:
Se da prioridad a la creación de redes que fomenten caminar y otras formas de transportarse de manera neutra en carbono, reduciendo la dependencia de los automóviles. Se sugiere que los fondos federales se centren en establecer estas redes para una comunidad más amigable con el clima.

Normas de construcción ecológicas:
La comunidad está interesada en hacer obligatorias las prácticas de construcción ecológica, en lugar de voluntarias, para garantizar una competencia justa. Quieren que todas las construcciones cumplan con altos estándares ambientales para evitar prácticas de construcción deficientes.

Expansión de la infraestructura de carga para vehículos eléctricos (VE): Si bien las carreteras estatales están viendo un aumento en los cargadores de VE, los residentes expresan la necesidad de más cargadores dentro de las ciudades, especialmente para aquellos que viven en apartamentos sin opciones de carga privada.

Gestión de residuos y compostaje:
Después de presenciar la cantidad de residuos producidos, hay una solicitud de un programa

integral de compostaje para gestionar los desechos de jardines y alimentos, con el objetivo de reducir las emisiones de metano de los vertederos.

Electrificación de nuevos edificios:
Existe preocupación por el uso continuo de infraestructuras de gas en nuevos edificios. Los residentes respaldan regulaciones que requieren que las nuevas construcciones sean eléctricas, viéndolo como una medida de ahorro de costos en la búsqueda de objetivos de emisión cero.

Acción inclusiva e inmediata sobre el cambio climático:
Finalmente, la comunidad expresa una apasionada súplica por una acción inclusiva que beneficie a todos, especialmente a la vulnerable comunidad latina. Hacen hincapié en la urgencia de implementar tecnología avanzada y accesible para abordar el cambio climático y proteger el planeta, afirmando que no hay otro hogar y que la acción debe tomarse de inmediato.

Prioridades generales:
Las principales prioridades son:

1. Modernizar las prácticas agrícolas y aumentar la educación en agricultura sostenible para minimizar el impacto ambiental.
2. Expandir las redes de transporte neutras en carbono con estaciones de carga de vehículos eléctricos accesibles y mejorar el transporte público.
3. Implementar códigos de construcción ecológica obligatorios e iniciar un programa de compostaje en todo el condado para minimizar los residuos y las emisiones.

Este resumen refleja el deseo de la comunidad de una acción inmediata e inclusiva hacia un futuro más sostenible, destacando la importancia de la educación, la infraestructura y el acceso equitativo a los recursos

Eloy Town Hall Open House Event - Eloy City Hall

English & Spanish PDFs:

- English
- Spanish

Event Overview:

Address:595 C St Suite 101, Eloy, AZ 85131

Date: Wednesday, December 13, 2023

Time: 5:00pm - 8:00pm
Participants: 10
Written Feedback: 7

Summary of Community Feedback on Grant Usage for Arizona's Power and Environmental Initiatives

Hybrid Vehicle Charging Expansion:
There's excitement about Toltec becoming a hub for hybrid vehicle charging systems, with anticipation of future expansion that aligns with environmental growth and supports sustainable transportation.

Preservation and Weatherization:
Funding is hoped to be directed toward the preservation of historical buildings and the Weatherization Assistance Program, enhancing both cultural heritage and energy efficiency in residential and commercial sectors.

Community Adaptability and Transportation Services:
Eloy is highlighted for its community spirit and adaptability, providing services for those in need. However, there's a call for improved transportation services, such as better ride-sharing options, with skepticism about fully autonomous vehicles.

Consideration of Wildlife in Development:
The community emphasizes the importance of incorporating wildlife habitats into infrastructure development to increase biodiversity and improve overall environmental health.

Affordability and Sustainability in Electric Transport:
While supporting electric vehicles, there's a concern about affordability and the current environmental impact of their production. Bringing sustainable transport options to smaller communities like Eloy is seen as challenging but crucial for the future.

Legislative Concerns and Economic Impact:
There's apprehension about potential legislation that could economically burden residents of smaller communities by requiring them to upgrade to less-polluting vehicles, highlighting the need for incentives rather than penalties.

Industrial Sector Incentives and Grid Improvement:
The feedback calls for incentives to upgrade the industrial sector and improve the power grid, suggesting zero upfront cost solutions for solar panels and underground power lines as long-term investments for the state's energy infrastructure.

Environmental Investment for Climate Impact:
Investing in planting drought-resistant vegetation and managing water resources effectively is urged to prevent dust bowl conditions and improve air quality, addressing climate change through proactive environmental care.

Waste Management Solutions:
The necessity for improved waste and wastewater management is stressed, with suggestions for methane capture and repurposing from treatment plants to enhance air quality and create business opportunities, alongside the modernization of the grid to prevent frequent power outages.

Overall Priorities from the Feedback:

1. Invest in Hybrid Vehicle Charging Infrastructure: Expand hybrid vehicle charging facilities in Arizona to foster sustainable transportation.

2. Improve Waste and Wastewater Management: Enhance waste management systems to mitigate odors and emissions and explore business opportunities in methane repurposing.

3. Strengthen Power Grid and Sustainable Practices: Modernize the power grid, incentivize residential solar panel installation, and implement environmental investments for a healthier ecosystem and climate impact mitigation.

Resumen del Evento:
Dirección:595 C St Suite 101, Eloy, AZ 85131
Fecha: Miércoles 13 de diciembre de 2023
Hora: 5:00pm - 8:00pm
Participantes: 10
Comentarios Escritos: 7

Resumen de los comentarios de la comunidad sobre el uso de subvenciones para iniciativas energéticas y medioambientales en Arizona

Expansión de la Carga de Vehículos Híbridos:
Hay entusiasmo por que Toltec se convierta en un centro para sistemas de carga de vehículos híbridos, con expectativas de una expansión futura que se alinee con el crecimiento ambiental y respalde el transporte sostenible.

Preservación y Aislamiento Térmico:
Se espera que la financiación se dirija hacia la preservación de edificios históricos y el Programa de Asistencia para el Aislamiento Térmico, mejorando tanto el patrimonio cultural como la eficiencia energética en sectores residenciales y comerciales.

Adaptabilidad Comunitaria y Servicios de Transporte:
Se destaca a Eloy por su espíritu comunitario y adaptabilidad, brindando servicios a quienes los necesitan. Sin embargo, se pide una mejora en los servicios de transporte, como opciones de viajes compartidos, con escepticismo sobre los vehículos completamente autónomos.

Consideración de la Vida Silvestre en el Desarrollo:
La comunidad enfatiza la importancia de incorporar hábitats de vida silvestre en el desarrollo de infraestructuras para aumentar la biodiversidad y mejorar la salud ambiental en general.

Asequibilidad y Sostenibilidad en el Transporte Eléctrico:
Aunque se apoya a los vehículos eléctricos, preocupa la asequibilidad y el impacto ambiental actual de su producción. Traer opciones de transporte sostenible a comunidades más pequeñas como Eloy se percibe como un desafío, pero algo que es crucial para el futuro.

Preocupaciones Legislativas e Impacto Económico:
Existe aprensión sobre posibles legislaciones que podrían ser una carga económica para los residentes de comunidades más pequeñas al requerirles actualizar a vehículos menos contaminantes, resaltando la necesidad de incentivos en lugar de sanciones.

Incentivos para el Sector Industrial y Mejora de la Red:
Los comentarios solicitan incentivos para mejorar el sector industrial y la red eléctrica, sugiriendo soluciones sin costo inicial para paneles solares y líneas eléctricas subterráneas como inversiones a largo plazo para la infraestructura energética del estado.

Inversión Ambiental para el Impacto Climático:
Se insta a invertir en la plantación de vegetación resistente a la sequía y en la gestión efectiva de los recursos hídricos para prevenir condiciones de polvo y mejorar la calidad del aire, abordando el cambio climático a través de un cuidado ambiental proactivo.

Soluciones de Gestión de Residuos:
Se destaca la necesidad de mejorar la gestión de residuos y aguas residuales, con sugerencias para la captura de metano y reutilización de plantas de tratamiento para mejorar la calidad del aire y crear oportunidades comerciales, junto con la modernización de la red para prevenir los apagones frecuentes.

Prioridades generales de acuerdo a los comentarios:

1. Invertir en Infraestructura de Carga de Vehículos Híbridos: Expandir las instalaciones de carga de vehículos híbridos en Arizona para fomentar el transporte sostenible.

2. Mejorar la Gestión de Residuos y Aguas Residuales: Mejorar los sistemas de gestión de residuos para mitigar olores y emisiones, y explorar oportunidades comerciales en la reutilización de metano.

3. Fortalecer la Red Eléctrica y Prácticas Sostenibles:
Modernizar la red eléctrica, incentivar la instalación de paneles solares residenciales e implementar inversiones ambientales para un ecosistema más saludable y la mitigación del impacto climático.

Mesa Community College Open House Event Summary

English & Spanish PDFs:

- English
- Spanish

Event Overview:
Address: 1833 W. Southern Avenue, Mesa, Arizona 85202
Date: Saturday, December 16, 2023
Time: 10:00am - 11:30am
Participants: 21
Written Feedback: 17

Summary of Community Feedback on Grant Usage for Environmental and Infrastructure Initiatives in Arizona

Solar Panel Implementation and Urban Planning:
Residents urge for the installation of solar panels on buildings to combat climate pollution and express concern about urban sprawl in the Phoenix Metropolitan area, advocating for strategies that avoid exacerbating it.

Federal Investments and Agency Collaboration:
There is gratitude for proactive federal investments and encouragement for MAG to work with the Office of Resiliency and the Arizona Department of Transportation to implement sustainable programs effectively.

Transportation Electrification and Pollution Reduction:
The community supports the push towards transportation electrification, including public vehicle fleets and infrastructure, and endorses the electrification of lawn and garden equipment as a simple pollution-cutting measure.

Building Emissions and Weatherization:
Programs aimed at reducing building emissions receive support, highlighting that weatherization assistance can help households of various income levels reduce both emissions and energy consumption.

Active Transportation Network Infrastructure:
Guests advocated for enhanced bicycle infrastructure and public transportation options, emphasizing the need for safer, dedicated lanes for cyclists and micromobility beyond mere road markings.

Statewide Composting Initiative:
There's a call for a statewide composting initiative to reduce methane emissions, with a focus on the significant impact of heat in Arizona, aiming to protect water resources and investments in homes and businesses.

Formation of a Resilience Committee:
Suggestions are made for the resilience, open space, and environment workgroup to become a formal committee, which could unify environmental and park planners to advance climate planning and initiatives.

Active Transportation and Community Connectivity:
Feedback includes a plea to reduce gated communities that impede active transportation and to consider native vegetation in public spaces for ecological and climate resilience.

Public Charging Infrastructure and Remote Work Incentives:
There is strong support for more public EV charging stations and transportation demand management, advocating for remote work options to reduce personal vehicle use.

Protection of Natural Lands and Wildlife Connectivity:
The importance of protecting natural and working lands is highlighted, with an emphasis on maintaining wildlife connectivity and developing microgrids and renewable energy sources, considering the integration of trails and e-bike lanes.

Safe Connections for Children and Bicycle Infrastructure:
Concerns are raised about the safety of children traveling to school in areas affected by historic redlining and the necessity for a comprehensive bicycle and active mode infrastructure grid.

Advocacy for Climate Action and Community Resilience:
There's a strong call for MAG to advocate for climate action at the national level and to develop local resilience hubs for community safety in emergencies, stressing the urgency of these measures.

Overall Priorities from the Feedback:

1. Strengthen Building Emission Standards and Weatherization Programs: Emphasize the development of programs that lower building emissions, with a special focus on expanding weatherization assistance to help residents across different income levels decrease their energy consumption and environmental impact.

2. Expand Electrification and Pollution Reduction Efforts: Accelerate the transition to electrified transportation, including public vehicle fleets and charging infrastructure, and promote the electrification of lawn and garden equipment to reduce overall pollution levels.

3. Advance Composting and Climate Resilience Measures: Implement a statewide composting initiative to address methane emissions and establish community resilience hubs to ensure safety during extreme weather events and grid outages.

Resumen del Evento:
Dirección: 1833 W. Southern Avenue, Mesa, Arizona 85202
Fecha: Sábado 16 de diciembre de 2023
Hora: 10:00am - 11:30am
Participantes: 21
Comentarios Escritos: 17

Resumen de los comentarios de la comunidad sobre el uso de subvenciones para iniciativas medioambientales e infraestructuras en Arizona:

Implementación de Paneles Solares y Planificación Urbana:
Los residentes instan a la instalación de paneles solares en edificios para combatir la contaminación climática y expresan preocupación por la expansión urbana en el área metropolitana de Phoenix, abogando por estrategias que eviten agravarla**.**

Inversiones Federales y Colaboración entre Agencias:
Hay gratitud por las inversiones federales proactivas y aliento para que MAG colabore con la Oficina de Resiliencia y el Departamento de Transporte de Arizona para implementar programas sostenibles de manera efectiva.

Electrificación del Transporte y Reducción de la Contaminación: La comunidad respalda el impulso hacia la electrificación del transporte, incluidas flotas de vehículos públicos e infraestructura, y respalda la electrificación de equipos de jardinería como medida sencilla para reducir la contaminación

Emisiones de Edificios y Aislamiento Térmico:
Los programas destinados a reducir las emisiones de edificios reciben apoyo, destacando que la asistencia para el aislamiento térmico puede ayudar a hogares de diversos niveles de ingresos a reducir tanto las emisiones como el consumo de energía.

Infraestructura de Red de Transporte Activo:
Los invitados abogaron por una mejor infraestructura para bicicletas y opciones de transporte público, enfatizando la necesidad de carriles más seguros y dedicados para ciclistas y micro movilidad más allá de simples marcas en la carretera.

Iniciativa Estatal de Compostaje:
Hay un llamado para una iniciativa estatal de compostaje para reducir las emisiones de

metano, con un enfoque en el impacto significativo del calor en Arizona, con el objetivo de proteger los recursos hídricos y las inversiones en hogares y negocios.

Formación de un Comité de Resiliencia:
Se sugiere que el grupo de trabajo de resiliencia, espacios abiertos y medio ambiente se convierta en un comité formal, lo que podría unificar a planificadores ambientales y de parques para avanzar en la planificación climática e iniciativas.

Transporte Activo y Conectividad Comunitaria:
Los comentarios incluyen una súplica para reducir las comunidades cerradas que obstaculizan el transporte activo y considerar la vegetación nativa en espacios públicos para la resiliencia ecológica y climática.

Infraestructura de Carga Pública e Incentivos para el Trabajo a Distancia: Existe un fuerte apoyo para más estaciones públicas de carga para vehículos eléctricos y gestión de la demanda de transporte, abogando por opciones de trabajo a distancia para reducir el uso de vehículos personales.

Protección de Tierras Naturales y Conectividad de Vida Silvestre: Se destaca la importancia de proteger tierras naturales y de trabajo, haciendo hincapié en mantener la conectividad de la vida silvestre y desarrollar microrredes y fuentes de energía renovable, considerando la integración de senderos y carriles para bicicletas eléctricas.

Conexiones Seguras para Niños e Infraestructura de Bicicletas: Se plantean preocupaciones sobre la seguridad de los niños que viajan a la escuela en áreas afectadas por la discriminación histórica en la asignación de recursos y la necesidad de una red integral de infraestructura para bicicletas y modos activos.

Defensa de la Acción Climática y Resiliencia Comunitaria:
Hay un fuerte llamado a que MAG defienda la acción climática a nivel nacional y desarrolle centros de resiliencia locales para la seguridad comunitaria en emergencias, subrayando la urgencia de estas medidas.

Prioridades generales de acuerdo a los comentarios:

1. Fortalecer los Estándares de Emisión de Edificios y Programas de Aislamiento Térmico:
Énfasis en el desarrollo de programas que reduzcan las emisiones de edificios, con un enfoque especial en expandir la asistencia para el aislamiento térmico para ayudar a residentes de diferentes niveles de ingresos a disminuir su consumo de energía e impacto ambiental.

2. Ampliar los Esfuerzos de Electrificación y Reducción de la Contaminación: Acelerar la transición hacia el transporte electrificado, incluyendo las flotas de vehículos públicos e infraestructura de carga, y promover la electrificación de equipos de jardinería para reducir los niveles generales de contaminación.

3. Avanzar en Medidas de Compostaje y Resiliencia Climática: Implementar una iniciativa estatal de compostaje para abordar las emisiones de metano y establecer centros de resiliencia comunitaria para garantizar la seguridad durante eventos climáticos extremos e interrupciones en la red.

Individual Sessions and Online Session by Date and Zip Codes

PDFs can be found in the following links:

- Individual - broken out by summary and dates/zip code.
- Online - broken out by zip code.

MARICOPA ASSOCIATION of GOVERNMENTS

Climate Pollution Reduction Grant Open House Feedback Summary

Color Key:

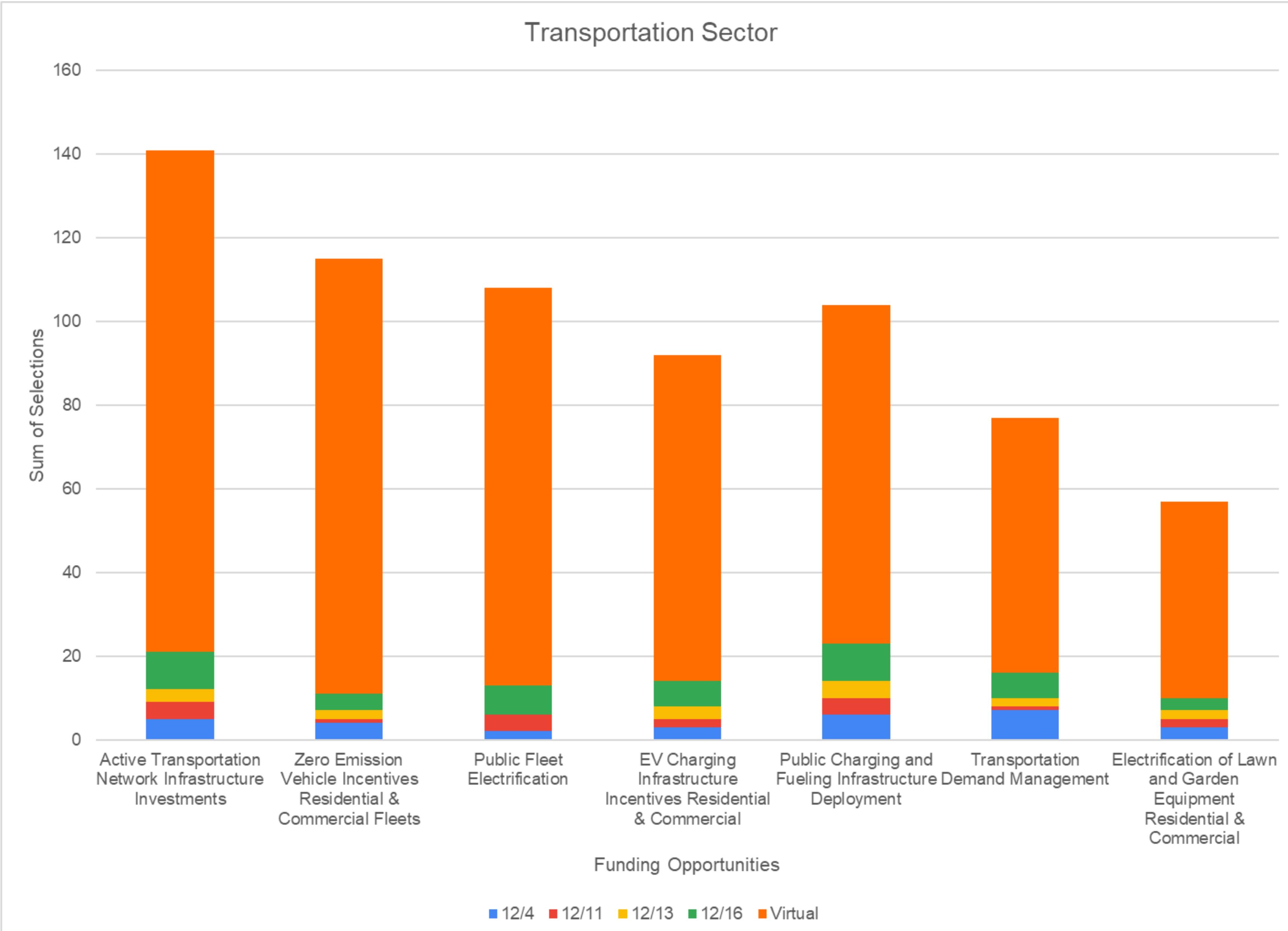
First Priority

Second Priority

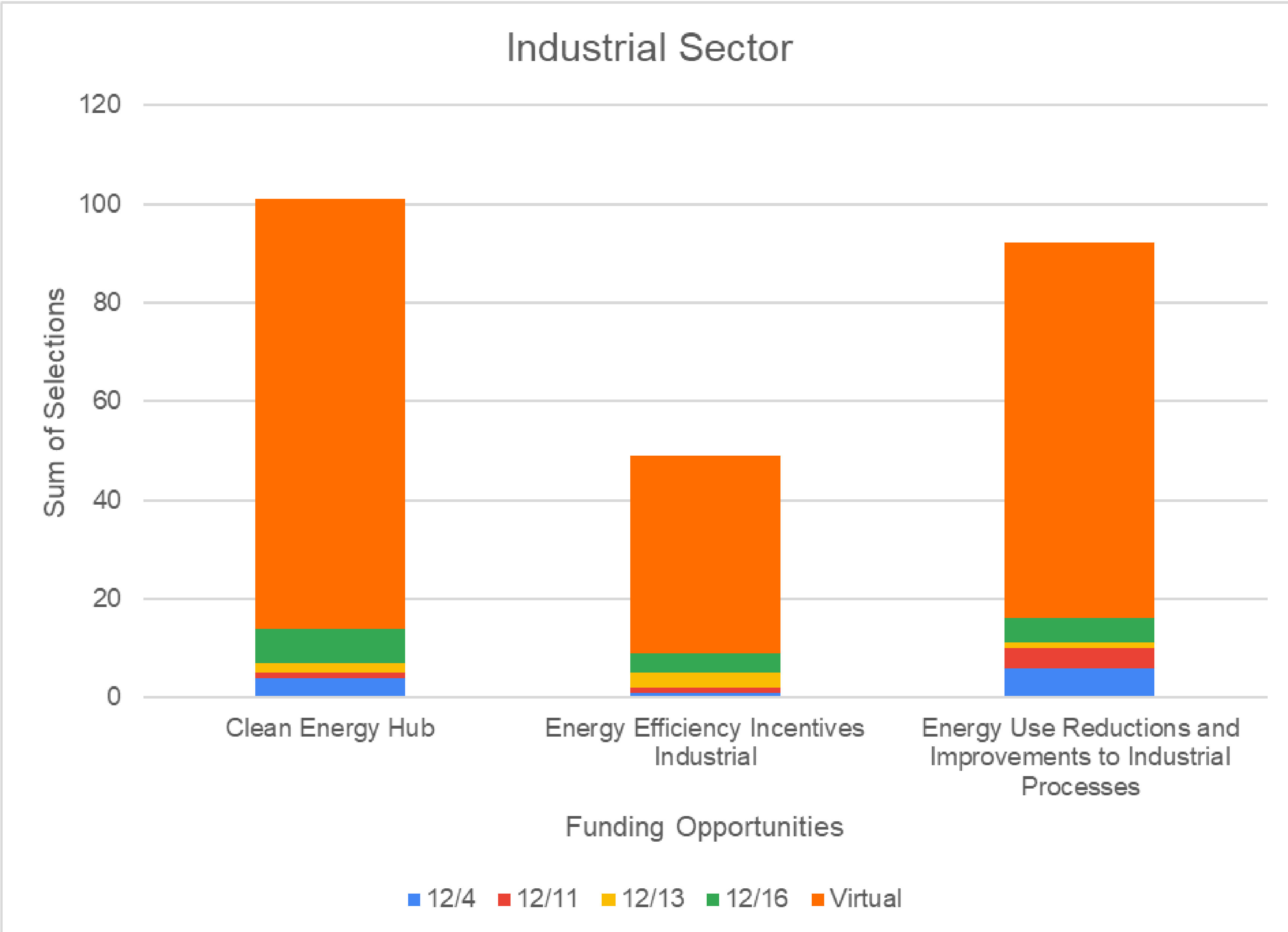
Third Priority

Event Date:	12/4	12/11	12/13	12/16	Virtual	Summary
Transportation Sector:						
Top 3 Priorities						
Active Transportation Network Infrastructure Investments	5	4	3	9	120	141
Zero Emission Vehicle Incentives Residential & Commercial Fleets	4	1	2	4	104	115
Public Fleet Electrification	2	4	0	7	95	108
EV Charging Infrastructure Incentives Residential & Commercial	3	2	3	6	78	92
Public Charging and Fueling Infrastructure Deployment	6	4	4	9	81	104
Transportation Demand Management	7	1	2	6	61	77
Electrification of Lawn and Garden Equipment Residential & Commercial	3	2	2	3	47	57
Industrial Sector						
Top Priority						
Clean Energy Hub	4	1	2	7	87	101
Energy Efficiency Incentives Industrial	1	1	3	4	40	49
Energy Use Reductions and Improvements to Industrial Processes	6	4	1	5	76	92
Building Sector						
Top 3 Priorities						

Weatherization Assistance Programs Residential and Commercial	8	4	4	11	138	165
Adoption of Green Energy Code Residential and Commercial	6	5	1	8	143	163
Energy Efficient Building Product Incentives Residential and Commercial	3	4	3	7	129	146
Voluntary Building Performance Standards and Incentives	1	2	4	7	27	41
Refrigerant Recovery Programs Residential and Commercial	3	1	1	3	44	52
Electrification of Municipal, Commercial, and Residential Buildings	7	5	3	8	108	131
Natural and Working Lands Sector						
Top 2 Priorities						
Urban Afforestation/Increase Tree Canopy Cover	8	3	4	8	147	170
Protection of Natural and Working Lands	4	0	4	7	107	122
Electrification of Agricultural Equipment	4	3	1	5	21	34
Improvements to Fertilizer Technologies and Techniques	1	2	2	6	41	52
Green Stormwater Infrastructure	5	6	2	4	84	101
Waste and Water Sector						
Top 2 Priorities						
Programs for Recycling, Composting, and Food/Yard Waste Diversion	7	4	3	7	113	134
Programs for Repair, Reuse, and Repurposing of Materials	4	3	3	9	93	112
Biogas Capture from Landfills and Wastewater Treatment Plants	2	2	2	3	51	60
Renewable Energy and Energy Efficiency at Wastewater Treatment Plants	6	3	3	5	76	93
Renewable Energy Generation at Landfills	4	3	3	6	75	91
Electric Power Sector						
Top 2 Priorities						
Renewable Energy Generation Incentives Residential and Commercial	0	2	6	5	115	128
Development of Microgrids	6	3	2	8	97	116
Procurement of Renewable Energy for Municipal Operations	2	4	2	5	51	64
Energy Efficiency Upgrades for Municipal Operations	5	3	2	5	46	61
Renewable Energy Generation at Municipal Facilities	7	2	2	7	92	110



Transportation Sector
160
140
120
100
80
60
40
20
0
Sum of Selections
Active Transportation Network Infrastructure Investments
Zero Emission Vehicle Incentives Residential & Commercial Fleets
Public Fleet Electrification
EV Charging Infrastructure Incentives Residential & Commercial
Public Charging and Fueling Infrastructure Deployment
Transportation Demand Management
Electrification of Lawn and Garden Equipment Residential & Commercial
Funding Opportunities
12/4
12/11
12/13
12/16
Virtual


Industrial Sector
Sum of Selections
120
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60
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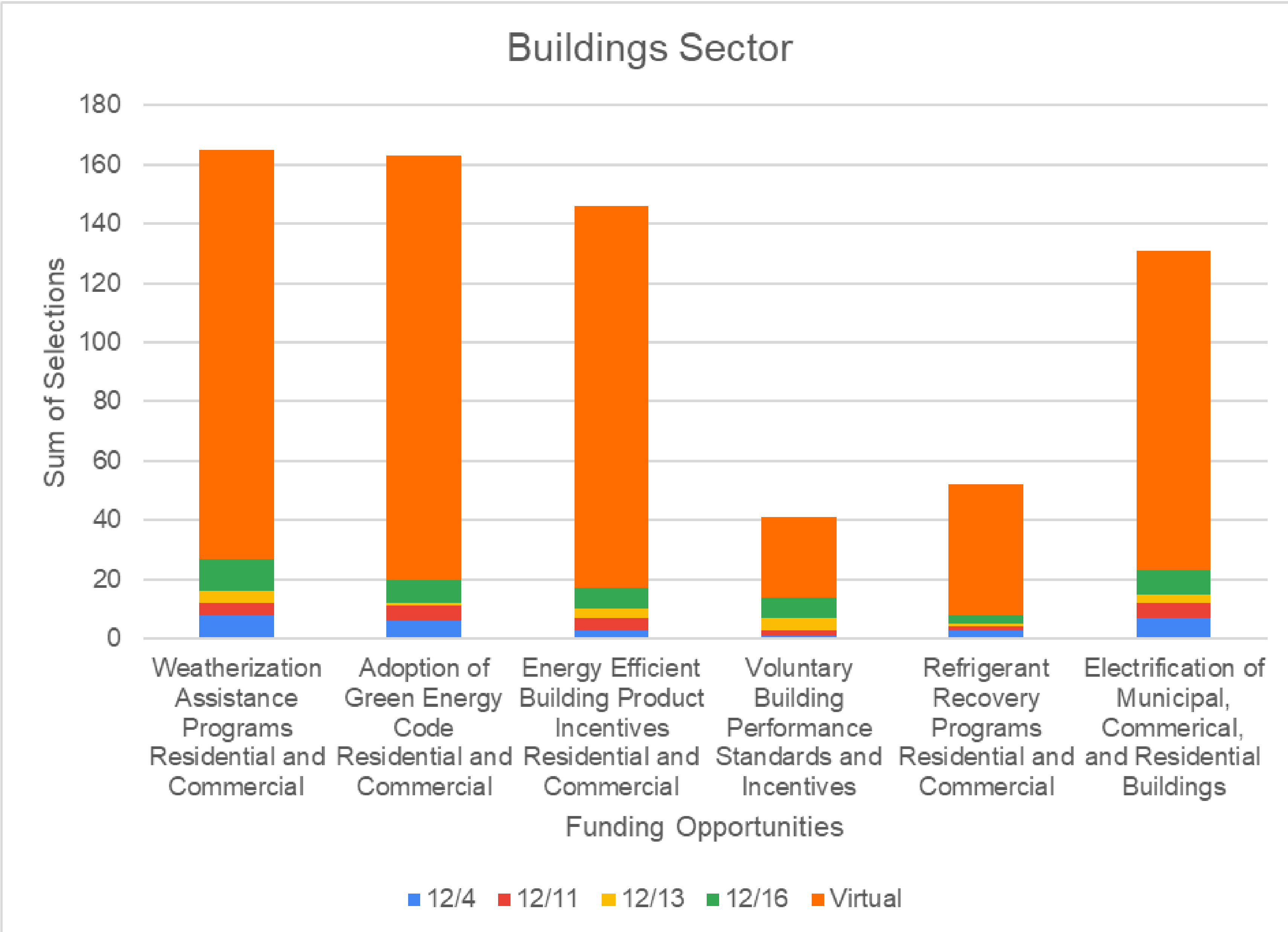
Clean Energy Hub
Energy Efficiency Incentives Industrial
Energy Use Reductions and Improvements to Industrial Processes
Funding Opportunities
12/4
12/11
12/13
12/16
Virtual


Buildings Sector
180
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Sum of Selections
Weatherization Assistance Programs Residential and Commercial
Adoption of Green Energy Code Residential and Commercial
Energy Efficient Building Product Incentives Residential and Commercial
Voluntary Building Performance Standards and Incentives
Refrigerant Recovery Programs Residential and Commercial
Electrification of Municipal, Commerical, and Residential Buildings
Funding Opportunities
12/4
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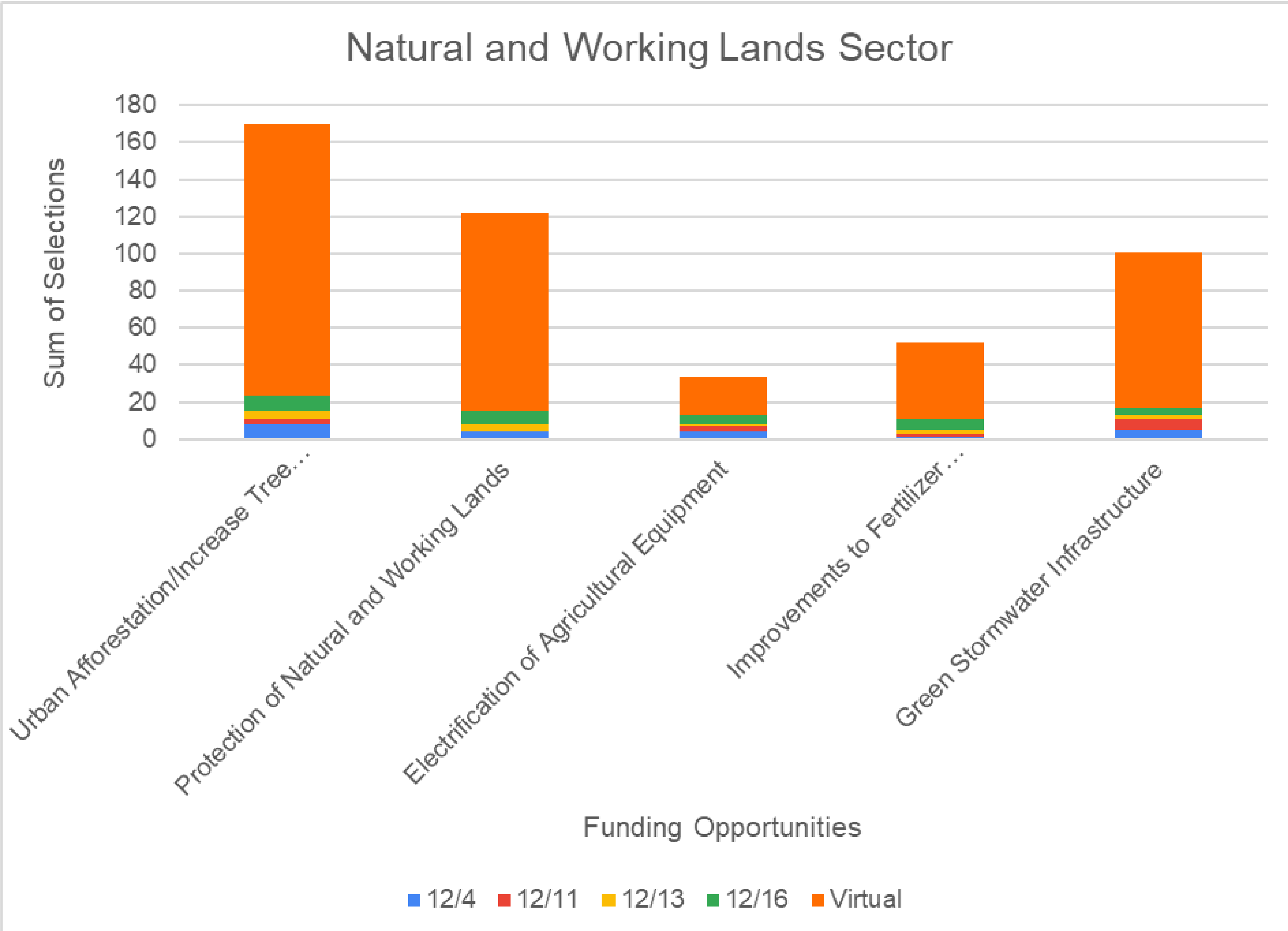
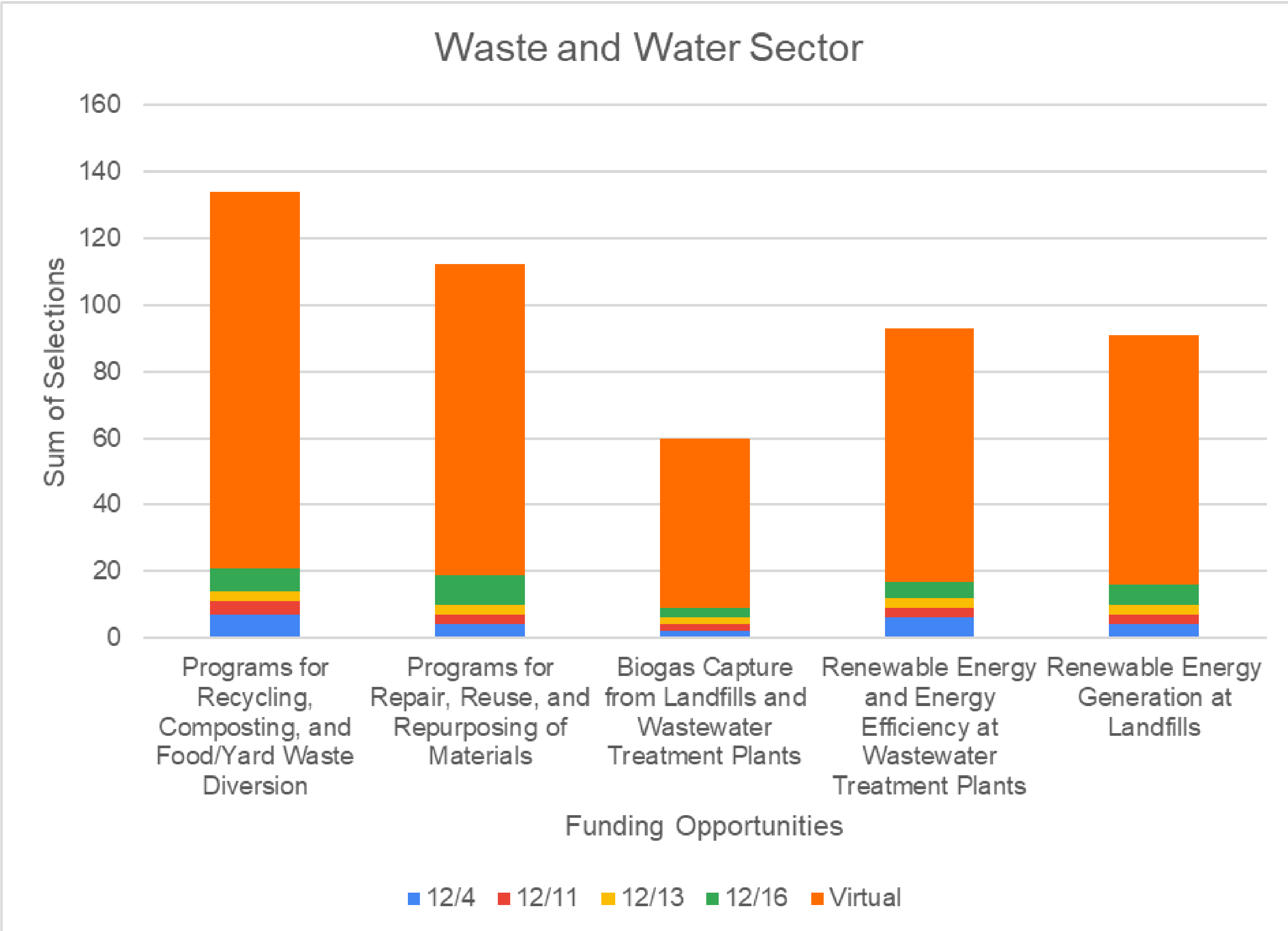
Virtual


Natural and Working Lands Sector
Sum of Selections
180
160
140
120
100
80
60
40
20
0
Urban Afforestation/Increase Tree…
Protection of Natural and Working Lands
Electrification of Agricultural Equipment
Improvements to Fertilizer …
Green Stormwater Infrastructure
Funding Opportunities
12/4
12/11
12/13
12/16
Virtual



Waste and Water Sector
Sum of Selections
160
140
120
100
80
60
40
20
0
Programs for Recycling, Composting, and Food/Yard Waste Diversion
Programs for Repair, Reuse, and Repurposing of Materials
Biogas Capture from Landfills and Wastewater Treatment Plants
Renewable Energy and Energy Efficiency at Wastewater Treatment Plants
Renewable Energy Generation at Landfills
Funding Opportunities
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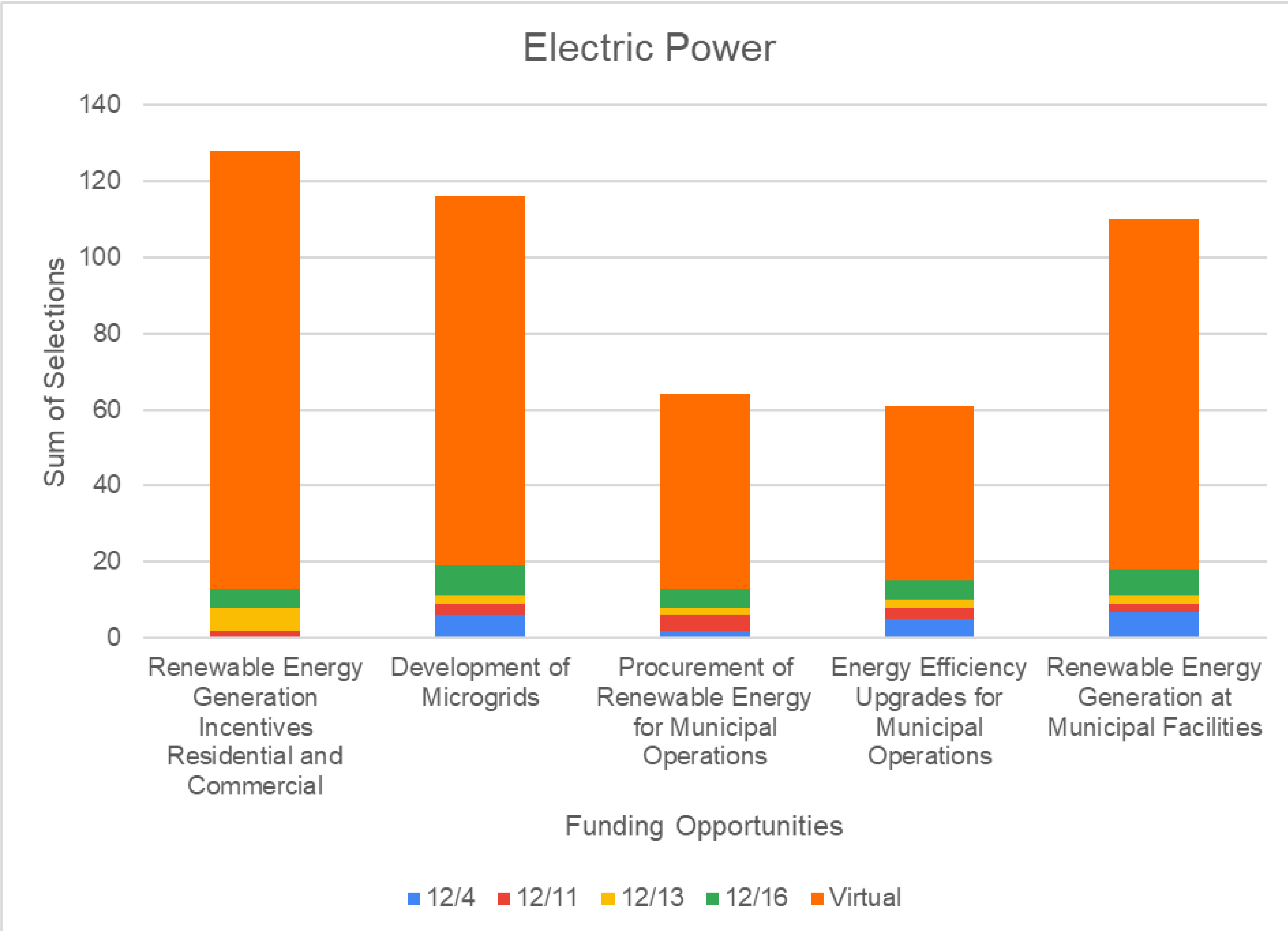
Electric Power
Sum of Selections
0
20
40
60
80
100
120
140
Renewable Energy Generation Incentives Residential and Commercial
Development of Microgrids
Procurement of Renewable Energy for Municipal Operations
Energy Efficiency Upgrades for Municipal Operations
Renewable Energy Generation at Municipal Facilities
Funding Opportunities
12/4
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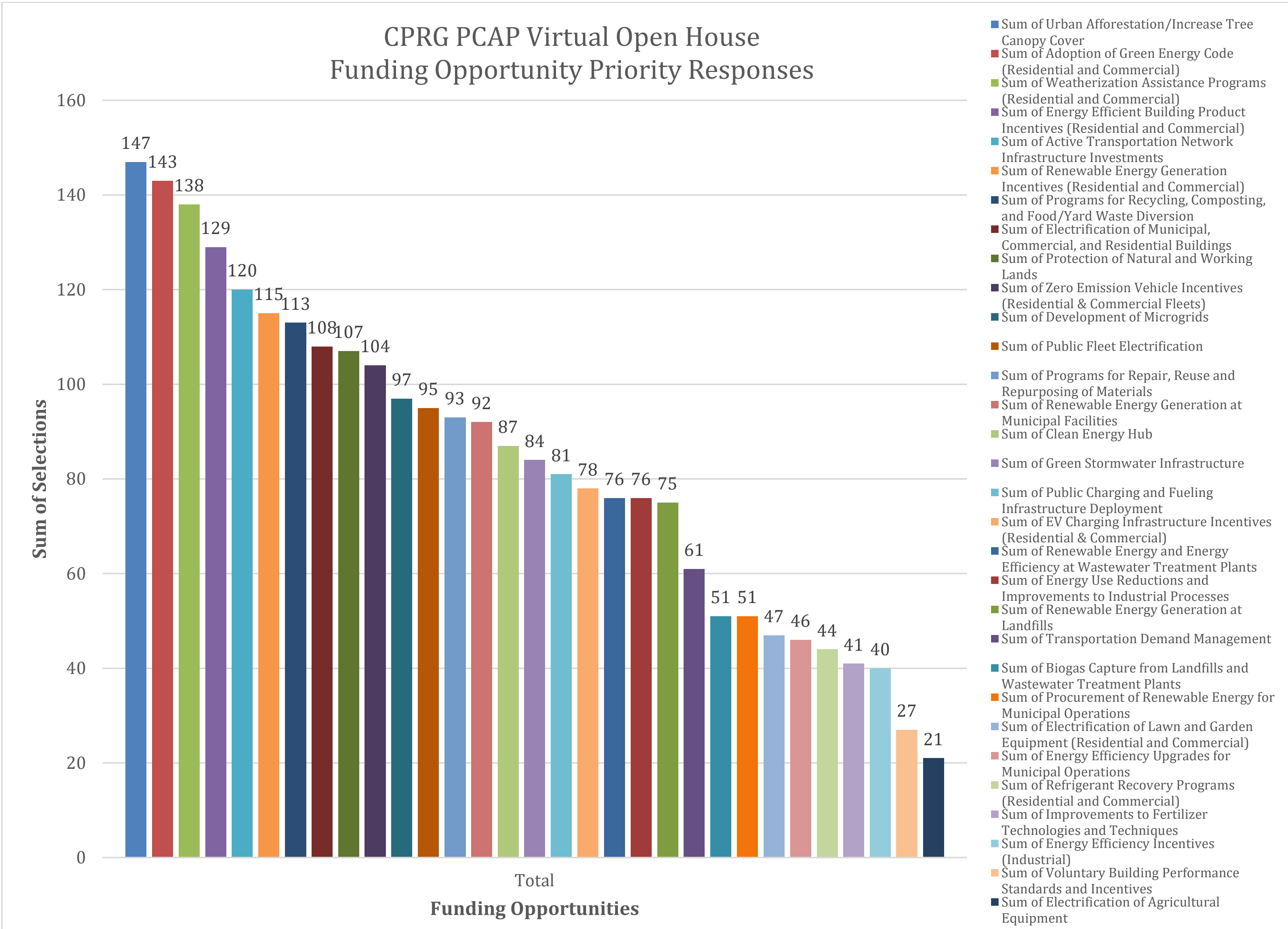
12/16
Virtual


CPRG PCAP Virtual Open House
Funding Opportunity Priority Responses
Sum of Selections
160
140
120
100
80
60
40
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0
147
143
138
129
120
115
113
108
107
104
97
95
93
92
87
84
81
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76
76
75
61
51
51
47
46
44
41
40
27
21
Total
Funding Opportunities
Sum of Urban Afforestation/Increase Tree Canopy Cover
Sum of Adoption of Green Energy Code (Residential and Commercial)
Sum of Weatherization Assistance Programs (Residential and Commercial)
Sum of Energy Efficient Building Product Incentives (Residential and Commercial)
Sum of Active Transportation Network Infrastructure Investments
Sum of Renewable Energy Generation Incentives (Residential and Commercial)
Sum of Programs for Recycling, Composting, and Food/Yard Waste Diversion
Sum of Electrification of Municipal, Commercial, and Residential Buildings
Sum of Protection of Natural and Working Lands
Sum of Zero Emission Vehicle Incentives (Residential & Commercial Fleets)
Sum of Development of Microgrids
Sum of Public Fleet Electrification
Sum of Programs for Repair, Reuse and Repurposing of Materials
Sum of Renewable Energy Generation at Municipal Facilities
Sum of Clean Energy Hub
Sum of Green Stormwater Infrastructure
Sum of Public Charging and Fueling Infrastructure Deployment
Sum of EV Charging Infrastructure Incentives (Residential & Commercial)
Sum of Renewable Energy and Energy Efficiency at Wastewater Treatment Plants
Sum of Energy Use Reductions and Improvements to Industrial Processes
Sum of Renewable Energy Generation at Landfills
Sum of Transportation Demand Management
Sum of Biogas Capture from Landfills and Wastewater Treatment Plants
Sum of Procurement of Renewable Energy for Municipal Operations
Sum of Electrification of Lawn and Garden Equipment (Residential and Commercial)
Sum of Energy Efficiency Upgrades for Municipal Operations
Sum of Refrigerant Recovery Programs (Residential and Commercial)
Sum of Improvements to Fertilizer Technologies and Techniques
Sum of Energy Efficiency Incentives (Industrial)
Sum of Voluntary Building Performance Standards and Incentives
Sum of Electrification of Agricultural Equipment

MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix C: 2023 MAG Regional Environmental Challenges Survey Results

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

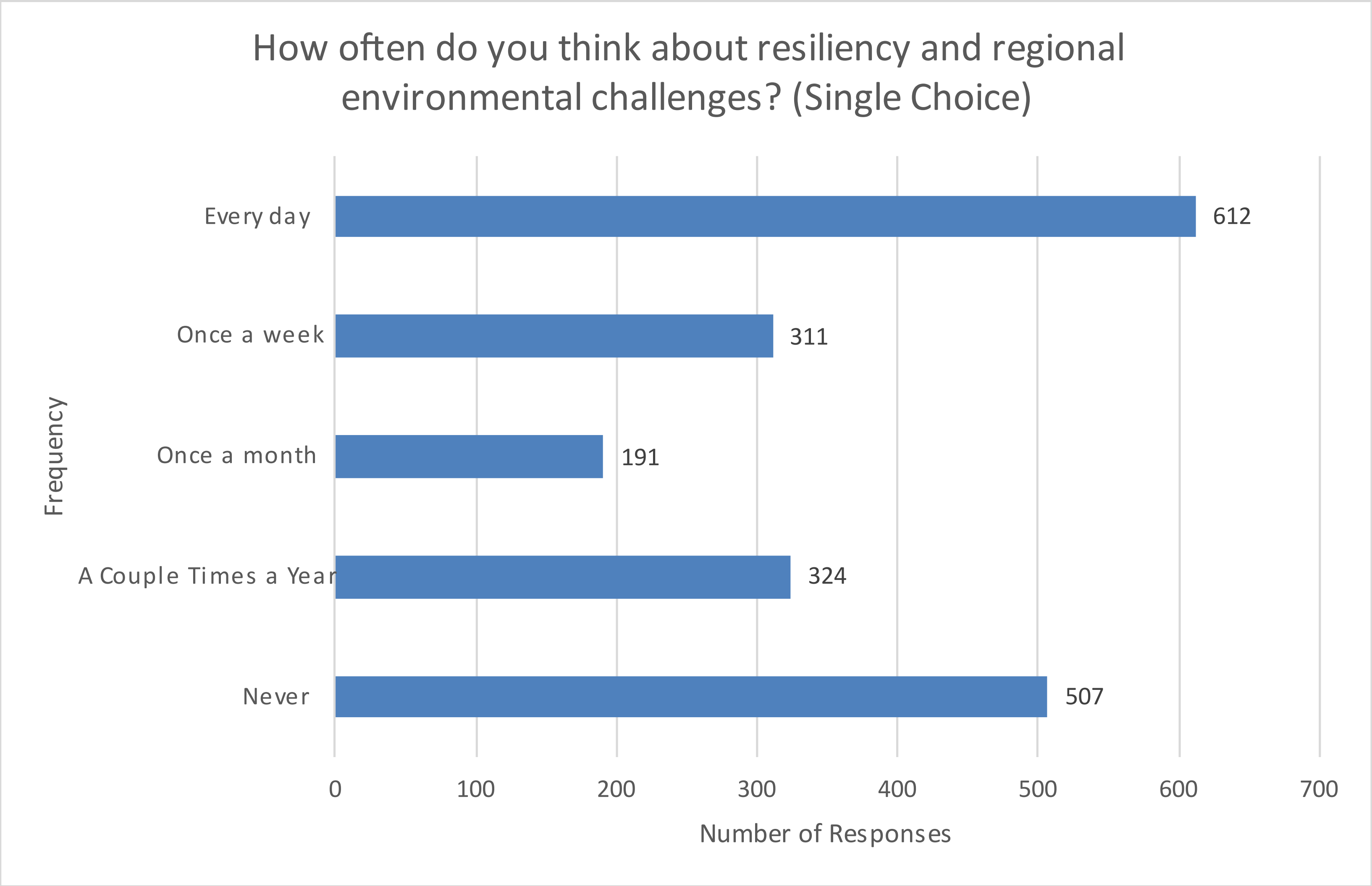
Introduction

In Fall of 2023, the Maricopa Association of Governments (MAG) in partnership with its member cities, towns, counties and Native nations, conducted a survey to engage residents and stakeholders to identify community values and priorities related to building resiliency, including reducing emissions that contribute to local air quality concerns. The purpose of this survey was to help inform MAG's environmental work including its work on the Climate Pollution Reduction Grants program.[1] The survey was open from October 17 to November 20, 2023 in both English and Spanish and received 1,972 responses. Graphs of the survey responses are included in the section below.

