City of Albuquerque

ONE ALBUQUERQUE sustainability

ALBUQUERQUE METROPOLITAN STATISTICAL AREA

PRIORITY CLIMATE ACTION PLAN 2024

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LETTER FROM MAYOR KELLER

For the last several years, Albuquerque has seen hotter than average summers, prolonged drought, and severe wildland fires that impact air and water quality. These are the effects of a changing climate. To combat this new normal, the City is making a One Albuquerque effort to reduce climate pollution, increase resiliency, and improve quality of life for the families who call Albuquerque home.

One such action is the Climate Pollution Reduction Grant (CPRG). In 2023, the City of Albuquerque was awarded Phase 1 of the CPRG. This initial funding enables the City to leverage our history of sustainability and community engagement work to create a comprehensive Climate Action Plan for the Albuquerque Metropolitan Statistical Area (MSA). Funded through the U.S. Environmental Protection Agency (EPA), this program seeks to address the needs of frontline communities and ensure significant climate pollution reduction that does not leave anyone behind.

CPRG gives us the opportunity to collaborate with community partners, pueblos and other tribes, and state, regional, and local governments to find creative solutions to make continuous progress towards our collective sustainability goals. During the 4-year timeframe of the planning grant, the City will:

- ✓ Hire a full time CPRG Manager.
- ✓ Execute two contracts for environmental and public engagement consultants.
- ✓ Submit the Priority Climate Action Plan.
- ✓ Hold public meetings to promote community engagement and feedback.
- ✓ Complete a new greenhouse gas inventory that includes the entire MSA.
- ✓ Submit the Comprehensive Climate Action Plan.
- ✓ Track and report progress to the EPA.

Fighting climate change is an ever-evolving landscape, and we recognize that our goals cannot be achieved alone. The City of Albuquerque is happy to facilitate this important work in our MSA and bring partners together to carry out the mission. We bring institutional knowledge and an impressive track record of nationally and internationally recognized climate action and are ready to bring everyone on board. My hope is that you feel connected and informed about the sustainability work of your local government, and see what is possible for institutions to accomplish with the support of the community. We are grateful to the EPA, our grant partners, and members of our community who will be a crucial part of the planning process and the engagement sessions to follow – your input has been, and will continue to be essential. We look forward to the work to come as we continue to make this a safe, resilient place for families to thrive.

Timothy Keller

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

Issues of climate and sustainability are central to the livelihoods of all Americans, and urban centers have a vital role to play in addressing the climate crisis. To effectively adapt and mitigate the changes we are already seeing, governments, industry, and community members recognize the need for coordinated planning that center the needs of frontline communities—those who are affected "first and worst" by the climate crisis. This Priority Climate Action Plan (PCAP) is the first step in a multi-year initiative towards transformative planning for the **Albuquerque Metropolitan Statistical Area (MSA) - which includes the City of Albuquerque and Bernalillo, Sandoval, Torrance, and Valencia County.** Funded and directed by the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) Planning Program, this report sets out to identify an initial list of high-priority, near-term, regional projects that both tackle climate pollution and benefit the needs of frontline communities.1

This Albuquerque MSA PCAP builds off of the important work done in the City of Albuquerque's 2021 Climate Action Plan (CAP),[2] the 2020 Greenhouse Gas (GHG) Inventory,[3] Albuquerque Justice 40 Oversight Coordinating Committee (J40 OCC),[4] the Single Space Strategies Draft CPRG Plan[5] and CPRG Working Group[6] engagement to present an initial list of regional near-term measures to address climate pollution to assist our frontline communities. Guided by the EPA's priorities, this PCAP is organized into the following sections:

- **Introduction**
- **Frontline Community Analysis**
- **Greenhouse Gas Inventory**
- **Community Priorities & Projects by Sector**
- **Conclusion**
- **Appendices**

[1] EPA uses the term Low-Income Disadvantaged Community (LIDAC) instead of frontline community. In this document, those terms are used interchangeably. The City of Albuquerque understands that these terms do not have the same meaning to all communities. To honor past community engagement, this report will use the term frontline communities in lieu of the term LIDAC.
[2] "2021 Climate Action Plan," City of Albuquerque, 2021,
https://www.cabq.gov/sustainability/documents/2021-climate-action-plan.pdf.
[3] "Greenhouse Gas Inventory," City of Albuquerque, 2020,
https://www.cabq.gov/sustainability/documents/city-of-albuquerque-ghg-inventory-3.pdf.
[4] The Albuquerque J40 OCC is a committee of legacy environmental justice leaders who provide guidance, support, and feedback to City staff to ensure Justice40 criteria are being met.
[5] City of Albuquerque Climate Pollution Reduction Grant Draft Implementation Plan," Single Space Strategies. October 31, 2023.
https://www.cabq.gov/sustainability/documents/msa-cprg-draft-pcap-plan_singlespacestrategies.pdf
[6] The CPRG Working Group consists of government staff across the City and the Counties, who have been actively working to identify and implement projects that meet the CPRG criteria.

This document introduces measures submitted to the City of Albuquerque in five main categories that are quickly implementable and work in concert to provide regional greenhouse gas reductions and community benefits. The categories and list of measures are provided in the table on the next page.

OVERVIEW OF MEASURES IN THIS PCAP

STRATEGY	IMPLEMENTATION ACTIONS
Sustainable Buildings (SB)	SB1: Community Energy Efficiency SB2: Multi-Family Decarbonization SB3: Community Center Efficiency & Education SB4: Los Poblanos Open Space
Renewable Energy (RE)	RE1: College Solar Canopies
Clean Transportation (CT)	CT1: Transit-Oriented Development CT2: Bicycle Safety Corridors CT3: Multimodal Rail Trail CT4: Juan Tabo Connectivity Trail CT5: Transit Electric Vehicles CT6: Municipal Fleet Electrification CT7: College Fleet Electrification CT8: Aviation Shuttle Electrification CT9: Electrification of Parks Equipment CT10: Balloon Fiesta Park Electrification CT11: Golf Cart Electrification CT12: DC Fast Chargers CT13: College Public Charging

STRATEGY	IMPLEMENTATION ACTIONS
Waste and Recycling (WR)	WR1: Food Waste Prevention & Composting WR2: Tribal Landfill Diversion WR3: Municipal Green Waste
Climate Conscious Neighborhoods (CN)	CN1: County Green Stormwater Infrastructure CN2: City Green Stormwater Infrastructure CN3: Tree Plantings Inventory

These measures include policy actions and projects that meet one or more of the CPRG criteria and are considered implementation ready. After the identification of these projects, major efforts were undertaken to gather community input in the face of time constraints. These included the issuance of a community survey (in english and spanish), over 29 public meetings, and over 50 stakeholder conversations (see Appendix C for more information).

The process of developing this report clearly highlighted further work needs to be done to break down silos between government, industry, and community. The next steps in this CPRG program is developing a Comprehensive Climate Action Plan (CCAP) that seeks to directly tackle this issue and ensure coordinated climate action towards the most acute needs of our frontline communities.

Interested in the forthcoming CCAP? Visit cabq.gov/cprg for updates and opportunities to get involved.

INTRODUCTION

The Albuquerque Metro Statistical Area (MSA) is more than just the vibrant metropolitan of Albuquerque and is more than just the complex tapestry of people and cultures that call it home. It is more than the three mountain ranges surrounding it and more than the life-giving waters of the Rio Grande that flows through it. The Albuquerque MSA is the heartbeat of the state. Containing more than half of New Mexico's population, it is our transportation, economic, and innovation center. Over the last century, it has grown from a series of farms and Puebloan communities to be the state's industrial driver and change maker. Importantly, the Albuquerque MSA, in all that time, has never lost its connection to place. Rooted by the strong traditions of its indigenous people and Hispano communities, the Albuquerque MSA is a place that looks to the lands and to its past for ways to address its rapidly changing future.

Made of four counties: Bernalillo, Sandoval, Torrance, and Valencia County, the Albuquerque MSA is rich in diversity in its geology, environment, and people. Rapid climate change and its varied and unpredictable effects have already started to directly endanger this precious fabric. Historically underserved by federal investment, New Mexico has for many years had to develop its own degree of self-reliance, developing interconnections shared by all residents who are now being threatened by the current climate and ecological crises. While calls for climate action are global and resounding, there is also a great need to refine action to the local contexts of place and history, with the recognition that not all communities are impacted equally.

Greenhouse gas emissions and climate change have dramatic impacts on everyone. Even modest temperature changes have led to dire results. Already, we have experienced a significant increase in wildfires, leading to respiratory health effects. Climate change can also lead to food insecurity, water quality disruptions, allergies, and disease spread. Rising temperatures, extreme rainfall events, and drought have significant health effects that reverberate through communities but have the greatest impact on frontline communities – communities that will be impacted "first and worst" by the effects of climate change.[7]

Critical to any process to address climate change is the work of uplifting the voices and experiences of those residents who continue to be impacted by disparities in energy burdens, health outcomes, and accessibility, among other challenges. These continued disparities require that the Climate Pollution Reduction Grant (CPRG) program center the experiences of Albuquerque's frontline communities. New Mexico's indigenous peoples, Hispano communities, other communities of color, as well as communities of low-income and other groups, face greater exposure to ongoing and legacy pollution. They bear the brunt of climate hazards, and with limited means to respond, they often become trapped in cycles of debt and suffering.

Vital to Albuquerque MSA's future is understanding and investing in centering these voices in designing and implementing resilient systems. Changes in infrastructure, innovation, supply chains, housing, and more will be necessary to meet this goal. Siloed work will not be effective, and while understanding climate change is complex and interdisciplinary and working in collaboration with the community is not easy, it is necessary. It is the work we must take up to ensure the creation of enduring equitable institutional resiliency and knowledge that will benefit the whole of the Albuquerque MSA.

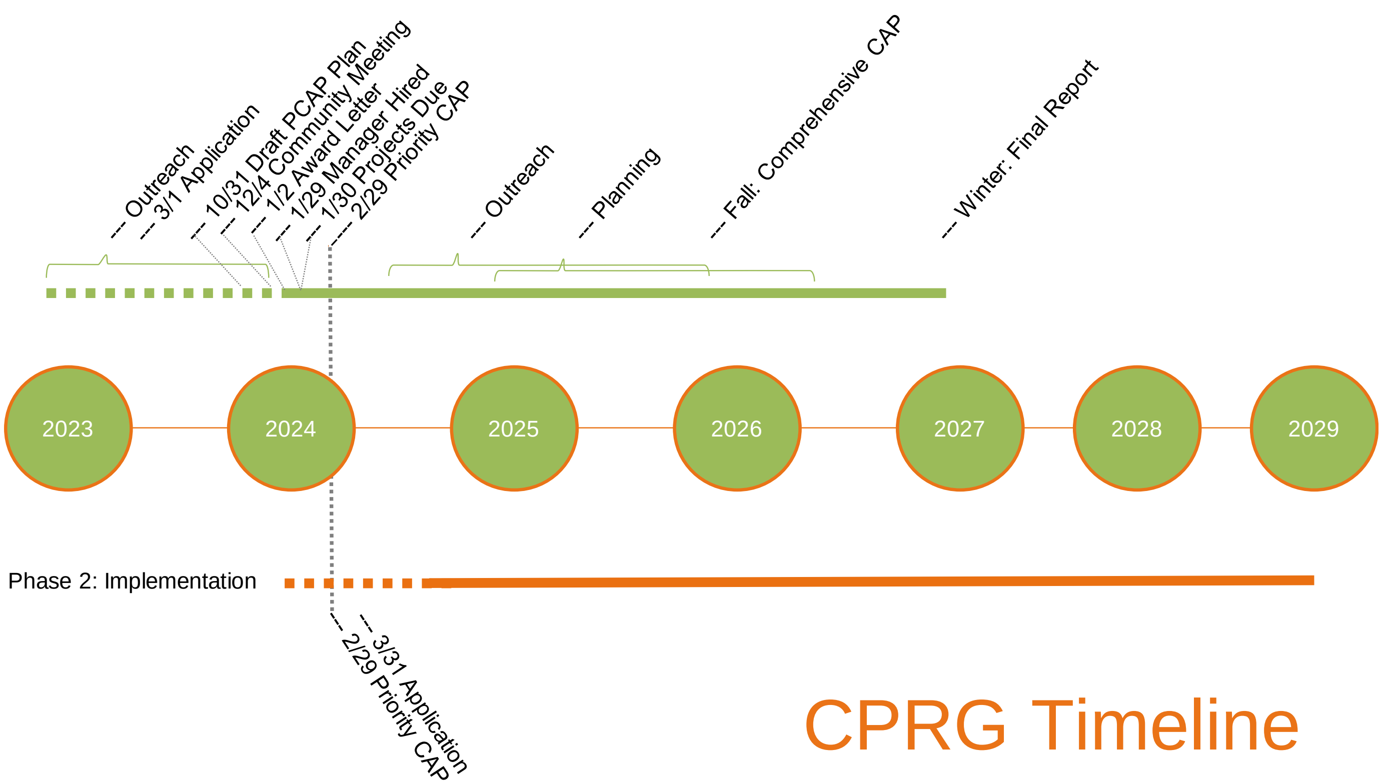
[7] EPA uses the term Low-Income Disadvantaged Community (LIDAC) instead of frontline community. In this document, those terms are used interchangeably. The City of Albuquerque understands that these terms do not have the same meaning to all communities. To honor past community engagement, this report will use the term frontline communities in lieu of the term LIDAC.

ABOUT THE PRIORITY CLIMATE ACTION PLAN

This Priority Climate Action Plan (PCAP) represents the first steps to multi-jurisdictional planning that centers the needs of frontline communities. Designed under the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) Planning Program,[8] this initial report marks the start to a multi-year process seeking to shift the ways regulatory bodies, industry, and community collaborate, plan for, and build a resilient future for all.

Led by the City of Albuquerque, this CPRG Planning Program will fund the following initiatives over a four-year period for the entire Albuquerque Metro Statistical Area (MSA).

- 2024: Complete a region-wide PCAP
- 2024: Complete a region-wide greenhouse gas inventory
- 2026: Publish a community-driven Comprehensive Climate Action Plan (CCAP)
- 2027: Submit a status report to EPA



[8] "About CPRG Planning Program Information" U.S. Environmental Protection Agency, last updated on February 20, 2024, https://www.epa.gov/inflation-reduction-act/about-cprg-planning-grant-information.

The purpose of this PCAP is two-fold. First, it lays the foundation for the core deliverable in this initiative, the CCAP. It does so by necessitating early stakeholder engagement and by providing time for agencies to identify and build capacity for meaningful community involvement. Second, the PCAP identifies a list of implementation-ready projects that may qualify for a second funding opportunity under the CPRG Implementation Program.[9] This secondary funding opportunity seeks to fund projects that:

- Have direct benefit to frontline communities,
- Have immediate, substantial, and long-lasting climate pollution reductions, and
- Are implementation-ready.

DID YOU KNOW?

Both the State of New Mexico and City of Albuquerque have a Justice40 Oversight and Coordinating Committee and the City was the first city in the nation to embrace the initiative.

The criteria listed above is a direct result of the Biden Administration's commitment of centering equity in policies and federal funding and is supported by the Justice40 Initiative, a "whole-of-government" approach to directing at least 40 percent of the benefits from a variety of federal funds to frontline communities. This, combined with the growing desire to accelerate the energy transition in advance of the presidential election, has resulted in a momentous opportunity to access federal funds for community-based climate action. The CPRG Planning and Implementation Programs seek to prioritize climate pollution reduction efforts that work to address environmental injustice and empower community-driven solutions in frontline communities. Collaboration with and direction from frontline communities need to be and remain central to shaping multi-jurisdictional plans.

To ensure this PCAP is framed for community-based climate action, this document begins with a preliminary analysis of the MSA's frontline communities and an overview of the MSA's best data on greenhouse gas emissions (GHGe).[10] Proceeding sections provide sector-specific context for the region and the MSA's best data on community priorities[11] to set the stage for the projects submitted by multiple entities for inclusion in this PCAP. The conclusion offers an overarching assessment of where the CPRG criteria meet regional needs and priorities and identifies next steps. Finally, acronyms and definitions are listed in Appendix A, Appendix B acknowledges the many people who contributed to the foundational documents, Appendix C details a comprehensive community engagement roadmap and resource list, Appendix D contains a summary table of all submitted government projects, and Appendix E provides full project descriptions of the measures for consideration, including measure-specific community feedback, frontline community benefits, and authority to implement.

[9] "Climate Pollution Reduction Grants Program: Implementation Grants General Competition" U.S. Environmental Protection Agency, last updated on January 16, 2024, https://epa.gov/system/files/documents/2024-01/cprg-general-competition-correction.pdf.

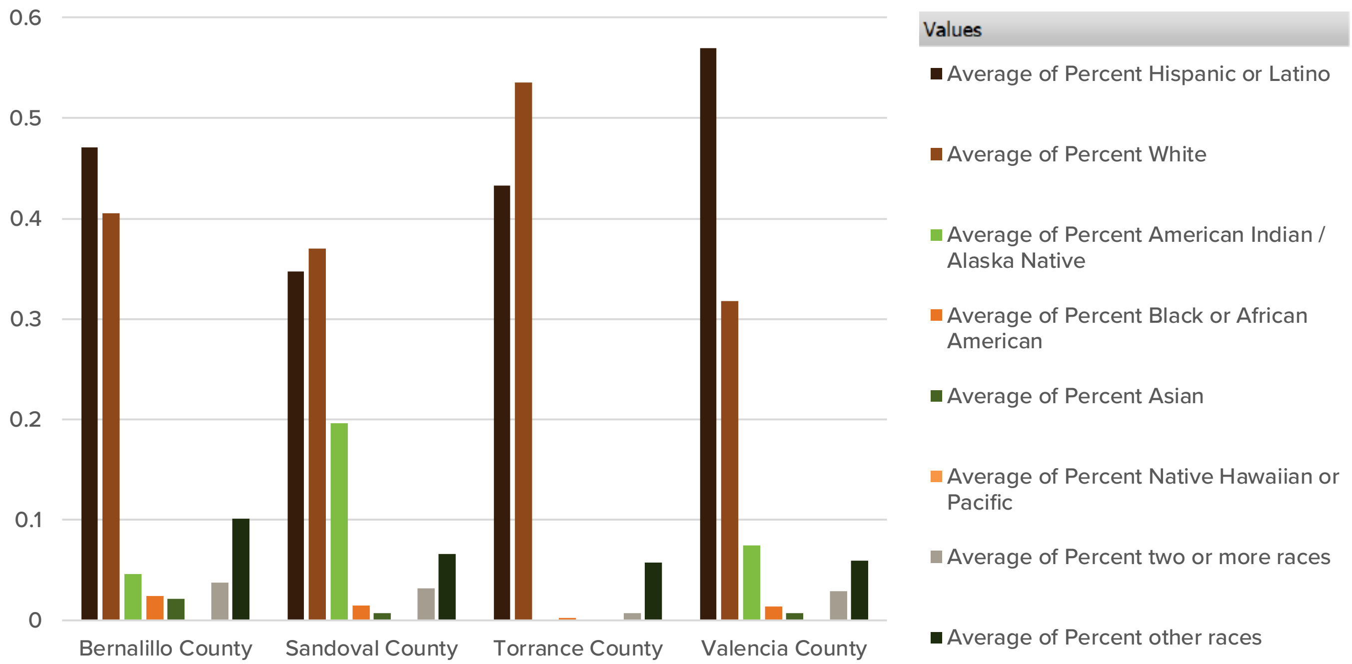
[10] The best data on the MSA's GHG emissions is the 2020 Albuquerque Greenhouse Gas Inventory which uses data from 2008-2017. The City of Albuquerque is actively working on a contract to conduct an MSA-side GHG Inventory which will inform the forthcoming CCAP.