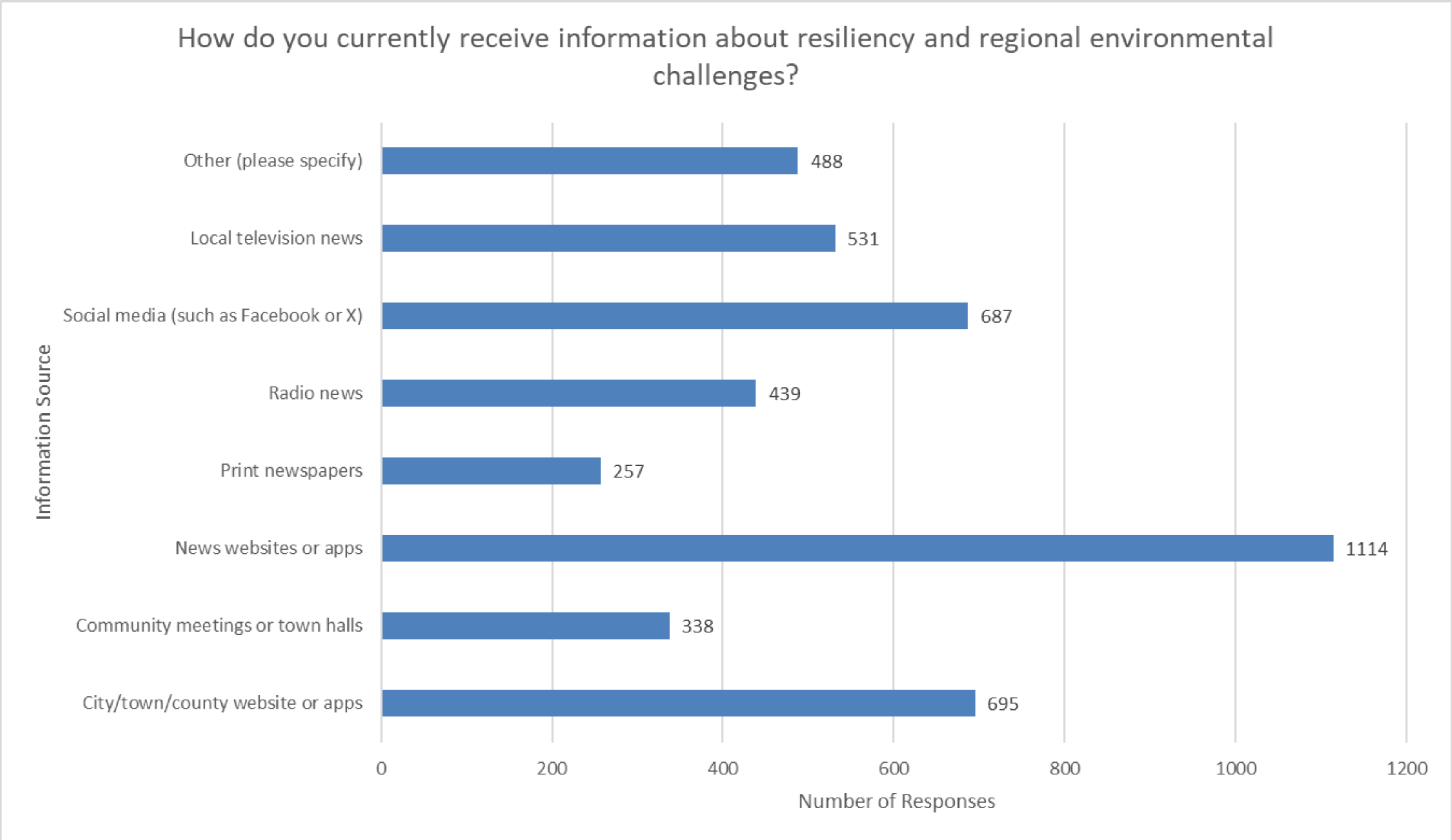
[1] While this initiative helped inform MAG's work on the CPRG program, CPRG Planning Grant funds were not used in the development of the 2023 MAG Regional Environmental Challenges survey.

Survey Results

Question 1

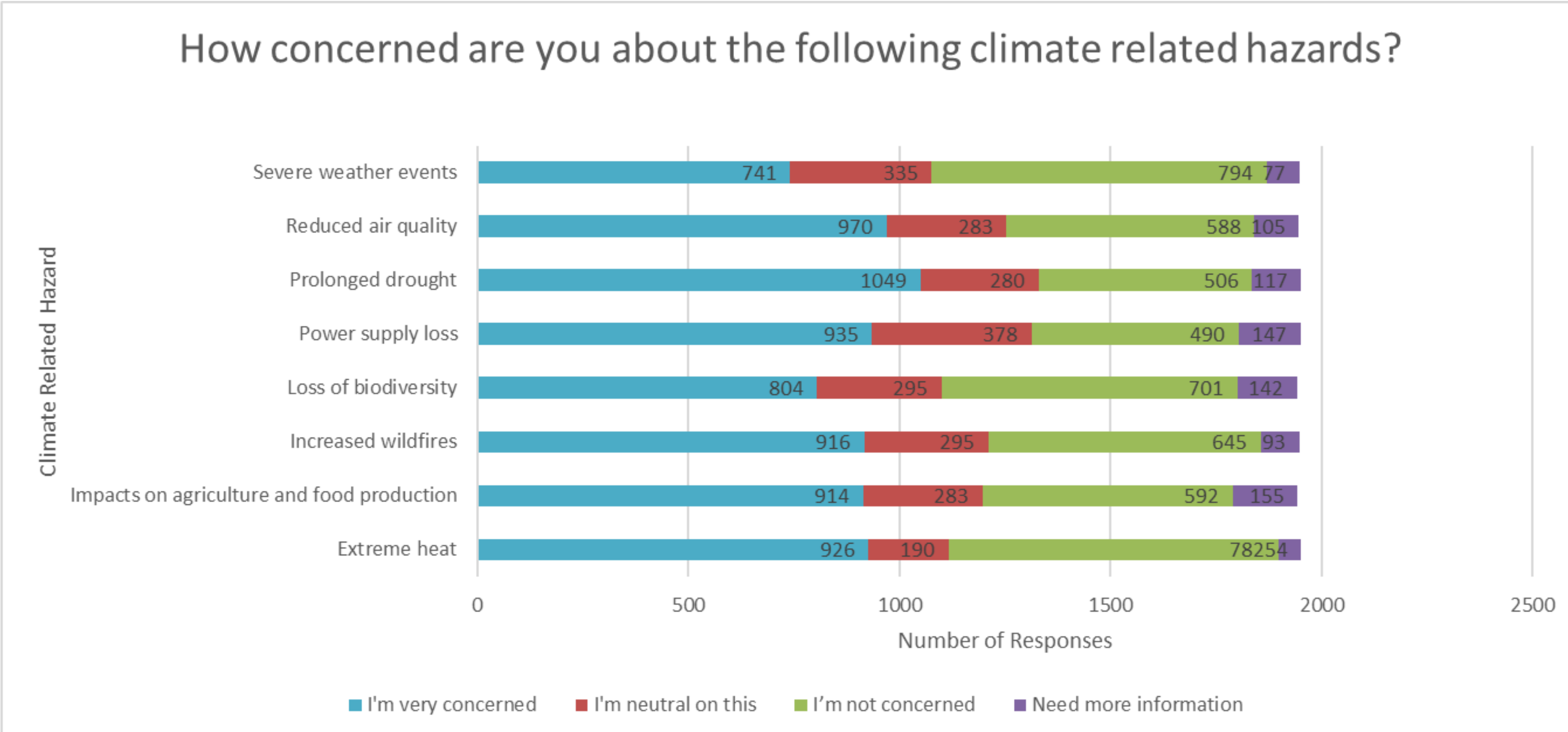


Question 2



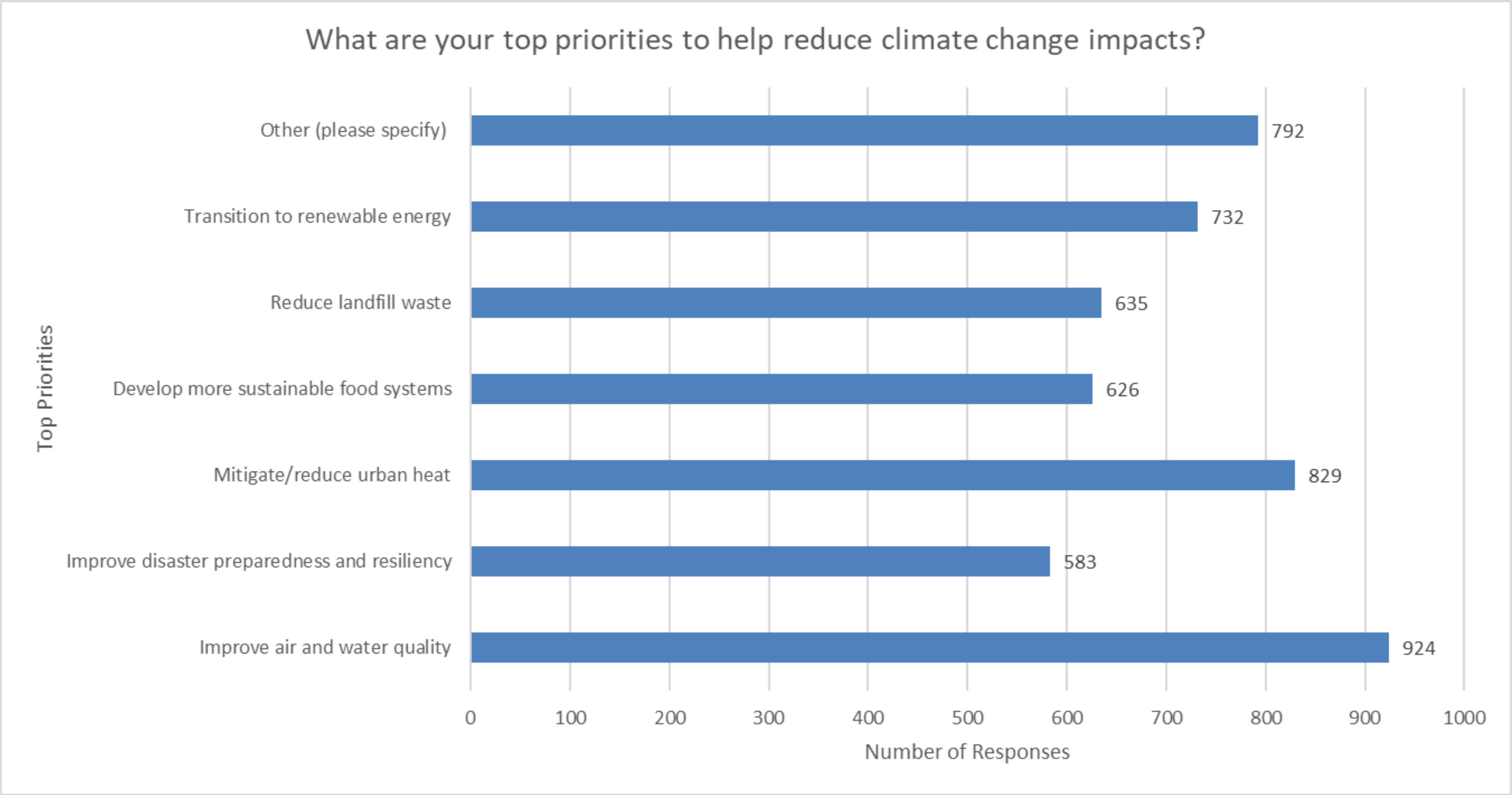
How do you currently receive information about resiliency and regional environmental challenges?
Other (please specify)
488
Local television news
531
Social media (such as Facebook or X)
687
Radio news
439
Print newspapers
257
News websites or apps
1114
Community meetings or town halls
338
City/town/county website or apps
695
Information Source
0
200
400
600
800
1000
1200
Number of Responses

Question 3

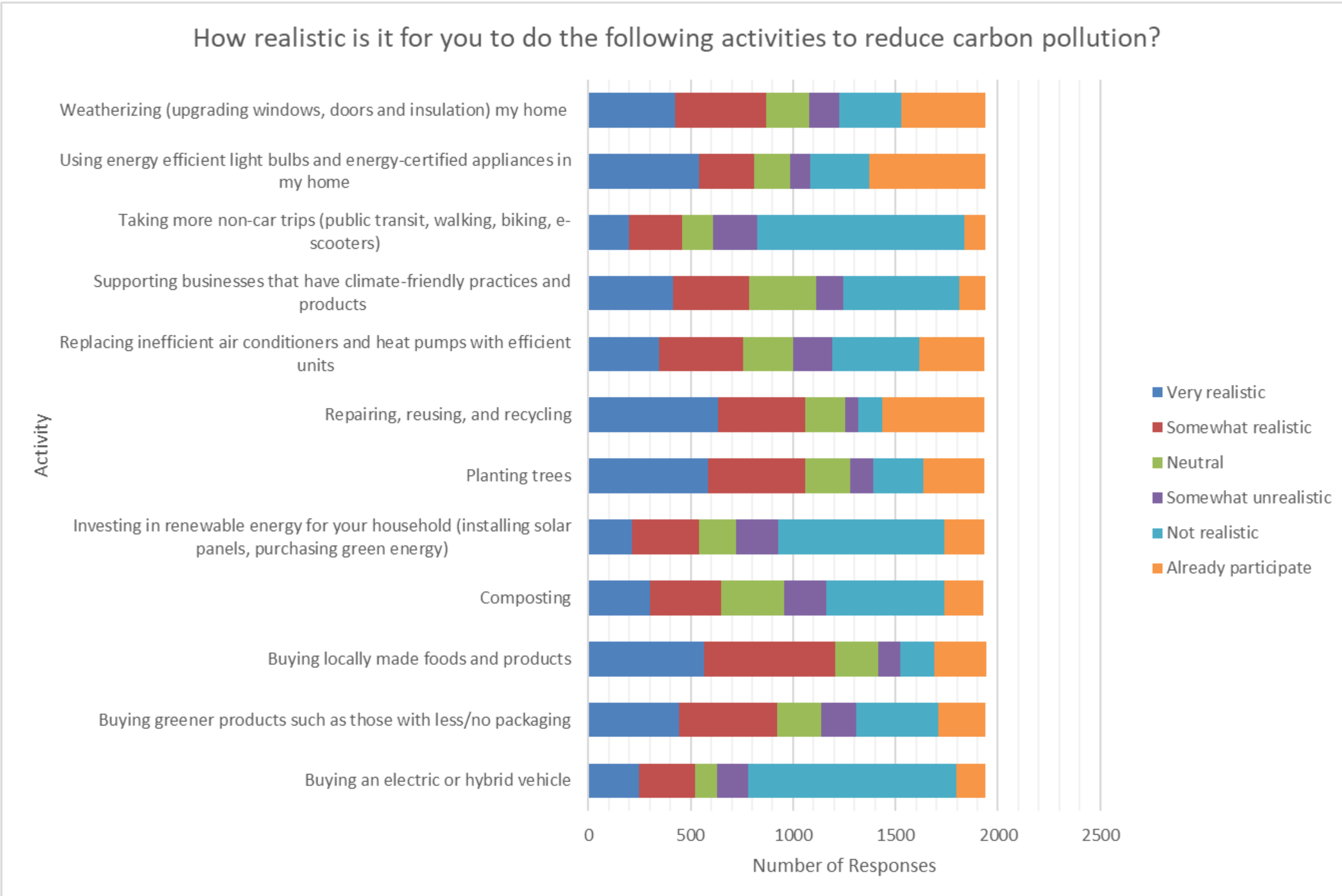


How concerned are you about the following climate related hazards?
Climate Related Hazard
Severe weather events
Reduced air quality
Prolonged drought
Power supply loss
Loss of biodiversity
Increased wildfires
Impacts on agriculture and food production
Extreme heat
741
335
794
77
970
283
588
105
1049
280
506
117
935
378
490
147
804
295
701
142
916
295
645
93
914
283
592
155
926
190
78254
0
500
1000
1500
2000
2500
Number of Responses
I'm very concerned
I'm neutral on this
I’m not concerned
Need more information

Question 4

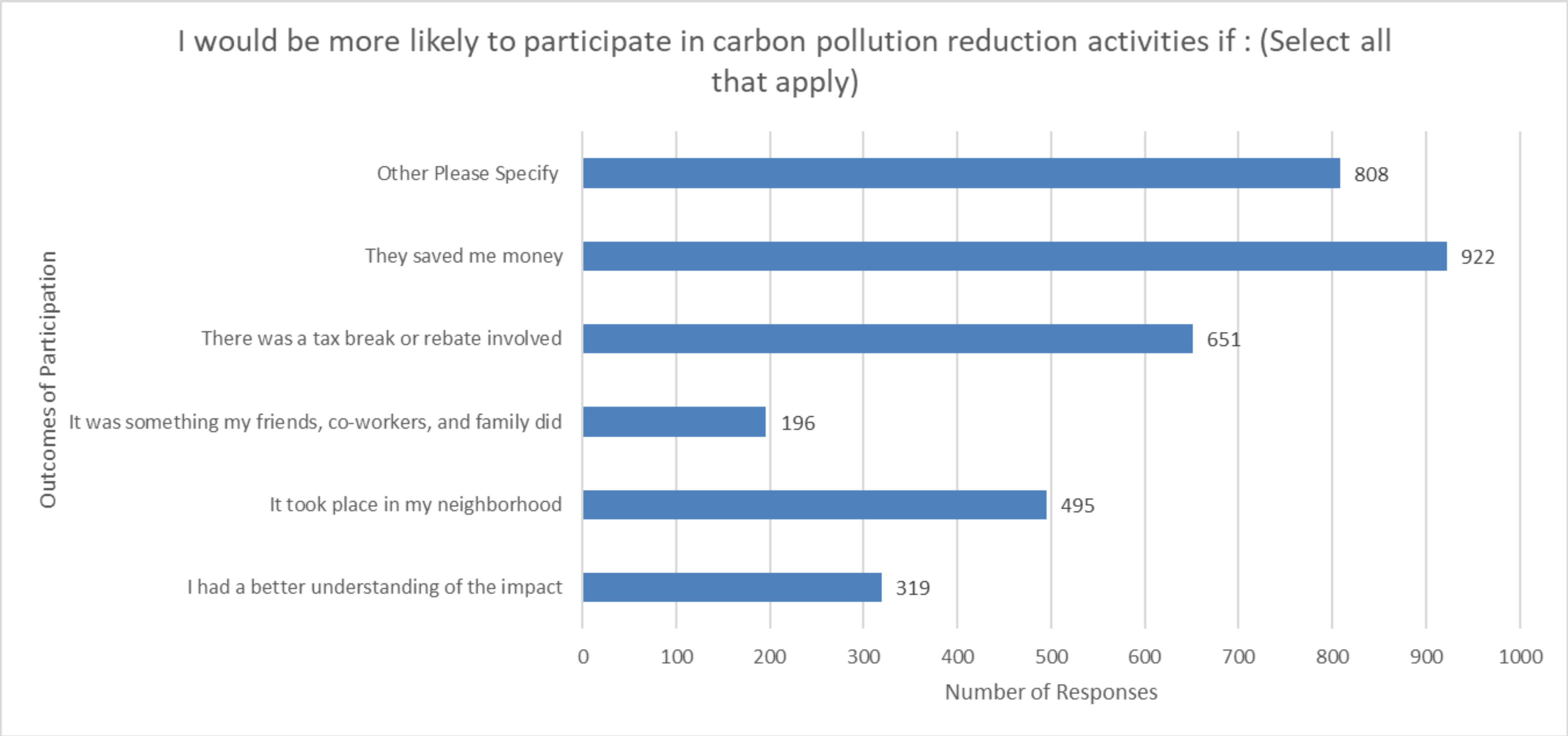

What are your top priorities to help reduce climate change impacts?
Top Priorities
Other (please specify)
Transition to renewable energy
Reduce landfill waste
Develop more sustainable food systems
Mitigate/reduce urban heat
Improve disaster preparedness and resiliency
Improve air and water quality
792
732
635
626
829
583
924
0
100
200
300
400
500
600
700
800
900
1000
Number of Responses

Question 5



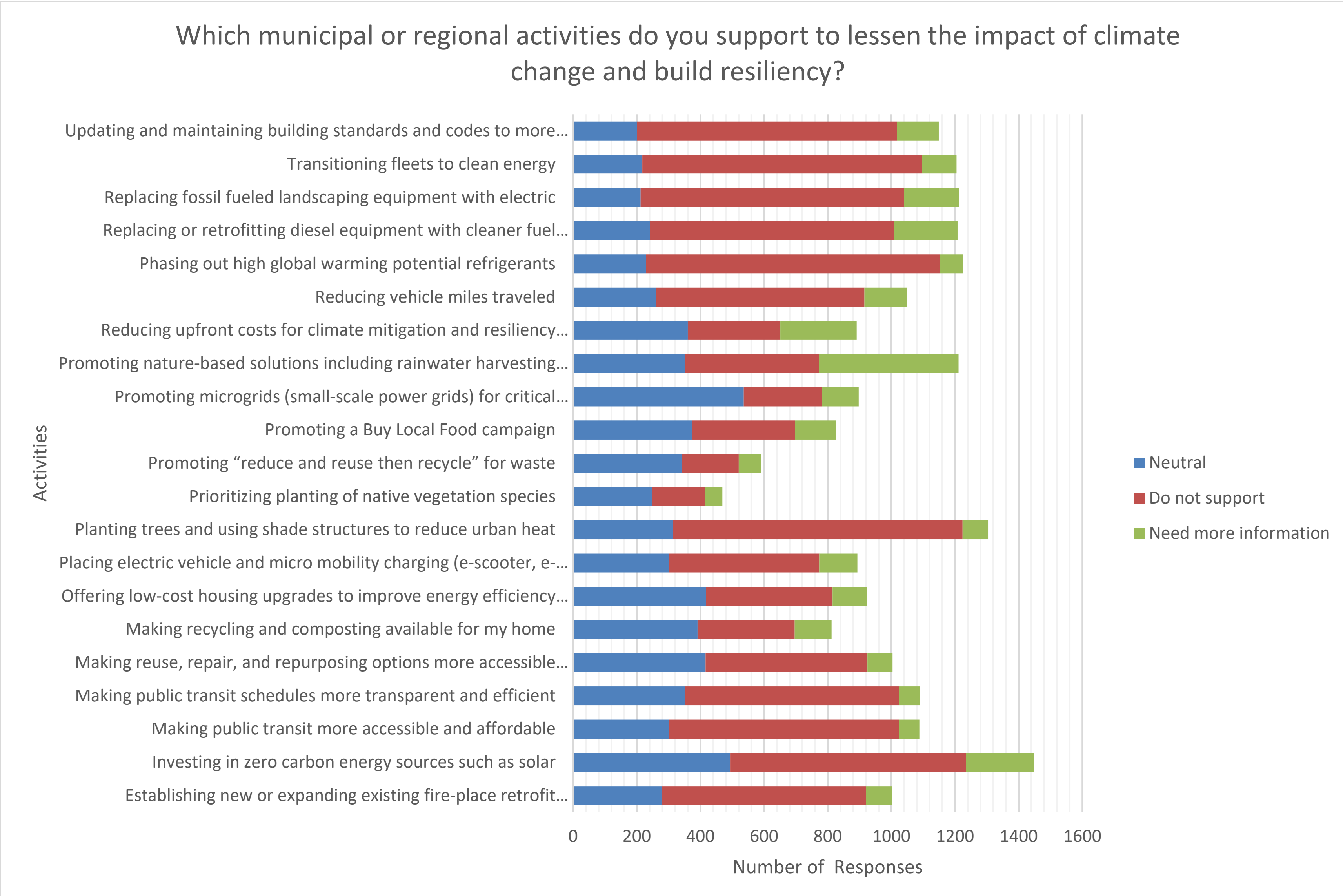
How realistic is it for you to do the following activities to reduce carbon pollution?
Weatherizing (upgrading windows, doors and insulation) my home
Using energy efficient light bulbs and energy-certified appliances in my home
Taking more non-car trips (public transit, walking, biking, e-scooters)
Supporting businesses that have climate-friendly practices and products
Replacing inefficient air conditioners and heat pumps with efficient units
Repairing, reusing, and recycling
Planting trees
Investing in renewable energy for your household (installing solar panels, purchasing green energy)
Composting
Buying locally made foods and products
Buying greener products such as those with less/no packaging
Buying an electric or hybrid vehicle
Activity
0
500
1000
1500
2000
2500
Number of Responses
Very realistic
Somewhat realistic
Neutral
Somewhat unrealistic
Not realistic
Already participate

Question 6

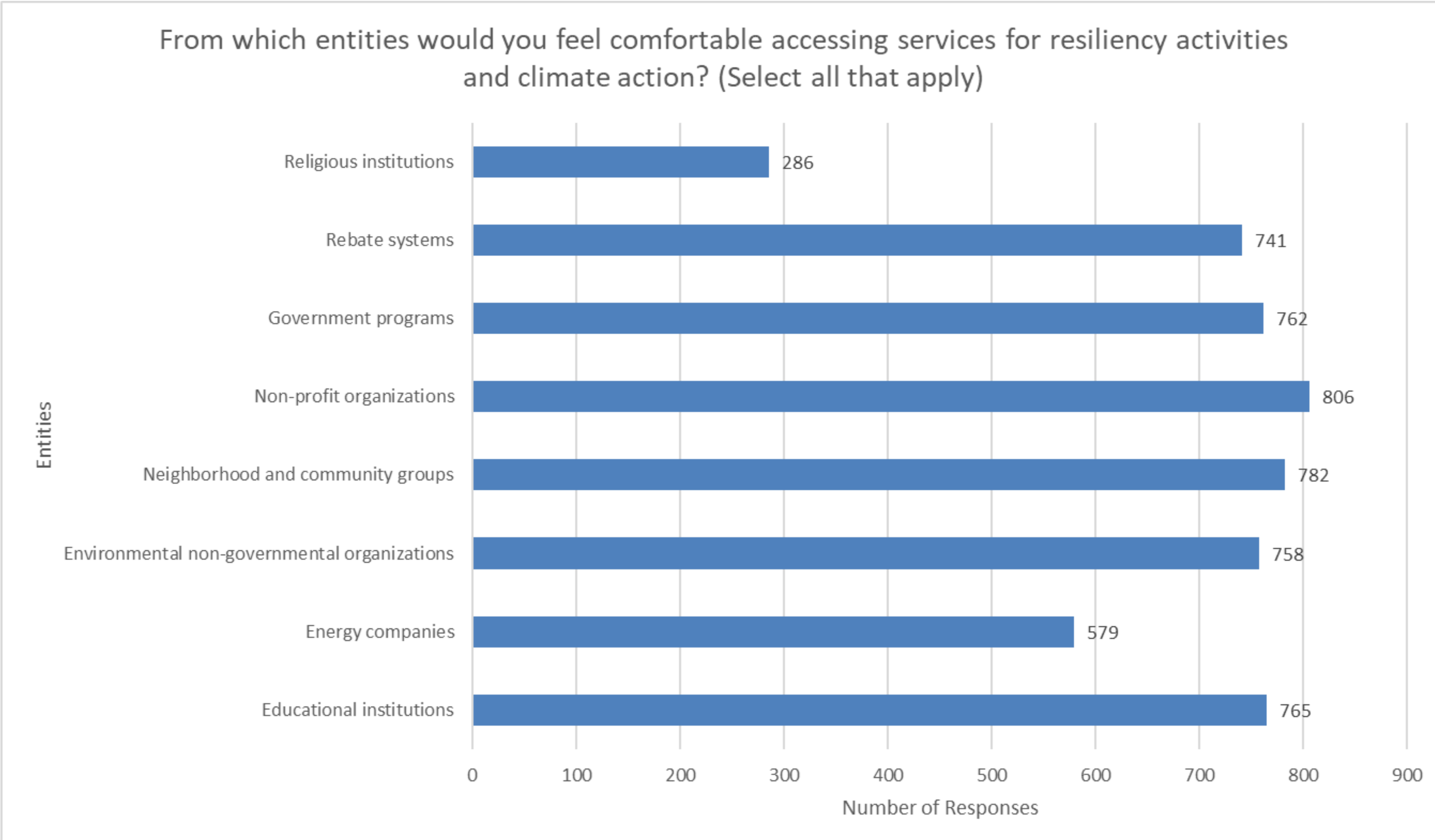


I would be more likely to participate in carbon pollution reduction activities if : (Select all that apply)
Other Please Specify
808
They saved me money
922
There was a tax break or rebate involved
651
It was something my friends, co-workers, and family did
196
It took place in my neighborhood
495
I had a better understanding of the impact
319
Outcomes of Participation
0
100
200
300
400
500
600
700
800
900
1000
Number of Responses

Question 7

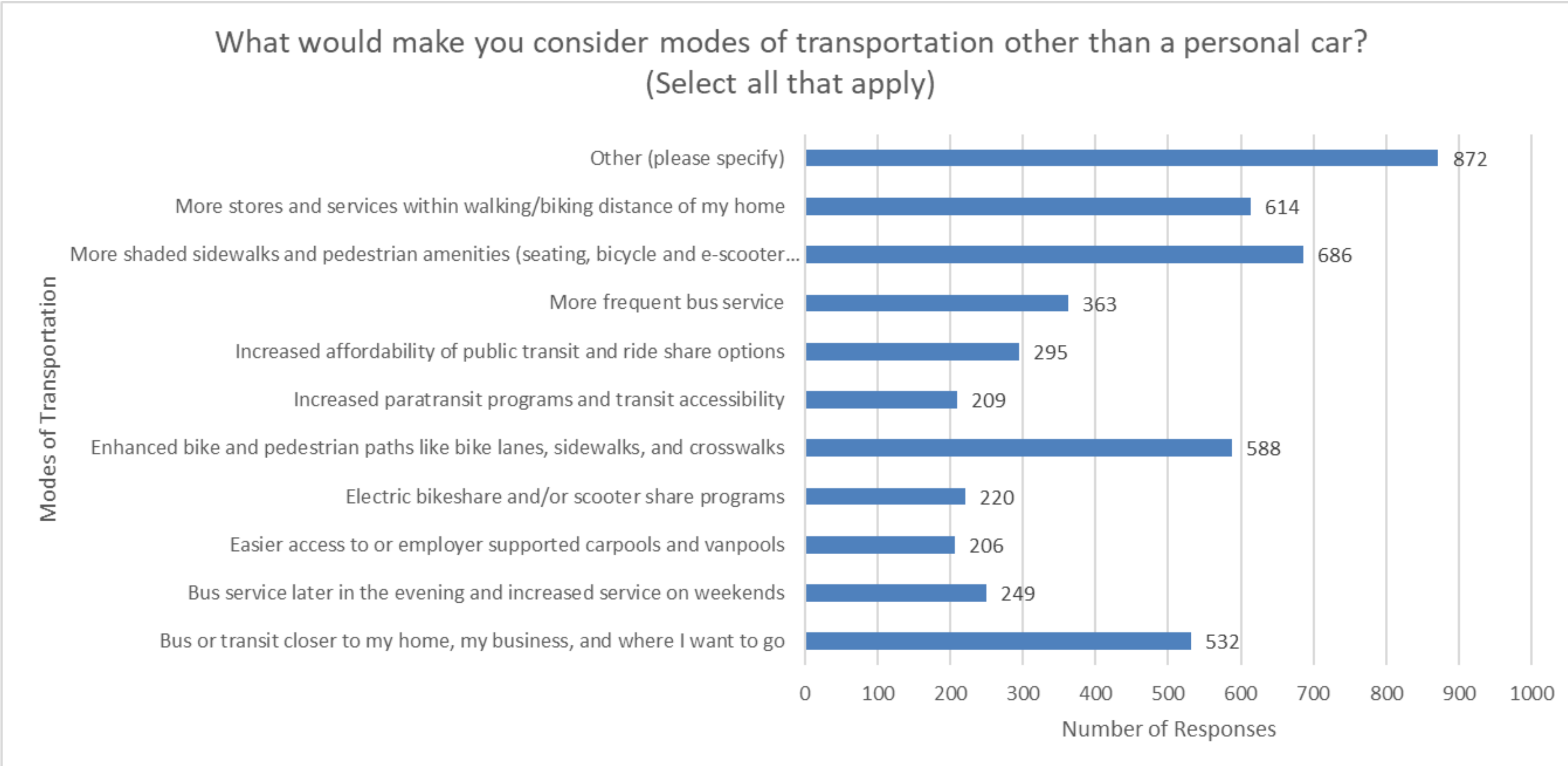

Which municipal or regional activities do you support to lessen the impact of climate change and build resiliency?
Activities
Updating and maintaining building standards and codes to more...
Transitioning fleets to clean energy
Replacing fossil fueled landscaping equipment with electric
Replacing or retrofitting diesel equipment with cleaner fuel...
Phasing out high global warming potential refrigerants
Reducing vehicle miles traveled
Reducing upfront costs for climate mitigation and resiliency...
Promoting nature-based solutions including rainwater harvesting...
Promoting microgrids (small-scale power grids) for critical...
Promoting a Buy Local Food campaign
Promoting "reduce and reuse then recycle" for waste
Prioritizing planting of native vegetation species
Planting trees and using shade structures to reduce urban heat
Placing electric vehicle and micro mobility charging (e-scooter, e-...
Offering low-cost housing upgrades to improve energy efficiency...
Making recycling and composting available for my home
Making reuse, repair, and repurposing options more accessible...
Making public transit schedules more transparent and efficient
Making public transit more accessible and affordable
Investing in zero carbon energy sources such as solar
Establishing new or expanding existing fire-place retrofit...
0
200
400
600
800
1000
1200
1400
1600
Number of Responses
Neutral
Do not support
Need more information

Question 8

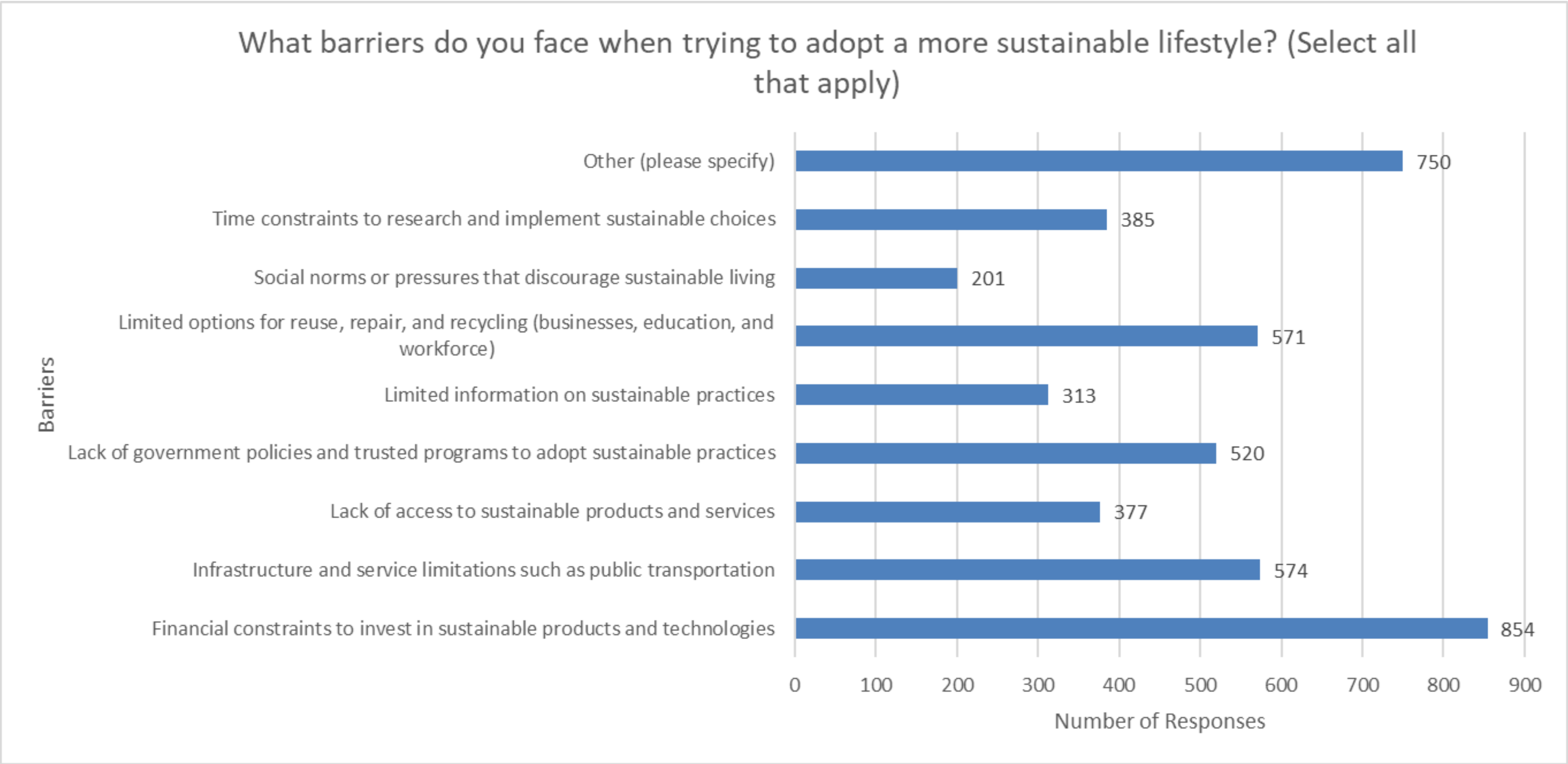


From which entities would you feel comfortable accessing services for resiliency activities and climate action? (Select all that apply)
Religious institutions
286
Rebate systems
741
Government programs
762
Non-profit organizations
806
Neighborhood and community groups
782
Environmental non-governmental organizations
758
Energy companies
579
Educational institutions
765
Entities
0
100
200
300
400
500
600
700
800
900
Number of Responses

Question 9

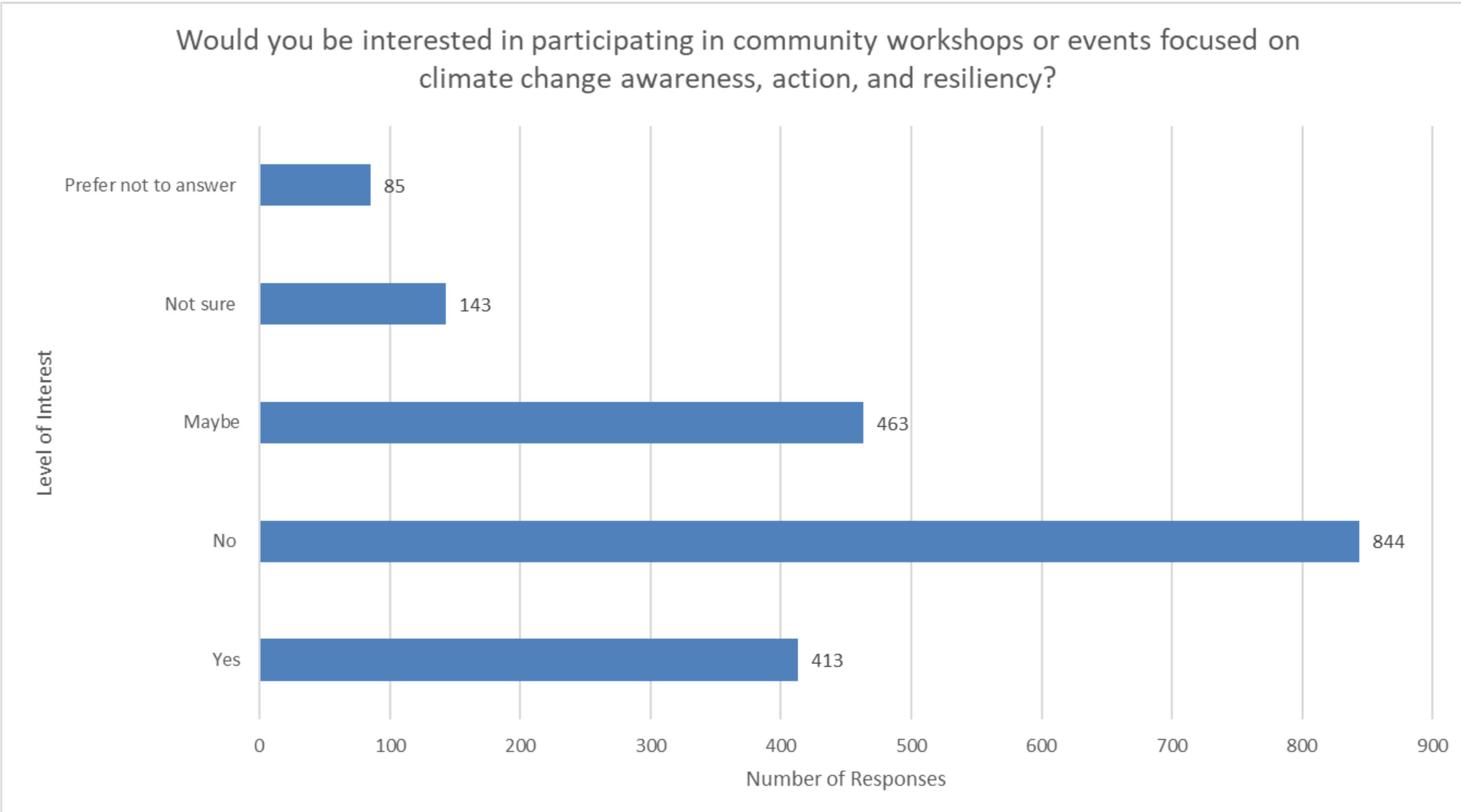

What would make you consider modes of transportation other than a personal car? (Select all that apply)
Modes of Transportation
Other (please specify)
872
More stores and services within walking/biking distance of my home
614
More shaded sidewalks and pedestrian amenities (seating, bicycle and e-scooter...
686
More frequent bus service
363
Increased affordability of public transit and ride share options
295
Increased paratransit programs and transit accessibility
209
Enhanced bike and pedestrian paths like bike lanes, sidewalks, and crosswalks
588
Electric bikeshare and/or scooter share programs
220
Easier access to or employer supported carpools and vanpools
206
Bus service later in the evening and increased service on weekends
249
Bus or transit closer to my home, my business, and where I want to go
532
0
100
200
300
400
500
600
700
800
900
1000
Number of Responses

Question 10



What barriers do you face when trying to adopt a more sustainable lifestyle? (Select all that apply)
Barriers
Other (please specify)
750
Time constraints to research and implement sustainable choices
385
Social norms or pressures that discourage sustainable living
201
Limited options for reuse, repair, and recycling (businesses, education, and workforce)
571
Limited information on sustainable practices
313
Lack of government policies and trusted programs to adopt sustainable practices
520
Lack of access to sustainable products and services
377
Infrastructure and service limitations such as public transportation
574
Financial constraints to invest in sustainable products and technologies
854
0
100
200
300
400
500
600
700
800
900
Number of Responses

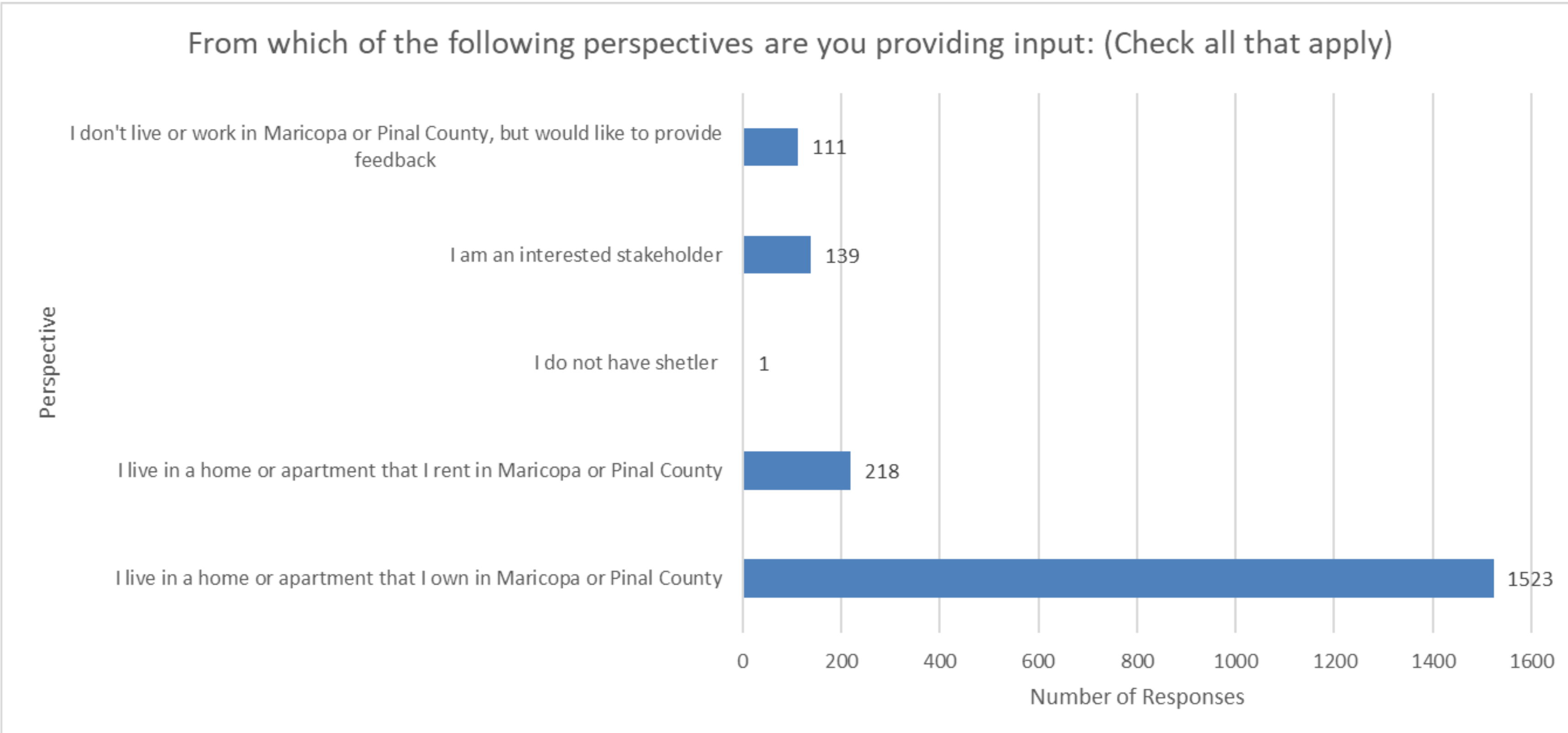
Question 11



Question 12

Please provide any additional suggestions or ideas you have about strategies that should be considered in the region-wide Climate Action Plan. (Open Ended Response)

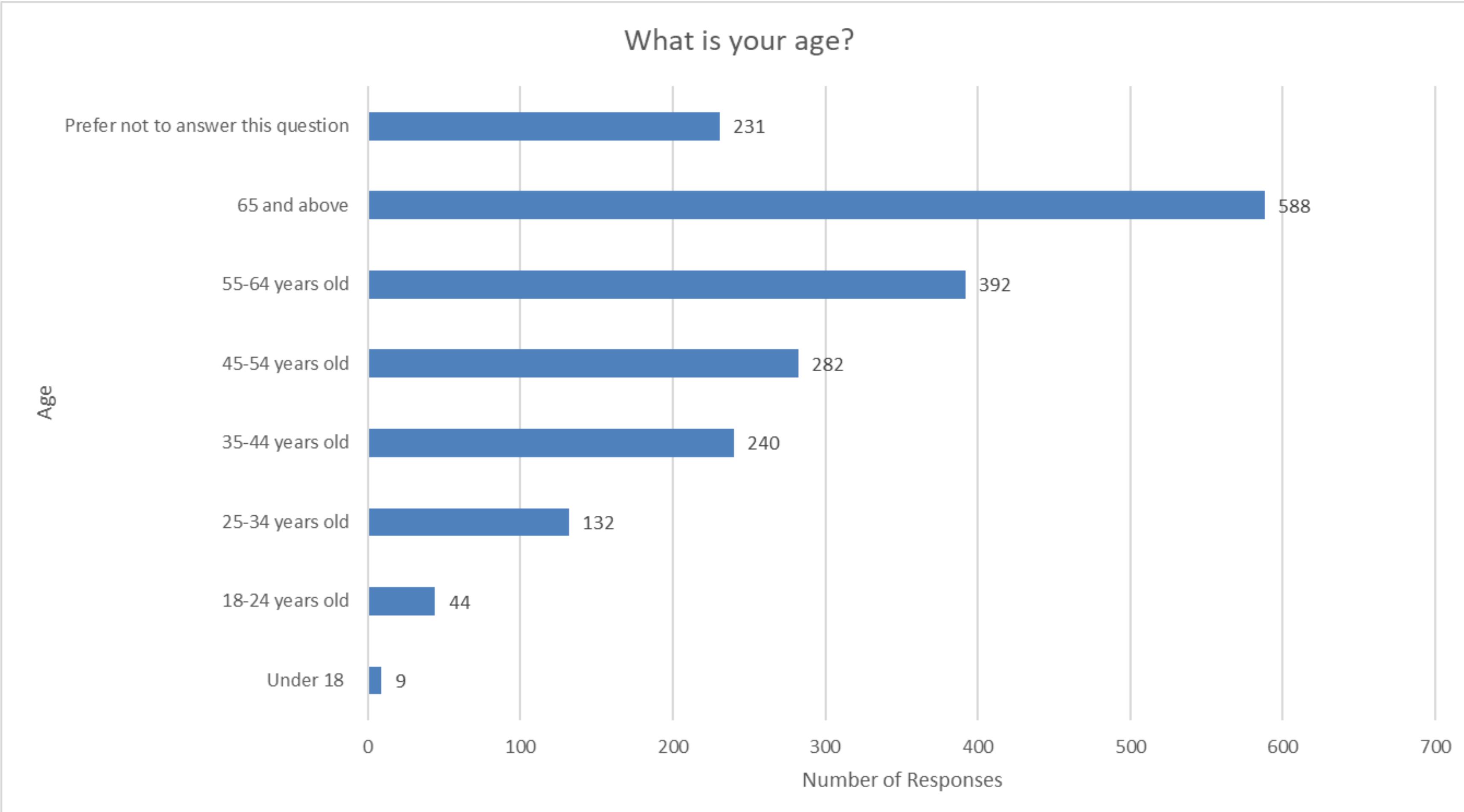
Question 13



Question 14

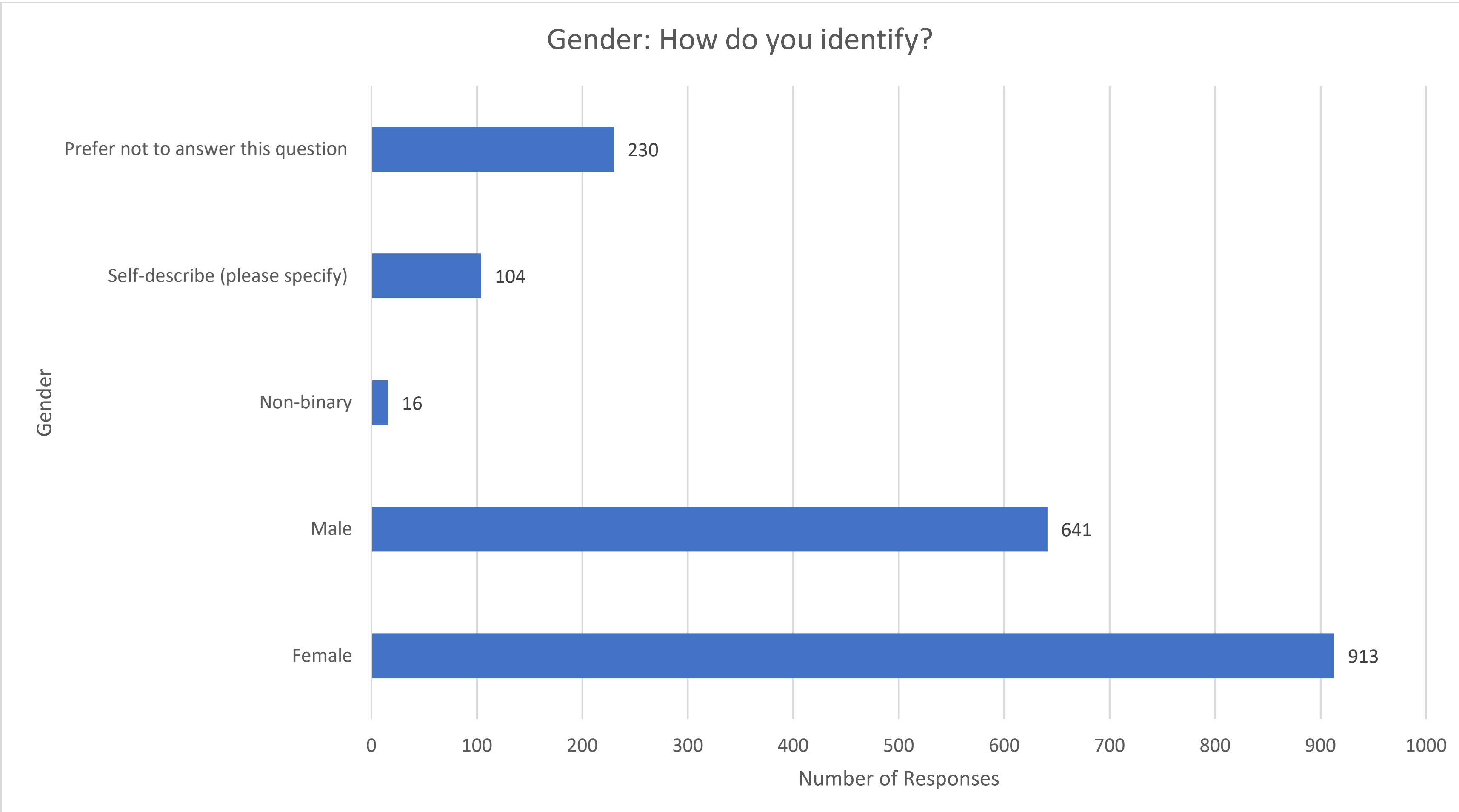
What is the ZIP code of your primary residence? (Open Ended Response)

Question 15



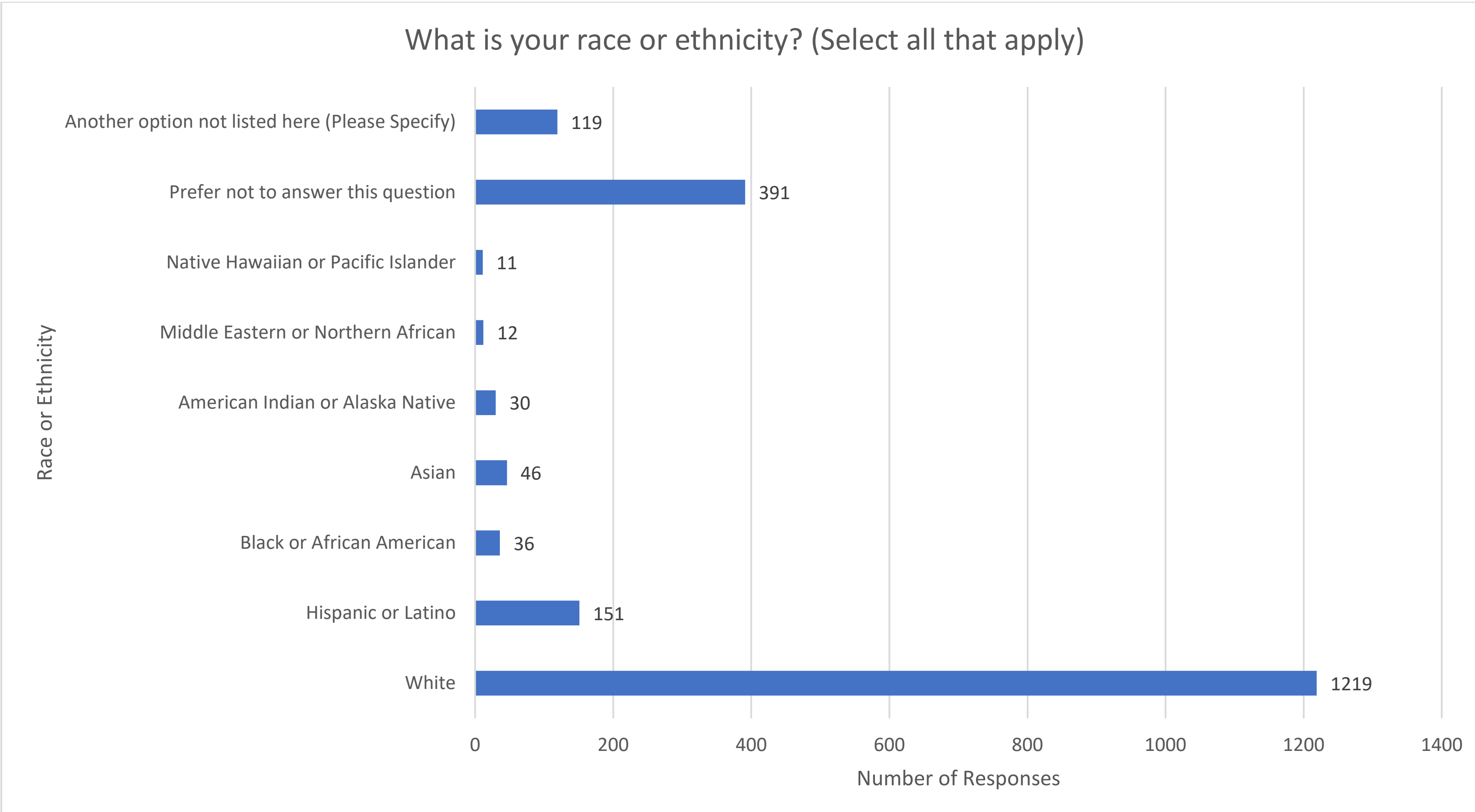
What is your age?
Prefer not to answer this question
65 and above
55-64 years old
45-54 years old
35-44 years old
25-34 years old
18-24 years old
Under 18
231
588
392
282
240
132
44
9
Age
0
100
200
300
400
500
600
700
Number of Responses

Question 16

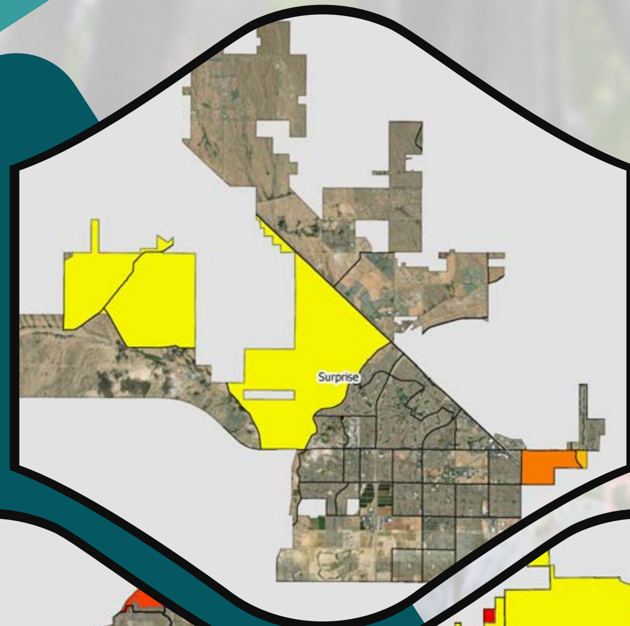


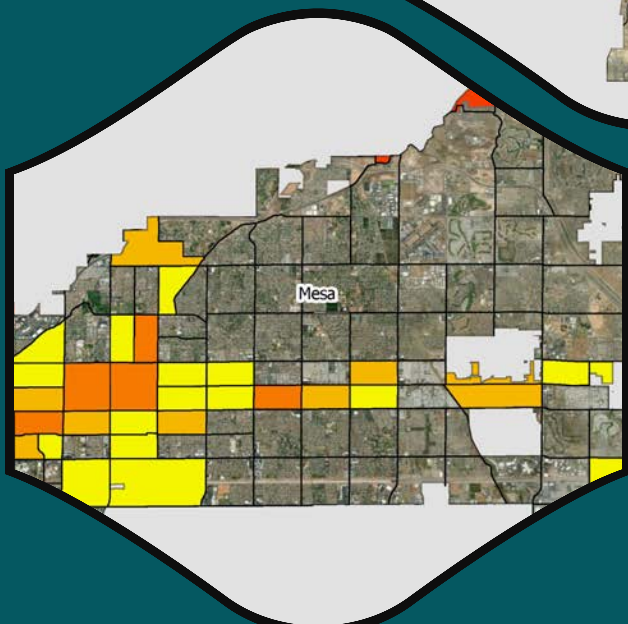
Gender: How do you identify?
Prefer not to answer this question
230
Self-describe (please specify)
104
Non-binary
16
Male
641
Female
913
Gender
0
100
200
300
400
500
600
700
800
900
1000
Number of Responses

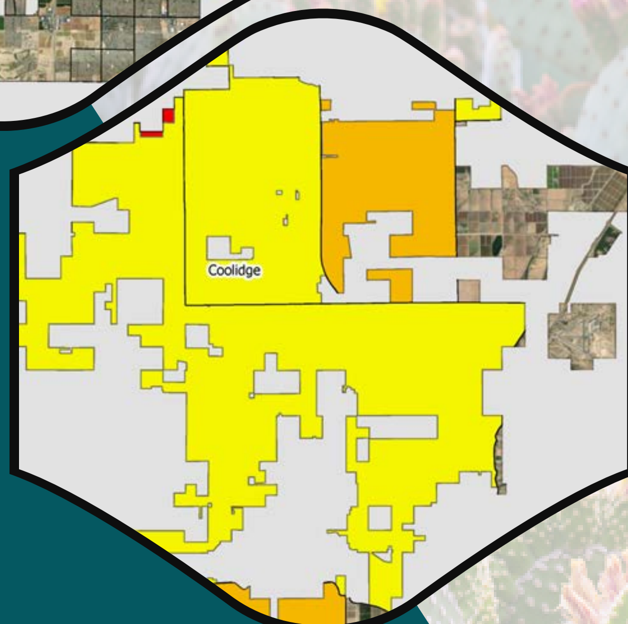
Question 17



What is your race or ethnicity? (Select all that apply)
Race or Ethnicity
Another option not listed here (Please Specify)
119
Prefer not to answer this question
391
Native Hawaiian or Pacific Islander
11
Middle Eastern or Northern African
12
American Indian or Alaska Native
30
Asian
46
Black or African American
36
Hispanic or Latino
151
White
1219
0
200
400
600
800
1000
1200
1400
Number of Responses







MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

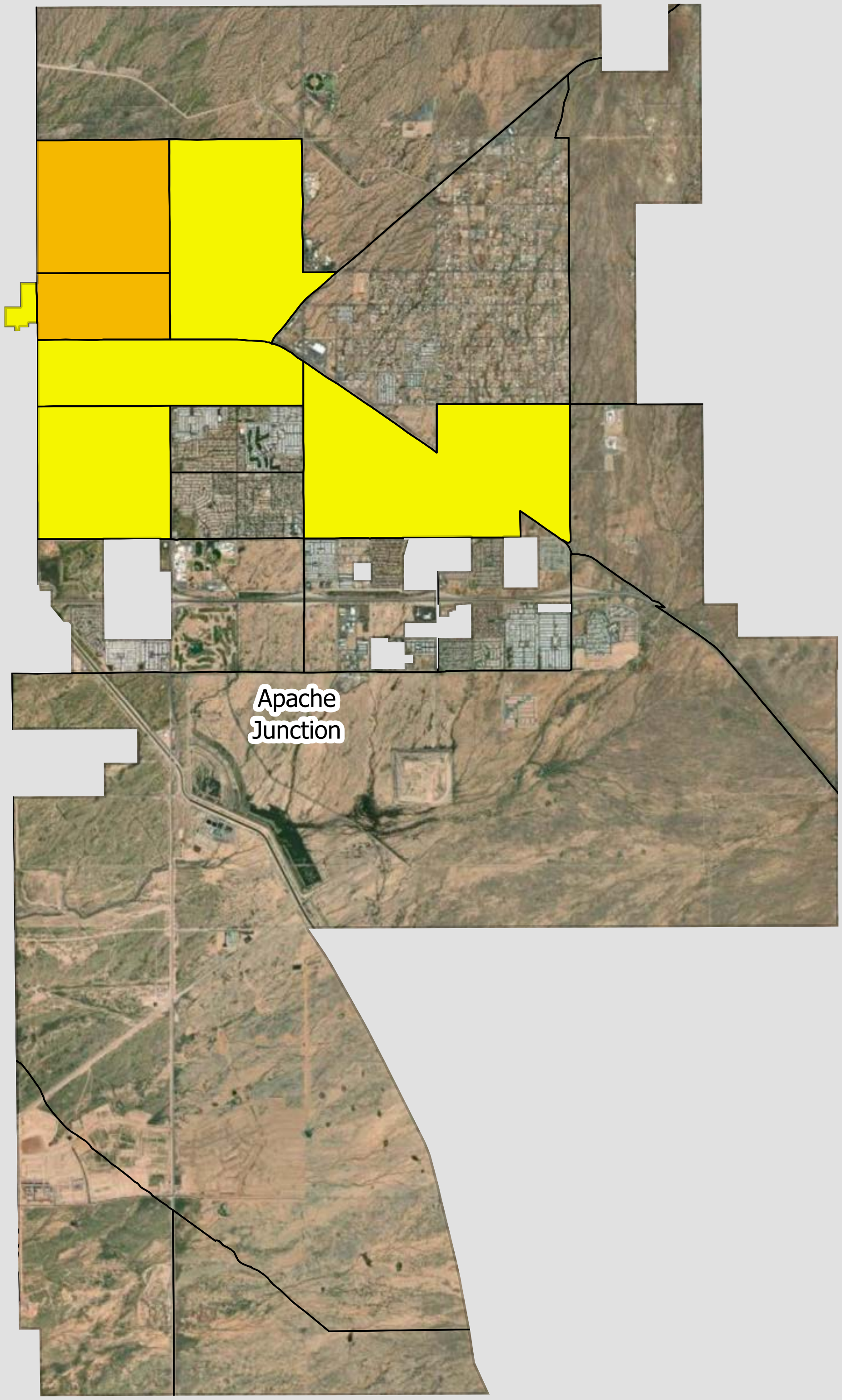
Appendix D: Map Book of CEJST Disadvantaged Communities within the Maricopa-Pinal County Region by Incorporated Cities

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

CEJST Disadvantaged Communties for Apache Junction, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

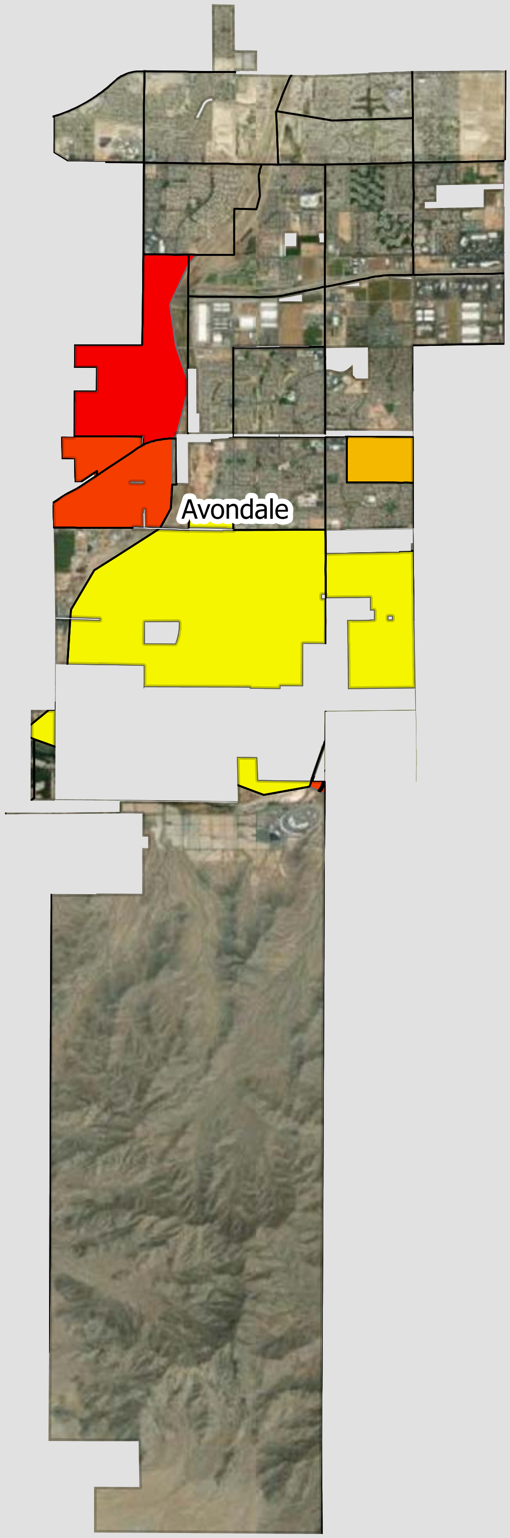
0 2 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Avondale, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



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Date: February 2024

N

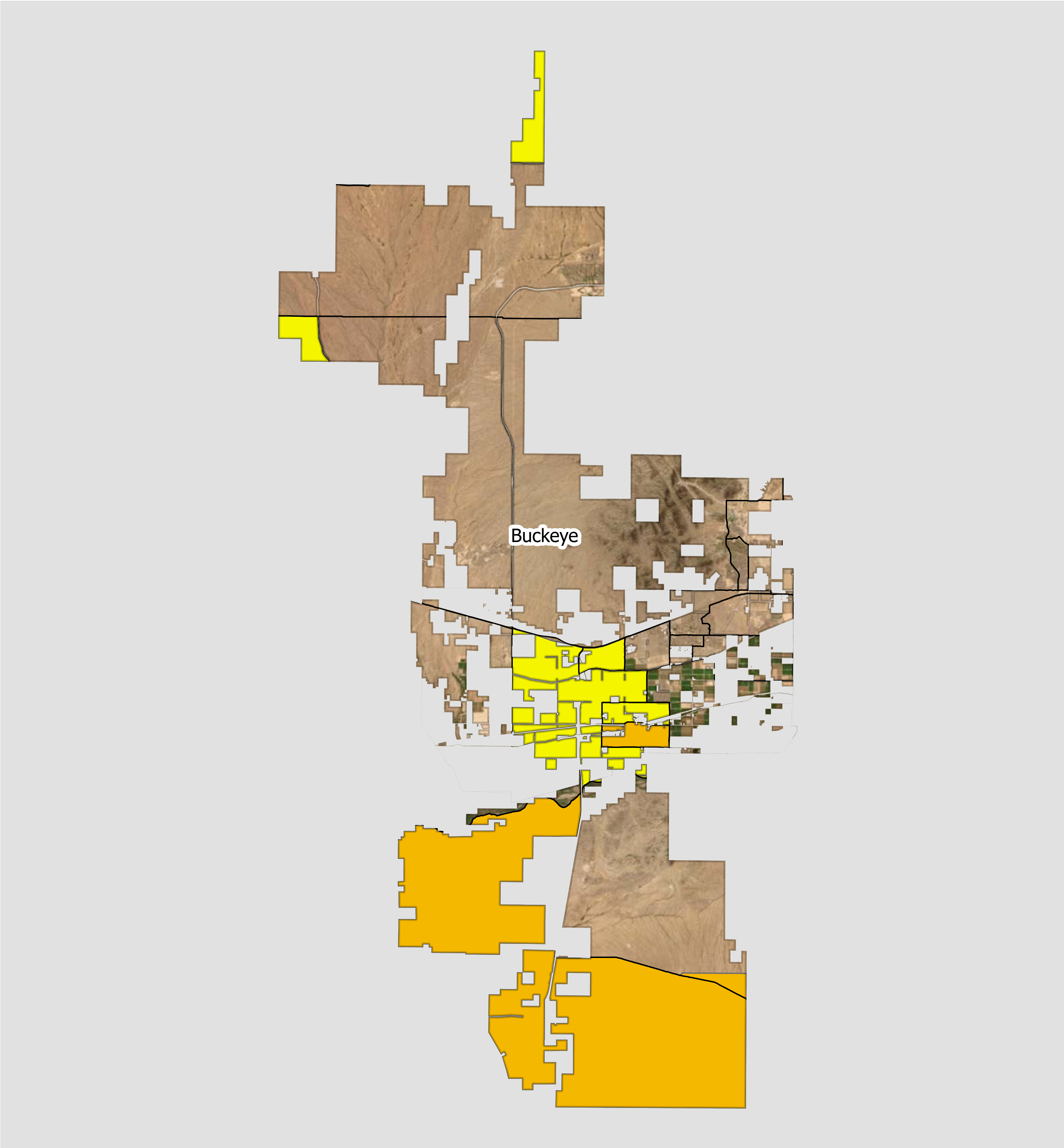
0 3 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Buckeye, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



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Date: February 2024

N

0 9 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Carefree, AZ

MARICOPA ASSOCIATION of GOVERNMENTS

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

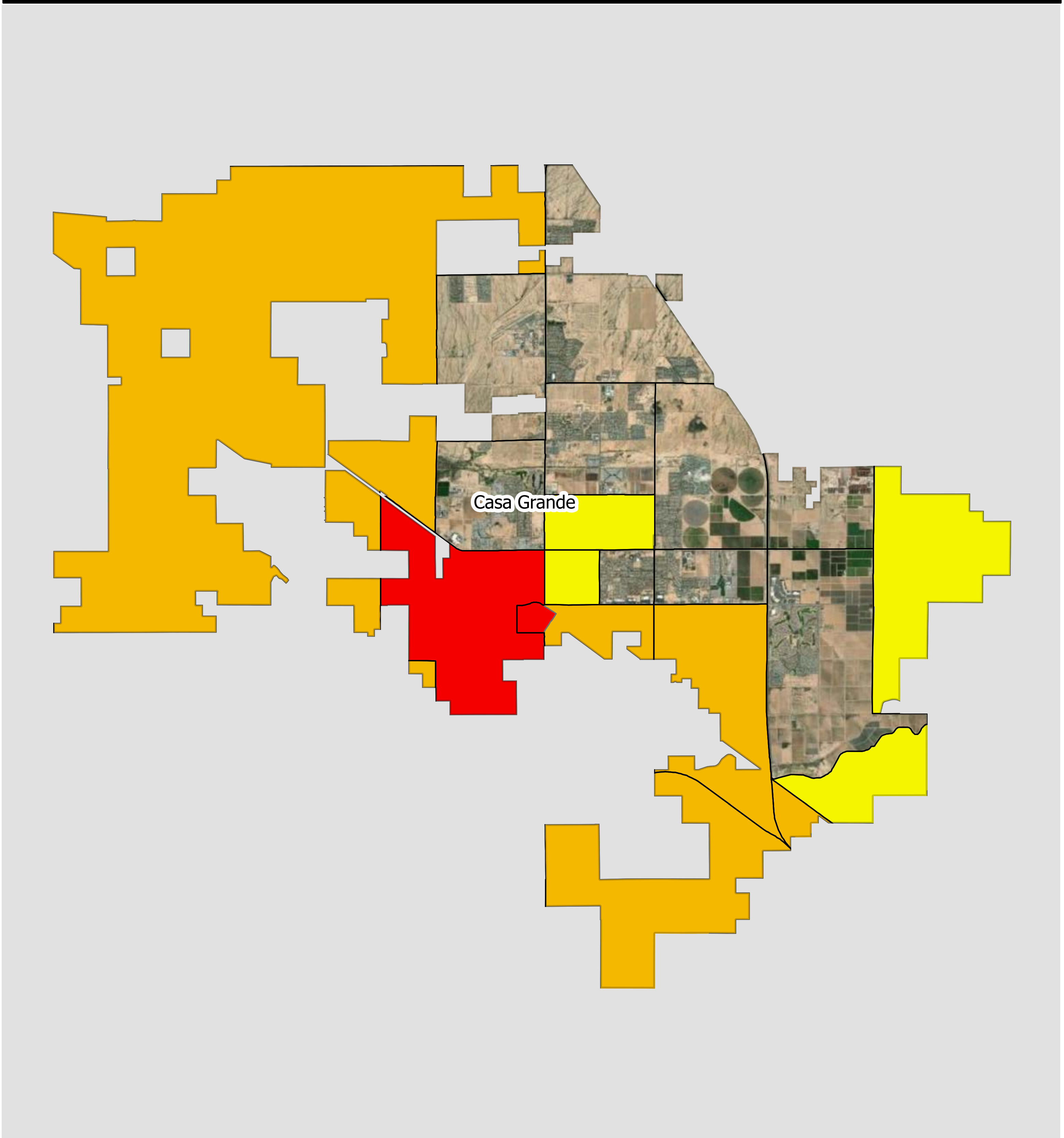
0 1 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Casa Grande, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 3.5 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Cave Creek, AZ

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Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

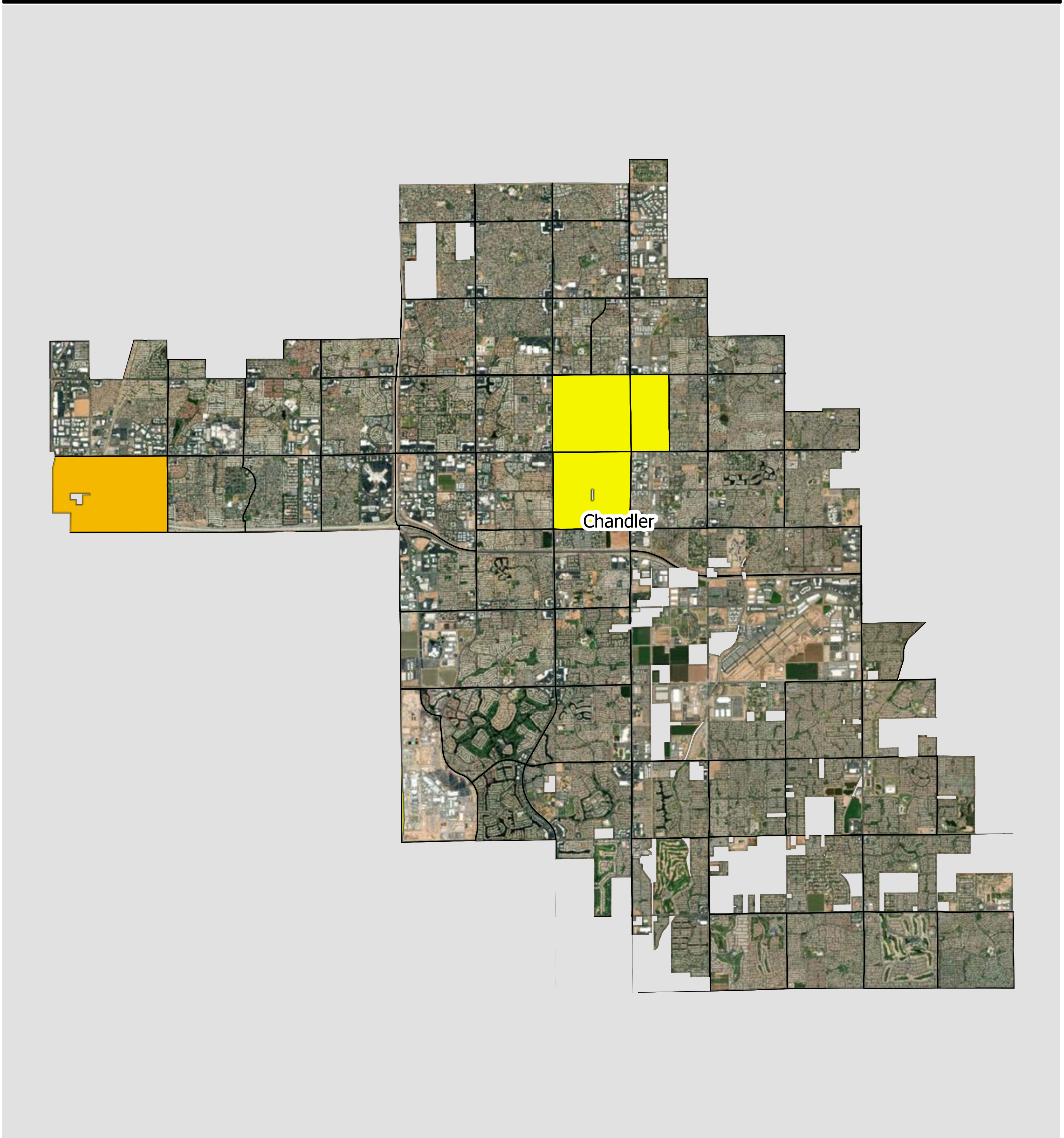
0 1 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Chandler, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 2.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Coolidge, AZ

MARICOPA ASSOCIATION of GOVERNMENTS

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

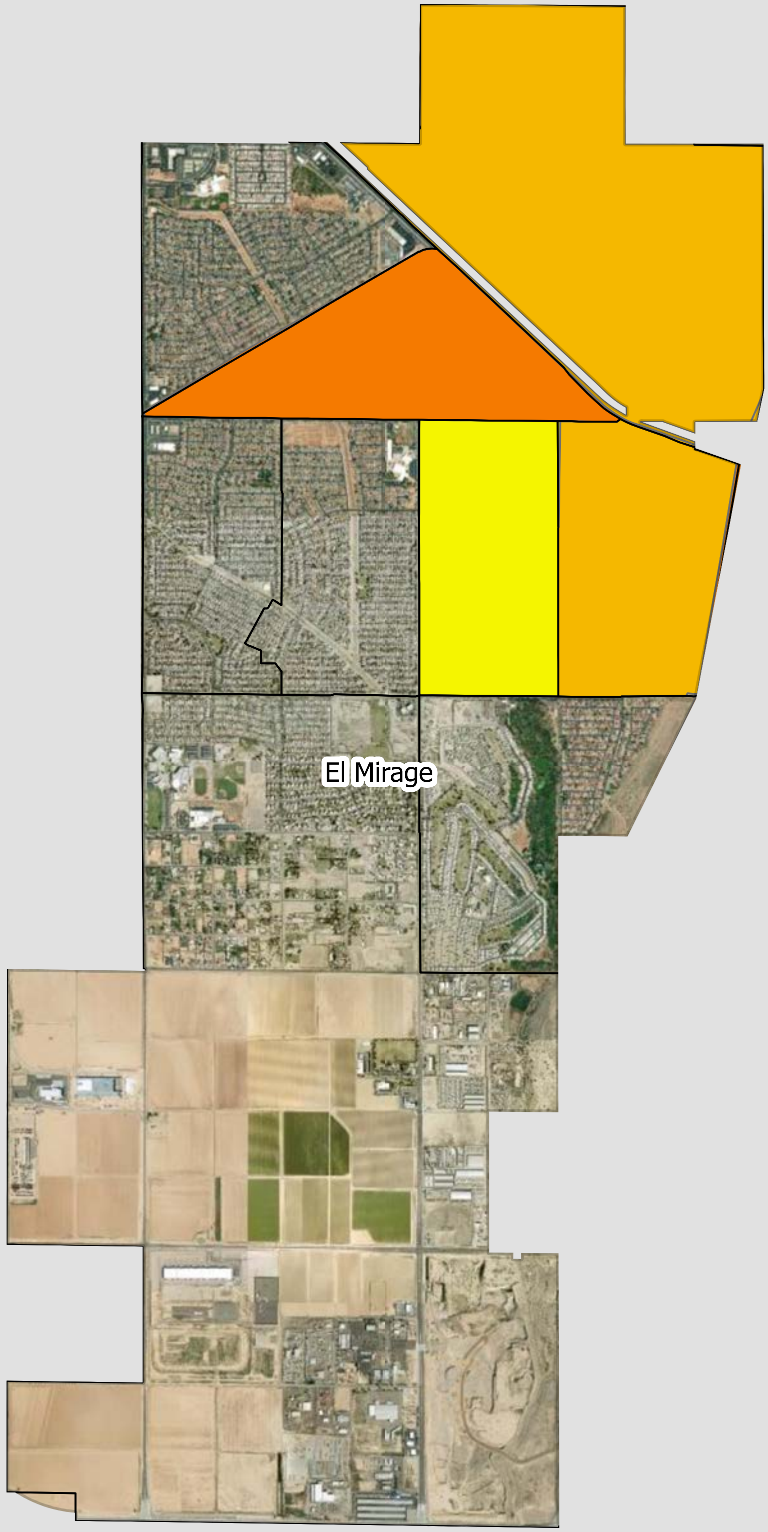
N

0 3 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for El Mirage, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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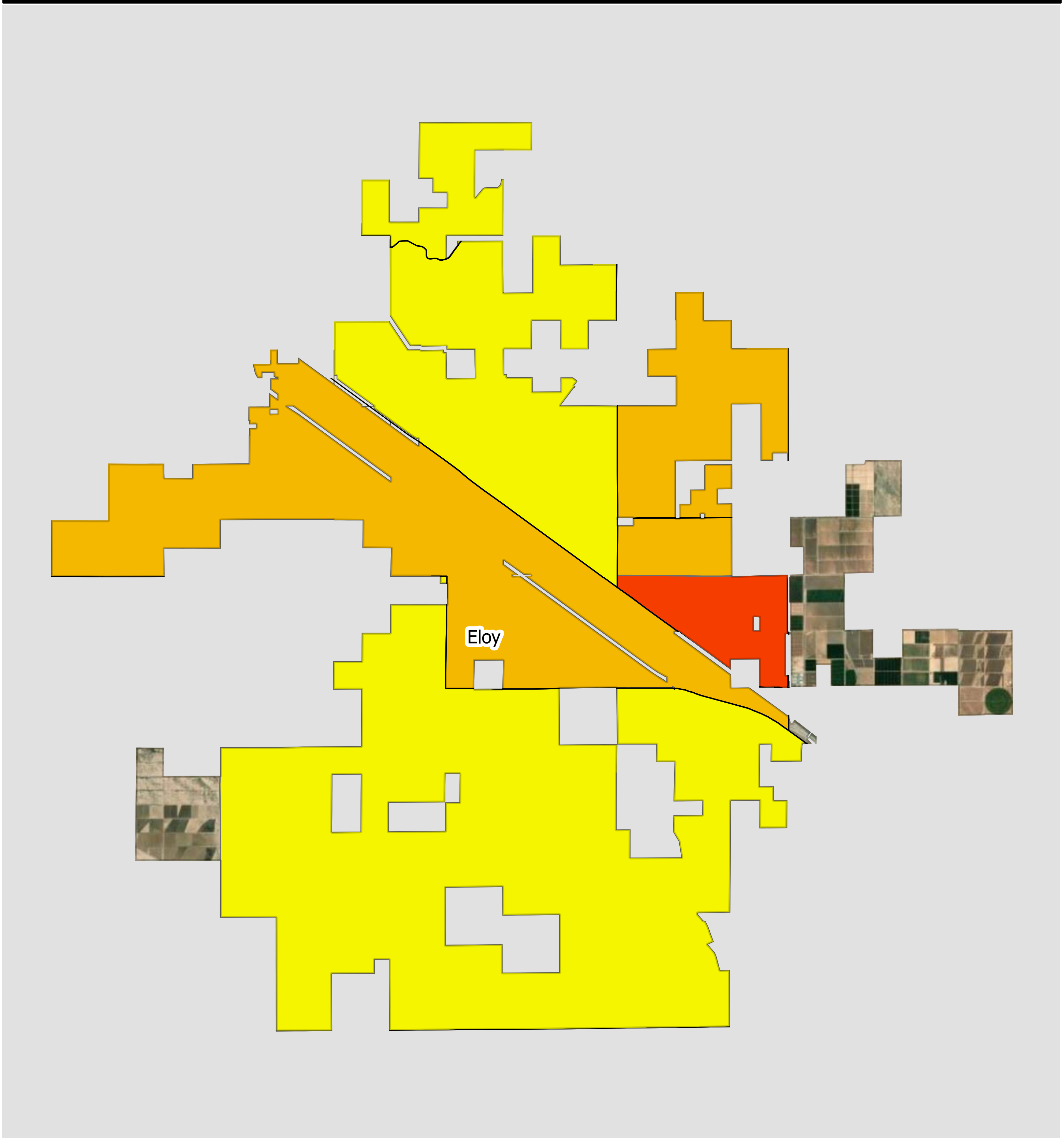
Date: February 2024

0 1 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Eloy, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

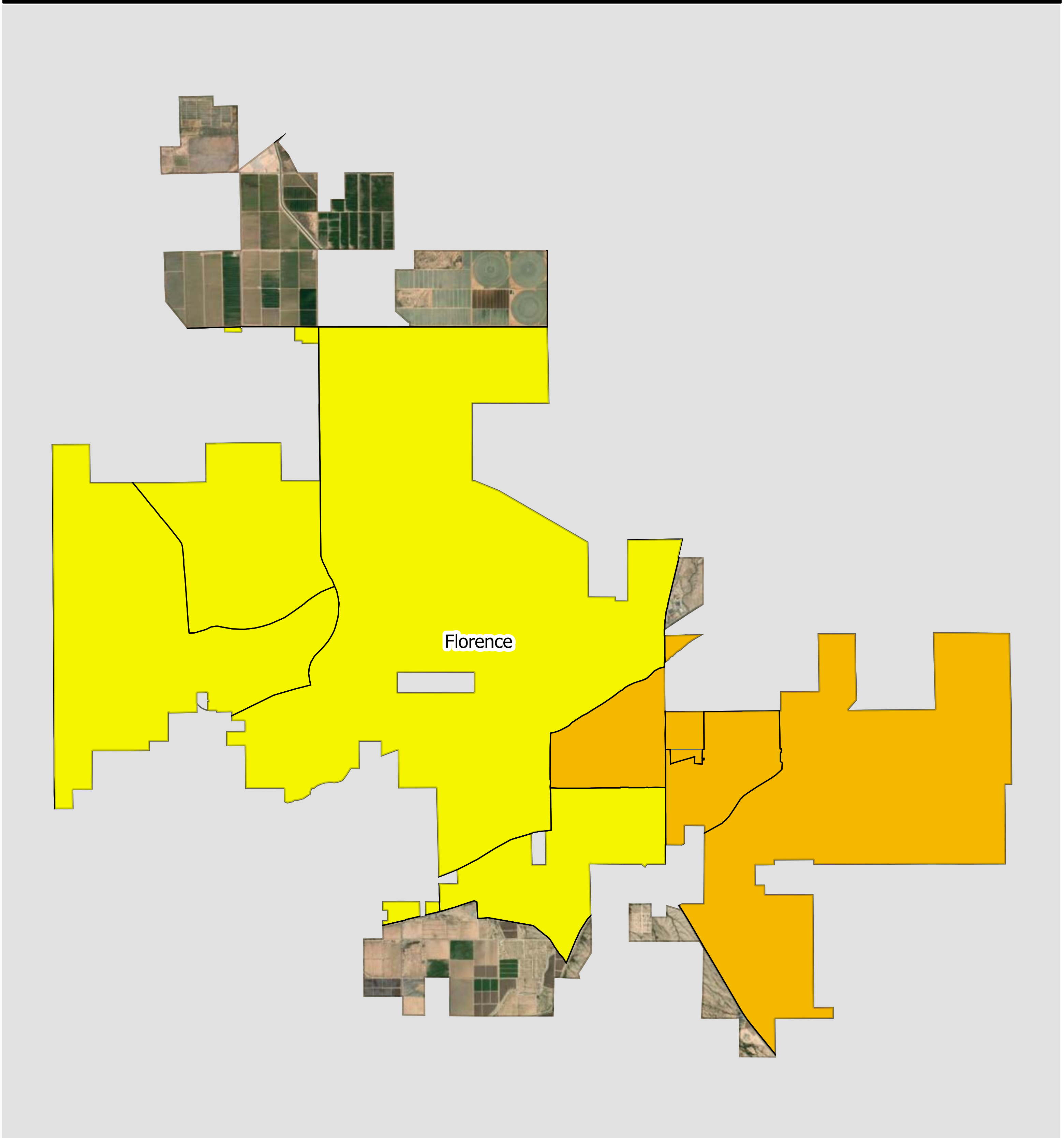
0 3.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Florence, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

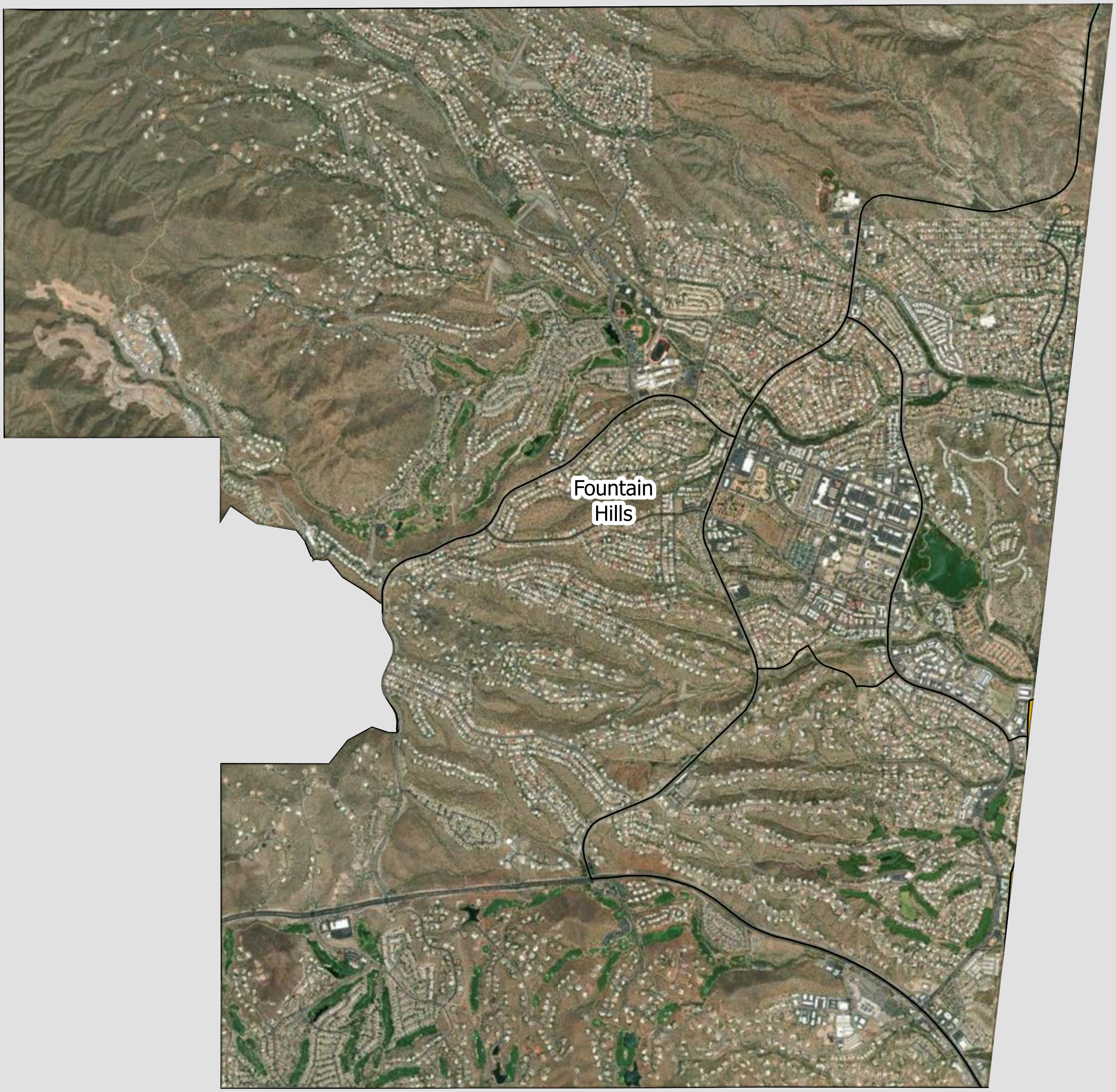
0 2.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Fountain Hills, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 1 Miles

CEJST Burden Thresholds Exceeded

1-2

3-4

5-6

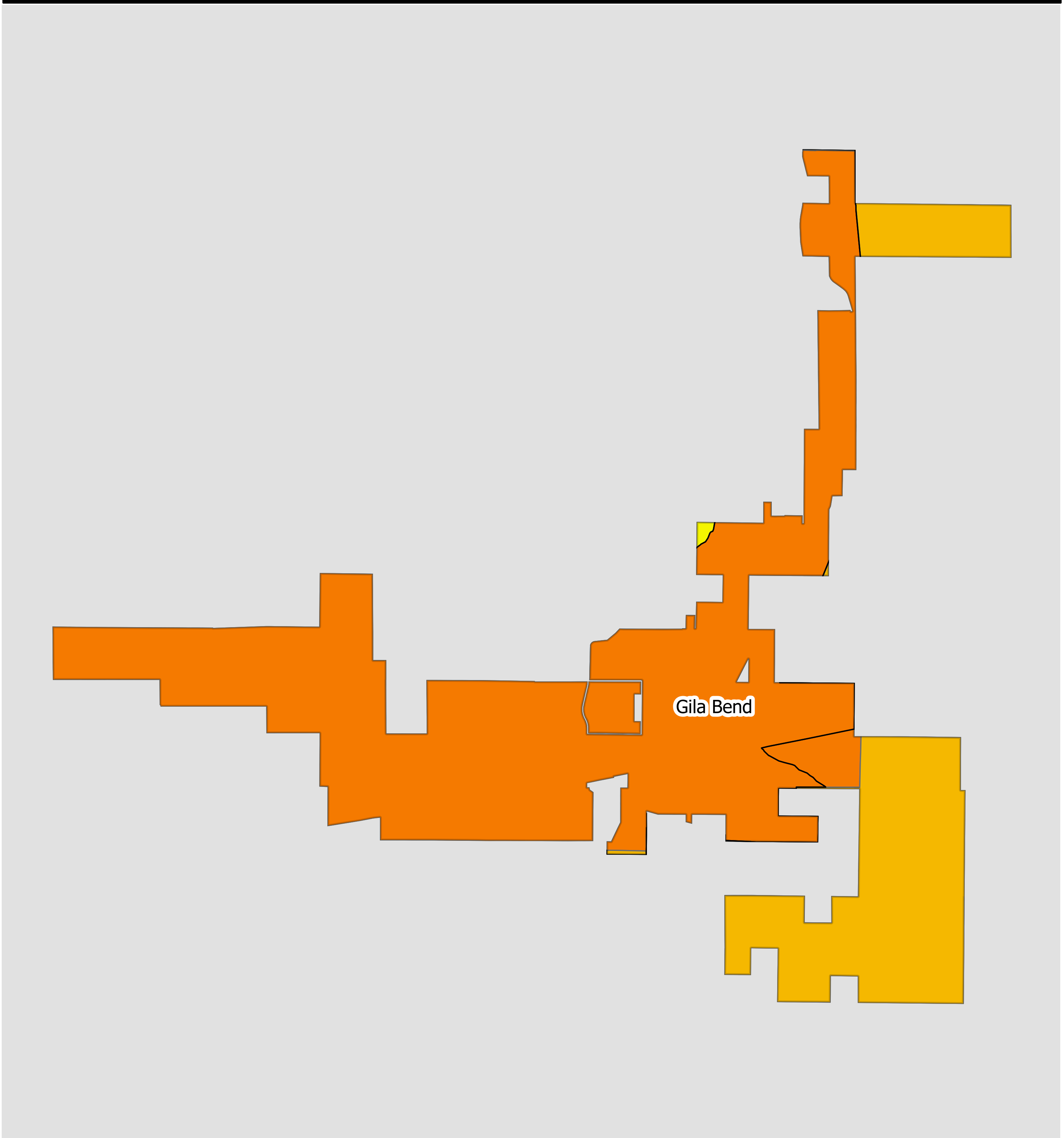
7-8

9-11

Tracts

CEJST Disadvantaged Communties for Gila Bend, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

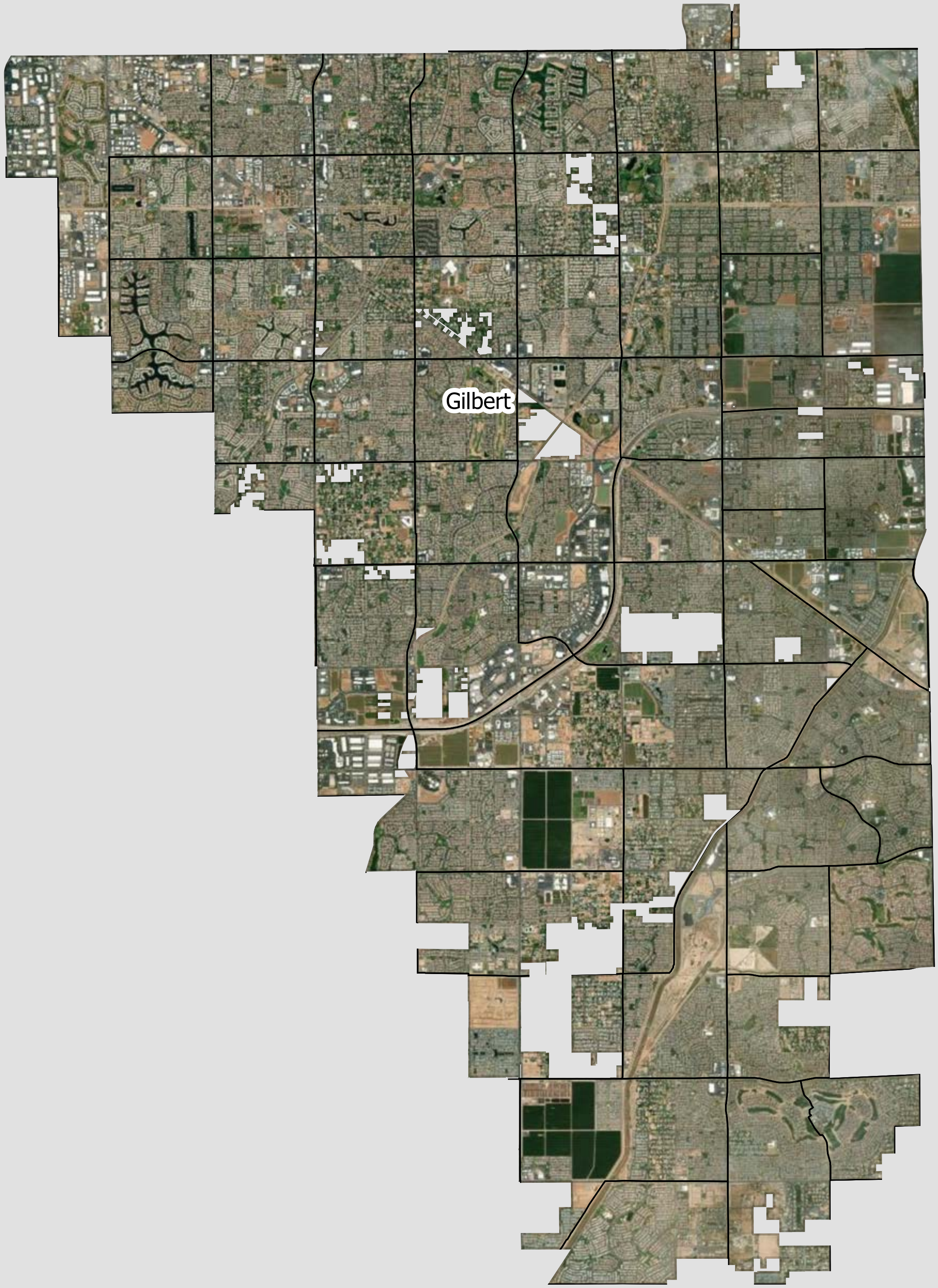
0 3.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Gilbert, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

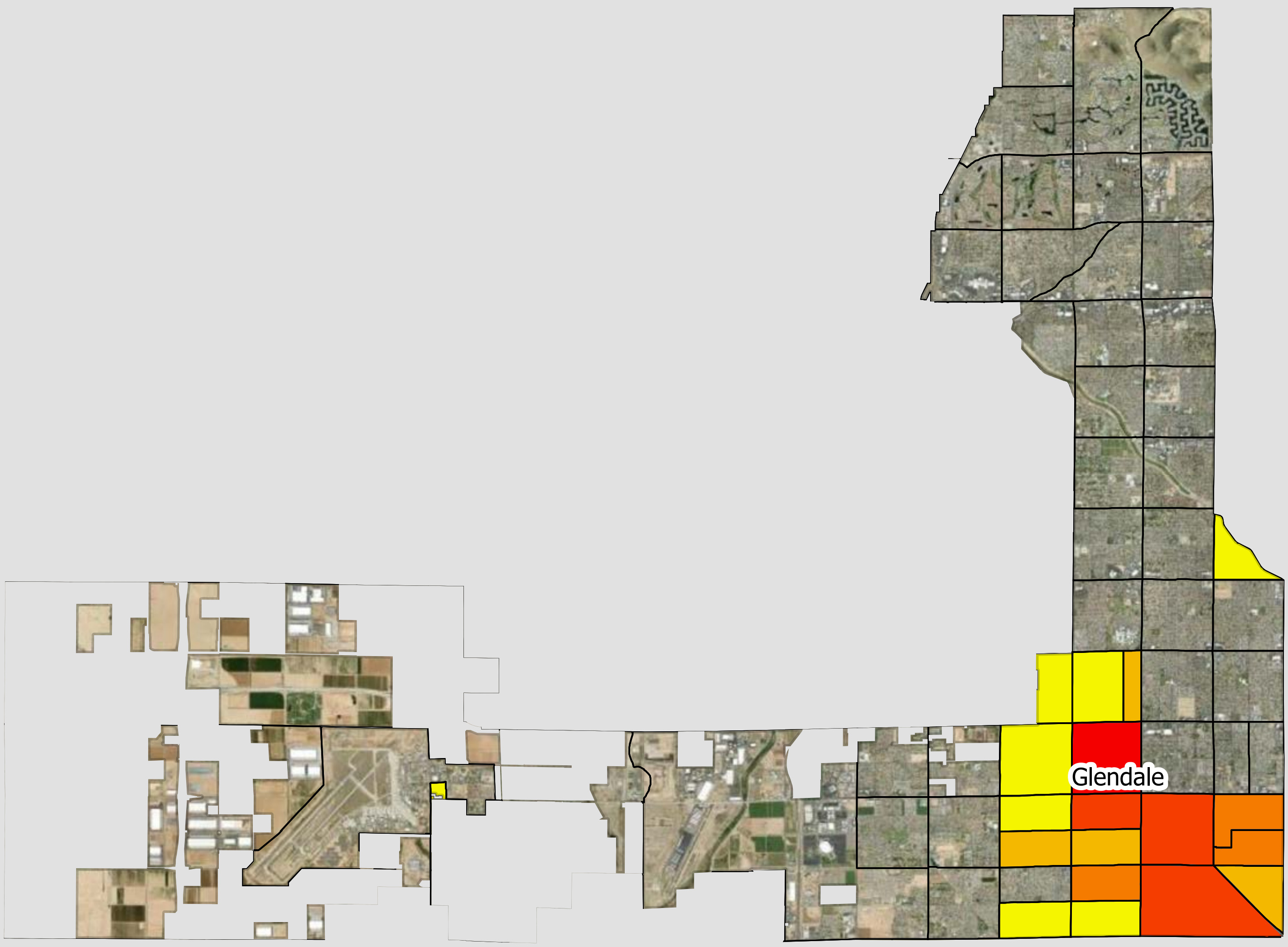
0 2 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Glendale, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

Page 15 of 36

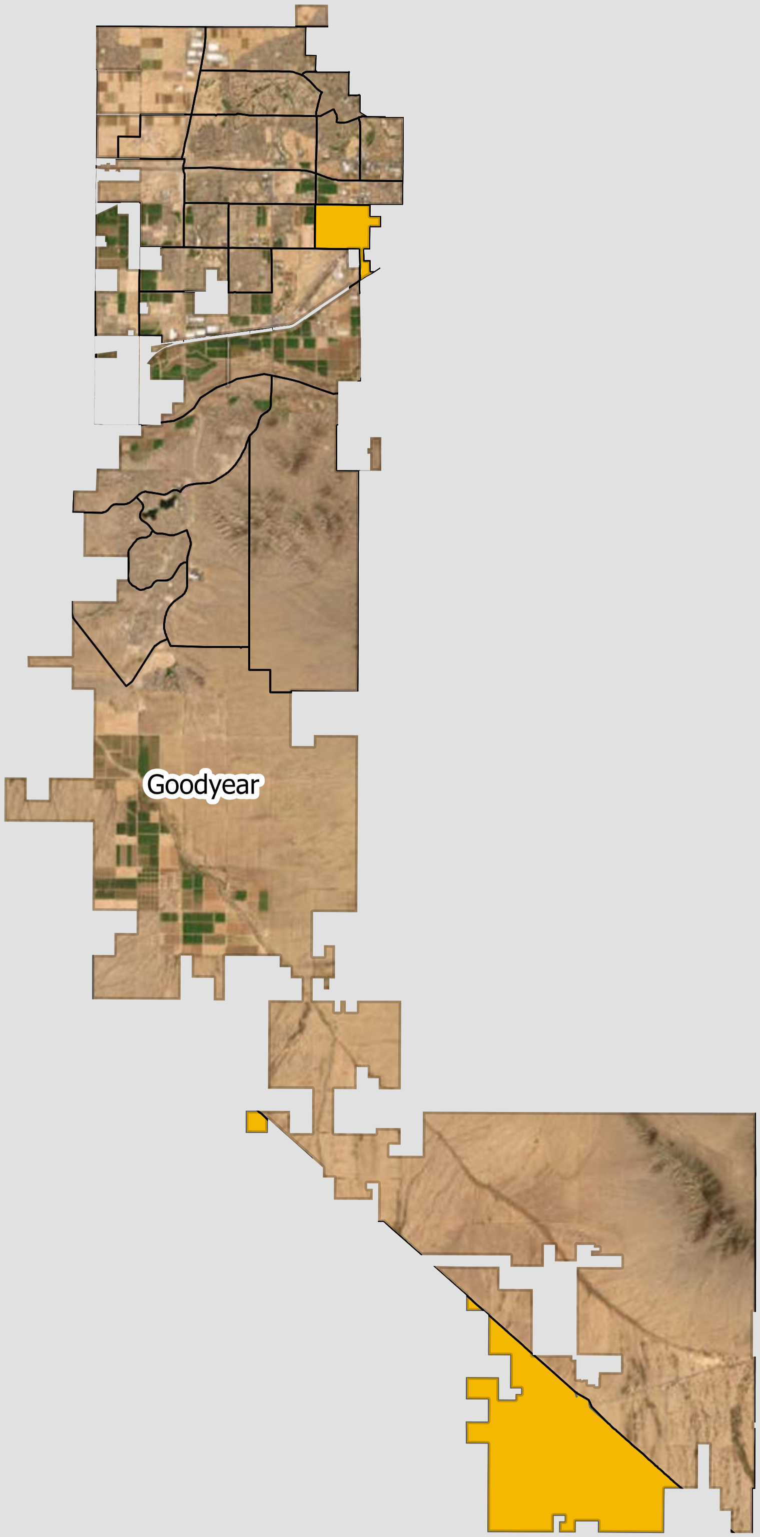
0 3.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Goodyear, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

Page 16 of 36

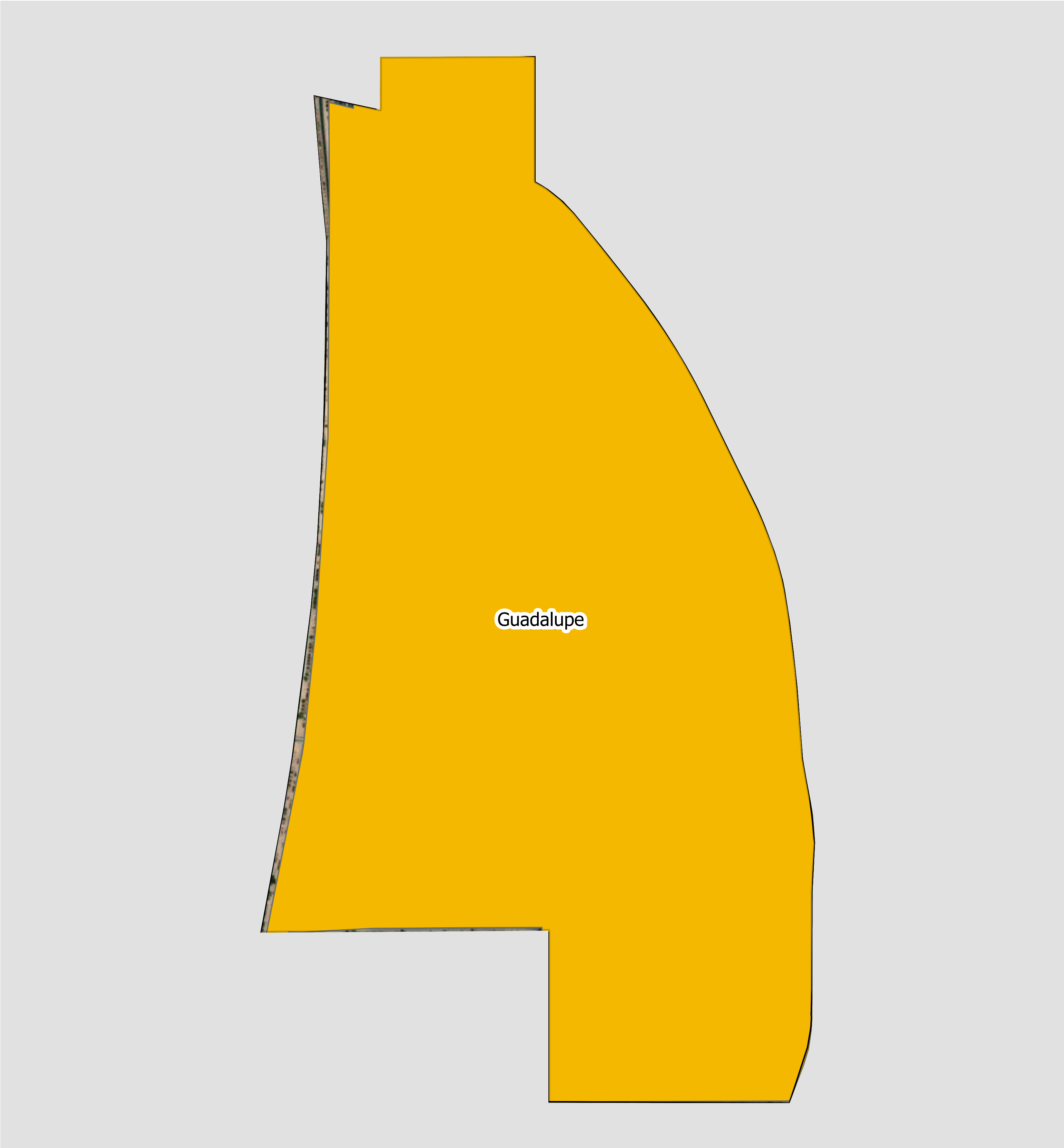
0 6.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Guadalupe, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 0.25 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Hayden, AZ