[11] The best data on the priorities and needs of frontline communities.

FRONTLINE COMMUNITY ANALYSIS

CLIMATE RISKS & PRIORITY CENSUS TRACTS

The Albuquerque MSA is composed of highly diverse communities that experience significant climate impacts and risks. As a region where nearly half of the communities in the region are considered at-risk communities, it is even more important to focus efforts to mitigate climate change, reduce financial burdens and health risks, and provide additional benefits to the people and environment in frontline community tracts[12] in the Albuquerque MSA.



[12] EPA uses the term Low-Income Disadvantaged Community (LIDAC) instead of frontline community. For the purposes of this analysis, the term frontline community tract refers to the EPA's LIDAC census tracts that are identified as priority census tracts based on criteria used in the Climate and Economic Justice Screening Tool (https://screeningtool.geoplatform.gov/en/#6.89/34.546/-106.669) and used in the Environmental Justice Screening and Mapping Tool (https://www.epa.gov/ejscreen).

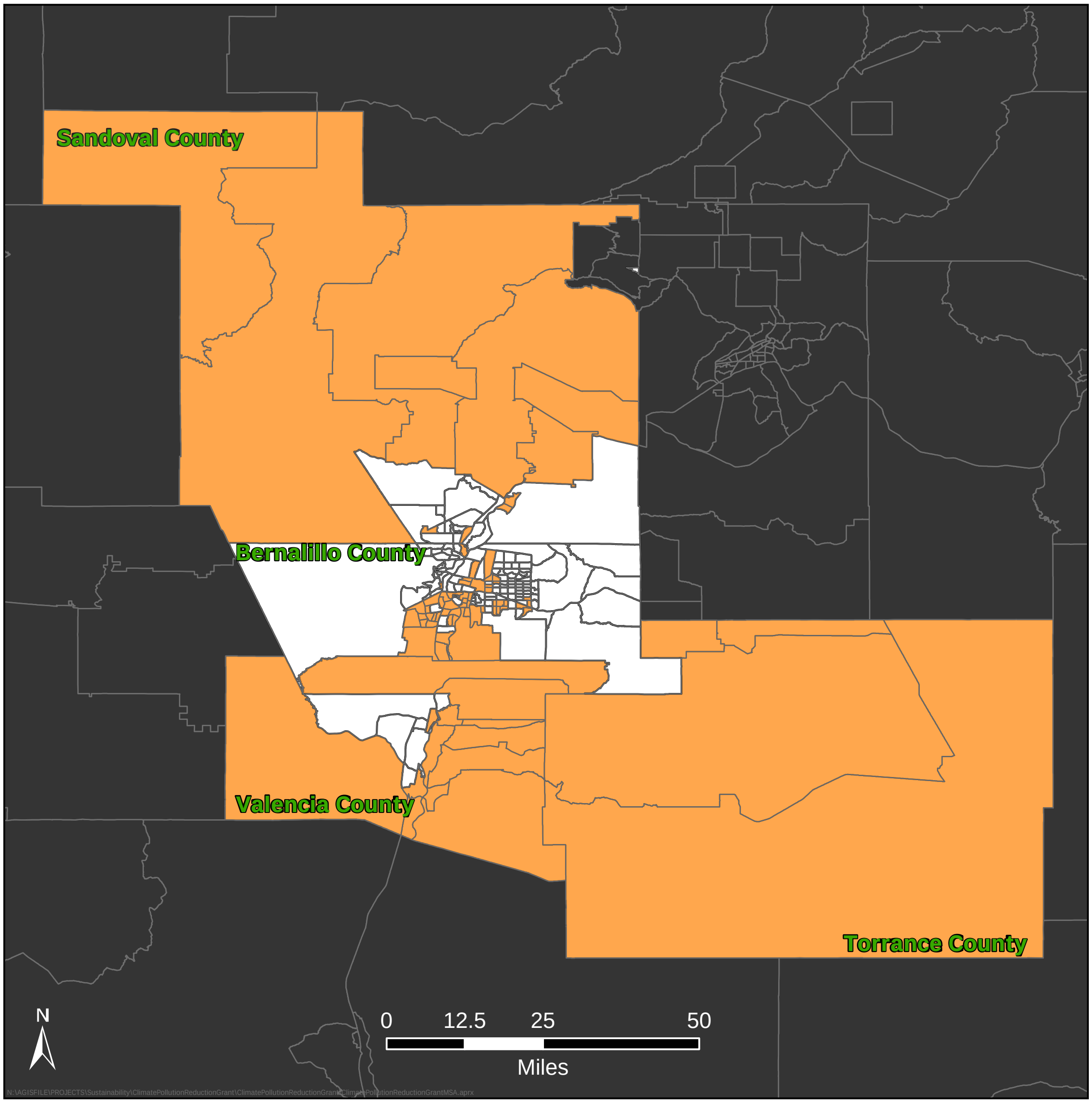
The Albuquerque MSA consists of 202 census tracts that cover an area of 9,950 square miles, includes four counties (Bernalillo, Sandoval, Valencia, and Torrance), and is home to a population 108, 650 people based on 2022 census data. Of the 202 census tracts, 40% or 80[13] tracts are identified as frontline community tracts based on the combined layer EPA created using both the Climate and Economic Justice Screening Tool (CEJST) and Environmental Justice Screening and Mapping Tool (EJScreen) tools. The 80 frontline community tracts are dispersed across the four counties with the largest number of tracts in the most densely populated portion of the area, Bernalillo County. The breakdown of frontline community tracts by county is as follows: 53 in Bernalillo County, 12 in Valencia County, 11 in Sandoval County, and 4 in Torrance County (see map on next page).

To better understand frontline communities in the Albuquerque MSA, here are some of the major risks and challenges people in these areas face:

- 78 tracts exceed the federal poverty level 200 threshold.
- 68 tracts have low high school education and a low percentage of higher ed students.
- 48 tracts climate change disadvantaged.
- 38 tracts training and workforce development disadvantaged.
- 37 tracts have a greater than or equal to the 90th percentile for share of properties at risk for fire in 30 years.
- 34 tracts have greater than or equal to the 90th percentile for diesel particulate matter.
- 31 tracts are greater than or equal to the 90th percentile for expected agricultural loss.
- 31 tracts clean transit disadvantaged.
- 29 tracts affordable and sustainable housing disadvantaged.
- 26 tracts have greater than or equal to the 90th percentile for homes without indoor plumbing or a kitchen.
- 26 tracts have greater than or equal to the 90th percentile for proximity to superfund sites

[13] The tract numbers for all 80 LIDAC tracts in the Albuquerque MSA are: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200, 35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004602, 35001004604, 35001004712, 35001004713, 35001004715, 35001004716, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, 35001004749, 35001940700, 35043010503, 35043010713, 35043010716, 35043010900, 35043011000, 35043011200, 35043940200, 35043940500, 35043940600, 35043940700, 35043940900, 35057963201, 35057963202, 35057963600, 35057963700, 35061940300, 35061970101, 35061970102, 35061970301, 35061970302, 35061970303, 35061970401, 35061970901, 35061970902, 35061971000, 35061971100, 35061971300. The list and details on these tracts are available at cabq.gov/cprg.

Albuquerque Statistical Area



Frontline Communities in the Albuquerque Metro Statistical Area

Using Justice40 Tract Data

AGISRMS
2/27/2024

FRONTLINE COMMMUNITY ENGAGEMENT

To improve how frontline communities in the MSA benefit from the policies and climate actions that shape their home, the City of Albuquerque utilized several methods to better understand their needs in face of severe time constraints.[14] The summary of project submission and community engagement are as follows:

- August 10, 2023: Single Space Strategies begin CPRG Working Group[15] meetings
- October 2023: CPRG becomes an ongoing agenda item for the Albuquerque J40 OCC,
- December 2023: Invitation to participate shared through the Mid-Region Council of Governments' (MR-COG) network,
- December 1, 2023: Initial draft of Priority Climate Actions List posted,
- December 4, 2023: PCAP Public Comment Meeting (hybrid), in collaboration with J40 OCC
- January, 2024: 8 additional community meetings held for late project submissions

As depicted above, the community input was solicited using traditional methods, beginning with the selection and submission of government and industry-led projects and various rounds of community engagement after the fact. While this technique was favorable due to time restrictions and the requirements of the Implementation Program,[16] it does not incorporate best practices for community involvement, collaboration, or ownership. To alleviate this gap, additional methods were incorporated to better reflect the needs and views of frontline communities in the Albuquerque MSA. These include:

- A request for community-driven projects, shared by the J40 OCC to community organizers,
- The inclusion of the 2021 CAP Task Force recommendations[17] in each section topic,
- The inclusion of the Albuquerque J40 OCC recommendations in the conclusion, and
- A renewed commitment to improve community involvement in the forthcoming CCAP

For a more detailed description of past and planned community engagement, see Appendix C.

[14] CABQ was not issued an award letter for the CPRG Planning Program until January 2, 2024.
[15] The CPRG Working Group consists of government staff across the City and the Counties, who have been actively working to identify and implement projects that meet the CPRG criteria.
[16] The CPRG Implementation Program necessitates that projects in the application must be government-led and "implementation-ready". This resulted in the assumption that projects had to be at least in initial planning stages to be considered for funding.
[17] The 2021 CAP Task Force recommendations are the result of several months of community-centered engagement sessions for the City of Albuquerque. While these views do not necessarily reflect the perspectives and needs of all frontline communities across the MSA, it is the direct recommendations from Albuquerque-based frontline community members and represents the best information available until more comprehensive engagement can be done.

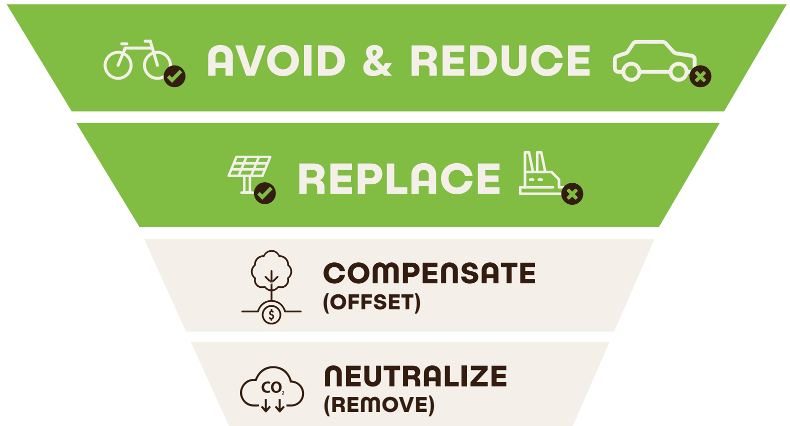
The results of these efforts included seven projects submitted by community organizations. These include:

- Example 1: Reduce the energy burden in low income households and communities for color in the historic communities of color neighborhoods in the City of Albuquerque through housing rehabilitation and energy efficiency programs and energy audits.
- Example 2: Restore, enhance, and plant more urban tree canopies in the historic neighborhoods of the City of Albuquerque.
- Example 3: Create more green spaces in key working class people of color neighborhoods like Santa Barbara Martineztown Neighborhood at 1100 Woodward NE.
- Example 4: Energy audits and energy efficiency upgrades to community centers and Senior centers in: Herman Sanchez Community Center, Jack Candelaria Community Center, Dennis Chavez Community Center, John Marshall Multipurpose Center, Barelas Community Center, and Barelas Senior Center, Santa Barbara Community Meeting Room
- Example 5: Creating job training programs at historic neighborhood community centers and highschools for energy audits (Albuquerque High School, Herman Sanchez Community Center).
- Example 6: Building a 1MW microgrid and creating the foundation of good quality jobs in the renewable energy sector.
- Example 7: Building 15 MW array and creating the foundation of good quality jobs in the renewable energy sector.

GREENHOUSE GAS INVENTORY

Tracking greenhouse gas (GHG) data is vital for any effective climate change strategy. To gain our best estimate of GHGe in the Albuquerque MSA, this plan builds off of the [2020 Greenhouse Gas Inventory](#) for the City of Albuquerque. This helps provide a snapshot of human activity and trends that covers stationary sources (buildings), transportation, and waste.

GREENHOUSE GAS MITIGATION HIERARCHY



Data for the 2020 inventory was prepared following the Global Protocol for Community Scale Greenhouse Gas Emission Inventories (GPC) using the City Inventory Reporting and Information System (CIRIS) tool. The inventory does not include GHG emissions related to the consumption of goods within the Albuquerque city limits that originated elsewhere nor include non-energy related industrial activities or agriculture, forestry, or other land-use emissions or sinks.

The results show that major contributors to the City's GHG emissions include on-road transportation (33%), commercial and institutional buildings (26%), and residential buildings (25%). This indicates that stationary energy[18] is the largest emissions producer at 55% of total emissions. Of that, 48% is from commercial/institutional sources, 46% is from residential, and 7% is from manufacturing and construction. Transportation is the next largest producer of emissions and includes on-road and off-road transportation, railways, and aviation with the majority of emissions coming from on-road transportation. Waste only produces around 4% of total emissions, but is still a significant source with emissions releasing mainly in landfills as waste starts to break down producing methane, a very powerful greenhouse gas. Waste also only accounts for product disposal impacts, and more is needed to assess prevention and reduction efforts. To understand the true benefits of addressing waste-related emissions it is essential to evaluate emissions tied to other aspects of the materials management pathway (i.e., scope 3 emissions sources) in alignment with the EPA's Waste Management Hierarchy[19] and Wasted Food Scale. [20]

[18] Stationary energy is all the energy that is used to power commercial, institutional and residential buildings in the entire city.

[19] "Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy," U.S. Environmental Protection Agency, last updated on June 19, 2023, https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.

[20] "Wasted Food Scale," U.S. Environmental Protection Agency, last updated on February 13, 2024, https://www.epa.gov/sustainable-management-food/wasted-food-scale.

To ensure future comprehensive climate action planning efforts are grounded in the most accurate data, an in-depth GHGe Inventory will be conducted in the year after releasing this document.[21] The intention of this expanded inventory is to cover scope 1-3 emissions and identify both consumption-based greenhouse gas emissions and sector-based inventories to account for emissions from producing, using and disposing of products within the MSA.

SCOPE 1

EMISSIONS INSIDE THE MSA

GHGe from sources located within the Albuquerque MSA

SCOPE 2

GRID-SUPPLIED ENERGY EMISSIONS

GHGe generated as a result of the use of grid-supplied electricity, heat, steam, and/or cooling within the Albuquerque MSA

SCOPE 3

OUTSIDE EMISSIONS

All other GHGe that occur outside the Albuquerque MSA as a result of activities taking place inside the Albuquerque MSA

[21] Scope 1, Emissions Inside the MSA: GHGe from sources located within the Albuquerque MSA. Scope 2, Grid-Supplied Energy Emissions: GHGe generated as a result of the use of grid-supplied electricity, heat, steam, and/or cooling within the Albuquerque MSA. Scope 3, Other Outside Emissions: All other GHGe that occur outside the Albuquerque MSA as a result of activities taking place inside the Albuquerque MSA.

SUSTAINABLE BUILDINGS

Buildings of all types have a multifaceted role to play in improving sustainability and growing an equitable, greener economy. Our homes and places of work all use energy, water and materials that create environmental strains. Extrapolating from the City's most recent greenhouse gas inventory, the energy generated to power the buildings in Albuquerque's MSA accounts for the majority of total annual GHGe.

The GHGe from this section derive from two sources: the burning of natural gas, and the use of electricity. In Albuquerque MSA, all natural gas is supplied by one publicly regulated entity: the New Mexico Gas Company (NMGC). Natural gas is used for heating, cooking and electricity generation.

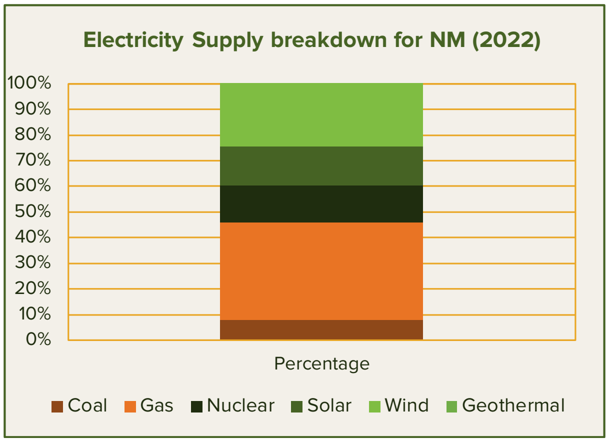
GHGe for electricity are challenging to inventory because each unit of generated electricity produces a different amount of GHGe. This is due to the differing types of energy sources used to generate electricity. Currently, the Public Service Company of New Mexico (PNM), Albuquerque MSA's electric utility, generates energy from coal, natural gas, nuclear, solar, wind and geothermal, as shown in the chart below.[22]

DID YOU KNOW?

The City of ABQ makes investments in its own facilities to increase energy efficiency with a carve-out from its capital improvement budget known as the 3% for Energy Conservation Fund.

The types of energy sources used for power generation vary based on consumer demand, which changes hour-to-hour and season-to-season. When energy needs are high (e.g., mid-day, mid-winter), utilities typically use peak load energy supply which can include natural gas and wind. In off-peak hours, baseload energy such as coal and solar with storage can be used. Weather conditions also affect the productivity of renewables, causing raising or lowering production at certain times of the year.