MARICOPA ASSOCIATION of GOVERNMENTS

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

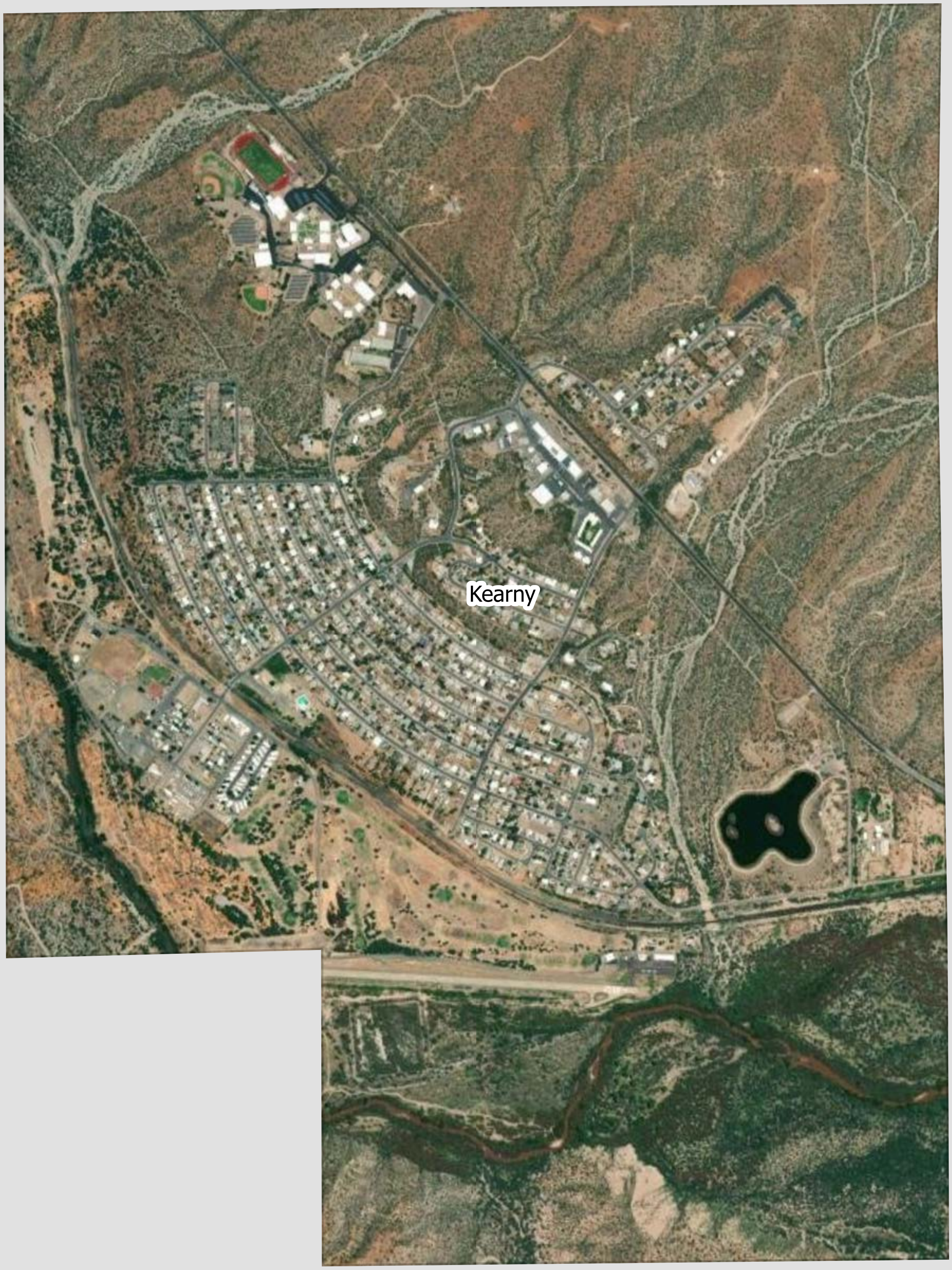
0 0.3 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Kearny, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

Disclaimer: While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

Date: February 2024

N

0 0.35 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Litchfield Park, AZ

MARICOPA ASSOCIATION of GOVERNMENTS

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

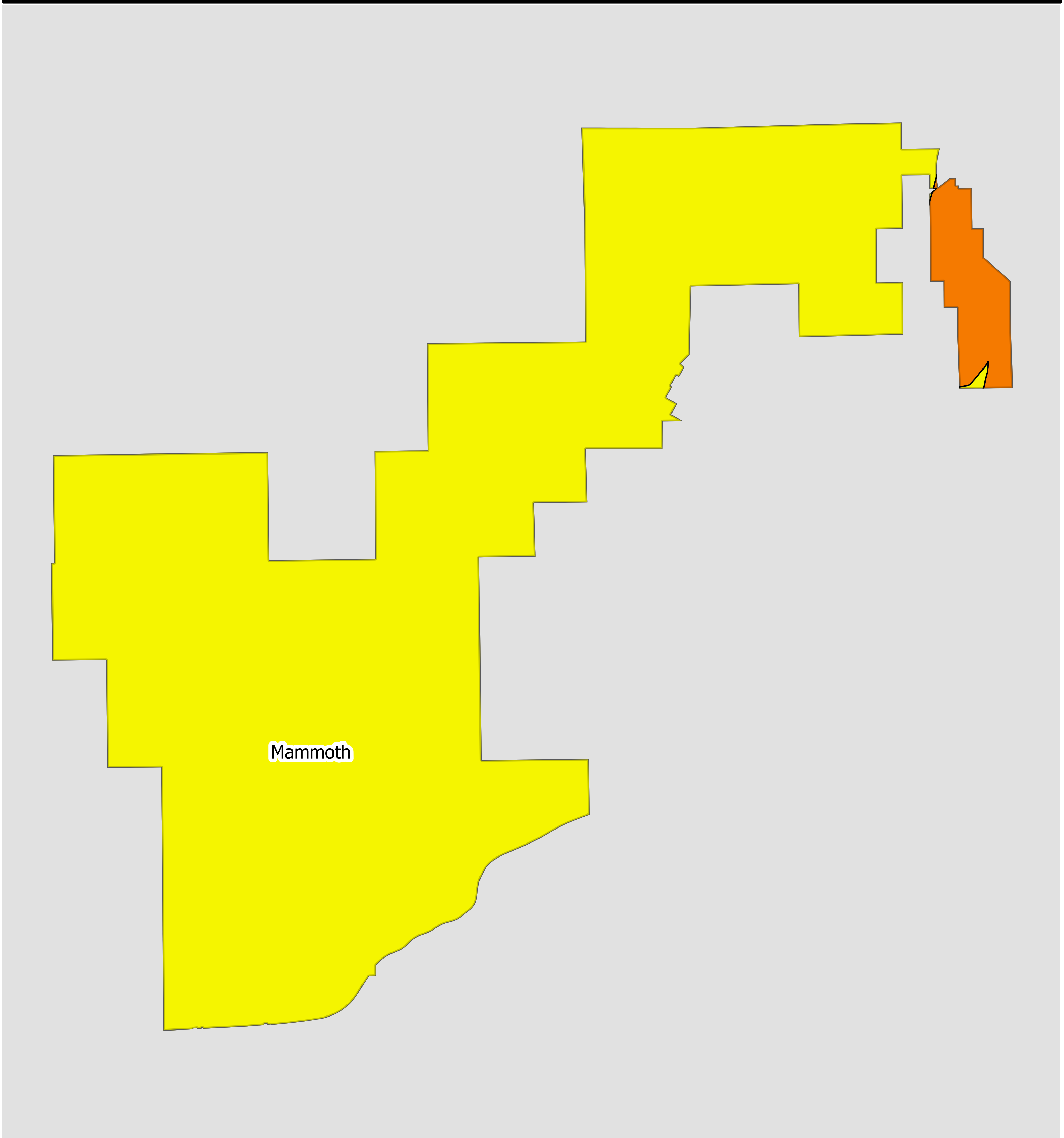
N

0 0.65 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Mammoth, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

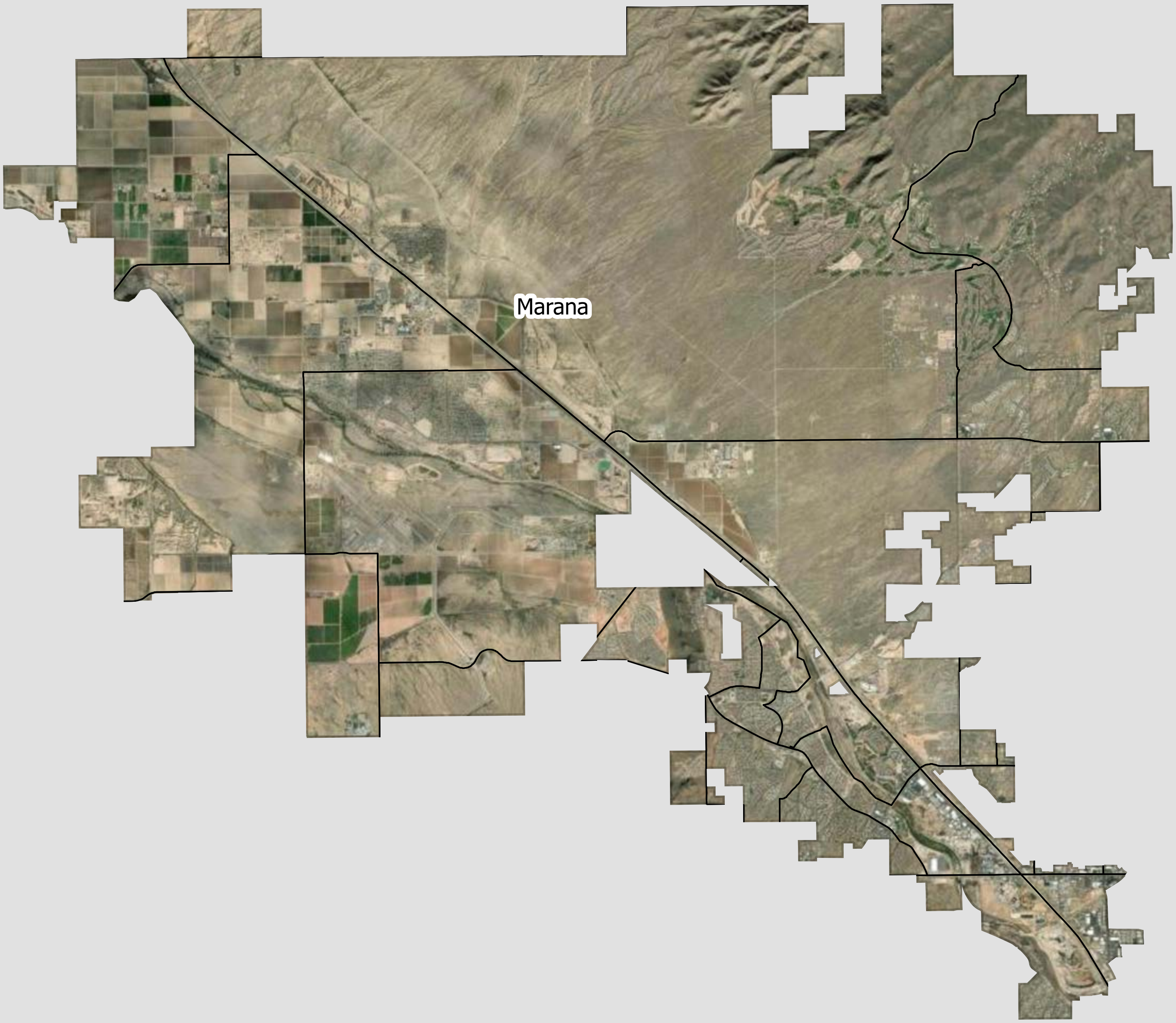
0 1.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Marana, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

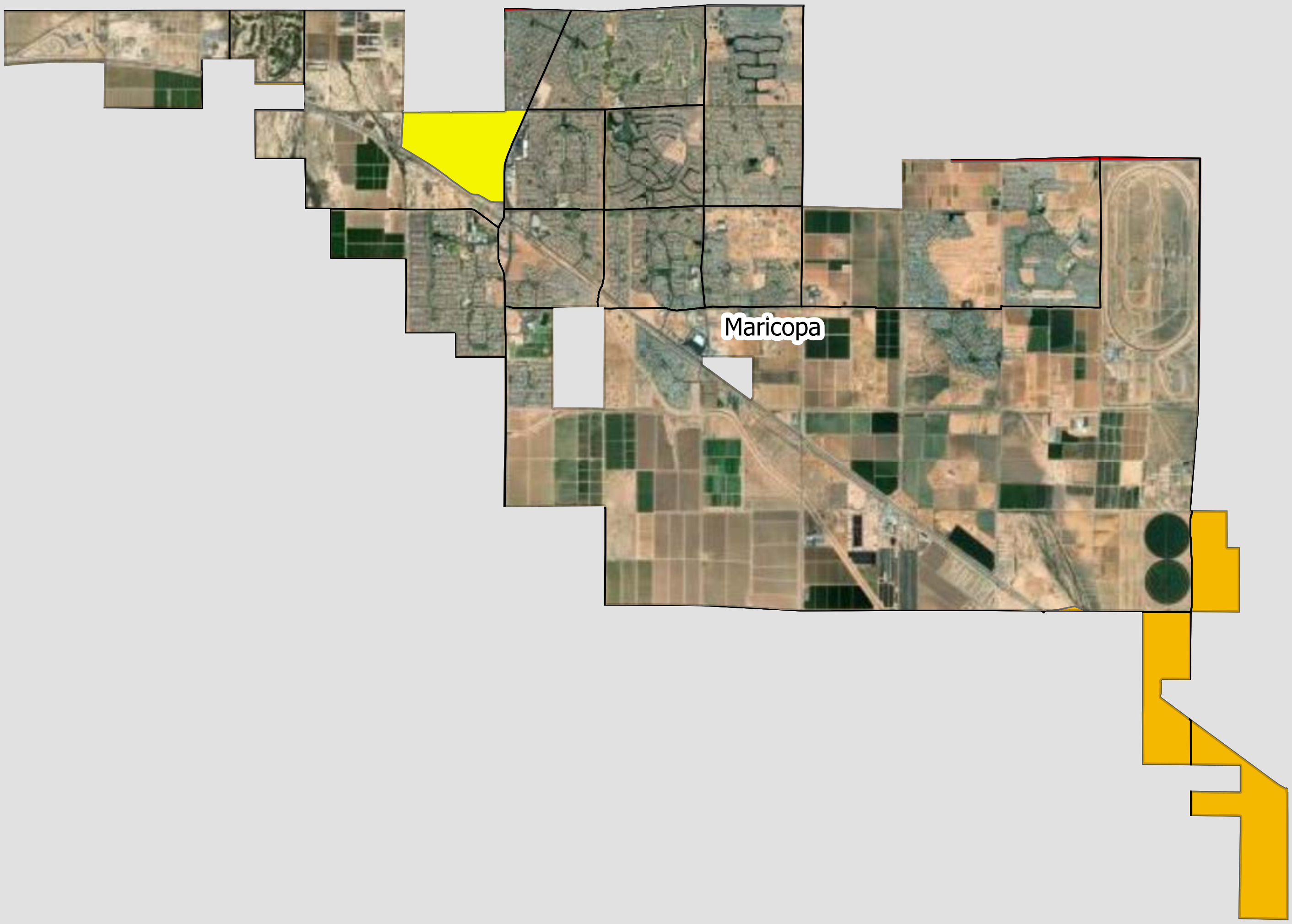
N

0 3 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Maricopa, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 2.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Mesa, AZ

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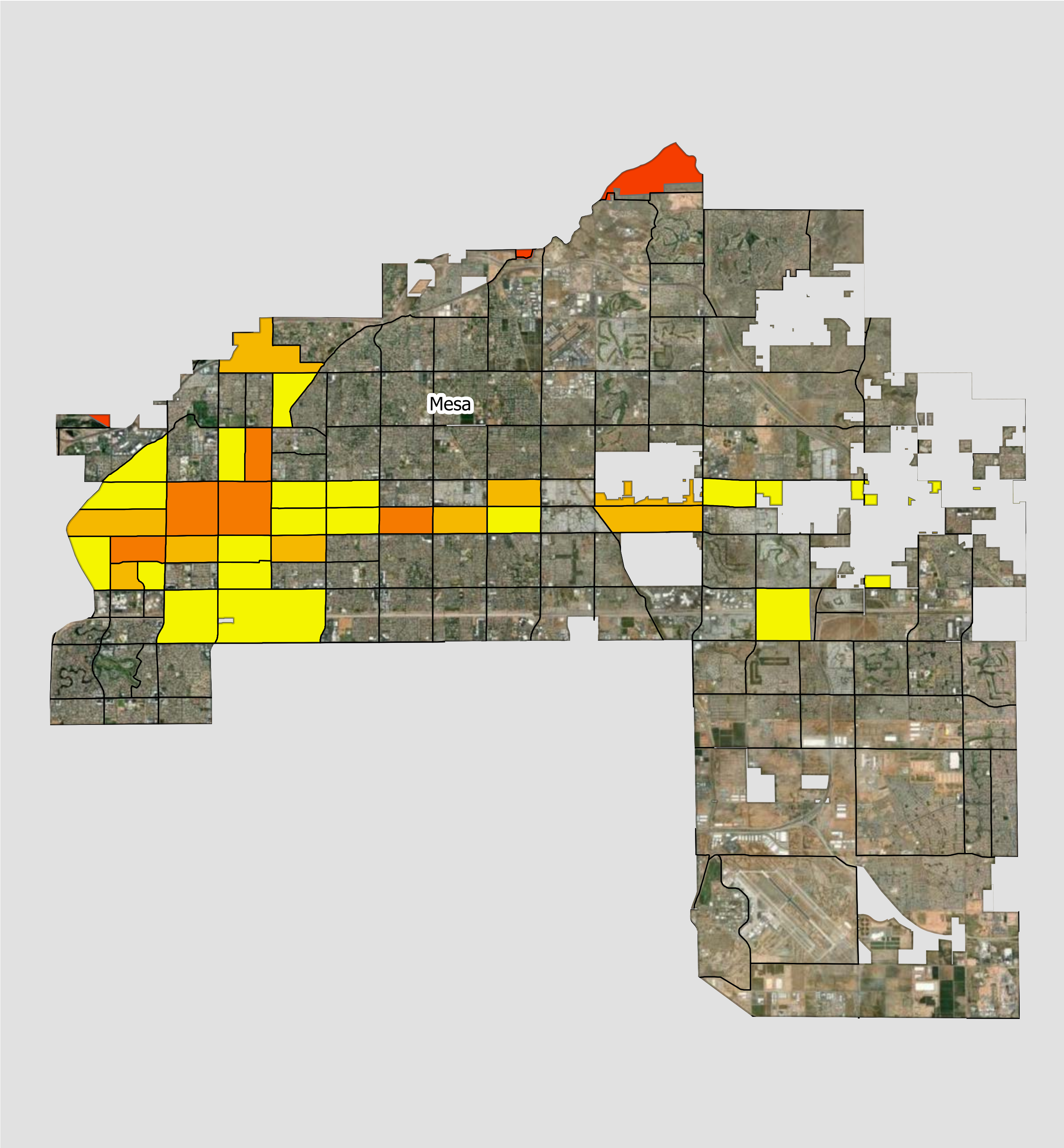

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

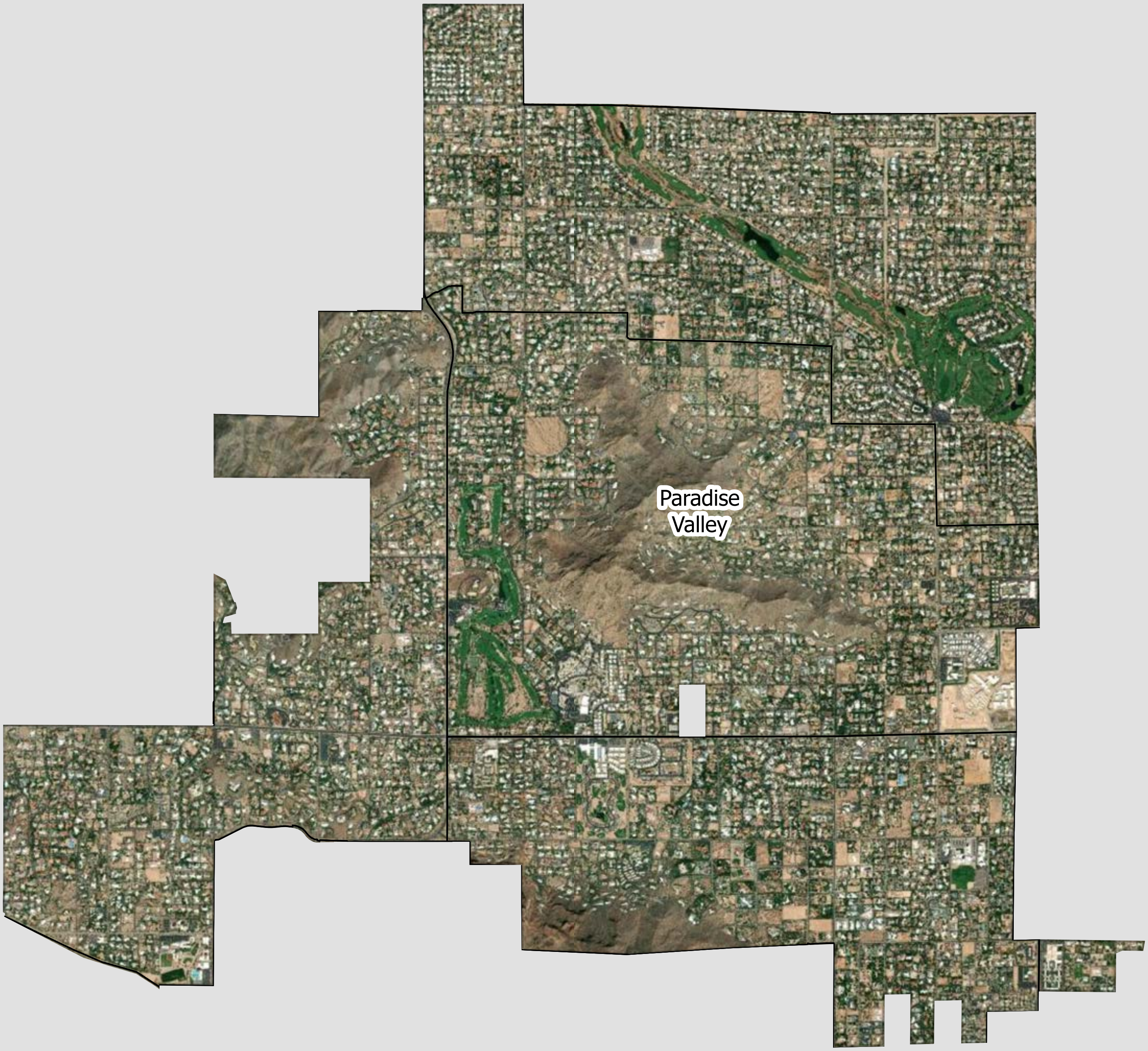
N

0 3.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Paradise Valley, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 1 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Peoria, AZ

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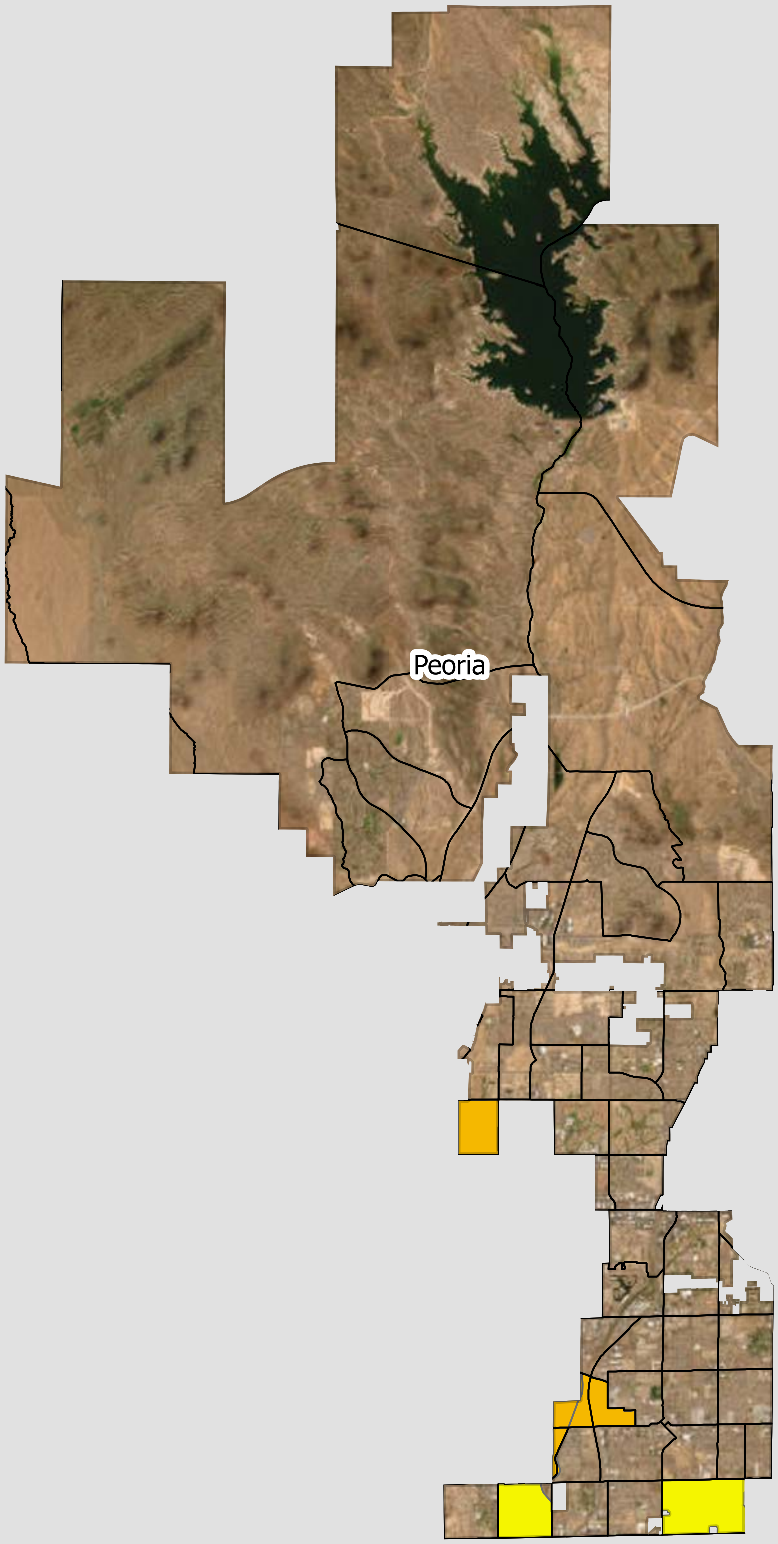

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

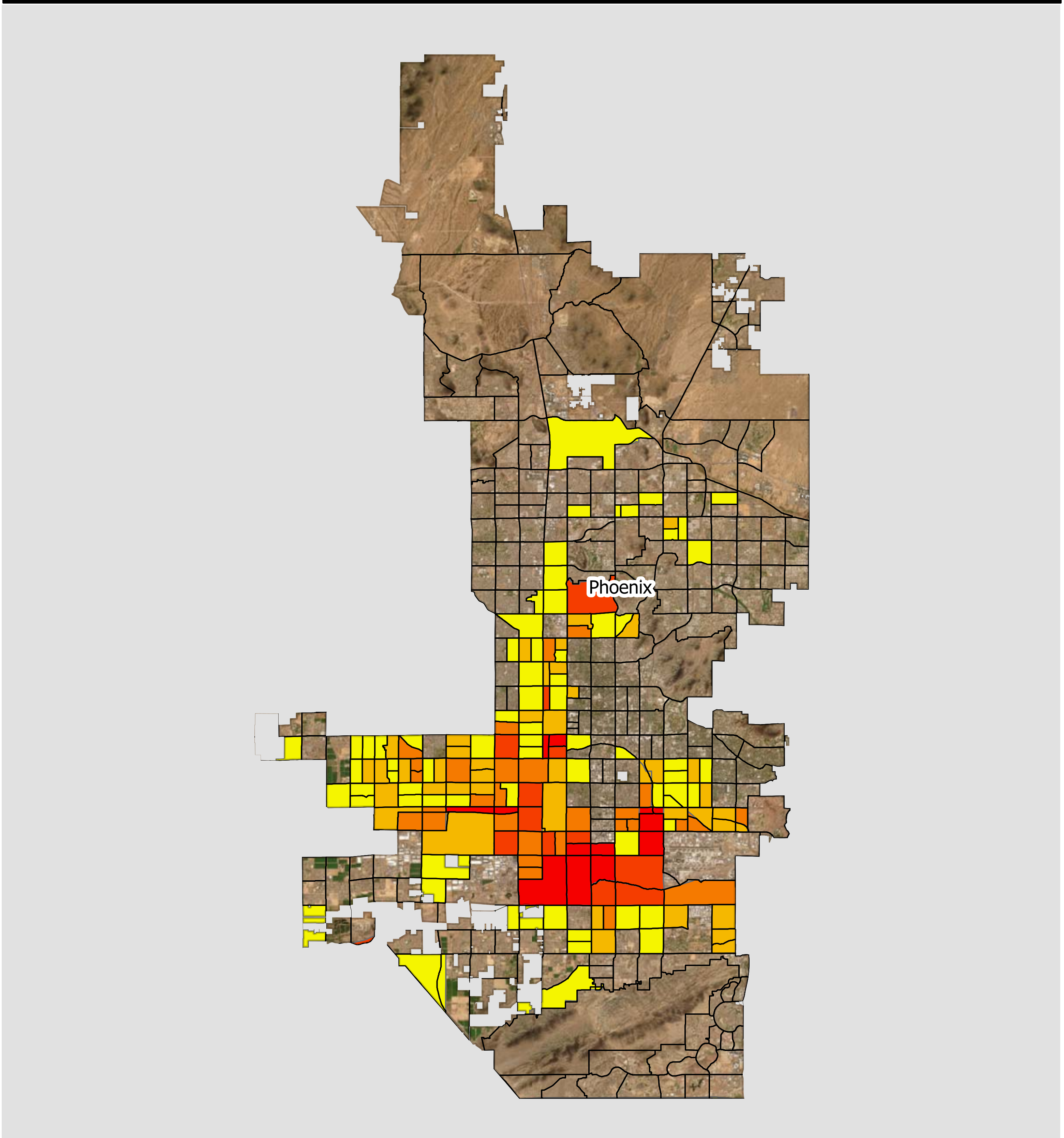
N

0 5 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Phoenix, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

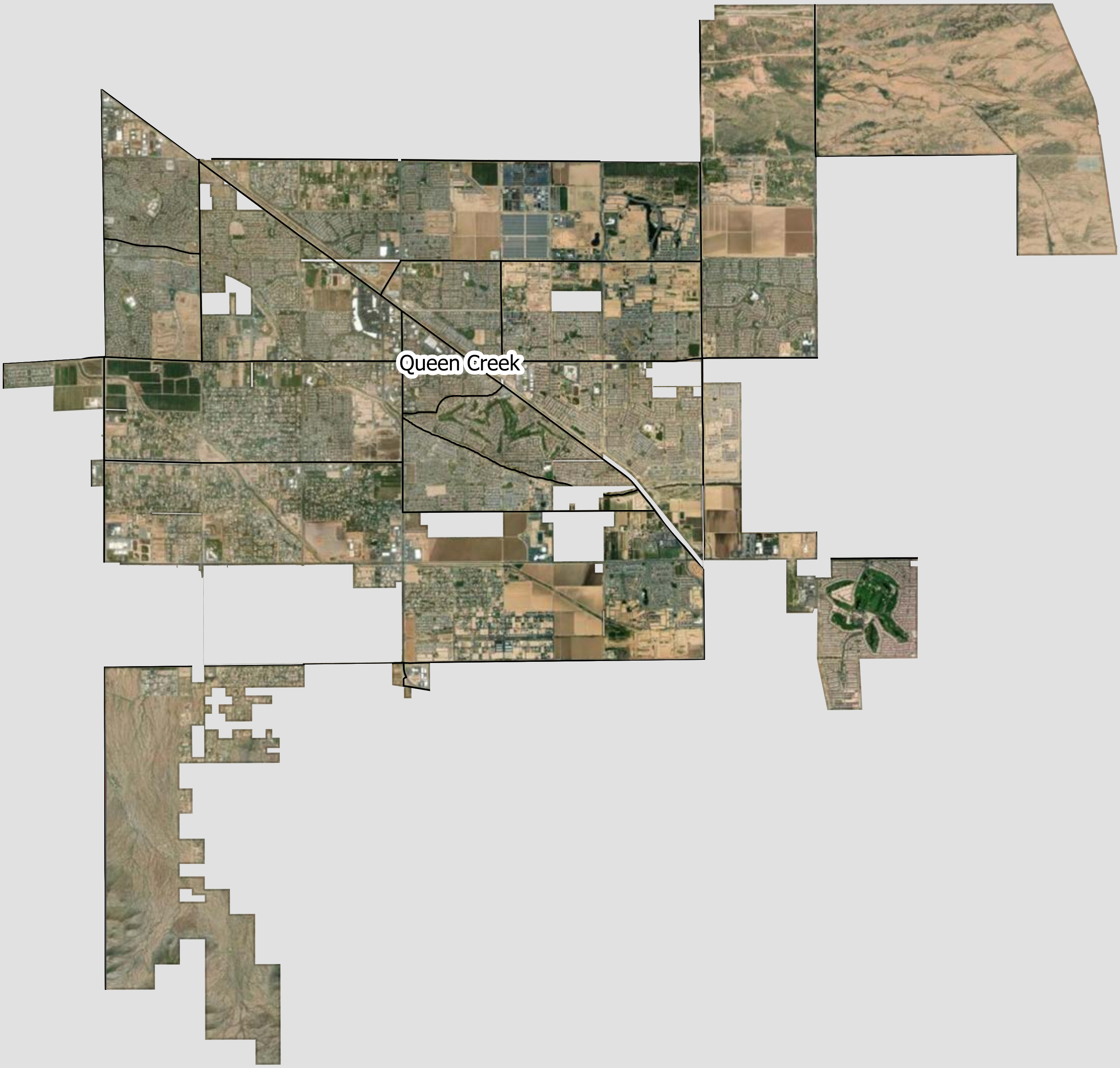
0 8 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Queen Creek, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

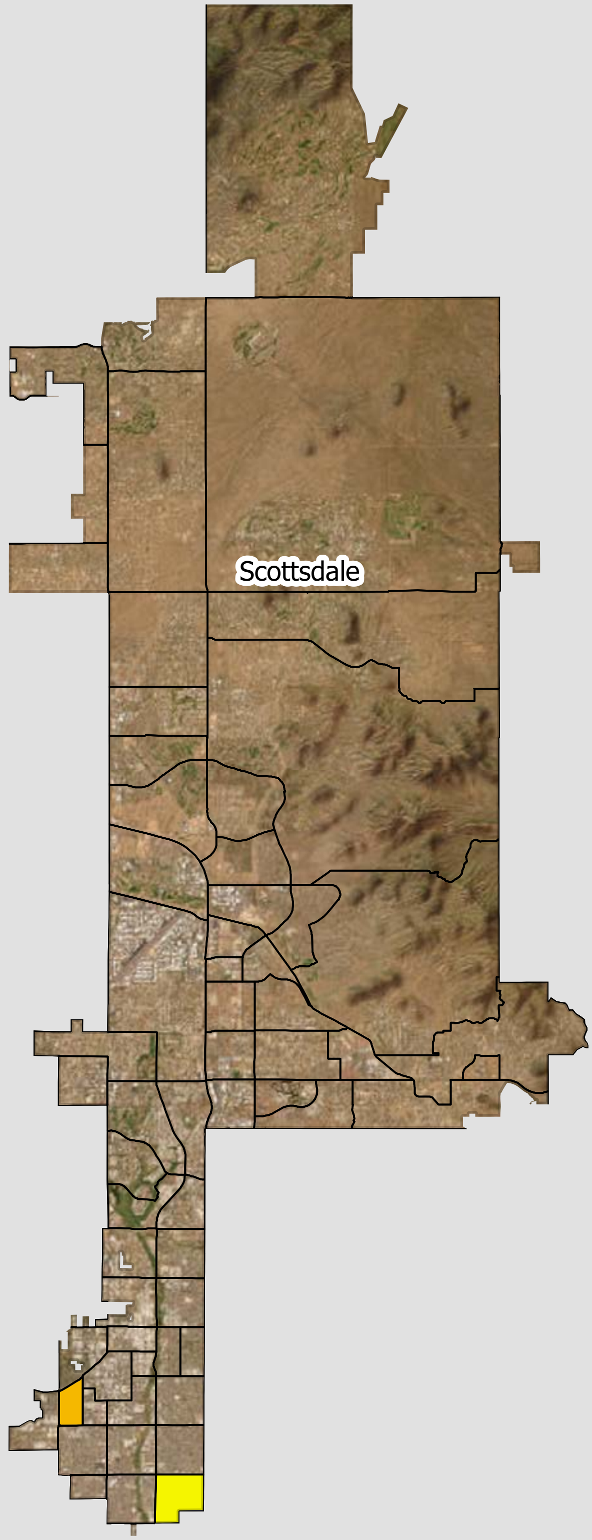
0 2 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Scottsdale, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

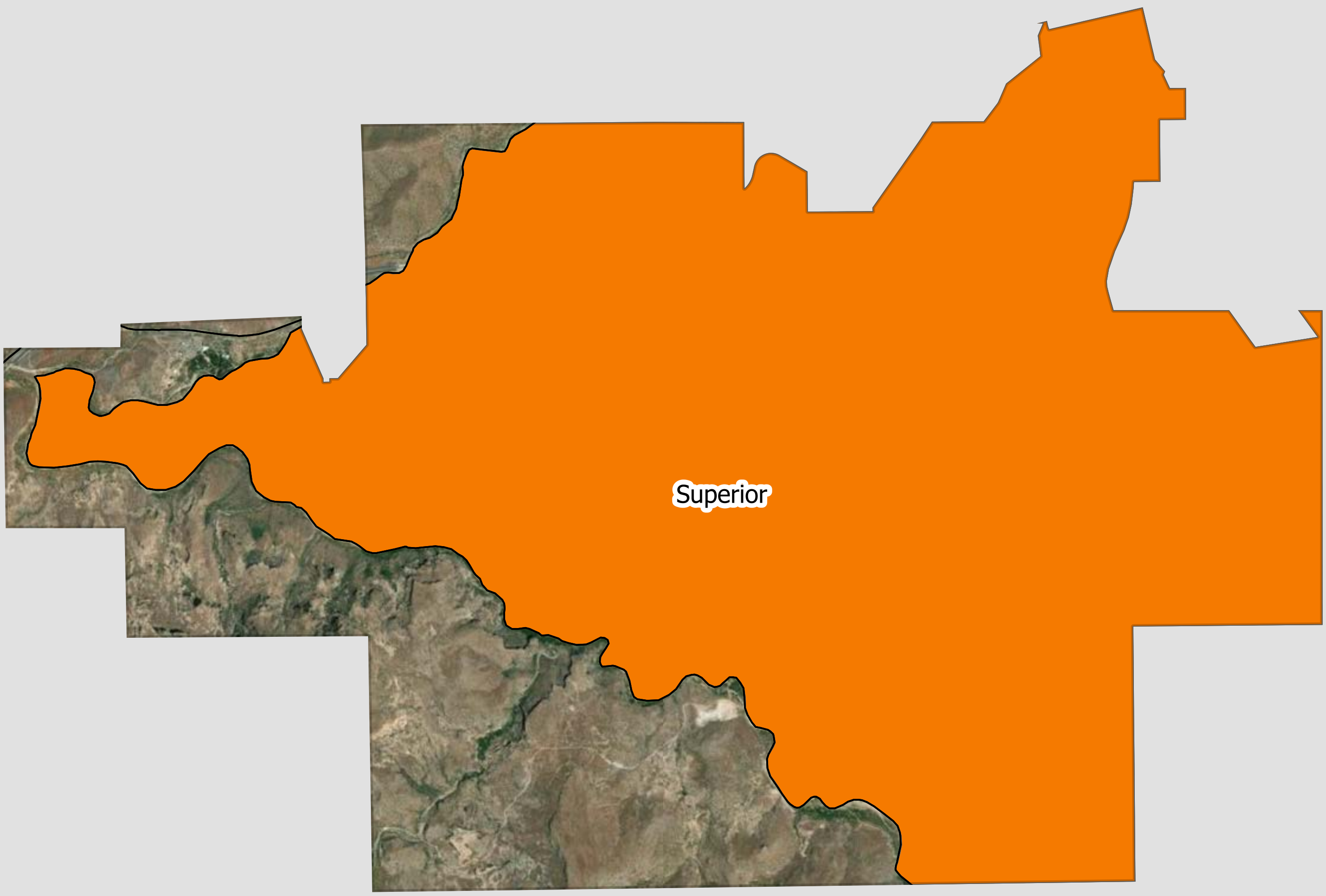
0 6 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Superior, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

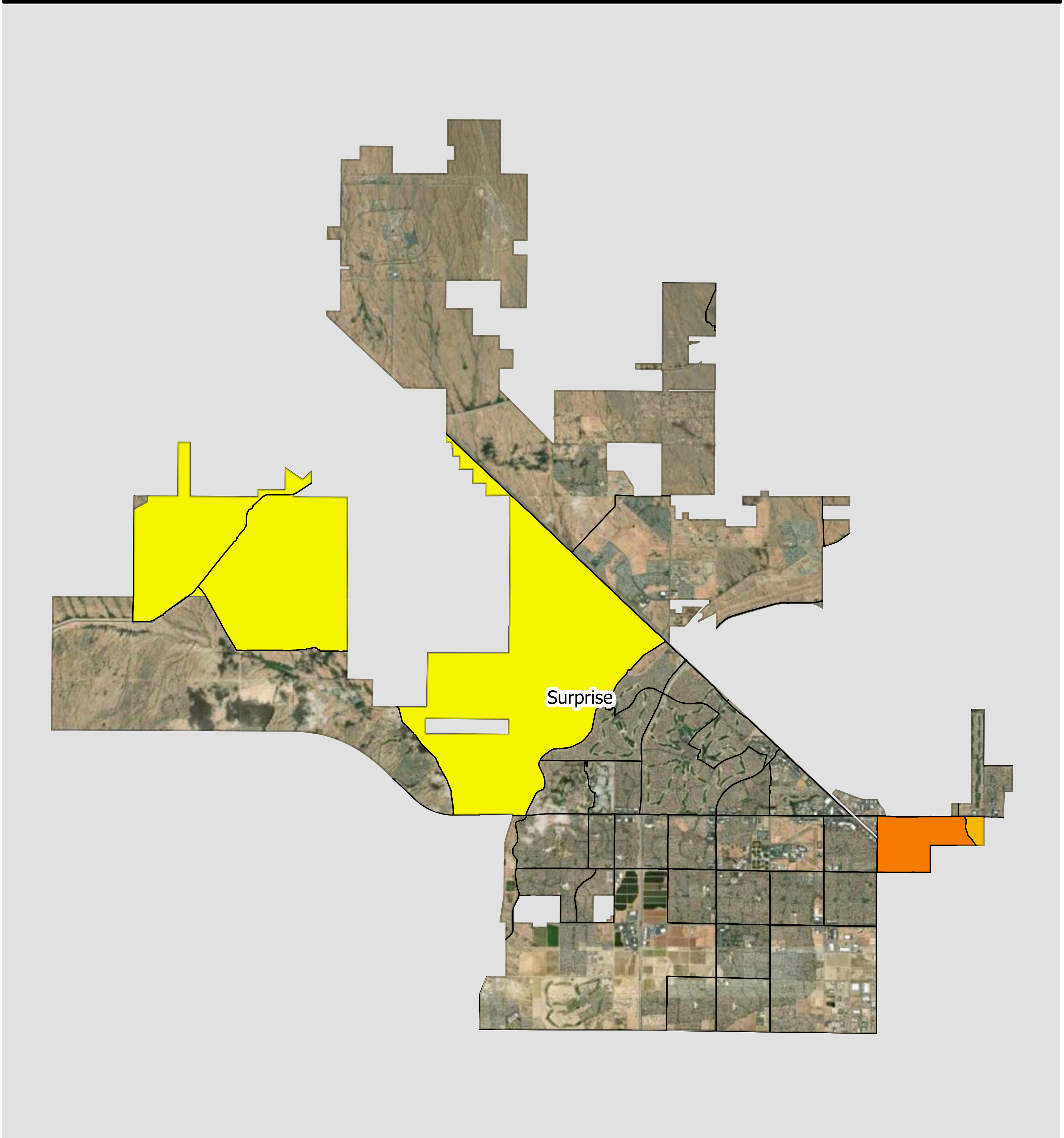
0 1 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Surprise, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

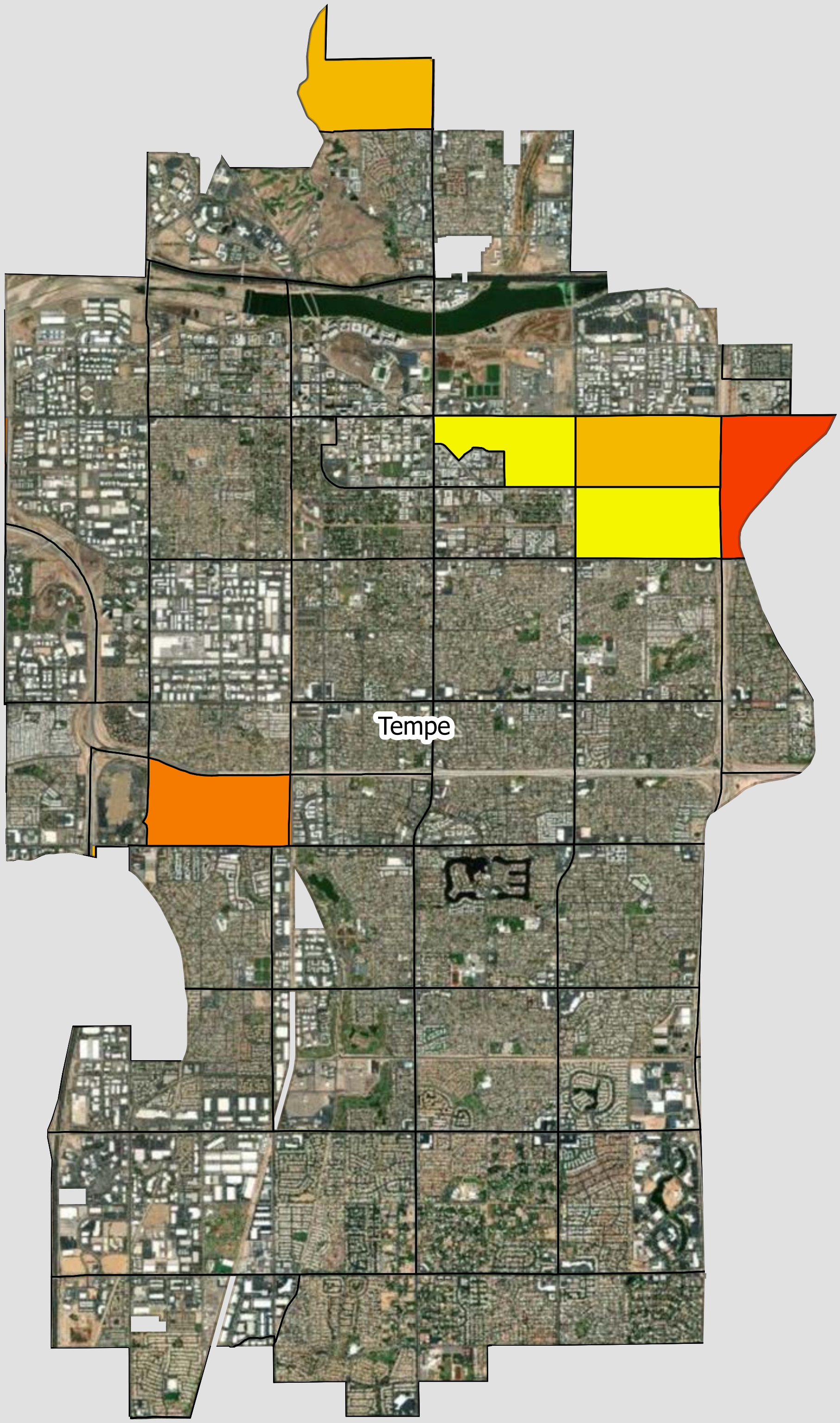
N

0 3.5 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Tempe, AZ



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

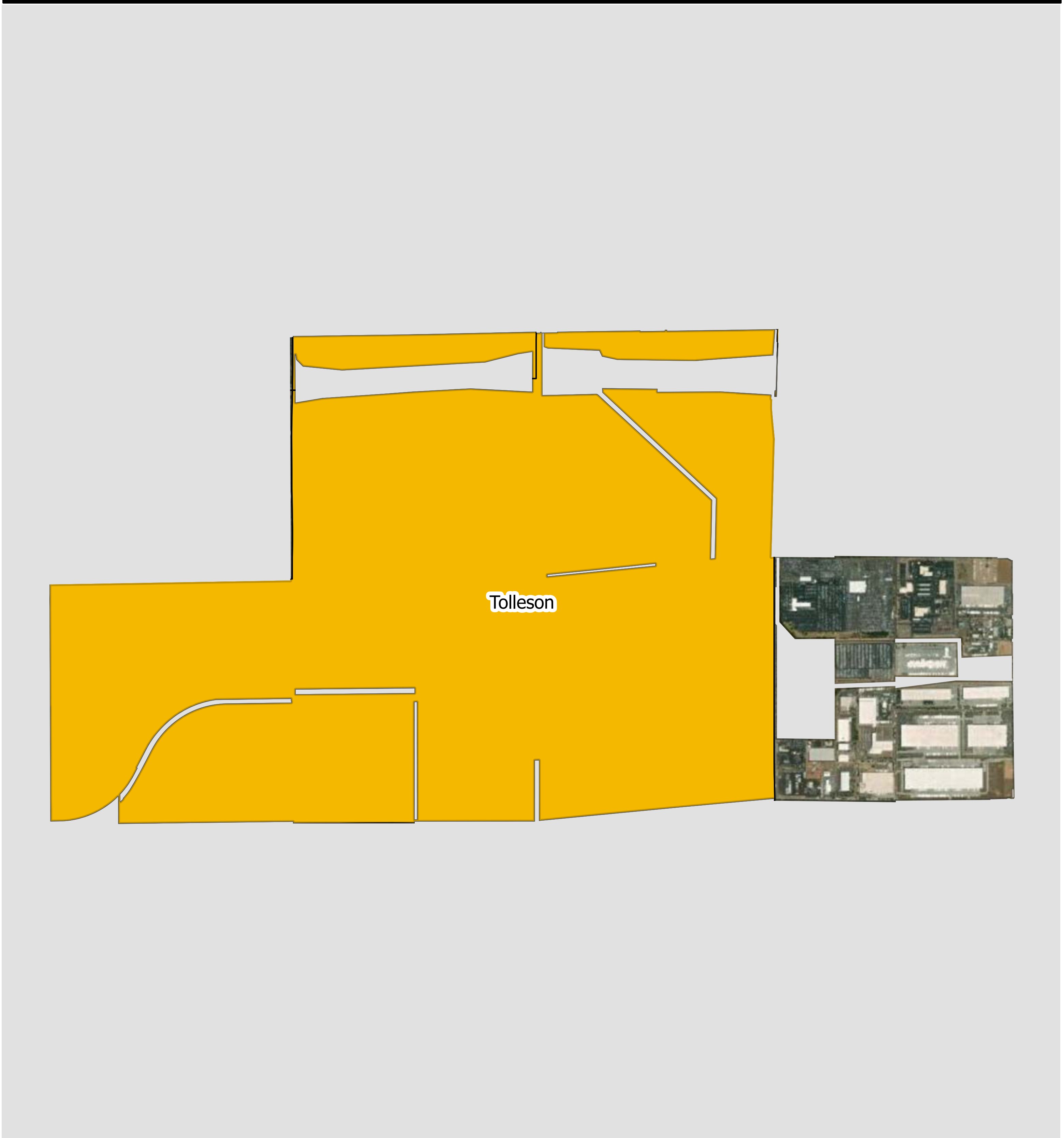
0 1.5 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Tolleson, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 0.75 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Wickenburg, AZ

MARICOPA ASSOCIATION of GOVERNMENTS

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 1.5 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

CEJST Disadvantaged Communties for Winkelman, AZ

Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

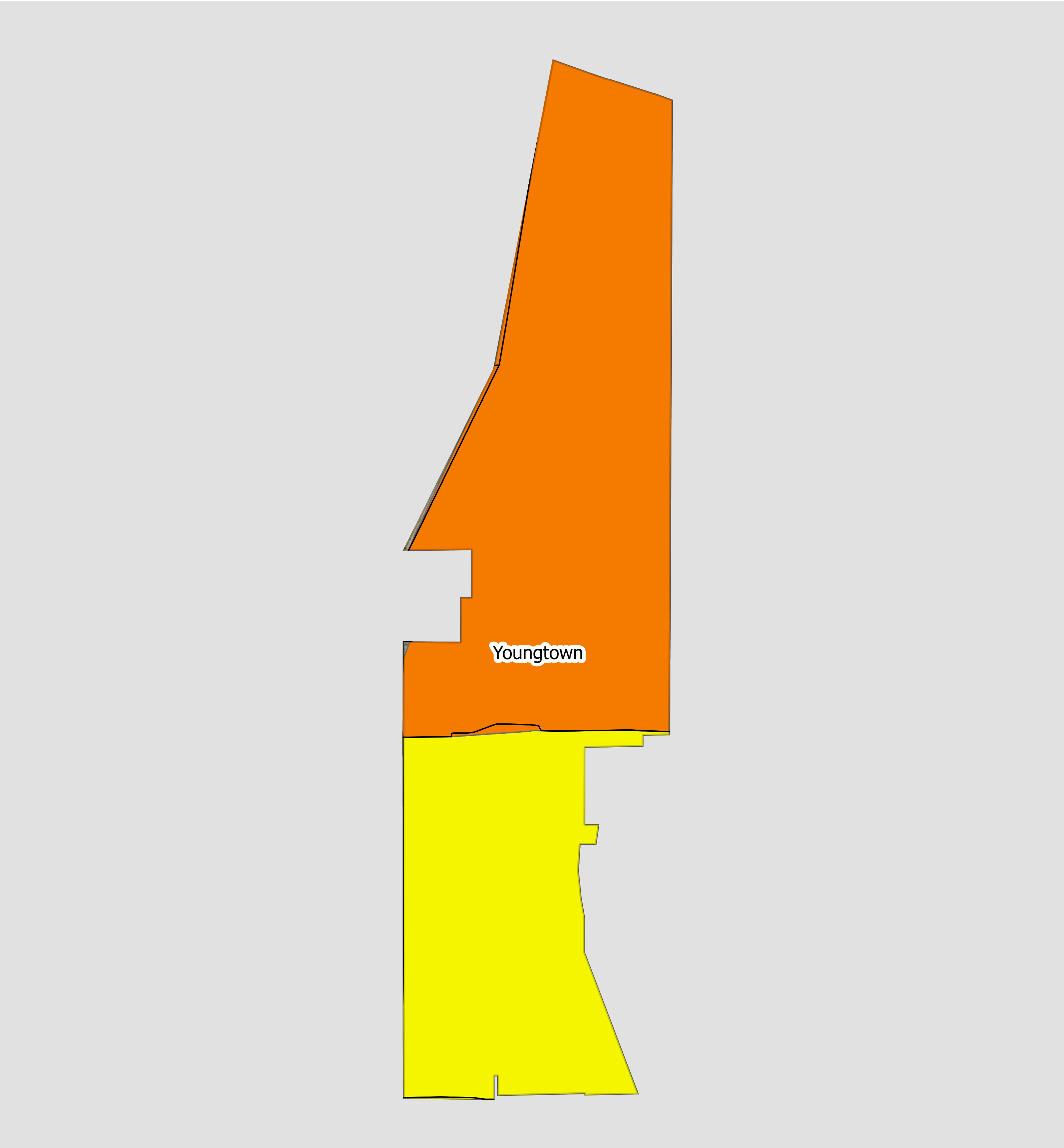
0 0.25 Miles

CEJST Burden Thresholds Exceeded

1-2
3-4
5-6
7-8
9-11
Tracts

CEJST Disadvantaged Communties for Youngtown, AZ

MARICOPA ASSOCIATION of GOVERNMENTS



Source: Climate and Economic Justice Screening Tool (2023)