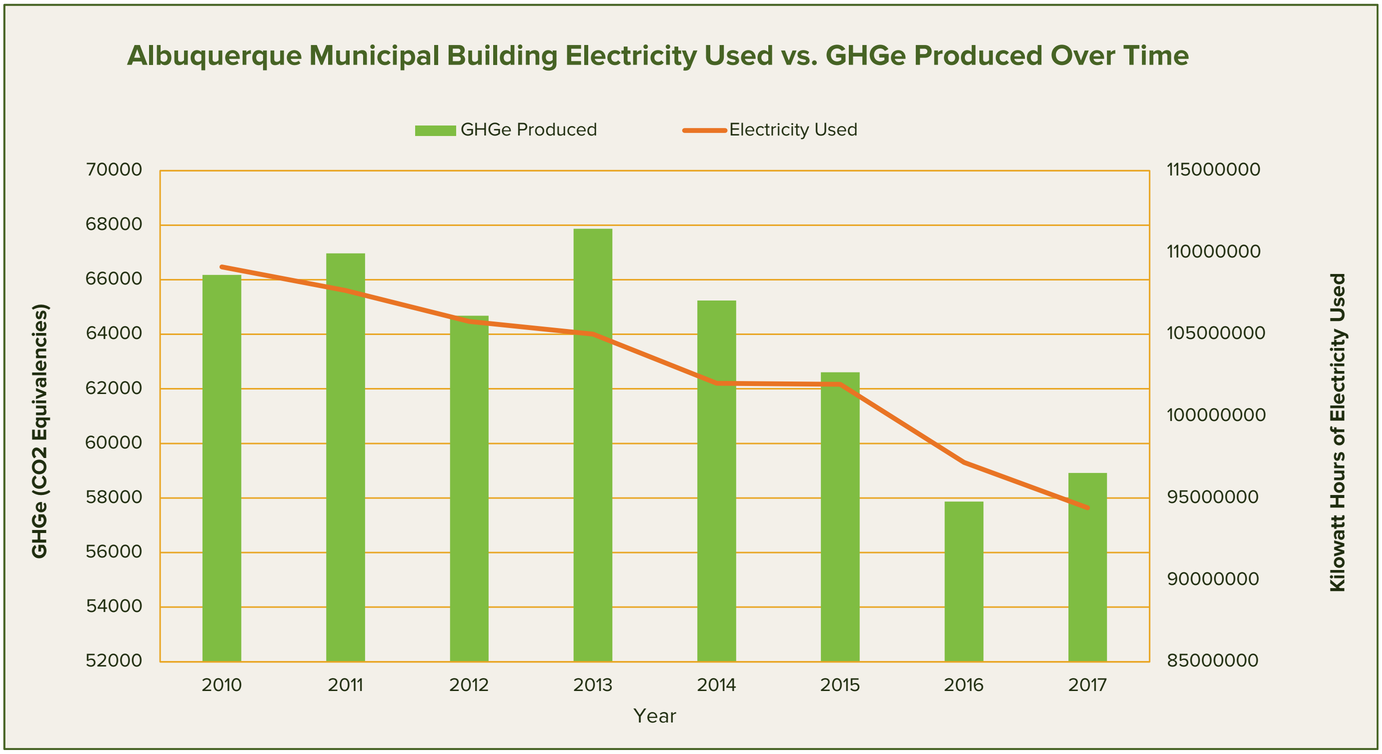
As of 2019, PNM has committed to phasing out its coal and some natural gas-fired power plants and increasing its reliance on solar to achieve a goal of 100% emissions-free energy generation by 2040.[23] As the trajectory of adopting emissions-free energy unfolds, the Albuquerque MSA can expect to see declines in GHGe produced through power generation.



Although energy efficiency measures can help to lessen the buildings' energy consumption thereby reducing GHGe produced, phasing out emissions-producing energy sources is vital to eliminating power generation emissions. Take the City of Albuquerque's electricity use for municipal buildings for example. As seen in the chart on the next page, between 2010 and 2017 consumption steadily declined thanks to investments in energy efficiency upgrades, yet the GHGe produced from the production of that electricity fluctuated.

[22] PNM (2022). Energy Sources. Retrieved on February 25, 2024 from https://www.pnm.com/energy-sources

[23] PNM (2020). Our Commitment. Retrieved on November 6, 2020 from https://www.pnm.com/our-commitment



In New Mexico, multiple programs and efforts support both commercial and residential energy efficiency. The New Mexico Mortgage Finance Authority (MFA) utilizes federal and local utility funding to support home energy upgrades for low-income homes through its NM Energy$mart Program. Following the passage of the 2005 Efficient Use of Energy Act, utilities have created a variety of energy-use reduction programs including audits and upgrades for low-income and multi-family homes.

In 2020, the City of Albuquerque adopted the 2018 International Energy Conservation Code, which sets more energy-efficient standards for new construction. Finally, the State of New Mexico offers the Sustainable Building Tax Credit to encourage private sector design and construction of energy-efficient buildings for commercial and residential use.

After the passage of the Community Energy Efficiency Development (CEED) Block Grant Fund during the 2022 legislative session, New Mexico took a much-needed step forward in sustainable building efforts that address longstanding equity issues. This block grant provides money to local and Tribal governments and the Mortgage Finance Authority specifically for retrofits and energy upgrades in single-family, low-income homes. Individuals can apply for these free retrofits under the NM Energy Smart Weatherization Program at housingnm.org.

DID YOU KNOW?

Community Energy Efficiency program retrofits provided services in frontline communities valued at $260,000.

NOW, EACH YEAR, THE UPGRADES SAVE:

- **Residents an estimated $7,000 in utility costs**
- **41,000 kWh of electricity**
- **4,500 therms of natural gas**
- **138,800 gallons of water**
- **60 tons of CO_2**

TASK FORCE RECOMMENDATIONS

The CAP Task Force, recognizing energy efficiency's many environmental and human benefits, discussed a range of solutions. Foremost, the CAP Task Force prioritized frontline communities' ability to access and benefit from efficiency technologies, as these residents' utility bills often demand disproportionately high percentages of their household incomes, also known as "energy burdens".[24] Programs to support building efficiency measures often include financial incentives, such as utility rebates; however, public awareness of these programs are vital to their deployment.[25]

Another strategy discussed by the CAP Task Force was energy use disclosures – the practice of informing potential homebuyers and tenants of a home's energy use costs (including potentially disproportionate costs) before leases or purchase agreements are signed. In jurisdictions throughout the U.S., energy use disclosures are enacted by law to help residents make informed decisions by understanding the full cost of housing, while also incentivizing property owners to invest in energy efficiency.[26] The CAP Task Force also advocated for offsetting the energy impacts of heat by expanding opportunities for incorporating drought-tolerant vegetation and trees in frontline communities.[27]

Large-scale options were also seen by the CAP Task Force as necessary to ensure greater building sustainability. The CAP Task Force called for energy efficiency standards to be consistently and regularly updated following Albuquerque's adoption of the 2018 International Energy Conservation Code. Other priorities included a focus on urban infill development to reduce sprawl and resource strains, as well as electrifying buildings to facilitate the increased incorporation of electricity created by renewable sources instead of natural gas. All CAP sustainable buildings and development strategies align with the CAP Task Force's agreed-upon principle to embrace culturally appropriate strategies for green building standards that respect and support sustainable indigenous building practices to better align the community with the traditional knowledge which has long spearheaded effective climate-conscious living.

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[24] The term "energy burden" refers to how much of a household income is spent on energy costs. In Albuquerque, the average energy burden is 2 percent of household income. However, in many neighborhoods, residents of low-income often experience average energy burdens of 6 percent or higher.

[25] In New Mexico, multiple utility, federal, state and local programs support improving both commercial and residential energy efficiency for more information see https://www.cabq.gov/sustainability/home-energy-efficiency.

[26] "Residential Energy Use Disclosure: A Guide for Policymakers." American Council for an Energy-Efficient Economy, February 5, 2020.

[27] By providing shade and through evapotranspiration, trees and vegetation that directly shade buildings decrease demand for air conditioning. Shaded surfaces, for example, may be 20–45°F (11–25°C) cooler than the peak temperatures of unshaded materials. "Using Trees and Vegetation to Reduce Heat Islands." United States Environmental Protection Agency, n.d. https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands

SUSTAINABLE BUILDINGS PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	P: Primary S: Secondary	A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life	*Policy Environments Change. This is solely based on the knowledge of the Task Force

	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Green Buildings & Development	Support local and state legislation that prioritizes urban infill, brownfield redevelopment and renovations, rather than new developments/new construction.	LT	P	A,P			X	X				X
			S	B,I	X	X			X	X	X	
	Support consistent and timely adoption of local and state legislation that requires developers and home builders to continue to meet current energy standards for newly constructed or renovated buildings and homes.	MT	P	B,I,P	X	X	X	X				X
			S	A					X	X	X	
	Prioritize the electrification of new City facilities and major renovations to existing City facilities, and support code requirements for electrification of private commercial and residential buildings.	MT Ongoing	P	I,P	X	X	X	X				X
			S	A,B					X	X	X	
Energy Efficiency for Frontline Communities	Explore opportunities to expand usage of drought tolerant plants, especially in frontline communities, utilizing existing plant guidance from the Albuquerque Bernalillo County Water Authority and the City of Albuquerque.	NT Ongoing	P	A,B,P	X				X			
			S	I		X	X	X		X	X	
	Promote access to programs that give incentives for window replacement, insulation, lighting, appliance upgrades, and other energy efficiency improvements for people with low-income.	NT Ongoing	P	A,B,I	X		X	X	X	X		X
			S	P		X					X	
	Support new legislation that requires energy disclosure during sale or lease of buildings, home or rental properties.	NT Ongoing	P	P	X				X		X	X
			S	A,B,I,T		X	X	X		X		

OVERVIEW OF WORKING GROUP MEASURES

Working Group members in the Albuquerque MSA identified four main opportunities to apply sustainable building strategies prioritized by the CAP Task Force. The first two implementation-ready project listed, focus on providing energy efficiency upgrades to frontline communities. Community Energy Efficiency (Sustainable Buildings 1 [SB1] measure) is a direct expansion of a successful program led by community-based organizations Prosperity Works and Energy Works, and Multi-Family Decarbonization seeks to bring some of these best practices to renters across the MSA.

The second two measures focus on bringing sustainable building practices to community spaces. Community Center Efficiency and Education (SB3) originally provided efficiency upgrades, solar power, and EV infrastructure to Bernalillo County community centers across the MSA. After several community meetings, this measure was further expanded upon to reach more centers and incorporate educational programs. The Los Poblanos Open Space measure (SB4) seeks to provide energy efficiency and renewable energy to the Rio Grande Community Farm, an educational center centering regenerative farming techniques.

All the measures in the table below center around or work towards one or more CAP Task Force recommendations for sustainable buildings. The table provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures are included in Appendix D, which is organized by the measure short code (e.g., SB1) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
Community Energy Efficiency *MSA-Wide*	**SB1:** Expansion of low income residential decarbonization across the MSA Total Funding Request: $20,263,000 $/GHGe Reduction: $24,151
Multi-Family Decarbonization *MSA-Wide*	**SB2:** Multi-faceted program to address energy burdens in low-income rental units. Total Funding Request: $5,469,000 $/GHGe Reduction: $3,433
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e
Los Poblanos Open Space *City of Albuquerque*	**SB4:** Improvements at Los Poblanos Farm to include a solar agriculture shed and workshop with storm management features and incinerating toilets. Total Funding Request: $151,235 $/GHGe Reduction: $336 / MT CO2e

STRATEGY	IMPLEMENTATION MEASURE
Transit-Oriented Development *MSA-Wide*	**CT1:** Implementation of a public transit plaza and mixed-use affordable housing development in Uptown Albuquerque. Total Funding Request: $7,000,000 $/GHGe Reduction: $7,818 / MT CO2e
Tree Plantings & Inventory *MSA-Wide*	**CN3:** Expansion of tree plantings and inventory in low-income neighborhoods. Total Funding Request: $4,750,000 $/GHGe Reduction: $85 / MT CO2e

RENEWABLE ENERGY

Renewable energy is energy generated from sources that are not depleted by use (e.g., solar, wind, geothermal and hydropower), and offer an alternative to more carbon-intensive fuels (e.g., coal, oil and natural gas). With its 350 sunny days a year and high elevation, Albuquerque MSA has exemplary environmental conditions for solar energy generation, and great potential to further increase development in the solar sector. Recent policy and technological advancements have spurred widespread local adoption of solar infrastructure by the private sector, homeowners and governments, allowing the Albuquerque MSA to become a national leader in solar.

DID YOU KNOW?

The State of New Mexico is ranked 6th in the nation for geothermal potential.

In the MSA, the electrical utility is the PNM, an investor-owned utility (IOU), regulated by the New Mexico Public Regulation Commission (PRC). Currently, PNM generates energy from coal, natural gas, nuclear, solar, wind and geothermal sources; the amounts and types of energy PNM generates is based on consumer demand, which changes hour-to-hour, and season-to-season. In accordance with the Energy Transition Act, PNM has committed to increasing its reliance on solar and phasing out all of its coal and some of its natural gas-fired power plants to achieve the goal of 100 percent emissions-free energy generation by 2040.

Given the state's remarkable renewable energy potential, additional efforts are actively underway to build out solar, wind, and geothermal energy sources. One example of this is the Community Solar legislation passed during the 2021 session that aims to eventually provide everyday New Mexicans, from homeowners to renters, better access to clean local electricity. This is accomplished by authorizing solar projects from small, local solar facilities. Once created, these facilities will be shared by multiple community subscribers. Residents who sign up receive credit on their electricity bills for their share of the power produced.

As of early 2024, the 45 selected solar projects are ramping up. The process for New Mexicans to be able to subscribe to these programs will be slow. Setbacks and the gradual nature of rolling out a new and complex program means it could be months or years before community members can tap into this network.

Geothermal energy is also increasingly becoming an important resource for helping to move New Mexico away from fossil fuel production. As of the writing of this document, **House Bill 91: Geothermal Resources Project Funds and House Bill 92: Geothermal Electricity Generation Tax Credits** have passed but are awaiting the Governor's signature. Should both of these bills be made into effect, it would greatly expand the capacity of the State for geothermal development projects by providing funding to a geothermal project development fund, a geothermal project revolving loan fund, tax incentives for corporate geothermal electricity generation, and a gross receipts tax and compensating tax reductions for geothermal energy development.

TASK FORCE RECOMMENDATIONS

The CAP Task Force discussions regarding energy went beyond the importance of increasing renewable energy adoption, instead centering on the concepts of a decentralized grid and its future modernization. In the traditional energy generation model, power is generated from a central facility and then distributed to buildings via power lines. Advancements in solar energy technology have reimagined the traditional energy model by creating opportunities to generate power at the same site where it is needed, creating more distributed energy generation. Examples of distributed energy include community solar projects, which allow for community members to have access to non-utility-owned solar when their homes are not conducive to rooftop solar installation.[28]

Acknowledging the anticipated influx in renewable energy availability, the CAP Task Force engaged in deep discussions on pursuing more widespread and equitable access to renewable energy for all Albuquerque residents. While the CAP Task Force's recommendations primarily focus on finding new pathways for more democratic systems of energy deployment, the group also emphasized the importance of investing in additional infrastructure and technologies such as microgrids, battery storage and grid modernization. The CAP Task Force recognized these technologies as vital to advancing more distributed energy generation, renewable energy adoption and future power grid security.

RENEWABLE ENERGY PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	P: Primary S: Secondary	A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life	*Policy Environments Change. This is solely based on the knowledge of the Task Force

	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Renewable Energy Development	Support local and state-wide standards for community solar programs, micro-grid establishment and grid modernization prioritizing low income areas.	MT	P	I,P,T			X	X				X
			S	A,B	X	X			X	X	X	
	Form partnerships with neighborhoods, businesses, institutions, and utilities to increase solar development prioritizing frontline communities.	MT Ongoing	P	A,B	X		X		X			X
			S	I,P,T		X		X		X	X	
	Create mechanisms for frontline communities to engage in decision-making regarding the ownership, generation, storage, distribution of, and transition to renewable energy.	MT	P	A,B,P	X				X			X
			S	I		X	X	X		X	X	

[28] Solar Energy Technologies Office. "Community Solar Basics." U.S. Office of Energy Efficiency and Renewable Energy, n.d. https://www.energy.gov/eere/solar/community-solar-basics

OVERVIEW OF WORKING GROUP MEASURES

Measures submitted by Working Group members in this section only focus on solar development. Given the close match of the region's solar gain and energy load and the ease of implementation, this is unsurprising. The three measures in this section highlight the multiple ways renewable energy development can benefit the region (RE1, SB2, and SB4). These measures, if implemented, help offset facility energy use, capture cost savings, and provide publicly accessible shade structures.

All the measures in the table below center around or work towards one or more CAP Task Force recommendations for renewable energy. The table provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures is included in Appendix D, which is organized by the measure short code (e.g., RE1, SB3, and SB4) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
College Solar Canopies *Central New Mexico Community College*	**RE1:** Installation of solar canopies at Central New Mexico College. Total Funding Request: $5,000,000 $/GHGe Reduction: $5 / MT CO2e
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e
Los Poblanos Open Space *City of Albuquerque*	**SB4:** Improvements at Los Poblanos Farm to include a solar agriculture shed and workshop with storm management features and incinerating toilets. Total Funding Request: $151,235 $/GHGe Reduction: $336 / MT CO2e

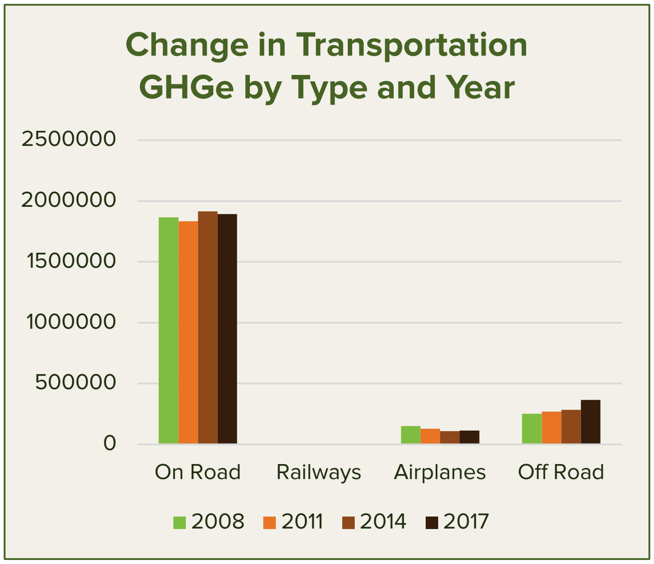
CLEAN TRANSPORTATION

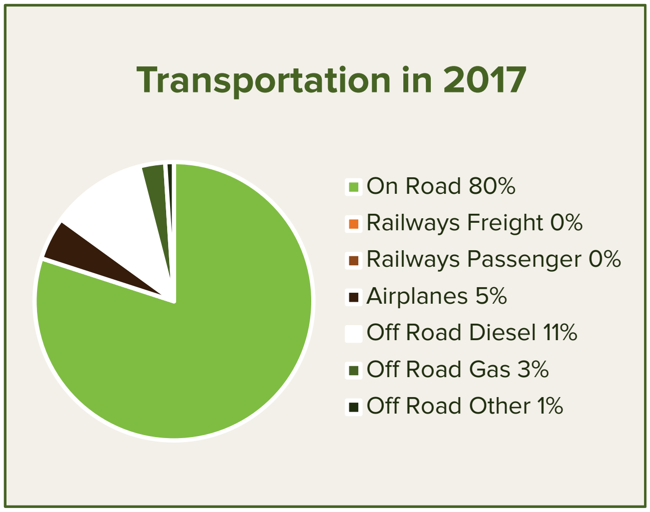
With an international airport, rail, and interstate connections, the Albuquerque MSA is the state's major transportation hub and a spread-out, southwestern city and region. Both of these factors contribute to significant levels of GHG emissions deriving from transportation, which equal forty-one percent of the City of Albuquerque's total emissions and approximately 2,310,992 metric tons of carbon dioxide (CO2) equivalent. A majority of these emissions come from on-road travel that produces about 1,914,544 metric tons of CO2 equivalent (MTCO2E). On-road transportation is made up of all the travel that has to take place in a vehicle every day, such as commuting to and from work and moving freight. The remaining emissions within the transportation sector come from off-road vehicles and equipment, aviation, and railways.

In other areas of the Albuquerque MSA outside the City of Albuquerque, on-road vehicles are also a substantial portion of the transportation GHG emissions, due to limited alternative transportation options, such as Rio Metro's Rail Runner regional rail and shuttle bus services.

DID YOU KNOW?

In January, New Mexico was awarded nearly $68 million to boost vehicle charging infrastructure across the state through the Bipartisan Infrastructure Law's Charging and Fueling Infrastructure Discretionary Grant Program.





While GHGe from travel can be challenging to calculate, this report utilized the best data available to estimate all journeys by road, rail, and air, including inter-city and international travel from within the city limits.[29] As seen in the accompanying graph, changes in transportation GHGe have not shown significant downward trends over time. Airplane emissions have made some downward progress while off-road emissions have increased. The amount of vehicle-based travel occurring every day calls for creative ways to reduce GHGe.

DID YOU KNOW?

The City of Albuquerque uses a "Zero Emissions First" policy to replace fleet vehicles with low or zero-emissions alternatives.

Over the last two years, some potential solutions are emerging in New Mexico from both community and government-led initiatives. Together For Brothers,[30] a 501(c)3 non-profit, for example, is actively involved in promoting transit equity, mobility sovereignty, and advocating for mobility self-determination across the MSA. Together for Brothers was a key community partner that advocated for a pilot Zero Fares transit program in December 2021 for the City of Albuquerque's transit system, ABQ RIDE. The pilot Zero Fares program became permanent in November 2023 for all ABQ RIDE services, due in part to their continuing community outreach and advocacy. ABQ RIDE serves about 23,800 riders daily, 88% of whom live in households with an income of less than $35,000 a year. The permanent Zero Fares program gives low-income frontline communities more equitable access to sustainable transportation options. This summer, Together for Brothers will be spearheading several surveys and community engagement sessions to outline pathways to continually improve transit equity in the region.

Communities are also addressing the need to encourage active transportation and improve conditions for pedestrians and cyclists in the Albuquerque MSA, through collaboration and coordination of active transportation planning efforts. The City of Albuquerque is continuing to improve its Complete Streets and Vision Zero programs, through targeted implementation and development of prioritization strategies. The City is also updating its Bikeway and Trail Facilities Plan to focus on making biking a safer and more appealing option for people of all ages, abilities, and backgrounds to access everyday destinations. In conjunction with these City initiatives, Bernalillo County is updating its Pedestrian and Bicyclist Safety Action Plan to incorporate the Federal Highway Administration's Safe System Approach as the strategy to reach its Vision Zero objectives and guide future active transportation capital infrastructure projects. Finally, the Mid-Region Metropolitan Planning Organization, which covers the Albuquerque MSA, is updating its Regional Transportation Safety Action Plan to: (1) create profiles of local jurisdictions and identify dangerous locations, (2) identify key safety and action items, such as policy, enforcement, and/or design, and (3) target safety improvements for all roadway users.

[29] Data for on-road travel is estimated from MRCOG's travel demand forecast; rail from BNSF Railway and Amtrak Railroad financial reports, Aviation from EPA's National Inventory Data; and off-road transportation from EPA's National Emissions Inventory Data.

[30] "Together for Brothers" https://www.togetherforbrothers.org

At the state level, there is also a considered effort to advance clean transportation technology and infrastructure. On November 16th, 2023, New Mexico adopted the **advanced clean vehicle rules** which mandate that in model year 2026, 43% of all new light-duty passenger vehicles and up to 20% of all new commercial medium and heavy-duty trucks shipped to New Mexico auto dealerships must be zero-emission vehicles. These percentages gradually increase to 82% of light-duty passenger vehicles for model year 2032 and up to 75% of medium and heavy-duty trucks for model year 2035.

DID YOU KNOW?
$10 million was appropriated to the New Mexico Energy, Minerals and Natural Resources Department for the Climate Investment Center from the budget this session.

In addition, the New Mexico Construction Industries Division instituted an update in January 2024 to the New Mexico Residential and Commercial Energy Conservation Codes. These updates require the installation of minimum percentages of parking spaces with electric vehicle (EV) charging infrastructure and EV capable parking spaces for most new residential, commercial, and industrial developments throughout New Mexico.

Furthermore, in the most recent New Mexico legislative session, **House Bill 41: Clean Fuel Standards** and **House Bill 140: Clean Car Income Tax Credit** were passed and are currently awaiting the Governor's signature. If the former should be made into effect, it would establish a state-wide clean transportation fuel standard and provide consumers access to alternative fuel at competitive prices and lower emissions. For the latter, it would create a personal and corporate tax credit for clean cars and clean car charging units resulting in credits from $400 for normal charging units to $25,000 for fast-charging or fuel cell charging units.

TASK FORCE RECOMMENDATIONS

The 2020 Public CAP Survey found that survey participants saw improving public transit and active transportation options within the city as the community's greatest priorities. Similarly, CAP Task Force deliberations yielded the group's shared recognition of how public transit is often the primary mode of transportation for frontline communities. Therefore, **public transit is the most highly prioritized mode for the CAP Task Force, as it is currently the most practical and affordable transportation option.**

Public transit was also buoyed as an effective means of reducing greenhouse gas emissions, increasing on-road safety and supporting public health. In regards to demand for public transit in Albuquerque, the CAP Task Force saw issues of safety, access and cultural norms as main barriers. The group's recommended strategies address these challenges and ultimately seek to increase public transit ridership, a vital component of an enduring and effective transit system.[31]

[31] ABQ RIDE consistently strives to ensure the affordability of its services which are funded primarily through City taxes; around eight percent of services are supported by fares. ABQ RIDE enacted fare-free public transit at the start of the COVID-19 pandemic select demographics such as youth under the age of 18. Generally, Albuquerque's buses require 8-10 passengers in order for them to be effective greenhouse gas-reducing modes of transportation. Stephanie Dominguez and Andrew De Garmo. "ABQ Ride: Public Transportation and Climate Change." Powerpoint Presentation, CABQ Climate Action Task Force, November 4, 2020. https://www.cabq.gov/sustainability/documents/11-4-20-cabq-task-force-presentation-andrew-de-garmo.pdf

CLEAN TRANSPORTATION PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
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	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Transit Access & Investment	Increase funding for public transit and invest in free public transit for transit dependent riders, prioritizing youth, students, older persons, and residents with low incomes.	MT	P	I,P		X			X	X	X	
			S	A,B,T	X		X	X				
	Treat public transportation as a public good, fund it effectively, and market it as a socially responsible and affordable option emphasizing rider safety and autonomy.	NT Ongoing	P	A,B,I,P		X	X		X			
			S	T	X			X		X	X	
	Reevaluate routes and increase access to transit, prioritizing low-income neighborhoods, seniors, and people with disabilities, also specifically target access to outlying neighborhoods, adjacent communities, and public green and open spaces.	NT	P	B,I,P					X	X	X	X
			S	A	X	X	X	X				
	Improve the “last mile” - the distance between public transportation and people's residence or workplace - with possible bike and ride sharing options.	LT	P	B,I,P					X	X	X	
			S	A,T	X	X	X	X				
Active Transportation & Transit Safety	Improve safety of buses and bus stops for vulnerable populations (e.g., women and children, people with disabilities, older persons) by improving lighting, visibility, protection from the elements, and epidemic-safe strategies.	MT	P	I,P	X				X	X	X	
			S	T		X	X	X				
	Invest in City-funded sidewalk improvement for safety and accessibility for all users and especially people with limited mobility.	MT	P	I					X	X	X	
			S	P,T	X	X	X	X				
	Prioritize equity, transparency and accountability when making investments to improve transportation safety.	MT Ongoing	P	A,B,P					X	X		
			S	I,T	X	X	X	X			X	
	Improve and create bike and walking infrastructure, especially in low-income and older neighborhoods.	LT	P	I,T					X	X	X	
			S	P	X	X	X	X				
Transit Public Education	Increase public education around greenhouse gas emissions that explain the positive impacts of walking, biking, and public transit (e.g., improved health, personal financial savings, decreased emissions, cleaner air, etc.), as well as the negative impacts of private transportation (e.g., health implications such as asthma, traffic congestion, etc.).	NT	P	B	X	X	X			X		
			S	A				X	X		X	
	Partner with the media to feature bus rider stories in an effort to combat fear and prejudice while highlighting advantages and accessibility.	NT	P	A,B	X				X		X	
			S			X	X	X		X		
Vehicle Emissions Reduction	Transition mass transit to zero emissions fuel sources.	MT	P	B,I,P,T	X	X	X					
			S	a				X		X	X	
	Sustain efforts to convert city fleet vehicles to electric where feasible.	MT	P	I	X		X					
			S	A,B,P,T		X		X		X	X	
	Promote rideshare options with electric vehicles, prioritizing increased options for frontline communities.	NT	P	A,B	X	X	X		X			
			S					X		X	X	

Other forms of transportation also factored into the development of the CAP Task Force's transportation strategies, showcasing how all climate-related actions must be both emissions-reducing and equity-increasing. Acknowledging the priorities of the 2020 CAP Public Survey, the CAP Task Force uplifted the need for active transportation infrastructure upgrades; this recommended strategy aligns with many of the efforts currently being advocated by Albuquerque's Vision Zero campaign. The adoption of carbon-reducing vehicle technologies and their integration into frontline communities were also seen as opportunities to make Albuquerque a safer, more environmentally resilient and accessible city for all.

OVERVIEW OF WORKING GROUP MEASURES

The Working Group identifies a myriad of options for low or zero emissions transportation projects in the Albuquerque MSA. The majority are centered on fleet and equipment electrification, spurred by internal goals, favorable policy environments, and the cost gap between electric options and their conventional counterparts. Those electrification projects listed below qualify under the CPRG criteria because they are utilized in frontline communities (CT2 and CT6 through CT11). Implementing these projects would benefit general air quality in frontline communities but have limited direct benefits to the communities.

The measures that took a more direct approach to improving frontline communities are those that attempt to build out a connected active transportation network (CT3, CT4, and CT5) or address systemic barriers to effective public transportation (CT1). While these projects still have a low cost effectiveness for GHGe reduction potential, they do directly improve the lives of those in frontline communities. Furthermore, the Transit Oriented Development Project (CT1) takes a bold, innovative approach to addressing housing and transit cost and efficient land-use design.

All the measures in the table below center around or work towards one or more CAP Task Force recommendations for clean transportation. The table provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures is included in Appendix D, which is organized by the measure short code (e.g., CT1) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
Transit-Oriented Development *City of Albuquerque*	**CT1:** Implementation of a public transit plaza and affordable housing development in Uptown Albuquerque. Total Funding Request: $7,000,000 $/GHGe Reduction: $7,818 / MT CO2e

STRATEGY	IMPLEMENTATION MEASURE
Transit-Oriented Development *City of Albuquerque*	**CT1:** Implementation of a public transit plaza and affordable housing development in Uptown Albuquerque. Total Funding Request: $7,000,000 $/GHGe Reduction: $7,818 / MT CO2e
Bicycle Safety Corridors *City of Albuquerque*	**CT2:** Design and construction of bike lanes on San Pedro from Bell Ave to Claremont and a bike boulevard on Claremont from Richmond to Moon. Total Funding Request: $4,500,000 $/GHGe Reduction: $210,743 / MT CO2e
Multimodal Rail Trial *City of Albuquerque*	**CT3:** Construction of final segment of active transportation trail in historic downtown neighborhoods. Total Funding Request: $12,000,000 $/GHGe Reduction: $2,997,003 / MT CO2e
Juan Tabo Connectivity Trail *Albuquerque City Council*	**CT4:** Development of an active transportation trail connecting Tijeras Arroyo and Innovation Parkway. Total Funding Request: $260,000 $/GHGe Reduction: $1,453,846 / MT CO2e
Transit EV *City of Albuquerque*	**CT5:** Purchase of electric vehicles for the City's transit department which service frontline communities. Total Funding Request: $37,935,000 $/GHGe Reduction: $2,801 / MT CO2e
Municipal Fleet Electrification *City of Albuquerque*	**CT6:** Purchase of electric vehicles for the City's fleet which operate in frontline communities. Total Funding Request: $7,225,000 $/GHGe Reduction: $6,817 / MT CO2e

STRATEGY	IMPLEMENTATION MEASURE
College Fleet Electrification *Central New Mexico Community College*	**CT7:** Purchase of electric vehicles for Central New Mexico College, located in a LDAC census tract. Total Funding Request: $1,584,000 $/GHGe Reduction: $2,167
Aviation Shuttle Electrification *City of Albuquerque*	**CT8:** Purchase of electric shuttle buses for the Airport, located in a LIDAC census tract. Total Funding Request: $1,210,000 $/GHGe Reduction: $4,736
Electrification of Parks Equipment *City of Albuquerque*	**CT9:** Purchase of electric alternatives for Parks equipment used in LIDAC census tracts. Total Funding Request: $1,414,048 $/GHGe Reduction: $6,057
Balloon Fiesta Park Electrification *City of Albuquerque*	**CT10:** Purchase of electric vehicles and equipment at Balloon Fiesta Park. Total Funding Request: $528,532 $/GHGe Reduction: $26,334 / MTCO2e
Golf Cart Electrification *City of Albuquerque*	**CT11:** Purchase of electric golf carts to replace conventional equipment, located in a LIDAC census tract. Total Funding Request: $400,000 $/GHGe Reduction: $18,232 / MT CO2e
DC Fast Chargers *Bernalillo County*	**CT12:** Install two DC Fast Chargers: downtown and at Route 66 Visitors Center, with solar canopies. Total Funding Request: $2,975,000 $/GHGe Reduction: $372

STRATEGY	IMPLEMENTATION MEASURE
College Public Charging *Central New Mexico Community College*	**CT13:** Install publicly accessible Level 2 and Level 3 Fast Charging EV stations and infrastructure. Total Funding Request: $800,000 $/GHGe Reduction: $1,510 / MT CO2e
Multi-Family Decarbonization *MSA-Wide*	**SB2:** Multi-faceted program to address energy burdens in low-income rental units. Total Funding Request: $5,469,000 $/GHGe Reduction: $3,433
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e

WASTE & RECYCLING

Waste accounts for about 4% of the City of Albuquerque's GHGe for a total of 243,627 MTCO2E annually. There are two forms of waste included in this sector: solid waste and wastewater treatment.

Solid waste is garbage or trash thrown away by residents and businesses, typically sent to the landfill. In the Albuquerque MSA, as of writing this document, there are seven permitted and open landfills, two of them are permitted for special materials (i.e., asbestos, construction and demolition waste). Many of these landfills accept materials from outside the Albuquerque MSA to support communities that do not have a closer option. Municipal solid waste from Albuquerque is sent to the Cerro Colorado Landfill, located on the top of the west downtown area.

DID YOU KNOW?
over 525,000 tons of residential and commercial trash is landfilled in the MSA each year.

Each year, the Cerro Colorado Landfill accepts about 525,000 tons of residential and commercial trash.[32] This waste will release chemicals into the atmosphere and surrounding land as it decomposes. In particular, organic waste can form methane as the material breaks down. Methane is a potent GHG, so to reduce these emissions, methane from the landfill is captured, transported by pipeline two miles, and sold to Bernalillo County's Metropolitan Detention Center where it is used to heat water, reducing the demand for fossil fuel at that site.

[32] City of Albuquerque. Solid Waste Department. Retrieved on November 6, 2020 from https://www.cabq.gov/solidwaste/trash-collection/cerro-colorado-landfill

Greenhouse gas emissions are also created by treating wastewater at Albuquerque Water Authority's Southside Wastewater Reclamation Plant. Each day, the plant treats about 55 million gallons of wastewater.[33] As the wastewater is treated and breaks down, methane and other GHGs are generated. Methane is captured from organic waste and used to generate about 6.6 megawatt-hours (MWh) of electricity at the site, about 70% of the plant's energy needs. Stabilized biosolids are dewatered and composted at the Soil Amendment Facility.[34]

Reducing emissions created by waste often relies on diverting organic waste sent to the landfill. In the U.S., recycling and composting diversion rates seemed to plateau in the 2010s.[35] However, potentially recyclable and compostable materials still account for over half of our waste on average,[36] and environmental impacts of continuing to send the same amount of materials to the landfill is unsustainable. Recycling, composting and reducing the use of paper waste and other organic materials are some ways of reducing emissions created by organic waste breakdown.[37]

Food waste is often a major contributor to waste GHGe, with a recent report citing that as much as 10% of human-induced GHGe globally.[38] In 2015, EPA even set a goal to reduce food loss and waste by 50% by 2030.[39]

[33] Albuquerque Bernalillo County Water Utility Authority. Water Resources Education. Retrieved on November 6, 2020 from https://abcwua.org/education/30_SWRP.html.

[34] "Compost del Rio Grande," 505 Outside, accessed February 20, 2024, https://www.505outside.com/2021/11/03/compost-del-rio-grande-2/.

[35] "National Overview: Facts and Figures on Materials, Wastes and Recycling," U.S. Environmental Protection Agency, accessed February 19, 2024, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#Trends1960-Today.

[36] "National Overview: Facts and Figures on Materials, Wastes and Recycling," U.S. Environmental Protection Agency, accessed August 2023, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#Generation.

[37] U.S. Environmental Protection Agency. Climate Change and Municipal Solid Waste. Retrieved on November 6, 2020 from https://archive.epa.gov/wastes/conserve/tools/payt/web/html/factfin.html.

[38] Allison Aubrey, National Public Radio. How to Reduce Food Waste. Retrieved on November 6, 2020 from https://www.npr.org/2019/12/10/786867315/how-to-reduce-food-waste.

[39] "United States 2030 Food Loss and Waste Reduction Goal," U.S. Environmental Protection Agency, accessed February 19, 2024, https://www.epa.gov/sustainable-management-food/united-states-2030-food-loss-and-waste-reduction-goal

Why is food waste such an important component of GHGe? Like other products, GHGs are generated at each stage of the product pathway. Also, a significant portion of food is not consumed. The EPA estimates one-third of the food produced in the U.S. is not eaten,[40] and NRDC (Natural Resources Defense Council) estimated that about 112,600 tons of food is wasted in the Albuquerque metro area annually.[41] Nationally, food waste makes up 58% of methane emissions from municipal solid waste landfills, and 61% of the methane generated by food waste avoids being captured, often because the gas is generated before the landfill gas collection system is installed or expanded.[42] Planning purposefully around food consumption to prevent food waste, committing to food reuse and composting when possible are some recommended best practices. EPA outlines additional best practices in the Wasted Food Scale, released October 2023.[43]

A variety of communities in the Albuquerque MSA have been working on waste reduction and recycling efforts. In the last year, four new community composting systems were installed (one in Isleta Pueblo, one in the Village of Los Ranchos, and two in Albuquerque. Progress towards the City of Albuquerque's goals has been documented in annual implementation reports, the 2022 CAP Implementation Report and the 2023 Implementation Report. Since completing the 2023 report, the City of Albuquerque partnered with FUSE Corps to host a fellow who is working with stakeholders and community members to design a citywide equity-focused composting program. Details on other major projects, resources, and educational materials are provided on the City's website.

TASK FORCE RECOMMENDATIONS

For the CAP Task Force, discussions on waste and recycling reflected the group's appreciation of circular economies, concern for equitable economic development, and awareness of the nuances of climate action within frontline communities. The CAP Task Force discussed plastics pollution policy, community composting, reuse programs and local job creation as means of improving Albuquerque's waste-related sustainability. Additionally, the CAP Task Force called for the transformative action that is the comprehensive reimagining of waste systems. For example, if fewer items were created as or considered to be disposable, communities could reduce waste production and focus on ensuring that potentially disposable products are recycled or repaired into items of value instead of entering the landfill.

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[40] "From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste," U.S. Environmental Protection Agency, accessed February 19, 2024, https://www.epa.gov/land-research/farm-kitchen-environmental-impacts-us-food-waste.

[41] "Food Waste & Rescue Potential in Albuquerque," NRDC, accessed February 19, 2024, https://www.cabq.gov/sustainability/documents/abq-calculator-two-pager.pdf.