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Date: February 2024

N

0 0.55 Miles

CEJST Burden Thresholds Exceeded

- 1-2
- 3-4
- 5-6
- 7-8
- 9-11
- Tracts

MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix E: List of CEJST Disadvantaged Communities within the Maricopa-Pinal County Region by Census Tract ID

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

List of Disadvantaged Communities within the Maricopa-Pinal County Region by Census Tract ID

Census tract 2010 ID	County Name	Total threshold criteria exceeded	Total categories exceeded	Identified as disadvantaged	Total population	Is low income?
04013040515	Maricopa County	2	2	TRUE	4654	TRUE
04013040517	Maricopa County	1	1	TRUE	8553	FALSE
04013050603	Maricopa County	1	1	TRUE	5926	FALSE
04013050607	Maricopa County	1	1	TRUE	8272	FALSE
04013050701	Maricopa County	1	1	TRUE	6526	TRUE
04013050702	Maricopa County	3	3	TRUE	4979	TRUE
04013060801	Maricopa County	5	4	TRUE	5737	TRUE
04013060802	Maricopa County	4	3	TRUE	2937	TRUE
04013060902	Maricopa County	5	4	TRUE	3273	TRUE
04013060903	Maricopa County	1	1	TRUE	5912	TRUE
04013060904	Maricopa County	3	2	TRUE	3820	TRUE
04013061046	Maricopa County	1	1	TRUE	6397	TRUE
04013061200	Maricopa County	9	7	TRUE	5924	TRUE
04013061300	Maricopa County	3	3	TRUE	1891	TRUE
04013061401	Maricopa County	8	7	TRUE	2257	TRUE
04013061402	Maricopa County	7	5	TRUE	6184	TRUE
04013071505	Maricopa County	3	2	TRUE	6820	TRUE
04013071600	Maricopa County	6	5	TRUE	3943	TRUE
04013071701	Maricopa County	2	2	TRUE	3041	TRUE
04013071702	Maricopa County	3	2	TRUE	3091	TRUE
04013071801	Maricopa County	3	1	TRUE	5205	TRUE
04013071802	Maricopa County	3	2	TRUE	3427	TRUE
04013071912	Maricopa County	3	3	TRUE	3183	TRUE
04013082007	Maricopa County	2	2	TRUE	4589	TRUE
04013082008	Maricopa County	1	1	TRUE	5793	TRUE
04013082009	Maricopa County	1	1	TRUE	5894	TRUE
04013082010	Maricopa County	3	3	TRUE	4996	TRUE
04013082012	Maricopa County	1	1	TRUE	7742	TRUE
04013082017	Maricopa County	2	2	TRUE	4721	TRUE
04013082018	Maricopa County	2	2	TRUE	5881	TRUE

04013082028	Maricopa County	2	2	TRUE	4671	TRUE
04013082207	Maricopa County	2	2	TRUE	3687	TRUE
04013082208	Maricopa County	2	2	TRUE	3070	TRUE
04013082209	Maricopa County	4	4	TRUE	3058	TRUE
04013083000	Maricopa County	3	3	TRUE	7246	TRUE
04013092311	Maricopa County	3	2	TRUE	3637	TRUE
04013092312	Maricopa County	2	2	TRUE	5161	TRUE
04013092600	Maricopa County	10	5	TRUE	3171	TRUE
04013092705	Maricopa County	1	1	TRUE	4612	TRUE
04013092716	Maricopa County	1	1	TRUE	4311	FALSE
04013092717	Maricopa County	1	1	TRUE	5547	TRUE
04013092718	Maricopa County	4	2	TRUE	3945	TRUE
04013092724	Maricopa County	1	1	TRUE	3976	TRUE
04013092801	Maricopa County	7	5	TRUE	5350	TRUE
04013092802	Maricopa County	4	3	TRUE	6747	TRUE
04013092900	Maricopa County	8	4	TRUE	3303	TRUE
04013093001	Maricopa County	5	3	TRUE	5696	TRUE
04013093002	Maricopa County	5	3	TRUE	4905	TRUE
04013093101	Maricopa County	3	3	TRUE	5040	TRUE
04013093104	Maricopa County	8	4	TRUE	5107	TRUE
04013093105	Maricopa County	6	3	TRUE	5467	TRUE
04013093106	Maricopa County	1	1	TRUE	5293	TRUE
04013093200	Maricopa County	2	2	TRUE	4053	TRUE
04013103302	Maricopa County	1	1	TRUE	7237	TRUE
04013103304	Maricopa County	2	1	TRUE	5304	TRUE
04013103305	Maricopa County	3	2	TRUE	3234	TRUE
04013103306	Maricopa County	2	2	TRUE	4466	TRUE
04013103609	Maricopa County	1	1	TRUE	5647	TRUE
04013103615	Maricopa County	7	4	TRUE	5990	TRUE
04013103900	Maricopa County	2	2	TRUE	6272	TRUE
04013104205	Maricopa County	1	1	TRUE	5948	TRUE
04013104227	Maricopa County	1	1	TRUE	2197	TRUE
04013104302	Maricopa County	2	2	TRUE	3862	TRUE
04013104401	Maricopa County	2	2	TRUE	4591	TRUE
04013104501	Maricopa County	5	4	TRUE	4321	TRUE
04013104502	Maricopa County	3	3	TRUE	5884	TRUE
04013104600	Maricopa County	2	2	TRUE	4026	TRUE
04013104701	Maricopa County	1	1	TRUE	2836	TRUE
04013104702	Maricopa County	3	3	TRUE	4289	TRUE
04013105501	Maricopa County	5	4	TRUE	2609	TRUE
04013105502	Maricopa County	4	3	TRUE	2011	TRUE

04013105503	Maricopa County	2	2	TRUE	3684	TRUE
04013105601	Maricopa County	2	2	TRUE	3989	TRUE
04013105602	Maricopa County	4	2	TRUE	6552	TRUE
04013105702	Maricopa County	1	1	TRUE	4880	TRUE
04013105900	Maricopa County	1	1	TRUE	5132	TRUE
04013106001	Maricopa County	3	3	TRUE	1723	TRUE
04013106002	Maricopa County	3	3	TRUE	2766	TRUE
04013106003	Maricopa County	1	1	TRUE	4207	TRUE
04013106701	Maricopa County	3	3	TRUE	4940	TRUE
04013106801	Maricopa County	8	4	TRUE	4694	TRUE
04013106802	Maricopa County	2	2	TRUE	3558	TRUE
04013106900	Maricopa County	1	1	TRUE	8561	TRUE
04013107101	Maricopa County	2	2	TRUE	4504	TRUE
04013107102	Maricopa County	5	3	TRUE	6246	TRUE
04013107201	Maricopa County	2	1	TRUE	1825	FALSE
04013107202	Maricopa County	3	3	TRUE	5254	TRUE
04013107300	Maricopa County	4	3	TRUE	6635	TRUE
04013108601	Maricopa County	1	1	TRUE	2833	TRUE
04013108902	Maricopa County	2	2	TRUE	5116	TRUE
04013109001	Maricopa County	10	5	TRUE	4952	TRUE
04013109002	Maricopa County	9	4	TRUE	4674	TRUE
04013109003	Maricopa County	7	4	TRUE	6165	TRUE
04013109101	Maricopa County	1	1	TRUE	3917	TRUE
04013109102	Maricopa County	2	2	TRUE	6637	TRUE
04013109200	Maricopa County	8	5	TRUE	3935	TRUE
04013109300	Maricopa County	2	2	TRUE	5343	TRUE
04013109400	Maricopa County	3	2	TRUE	9113	TRUE
04013109601	Maricopa County	2	1	TRUE	5491	TRUE
04013109602	Maricopa County	5	4	TRUE	7269	TRUE
04013109603	Maricopa County	3	3	TRUE	5317	TRUE
04013109604	Maricopa County	1	1	TRUE	4253	TRUE
04013109701	Maricopa County	6	4	TRUE	8685	TRUE
04013109702	Maricopa County	3	3	TRUE	5902	TRUE
04013109703	Maricopa County	3	3	TRUE	3279	TRUE
04013109704	Maricopa County	2	2	TRUE	2586	TRUE
04013109705	Maricopa County	2	2	TRUE	2449	TRUE
04013109801	Maricopa County	2	2	TRUE	4994	TRUE
04013109802	Maricopa County	3	3	TRUE	5894	TRUE
04013109900	Maricopa County	5	4	TRUE	9128	TRUE
04013110001	Maricopa County	3	3	TRUE	5362	TRUE
04013110002	Maricopa County	3	3	TRUE	4064	TRUE

04013110100	Maricopa County	6	4	TRUE	7122	TRUE
04013110400	Maricopa County	1	1	TRUE	5179	TRUE
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04013110702	Maricopa County	3	2	TRUE	4305	TRUE
04013110801	Maricopa County	1	1	TRUE	5502	TRUE
04013110802	Maricopa County	1	1	TRUE	2227	TRUE
04013110901	Maricopa County	4	4	TRUE	3149	TRUE
04013110902	Maricopa County	1	1	TRUE	5277	TRUE
04013111202	Maricopa County	5	4	TRUE	2418	TRUE
04013111203	Maricopa County	4	2	TRUE	1567	TRUE
04013111401	Maricopa County	2	2	TRUE	4584	TRUE
04013111402	Maricopa County	3	3	TRUE	4125	TRUE
04013111501	Maricopa County	2	2	TRUE	2148	TRUE
04013111502	Maricopa County	2	2	TRUE	6364	TRUE
04013111601	Maricopa County	2	1	TRUE	3591	TRUE
04013111602	Maricopa County	6	4	TRUE	5242	TRUE
04013112100	Maricopa County	7	5	TRUE	3748	TRUE
04013112201	Maricopa County	2	2	TRUE	4941	TRUE
04013112202	Maricopa County	6	5	TRUE	4515	TRUE
04013112301	Maricopa County	5	4	TRUE	5768	TRUE
04013112302	Maricopa County	3	3	TRUE	7777	TRUE
04013112401	Maricopa County	4	4	TRUE	6004	TRUE
04013112402	Maricopa County	2	2	TRUE	6661	TRUE
04013112502	Maricopa County	2	2	TRUE	6582	TRUE
04013112503	Maricopa County	2	2	TRUE	9960	TRUE
04013112504	Maricopa County	3	3	TRUE	4468	TRUE
04013112505	Maricopa County	6	4	TRUE	9863	TRUE
04013112507	Maricopa County	9	5	TRUE	3069	TRUE
04013112508	Maricopa County	5	4	TRUE	2211	TRUE
04013112509	Maricopa County	4	3	TRUE	11473	TRUE
04013112512	Maricopa County	3	2	TRUE	770	TRUE
04013112513	Maricopa County	2	1	TRUE	9486	TRUE
04013112601	Maricopa County	11	6	TRUE	3804	TRUE
04013112602	Maricopa County	6	4	TRUE	8617	TRUE
04013112700	Maricopa County	8	5	TRUE	7403	TRUE
04013112900	Maricopa County	5	4	TRUE	4835	TRUE
04013113201	Maricopa County	6	4	TRUE	2674	TRUE
04013113202	Maricopa County	5	3	TRUE	2095	TRUE
04013113203	Maricopa County	5	3	TRUE	2642	TRUE
04013113300	Maricopa County	10	5	TRUE	4987	TRUE
04013113400	Maricopa County	2	2	TRUE	343	TRUE

04013113501	Maricopa County	4	2	TRUE	4824	TRUE
04013113502	Maricopa County	5	4	TRUE	3366	TRUE
04013113601	Maricopa County	3	2	TRUE	5272	TRUE
04013113602	Maricopa County	6	4	TRUE	4090	TRUE
04013113700	Maricopa County	4	2	TRUE	8039	TRUE
04013113900	Maricopa County	10	6	TRUE	1457	TRUE
04013114000	Maricopa County	1	1	TRUE	1996	FALSE
04013114200	Maricopa County	9	6	TRUE	994	TRUE
04013114301	Maricopa County	8	4	TRUE	565	TRUE
04013114302	Maricopa County	11	6	TRUE	3173	TRUE
04013114401	Maricopa County	8	6	TRUE	1458	TRUE
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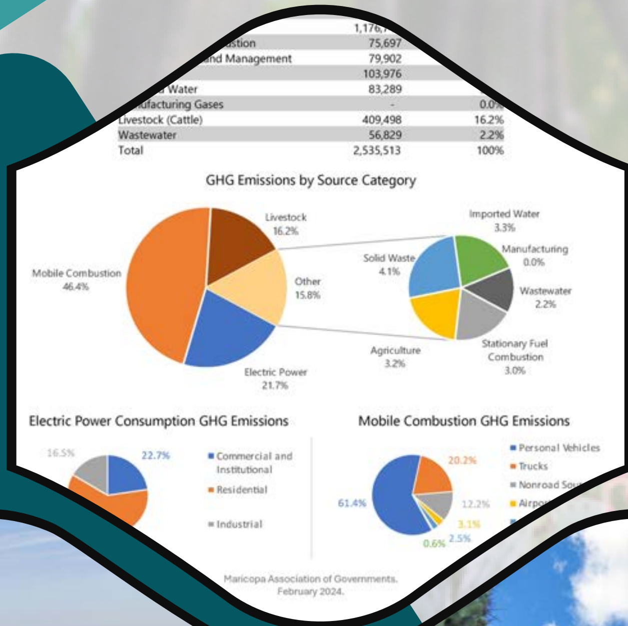
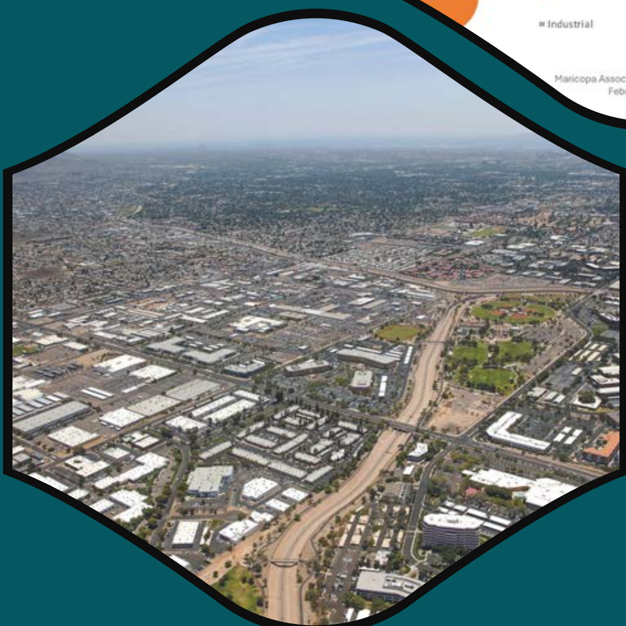




MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix F: Maricopa-Pinal County Region 2020 Community GHG Emissions Profiles

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

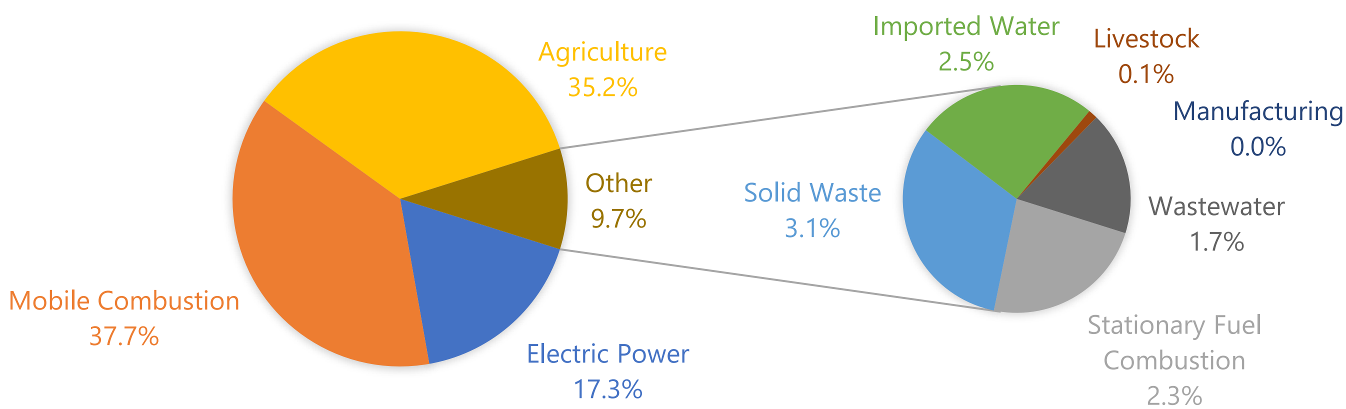
This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Ak Chin Indian Community

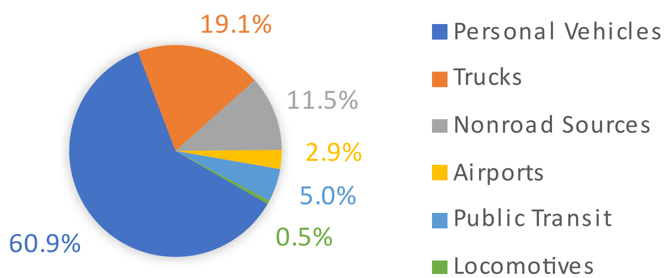
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	3,013	17.3%
Mobile Combustion	6,556	37.7%
Stationary Fuel Combustion	395	2.3%
Agriculture and Land Management	6,113	35.2%
Solid Waste	542	3.1%
Imported Water	434	2.5%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	22	0.1%
Wastewater	296	1.7%
Total	17,371	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

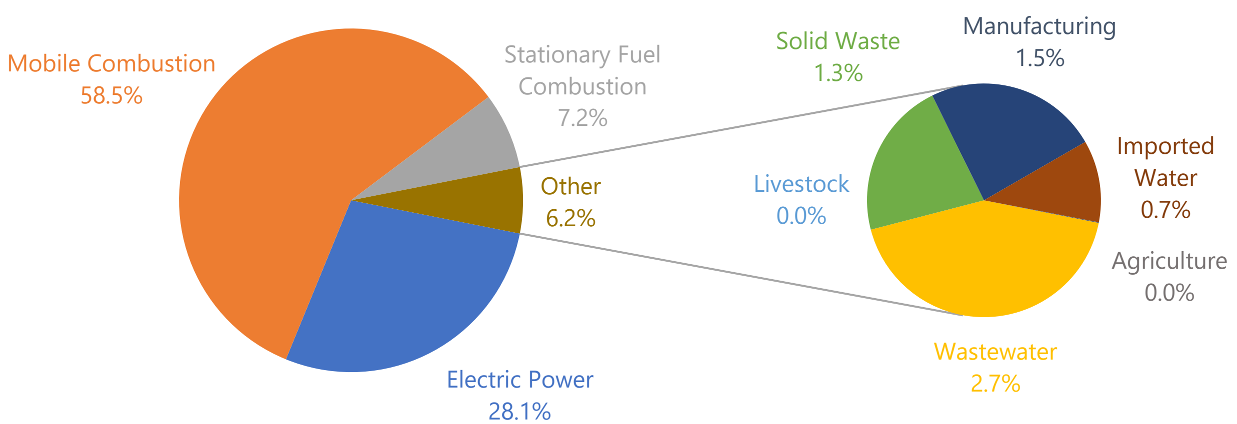


Apache Junction (Maricopa Portion)

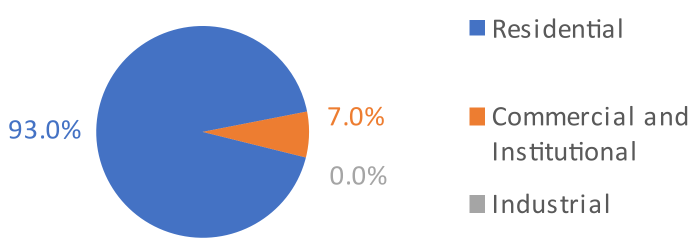
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	975	28.1%
Mobile Combustion	2,034	58.5%
Stationary Fuel Combustion	249	7.2%
Agriculture and Land Management	0	0.0%
Solid Waste	47	1.3%
Imported Water	24	0.7%
Manufacturing Gases	52	1.5%
Livestock (Cattle)	-	0.0%
Wastewater	92	2.7%
Total	3,473	100%

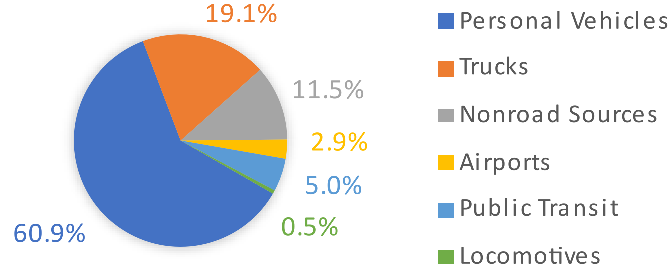
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

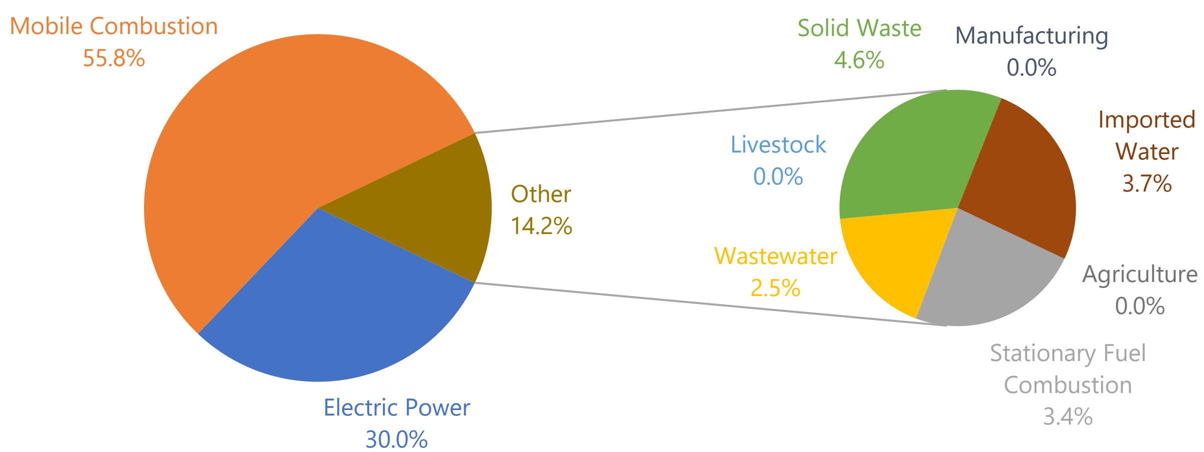


Apache Junction, AZ (Pinal Portion)

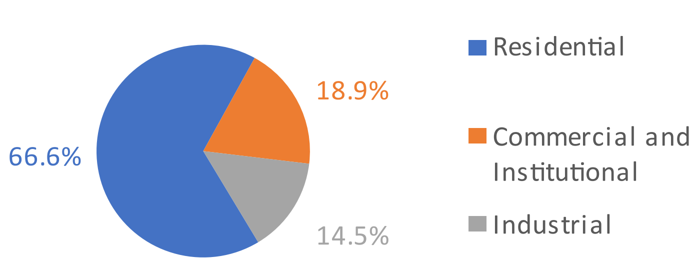
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO2e	Percentage
Electric Power Consumption	125,024	30.0%
Mobile Combustion	232,297	55.8%
Stationary Fuel Combustion	13,985	3.4%
Agriculture and Land Management	13	0.0%
Solid Waste	19,210	4.6%
Imported Water	15,388	3.7%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	10,499	2.5%
Total	416,416	100%

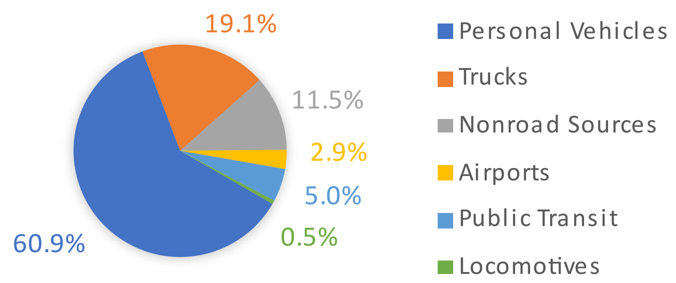
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

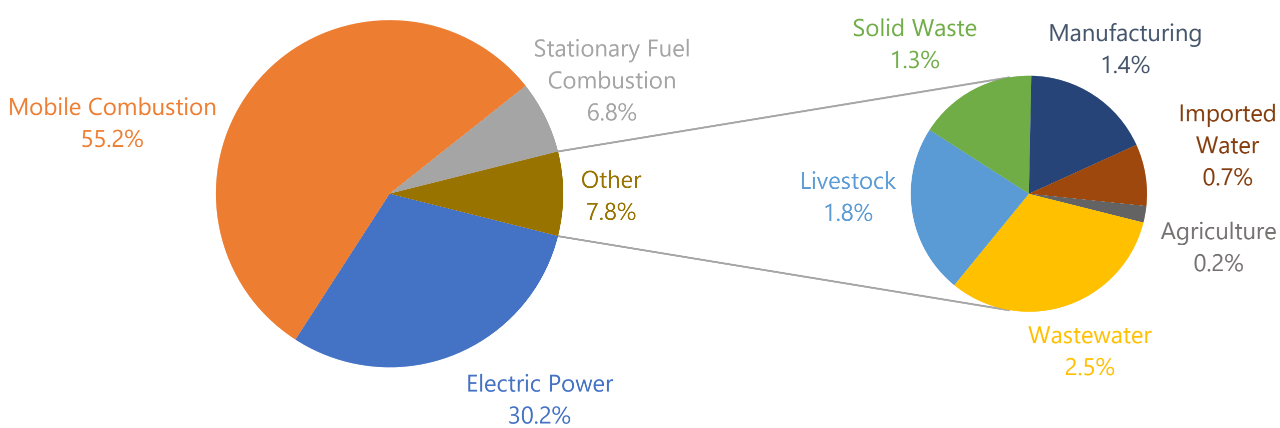


Avondale, AZ

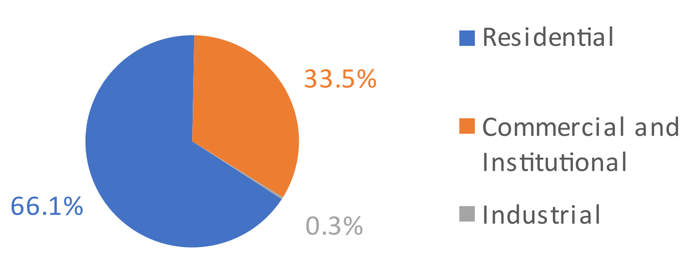
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO2e	Percentage
Electric Power Consumption	252,057	30.2%
Mobile Combustion	460,685	55.2%
Stationary Fuel Combustion	56,396	6.8%
Agriculture and Land Management	1,474	0.2%
Solid Waste	10,616	1.3%
Imported Water	5,533	0.7%
Manufacturing Gases	11,693	1.4%
Livestock (Cattle)	15,168	1.8%
Wastewater	20,914	2.5%
Total	834,536	100%

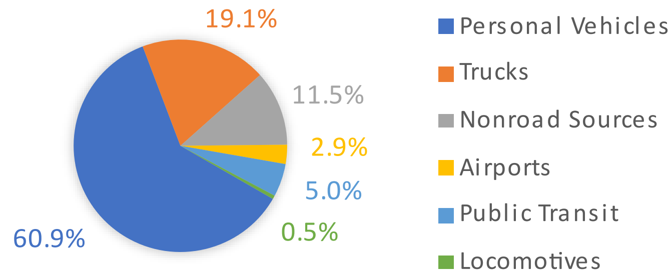
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

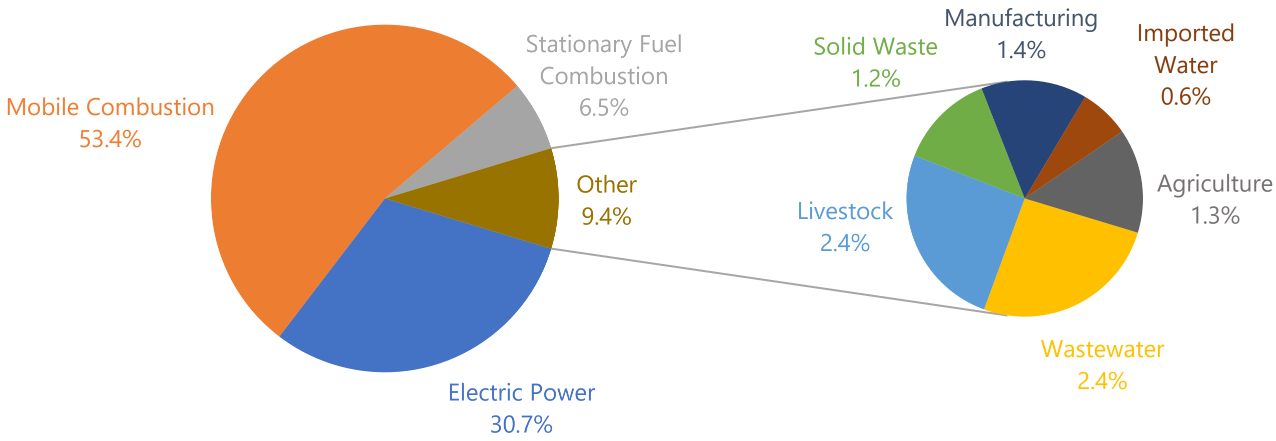


Buckeye, AZ

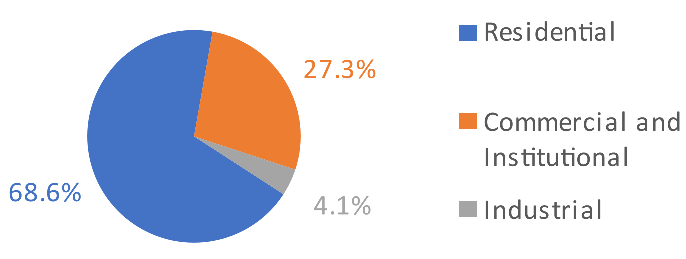
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	277,241	30.7%
Mobile Combustion	482,046	53.4%
Stationary Fuel Combustion	59,011	6.5%
Agriculture and Land Management	12,050	1.3%
Solid Waste	11,108	1.2%
Imported Water	5,790	0.6%
Manufacturing Gases	12,235	1.4%
Livestock (Cattle)	21,365	2.4%
Wastewater	21,884	2.4%
Total	902,730	100%

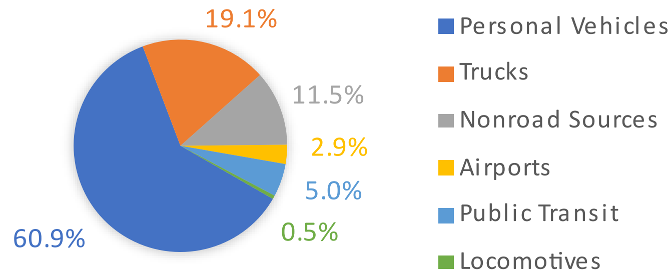
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

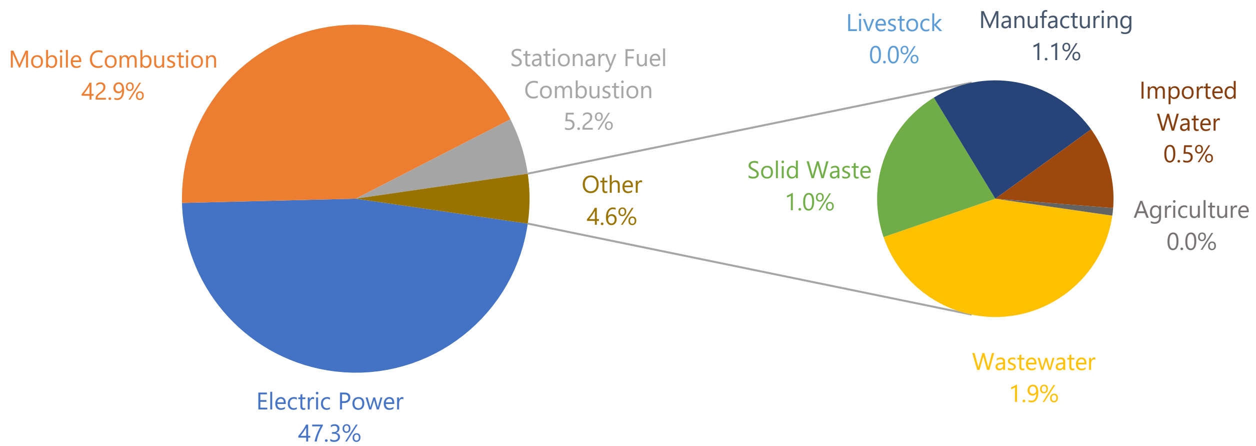


Carefree, AZ

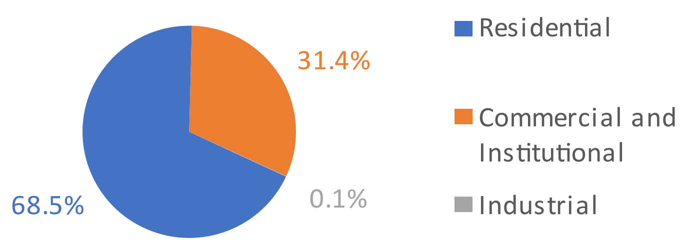
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	20,987	47.3%
Mobile Combustion	19,008	42.9%
Stationary Fuel Combustion	2,327	5.2%
Agriculture and Land Management	21	0.0%
Solid Waste	438	1.0%
Imported Water	228	0.5%
Manufacturing Gases	482	1.1%
Livestock (Cattle)	-	0.0%
Wastewater	863	1.9%
Total	44,355	100%

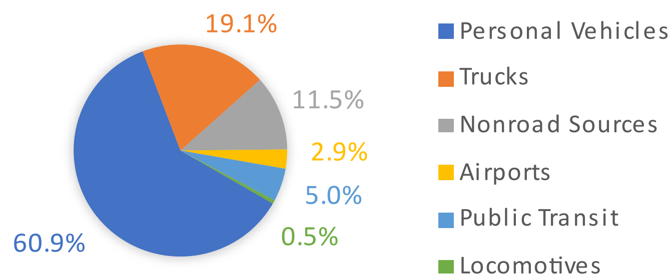
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

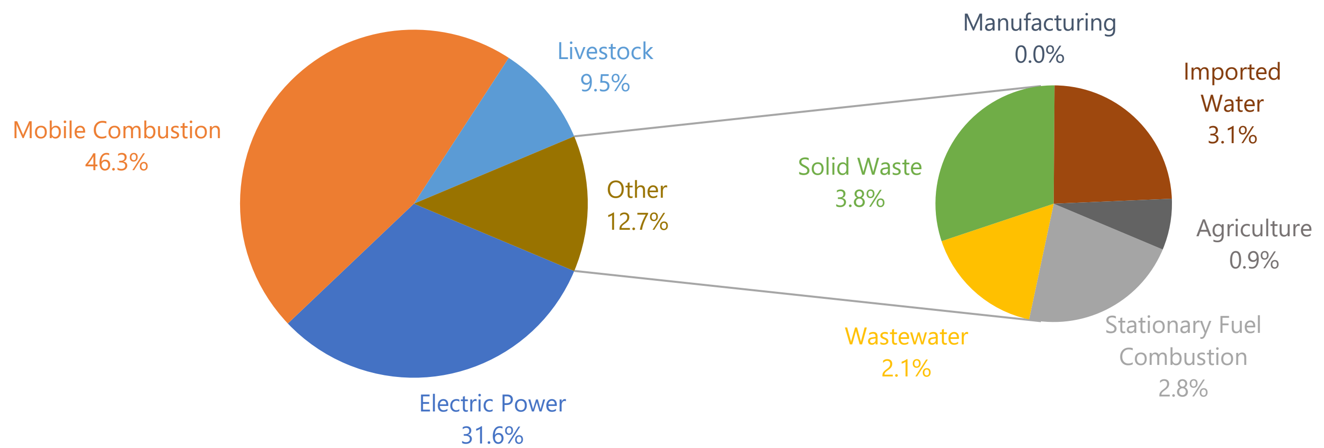


Casa Grande, AZ

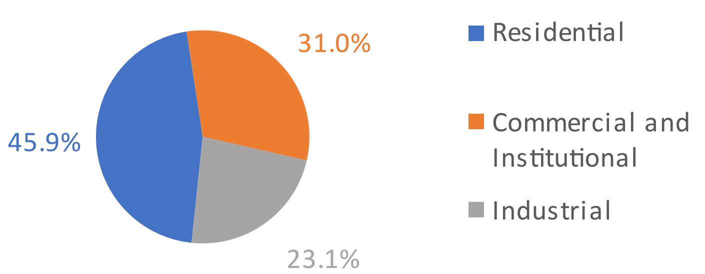
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	223,860	31.6%
Mobile Combustion	327,969	46.3%
Stationary Fuel Combustion	19,745	2.8%
Agriculture and Land Management	6,271	0.9%
Solid Waste	27,122	3.8%
Imported Water	21,726	3.1%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	67,265	9.5%
Wastewater	14,824	2.1%
Total	708,782	100%

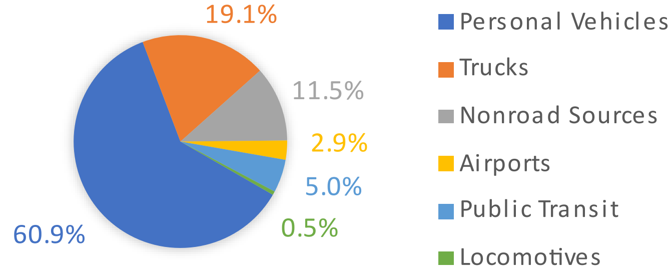
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

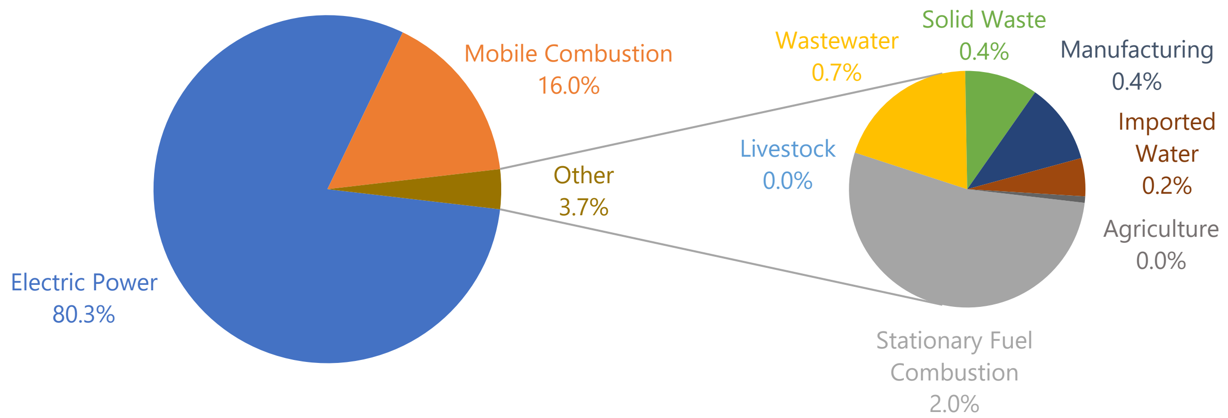


Cave Creek, AZ

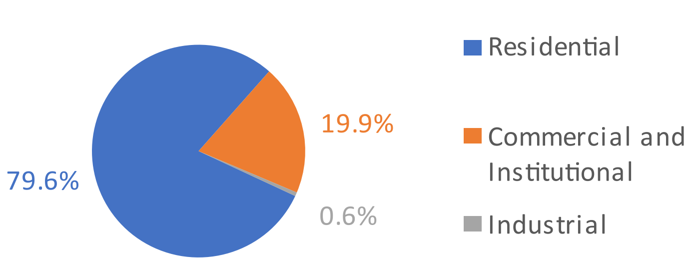
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	127,046	80.3%
Mobile Combustion	25,351	16.0%
Stationary Fuel Combustion	3,103	2.0%
Agriculture and Land Management	51	0.0%
Solid Waste	584	0.4%
Imported Water	304	0.2%
Manufacturing Gases	643	0.4%
Livestock (Cattle)	-	0.0%
Wastewater	1,151	0.7%
Total	158,234	100%

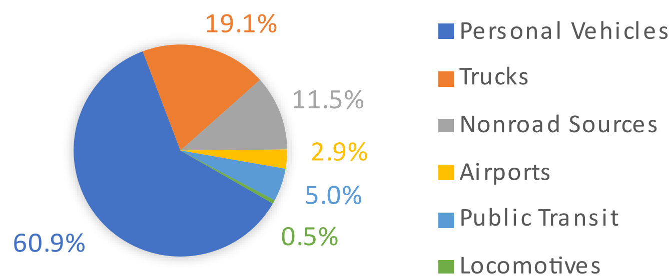
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

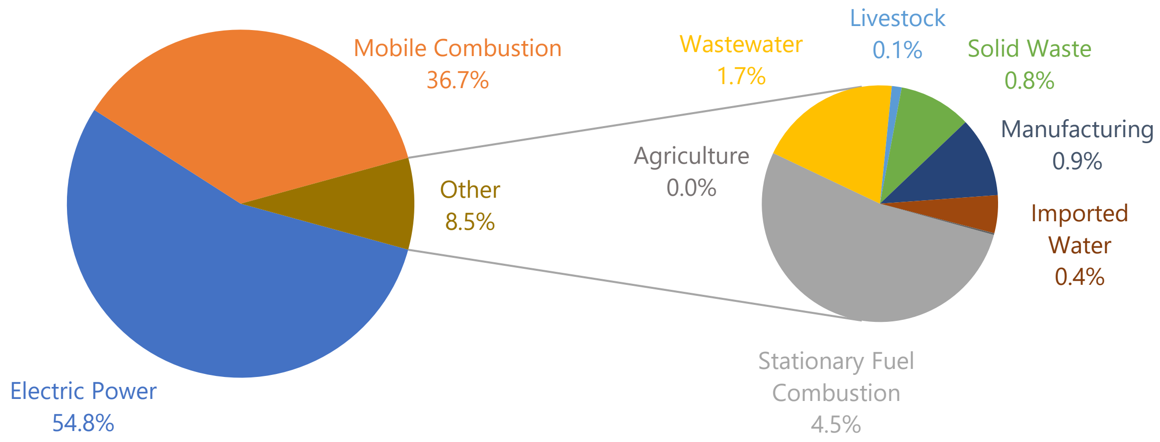


Chandler, AZ

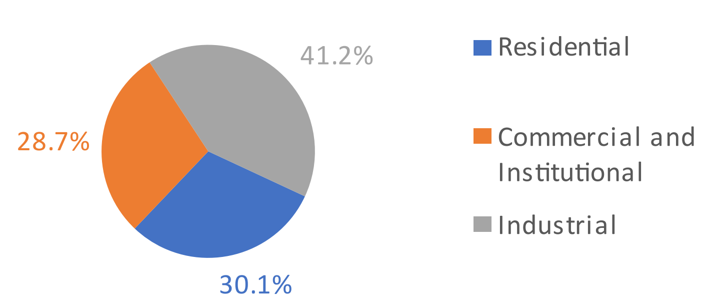
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	2,131,268	54.8%
Mobile Combustion	1,426,724	36.7%
Stationary Fuel Combustion	174,657	4.5%
Agriculture and Land Management	786	0.0%
Solid Waste	32,876	0.8%
Imported Water	17,136	0.4%
Manufacturing Gases	36,212	0.9%
Livestock (Cattle)	4,478	0.1%
Wastewater	64,770	1.7%
Total	3,888,905	100%

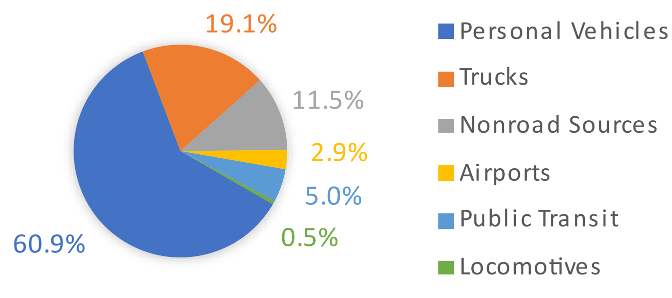
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

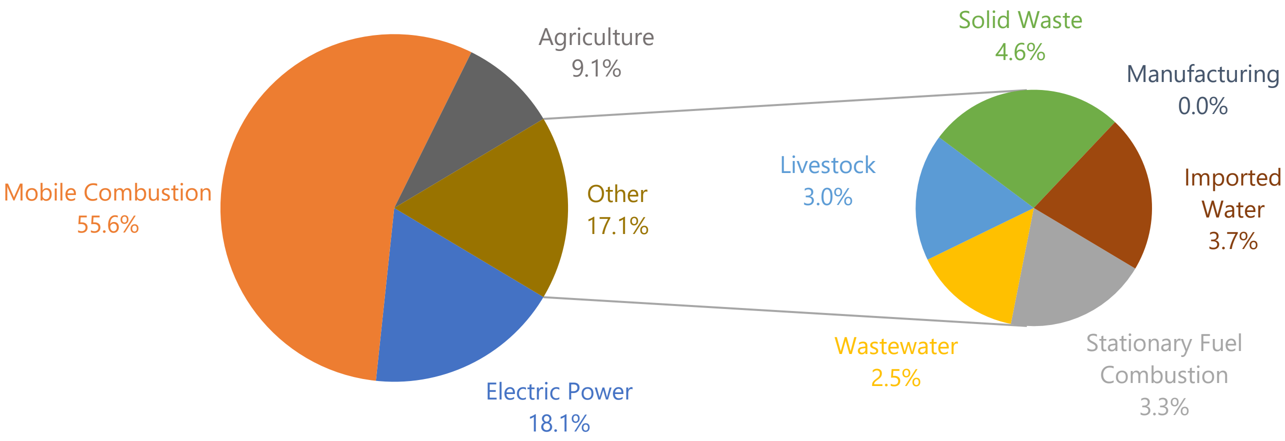


Coolidge, AZ

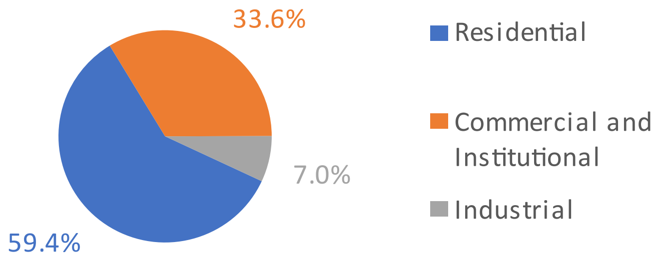
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO2e	Percentage
Electric Power Consumption	26,429	18.1%
Mobile Combustion	81,168	55.6%
Stationary Fuel Combustion	4,887	3.3%
Agriculture and Land Management	13,291	9.1%
Solid Waste	6,712	4.6%
Imported Water	5,377	3.7%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	4,352	3.0%
Wastewater	3,669	2.5%
Total	145,886	100%

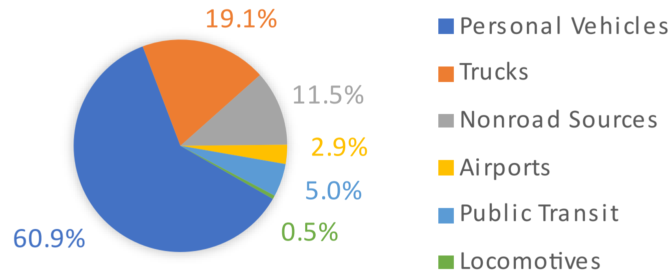
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

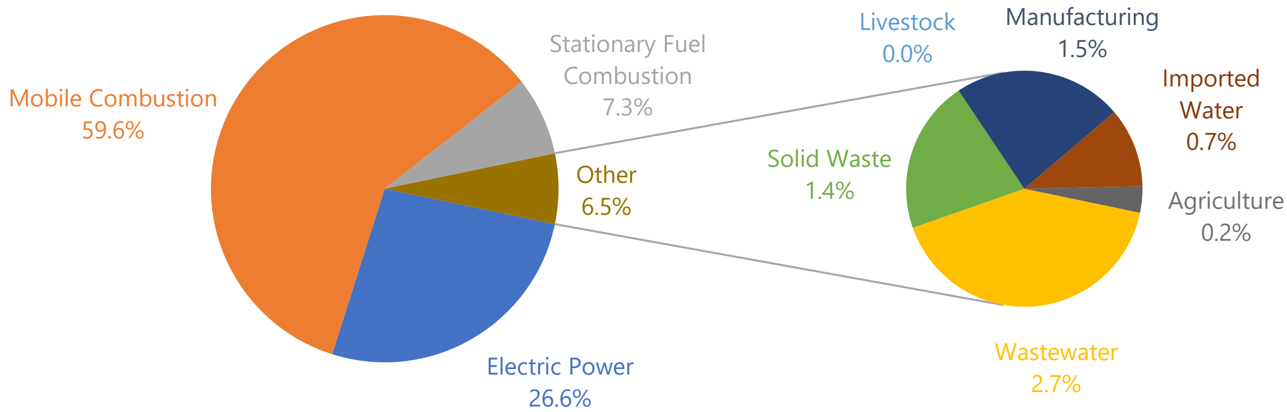


El Mirage, AZ

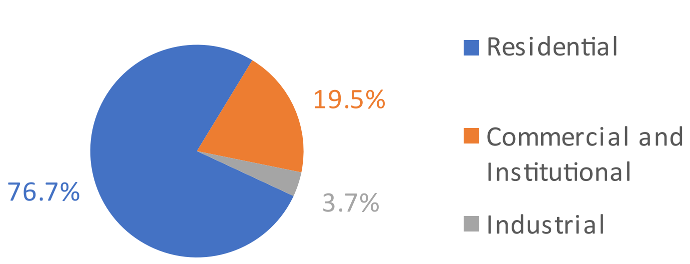
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	Percentage
Electric Power Consumption	82,681	26.6%
Mobile Combustion	184,969	59.6%
Stationary Fuel Combustion	22,644	7.3%
Agriculture and Land Management	727	0.2%
Solid Waste	4,262	1.4%
Imported Water	2,222	0.7%
Manufacturing Gases	4,695	1.5%
Livestock (Cattle)	-	0.0%
Wastewater	8,397	2.7%
Total	310,596	100%

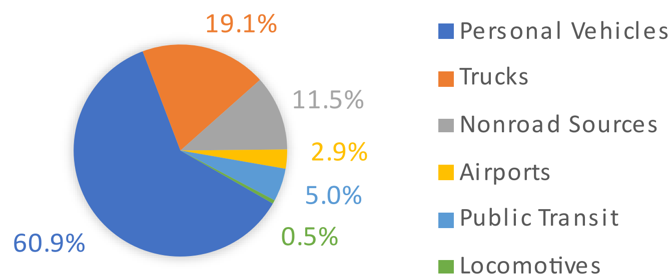
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

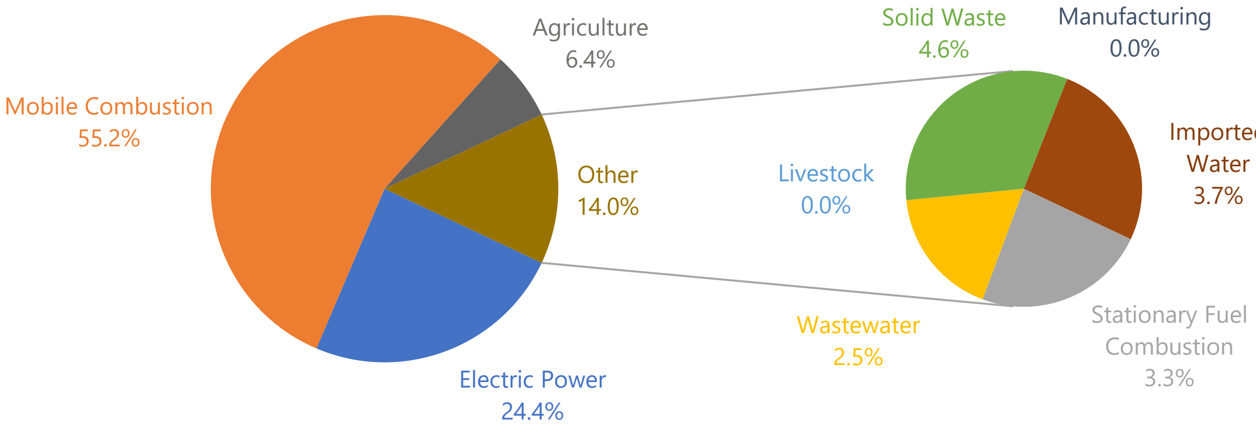


Eloy, AZ

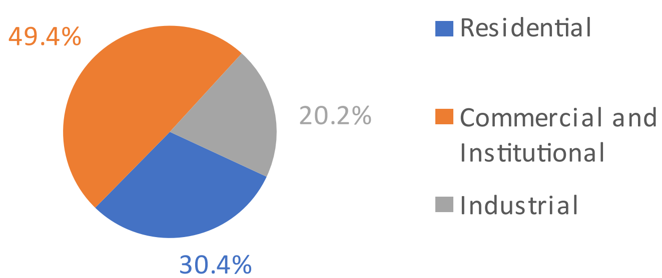
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	42,079	24.4%
Mobile Combustion	95,216	55.2%
Stationary Fuel Combustion	5,732	3.3%
Agriculture and Land Management	10,957	6.4%
Solid Waste	7,874	4.6%
Imported Water	6,307	3.7%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	4,304	2.5%
Total	172,470	100%

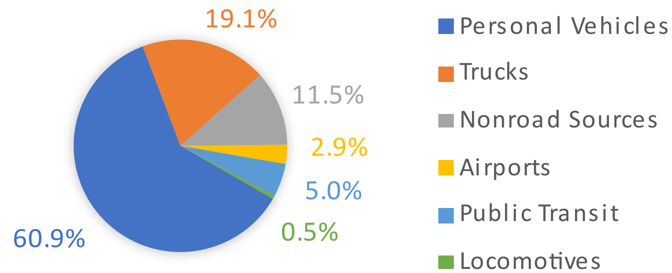
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

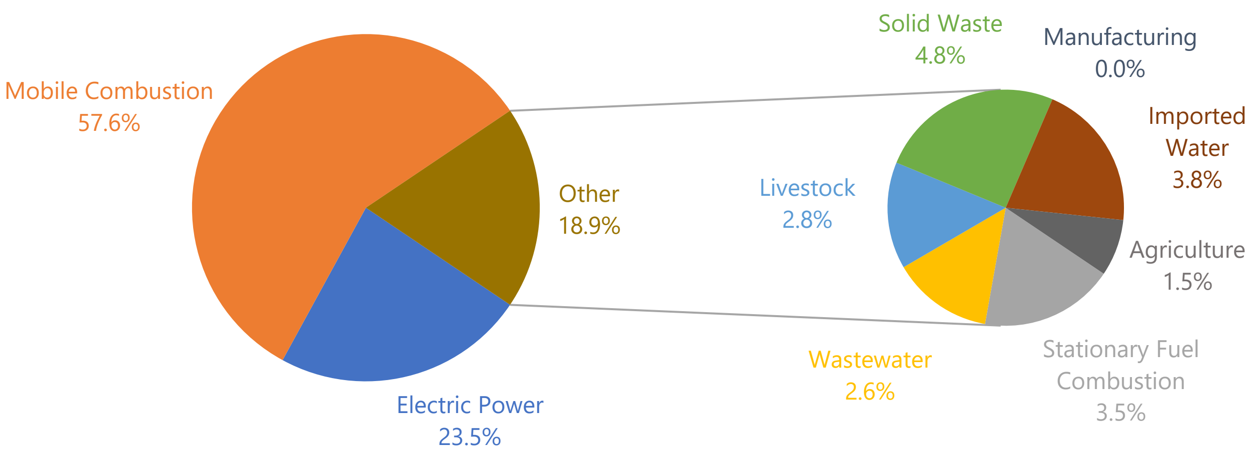


Florence, AZ

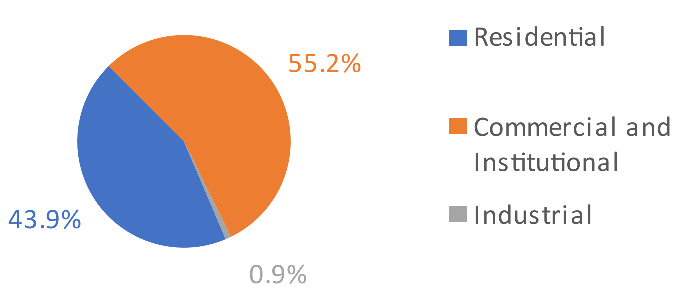
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	66,842	23.5%
Mobile Combustion	163,778	57.6%
Stationary Fuel Combustion	9,860	3.5%
Agriculture and Land Management	4,172	1.5%
Solid Waste	13,544	4.8%
Imported Water	10,849	3.8%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	7,858	2.8%
Wastewater	7,403	2.6%
Total	284,305	100%