[42] U.S. Environmental Protection Agency, Quantifying Methane Emissions from Landfilled Food Waste, WPA-600-R-23-064 (Washington, DC, October 2023), https://www.epa.gov/system/files/documents/2023-10/food-waste-landfill-methane-10-8-23-final_508-compliant.pdf.

[43] "Wasted Food Scale," U.S. Environmental Protection Agency, accessed February 19, 2024, https://www.epa.gov/sustainable-management-food/wasted-food-scale.

The CAP Task Force discussions on waste did not shy away from acknowledging and assessing waste's complex entanglement with issues of sustainability and climate justice. In hopes of respectfully motivating and involving community residents with local waste reduction efforts, the group discussed how to encourage reductions in waste production while ensuring that frontline community members gain from the tangible benefits of these actions. Ultimately, the group's recommendations present a vision of Albuquerque in which more products are repurposed instead of going to the landfill, and that recognizes the importance of putting the onus of change on corporations and systems rather than individual community members. Themes related to these strategies harken back to the CAP Task Force's guiding principle to move beyond policies that focus primarily on the role and responsibility of individuals and look at larger systemic issues.

WASTE AND RECYCLING PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

		Initiation NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	**Priority** P: Primary S: Secondary	**Constraints** A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	**Benefits** AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life							**Favorable Policy Environment** *Policy Environments Change. This is solely based on the knowledge of the Task Force
	Strategies	**Phase**	**Priority**	**Constraints**	**AR**	**AQ**	**CM**	**ED**	**EQ**	**HO**	**QL**	**Policy**
Recycling, Composting, & Waste Reduction	Fund physical infrastructure and coordination for neighborhood and school composting, including educational programs about how to compost and benefits for greenhouse gas reduction, soil health, regenerative agriculture, native crops, local foods and plant-based diets.	MT	P	B,I,P	X	X	X		X	X		
			S	A,T				X			X	
	Promote methods of recycling, reuse, and composting in frontline communities -- highlighting their health and environmental benefits with the support of community-based educators (i.e., promotoras).	NT Ongoing	P	A,B,I					X	X		
			S	P,T	X	X	X	X			X	
	Use public policy to reduce plastic waste in the public sector.	NT Ongoing	P	B,P	X		X					
			S	A,I				X		X	X	
	Increase accountability for corporate producers and polluters, including but not limited to the reduction of construction and other waste and increased electronic and textile recycling.	MT Ongoing	P	B,P,T		X	X	X	X	X	X	
			S	A,I		X		X		X	X	

OVERVIEW OF WORKING GROUP MEASURES

The primary measures submitted in this sector focus on food waste prevention and organic matter diversion (WR1 and WR2). Food waste prevention and organic matter diversion through composting are important components of three measures introduced in the sustainable buildings section (SB1, SB2, and SB3). Through education and infrastructure investments, these measures directly benefit low-income families through financial savings by preventing food loss. Secondary measures submitted in this section (CN1 and CN2) have direct benefits that reduce local flooding and improve water quality while also providing a myriad of other benefits. These measures are not directly housed under this sector because stormwater flows directly into the river and is not treated in the Southside Wastewater Reclamation Plant. See Climate Conscious Neighborhoods and Appendix E for more information.

All the measures in the table below center around or work towards one or more CAP Task Force recommendations for waste and recycling. The table provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures are included in Appendix D, which is organized by the measure short code (e.g., WR1) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
Food Waste Prevention & Composting *MSA-Wide*	**WR1:** Scalable food waste prevention program targeted at small, local restaurants. Total Funding Request: $500,000 $/GHGe Reduction: $3,704
Tribal Landfill Diversion *San Felipe*	**WR2:** Waste diversion infrastructure investment for tribal entities Total Funding Request: $451,450 $/GHGe Reduction: $659
Municipal Green Waste *City of Albuquerque*	**WR3:** Purchase of Bioreactor to divert park and open space green matter from the landfill. Total Funding Request: $438,000 $/GHGe Reduction: $11,487 / MT CO2e

STRATEGY	IMPLEMENTATION MEASURE
Community Energy Efficiency *MSA-Wide*	**SB1:** Expansion of low income residential decarbonization across the MSA. Total Funding Request: $20,263,000 $/GHGe Reduction: $24,265.00 / MT CO2e
Multi-Family Decarbonization *MSA-Wide*	**SB2:** Multi-faceted program to address energy burdens in low-income rental units. Total Funding Request: $5,469,000 $/GHGe Reduction: $3,433
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e
County Green Stormwater Infrastructure *Bernalillo County*	**CN1:** Installation of street trees and green stormwater infrastructure in frontline communities in the South Valley.Total Funding Request: $1,550,000 $/GHGe Reduction: $11,832 / MT CO2e
City Green Stormwater Infrastructure *City of Albuquerque*	**CN2:** Installation of street trees and green stormwater infrastructure in frontline communities across Albuquerque Metro. Total Funding Request: $3,445,000 $/GHGe Reduction: $261,778 / MT CO2e

ECONOMIC DEVELOPMENT

As Albuquerque, like many other communities across the globe, mobilizes and bolsters efforts to tackle the climate crisis, the redefinition of local economic activity will factor significantly into climate mitigation. Although estimates show that the U.S. leads in the global green economy, numerous initiatives have identified there is still untapped potential to create economic growth by transitioning from extractive to regenerative economic activities.[44] Strong examples of potential job growth and investment opportunities include waste reuse, local food and agriculture, energy efficiency and renewable energy among others.[45] As New Mexico scales up its renewable energy adoption, estimates project that, by 2030, these actions could create up to 8,830 new jobs in New Mexico's clean energy economy and stimulate over $4.6 billion of new investment.[46]

Efforts to improve local, sustainable and equitable economic development, as well as community-engaged governance are visible in recent initiatives from the City of Albuquerque. The City's Jobs Training Albuquerque (JTA) workforce development program gives preference to companies in the renewable and alternative energy product manufacturing industry.[47] Additionally, the City's Rail Yards redevelopment work focuses on seeking out and listening to community voices when undertaking projects meant to enact policy change, develop new infrastructure or create new jobs.[48] Furthermore, state-level deliberations are solidifying strategies for effectively achieving a Just Transition away from natural resource extraction for New Mexico's economy (i.e., oil, gas and mineral extraction).[49]

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[44] As of 2019, the U.S. green economy is estimated to generate $1.3 trillion in annual sales revenue and to employ nearly 9.5 million workers – 4% of working age people in the U.S. Georgeson, Lucien and Mark Maslin. "Estimating the Scale of the US Green Economy within the Global Context." Palgrave Communications 5, no. 121 (2019). https://www.nature.com/articles/s41599-019-0329-3#auth-1

[45] New Mexico Department of Workforce Solutions. New Mexico Clean Energy Workforce Development Study. June 2020. https://www.dws.state.nm.us/Portals/0/DM/LMI/NM_Clean_Energy_Workforce_Report. pdf; Global Alliance for Incinerator Alternatives. "Zero Waste and Economic Recovery: The Job Creation Potential of Zero Waste Solutions." Beyond Plastics, February 16, 2021. https://www.beyondplastics.org/ reports/zero-waste-economic-recovery; "Energy Efficiency Jobs Growing Across the Southwest." Southwest Energy Efficiency Project, November 21, 2023. https://www.swenergy.org/energy-efficiency-jobs-growing-across-the-southwest; Grow New Mexico. Albuquerque Food and Agriculture Plan. City of Albuquerque and the Thornburg Foundation, February 2019.

[46] Long, Noah and Arjun Krishnaswami. "50% Renewable Energy Would Create Jobs, Investment in NM." National Resources Defense Council, January 16, 2019.
https://www.nrdc.org/experts/noah-long/50-renewable-energy-would-create-jobs-investment-nm

[47] "Job Training Albuquerque." Central New Mexico Community College, n.d.
https://www.cnm.edu/depts/workforce-training/job-training-albuquerque

[48] Isaac, Claudia B. Report on Equitable Development and Community Benefits in the Albuquerque Rail Yards "Draft." City of Albuquerque, June 12, 2019.
https://www.cabq.gov/railyards/documents/equitabledevelopment-companion-report-draft.pdf

[49] New Mexico's 2021 legislative session saw the passing of Senate Bill 112, Sustainable Economy Task Force, a state-level legislative reflection of the task force's goals for the Albuquerque area. The bill funds the creation of an expert- and community member-task force on the future of New Mexico's energy transition. "Sustainable Economy Task Force." S.B. 112, 55th Legislature (New Mexico 2021).
https://www.nmlegis.gov/Sessions/21%20Regular/bills/senate/SB0112.pdf

Due to the Biden Administration's efforts to update the country's infrastructure, there is an enormous, once-in-a-lifetime amount of federal funding currently available. While these funds offer an incredible opportunity for states, tribes, municipalities, and community groups, however, the federal match requirement can be a significant barrier to accessing federal funds. This legislative session, the State took a momentous step to remove this pitfall. Awaiting signing from the Governor is House Bill 177 NM Match Fund which creates a $75 million annual and non-reverting fund that can provide the requisite "local match" or "state match" that many of these federal funding opportunities require.

DID YOU KNOW?

If signed, New Mexico will be only the third state in the nation to develop a Match Fund. Without this fund, New Mexico risks leaving billions of federal dollars on the table.

TASK FORCE RECOMMENDATIONS

The CAP Task Force maintained that community-building and equitable economic development are integral components of effective climate change mitigation. Although economic activity has often been cited as a cause of widespread environmental degradation, the CAP Task Force also saw it as a potential means of repairing environmental harms and supporting local communities. In the group's discussions, the guiding principle outlining economic development recommendations intended to leverage and direct funds to support reparations efforts to redress harms caused by environmental injustice to frontline communities. Central to this belief is the importance of localized, community-based job creation – a strategy that could help to boost community interest in sustainability and reduce transportation-related issues by averting the need for long commutes.

The group strongly voiced the need to enact economic policies that align with Just Transition principles, such as developing economic activity that supports both environmental and worker health. The CAP Task Force emphasized that there were many employment and investment opportunities that are sustainable and celebrate – rather than exploit – environmental systems. Some of the specific sectors identified in the following strategies include local food and agriculture, waste, recycling and renewable energy. Finally, the group shared that just as important as opportunities for growth and investment are the ways in which these opportunities are rooted in equitable partnerships.

ECONOMIC DEVELOPMENT PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	P: Primary S: Secondary	A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life	*Policy Environments Change. This is solely based on the knowledge of the Task Force

	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Economic Investment	Provide community and economic development opportunities while restoring the land, water, and air while investing in members of frontline, underrepresented, and economically disadvantaged communities and local infrastructure.	MT Ongoing	P	A,B,I,P	X			X	X		X	
			S			X	X			X		
	Localize systems of production, for example food and agriculture, to reduce transportation time and emissions.	NT Ongoing	P	B,P,T	X			X			X	
			S	A,I		X	X		X	X		
	Strengthen our local food system, shorten the supply chain, reduce greenhouse gas emissions, and support the local economy by increasing community gardens and promoting local farm-to-fork culinary tourism in frontline communities through coordinated community education and collaboration.	NT Ongoing	P	I,P,T	X	X		X	X		X	
			S	A,B			X			X		
Job Creation in Frontline Communities	Provide community and economic development opportunities while restoring the land, water, and air and investing in frontline, underrepresented, and economically-disadvantaged communities and local infrastructure.	MT Ongoing	P	I,P	X			X	X		X	
			S	A,B		X	X			X		
	As a workforce development strategy, co-create jobs with family-supporting wages in frontline communities that have historically experienced systematic underinvestment and disinvestment.	MT Ongoing	P	I,P	X			X	X			X
			S	A,B		X	X			X	X	
	Develop community and economic development opportunities that mitigate climate change and increase human-nature interaction via local recycling efforts, processing yard waste to compost, earn-while-you learn and apprenticeship opportunities for solar and community solar installation, land revitalization for community gardens (using City-owned vacant lots) and other green redevelopment efforts.	MT Ongoing	P	B,I,P	X			X	X			
			S	A		X	X			X	X	

OVERVIEW OF WORKING GROUP MEASURES

Initially, the CPRG Working Group did not submit any measures that specifically addressed economic development. While many of the proposed measures would help create jobs through subcontracted work and development, there was a clear need for concerted effort to improve these benefits. The following measures take a first step at addressing this gap. Inspired by community engagement sessions, additional mechanisms such as procurement policies, education and outreach, and the expansion of existing workforce development programs.

The table below provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures are included in Appendix D, which is organized by the measure short code (e.g., SB1) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
Multi-Family Decarbonization *MSA-Wide*	**SB2:** Multi-faceted program to address energy burdens in low-income rental units. Total Funding Request: $5,469,000 $/GHGe Reduction: $3,433
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e
Food Waste Prevention & Composting *MSA-Wide*	**WR1:** Scalable food waste prevention program targeted at small, local restaurants. Total Funding Request: $500,000 $/GHGe Reduction: $3,704
Transit-Oriented Development *City of Albuquerque*	**CT1:** Implementation of a public transit plaza and affordable housing development in Uptown Albuquerque. Total Funding Request: $7,000,000 $/GHGe Reduction: $7,818 / MT CO2e

EDUCATION & AWARENESS

Undoubtedly, the education and awareness communities receive and maintain are fundamental drivers of current and future action. Whether messaging is shared from families, friends, media or schools, the information people receive and how it is interpreted can catalyze change. However, education and public messaging on sustainability topics face unique challenges. Issues such as climate change, water, soil and air quality are complex, with technical barriers to understanding and complicated takeaways. Effective marketing often relies on simple, actionable behavior changes, but combating climate change requires large, systemic reforms. All sustainability messaging difficulties are compounded by deliberate efforts to deny and refute the scientific findings identifying climate change and its impacts.[50]

In regards to climate change and public education, lessons in New Mexico's public schools are informed by both national and state-specific standards, in addition to many teachers' incorporations of outdoor education, classroom experimentation and innovative field trips. Adopted by New Mexico in 2018, the Next Generation Science Standards incorporate climate science- and sustainability-related content at every K-12 grade level, with explicit mentions of climate change in middle and high school curricula.[51] Additionally, the New Mexico STEM Ready! Science Standards present state-specific standards that prompt students to consider local sustainability-related issues like energy production and human-environment relations.[52] In Albuquerque, sustainability-related curricula items include the district-wide school gardens program and Albuquerque Public School's (APS) focus on energy conservation.[53]

[50] Cook, John, Geoffrey Supran, Stephan Lewandowsky, Naomi Oreskes, and Ed Maibach. "America Misled: How the Fossil Fuel Industry Deliberately Misled Americans About Climate Change." George Mason University Center for Climate Change Communication, October, 2019. https://www.climatechangecommunication.org/wp-content/uploads/2019/10/America_Misled.pdf

[51] "Climate Change in the Next Generation Science Standards (K-12)." Climate Education Research, 2013. http://www.climateedresearch.org/publications/2013/Climate-Change-NGSS.pdf

[52] "NM STEM Ready! Science Standards." New Mexico Public Education Department, 2018. https://webnew.ped.state.nm.us/wp-content/uploads/2018/05/NM-6-Specific-Standards-Framework.pdf

[53] APS is the largest school district in New Mexico serving over 75,000 students across an area of 1,200 square miles. The district's school gardens program supports over 90 gardens which are incorporated into curricula by individual teacher efforts aided by local Master Gardeners and a district-wide garden specialist. These gardens are used as interdisciplinary vehicles for outdoor education of all types, with sample lesson plans focusing on Indigenous New Mexican agricultural knowledge and climate change.

TASK FORCE RECOMMENDATIONS

The CAP Task Force's deliberations on issues pertaining to sustainability education and awareness revealed common themes that highlighted the importance of broadly increasing overall messaging and education, as well as tailoring outreach to resonate with specific communities to inspire individual and collective efforts. As a guiding principle, the CAP Task Force agreed to **prioritize culturally responsive public education efforts that are multi-media, multi-generational, multi-lingual and include the arts and sciences.** Another broad intent of the group was to empower large-scale change via the sharing of information that cuts through complexity and notes the real consequences of climate inaction. It is the CAP Task Force's hope that – collectively – media attention, the collection and sharing of data, commitment from regional leaders and public education can all act in concert to fuel further and deepened responses to the climate crisis.

OVERVIEW OF WORKING GROUP MEASURES

In line with CAP Task Force recommendations, four of the measures submitted specifically address the need for enhanced education and awareness. Within the MSA, there exists many public resources and programs that benefit frontline communities, but often overlapping and systemic barriers prevent these families from seeing the full benefit of these programs. To overcome this, the following measures build off of lessons from successful non-profit-public partnerships. Specifically, these measures employ and rely on the expertise of frontline community members and organizers to bring these programs to households in their own community.

The table below provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures are included in Appendix D, which is organized by the measure short code (e.g., SB2) and title.

EDUCATION AND AWARENESS PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	P: Primary S: Secondary	A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life	*Policy Environments Change. This is solely based on the knowledge of the Task Force

	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Climate Emergency Mobilization Efforts	Annually convene regional climate action summit led by frontline and Indigenous communities.	NT Ongoing	P	A,B					X			
			S	I	X					X	X	
	Routinely monitor progress toward activities that impact greenhouse gas reductions (e.g., new tree plantings, City and utility renewable energy usage and production, etc.) by creating an accurate, timely and accessible data dashboard on the City of Albuquerque Sustainability Office website.	NT Ongoing	P	I,T		X	X					X
			S	A	X				X	X	X	
	Publish daily vehicle emissions data (actual or estimated) and correlate it with daily ozone and particulate pollution data. Allow for visualization of numerical data through the use of a color-coded map.	NT	P	I,T	X		X					
			S	A,B		X		X		X	X	
	Partner with local media to launch a climate action public service announcement campaign to educate on climate change challenges and opportunities for action.	NT Ongoing	P	I			X					
			S	A,B	X			X	X	X	X	
Public Sustainability Education	Partner with Albuquerque Public Schools (APS) to make traditional ecological knowledge, climate change and school gardens part of all APS curricula.	MT	P	A,B,P	X						X	
			S	I,T			X		X	X		
	Invest in public education campaigns about mitigating climate change in partnership with frontline communities on a wide range of climate issues including but not limited to: fossil fuels, carbon dioxide and other greenhouse gases, waste and recycling, climate impacts on ecosystem health, consequences of bio-diversity loss, green jobs, embodied energy, contributions of animal agriculture to greenhouse gases and deforestation, green washing and tainted water supplies.	NT Ongoing	P	A,B,I			X		X	X		
			S	P,T	X	X		X			X	
	Educate residents about the energy and water nexus, as well as waste generation and consumption, to support education campaigns and reduce waste in both the public and private sectors.	NT Ongoing	P	A,B,I	X						X	
			S	P,T			X	X	X	X		

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
Community Energy Efficiency *MSA-Wide*	**SB1:** Expansion of low income residential decarbonization across the MSA. Total Funding Request: $20,263,000 $/GHGe Reduction: $24,265.00 / MT CO2e
Multi-Family Decarbonization *MSA-Wide*	**SB2:** Multi-faceted program to address energy burdens in low-income rental units. Total Funding Request: $5,469,000 $/GHGe Reduction: $3,433
Community Center Efficiency & Education *MSA-Wide*	**SB3:** Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities. Total Funding Request: $17,678,197 $/GHGe Reduction: $1,511 / MT CO2e
Food Waste Prevention & Composting *MSA-Wide*	**WR1:** Scalable food waste prevention program targeted at small, local restaurants. Total Funding Request: $500,000 $/GHGe Reduction: $3,704

CLIMATE CONSCIOUS NEIGHBORHOODS & RESOURCES

DID YOU KNOW?

91% of Albuquerque's population live within a half-mile of a park.

As a semi-arid, high-desert urban area, the Albuquerque MSA has always felt the constraints of water scarcity and heat. The advancement of climate change compounds these existing challenges and requires adaptation to new conditions. Looking to the future, projections show that climate-driven changes to the region will result in decreases in water availability, a rise in summer wildfires and extreme heat, among other impacts.[54] The Albuquerque MSA is already feeling these effects: the last decade has been the warmest on record with the observed number of extremely hot days (at or above 100°F) greater than 17 days per year. Local frontline communities are at heightened risk of heat-related illnesses during these instances of unprecedented heat.[55] Preparing for impending climate change impacts in Albuquerque requires increased attention to conserving and protecting water resources, ensuring sustainable development and increasing trees, green spaces and vegetation.

Challenges spurred by climate change illustrate the interconnectedness of our resources and the need to thoughtfully strategize their use. Greenhouse gas emissions can be mitigated by increasing tree canopy and green spaces, effectively creating a carbon sink and reducing heat.[56] However, planting efforts must also strike a delicate balance with available water resources and resources for maintenance of new landscapes. Such balance is seen in current Albuquerque tree planting and water conservation initiatives that work in tandem. For example, in the recently launched Let's Plant Albuquerque campaign, a broad coalition of government, community and educational organizations formed a unified campaign to promote community tree plantings and share public resources to increase "climate-ready" trees and plants that use less water.[57]

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[54] United States Environmental Protection Agency. What Climate Change Means for New Mexico. EPA 430-F-16-033. August 2016. https://nepis.epa.gov/Exe/tiff2png.exe/P100QVA0.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C16THRU20%5CTIFF%5C00000053%5CP100QVA0.TIF https://nepis.epa.gov/Exe/tiff2png.exe/P100QVA0.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C16THRU20%5CTIFF%5C00000053%5CP100QVA0.TIF

[55] National Oceanic and Atmospheric Administration. New Mexico. National Centers for Environmental Information, State Climate Summaries 142-NM. May 2019. https://statesummaries.ncics.org/downloads/NMscreen-hi.pdf

[56] "Using Trees and Vegetation to Reduce Heat Islands." United States Environmental Protection Agency, n.d. https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands

[57] "Let's Plant ABQ" brings together Tree New Mexico, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), Bernalillo County, New Mexico State University Cooperative Extension Service, The Nature Conservancy, the Dakota Tree Project, New Mexico State Forestry Division, and the City of Albuquerque Parks and Recreation Department. "City Tree Planting Alliance to Boost Albuquerque Urban Forest." City of Albuquerque, n.d. https://www.cabq.gov/parksandrecreation/news/city-tree-planting-alliance-to-boost-albuquerque-urban-forest

TASK FORCE RECOMMENDATIONS

The CAP Task Force's conversations on the myriad of topics in this section presented the opportunity to envision an Albuquerque of dynamic climate justice, greenhouse gas mitigation efforts and future climate adaptation. In alignment with the priorities highlighted in the CAP Public Survey, the CAP Task Force identified additional supports for increasing trees, vegetation and citywide community gardens. Guided by their agreed-upon principle to **protect and respect agricultural land and water use**, the CAP Task Force strategized deeply on the future potential of additional green infrastructure and water protection efforts, acknowledging actions such as increasing mulch and water reuse practices to mitigate heat and conserve water. Finally, CAP Task Force strategies called for the preservation and expansion of wetlands and green spaces on the conditions that such initiatives **use equity and access to prioritize future open space and park development or rehabilitation.**[58]

The CAP Task Force also observed that future development must also be carefully planned to prevent further strain on resources and contributions to sprawl and transportation-driven emissions. As Albuquerque is not immune to environmental justice issues, the CAP Task Force stressed how past land use and housing practices have created present-day inequities.[59] The CAP Task Force therefore urged citywide entities to create greater equity standards and practices to prevent clustering of locally undesirable land uses in frontline communities. The CAP Task Force also sought to ensure that planning processes are taken in partnership with, rather than on or for, frontline communities, referencing Valle de Oro National Wildlife Refuge's community engagement model as inspiration.[60]

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[58] This guiding principle is in alignment with findings by the Wilderness Society on disparities in green space distribution and access in Albuquerque. Next Stop: Equitable Access. The Wilderness Society, 2020. https://www.wilderness.org/articles/blog/report-albuquerque-park-access-lacking-vulnerable-communities-expanded-transit-could-help

[59] "Database: Racial Covenants." KRQE. November 10, 2020 https://www.krqe.com/news-resources/racial-covenants-database

[60] Valle de Oro's community engagement model is oriented around both the U.S. Fish and Wildlife Service's Standards of Excellence for Urban National Wildlife Refuges – which stress the importance of community connection, equity and accessibility – and their own work in the community of Mountain View. The Refuge's non-profit partner, Friends of Valle de Oro, has demonstrated their commitment to equitable access by surveying the local Mountain View community about how the refuge could best serve community needs. Environmental and Economic Justice Strategic Plan. Valle de Oro National Wildlife Refuge, April 2017. https://friendsofvalledeoro.org/wp-content/uploads/2020/03/VdO-Environmental-and-Economic-Justice-StrategicPlan-April-2017.pdf

CLIMATE CONSCIOUS NEIGHBORHOODS PRIORITIES IN THE 2021 CLIMATE ACTION PLAN

Initiation	Priority	Constraints	Benefits	Favorable Policy Environment
NT: Near-Term (By 2022) MT: Mid-Term (By 2026) LT: Long-Term (By 2031)	P: Primary S: Secondary	A: Awareness B: Behavior Change I: Investment P: Policy T: Technology & Infrastructure	AR: Adaptation & Resilience AQ: Air Quality CM: Climate Mitigation ED: Economic Development EQ: Equity Building HO: Health Outcomes QL: Quality of Life	*Policy Environments Change. This is solely based on the knowledge of the Task Force

	Strategies	Phase	Priority	Constraints	AR	AQ	CM	ED	EQ	HO	QL	Policy
Greening Efforts in Frontline Communities	Prioritize development and maintenance of green spaces, community gardens and food forests within a 10-minute walk of all residential spaces.	LT	P	B,I,P	X	X				X	X	
			S	A,T			X	X	X			
	Improve safe trails and biking infrastructure and ensure that these are equitably distributed to increase access to and enjoyment of open space by all residents.	LT	P	I,P		X			X	X	X	
			S	T	X		X	X				
	Ban use of glyphosate products (i.e., Roundup), plant climate ready food forests, incentivize replacing rock with natural mulch, and promote understory vegetation to reduce water run off, improve aquifer health and other environmental functions.	MT	P	A,B,P	X					X		
			S	I		X	X	X	X		X	
	Reduce the heat island effect and address wildlife needs by increasing vegetation cover city-wide, creating a tree preservation ordinance, and updating the street tree ordinance to prioritize "greening" in frontline communities.	LT	P	I,P	X				X	X	X	
			S	A,B		X	X	X				
Sustainable Development & Land Use Planning & Practices	Create city-wide sustainable development goals to address climate change and require that every new development submit a sustainability plan.	MT Ongoing	P	B,P	X	X	X	X				X
			S	A,I					X	X	X	
	Strengthen city-wide planning processes by using community engagement models rooted in environmental justice, such as the one used by the Valle del Oro National Fish and Wildlife Refuge.	MT	P	A,B,P					X			
			S	I	X	X	X	X		X	X	
	Create opportunities for the City of Albuquerque to purchase farmland that might otherwise be slated for development in order to expand wetlands to improve water supply, habitat, and outdoor recreation.	NT Ongoing	P	I,P	X	X					X	
			S	A,B			X	X	X	X		
	Invest in green infrastructure (including rain water collection) and incorporate green infrastructure and green storm water infrastructure into new construction projects to address urban heat island effects and water greenspaces, prioritizing frontline communities with less vegetation and lower access to air conditioning.	MT Ongoing	P	I,P,T	X				X	X	X	
			S	A,B,		X	X	X				
Water Conservation & Smart Planning	Create and monitor a Climate Action Plan water budget that supports climate mitigation efforts. Develop a water security strategy through collaboration and data sharing with the Albuquerque Bernalillo County Water Utility Authority and other water management entities.	MT Ongoing	P	B,P	X							X
			S	A,I			X	X	X	X	X	
	Revise the City Water Code and other applicable policies to increase gray and black water reclamation and other water-saving technologies in new buildings, and when feasible, in existing buildings as well.	MT Ongoing	P	A,P,T	X							X
			S	B,I			X		X	X	X	
	Review City land use practices to address water shortages and determine best practices to conserve water while respecting private agricultural needs and practices.	NT	P	P,T	X						X	X
			S	A,B			X	X	X	X		

OVERVIEW OF WORKING GROUP MEASURES

Working Group projects in this section provide a multitude of benefits that directly impact neighborhoods, in addition to reducing greenhouse gas emissions. Green stormwater infrastructure projects (CN1 and CN2) will install trees and climate-resilient plants in basins that capture stormwater runoff along residential streets. These projects will reduce flooding, improve stormwater quality, increase tree canopy and green space, reduce urban heat, sequester carbon, improve air quality, calm traffic, and create wildlife habitat. The final measure in this section seeks to conduct a study on where increasing tree plantings in frontline communities (CN3) could help reduce airborne pollutants and urban heat.

All the measures in the table below center around or work towards one or more CAP Task Force recommendations for climate-conscious neighborhoods. The table provides the strategy, general impact area, title, estimated GHGe reduction, and measure-specific cost effectiveness. Additional details for the following measures is included in Appendix D, which is organized by the measure short code (e.g., CN1) and title.

MEASURES

STRATEGY	IMPLEMENTATION MEASURE
County Green Stormwater Infrastructure *Bernalillo County*	**CN1:** Installation of street trees and green stormwater infrastructure in frontline communities in the South Valley. Total Funding Request: $1,550,000 $/GHGe Reduction: $11,832 / MT CO2e
City Green Stormwater Infrastructure *City of Albuquerque*	**CN2:** Installation of street trees and green stormwater infrastructure in frontline communities across the City of Albuquerque. Total Funding Request: $3,445,000 $/GHGe Reduction: $261,778 / MT CO2e
Tree Plantings Inventory *City of Albuquerque*	**CN3:** Research to expand tree plantings and inventory in low-income neighborhoods. Total Funding Request: $4,750,000 $/GHGe Reduction: $85 / MT CO2e

CONCLUSION

This plan is both a call to action and a statement: we must act now to counter the global and local effects of climate change. We will need to transcend our differences and acknowledge our limitations. But change for the better is coming and the Albuquerque MSA is committed to being at the forefront of that movement. To that end, we will move forward step by step. The goal of this document is a first attempt in identifying short-term implementable projects that make critical strides in reducing climate pollution and improving the lives of our frontline communities.

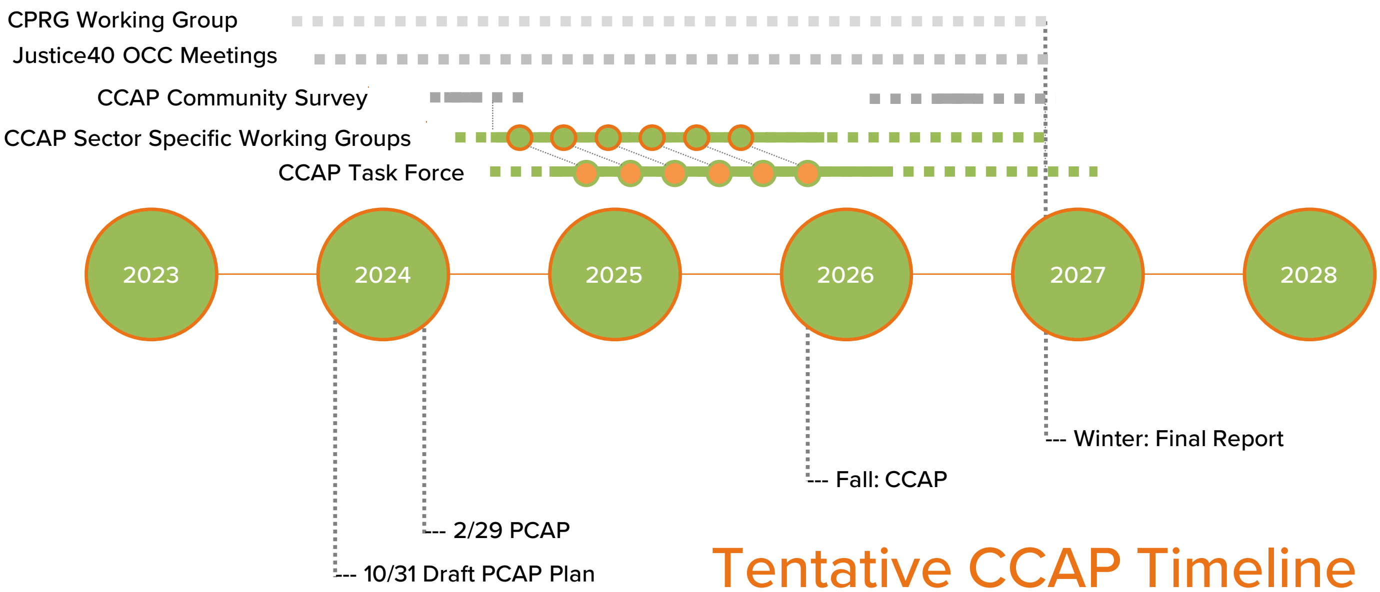
Climate change is degrees of magnitude more complex than traditional civic issues. Robust locally focused educational programs are essential for informing residents as well as industry on the dangers forecasted for their environment. Simultaneously, we must also ensure that these warnings are coupled with tangible potential solutions. An essential avenue we will employ to bring this about is through policy and project initiatives. This will work to bring community, industry, and local government agencies together. Government has incredible power to act as a mediator between public and private interest and to pilot transformational changes where MSA residents live, work, pray, and play.

This kind of collaboration can be transformational, but it needs table setting. This CPRG Planning Program seeks to provide the foundation for place-based and equitable climate action across the MSA and to allow us to access the best of our diverse organizational forms: industry to provide the innovation, fast-acting solutions; nonprofits and community to uplift the lived experiences and address the needs of our frontline communities; and government to erect the guard rails for transformational work and set a vision for an equitable future for all.

Going forward, the City of Albuquerque Sustainability Office (SO) is committed to guiding the execution of CPRG's ethos by centering the needs of frontline communities, performing deep, lasting climate pollution reduction, and breaking down silos. Ultimately, progress towards a more equitable and climate-resilient MSA requires coordinated action between the state, the city, the counties, industry, and all members of the community. This effort will undertake key tasks to lay the groundwork for this collaborative future through the development of the Comprehensive Climate Action Plan. Key community engagement mechanisms likely will include:

- The development of two Climate Action Community Surveys
- The development of sector-specific working groups
- The development and support of a community-based CCAP Task Force
- The development of the CPRG Planning Program's outreach list

For a comprehensive summary of past and planned community outreach including meeting minutes, agendas, recordings and additional materials, see Appendix C or visit cabq.gov/cprg.

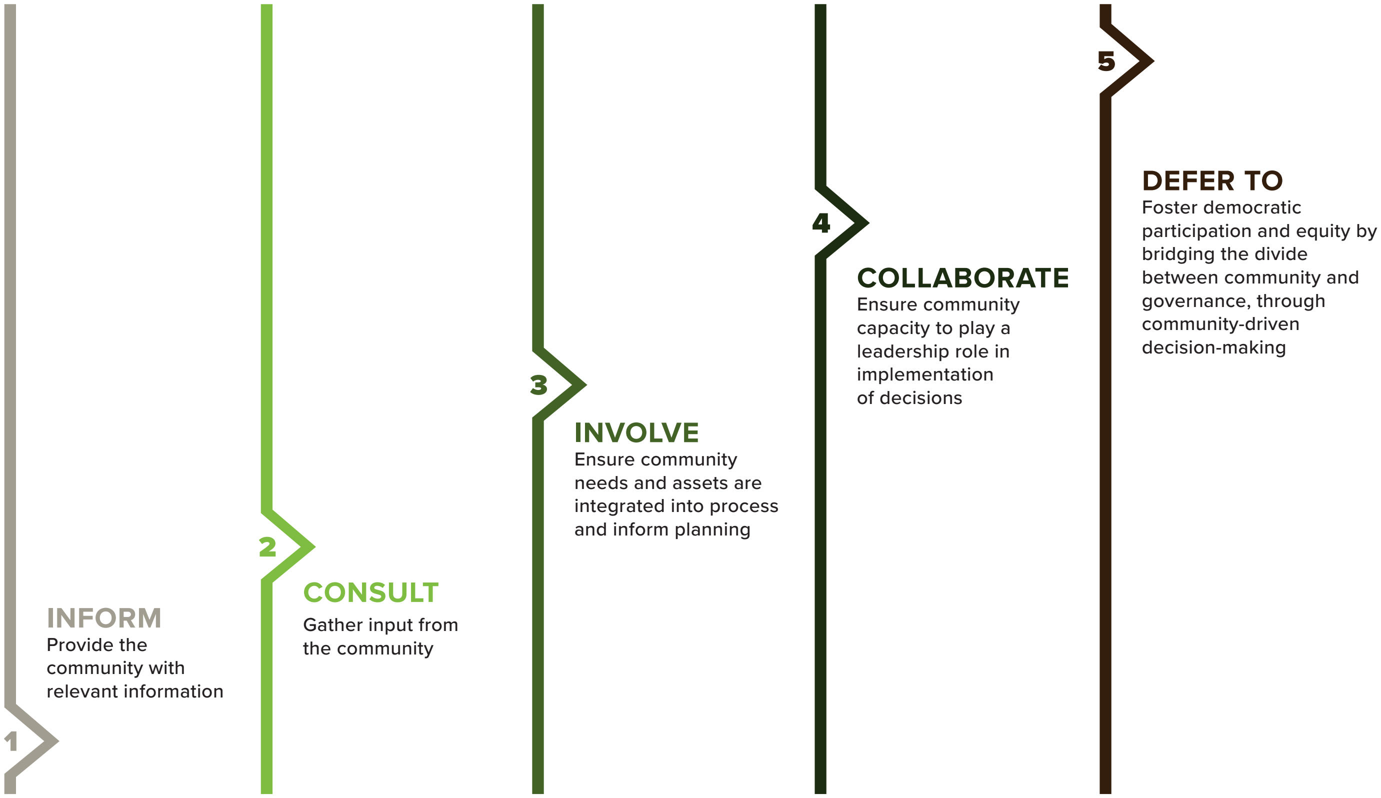


Tentative CCAP Timeline

ALBUQUERQUE JUSTICE40: A CALL FOR ENVIRONMENTAL JUSTICE

The Justice40 Initiative was established by the Biden-Harris Administration to address inadequate investment in marginalized communities disproportionately affected by climate change, pollution, and environmental hazards. In response to community leadership, Mayor Keller issued an executive order creating Albuquerque Justice40 appointing members of an Oversight and Coordinating Committee (OCC) to advocate and create accountability within the City to prioritize efforts to obtain federal funding beginning with those communities previously ignored.