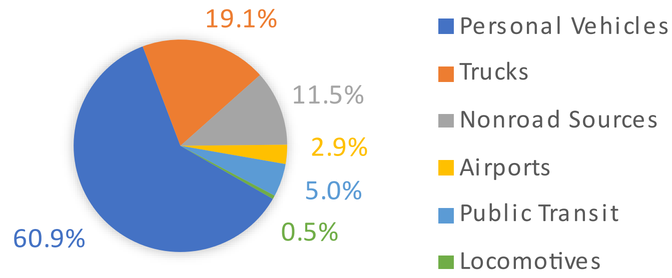
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

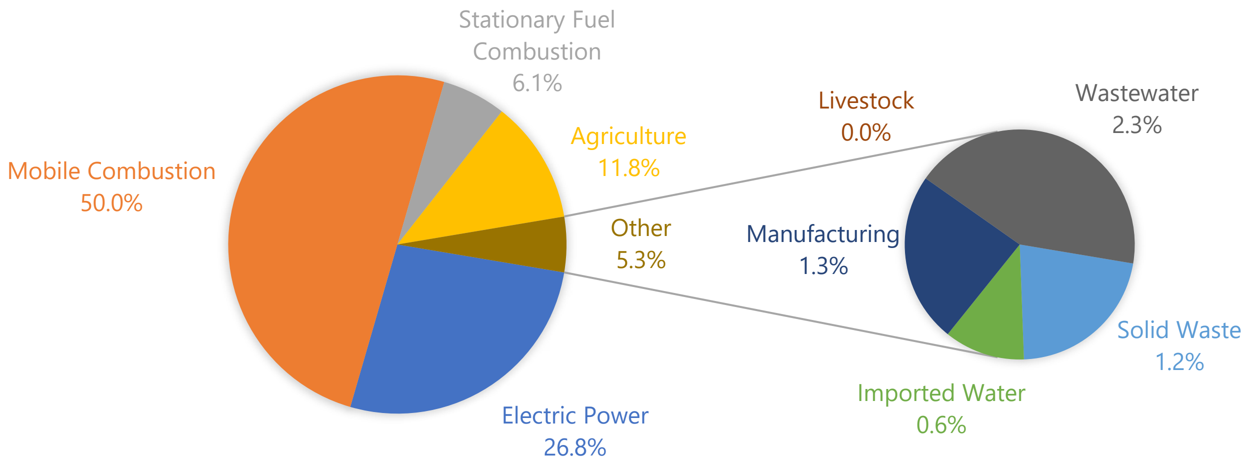


Fort McDowell Yavapai Nation

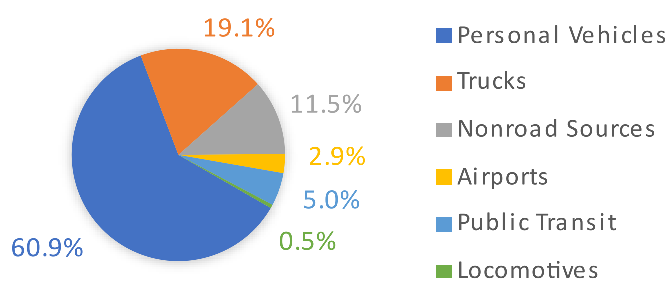
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	3,197	26.8%
Mobile Combustion	5,952	50.0%
Stationary Fuel Combustion	729	6.1%
Agriculture and Land Management	1,401	11.8%
Solid Waste	137	1.2%
Imported Water	71	0.6%
Manufacturing Gases	151	1.3%
Livestock (Cattle)	-	0.0%
Wastewater	270	2.3%
Total	11,908	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

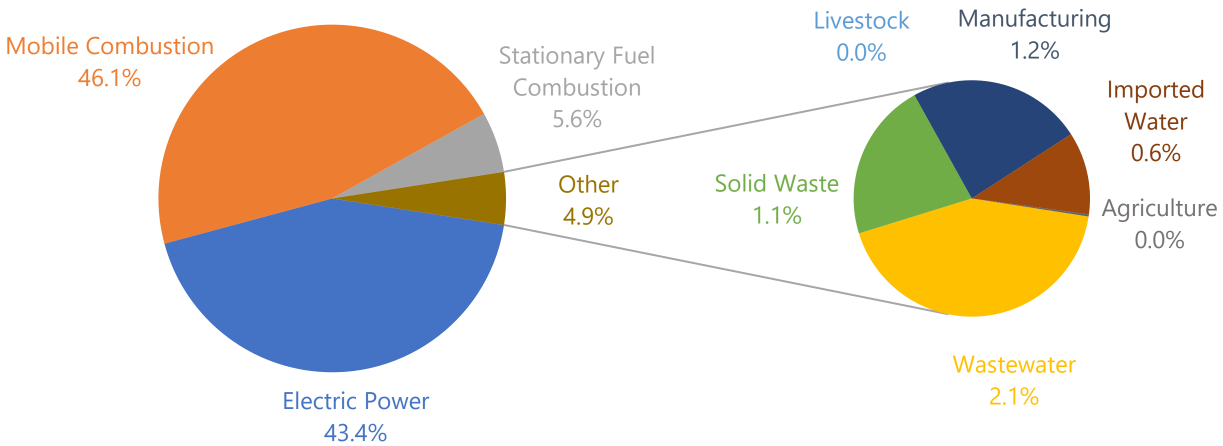


Fountain Hills, AZ

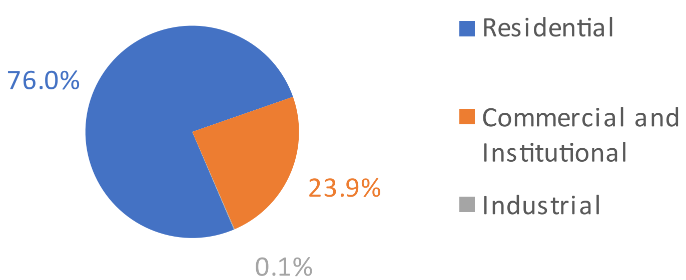
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	115,549	43.4%
Mobile Combustion	122,827	46.1%
Stationary Fuel Combustion	15,036	5.6%
Agriculture and Land Management	37	0.0%
Solid Waste	2,830	1.1%
Imported Water	1,475	0.6%
Manufacturing Gases	3,117	1.2%
Livestock (Cattle)	-	0.0%
Wastewater	5,576	2.1%
Total	266,449	100%

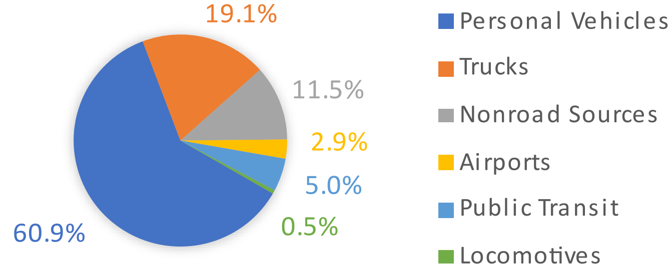
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

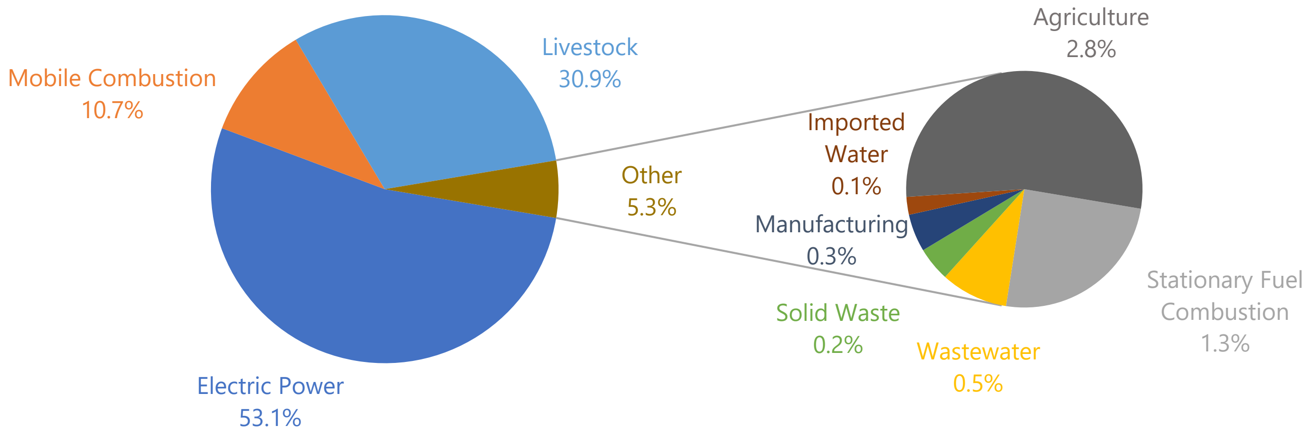


Gila Bend, AZ

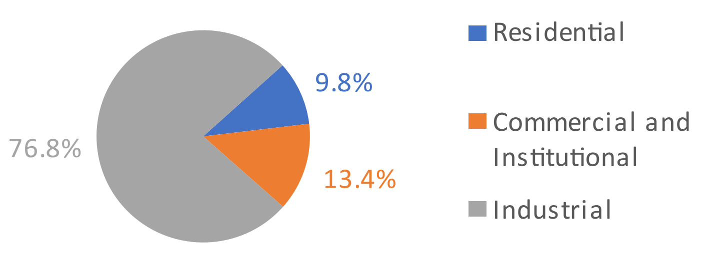
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	48,096	53.1%
Mobile Combustion	9,741	10.7%
Stationary Fuel Combustion	1,192	1.3%
Agriculture and Land Management	2,577	2.8%
Solid Waste	224	0.2%
Imported Water	117	0.1%
Manufacturing Gases	247	0.3%
Livestock (Cattle)	28,020	30.9%
Wastewater	442	0.5%
Total	90,657	100%

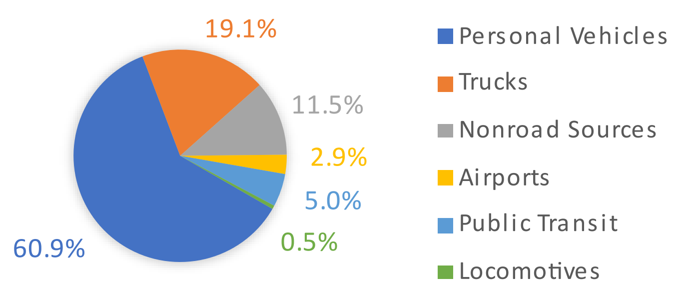
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

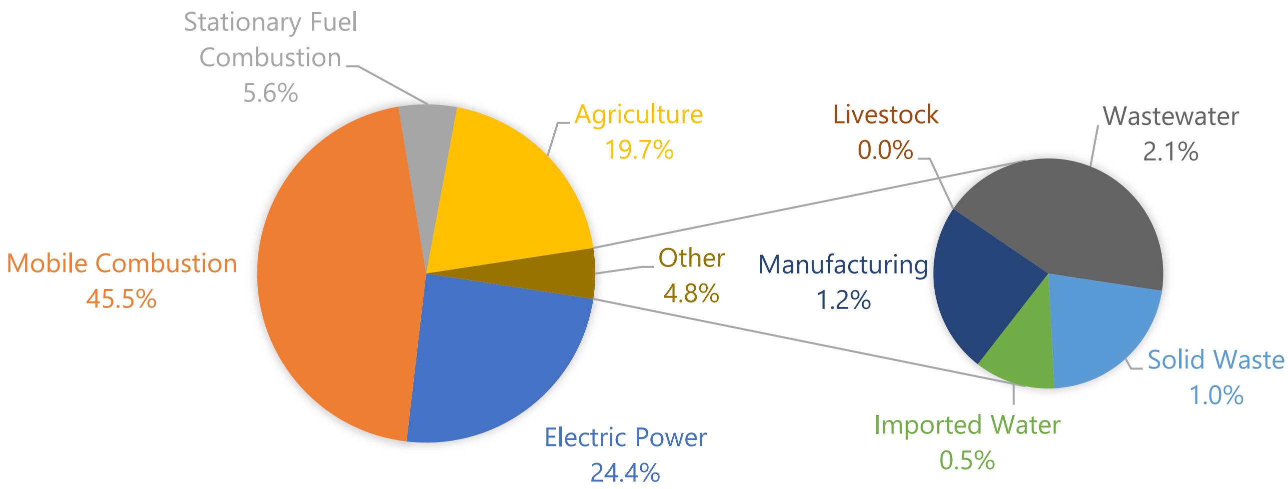


Gila River Indian Community (Maricopa Portion)

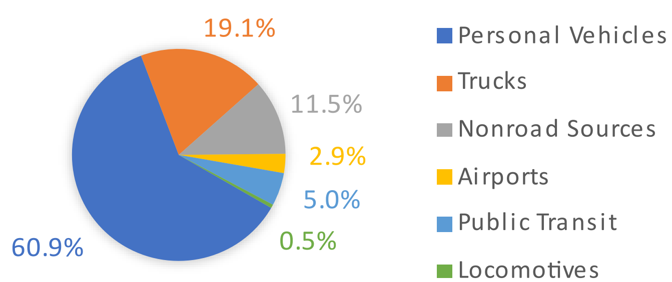
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	9,945	24.4%
Mobile Combustion	18,514	45.5%
Stationary Fuel Combustion	2,266	5.6%
Agriculture and Land Management	7,999	19.7%
Solid Waste	427	1.0%
Imported Water	222	0.5%
Manufacturing Gases	470	1.2%
Livestock (Cattle)	-	0.0%
Wastewater	840	2.1%
Total	40,684	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

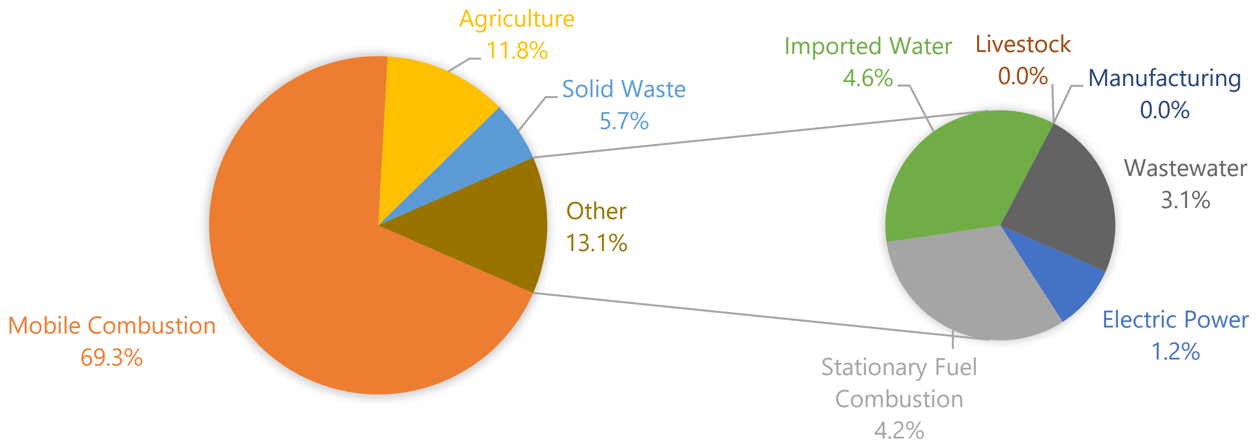


Gila River Indian Community (Pinal Portion)

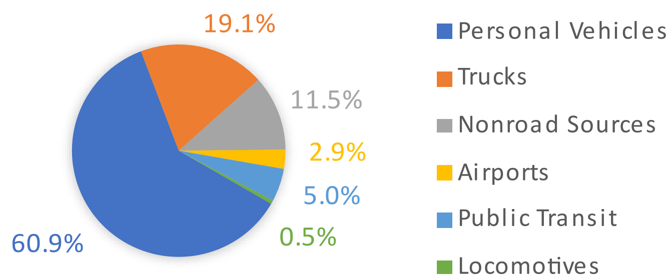
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO₂e	GHG Emissions Percentage
Electric Power Consumption	1,130	1.2%
Mobile Combustion	64,159	69.3%
Stationary Fuel Combustion	3,863	4.2%
Agriculture and Land Management	10,931	11.8%
Solid Waste	5,306	5.7%
Imported Water	4,250	4.6%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	2,900	3.1%
Total	92,538	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

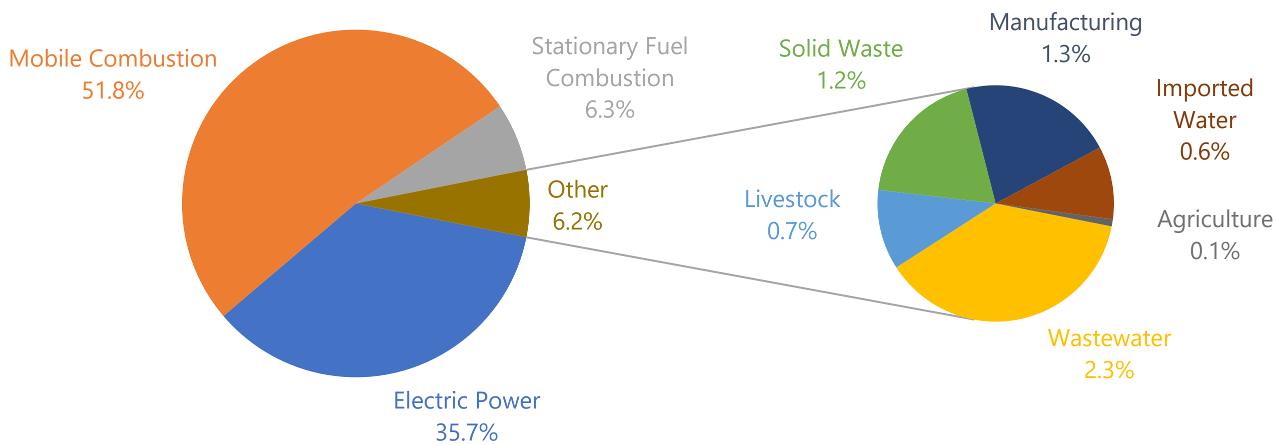


Gilbert, AZ

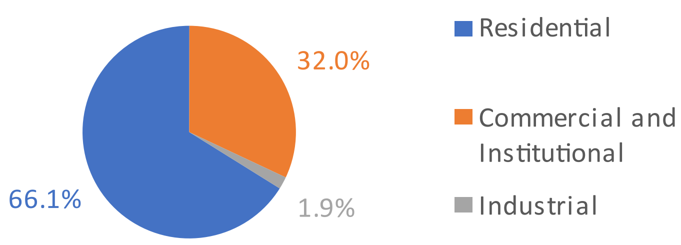
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	953,612	35.7%
Mobile Combustion	1,383,538	51.8%
Stationary Fuel Combustion	169,370	6.3%
Agriculture and Land Management	1,612	0.1%
Solid Waste	31,881	1.2%
Imported Water	16,617	0.6%
Manufacturing Gases	35,115	1.3%
Livestock (Cattle)	18,195	0.7%
Wastewater	62,809	2.3%
Total	2,672,750	100%

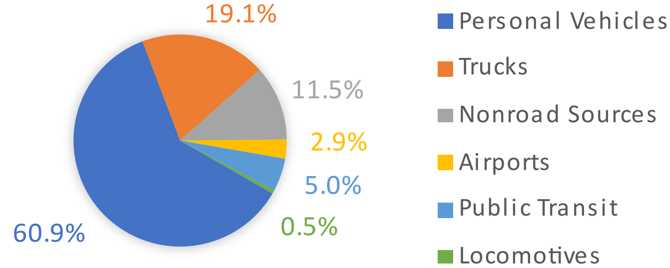
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

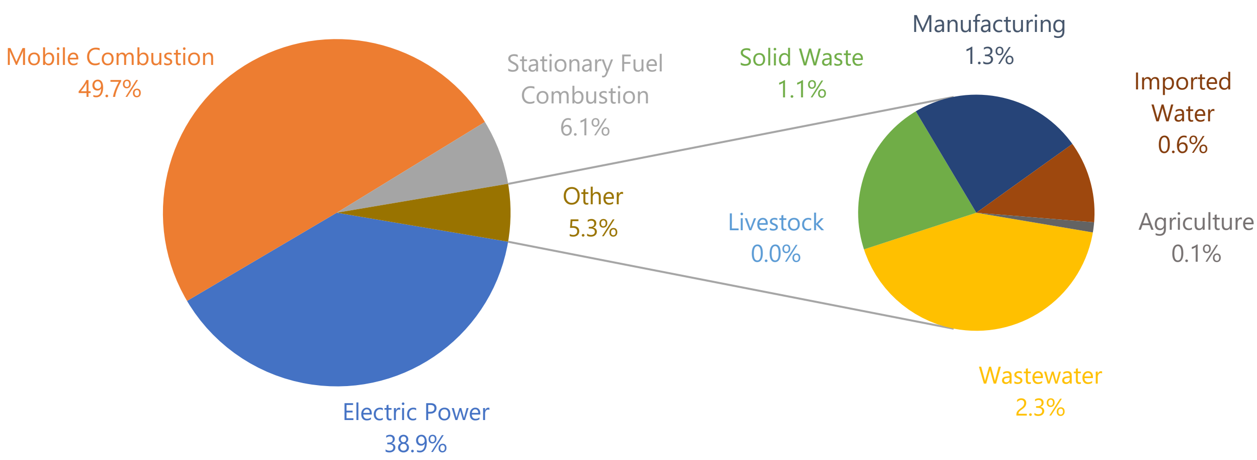


Glendale, AZ

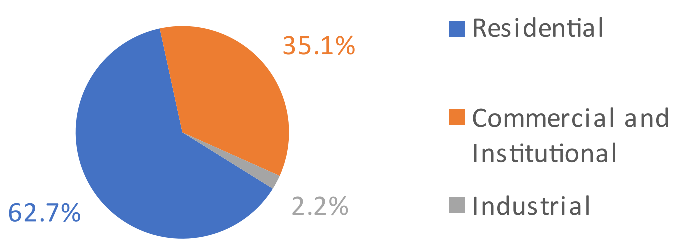
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	1,000,398	38.9%
Mobile Combustion	1,280,353	49.7%
Stationary Fuel Combustion	156,738	6.1%
Agriculture and Land Management	1,889	0.1%
Solid Waste	29,503	1.1%
Imported Water	15,378	0.6%
Manufacturing Gases	32,496	1.3%
Livestock (Cattle)	-	0.0%
Wastewater	58,125	2.3%
Total	2,574,880	100%

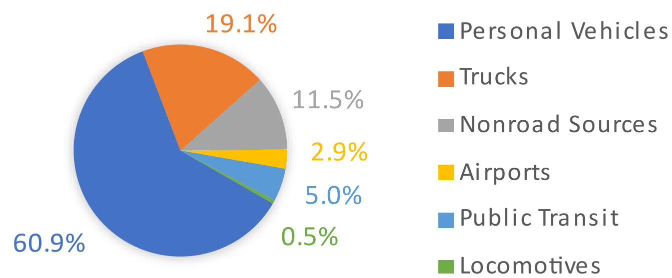
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

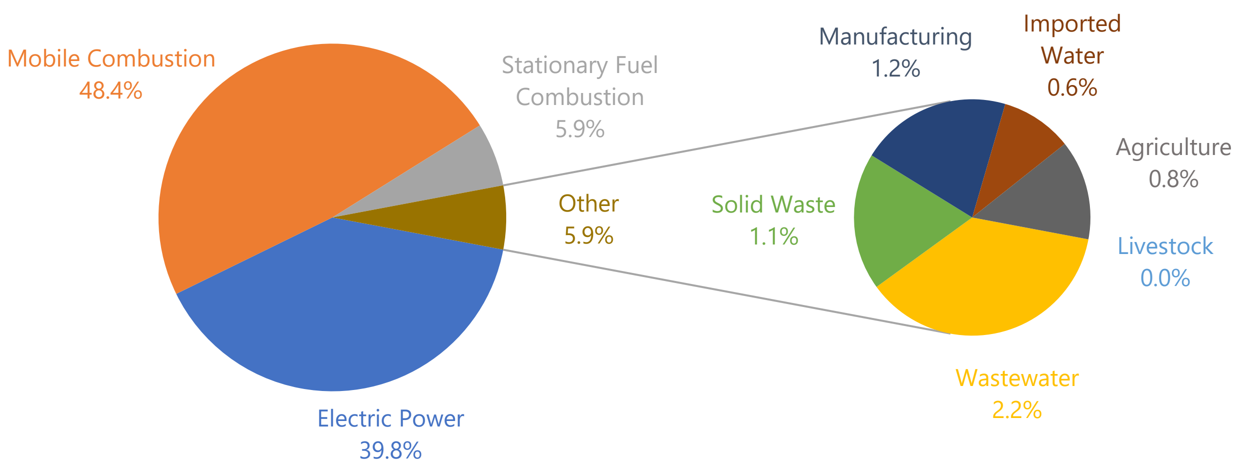


Goodyear, AZ

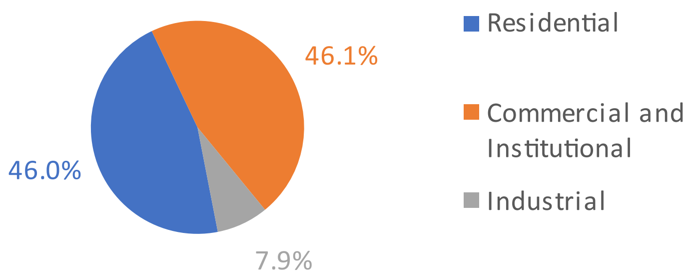
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	409,982	39.8%
Mobile Combustion	498,315	48.4%
Stationary Fuel Combustion	61,003	5.9%
Agriculture and Land Management	8,335	0.8%
Solid Waste	11,483	1.1%
Imported Water	5,985	0.6%
Manufacturing Gases	12,648	1.2%
Livestock (Cattle)	-	0.0%
Wastewater	22,622	2.2%
Total	1,030,373	100%

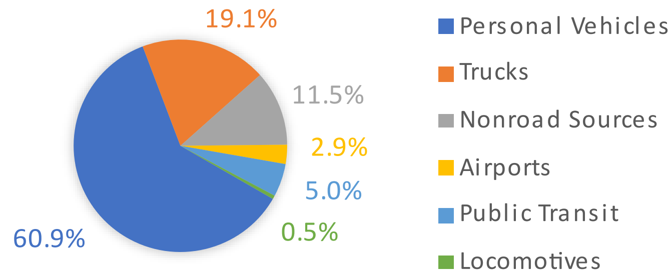
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

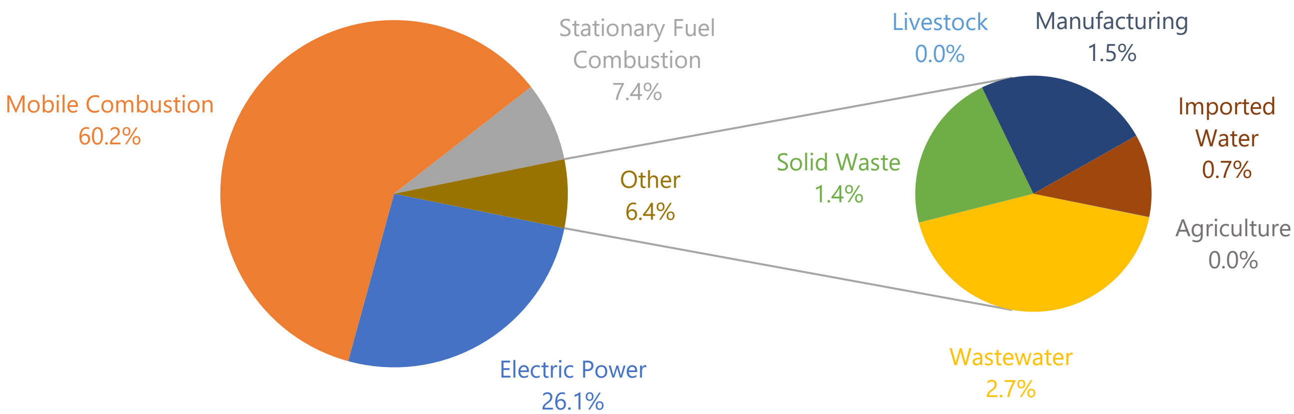


Guadalupe, AZ

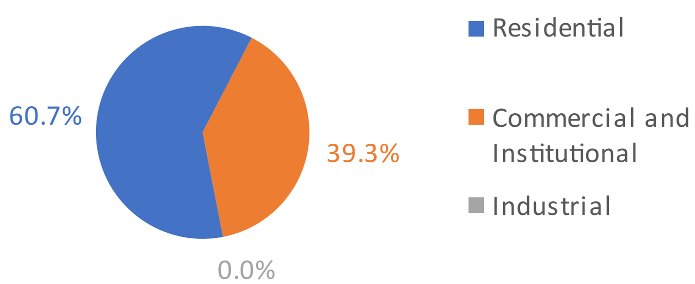
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	11,879	26.1%
Mobile Combustion	27,421	60.2%
Stationary Fuel Combustion	3,357	7.4%
Agriculture and Land Management	1	0.0%
Solid Waste	632	1.4%
Imported Water	329	0.7%
Manufacturing Gases	696	1.5%
Livestock (Cattle)	-	0.0%
Wastewater	1,245	2.7%
Total	45,559	100%

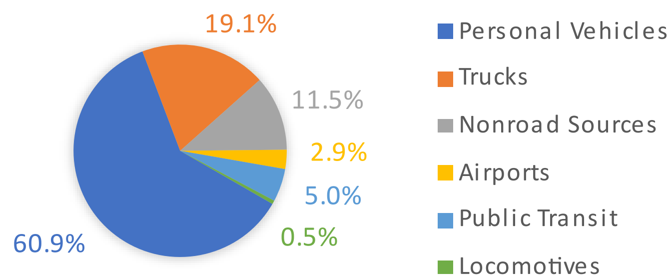
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions



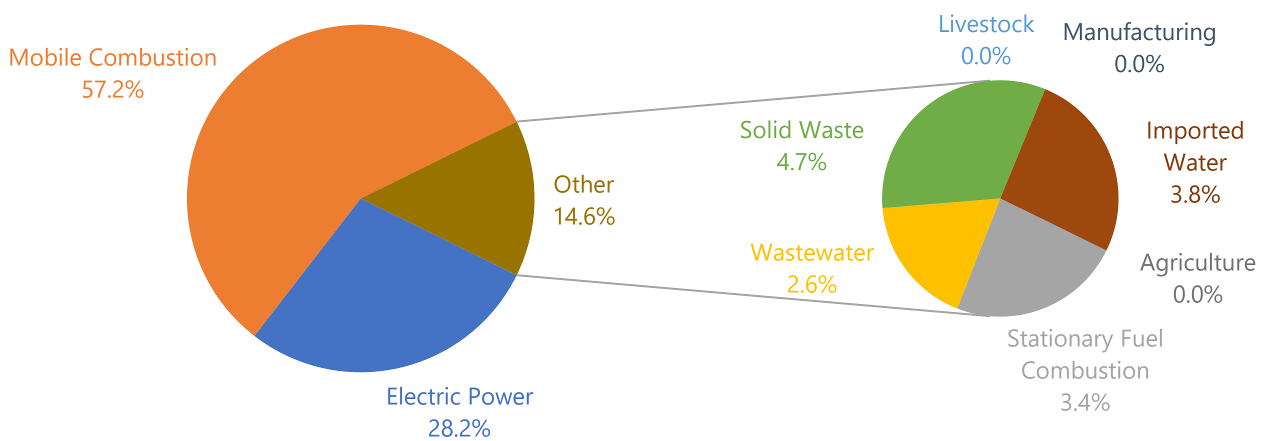
MARICOPA ASSOCIATION of GOVERNMENTS

Kearny, AZ

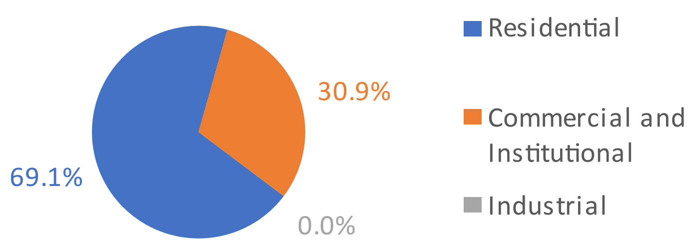
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	5,217	28.2%
Mobile Combustion	10,588	57.2%
Stationary Fuel Combustion	637	3.4%
Agriculture and Land Management	1	0.0%
Solid Waste	876	4.7%
Imported Water	701	3.8%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	479	2.6%
Total	18,499	100%

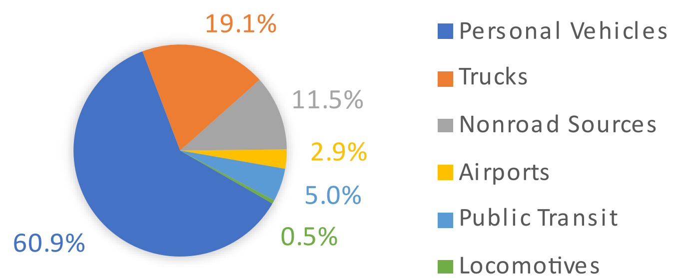
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

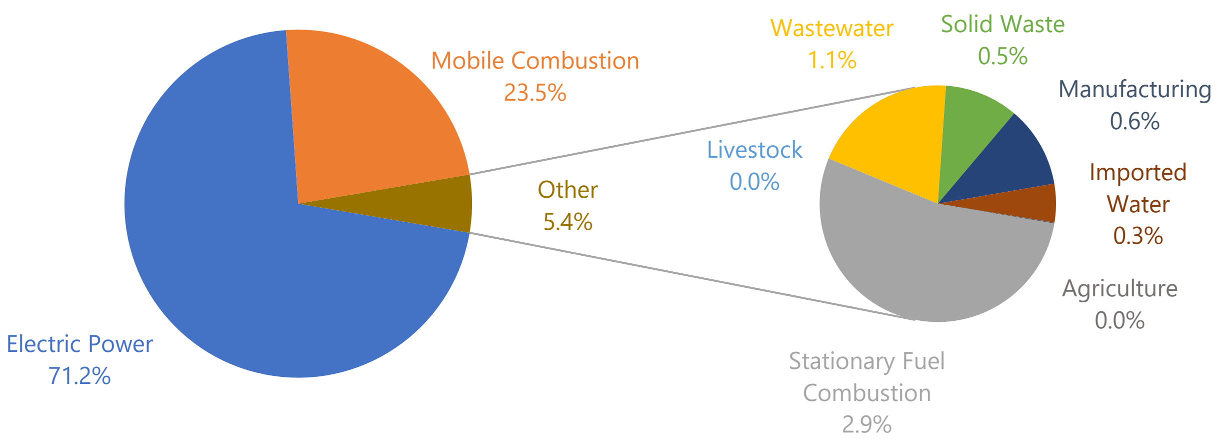


Litchfield Park, AZ

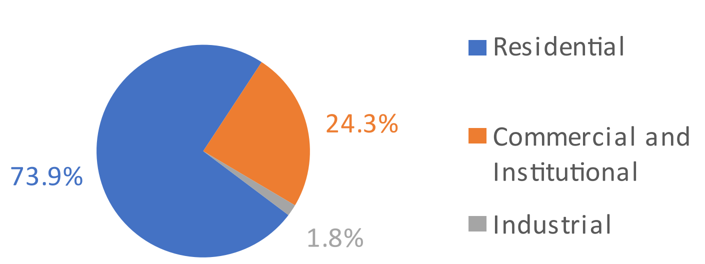
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	107,542	71.2%
Mobile Combustion	35,427	23.5%
Stationary Fuel Combustion	4,337	2.9%
Agriculture and Land Management	11	0.0%
Solid Waste	816	0.5%
Imported Water	425	0.3%
Manufacturing Gases	899	0.6%
Livestock (Cattle)	-	0.0%
Wastewater	1,608	1.1%
Total	151,065	100%

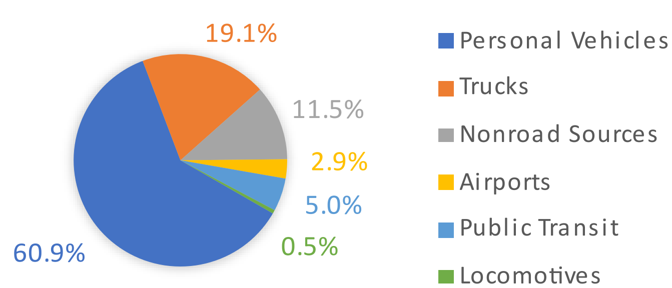
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

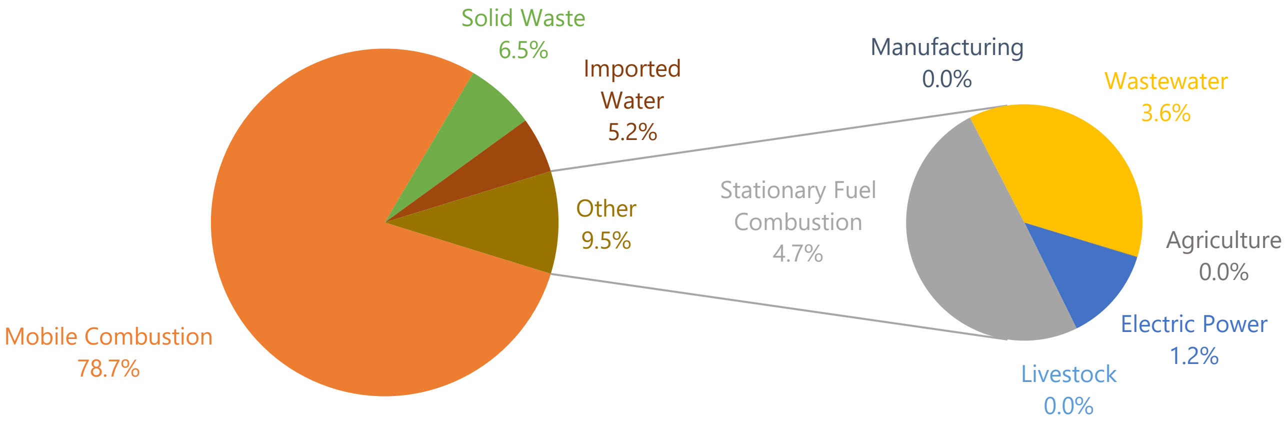


Mammoth, AZ

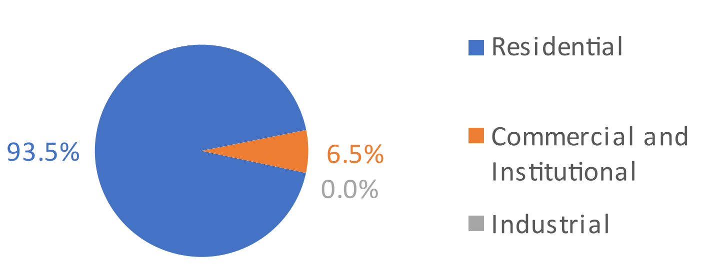
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO$_2$e	Percentage
Electric Power Consumption	103	1.2%
Mobile Combustion	6,544	78.7%
Stationary Fuel Combustion	394	4.7%
Agriculture and Land Management	1	0.0%
Solid Waste	541	6.5%
Imported Water	433	5.2%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	296	3.6%
Total	8,311	100%

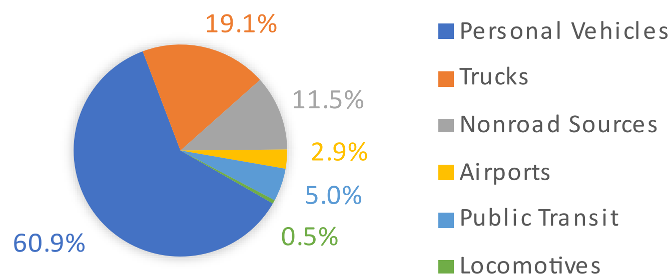
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

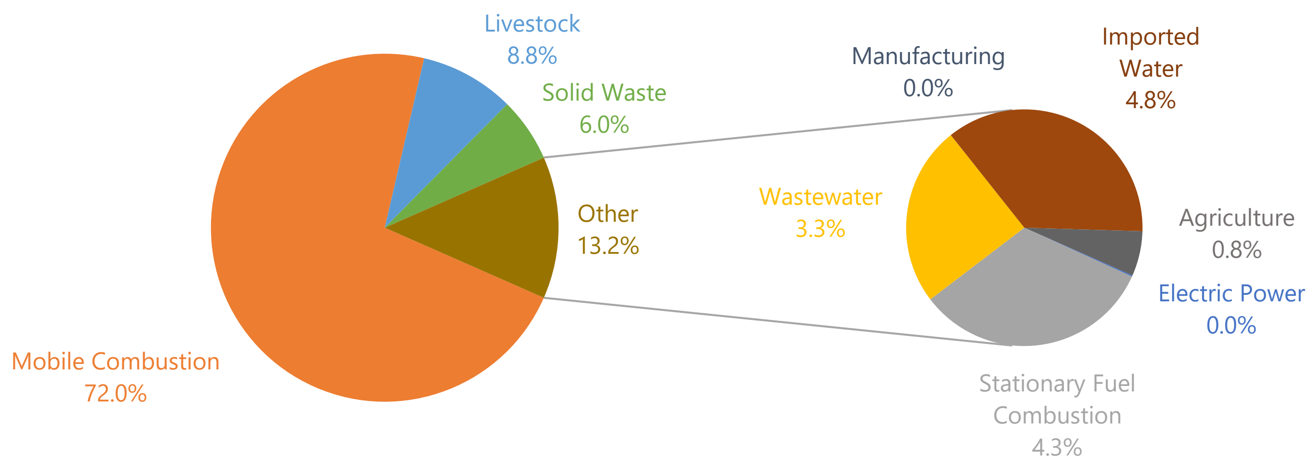


Maricopa, AZ

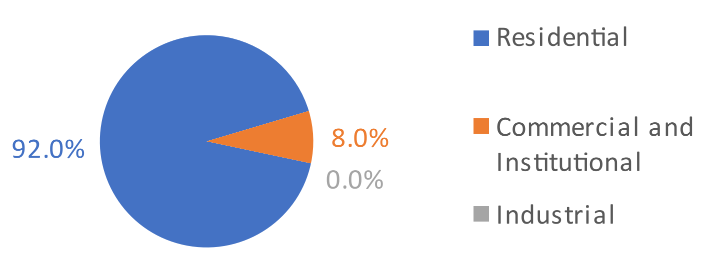
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO2e	Percentage
Electric Power Consumption	113	0.0%
Mobile Combustion	356,503	72.0%
Stationary Fuel Combustion	21,463	4.3%
Agriculture and Land Management	3,997	0.8%
Solid Waste	29,482	6.0%
Imported Water	23,616	4.8%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	43,570	8.8%
Wastewater	16,113	3.3%
Total	494,857	100%

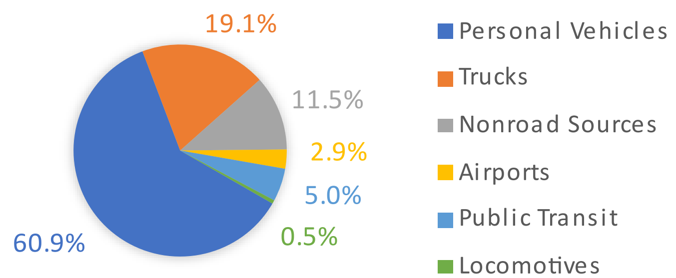
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

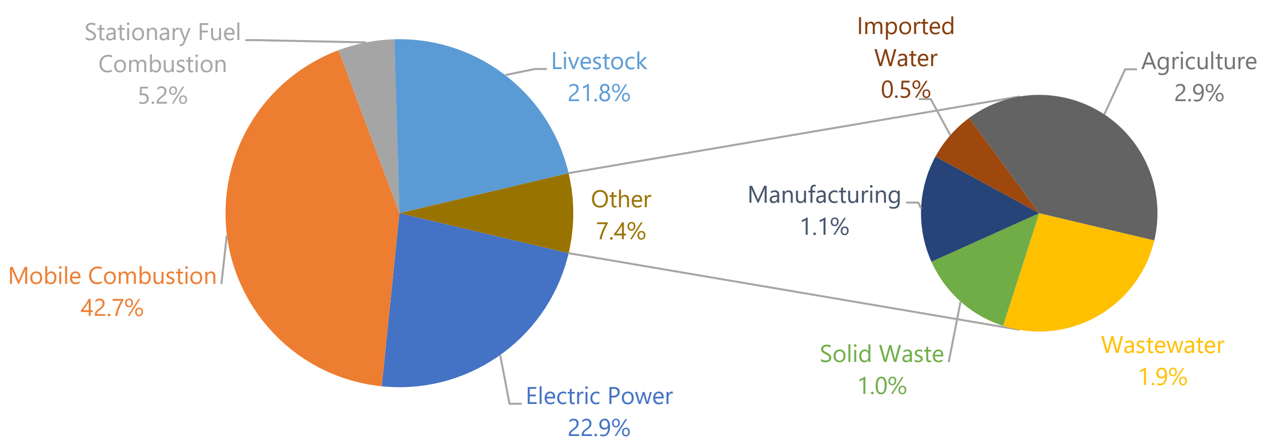


Maricopa County, AZ Unincorporated Areas

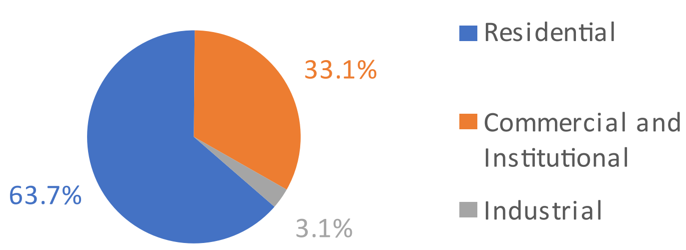
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	880,877	22.9%
Mobile Combustion	1,639,834	42.7%
Stationary Fuel Combustion	200,746	5.2%
Agriculture and Land Management	110,007	2.9%
Solid Waste	37,787	1.0%
Imported Water	19,695	0.5%
Manufacturing Gases	41,620	1.1%
Livestock (Cattle)	836,578	21.8%
Wastewater	74,444	1.9%
Total	3,841,589	100%

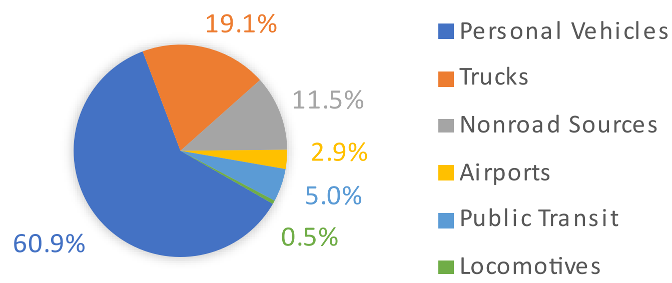
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

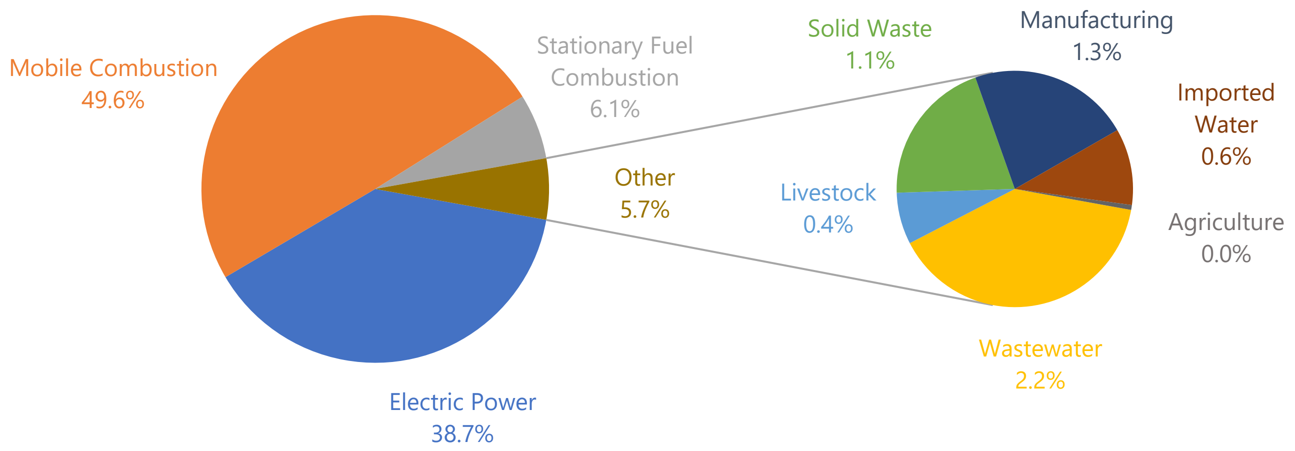


Mesa, AZ

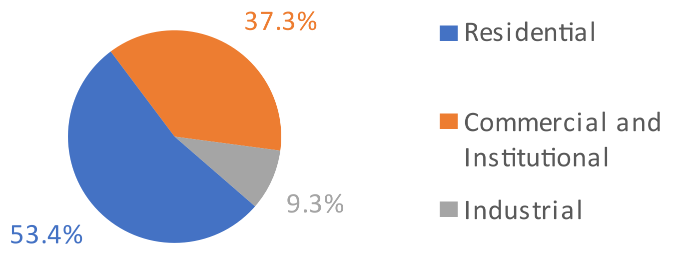
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	2,031,454	38.7%
Mobile Combustion	2,602,279	49.6%
Stationary Fuel Combustion	318,566	6.1%
Agriculture and Land Management	1,985	0.0%
Solid Waste	59,964	1.1%
Imported Water	31,255	0.6%
Manufacturing Gases	66,048	1.3%
Livestock (Cattle)	21,117	0.4%
Wastewater	118,137	2.2%
Total	5,250,806	100%

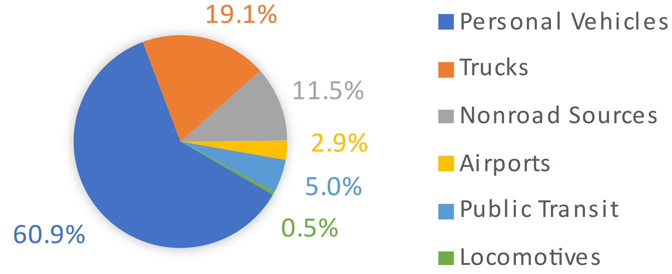
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

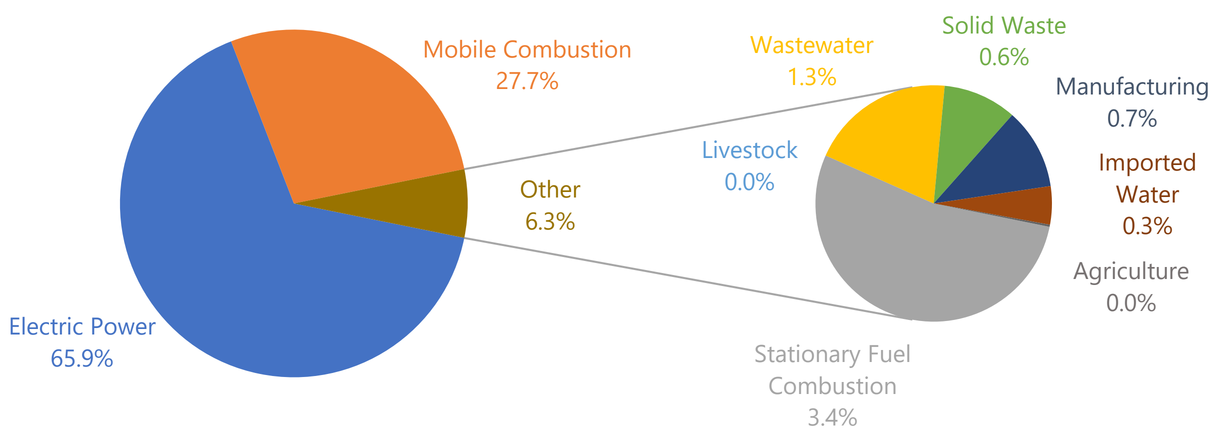


Paradise Valley, AZ

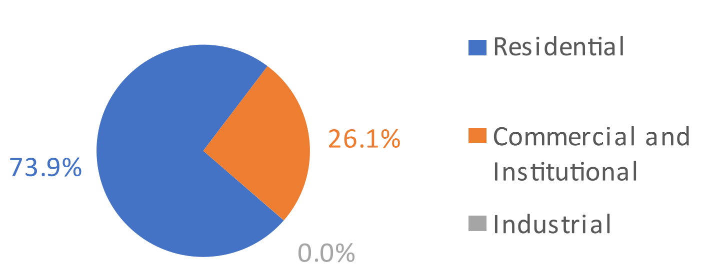
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO2e	Percentage
Electric Power Consumption	155,250	65.9%
Mobile Combustion	65,236	27.7%
Stationary Fuel Combustion	7,986	3.4%
Agriculture and Land Management	42	0.0%
Solid Waste	1,503	0.6%
Imported Water	784	0.3%
Manufacturing Gases	1,656	0.7%
Livestock (Cattle)	-	0.0%
Wastewater	2,962	1.3%
Total	235,419	100%

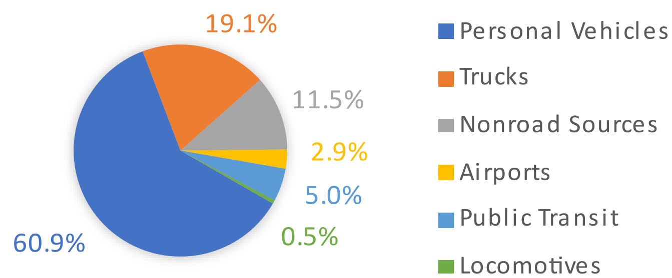
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

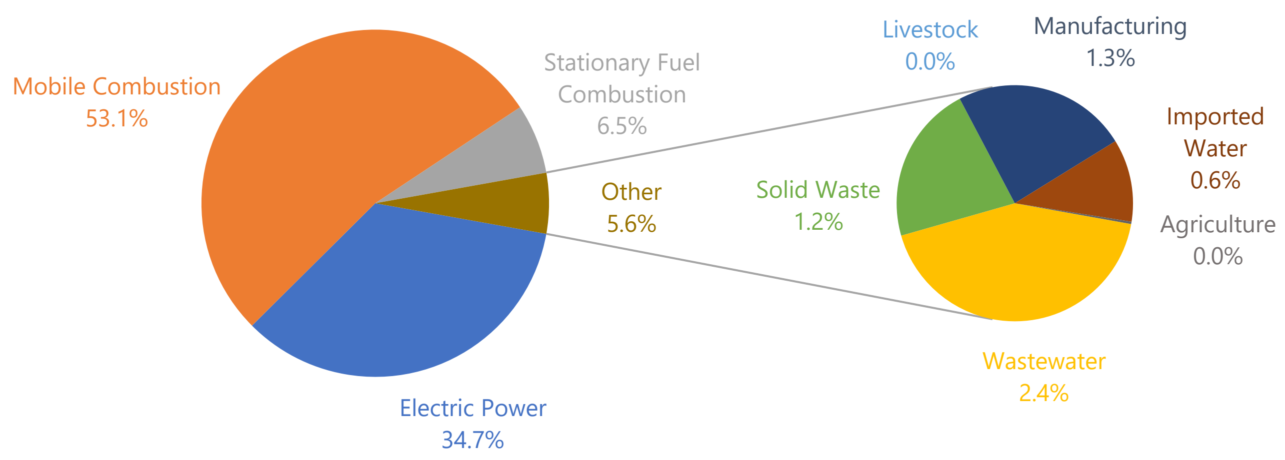


Peoria, AZ

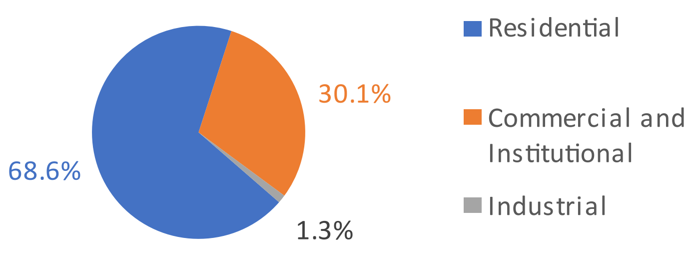
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	645,659	34.7%
Mobile Combustion	987,729	53.1%
Stationary Fuel Combustion	120,916	6.5%
Agriculture and Land Management	333	0.0%
Solid Waste	22,760	1.2%
Imported Water	11,863	0.6%
Manufacturing Gases	25,069	1.3%
Livestock (Cattle)	-	0.0%
Wastewater	44,840	2.4%
Total	1,859,170	100%