The desired outcome of Albuquerque Justice40 is a paradigm shift that is illustrated by the spectrum of community engagement to ownership, illustrated below.[61]



[61] "The spectrum of community engagement to ownership" Facilitating Power, https://www.cabq.gov/office-of-equity-inclusion/documents/spectrum-2-1-1-1.pdf

The J40 OCC will endeavor to support the City to ensure any applications for federal funding address environmental impacts with the communities most impacted, seeking to eventually defer to their needs and support self-determination and autonomy. The J40 OCC encourages the City and any entity involved in obtaining federal funds to review the wealth of resources supplied by the OEI such as their Community Engagement Guide[62], and Inclusion Worksheet.[63]

The City of Albuquerque Sustainability Office and OEI will continue to engage with the J40 OCC to strive for community engagement and accountability. This will encompass both planning and implementation of the Climate Pollution Grant to ensure efforts adhere to the principles of Albuquerque J40 to reverse and prevent further injustices in the distribution of hazards and resources.

[62] "Practical guide to community engagement in the City of Albuquerque" CABQ Office of Equity and Inclusion, https://www.cabq.gov/office-of-equity-inclusion/documents/community-engagement-guide_mm_4_30_21.pdf
[63] "OEI Worksheet: Guide to Inclusive Community Engagement" CABQ Office of Equity and Inclusion, '
https://www.cabq.gov/office-of-equity-inclusion/documents/oei-worksheet-for-inclusive-community-engagement.pdf

NEXT STEPS

CLIMATE POLLUTION REDUCTION GRANT PLANNING PROGRAM

The next steps in this CPRG Program is developing the Albuquerque MSA CCAP that seeks to ensure coordinated climate action centered on addressing the most acute needs of our frontline communities. To ensure the CPRG Program has the skills and capabilities to appropriately empower frontline communities in this initiative, key staff will work with the OEI and the J40 OCC to amend the Community Engagement Roadmap (Appendix C).

To follow the progress of the Albuquerque MSA CPRG Planning Program, visit: cabq.gov/cprg

CLIMATE POLLUTION REDUCTION GRANT IMPLEMENTATION PROGRAM

Measures that are included in this PCAP may also qualify for the competitive CPRG Implementation Program. Each government department is capable of submitting two applications for implementation funds: one as a lead applicant, and one as a coalition application. For more information, visit:
https://www.epa.gov/inflation-reduction-act/about-cprg-implementation-grants

APPENDIX A
ACRONYMS AND DEFINITIONS

Acronyms

ABCWUA: Albuquerque/Bernalillo County Water Utility Authority
BernCo: Bernalillo County
CAP: Climate Action Plan
CABQ: City of Albuquerque
CCAP: Comprehensive Climate Action Plan
CN: Climate Conscious Neighborhoods measure
CPRG: Climate Pollution Reduction Grant
CT: Clean Transportation measure
EA: Education and Awareness measure
ED: Economic Development measure
EPA: Environmental Protection Agency
ETA: Energy Transition Act
EV: Electric Vehicle
GHG: Greenhouse gas
IECC: International Energy Conservation Code
IPCC: Intergovernmental Panel on Climate Change
J40OCC: Justice40 Oversight and Coordinating Committee
JTA: Job Training Albuquerque
LED: Light-emitting diode
LEED: Leadership in Energy and Environmental Design
LIDAC: Low Income Disadvantaged Communities
NMPRC/PRC: New Mexico Public Regulation Commission
NMMFA: New Mexico Mortgage Finance Authority
MRCOG: Mid-Region Council of Governments
MSA: Metro Statistical Area
NMDOT: New Mexico Department of Transportation
OEI: Office of Equity and Inclusion, CABQ
PCAP: Priority Climate Action Plan, the plan
PNM: Public Service Company of New Mexico
PPA: Power purchase agreement
RE: Renewable Energy measure
SB: Sustainable Buildings measure
SO: Sustainability Office, CABQ
WR: Waste and Recycling measure

Definitions

Active Transportation: Any self-propelled, human-powered mode of transportation, such as walking or bicycling.
Adaptation: Also known as "climate change adaptation," this is the process of adjusting to current or expected climate change and its effects. It, like climate change mitigation, is one way to respond to climate change.
Battery Storage: Also known as utility-scale battery systems, these are stationary power storage systems that can be connected to distribution/transmission networks or power-generation assets, primarily for the storage of renewable energy. Utility-scale storage capacity ranges from several megawatt-hours to hundreds. Lithium-ion batteries are most prevalent.
Biodiversity: The biological variety and variability of life on Earth. Biodiversity is typically a measure of variation at the genetic, species and ecosystem level.
Brownfield: A property for which expansion, redevelopment or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.
CAP Task Force: A group of community members specifically selected for their ability to accurately represent the needs of their frontline communities. This task force worked over the span of four months to learn, deliberate, and ultimately write the 2021 CAP to guide climate actions for the City of Albuquerque.

Carbon Sink: A forest, ocean or other natural environment that accumulates and absorbs carbon dioxide from the atmosphere.

CCAP Task Force: A future group of community members who will be selected for their ability to accurately represent the needs of their frontline communities. The intention with this task force is for these community members to work over the span of four or more months to learn, deliberate, and ultimately write the 2025 CCAP to guide climate actions for the entire Albuquerque MSA.

Climate Change: A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Climate Change Mitigation: Efforts to reduce or prevent greenhouse gas emissions.

Climate Justice: A term used to frame global warming as an ethical and political issue, rather than one that is purely environmental or physical in nature.

Community Solar: Any solar project or purchasing program, within a geographic area, in which the benefits of a solar project flow to multiple customers such as individuals, businesses, nonprofits and other groups. In most cases, customers are benefiting from energy generated by solar panels at an off-site array.

Compost: A means of recycling organic materials, such as food and yard waste, into a nutrient-rich soil amendment. Composting can be practiced on a variety of scales, from the backyard to the municipal.

CPRG Working Group: The CPRG Working Group consists of government staff across the City and the Counties, who worked over three months to identify and implement projects that meet the CPRG criteria.

Decoupling: The regulation of a utility in which – in an effort to target the profitability of high usage of gas, electricity or water – profits and utility sales are disconnected

Distributed Energy Generation: Decentralized electricity production that occurs in multiple, smaller-scale sites, meaning that electricity is produced by a variety of flexible (typically renewable) sources and requires less long-distance travel.

Electric Vehicle: Vehicles that are powered by a battery and electric motor which must be recharged by electricity instead of gasoline. Also known as battery-electric vehicles or “EVs”, these vehicles do not produce any tailpipe emissions.

Energy Burden: The measure of how much of a household’s income is spent on energy costs. Higher utility bills are often linked to aging homes, resident inability to cover costs for home improvement etc. Barriers preventing some energy improvements for low-income residents commonly include access for renters, as well as qualifying for program support. Increasing energy efficiency initiatives, improving reach of existing programs and making the public more aware of available energy efficiency programs are potential solutions.

Energy Disclosure: Also known as an “energy rating,” this is the practice of evaluating the energy efficiency of a home or building and making the information known to consumers.

Energy Efficiency: Utilization of improved technology or infrastructure that uses less energy to perform the same function.

Energy-Water Nexus: This concept refers to the many relationships between energy production and water, reminding us that energy production – both electric and oil and gas – requires water (to cool power plants, for hydraulic fracking, etc), and that the processing and treatment of water requires energy (to power treatment plants and pumps, for example).

Environmental Justice: The fair treatment and intentional, meaningful involvement of all people – regardless of race, color, ethnicity, education level or income – with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Energy Transition Act: A New Mexican law enacted in 2019 that shifts New Mexico's electric utilities from fossil fuel-dependent forms of energy production to renewable energy sources, while also addressing issues of economic development and job creation.

Evapotranspiration Cover: A type of cap placed over contaminated material, such as soil, landfill waste, or mining tailings, to prevent water from reaching it.

Family-supporting Wages: The minimum household income which is needed to fully support the economic needs of a family, especially the most basic needs of food, housing and utilities. Family-supporting wages differ from "living wages" as they are intended to fulfill the needs of a family rather than an individual.

Farm-to-Fork Tourism: The involvement of local agricultural producers and restaurants in tourism as a means of highlighting the talent in a community's food-related industries, as well as the seasonality and nuances of local food systems.

Food Forests: Areas structured to mimic the complex, multi-layered ecosystems of forests while focusing on the cultivation of edible plants. Food forests are meant to improve wildlife habitat and offer safe, bountiful and free food to all members of a community.

Fossil Fuels: Energy sources – including coal, oil and natural gas – created from millions-of-years-old plant and animal residues. Fossil fuels are typically accessed through drilling or mining, and are then burned or refined in order to be used as energy – all processes which result in GHG emissions.

Frontline Communities: Communities that will be impacted "first and worst" by the effects of climate change. These communities include Indigenous, Black and other communities of color, as well as communities of low-income and other groups that face greater exposure to pollution and climate hazards with more limited resources to respond.

Glyphosate: An herbicide used in agriculture and forestry to kill plants. Glyphosate products (such as the commonly known Roundup) are known to deplete soil health and endanger pollinator species.

Greenhouse Gasses (GHGs): Heat-trapping gas molecules which have transcended their natural levels in the atmosphere due to human activities, such as the burning of fossil fuels. The heat-trapping nature of GHGs, such as carbon dioxide (CO2), results in the warming of Earth's surface temperature, causing shifts in global climatic patterns.

Green Stormwater Infrastructure: A stormwater management method that uses living, natural systems to reduce and treat stormwater runoff before it reaches surface waters, while also providing other co-benefits such as increasing tree canopy, reducing urban heat, and creating wildlife habitat.

Green Jobs: Employment opportunities in which either an environmentally beneficial good or service is created and/or offered, or where a job focuses on improving the sustainability of a workplace or institution.

Grid Modernization: The updating of the electrical power grid to make it more adaptable and resilient. Updates can manifest in a range of actions – grid modernization seeks out changes which improve infrastructure, efficiency, renewable energy technologies acquisition, amongst many other updates.

Grey- and Blackwater: Two distinct types of wastewater, with the principal difference being that blackwater is likely to have come into contact with fecal matter, while greywater has not. Examples of greywater include the byproducts of washing or bathing; sewage would be an example of blackwater.
Hybrid Vehicles: Hybrid vehicles contain both an electric motor and an internal combustion engine -- meaning they can utilize both electricity and gasoline (or diesel) for fuel. These vehicles still produce tailpipe emissions, but are considered low-emissions vehicles.
International Energy Conservation Code (IECC): A model building code created by the International Code Council. It is a code adopted by many states and municipal governments in the United States for the establishment of minimum design and construction requirements for energy efficiency.
Investor Owned Utility (IOU): Large electric distributors (utilities) that issue stock owned by shareholders.
Just Transition: A unifying and place-based framework, spearheaded by labor unions and environmental justice groups, that works to empower communities, individuals and organizations politically and economically so that they can shift from extractive to regenerative economies.
Justice40: An initiative through the Biden Administration that requires 40% of federal funding go towards historically under and dis-invested communities.
Justice40 Oversight Coordinating Committee: A committee of legacy environmental justice leaders who provide guidance, support, and feedback to ensure Justice40 criteria are being met for their designated region.
Life-cycle Emissions: The total greenhouse gas impacts produced by a product at every stage of its production, use and disposal.
Low Income Disadvantaged Communities: The term used by the EPA to describe frontline communities - those impacted first and worst by climate change.
Low Emissions Transportation: A mode of transportation typically in a low emissions motor vehicle that emits relatively low levels of motor vehicle emissions. This term may also be technically defined in various air quality statutes.
Measure: A project, program or policy as defined by the EPA that seeks to reduce GHGe and benefit frontline communities.
Methane: A powerful greenhouse gas with a 100-year global warming potential 25 times that of carbon dioxide. Measured over a 20-year period, methane is 84 times more potent as a greenhouse gas than carbon dioxide.
Methane Capture: Instead of releasing methane into the atmosphere, methane capture traps this potent GHG and uses it for alternate purposes, such as electricity production.
Microgrid: A local, decentralized energy grid with control capability, meaning it can disconnect from the traditional grid and operate autonomously.
On-road Transportation: All travel which takes place in an emissions-producing vehicle such as commuting to and from work.

Open Space: Areas of land that are undeveloped (with no or limited built structures) and are accessible to the public. In the context of Albuquerque, Open Space can also refer to land conserved by the City's Parks and Recreation Department's Open Space Division. Albuquerque's Open Spaces intend to conserve natural and archeological resources, facilitate outdoor education and recreation and define the edges of the city's urban environment.

Paris Climate Agreement: A 2015 international climate change accord which sets climate mitigation goals; this landmark treaty has been adopted by the majority of UN parties.

Power Grid: Alternatively known as an electrical grid or an electric grid, an interconnected network for delivering electricity from producers to consumers.

Promotoras: Promotores de salud, shortened as promotoras, is the Spanish phrase for "community health workers". The Hispanic community recognizes promotores de salud as lay health workers who work in Spanish-speaking communities.

Regenerative Agriculture: Farming and grazing practices focused on mitigating climate change by restoring and improving the organic matter and biodiversity of soil.

Renewable Energy: Energy generated from sources that do not deplete after use (e.g., solar, wind, geothermal and hydropower), and offer an alternative to more carbon intensive fuels (e.g., coal, oil and natural gas).

Resilience: A term which refers to something's (for example, a community, individual or environment) ability to prevent, withstand, respond to and recover from setbacks.

Ridership: The volume and demographics of public transit users for a specific transit system.

Scope 1 Emissions: GHG emissions from sources located within the given geographical area

Scope 2 Emissions: GHG emission occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the geographical area

Scope 3 Emissions: All other GHG emissions that occur outside the city boundary as a result of activities taking place within the geographical area

Single-use Plastics: Plastic items which are designed to be disposed of, rather than reused, after only one use. Typically, single-use plastics – like disposable cutlery or plastic grocery bags – are also difficult to recycle.

Urban Heat Island Effect: The disproportionate heating of urban areas in relationship to the non-urban areas around them due to the materials, infrastructure and related GHG emissions of urban environments.

Urban Infill: The development or re-development of urban plots of land that are vacant and/or have not been built up. Urban infill is a means of reducing urban sprawl by repurposing underutilized land and/or buildings.

Vision Zero: A strategy for creating safer streets for all, whether walking, biking, driving or taking transit, and regardless of age or ability. It is used around the world as a means of eliminating all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

Zero Emissions Transportation: Modes of transportation that do not directly produce greenhouse gas emissions (e.g., biking, driving electric vehicles).

Zero Waste: A movement and/or a practice in which an individual, organization or institution strives to reduce their disposable waste production as much as possible.

APPENDIX B

2021 CLIMATE ACTION PLAN CONTRIBUTORS

2021 ALBUQUERQUE CLIMATE ACTION TASK FORCE MEMBERS

Genesis Arizmendi, Postdoctoral Researcher & Instructor, University of New Mexico
Daniel Beaman, Special Projects Coordinator, Bernalillo County
Kevin Bean, Member, Rio Grande Chapter of the Sierra Club
Molly Blumhoefer, M.W.R., CLL & Sustainability Project Manager, CNM
Marcus Burnett, Chief, Kirtland Air Force Base
Theresa Cardenas, President Noble Renewables Group LLC & Past President Middle Rio Grande Water Advocates
Amy Carpenter, M.A., Multicultural Educator Josue De Luna Navarro, Fellow, The Institute for Policy Studies
Helga Garza, Executive Director, Agri-Cultura Cooperative Network
Solana Granados, Student, University of New Mexico
Sharon Hausam, Ph.D., AICP, Adjunct Faculty, University of New Mexico Community & Regional Planning, Indigenous Design + Planning Institute
Karen Leming, Vice President Board of Directors, New Mexico Autism Society
Cassandra Miller, Biology Graduate Student, University of New Mexico
Alex Montano, Senior Vice President, Yearout Energy Services Company
Emily Phan, Vice President, Fight For Our Lives
Chas Robles, Corps Director, Ancestral Lands Conservation Legacy
Tony Sparks, Project Manager, CxA, LEED AP, BOC, Albuquerque Public Schools
Tara Trafton, Account Manager, EMIT, Yearout Energy Services Company
Erica Velarde, P.E., Trane Technologies

2021 POLICY ADVISORS

Alaric Babej, PNM
Mayane Barudin, Vote Solar Baruch Campos, Together for Brothers
Luis Coluna, Together for Brothers
Tammy Fiebelkorn, Southwest Energy Efficiency Project
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Aryn LaBrake, Friends of Valle de Oro National Wildlife Refuge
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Michael Lucero, Indian Pueblo Cultural Center
Beverlee McClure, Indian Pueblo Cultural Center
Colin Messer, Land of Enchantment Clean Cities Coalition
Sarah Pierpoint, The New Mexico Recycling Coalition
Christopher Ramirez, Together for Brothers
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Kateri Sava, Albuquerque Public Schools: School Garden Program Endion Schichtel, Conservation Carnivale

2021 CITY OF ALBUQUERQUE STAFF

Ryan Mast, Director of the Environmental Health Department
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2021 NEW MEXICO FIRST STAFF

Lilly Irvin-Vitela, President and Executive Director
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Melanie Sanchez Eastwood, Deputy Director
Sharon Berman, Strategic Civic Engagement and Policy Manager
Wendy Wintermute, Share NM Policy Director

APPENDIX C

COMMUNITY ENGAGEMENT ROADMAP & RESOURCES

SUMMARY OF PAST OUTREACH

This PCAP was developed on the foundation of community engagement that dates back to 2020. This foundational work resulted in community-written recommendations to the City of Albuquerque to ensure climate action is reflected in the needs of frontline communities. Key components of this engagement include:

- July 2020, Public Survey Released.
- September 2020, CAP Task Force Started.
- October 2020, CAP Task Force Meetings Begin.
- January 2021, Draft Recommendation Released.
- February 2021, Public Comment Meetings Held.
- March 2021, Final CAP Task Force Meetings Concluded.
- April 22, 2021, Climate Action Plan Released.

Since the release of the 2021 Climate Action Plan,[64] the City of Albuquerque has made meaningful strides to implement the CAP Task Force suggestions and engage with continued community feedback. Examples of this include:

- September 8, 2022: First Annual Implementation Report released.
- September 28, 2022: Public update and feedback meeting held – Energy efficiency focus
- December 14, 2022: Public update and feedback meeting held – Transit and Vision Zero focus
- April 19, 2023: Public update and feedback meeting held – Electric vehicles focus
- November 27, 2023: Second Implementation Report released.[65]

In anticipation of receiving the award letter for the CPRG Planning Grant, the City of Albuquerque began to meet with key government stakeholders. This outreach was contracted out to Albuquerque-based Single Space Strategies and resulted in an initial list of near-term implementation- ready projects. To ensure the projects submitted met PCAP guidelines and community needs, recommendations from the CAP Task Force were utilized to inform targeted community outreach, which was completed during this timeframe.