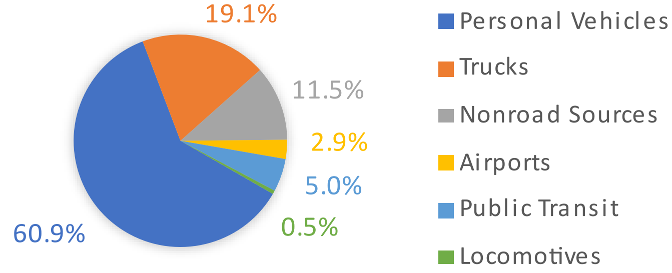
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

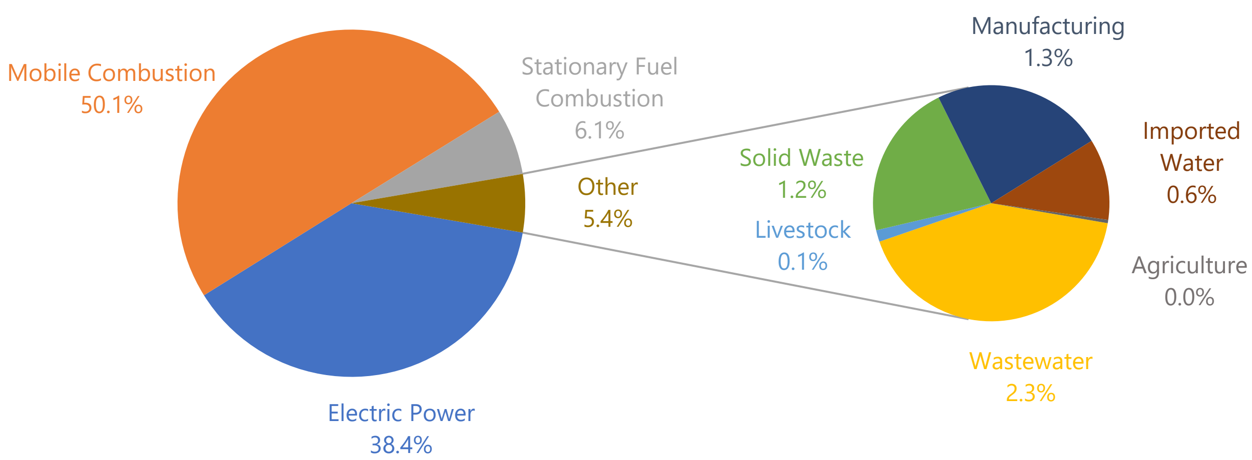


Phoenix, AZ

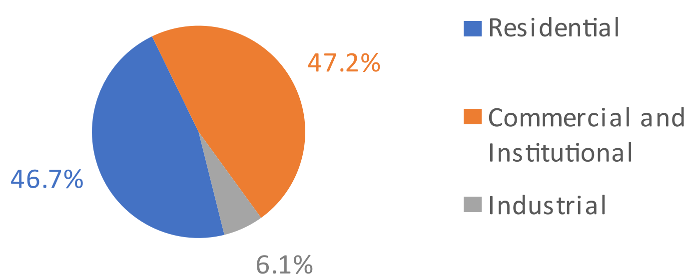
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	6,363,083	38.4%
Mobile Combustion	8,295,021	50.1%
Stationary Fuel Combustion	1,015,462	6.1%
Agriculture and Land Management	4,003	0.0%
Solid Waste	191,142	1.2%
Imported Water	99,627	0.6%
Manufacturing Gases	210,535	1.3%
Livestock (Cattle)	14,312	0.1%
Wastewater	376,572	2.3%
Total	16,569,756	100%

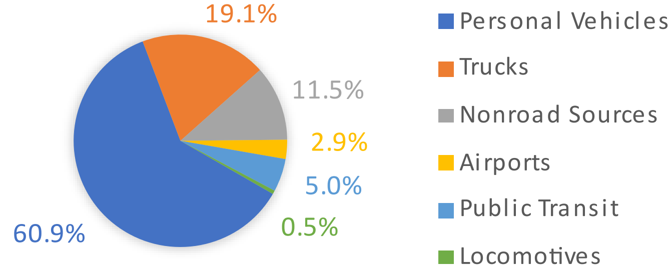
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

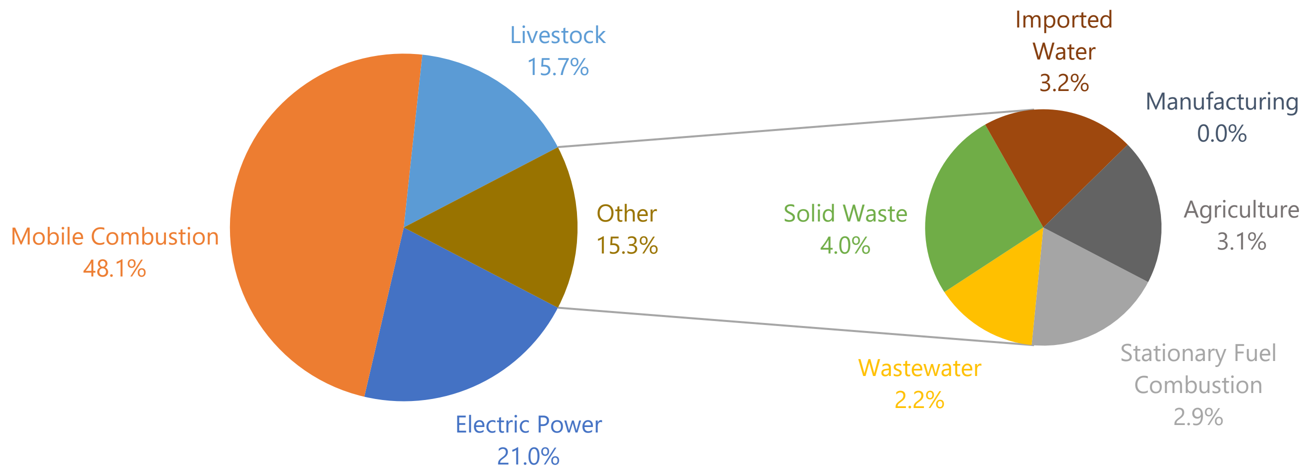


Pinal County, AZ Unincorporated Areas

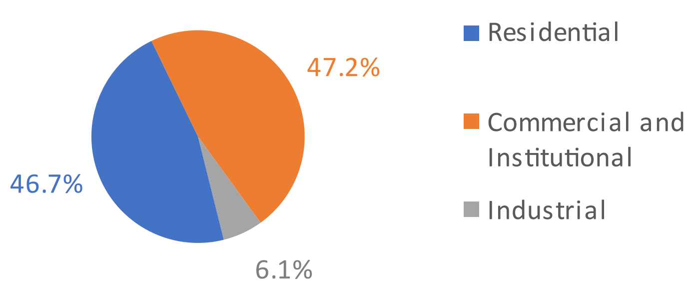
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO₂e	GHG Emissions Percentage
Electric Power Consumption	549,578	21.0%
Mobile Combustion	1,257,326	48.1%
Stationary Fuel Combustion	75,697	2.9%
Agriculture and Land Management	79,902	3.1%
Solid Waste	103,976	4.0%
Imported Water	83,289	3.2%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	409,498	15.7%
Wastewater	56,829	2.2%
Total	2,616,094	100%

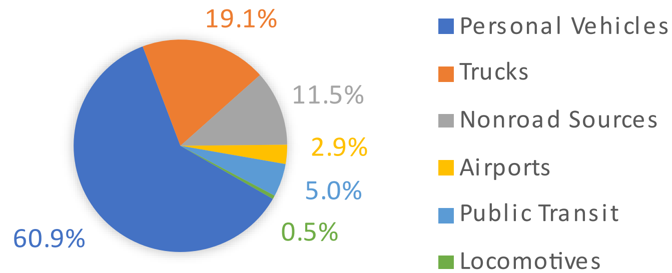
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

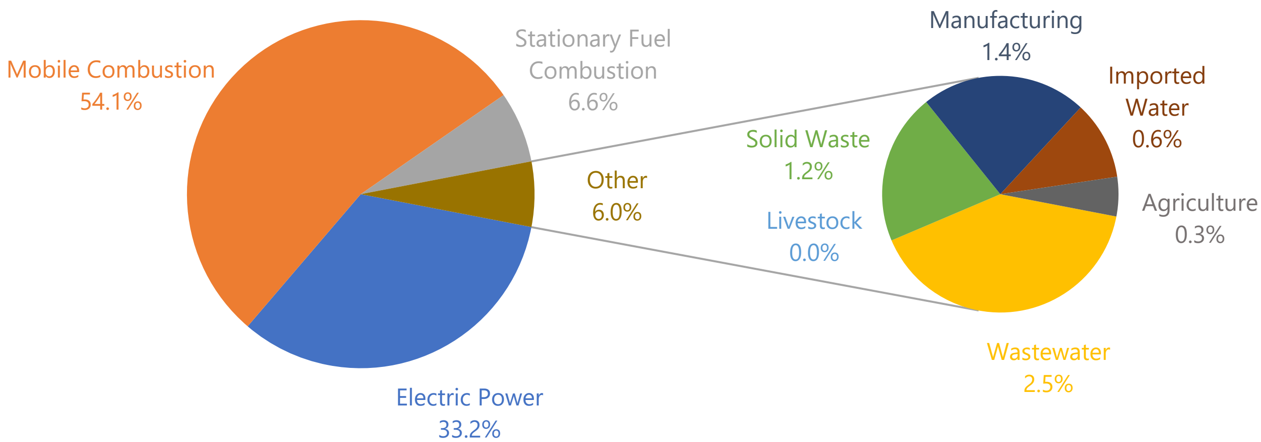


Queen Creek, AZ (Maricopa Portion)

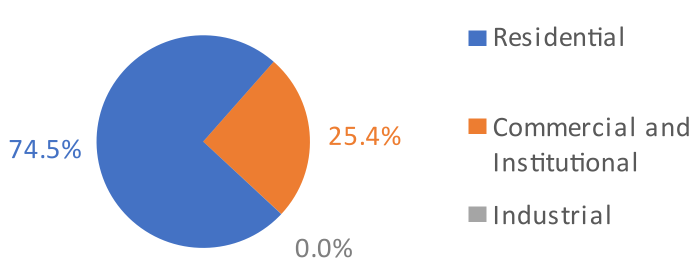
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	162,258	33.2%
Mobile Combustion	263,911	54.1%
Stationary Fuel Combustion	32,307	6.6%
Agriculture and Land Management	1,590	0.3%
Solid Waste	6,081	1.2%
Imported Water	3,170	0.6%
Manufacturing Gases	6,698	1.4%
Livestock (Cattle)	-	0.0%
Wastewater	11,981	2.5%
Total	487,997	100%

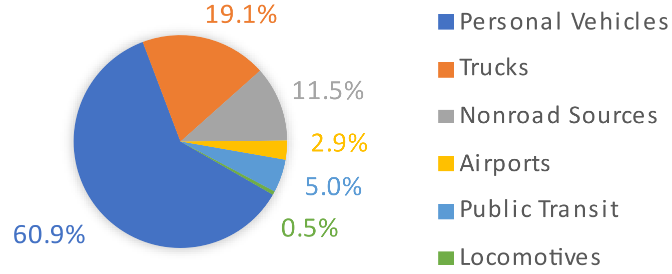
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions



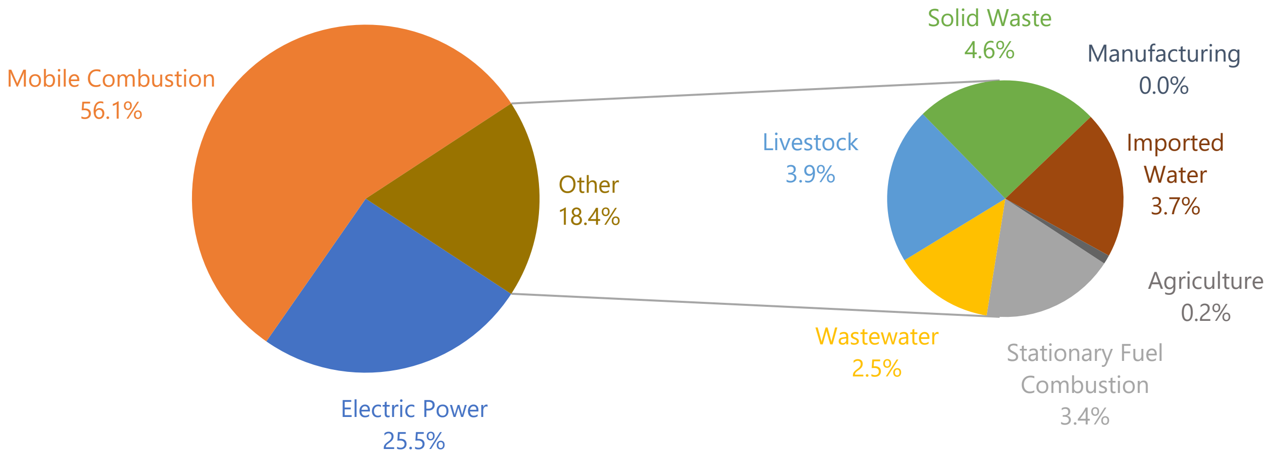
MARICOPA ASSOCIATION of GOVERNMENTS

Queen Creek, AZ (Pinal Portion)

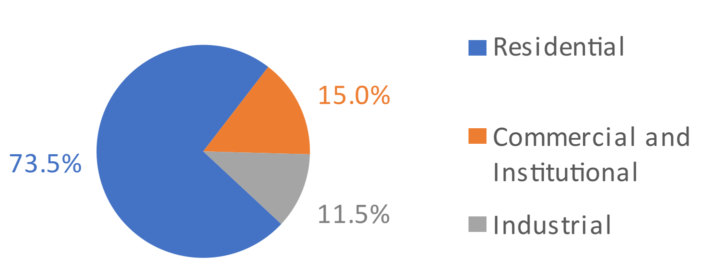
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	26,401	25.5%
Mobile Combustion	58,132	56.1%
Stationary Fuel Combustion	3,500	3.4%
Agriculture and Land Management	233	0.2%
Solid Waste	4,807	4.6%
Imported Water	3,851	3.7%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	4,091	3.9%
Wastewater	2,627	2.5%
Total	103,643	100%

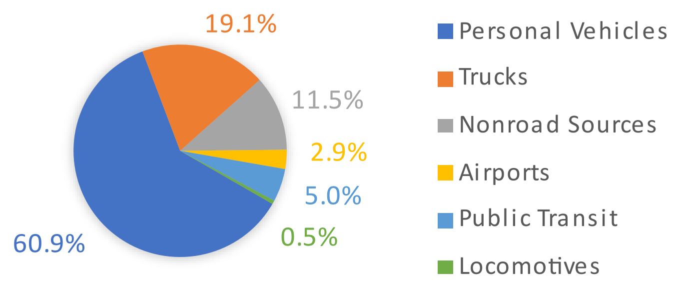
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

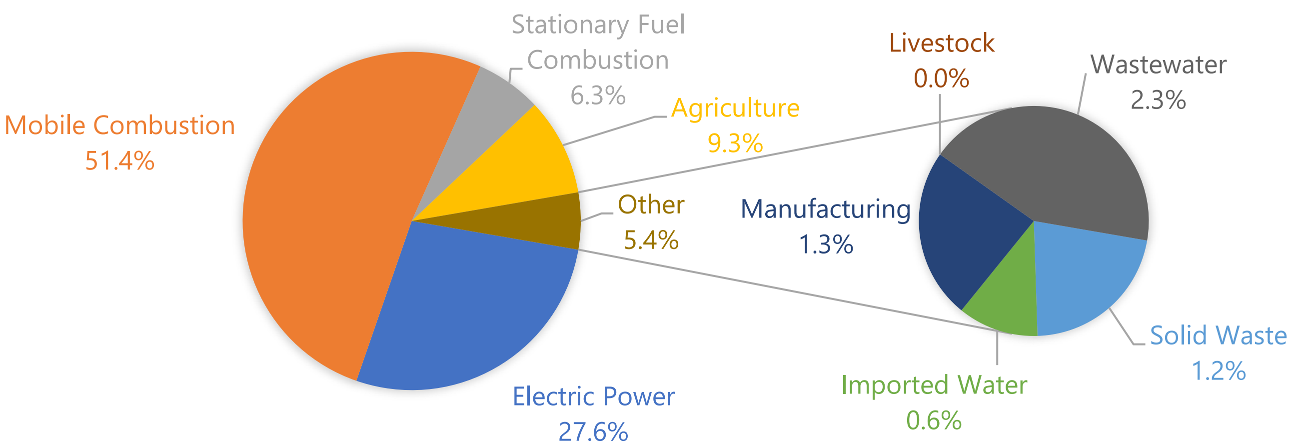


Salt River Pima-Maricopa Indian Community

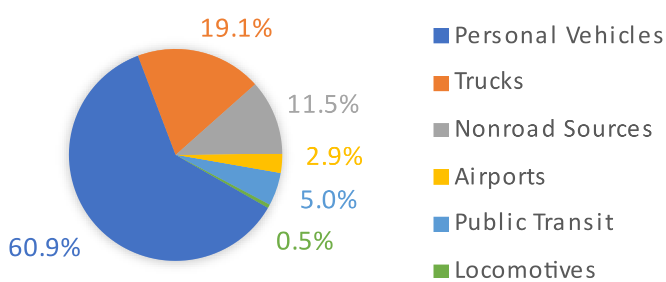
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	17,545	27.6%
Mobile Combustion	32,662	51.4%
Stationary Fuel Combustion	3,998	6.3%
Agriculture and Land Management	5,929	9.3%
Solid Waste	753	1.2%
Imported Water	392	0.6%
Manufacturing Gases	829	1.3%
Livestock (Cattle)	-	0.0%
Wastewater	1,483	2.3%
Total	63,591	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

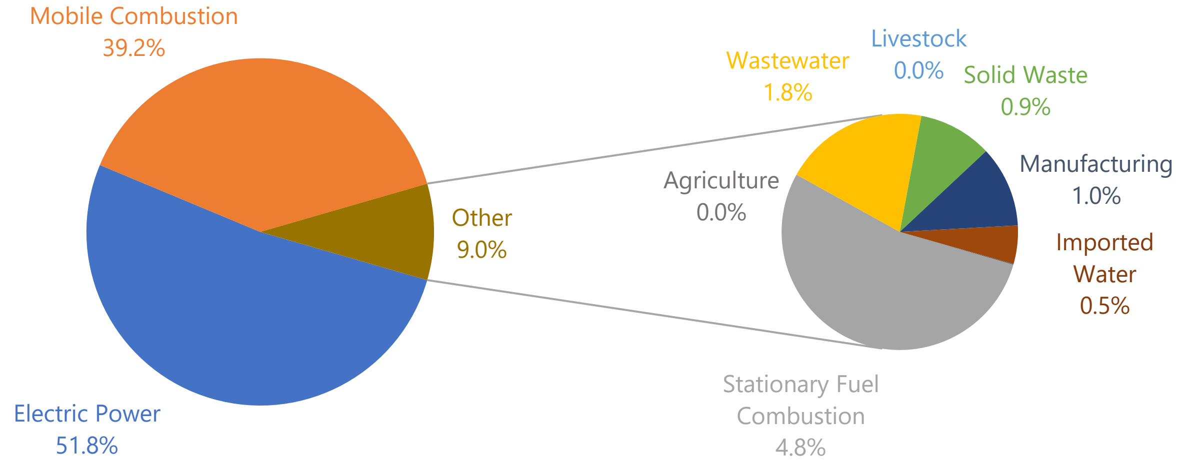


Scottsdale, AZ

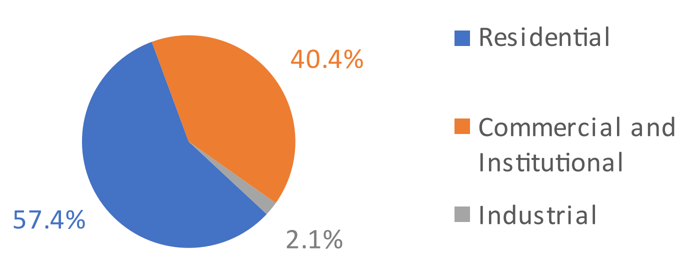
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO₂e	GHG Emissions Percentage
Electric Power Consumption	1,643,720	51.8%
Mobile Combustion	1,244,478	39.2%
Stationary Fuel Combustion	152,347	4.8%
Agriculture and Land Management	295	0.0%
Solid Waste	28,677	0.9%
Imported Water	14,947	0.5%
Manufacturing Gases	31,586	1.0%
Livestock (Cattle)	-	0.0%
Wastewater	56,496	1.8%
Total	3,172,545	100%

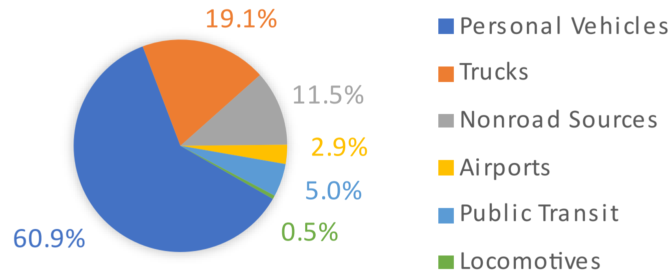
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

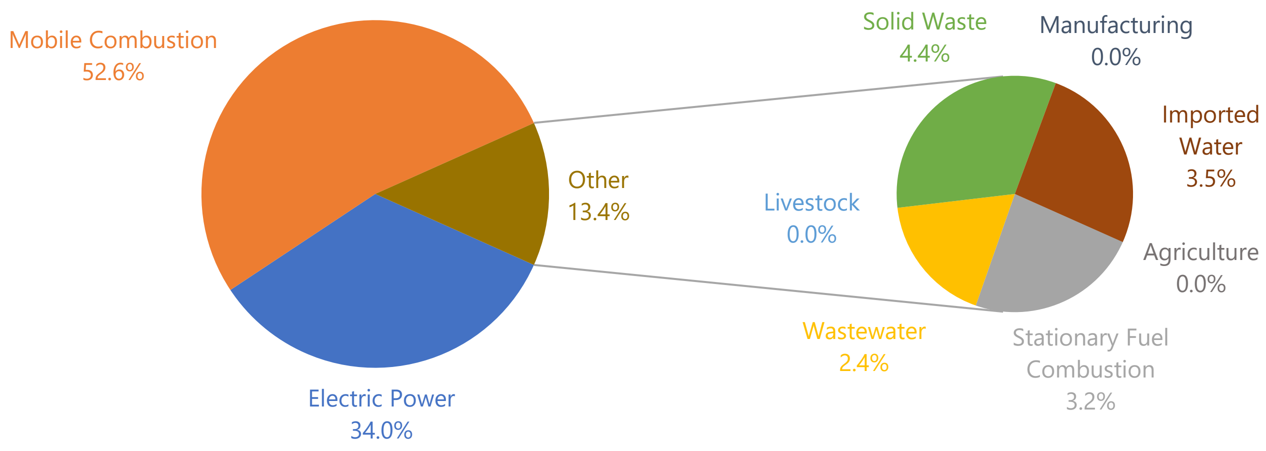


Superior, AZ

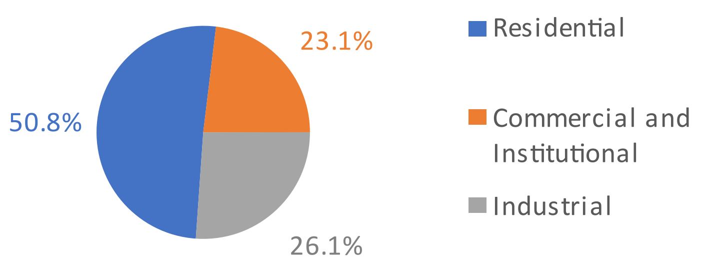
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	GHG Emissions Percentage
Electric Power Consumption	9,464	34.0%
Mobile Combustion	14,650	52.6%
Stationary Fuel Combustion	882	3.2%
Agriculture and Land Management	1	0.0%
Solid Waste	1,212	4.4%
Imported Water	970	3.5%
Manufacturing Gases	-	0.0%
Livestock (Cattle)	-	0.0%
Wastewater	662	2.4%
Total	27,841	100%

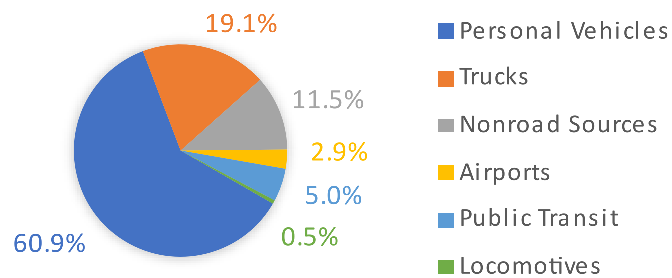
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

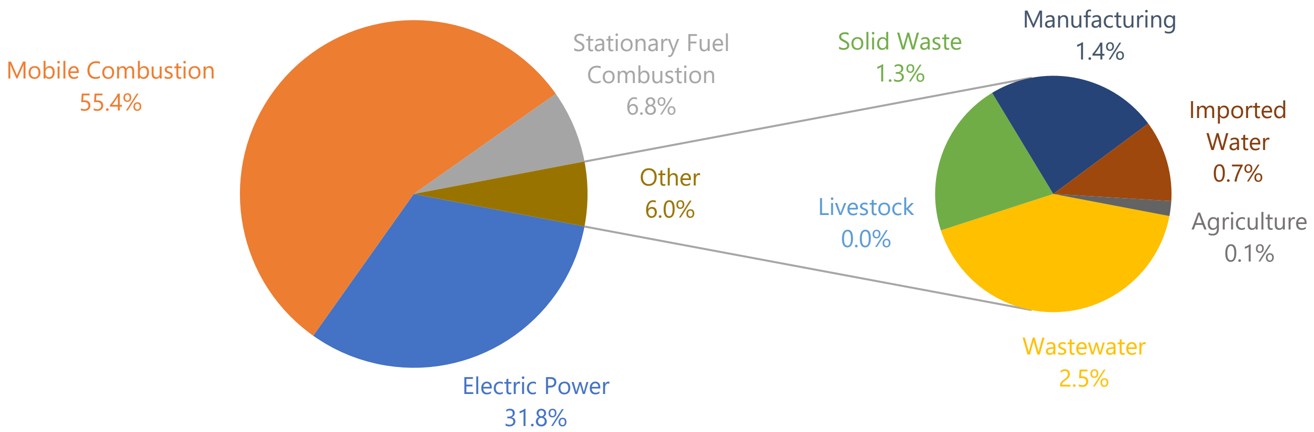


Surprise, AZ

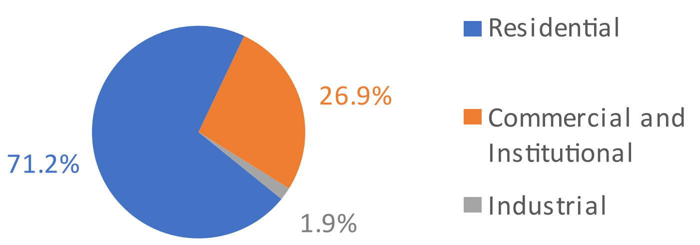
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	426,579	31.8%
Mobile Combustion	742,646	55.4%
Stationary Fuel Combustion	90,913	6.8%
Agriculture and Land Management	1,638	0.1%
Solid Waste	17,113	1.3%
Imported Water	8,920	0.7%
Manufacturing Gases	18,849	1.4%
Livestock (Cattle)	-	0.0%
Wastewater	33,714	2.5%
Total	1,340,372	100%

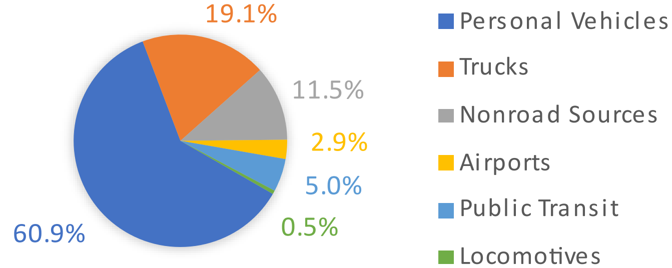
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

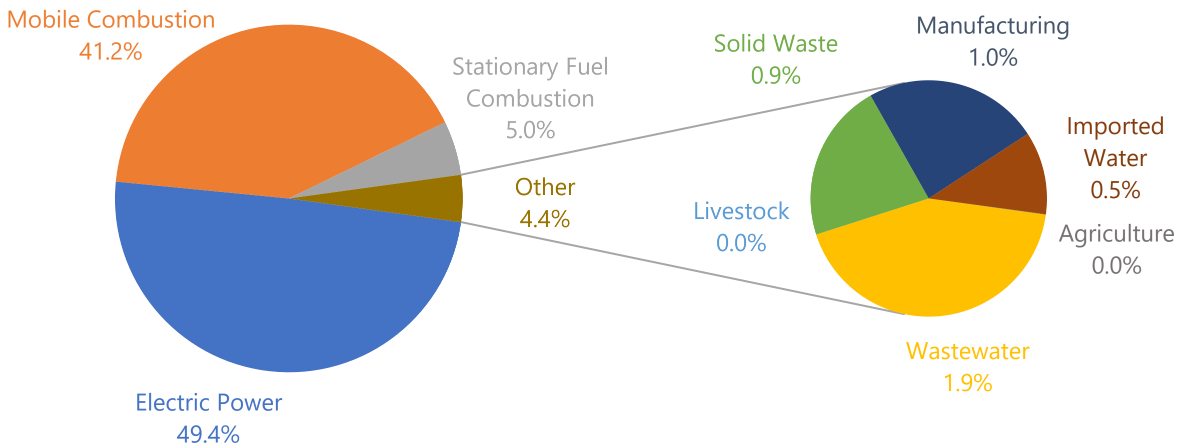


Tempe, AZ

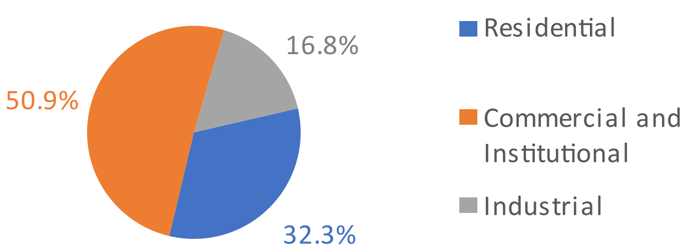
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	1,119,515	49.4%
Mobile Combustion	934,859	41.2%
Stationary Fuel Combustion	114,444	5.0%
Agriculture and Land Management	46	0.0%
Solid Waste	21,542	0.9%
Imported Water	11,228	0.5%
Manufacturing Gases	23,728	1.0%
Livestock (Cattle)	-	0.0%
Wastewater	42,440	1.9%
Total	2,267,802	100%

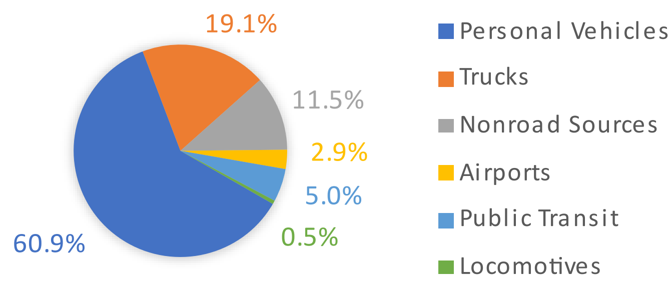
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

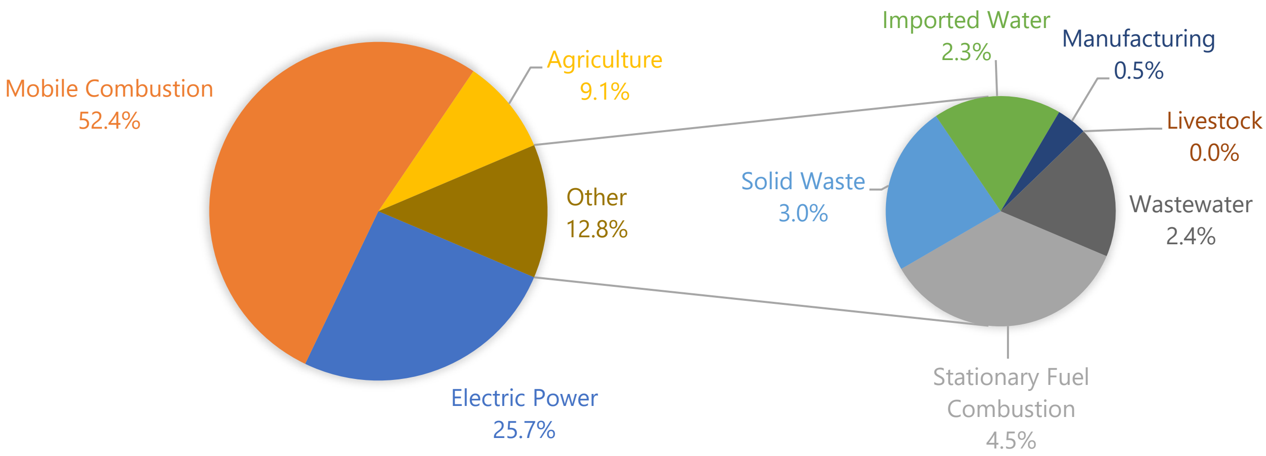


Tohono O'odham Nation (Pinal Portion)

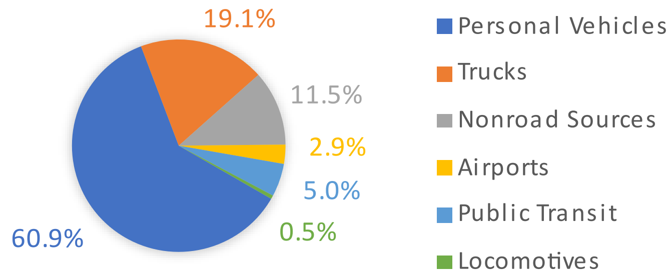
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions MTCO$_2$e	Percentage
Electric Power Consumption	2,612	25.7%
Mobile Combustion	5,313	52.4%
Stationary Fuel Combustion	456	4.5%
Agriculture and Land Management	925	9.1%
Solid Waste	309	3.0%
Imported Water	233	2.3%
Manufacturing Gases	56	0.5%
Livestock (Cattle)	-	0.0%
Wastewater	241	2.4%
Total	10,145	100%

GHG Emissions by Source Category



Mobile Combustion GHG Emissions

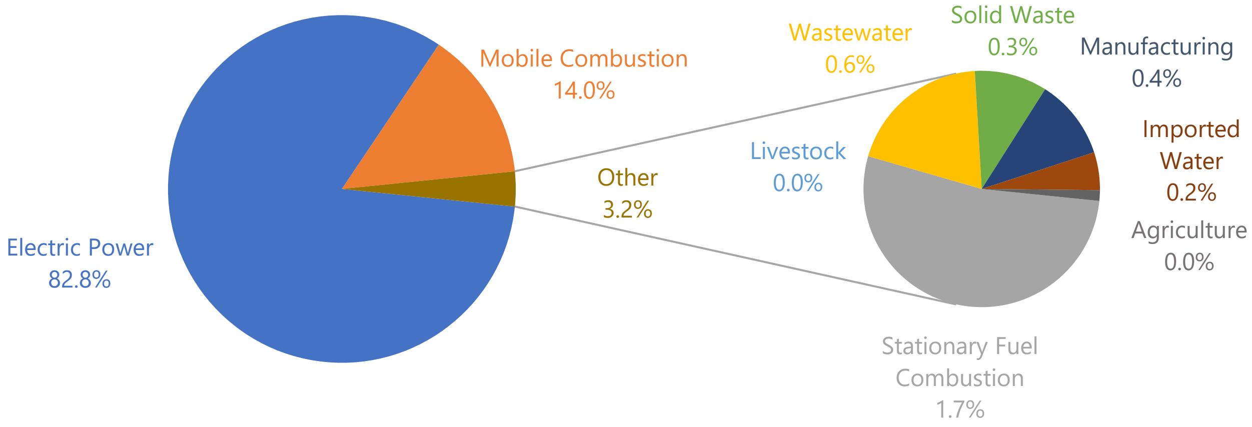


Tolleson, AZ

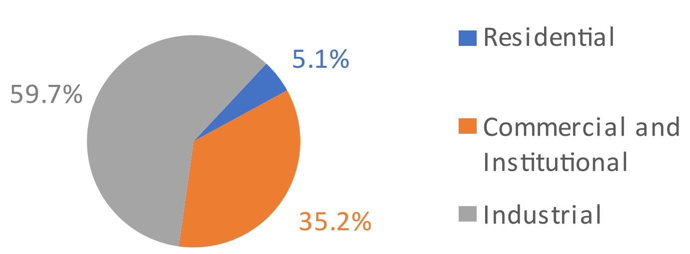
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	$MTCO_2e$	Percentage
Electric Power Consumption	221,506	82.8%
Mobile Combustion	37,388	14.0%
Stationary Fuel Combustion	4,577	1.7%
Agriculture and Land Management	126	0.0%
Solid Waste	862	0.3%
Imported Water	449	0.2%
Manufacturing Gases	949	0.4%
Livestock (Cattle)	-	0.0%
Wastewater	1,697	0.6%
Total	267,554	100%

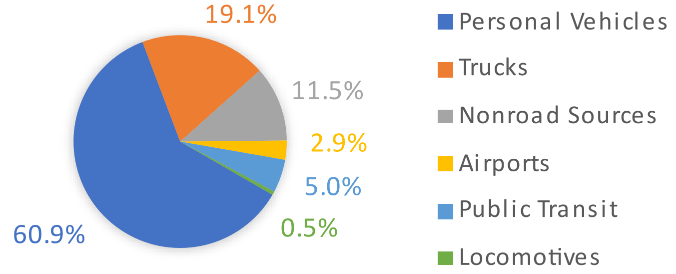
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

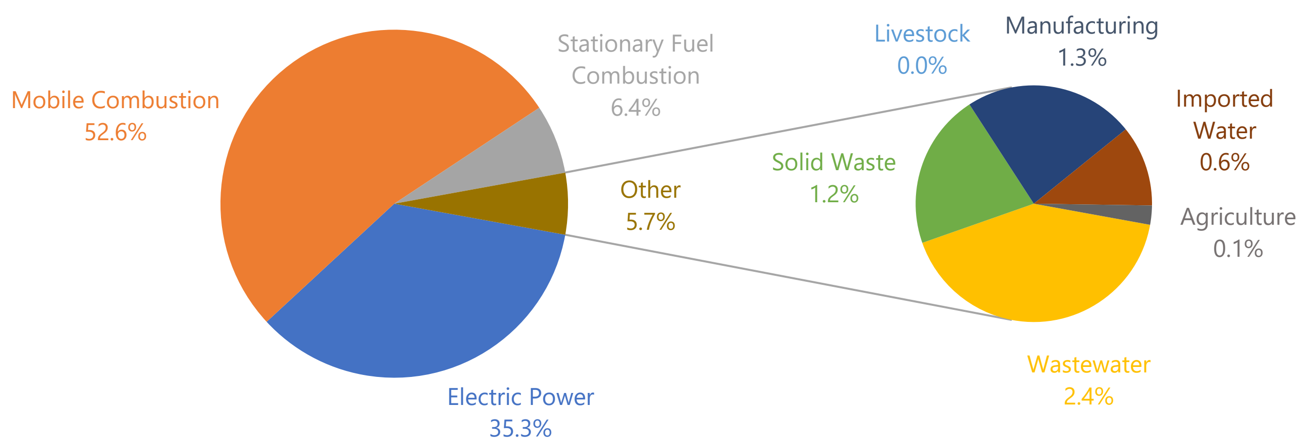


Wickenburg, AZ

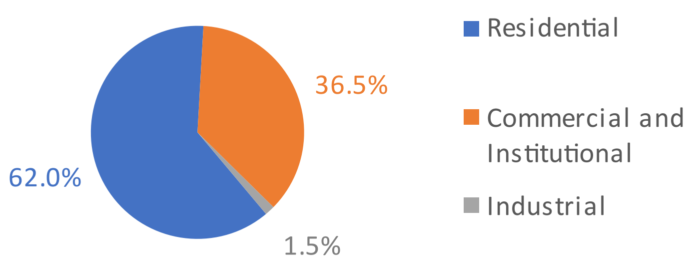
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	22,867	35.3%
Mobile Combustion	34,093	52.6%
Stationary Fuel Combustion	4,174	6.4%
Agriculture and Land Management	97	0.1%
Solid Waste	786	1.2%
Imported Water	409	0.6%
Manufacturing Gases	865	1.3%
Livestock (Cattle)	-	0.0%
Wastewater	1,548	2.4%
Total	64,838	100%

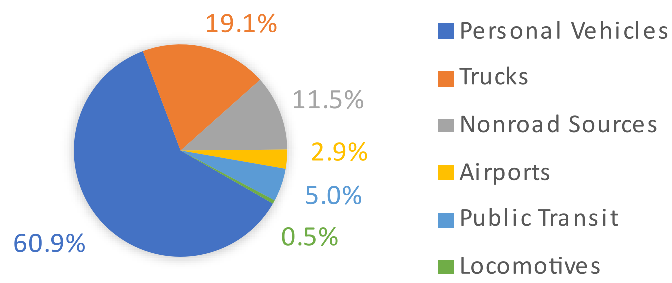
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions

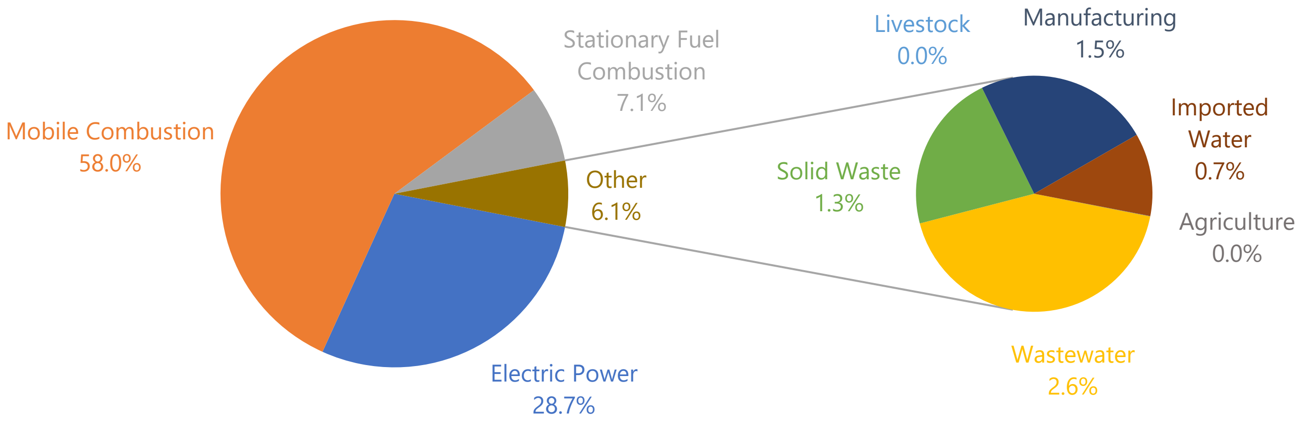


Youngtown, AZ

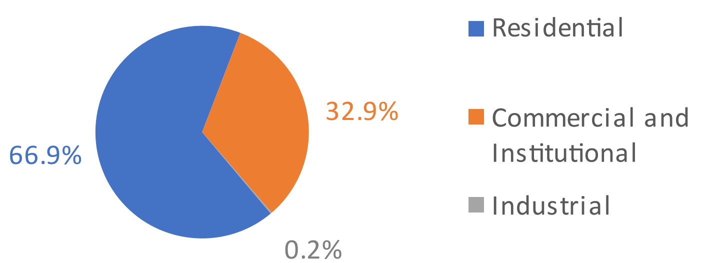
2020 Greenhouse Gas (GHG) Emissions Profile

GHG Emissions by Source Category	GHG Emissions	
	MTCO₂e	Percentage
Electric Power Consumption	17,973	28.7%
Mobile Combustion	36,328	58.0%
Stationary Fuel Combustion	4,447	7.1%
Agriculture and Land Management	2	0.0%
Solid Waste	837	1.3%
Imported Water	436	0.7%
Manufacturing Gases	922	1.5%
Livestock (Cattle)	-	0.0%
Wastewater	1,649	2.6%
Total	62,594	100%

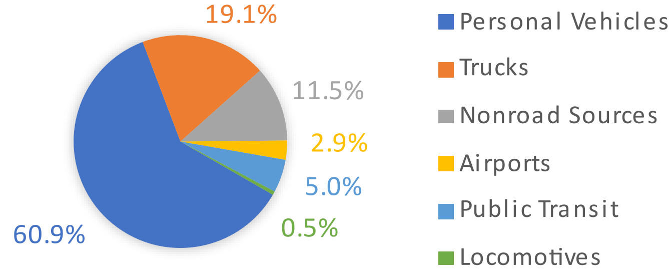
GHG Emissions by Source Category



Electric Power Consumption GHG Emissions



Mobile Combustion GHG Emissions



MARICOPA-PINAL COUNTY REGION PRIORITY CLIMATE ACTION PLAN

Appendix G: Compilation of Notifications and Comment Letters Received for the Maricopa-Pinal County Priority Climate Action Plan

Maricopa Association of Governments
February 2024

MARICOPA ASSOCIATION of GOVERNMENTS

This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T77101 to the Maricopa Association of Governments. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

City of Phoenix
OFFICE OF THE CITY MANAGER

February 1, 2024

Mr. Ed Zuercher, Executive Director
Maricopa Association of Governments
302 N. 1st Ave., Ste. 300
Phoenix, AZ 85003

Re: Climate Pollution Reduction Grant (CPRG) Priority Measures for consideration in the regional Priority Climate Action Plan (PCAP) to seek Phase II Funding

Dear Mr. Zuercher:

The City of Phoenix appreciates the opportunity to provide input for the Priority Climate Action Plan (PCAP) being developed by the Maricopa Association of Governments as part of the Climate Pollution Reduction Grant (CPRG) Phase I. On January 24, 2024, the Phoenix City Council unanimously voted approval for Phoenix to serve as the lead applicant for a Regional Coalition to pursue CPRG Phase II funding. The Regional Coalition will include as members the City of Phoenix, the City of Mesa, the City of Tempe, Maricopa County, and Valley Metro and will also include other partner eligible entities such as the cities of Avondale and Scottsdale. The coalition has evaluated the following priority measures for the sectors of Electricity Generation, Transportation, Commercial and Residential Buildings, and Waste and Materials Management. Phoenix, along with the potential coalition members and partners, request that these measures be included in the PCAP. Inclusion of the measures in the PCAP will allow our regional coalition to apply for implementation funding under Phase II of the CPRG, thereby accelerating regional goals to reduce climate pollution.

Proposed Measures
The following measures cover a wide range of projects that, if implemented, will provide significant benefits to our region. These benefits include workforce development, improved air quality from emissions reduction, and decreased cost burden for residents and businesses.

In the following paragraphs, we provide a short description of proposed measures with an estimate of the quantifiable greenhouse gas emissions (GHG) reductions. Attached to this letter is a supplemental table providing additional information about each measure.

1. **Renewable Energy Generation at Municipal and Other Public Facilities**
   This measure will fund the deployment of renewable energy generation systems, including solar and hydropower energy generation systems, at municipal and public facilities. Projects may include installation of photovoltaic panels at municipal facilities, like airports and landfills, and other public facilities like community colleges. Projects may also include the installation of micro-hydropower generation systems in a water system. Anticipated co-benefits include improved air quality, increased resilience of the

electricity grid, reduced energy costs, workforce development and improved public health due reduced air pollution.

- Applicable Sector – **Electricity Generation**
- Estimate of Quantifiable GHG Emission Reductions
  - 2025-2030: **26,000 MT CO_2e**
  - 2030-2050: **93,000 MT CO_2e**

2. **Development of Microgrids**
This measure supports, funds, and/or will incentivize the development of renewable energy microgrids at the local and community levels. Projects may include the installation of solar and battery systems at municipal facilities that could also double as resilience hubs such as community centers and libraries. Co-benefits include improved air quality, improved public health due to reductions in air pollution, increased climate resilience, and improved public access to services and critical resources in times of emergency.
    - Applicable Sector – **Electricity Generation**
    - Estimate of Quantifiable GHG Emission Reductions –
      - 2025-2030: **1,600 MT CO_2e**
      - 2030-2050: **9,500 MT CO_2e**

3. **Public Fleet Electrification and Publicly Available Charging Infrastructure Development**
This measure incentivizes the installation of electric vehicle (EV) charging infrastructure for publicly available charging and funds the transition of public fleets from fossil fuel-powered vehicles to EVs. Projects include the procurement of light-, medium-, and heavy-duty service municipal and other public entity vehicles along with public transit vehicles, like the bus fleet. Workforce development will be included in this measure with development of programs to address EV maintenance and charging station installation, beginning with current employees. Co-benefits include improved air quality, reduced tailpipe emissions, and improved public health due to reduced air pollution.
    - Applicable Sector – **Transportation**
    - Estimate of Quantifiable GHG Emission Reductions –
      - 2025-2030: **430,000 MT CO_2e**
      - 2030-2050: **550,000 MT CO_2e**

4. **Zero Emission Vehicle Incentives (Residential & Commercial Fleets)**

This measure incentivizes the transition from fossil fuel powered vehicles to zero emission vehicles. Rebates, grants, or other incentives will be offered to residents or commercial entities to purchase zero emission vehicles. These incentives may include providing funding for electrical infrastructure assessments and infrastructure installation for businesses and governments, as well as establishing a low-income EV carshare service in underserved neighborhoods. Co-benefits include improved air quality, reduced tailpipe emissions, and improved public health due to reduced air pollution.

- Applicable Sector – **Transportation**
- Estimate of Quantifiable GHG Emission Reductions

    - 2025-2030: **25,000 MT CO_2e**
    - 2030-2050: **100,000 MT CO_2e**

5. **Active Transportation Network Infrastructure Investments**
   This measure funds active transportation network upgrades. Active transportation is walking, bicycling, using small-wheeled vehicles, or a micro-mobility device. Implementation examples include increasing the number of bike lanes, expanding cool corridors/walking paths, and increasing e-mobility accessibility. Possible projects may incorporate green stormwater infrastructure principles to manage stormwater, through the deployment of permeable pavement technologies, rainwater harvesting systems, and the protection and expansion of green spaces. Co-benefits include improved air quality, improved public health, reduction in localized surface air temperatures, increase in local shade, increased climate resilience.
   - Applicable Sector – **Transportation**
   - Estimate of Quantifiable GHG Emission Reductions
     - 2025-2030: **500 MT CO_2e**
     - 2030-2050: **2,000 MT CO_2e**

6. **Electrification of Commercial and Governmental-Owned Lawn and Garden Equipment**
   This measure funds programs to change from gas-powered to electrical lawn and garden equipment. Projects may include implementing a voucher to assist in the cost of replacement of equipment used by government agencies and businesses for use in the region. Co-benefits include improved air quality and improved health due to air pollution reduction.
   - Applicable Sector – **Transportation**
   - Estimate of Quantifiable GHG Emission Reductions
     - 2025-2030: **11,000 MT CO_2e**
     - 2030-2050: **17,000 MT CO_2e**

7. **Energy Efficiency Upgrades for Municipal Operations**
   This measure supports the deployment of energy efficiency upgrades for municipal operations. Projects may include LED lighting upgrades, replacement of commercial appliances, facility retrofit programs, emergency generator replacement, and energy management control systems upgrades. Co-benefits include improved air quality, energy cost savings, workforce development and improved public health due to air pollution reduction.
   - Applicable Sector – **Commercial and Residential Buildings**
   - Estimate of Quantifiable GHG Emission Reductions
     - 2025-2030: **12,000 MT CO_2e**
     - 2030-2050: **33,000 MT CO_2e**

8. **Weatherization Assistance Programs (Residential and Commercial)**
   This measure funds residential and commercial building weatherization projects and specific replacement programs, like a low- and moderate-income HVAC replacement

program, and workforce expansion through training and certification programs. Co-benefits include improved air quality, energy cost savings, workforce development, improved public health due to air pollution reduction and increased climate resilience.

- Applicable Sector – **Commercial and Residential Buildings**
- Estimate of Quantifiable GHG Emission Reductions
  - 2025-2030: **3,500 MT CO_2e**
  - 2030-2050: **12,000 MT CO_2e**

9. **Electrification of Municipal, Commercial, and Residential Buildings**
This measure supports and/or incentivizes the conversion of fossil fueled building equipment to electric equipment. Projects may focus on the replacement of woodburning fireplaces with electric fireplaces or similar initiatives. Co-benefits include improved air quality and improved public health due to air pollution reduction.
   - Applicable Sector – **Commercial and Residential Buildings**
   - Estimate of Quantifiable GHG Emission Reductions
     - 2025-2030: **1,400 MT CO_2e**
     - 2030-2050: **7,000 MT CO_2e**

10. **Food Waste Diversion for Biogas Capture from Landfills and Wastewater Treatment Plants for Renewable Energy Generation**
This measure will further the implementation and/or expansion of vegetative and food waste diversion programs to support the collection of generated biogas from the food waste for processing and use as a source of renewable energy. Co-benefits include improved air quality and improved public health due to air pollution reduction.
    - Applicable Sector – **Waste and Materials Management**
    - Estimate of Quantifiable GHG Emission Reductions
      - 2025-2030: **20,000 MT CO_2e**
      - 2030-2050: **150,000 MT CO_2e**

The above measures represent the collaborative efforts of regional governments and community organizations in the Phoenix Metro area to identify potential projects that can be implemented quickly and efficiently to address climate pollution. Coalition partners have a proven history of working together and each has a record of successfully implementing complex programs and projects. Again, we appreciate this opportunity to provide measures for inclusion in the PCAP that we believe will make a difference in addressing the challenges of regional climate pollution.

Respectfully,

Jeff Barton
City Manager
City of Phoenix

CC: Laura Hyneman, City of Mesa
Scott Bouchie, City of Mesa
Brianne Fisher, City of Tempe
Melissa Boyles, Valley Metro
Alexis Tameron Kinsey, Valley Metro
Phil McNeely, Maricopa County
Kimberley Anderson, City of Avondale
Lisa McNeily, City of Scottsdale
Carol Ketcherside, Valley Metro

Enc: Attachment: CPRG Priority Measures for consideration in the Regional Priority Climate Action Plan (PCAP)

CPRG Priority Measures for Consideration in the Regional Priority Climate Action Plan (PCAP)

	Applicable Sector	Estimate of Quantifiable GHG Emission Reductions	Implementing Agency or Agencies	Authority to Implement	Implementation Schedule	Geographic Scope	Metrics for Tracking Progress	Co-benefits
1. Renewable Energy Generation at Municipal and Other Public Facilities	Electricity Generation	2025-2030: 26,000 MT CO_2e 2030-2050: 93,000 MT CO_2e	MC, COA, COP, COS OR Local Jurisdictions and Counties	No additional authority is required	5 years for implementation	Phoenix-Mesa MSA OR MC OR, COA, COP, COS	kWh of clean electricity generated	improved air quality, increased grid resilience, reduced energy costs, workforce development, improved public health
2. Development of Microgrids	Electricity Generation	2025-2030: 1,600 MT CO_2e 2030-2050: 9,500 MT CO_2e	COT OR Local Jurisdictions and Counties	No additional authority is required.	4 to 5 years for implementation	COT OR MC OR Phoenix-Mesa MSA	kWh of clean electricity generated	improved air quality, increased resilience, improved public access to critical resources and services, improved public health
3. Public Fleet Electrification and Publicly Available Charging Infrastructure Development	Transportation	2025-2030: 430,000 MT CO_2e 2030-2050: 550,000 MT CO_2e	MC, COM, COP, COT, VM OR Local Jurisdictions and Counties		2 to 5 years for implementation	MC, COM, COP, COT OR MC OR Phoenix-Mesa MSA	kWh electricity used for charging stations, number of vehicles that are transitioned to electric, vehicle miles traveled by electric vehicles, number of charging stations installed, number of employees trained	improved air quality, reduced tailpipe emissions, improved public health
4. Zero-Emission Vehicle Incentives (Residential & Commercial Fleets)	Transportation	2025-2030: 25,000 MT CO_2e 2030-2050: 100,000 MT CO_2e	COP, VM OR Local Jurisdictions and Counties	May require partnerships with businesses and share riding companies	1 to 5 years for implementation	COP OR MC OR Phoenix-Mesa MSA	kWh electricity used for charging stations, vehicle miles traveled by electric vehicles, number of charging stations installed	improved air quality, reduced tailpipe emissions, improved public health

	Applicable Sector	Estimate of Quantifiable GHG Emission Reductions	Implementing Agency or Agencies	Authority to Implement	Implementation Schedule	Geographic Scope	Metrics for Tracking Progress	Co-benefits
5. Active Transportation Network Infrastructure Investments	Transportation	2025-2030: 500 MT CO_2e 2030-2050: 2,000 MT CO_2e	COP OR Local Jurisdictions and Counties	No additional authority is required	1 to 5 years for implementation	COP OR MC OR Phoenix-Mesa MSA	number of miles of walking path and bike lanes added, gallons of water savings	improved air quality, improved public health, reduction in localized surface air temperatures, increase in local shade, increased climate resilience
6. Electrification of Commercial and Government-Owned Lawn and Garden Equipment	Transportation	2025-2030: 11,000 MT CO_2e 2030-2050: 17,000 MT CO_2e	MC OR Local Jurisdictions and Counties	No additional authority is required	4 to 5 years for implementation	MC OR Phoenix-Mesa MSA	number of equipment transitioned to electricity	improved air quality, improved public health
7. Energy Efficiency Upgrades for Municipal Operations	Commercial and Residential Buildings	2025-2030: 12,000 MT CO_2e 2030-2050: 33,000 MT CO_2e	MC, COM, COP OR Local Jurisdictions and Counties	No additional authority is required	2 to 5 years for implementation	Maricopa County, COA, COP, COS OR Phoenix-Mesa MSA OR MC	kWh electricity use, therms natural gas use	improved air quality, energy cost savings, workforce development, improved public health
8. Weatherization Assistance Programs (Residential and Commercial)	Commercial and Residential Buildings	2025-2030: 3,500 MT CO_2e 2030-2050: 12,000 MT CO_2e	MC, COP, COS OR Local Jurisdictions and Counties	No additional authority is required	1 to 5 years for implementation	MC, COP, COS OR Phoenix-Mesa MSA OR Maricopa County	number of homes/businesses retrofit, energy savings, energy cost savings, number of trainings or certifications completed	improved air quality, energy cost savings, workforce development, improved public health, increased climate resilience
9. Electrification of Municipal, Commercial, and Residential Buildings	Commercial and Residential Buildings	2025-2030: 1,400 MT CO_2e 2030-2050: 7,000 MT CO_2e	MC OR Local Jurisdictions and Counties	No additional authority is required	2 to 5 years for implementation	MC	number of fireplace replacements	improved air quality, improved public health

	Applicable Sector	Estimate of Quantifiable GHG Emission Reductions	Implementing Agency or Agencies	Authority to Implement	Implementation Schedule	Geographic Scope	Metrics for Tracking Progress	Co-benefits
10. Food Waste Diversion for Biogas Capture from Landfills and Wastewater Treatment Plants for Renewable Energy Generation	Waste and Materials Management	2025-2030: 20,000 MT CO_2e 2030-2050: 150,000 MT CO_2e	COM, COP OR Local Jurisdictions and Counties OR Phoenix-Mesa MSA	No additional authority is required	2 to 5 years for implementation	COM, COP	therms of biogas generated, tons of food waste diverted from landfill	improved air quality, improved public health

COP – City of Phoenix

COM – City of Mesa

COT – City of Tempe

MC – Maricopa County

COA – City of Avondale

COS – City of Scottsdale

VM – Valley Metro

American Lung Association.
Arizona

Elias Toon
Maricopa Association of Governments
302 N. 1st Ave.
Phoenix, AZ 85003

January 15, 2024

Public Health Recommendations for Climate Pollution Reduction Grant

Dear Elias:

On behalf of the American Lung Association, we appreciate the opportunity to share recommendations for Maricopa Association of Governments (MAG) to include in Arizona's Priority Climate Action Plan (PCAP) for the Climate Pollution Reduction Grant (CPRG) which will play a critical role to clean up pollution and transform Arizona's transportation future. MAG has the opportunity to significantly decrease greenhouse gas emissions while expanding transportation electrification generating millions in public health savings.

Arizonans experience some of the greatest air pollution challenges in the United States. The American Lung Association's 2023 "State of the Air" report revealed that **84 percent of residents live in a county with at least one failing grade for air quality.** Exposure to pollution threatens lung and heart health by worsening asthma attacks, increasing the risk of heart attacks and strokes, and premature death.[1] Arizona children, seniors, low-income people and people of color face elevated risks. These health risks highlight the need to transition from fossil fuels that cause air pollution and drive climate change toward zero-emission technologies.

Recent polling from the American Lung Association found Arizona voters are supportive of various zero-emission technologies including:

- Investments to transition all school buses from diesel-powered vehicles to zero-emission buses by 2040 (67% support).
- Investments for charging infrastructure along major highways and roads (65% support).
- Consumer incentives to purchase electric vehicles (64% support).
- Policies that transition to pollution-free vehicles including decreasing emissions from cars and truck over time (62% support), electrifying the medium and heavy-duty sector by 2040 (62% support), and transitioning public fleet vehicles to zero-emission by 2035 (59% support).

The transportation sector is the primary contributor to our air pollution burdens, which is why prioritizing programs that steer us toward a zero-emission future will yield the greatest health and economic benefits. To maximize the full federal funding investment, we encourage the following programs to be included in the PCAP and considered for the implementation grant application, as they align with the CPRG goals that have the greatest impact to reduce emissions with new and existing programs.

[1] https://www.lung.org/research/sota/health-risks

- **Municipal Fleet Electrification:** MAG's Regional Electrification Readiness Strategic Plan provides a strong framework for electrification. Using the CPRG funds to transition municipal vehicle fleets would fast-track more zero-emission vehicles on our roads and generate the greatest air quality benefits. This program should be expanded to increase more electric school buses and public transit buses as healthier and pollution free transportation options for Arizonans.
  - According to the Health Effects Institute found exposure to traffic pollution is linked with heart disease, lung cancer mortality; asthma onset in both children and adults; and acute lower respiratory infections in children[2]. Our "Driving to Clean Air" report shows Arizona could benefit from **$10.2 billion in public health savings** from cleaning up the light-duty and electricity generation sectors.
  - Medium and heavy-duty vehicles represent approximately six percent of vehicles on the road but generate 59 percent of ozone and particle-forming NOx emissions[3]. Further, heavy truck traffic is centered around major highways and warehouses, which are often situated in lower-income areas. This exacerbates the health disparities from traffic pollution-related health effects. Our "Delivering Clean Air" report shows a transition to pollution-free trucks and buses coupled with non-combustion electricity would result in **$7.6 billion in health benefits between 2020-2050 in Maricopa County alone**.
- **Expanded EV Infrastructure:** Expanding infrastructure for zero-emission technologies including charging stations will reduce greenhouse gas emissions and protect Arizonans' health against increased air pollution. These funds should supplement current plans to expand infrastructure (such as ADOT's Electric Vehicle Infrastructure Deployment Plan) to provide reliable and increased access to charging stations. We encourage MAG to consider prioritizing investments in communities overburdened with pollution and include charging station in multi-family housing and lower-income neighborhoods.

In closing, the American Lung Association encourages MAG to seek programs that will invest in zero-emission technologies to ensure a healthier future for all Arizonans. We look forward to working with the state to ensure the greatest possible investments to reduce harmful air pollution, protect lung health, and increase access to reliable and clean transportation.

Sincerely,

JoAnna Strother
Senior Director, Advocacy
JoAnna.Strother@lung.org

Melissa Ramos, MPA
Senior Manager, Clean Air Advocacy
Melissa.ramos@lung.org

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[2] https://www.healtheffects.org/publication/systematic-review-and-meta-analysis-selected-health-effects-long-term-exposure-traffic
[3] https://www.lung.org/getmedia/e1ff935b-a935-4f49-91e5-151f1e643124/zero-emission-truck-report

American Lung Association.

Arizona Alliance for Retired Americans

ACAC
Arizona Climate Action Coalition

ARIZONA INTERFAITH POWER AND LIGHT

ARIZONA PARTNERSHIP FOR HEALTHY COMMUNITIES

Arizona PIRG Education Fund

ARIZONANS FOR A CLEAN ECONOMY

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Arizona Chapter

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LOCAL FIRST ARIZONA

MI FAMILIA VOTA
EDUCATION FUND

MOMS clean air FORCE
FIGHTING FOR OUR KIDS' HEALTH

Building Resilient Neighborhoods
Preparedness through Community Cohesion
PSR

PINNACLE PREVENTION

Plug In America

PODER LATINX
VOTE • ORGANIZE • CHANGE

RAZA

SIERRA CLUB
GRAND CANYON

SOLAR UNITED NEIGHBORS

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

Tierra Strategy
Know More. Do Better

VetsFWD

VOTE SOLAR

WESTERN GRID GROUP
Connecting Clean Energy in the West

wra

wildfire
Igniting Community Action to End Poverty in Arizona

January 15, 2024

Elias Toon
Maricopa Association of Governments
302 N. 1st Ave.
Phoenix, AZ 85003

Dear Elias,

Re: Climate Pollution Reduction Grant - Priority Climate Action Plan

Thank you for the opportunity to provide input on developing the Priority Climate Action Plan (PCAP) through the Climate Pollution Reduction Grant (CPRG) program. Our organizations were pleased that the Maricopa Association of Governments (MAG) sought and received a CPRG planning grant and want to be helpful as you advance the PCAP and provide opportunities for municipalities in the region to secure implementation grants.

The PCAP provides an opportunity to identify top measures to reduce climate pollution in a timely, effective, efficient, and equitable manner (in accordance with the Justice40 Initiative). As you know, the transportation and building sectors are major sources of greenhouse gas emissions, which significantly contribute to the region's air quality problems and negatively impact public health and the economy. Fortunately, extensive research, case studies, and data exist that outline strategies to reduce emissions and save taxpayers money (see below). **Our organizations urge you to prioritize transportation electrification and building efficiencies in the PCAP and competitive grant application.**

The following recommendations are aligned with CPRG objectives and have strong potential for high impact in the region:

Transportation Electrification

- **Public Fleets (Local Government Light-Duty Electric Fleets and Medium - and-Heavy-Duty Electric Vehicles)**

  Transition to Local Government Light-Duty Electric Fleets. MAG's *Regional Electrification Readiness Strategic Plan* offers a strong case for regional electrification. The Arizona PIRG Education Fund and Frontier Group's report *Electric Fleets for Arizona* makes the specific case for municipalities in the MAG region to replace retiring light-duty cars and trucks with electric vehicles (EVs). The report documents the air quality, energy, and taxpayer benefits of 10 of Arizona's largest municipalities (nine in Maricopa County) replacing retiring light-duty vehicles with EVs over the next decade.

Key findings include: reduction of over 144,000 short tons of greenhouse gas emissions and nearly $80 million in taxpayer savings.[1] The organization's subsequent report *Electric Vehicles Save Money for Government Fleets* documents the emission reductions and taxpayer savings for Arizona and its local governments. Key findings include: reduction of greenhouse gas emissions by 462,000 short tons (the same amount as produced by driving more than 1 billion miles in a typical car) and nearly $283 million in taxpayer savings.[2]

Transition to Medium -and-Heavy-Duty (MHD) Electric Vehicles. Valley Metro and school districts in the region are committing to and/or exploring options to transition to electric buses to reduce greenhouse gas emissions and save taxpayers money. The Arizona PIRG Education Fund and Frontier Group's report *Electric Buses: Clean Transportation for Healthier Neighborhoods and Cleaner Air* documents that replacing all of the U.S. school buses with electric buses could avoid an average of 5.3 million tons of greenhouse gas emissions each year and replacing all of the diesel-powered transit buses with electric buses in the U.S. could save more than 2 million tons of greenhouse gas emissions each year.[3] Although cost savings vary by type of bus and use, the across-the-board reduced operating and maintenance expenses have proven financially beneficial.

While MHD trucks make up only 5% of all vehicles on the road nationally, the NESCAUM Zero-Emission Vehicle Task Force states that they are responsible for 30% of on-road greenhouse gas emissions and over 50% of on-road PM2.5 emissions across the country.[4] The emissions from MHD trucks are disproportionately concentrated in communities of color due to their proximity to major roadways and warehouses.

Provide incentives to lower the upfront cost of light-duty and MHD electric vehicles such as buses, waste management vehicles, cargo and passenger vans, and other large vehicles, which can lead to more public entities and businesses investing in vehicles that will reduce greenhouse gas emissions and provide total cost savings over traditional vehicles.

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[1] Tony Dutzik, Frontier Group and Diane E. Brown, Arizona PIRG Education Fund, Electric Fleets for Arizona: Saving taxpayers money through municipal fleet electrification, Fall 2022, pages 4-5, available at https://pirg. org/arizona/edfund/resources/electric-fleets-forarizona/

[2] Tony Dutzik, Frontier Group and Diane E. Brown, Arizona PIRG Education Fund, Electric Vehicles Save Money for Government Fleets: Billions of Dollars in Savings Possible for State and Local Governments, June 2023, pages 29-31, available at https://publicinterestnetwork.org/wp-content/uploads/2023/06/Electric-Fleets-Report-6-27-23.pdf

[3] Alana Miller and Hye-Jin Kim, Frontier Group and Jeffrey Robinson and Matthew Casale, PIRG Education Fund, Electric Buses: Clean Transportation for Healthier Neighborhoods and Cleaner Air, May 2018, page 2, available at https://pirg.org/wp-content/uploads/2018/06/Electric-Bus-Report-5-18.pdf

[4] NESCAUM ZEV Multi-State Task Force, Multi-State Medium- and Heavy-Duty Task Force Zero-Emission Vehicle Action Plan: A Policy Framework to Eliminate Harmful Truck and Bus Emissions, July 2022, page 10, available at https://www.nescaum.org/documents/multi-state-medium-and-heavy-duty-zev-action-plan.pdf

- **Coordinate and Accelerate EV Charging Infrastructure.** Municipalities across the region have recognized the growth of EVs on the road and the need to get ahead of infrastructure needs now versus missing opportunities and likely paying higher costs later. Incentives for L2 and DC fast charging, with a focus on low-income and multi-family housing and small business areas, can support EV adoption across the region and complement the Charging and Fueling Discretionary Grant Infrastructure (CFI) Program and ADOT's Electric Vehicle Infrastructure Deployment Plan via the National Electric Vehicle Infrastructure (NEVI) Program.

- **Expand Maricopa County's Mowing Down Pollution Program.** Maricopa County's well-established program to reduce pollution from lawn equipment by switching to electric products bodes well for its ability to expand. Research conducted by the Arizona PIRG Education Fund and the Frontier Group as part of its recent report *Lawn Care Goes Electric* found that gasoline-powered lawn and garden equipment in Maricopa County in 2020 (latest data available) emitted over 233,000 tons of carbon dioxide emissions, the equivalent of over 51,000 cars. In addition to carbon dioxide, the pollutants emitted by gasoline-powered lawn equipment include fine particulates, ozone-forming nitrogen oxides (NOx), and volatile organic compounds (VOCs). Although electric lawn equipment sometimes has a higher initial price tag than gasoline-powered counterparts, money can be saved over time due to lower fuel and maintenance costs – usually paying back the initial investment in just one to three years. As part of the CPRG, the Mowing Down Pollution Program should focus on electrifying local government operations and robustly promoting the program, particularly in low-income and multi-family housing areas, which disproportionately are impacted by the adverse effects of air pollution.

Building Efficiencies

- **Conduct Comprehensive Retrofits for Local Governments, Schools, and Non-Profit Buildings to be more Energy Efficient.** Energy efficiency is the cheapest, cleanest, and quickest way to meet growing energy needs while reducing greenhouse gas emissions. Energy efficiency retrofits to local governments, schools, and non-profit buildings can reduce energy waste and save money as well as provide critical leadership in demonstrating the value of energy-efficient retrofits to residents in the region, including students.

  In Maricopa County, more than 40% of greenhouse gas emissions result from electricity use.[5] Including a well-targeted retrofit strategy in the PCAP has the potential to achieve more than 15%-40% energy savings, alone from other project interventions.[6] As part of

[5] Maricopa County 2020 Community Greenhouse Gas Emissions Inventory, September 2023, available at https://www.maricopa.gov/DocumentCenter/View/62545/GHG_Inventory_Report_FINAL-PDF?bidId=

[6] Rohini Srivastava and Jasmine Mah, Moving The Needle On Comprehensive Commercial Retrofits, American Council for an Energy-Efficient Economy (ACEEE), May 2022, available at https://www.aceee.org/sites/default/files/pdfs/b2203.pdf

the CPRG, the region should support energy efficiency system design and project costs for local governments, schools, and non-profit buildings. For example, The Alliance Center, a non-profit multi-tenant office building in downtown Denver, CO, completed a major renovation that included upgrading failing mechanical systems, reducing plug and elevator loads, and heating and lighting use. This retrofit project resulted in 34% annual energy savings and more than 300,000 lb/year in annual avoided carbon emissions.[7]

Municipalities, school districts, and non-governmental organizations interested in renovation projects can also leverage the federal Investment Tax Credit (ITC) for solar and geothermal heat pump systems for up to 30%-50% of total project costs.[8]

- **Incentivize Small Business Electrification.** The Home Efficiency Rebates and Home Electrification and Appliance Rebates program provides over $180 million in funding to residential households in Arizona. As such, the programs will establish a robust infrastructure and processes for deploying energy efficiency improvements, which will reduce climate pollution and save money for Arizona households. The MAG region should help leverage CPRG funding and the federal rebate infrastructure to provide complementary rebates for small businesses, as energy bills can often make or break a small business. Small businesses can also qualify for the solar and geothermal heat pump system ITC, which can account for upwards of 30%-50% of total project costs, which can further reduce climate pollution and electricity costs.[9] Additionally, energy efficiency and electrification rebates for small businesses (those with less than 50 employees) to incentivize high-efficiency heat pump installations, insulation, and other efficiency improvements can provide well-needed support for a significant part of Arizona's workforce and help round out the components of your PCAP.

While each of our organizations has a unique mission, we collectively agree that the measures listed above include priorities we would like to see integrated into the regional PCAP and competitive grant application.

For more information on the transportation section, please contact: Diane E. Brown with Arizona Public Interest Research Group (Arizona PIRG) Education Fund at dbrown@arizonapirg.org; Alexia Melendez Martineau with Plug In America at amartineau@pluginamerica.org; and/or Deborah Kapiloff with Western Resource Advocates at deborah.kapiloff@westernresources.org.

For more information on the building efficiencies section, please contact Caryn Potter with the Southwest Energy Efficiency Project (SWEEP) at cpotter@swenergy.org; Doug Presley with the

---

[7] U.S. Dept. of Energy, Commercial Building Energy Efficiency, Alliance for Sustainable Colorado Renovation Raises Its Energy Performance to New Heights, available at https://www.nrel.gov/docs/fy15osti/63867.pdf

[8] Office of Energy Efficiency & Renewable Energy, Federal Solar Tax Credits for Businesses, August 2023, https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses

[9] Ibid. Note that electric systems that are under 1 MW of capacity do not need to meet prevailing wage or apprenticeship requirements. Also see Internal Revenue Code Section 48.

Building Performance Association at doug@anndyl.com; and/or Jason Lowry with Local First Arizona at jason@localfirstaz.com.

Please contact Diane E. Brown, dbrown@arizonapirg.org or (602)318-2779 (c), with overall questions or to arrange a meeting with signers listed below.

Thank you for your leadership on the CPRG program and consideration of our comments.

Sincerely,

American Lung Association
JoAnna Strother, Senior Director | Advocacy | Southwest

Arizona Alliance for Retired Americans
Dora Vasquez, Executive Director

Arizona Climate Action Coalition
Hazel Chandler, State Coordinator

Arizona Interfaith Power & Light
Melanie Beikman, Director

Arizona Partnership for Healthy Communities
David Longoria, Manager

Arizona Public Interest Research Group (Arizona PIRG) Education Fund
Diane E. Brown, Executive Director

Arizonans for a Clean Economy
Charlie Fisher, Executive Director

Ceres
Kelly Trombley, Manager, State Policy

Chispa Arizona
Vania Guevara, Advocacy Deputy Director

Climate Cabinet Action
Nick Arnold, Arizona State Lead

Elders Climate Action - Arizona Chapter
Lizz Tucker, Arizona Field Coordinator

Environment Arizona Research & Policy Center
Alec Sprague, Spokesperson

Keep Sedona Beautiful, Inc.
Craig Swanson, President

LISC Phoenix
Terry Benelli, Executive Director

Local First Arizona
Kimber Lanning, CEO

Mi Familia Vota
Vanessa Perez, Civic Engagement Director

Moms Clean Air Force, Arizona
Hazel Chandler, Arizona Field Organizer

Physicians for Social Responsibility, Arizona Chapter
Barbara Warren, MD, MPH

Pinnacle Prevention
Adrienne Z. Udarbe, Executive Director

Plug In America
Alexia Melendez Martineau, Policy Manager

Poder Latinx
Yadira Sanchez, Executive Director

Rural Arizona Action
Madison Rock, Interim Political and Policy Director

Sierra Club - Grand Canyon (Arizona) Chapter
Sandy Bahr, Director

Solar United Neighbors
Adrian Keller, Arizona Program Director

Southwest Energy Efficiency Project (SWEEP)
Caryn Potter, Arizona Representative

Tierra Strategy
Autumn Johnson, CEO

VetsFWD
Aaron Marquez, Executive Director

Vote Solar
Yara Marin, Regional Director, Interior West

Western Grid Group
Amanda Ormond, Director

Western Resource Advocates
Alex Routhier, Ph.D., Arizona Clean Energy Manager/Senior Policy Advisor

Wildfire: Igniting Community Action to End Poverty in Arizona
Kelly McGowan, Executive Director

January 16, 2024

Elias Toon
Maricopa Association of Governments
302 N. 1st Ave.
Phoenix, AZ 85003

Dear Mr. Toon,

Re: The Southwest Energy Efficiency Project's Recommendations for Climate Pollution Reduction Grant - Priority Climate Action Plan

The Southwest Energy Efficiency Project (SWEEP) is a public-interest organization that promotes greater energy efficiency in Arizona and five other states in the Southwest. SWEEP commends the Maricopa Association of Governments(MAG) and its partners for developing the Priority Climate Action Plan (PCAP) through the Climate Pollution Reduction Grant (CPRG) program.

Below, SWEEP outlines several policies, strategies, and example projects for your consideration as you finalize your measure list in the PCAP. These recommendations will help Central Arizona to rapidly decarbonize while meeting the needs of communities most directly affected by climate change.

SWEEP welcomes the opportunity to meet with you and your partners to provide additional details on these recommendations, including implementation examples from other jurisdictions in the southwest.

Thank you for the opportunity to submit these comments.

Sincerely,

Caryn Potter
Arizona Representative, Southwest Energy Efficiency Project
cpotter@swenergy.org, 602-312-1345 (mobile)

SWEEP Recommendations for the Priority Climate Action Plan

Given the significant emissions that come from the Electric Power, Transportation, and Buildings Sectors, SWEEP recommends that these sectors should be the main priority within the PCAP. SWEEP presents our seven policy- and project-based recommendations for consideration as MAG finalizes its Priority Climate Action Plan (PCAP) through the Climate Pollution Reduction Grant (CPRG) program.

Buildings Sector

1. Adopt Low-to-Zero-Energy and Green Building Codes and Practices That Prioritize New Construction of Affordable Housing

Adopting Low-to-Zero Energy and Green Building Codes and practices, specifically prioritizing both market-rate and affordable housing in new construction, stands at the forefront of municipal decarbonization strategies. Adoption of Low-to-Zero Energy and Green Building Codes have emerged as a pivotal instrument in decarbonizing the built environment while ensuring new, more efficient homes are also available to the historically disadvantaged communities that would benefit the most from the new construction.

There are multiple policy levers that local governments can utilize that would lead to the construction of more efficient affordable housing. For instance:

- Incentivize builders and developers to construct highly efficient homes through accelerated permitting, city recognition, and financial incentives and credits. One example would be to encourage developers to build to ENERGY STAR 3.1 in order for them to obtain the 45L builder tax credit.[1]
- Offer accelerated or fast-track permitting for developers who commit to constructing homes to the required specifications in the 2021 International Energy Conservation Code (IECC) while omitting luxurious home amenities[2] that make homes less affordable.
- Provide density bonuses to builders who incorporate energy-efficient features in their projects. This concept can include additional allowances for floor area or the number of units, encouraging builders to prioritize energy efficiency.[3]

2. Expand Funding for Voluntary Industrial Decarbonization Demonstration Projects

As a part of the CPRG Phase 1 and 2 processes; applicants should allocate funding for voluntary industrial decarbonization demonstration projects as a strategic investment in commercial and

[1] ENERGY STAR is a voluntary program developed by the U.S. Environmental Protection Agency (EPA) to identify and promote energy-efficient products and practices. Version 3.1 provides an updated set of guidelines for builders to construct homes that meet energy efficiency requirements and qualify for various incentives, including the 45L Builder Tax Credit.
[2] While this is open to interpretation, SWEEP would consider luxury amenities such as brick drive-ways, granite countertops, and other aesthetic decisions that drive up cost.
[3] The City of Seattle allows a density bonus for projects with affordable units and/or childcare facilities.
https://clerk.seattle.gov/~CFS/CF_319522.pdf

industrial building types. While industrial emissions in Maricopa County have not historically been the largest category, they will likely grow significantly in the near future due to recent announcements in the semiconductor, battery development, and advanced manufacturing industries.

Local governments can utilize CPRG funds to prepare to reduce current and future industry GHG emissions through strategic energy management and emerging near-term industrial technologies. Please note that the following strategies would likely require coordination with utilities.

Example Projects	Description
Strategic Energy Management SEM	- Strategic Energy Management is a strategy to help the largest electric and gas system users achieve large continuous energy savings over five-year periods or longer.[4] Individual SEM measures include optimization of any systems, including motor, fan, pump, and compressed air systems, that typically account for more than half of electric energy consumption in industrial facilities.
Emerging Near-Term Industrial Technologies and Electrification	- Technology examples include submerged combustion melting, inert anodes for aluminum production, and low-carbon cement and steelmaking. - Industrial electrification can include heat electrification using induction, radiative heating, or advanced heat pumps and replacing thermally-driven processes with electrochemical ones.[5]

3. Improve Outreach and Opportunities for Energy Efficiency Retrofits and Appliance Electrification Projects

Nearly half of Arizona's energy consumption is directly attributable to buildings.[6] Consequently, improvements to the efficiency of the state's new and existing building stock can save money for consumers and businesses, reduce the need for costly new energy infrastructure, increase the reliability of energy supply, and cut pollution and greenhouse gas emissions. Because many homes and commercial buildings standing in 2050 have already been built, energy efficiency retrofits, and appliance electrification projects for existing homes and buildings should be considered a top decarbonization priority.

Local governments can utilize multiple policy levers that would lead to more building retrofit and electrification projects. For instance:

- Align home and building retrofit financial incentives and rebates with those offered through the Home Energy Rebate program.[7]

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[4] "Utility Strategic Energy Management Programs," Southwest Energy Efficiency Project, March 2013, https://www.swenergy.org/directory/utility-strategic-energy-management-programs/

[5] "DOE Industrial Decarbonization Roadmap," https://www.energy.gov/industrial-technologies/doe-industrial-decarbonization-roadmap#:~:text=to%20decarbonization%20efforts.-,Decarbonization%20efforts%20include%3A,driven%20processes%20with%20electrochemical%20ones.

[6] ARizona Energy Consumption by End-Use Sector, 2021, https://www.eia.gov/state/?sid=AZ#tabs-2

[7] https://resilient.az.gov/resiliency-programs/energy-programs/energy-affordability/efficiency-rebates

- Streamline the application process for residents by hiring a dedicated Energy Efficiency Permitting Team specialized in handling energy efficiency home and building retrofit applications, offering pre-approved project design templates for projects, and providing regulated training and outreach.
- Launch an educational, public awareness campaign that educates property owners and managers about the benefits of home and building retrofits while providing steps to participate.

Electric Power Sector

4. Fund Virtual Power Plant Demonstration Projects With Equitable Benefits

Virtual power plants (VPPs) are a type of decentralized energy supply that relies on a network of small energy-producing and energy storage assets – distributed energy resources – instead of the primary centralized power grid. They serve as a viable and affordable option to traditional renewable energy generation projects while including technologies such as Connected Smart Thermostats, Water Heating Controls, Pool Pump Controls, Managed EV Charging, Electric Batteries, and Building Energy Management Systems as key reliability resources. [8]

Businesses can participate in VPPs, and as they become more prolific, it opens up opportunities for both commercial and industrial organizations and residential homes with solar, storage, and electric vehicles to participate. Virtual Power Plant example projects are in states such as California, New York, Massachusetts, North Carolina, Texas, and Indiana. There is room to also strengthen project concepts at the municipal level in partnership with Arizona utilities. Below are two example projects that states and municipalities can consider for VPP projects.

Example Projects	Description
Emergency Load Reduction Projects (ELRP)	- Emergency Load Reduction Projects are designed to pay electricity consumers for energy conservation during grid emergencies.[9] Recently, Tesla has partnered up with Pacific Gas and Electric Company (PG&E) to create the Emergency Load Reduction Program (ELRP) pilot program, which encourages residential customers to become a part of the 'largest distributed battery in the world' to help keep California's energy clean and reliable. Eligible customers with a Tesla Powerwall receive a notification a short time before the grid needs emergency support, which helps reduce the chance of community power outages. Eligible participants are already incentivized by receiving $2 for every additional kWh their Tesla Powerwall provides during an event.[10]

[8] https://pubs.naruc.org/pub/C7DAB2B0-BB3B-30C0-DFB5-EAD56D0A40C6
[9] "Emergency Load Reduction Program," https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/demand-response-dr/emergency-load-reduction-program
[10] https://www.tesla.com/support/energy/virtual-power-plant/pge

Community-Wide Demonstration Projects	- SDG&E launched a VPP Pilot Project in 2022 to strengthen community resilience and electric reliability in the unincorporated community of Shelter Valley in East San Diego County.[11] Over 18 months, the VPP project will investigate how distributed energy resources (DERs) such as smart thermostats, load controllers, and battery energy storage function in real-world conditions and how they can serve as a resource to help balance supply and demand on the grid.
Equity-Based VPP Projects	- In the City of Sacramento, a non-profit affordable housing company launched the "2500R Midtown Project," in which 34 affordable "smart homes" were built with smart devices aimed at reducing energy costs.[12] - Green Mountain Power's McKnight Lane Redevelopment Project aimed to revitalize a struggling mobile home park by allowing low- and middle-income residents to rent smart homes that include solar + storage systems that help the utility manage peak energy demand.[13]

Transportation Sector

Maricopa County benefits significantly from decarbonizing the transportation sector through increased electric vehicle (EV) adoption. Benefits would include:

Improved air quality and public health: Increased EV adoption would help reduce ground-level ozone and emissions of carbon dioxide, sulfur dioxide, carbon monoxide, and particulate matter. These air quality improvements would benefit public health, help mitigate climate change, and help Arizona comply with federal air pollution requirements at lower cost.

A recent SWEEP analysis shows that an EV driven in Maricopa County, _ when compared with a gasoline-fueled vehicle, _ will reduce Volatile Organic Compounds and carbon monoxide emissions by 99%, sulfur dioxide emissions by 93%, nitrogen oxide emissions by 76%, particulate matter emissions (60% for PM2.5 and 45% for PM10).[14] *SWEEP would welcome the opportunity to conduct a similar analysis for the County if it would help the PCAP CPRG application process.*

Reduced consumer fuel costs: The average American household spends $2,000-$3,000 on gasoline yearly. EV drivers can save between $700-$1,400 annually on fuel costs _ money that consumers can direct back into the local economy.[15] Depending on EV adoption rates and gasoline prices, the total economic benefit to Arizona in reduced fuel costs could be between $75 million and

[11] "Shelter Valley Virtual Power Plant Pilot Project," https://www.sdge.com/major-projects/shelter-valley-virtual-power-plant-pilot-project#:~:text=As%20part%20of%20our%20Sustainability,Valley%20in%20East%20San%20Diego

[12] Installed smart devices include a 2.25 kW solar PV system, an 11.7 kWh lithium-ion battery, a smart thermostat, and a smart energy outlet. https://www.nrel.gov/docs/fy24osti/86607.pdf

[13] https://www.cleanegroup.org/initiatives/technical-assistance-fund/featured-installations/mcknight-lane/

[14] Ibid.

[15] "Air Quality and Economic Benefits of Electric Vehicles in Arizona," Mike Salisbury, Southwest Energy Efficiency Project, September 2013: http://www.swenergy.org/data/sites/1/media/documents/publications/documents/AZ%20EV%20AirQuality.EconAnalysis.9.26.13%20.pdf

$489 million per year by 2030.[16] Flagstaff stands to benefit from a portion of these savings.

Significant benefits to the electric grid include assistance with integrating renewable energy. Multiple studies document the many grid benefits of transportation electrification.[17] For instance, EVs can improve the grid's utilization because they can be charged at night (when there is spare capacity) or during the day (when there is excess solar production). Additionally, EVs can put downward pressure on energy rates overall as the energy system costs are recovered over increased sales due to EV charging.

5. Set Ambitious Goals For Municipal EV Adoption In Operations While Expanding Public Charging Infrastructure.

As one of Maricopa County's largest GHG emissions sources, transportation sector decarbonization is paramount for achieving broader climate goals. While decision-makers may not have direct control over consumer vehicle purchases, several goals can be achieved for business operations and incentives to help the public transition to EVs. For example, SWEEP recommends the following:

- Setting a goal for 100% of *new* light-duty city fleet vehicles to be electric by 2025.
- Setting a goal for 75% of new medium- and heavy-duty city fleet vehicle purchases to be electric by 2025.
- Set a goal for 75% of all vehicles in the region to be EVs by 2040.

The following policies and examples are example actions that support ambitious EV adoption goals:

Example Policies and Projects	Description
Low-Income EV Rideshare Programs	- These programs make publicly-owned EV fleets available to qualifying low-income residents to rent on a per-mile basis. Parking is typically free for participants, and cars can be dropped off anywhere, making it easier to access transit hubs or make emergency trips. Affordable Mobility Platform (AMP) is a nationwide community car-sharing program with locations in Oregon, Washington, North Carolina, Missouri, Michigan, Idaho, Nevada, and New Mexico.[18]

[16] Ibid.

[17] For example see: "California Transportation Electrification Assessment: Phase 2: Grid Impacts, ICF International, October 23, 2014, http://www.caletc.com/wp-content/uploads/2016/08/CalETC_TEA_Phase_2_Final_10-23-14.pdf

[18] See Forth Mobility's Community Carsharing, https://forthmobility.org/community-carsharing#:~:text=The%20Affordable%20Mobility%20Platform%20(AMP)%20is%20a%20nationwide%20community%20carsharing,vehicles%20to%20affordable%20housing%20locations.

EV Infrastructure Building Codes	- EV infrastructure building codes[19] require parking in new buildings to include the electrical equipment necessary to enable the easy and low-cost installation of electric vehicle (EV) charging stations.[20] EV-ready building codes address these barriers by requiring new homes and multi-unit dwellings (MUDs) to be built with wiring ready for Level 2 (L2) charging.[21] - EV Building Codes are an important opportunity for incorporating Justice40 Initiatives as well, especially charging infrastructure for multi-family housing.[22]
Streetlight and Right-of-Way Charging	- Decision-makers can make EV charging infrastructure more accessible to all residents through Streetlight and Right-of-Way Charging, which incorporate EV charging into existing infrastructure like streetlights and sidewalks. While cities like Los Angeles[23] and New York[24] have implemented streetlight EV charging. Other cities such as New Orleans, Berkeley, and Sacramento have also explored the concept of sidewalk charging.

Reduce Passenger Vehicle Miles Traveled

Reducing vehicle miles traveled (VMT) emerges as a cornerstone goal in pursuing ambitious greenhouse gas emissions reductions. According to RMI's modeling, the U.S. needs to put 70 million EVs on the road and cut household driving (VMT) by 20% by 2030 to reduce transportation emissions by 45% in line with the Paris Climate Agreement.[25] SWEEP recommends the following policies and strategies to drive deep decarbonization in the Transportation Sector.

Example Policies	Description
Pair Improved Public Transit Routes with Transit-Oriented Development (TOD)	- TOD projects focus on strategically building homes close to high capacity transit and other essential services. Overall, about 80% of the GHG reductions associated with public transit are from land use efficiencies and the walkable, mixed-use development focused around rapid transit. Even residents who do not use the transit system drive fewer miles because trips are shorter and more accessible by foot or bike.[26] - To encourage greater public transit participation by increasing and improving bus frequency and service to historically disadvantaged communities that disproportionately rely on public transit.

[19] EV Ready building codes typically require new building construction to prepare a certain proportion of parking spots for EV charging stations to be installed at a later date.
[20] https://www.swenergy.org/ev-infrastructure-building-codes/
[21] Level 2 Charging requires special equipment to be installed in the home that has the capacity to use 240 volts of power for a faster charging capability when compared to a Level 1.
[22] For more information see: How Leading Utilities are Embracing Electric Vehicles, Mike Salisbury and Will Toor, Southwest Energy Efficiency Project, February 2016, http://www.swenergy.org/data/sites/1/media/documents/publications/documents/How_Leading_Utilities_Are_Embracing_EVs_Feb-2016.pdf
[23] https://bsl.lacity.org/smartcity-ev-charging.html
[24] https://www.smartcitiesdive.com/news/tech-that-turns-light-poles-into-ev-chargers-wins-nyc-climate-award/530111/
[25] "Urban Land Use Reform,"https://rmi.org/insight/urban-land-use-reform/
[26] Transit Cooperative Research Program, 2018, https://nap.nationalacademies.org/read/26103/chapter/2

From:	Matthew Poppen
To:	Elias Toon; Audra Koester Thomas
Cc:	Tim Franquist
Subject:	FW: CPRG Recommendation - Prioritize Food Waste in PCAP
Date:	Friday, October 27, 2023 3:51:03 PM

Passing this along in case you did not receive this.

Matt

From: Niyeti Shah <zfwcoalition@gmail.com>
Sent: Friday, October 27, 2023 2:11 PM
To: Matthew Poppen <MPoppen@azmag.gov>
Subject: CPRG Recommendation - Prioritize Food Waste in PCAP

Dear Executive Office of Arizona ,

We are writing on behalf of the Zero Food Waste Coalition, a coalition of over 100 organizations committed to advancing food loss and waste policy at the federal, state and local level. As your agency prepares to allocate funding through the Climate Pollution Reduction Grants, including developing the associated Priority Climate Action Plan, we urge you to prioritize initiatives aimed at combating food loss and waste (FLW).

FLW is responsible for 6% of all U.S. GHG emissions and nearly 60% of all landfill methane emissions—making landfills the country's third largest source of methane. Beyond these climate impacts, food waste unnecessarily strains our supply chains and drinking water supply by using nearly one-fifth of all freshwater and 16% of our cropland to grow, process, transport, and cool food we then waste.

The order of investments should follow the EPA Wasted Food Scale hierarchy, which ranks pathways of addressing food waste based on environmental preferability and creating a more circular economy. According to this hierarchy, funding can prioritize the highest use of food by making investments in food recovery and compost. These initial investments must come before investments in landfill infrastructure. It is vital that policies and programs established through funding disincentivize least preferred pathways and incentivize most preferred pathways established in the EPA's From Field to Bin Report. Donation and upcycling of foods are the most preferred pathways, so funding should prioritize these goals. To support these pathways and maximize impact, infrastructure investments are needed as well.

By prioritizing actions that keep food out of landfills and incinerators, while also strengthening landfill emission controls, Climate Pollution Reduction Grants can achieve substantial GHG reductions with multiple co-benefits. Policies and programs that disincentivize food from being landfilled or incinerated (such as food donation or recycling mandates) incentivize greater food waste prevention, while new infrastructure (such as food rescue, food hub, or composting facilities) help businesses and communities donate, upcycle, and recycle more of their excess food. These measures additionally support new jobs, help businesses and individuals cut their food purchasing costs, alleviate food insecurity among low-income and disadvantaged communities, and mitigate the longstanding environmental justice impacts of landfills and incinerators on local communities. We are confident that by allocating a portion of the CPRG grants to projects focused on food loss and waste, your agency can take a crucial step in the right direction, promoting environmental sustainability, economic resilience, and social equity.

We would be delighted to offer our expertise, collaborate, or provide further information to assist in the decision-making process. As you draft the Priority Climate Action Plan, **we recommend leveraging the Zero Food Waste Coalition's State Policy Toolkit, which provides examples of policies and actions that can be incorporated into climate action plans to keep food waste out of landfills and reduce associated landfill methane emissions.** Together, we can make a significant impact on the reduction of greenhouse gas emissions and the improvement of our state's overall sustainability.

Thank you for your time and consideration. Please let us know if we can be of help, or answer any questions.

Sincerely,

Niyeti Shah

Zero Food Waste Coalition

zfwcoalition@gmail.com

From:	Matthew Poppen
To:	Elias Toon
Subject:	FW: CPRG Recommendation - Prioritize Food Waste in PCAP
Date:	Monday, November 20, 2023 9:27:44 AM

From: Sophia Adelle <sophia.adelle@farmlinkproject.org>
Sent: Monday, November 20, 2023 9:08 AM
To: Matthew Poppen <MPoppen@azmag.gov>
Subject: CPRG Recommendation - Prioritize Food Waste in PCAP

CAUTION: This is an external email! Please take care when clicking links or opening attachments. When in doubt, contact the IT Department.

Dear Matthew,

We are writing on behalf of The Farmlink Project, **a national organization with a mission to connect surplus produce to communities in need, reduce carbon emissions, and empower the next generation of young changemakers**. The Farmlink Project serves as a "link" connecting the broken supply chains of the agricultural and food access industries in Arizona and across the United States. As your agency prepares to allocate funding through the Climate Pollution Reduction Grants, including developing the associated Priority Climate Action Plan, we urge you to prioritize initiatives aimed at combating food loss and waste (FLW).

FLW is responsible for 6% of all U.S. GHG emissions and nearly 60% of all landfill methane emissions—making landfills the country's third largest source of methane. Beyond these climate impacts, food waste unnecessarily strains our supply chains and drinking water supply by using nearly one-fifth of all freshwater and 16% of our cropland to grow, process, transport, and cool food we then waste. At The Farmlink Project, we are on track to deliver 200 million pounds of food by the end of 2023, the equivalent of 240 million meals, made possible for individuals in food insecure communities across the United States, while reducing over 200,000 metric tons of CO_2e in greenhouse gas emissions.

The order of investments should follow the EPA Wasted Food Scale hierarchy, which ranks pathways of addressing food waste based on environmental preferability and creating a more circular economy. According to this hierarchy, funding can prioritize the highest use of food by making investments in food recovery and compost. These initial investments must come before investments in landfill infrastructure. It is vital that policies and programs established through funding disincentivize least preferred pathways and incentivize most preferred pathways established in the EPA's From Field to Bin Report. Donation and upcycling of foods are the most preferred pathways, so funding should prioritize these goals. To support these pathways and maximize impact, infrastructure investments are needed as well.

By prioritizing actions that keep food out of landfills and incinerators, while also strengthening landfill emission controls, Climate Pollution Reduction Grants can achieve substantial GHG reductions with multiple co-benefits. Policies and programs that disincentivize food from being landfilled or incinerated (such as food donation or recycling mandates) incentivize greater food waste prevention, while new infrastructure (such as food rescue, food hub, or composting facilities) help businesses and communities donate, upcycle, and recycle more of their excess food. These measures additionally support new jobs, help businesses and individuals cut their food purchasing costs, alleviate food insecurity among low-income and disadvantaged communities, and mitigate the longstanding environmental justice impacts of landfills and incinerators on local communities. We are confident that by allocating a portion of the CPRG grants to projects focused on food loss and waste, your agency can take a crucial step in the right direction, promoting environmental sustainability, economic resilience, and social equity.

We would be delighted to offer our expertise, collaborate, or provide further information to assist in the decision-making process. As you draft the Priority Climate Action Plan, we recommend leveraging the Zero Food Waste Coalition's State Policy Toolkit, which provides examples of policies and actions that can be incorporated into climate action plans to keep food waste out of landfills and reduce associated landfill methane emissions. Together, we can make a significant impact on the reduction of greenhouse gas emissions and the improvement of our state's overall sustainability.

Thank you for your time and consideration. We look forward to discussing this important matter further and working together to create a more sustainable future.

Sincerely,
Sophia Adelle

Sophia Adelle
Head of Policy / **The Farmlink Project**
Phone: (651) 271-2130
Email: sophia.adelle@farmlinkproject.org
Website: farmlinkproject.org

February 23, 2024

Elias Toon
Maricopa Association of Governments
302 N. 1st Ave.
Phoenix, AZ 85003

Dear Elias,

Re: Draft Priority Climate Action Plan

On behalf of the Arizona Public Interest Research Group (Arizona PIRG) Education Fund, Plug In America, Sierra Club-Grand Canyon (Arizona) Chapter, Southwest Energy Efficiency Project (SWEEP), and Western Resource Advocates, we write to offer input on the *Maricopa Association of Governments Draft Maricopa-Pinal County Region Priority Climate Action Plan* (PCAP).

Our comments stem from the transportation electrification recommendations provided to you in a January 15, 2024 letter (see attached) submitted by our organizations and 25 other entities representing business, community, consumer, energy, environmental, faith, public health, senior citizen, and veterans' interests.

We appreciate the comprehensive and hard work that has been conducted to incorporate measures and specific data from various sectors into the PCAP. We also recognize and appreciate the mention of existing Climate Action Plans in the region and the many and various opportunities for members of the public to engage in this process (in English or Spanish) – whether in-person or virtually - as noted on page 4 of the PCAP.

Introduction

Our comments aim to provide feedback related to how the Maricopa-Pinal County Region's proposed transportation measures will perform in respect to the EPA's scoring criteria for the Climate Pollution Reduction Grant (CPRG). Because the CPRG process does not limit what is put into the PCAP, we are not advocating for any new items to be added to the PCAP or for any existing items to be taken out. Rather, this commentary is given with an eye to the implementation grant proposal due April 1st, 2024, and is meant to address which measures in the draft PCAP are most likely to be awarded grants, given the EPA's scoring criteria. The intent is to help the Maricopa-Pinal County Region submit an implementation grant proposal on April 1st, 2024, that stands the highest chance of being awarded.

Please note that we see the value in each transportation measure listed in this PCAP. Our feedback should not be interpreted to say we do not support a specific measure but rather that it may not fare as well regarding the specific scoring criteria laid out by EPA.

Background on our Approach to Feedback

The organizations submitting these comments have spent significant time reviewing the EPA guidance on Implementation Grants, particularly the sections about the CPRG goals that EPA is looking for projects to meet, and the more specific and detailed evaluation criteria that the EPA will use to pick the applicants who win grants. While some components of who wins the grants will come down to the quality of the application that is put together and are not directly tied to which program is selected, we noticed several of EPA's evaluation criteria will pertain to which programs are included in the implementation grants. The guidance highlights several criteria as key for picking winning projects in several places in the guidance, including in the "Program Goals and Objectives" section and the Evaluation Criteria Rubric. We highlighted those "program specific indicators" that appear to be most important to consider when selecting which programs to include in the implementation grant including:

- Community Benefits (25 points)
- 2025-2030 GHG Reductions (20 points)
- Cost Effectiveness, Program Dollars per Unit of Emissions Reduced (15 points)
- Transformative Impact (15 points)
- Funding Need (10 points)
- 2030-2050 Emission Reductions (10 points)
- Job Quality (5 points)

The programs that we are advocating for the Maricopa-Pinal County Region to prioritize consider which projects are likely to score highest along these rubrics in order to secure the desired federal dollars.

Feedback on Priority Transportation Sector Measures

Our high-level comments are based on the information provided in the PCAP. One critical component that seems to be missing is the estimated budget for each program, which will inform which funding tier is sought and make it easier for EPA to assess the cost-effectiveness of each measure.

As pages 7 and 8 of the PCAP note, mobile combustion is the largest source of greenhouse gas emissions in the Maricopa-Pinal County Region. In this section, we encourage you to note the significant air quality and subsequent public health and economic problems due to the region's current transportation system and its disproportionate impacts on low-income households and people of color.

Measure 1. Public Fleet Electrification and Publicly Available Charging Infrastructure Development

a. Transitioning Public Fleets. As you are aware, this measure can be highly effective in achieving near-term emission reductions due to the relative ease of fleet purchasing decisions. If large public fleets commit to purchasing zero emission vehicles (ZEVs), the emission reductions and associated benefits can be immediately and significantly impactful, which is likely to lead this measure to be competitive when evaluated by EPA criteria. We wholeheartedly support this strong measure and encourage the Maricopa-Pinal County Region to seek an implementation grant to support this measure.

   As stated in our previous letter, the Maricopa Association of Government's (MAG's) *Regional Electrification Readiness Strategic Plan* offers a strong case for regional electrification. We encourage the PCAP to emphasize the commitment of the MAG region alongside the challenge of financial resources.

   Additionally, the Arizona PIRG Education Fund and Frontier Group's report *Electric Fleets for Arizona* makes the specific case for municipalities in the MAG region to replace retiring light-duty cars and trucks with electric vehicles (EVs). The report documents the air quality, energy, and taxpayer benefits of 10 of Arizona's largest municipalities (nine in Maricopa County) replacing retiring light-duty vehicles with EVs over the next decade.

Key findings include: reduction of over 144,000 short tons of greenhouse gas emissions and nearly $80 million in taxpayer savings.[1] The organization's subsequent report *Electric Vehicles Save Money for Government Fleets* documents the emission reductions and taxpayer savings for Arizona and its local governments. Key findings include: reduction of greenhouse gas emissions by 462,000 short tons (the same amount as produced by driving more than 1 billion miles in a typical car) and nearly $283 million in taxpayer savings.[2] We encourage you to highlight this additional data in the PCAP.

Further, the Arizona PIRG Education Fund and Frontier Group's report *Electric Buses: Clean Transportation for Healthier Neighborhoods and Cleaner Air* documents that replacing all of the U.S. school buses with electric buses could avoid an average of 5.3 million tons of greenhouse gas emissions each year and replacing all of the diesel-powered transit buses with electric buses in the U.S. could save more than 2 million tons of greenhouse gas emissions each year.[3] We think it is helpful to note that Valley Metro and school districts in the region are committing to and/or exploring options to transition to electric buses to reduce greenhouse gas emissions and save taxpayers money. The biggest obstacle we have heard from school districts is the need for funding to make up the differential cost of purchasing an electric bus.

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[1] Tony Dutzik, Frontier Group and Diane E. Brown, Arizona PIRG Education Fund, Electric Fleets for Arizona: Saving taxpayers money through municipal fleet electrification, Fall 2022, pages 4-5, available at https://pirg. org/arizona/edfund/resources/electric-fleets-forarizona/

[2] Tony Dutzik, Frontier Group and Diane E. Brown, Arizona PIRG Education Fund, Electric Vehicles Save Money for Government Fleets: Billions of Dollars in Savings Possible for State and Local Governments, June 2023, pages 29-31, available at https://publicinterestnetwork.org/wp-content/uploads/2023/06/Electric-Fleets-Report-6-27-23.pdf

[3] Alana Miller and Hye-Jin Kim, Frontier Group and Jeffrey Robinson and Matthew Casale, PIRG Education Fund, Electric Buses: Clean Transportation for Healthier Neighborhoods and Cleaner Air, May 2018, page 2, available at https://pirg.org/wp-content/uploads/2018/06/Electric-Bus-Report-5-18.pdf

b. Public Charging. This measure will help fill a much-needed gap for charging infrastructure that exists in Maricopa-Pinal County - a gap that consistently is raised as a top concern in transportation electrification discussions in the MAG region. The Maricopa-Pinal County Region should focus not just on highway fast charging—but also incentives for fleet, workplace, multifamily and destination charging. Fast charging is critical but providing access to reliable Level 2 charging is also an important component of a robust EV charging network. For all these reasons, we find this measure scores well on key criteria laid out by EPA to reduce near term emissions, be cost-effective, and achieve community benefits.

The Implementation Schedule and Milestones chart on page 13 would benefit from adding an evaluative component in years 2-5.

Measure 2. Zero Emissions Vehicle Incentives (Residential and Commercial Fleets)

As is mentioned in the "transitioning public fleets" section, incentives to help purchase ZEVs is a great way to achieve near-term emission reductions in line with the EPA guidance. This, too, is a strong measure we wholeheartedly support and encourage the Maricopa-Pinal County Region to seek an implementation grant to support this measure.

Since the process for purchasing vehicles varies depending on whether it is a resident or a commercial fleet buyer, an important component of the program should include the differentiation of budgets.

The estimated CO2 emissions reduction for this program is much lower than the "public fleet electrification and public available charging infrastructure" program. In other state PCAPs, the ZEV incentive programs tend to have the highest emissions reduction benefit; therefore, this low estimate seems notable and we respectfully ask you to revisit the data.

The Implementation Schedule and Milestones chart on page 15 would benefit from adding an evaluative component in years 2-5. Additionally, we think it is important to directly state education and outreach in year 1 and subsequent years — both to determine neighborhoods and to promote local opportunities.

Measure 3. Active Transportation Network Infrastructure Investments

This proposal provides many co-benefits for local communities; however, the greenhouse gas (GHG) reduction figures provided in this area are small. While we support the Active Transportation proposal, given the CPRG funding priority on near-term emissions reductions, it seems unlikely to fare well on the EPA Implementation Grant scoring criteria.

The Implementation Schedule and Milestones chart on page 17 would benefit from adding an evaluative component in years 2-5. Additionally, we are not confident that the construction phase can be completed in year 2 and think it is worth including construction in year 3. We also think it is important to directly state education and outreach in year 1 and subsequent years — both to determine site selection (which hopefully can align with public transit) and to promote local opportunities.

Measure 4. Electrification of Commercial and Government-Owned Lawn and Garden Equipment

This proposal can offset equipment that is known to have an outsized role in pollution and fare well on cost-effectiveness per unit of GHG reductions. Given the well-established *Maricopa County's Mowing Down Pollution Program,* we would encourage citing the pollution already reduced through this Program and how the Program is well-situated for expansion.

Further, we encourage you to incorporate research conducted by the Arizona PIRG Education Fund and the Frontier Group as part of its recent report *Lawn Care Goes Electric*, which found that gasoline-powered lawn and garden equipment in Maricopa County in 2020 (latest data available) emitted over 233,000 tons of carbon dioxide emissions, the equivalent of over 51,000 cars. In addition to carbon dioxide, the pollutants emitted by gasoline-powered lawn equipment include fine particulates, ozone-forming nitrogen oxides (NOx), and volatile organic compounds (VOCs).

The Implementation Schedule and Milestones chart on page 18 would benefit from adding an evaluative component in years 2-5. The Metrics for Tracking Progress would benefit from adding a breakdown of what types of lawn equipment were switched to electric.

In closing, we appreciate the opportunity to provide input on the PCAP and the work conducted to date by the Maricopa-Pinal County Region. We look forward to continued engagement as you finalize the PCAP and work to secure an implementation grant.

Please contact Diane E. Brown, dbrown@arizonapirg.org or (602)318-2779 (c), if you have any questions or wish to arrange a meeting with the signers listed below.

Thank you for your consideration of our comments.

Sincerely,

Arizona Public Interest Research Group (Arizona PIRG) Education Fund
Diane E. Brown, Executive Director

Plug In America
Alexia Melendez Martineau, Policy Manager

Sierra Club - Grand Canyon (Arizona) Chapter
Sandy Bahr, Director

Southwest Energy Efficiency Project (SWEEP)
Caryn Potter, Arizona Representative

Western Resource Advocates
Aaron Kressig, Transportation Electrification Manager