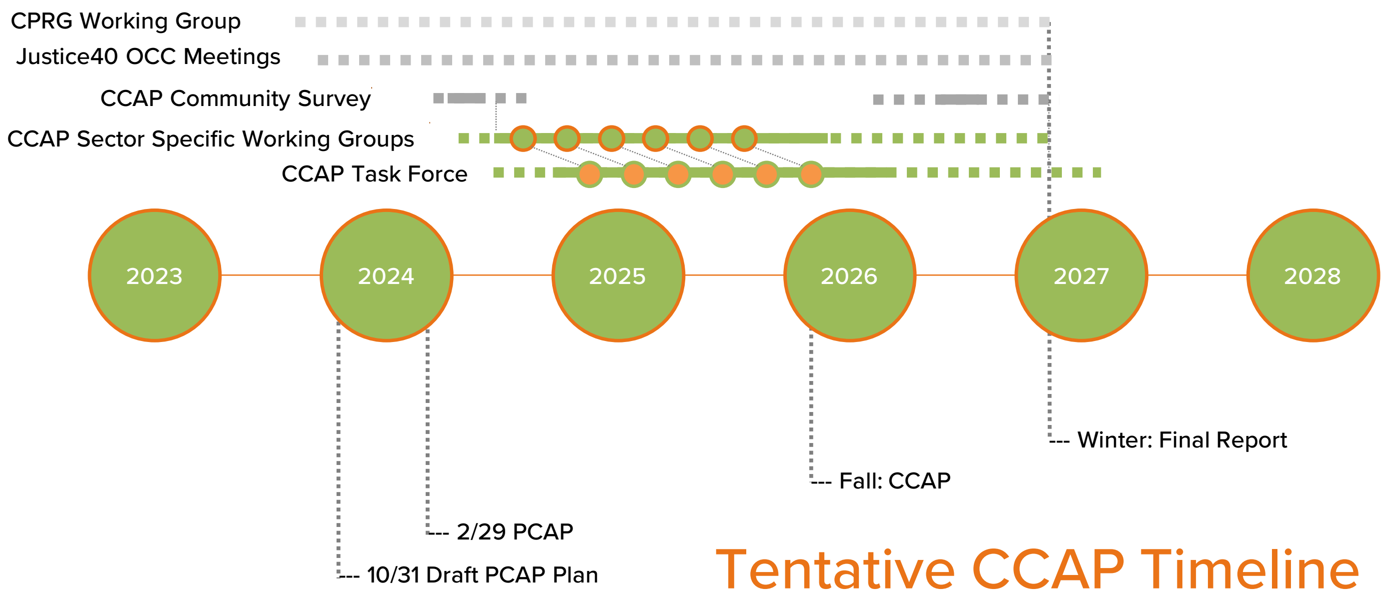
[64] "2021 Climate Action Plan," City of Albuquerque, 2021, https://www.cabq.gov/sustainability/documents/2021-climate-action-plan.pdf.

[65] Copies of the reports, meeting minutes, and other resources are available on the City's Climate Action Plan webpage (https://www.cabq.gov/sustainability/climate-action-plan#CAP-community-engagement).

- August 10, 2023: PCAP Working Group meetings begin.
- October 2023: CPRG becomes an ongoing agenda item for the Albuquerque Justice40 Oversight Coordination Committee (J40OCC) meetings.
- December 1, 2023: Initial draft of Priority Climate Actions List posted.
- December 2023 – January 2024: 8 meetings with stakeholders, 3 with the State of New Mexico, 4 with the State and other communities in New Mexico, and 4 meetings for other PCAP planning purposes.
- October 2023 – February 2024: Composting-specific research and community engagement conducted, including 50 interviews, 95 listening session attendees, and 70 survey respondents.
- December 2023: Invitation to participation shared across the MSA through the Mid-Region Council of Governments' network.
- December 4, 2023: PCAP Public Comment Meeting (hybrid) held in collaboration with the J40OCC (link to presentation slides; link to meeting recording; additional resources available on the City's Climate Action Plan webpage).
- December 15, 2023: PCAP Public Survey Posted/Released (eEnglish and sSpanish).

After receiving the award letter, additional community engagement was conducted to inform project development.

- January 2, 2024: CPRG Award Letter received.
- January 22, 2024: PCAP Public Survey closed.
- January 29, 2024: CPRG Manager hired.
- January – February 2024: Partner agency additional community engagement meetings held (27 meetings with community members, 50 stakeholder conversations).
    - South Valley Meetings:
        - January 24, 2024, Mountain View Community Center
        - January 25, 2024, Valle de Oro National Wildlife Refuge
        - January 30, 2024, Westside Community Center
        - February 1, 2024, Los Padillas Community Center
    - North Valley Meetings:
        - February 6, 2024, Paradise Hills Community Center
        - February 21, 2024, Raymond G. Sanchez Community Center
    - East Mountain Meetings:
        - February 7, 2021, Los Vecinos Community Center
- February 2024: Working Group amends projects to incorporate feedback.



Tentative CCAP Timeline

ANTICIPATED CCAP OUTREACH

To address gaps in meaningful community engagement, the CPRG Planning Program will work with the OEI and the J40 OCC to further build out and amend next steps. Below is the draft list of activities to enable meaningful outreach:

- Fill out the OEI Worksheet: Guide to Inclusive Community Engagement
- Conduct a Stakeholder Analysis
- Develop a pre-Task Force community-wide survey
- Develop an inclusive, community-based CCAP Task Force
- Develop sector-specific Working Groups to support the CCAP Task Force
- Develop a post-Task Force community-wide survey

RESOURCE LIST

Throughout the PCAP, planning documents and supplemental reports are incorporated to showcase important climate and equity work as it relates to comprehensive planning efforts. These include:

- The 2020 City of Albuquerque Greenhouse Gas Inventory (2008 – 2017 data)
- The City of Albuquerque 2021 Climate Action Plan
- Albuquerque Vision Zero Action Plan
- Albuquerque MSA Business Location Overview
- Connections 2040 Transportation Plan
- 2023 Climate Action Plan (CAP) Implementation Report
- 2022 CAP Implementation Report
- 2021 Urban Heat Watch Campaign Report
- 2019 Albuquerque Food and Agriculture Action Plan
- 2019 Optimized Municipal Electric Vehicle Charging Infrastructure Report
- 2023 Estimate of Food Waste and Rescue Potential in Albuquerque

APPENDIX D

Project Description			
Strategy	Measure Name	Brief Description	Submitting Agency
Sustainable Buildings (SB)			
Energy Efficiency for Frontline Communities	SB1: Community Energy Efficiency	Expansion of low income residential decarbonization across the MSA.	City of Albuquerque
Energy Efficiency for Frontline Communities	SB2: Multi-Family Decarbonization	Multi-faceted program to address energy burdens in low-income rental units.	City of Albuquerque
Green Buildings & Development	SB3: Community Center Efficiency & Education	Sub-grant program to develop cooling and education centers to share sustainability best practices to front-line communities.	Bernalillo County
Green Buildings & Development	SB4: Los Poblanos Open Space	Improvements at Rio Grande Community Farm to include a Solar Hay Shed and Incinerating Toilets.	Rio Grande Community Farm and City of Albuquerque
Renewable Energy (RE)			
Renewable Energy Development	RE1: College Solar Canopies	Building solar panel canopies at five Central New Mexico Community College (CNM) Campuses	Central New Mexico Community College
Clean Transportation (CT)			
Transit Access and Active Transportation	CT1: Transit-Oriented Development	Implementation of a transit plaza and mixed-use, affordable housing development in Uptown Albuquerque.	City of Albuquerque
Transit Access and Active Transportation	CT2: Bicycle Safety Corridors	Development of bike lanes from Bell Ave to Claremont.	City of Albuquerque
Transit Access and Active Transportation	CT3: Multimodal Rail Trail	Development of final segment of active transportation trail in Downtown Albuquerque.	City of Albuquerque
Transit Access and Active Transportation	CT4: Juan Tabo Connectivity Trail	Development of an active transportation trail connecting Tijeras Arroyo and Innovation Parkway.	City of Albuquerque
Vehicle Emissions Reduction	CT5: Transit Electric Vehicles	Purchase of electric vehicles for the City's transit department which service frontline communities.	City of Albuquerque
Vehicle Emissions Reduction	CT6: Municipal Fleet Electrification	Purchase of electric vehicles for the City's fleet which operate in frontline communities.	City of Albuquerque
Vehicle Emissions Reduction	CT7: College Fleet Electrification	Purchase of electric vehicles for Central New Mexico College, located in a LIDAC census tract.	Central New Mexico Community College
Vehicle Emissions Reduction	CT8: Aviation Shuttle Electrification	Purchase of electric shuttle buses for the Airport, located in a LIDAC census tract.	City of Albuquerque
Vehicle Emissions Reduction	CT9: Electrification of Parks Equipment	Purchase of electric alternatives for Parks equipment used in LIDAC census tracts.	City of Albuquerque
Vehicle Emissions Reduction	CT10: Balloon Fiesta Park Electrification	Purchase of electric vehicles and equipment at Balloon Fiesta Park.	City of Albuquerque
Vehicle Emissions Reduction	CT11 Golf Cart Electrification	Purchase of electric golf carts to replace conventional equipment, located in a LIDAC census tract.	City of Albuquerque
Vehicle Emissions Reduction Infrastructure	CT12: DC Fast Chargers	Install two DC Fast Chargers: downtown and at Route 66 Visitors Center, with solar canopies.	Bernalillo County
Vehicle Emissions Reduction Infrastructure	CT13: College Public Charging	Install publicly accessible Level 2 and Level 3 Fast Charging EV stations and infrastructure.	Central New Mexico Community College
Waste & Recycling (WR)			
Waste Reduction and Composting	WR1: Food Waste Prevention & Composting	Scalable food waste prevention program targeted at small, local restaurants.	City of Albuquerque
Waste Reduction and Composting	WR2: Tribal Landfill Diversion	Divert food waste and green waste from the Pueblo of San Felipe's transfer station & develop low GHGe composting solutions.	Pueblo of San Felipe
Waste Reduction and Composting	WR3: Municipal Green Waste	Purchase of Bioreactor to divert park and open space green matter from the landfill.	City of Albuquerque
Climate Conscious Neighborhoods (CN)			
Sustainable Land Use Planning & Practices	CN1: County Green Stormwater Infrastructure	Installation of street trees and green stormwater infrastructure in frontline communities in the South Valley.	Bernalillo County
Sustainable Land Use Planning & Practices	CN2: City Green Stormwater Infrastructure	Installation of street trees and green stormwater infrastructure in frontline communities across Albuquerque MSA.	City of Albuquerque
Greening Efforts in Frontline Communities	CN3: Tree Plantings & Inventory	Research to expand tree plantings and inventory in low-income neighborhoods.	City of Albuquerque

Sector							CAP Sub Sector															COMPETITIVENESS										
Industry	Electricity Generation and/or Use	Transportation	Commercial & Residential Building	Agriculture	Natural & Working Lands	Waste & Materials Management	Active Transportation & Transit Safety	Climate Emergency Mobilization Efforts	Economic Investment	Energy Efficiency for Green Buildings & Development	Greening Efforts in Frontline Communities	Job Creation in Frontline Communities	Public Sustainability Education	Recycling, Composting, & Waste	Renewable Energy Development	Sustainable Development & Land Use Planning	Transit Access & Investment	Transit Public Education	Vehicle Emissions	Water Conservation & Smart Planning	Other	Greenhouse Gas Emissions Reduction Estimate (metric tons CO2e, 2025-2030)	Greenhouse Gas Emissions Reduction Estimate (metric tons CO2e, 2025-2050)	Funding Request	$/metric tons GHGe	LIDAC Benefits (Achieves multiple LIDAC benefits/aligns with LIDAC priorities 4 = best, 0 = worst)	Matching/Leveraging Funds	Demonstration of Need	Added jobs?	Authority to Implement?	Previous community engagement?	Project review overal score (4 = best, 0 = worst)
	x		x			x				x	x	x	x	x								839	9,680	$20,263,000	$24,151	4	x	x	x	x	x	3.4
	x	x	x			x	x		x	x	x	x	x	x					x	x		1,593	18,175	$5,468,000	$3,433	4	x	x	x	x		3.4
	x	x	x			x			x	x			x	x	x				x	x		11,696	62,182	$17,678,197	$1,511	3				x	x	3.1
	x			x		x							x	x						x		450	2,702	$151,235	$336	-		x	x	x	x	-
	x														x							1,105,545	7,800,000,000	$5,000,000	$5	2			x	x		2.8
		x	x				x		x	x						x	x	x	x			895	9,849	$7,000,000	$7,818	3	x	x	x	x	x	3.2
		x					x									x						21	448	$4,500,000	$210,743	3		x	x	x	x	2.8
		x					x		x		x					x	x		x			4	23	$12,000,000	$2,997,003	3	x		x	x	x	3.2
		x					x									x	x		x			0.2	1	$260,000	$1,453,846	3	x	x		x	x	2.6
	x	x															x		x			13,546	67,728	$37,935,000	$2,801	3		x		x	x	3.4
		x																	x			1,060	9,729	$7,225,000	$6,817	2				x	x	2.9
		x																	x			731	4,965	$1,584,000	$2,167	2				x	x	2.7
		x																	x			256	1,716	$1,210,000	$4,736	1				x		2.2
		x																	x			233	1,167	$1,414,048	$6,057	1				x		1.8
	x	x																	x			20	100	$528,532	$26,334	1		x	x	x		2.2
		x																	x			22	110	$400,000	$18,232	1		x	x	x		2.2
		x																	x			8,000	48,000	$2,975,000	$372	2				x		3
	x	x																	x			529.8	2,649	$800,000	$1,510	3				x		2.9
						x							x	x								135	1,003	$500,000	$3,704	3	x	x	x	x	x	3.2
						x								x								685	3,293	$451,450	$659	4		x		x	x	3.2
				x	x	x					x		x	x		x				x		38	165	$438,000	$11,487	2				x	x	2.7
					x						x		x			x				x		131	658	$1,550,000	$11,832	4	x	x	x	x	x	3.2
					x						x		x			x				x		13	1,054	$3,000,000	$227,964	3	x			x		2.9
				x	x				x		x		x			x				x		56,144	112,289	$4,750,000	$85	3	x			x	x	2.6

APPENDIX E

MEASURES

Sustainable Buildings (SB)	SB1: Community Energy Efficiency SB2: Multi-Family Decarbonization SB3: Community Center Efficiency & Education SB4: Los Poblanos Open Space
Renewable Energy (RE)	RE1: College Solar Canopies
Clean Transportation (CT)	CT1: Transit-Oriented Development CT2: Bicycle Safety Corridors CT3: Multimodal Rail Trail CT4: Juan Tabo Connectivity Trail CT5: Transit Electric Vehicles CT6: Municipal Fleet Electrification CT7: College Fleet Electrification CT8: Aviation Shuttle Electrification CT9: Electrification of Parks Equipment CT10: Balloon Fiesta Park Electrification CT11: Golf Cart Electrification CT12: DC Fast Chargers CT13: College Public Charging
Waste and Recycling (WR)	WR1: Food Waste Prevention & Composting WR2: Tribal Landfill Diversion WR3: Municipal Green Waste
Climate Conscious Neighborhoods (CN)	CN1: County Green Stormwater Infrastructure CN2: City Green Stormwater Infrastructure CN3: Tree Plantings Inventory

The City of Albuquerque does not claim the accuracy of greenhouse gas calculations submitted by other agencies.

SB1: COMMUNITY ENERGY EFFICIENCY

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Program consisting of 4 areas, (1) infrastructure in the form of building (single family/ and multi-family homes) energy efficiency retrofits/improvements for low-income residents throughout the Albuquerque Metropolitan Statistical Area (MSA) LIDAC communities as determined by the combined layer of CEJST and EJScreen census tracts created by the EPA for this grant program, (2) food waste prevention and composting education and tools, (3)workforce development within these areas, creating quality jobs and engagement within these areas by hiring local residents when possible, and creating careers within the resiliency themes of energy efficiency, waste reduction, and sustainability, and, (4) an educational campaign focused on the benefits of proper weatherization retrofits, energy efficiency, waste prevention and reduction, building community resilience and providing information most valuable to low-income residents.

Project/Program Alternate title:

Community Resiliency Program
SB1: Community Energy Efficiency

Mechanism

Through partnering with local community-based organization Prosperity Works, a community-to-community model will be used for identifying, qualifying and scheduling work. In this model, trusted and known community organizations identify community leaders who are trained and compensated by Prosperity Works to conduct outreach. This is an essential approach to overcoming the trust barrier that is broadly held by limited income people who have had less than optimal experiences with the entities that are supposed to "serve" them. Individuals conducting said work within the communities are trained and compensated through Prosperity Works to do that work.

List any potential risks for this mechanism

This measure is grounded in the success in the existing City of Albuquerque program. With the City as the Administrator, and more households in need than this funding will cover, the City will ensure that the community organizations are able to continue the City's successful model. Since the community energy efficiency program is currently funded through City allotment, grant funds such as these are imperative to the continued success and impact of this program.

Transformative Impact (i.e., scalability/replicability)

This measure will create transformative change within the Albuquerque MSA's identified LIDAC communities and will not only reduce GHGe, but also create safer, more resilient communities for generations to come.

The most transformative work is the work that will create change not only quantitatively but holistically within communities. When there is a reduction of the energy burden, there is an increase in energy equity, and with further implementation of climate change mitigation strategies low-income residents can focus more on quality of life. As public servants the City of Albuquerque prioritizes comfort and safety of residents in the fight against climate change, along with opportunities to help expand the program to the broader region (the Albuquerque MSA).

Focusing on tools to create changes in behavior and save community members money, is key for creating transformational changes in the residential sector. The food waste prevention component of this measure can result in savings of up to $1,500 per year for a 4-person household, which does not include the additional array of benefits from composting. By working on multiple areas of the food system (food waste prevention and composting), this measure aims to transform the linear system from the consumer to disposal by infusing circularity, strengthening the local food system, reducing greenhouse gasses and increasing the soil's ability to further store carbon, and providing a wide array of other benefits. This component can be easily replicated and scaled to whole communities, hub distribution sites, or other regions.

Key Implementing Agencies

City of Albuquerque - Administrator

Partners

Prosperity Works – Contractor
EnergyWorks - Subcontractor
Office of Financial Empowerment, Bank On - Project Supporter

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The Community Energy Efficiency Project which is the model the Community Resiliency Project is based on, was launched in 2021. Since its inception, there have been "phases" launched annually, with each contract renewal. To date the Community Energy Efficiency Project has serviced 47 houses in Albuquerque's LIDAC communities.

For the food waste component, The City developed a "Waste as Resources" webpage with food waste and composting sections along with educational content posted on social media, and talking with community members to create a foundation for this work.

Progress between March 1st and October 1st (if any)

Positioning.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Contract procurement: October through December 2024

- Contract period: January 2025 through August 2029
- Identify homes: January 2025 through June 2025
- Conduct initial assessment and provide services to homes: May 2025 through July 2029
- Contractor final report: Due August 2029

Geographic Scope

LIDAC communities in the Albuquerque MSA. The specific tract numbers are listed in the “Impacts on Low-Income and Disadvantaged Communities” section.

Metrics for Tracking Progress:

EnergyWorks will collect the data required to complete the energy savings and carbon avoidance calculations for each home. The analysis will be based on the New Mexico Technical Resource Manual for the Calculation of Energy Efficiency Savings, leading industry standards, and resources from the Department of Energy and Environmental Protection Agency. A report of all services and savings will be provided for each home.

EnergyWorks will maintain written and photographic notes of all services provided to each home. This includes the pre and post condition and a detailed energy assessment of the home, as related to the energy efficiency services. EnergyWorks will maintain all notes, reports, records, and provide any requested documentation.

For the food waste and composting component, metrics include toolkits handed out, survey responses, and waste audits (before and after sharing the toolkit and education materials). All data will be collected according to best practices.

Cost Estimates for Implementation:

Unit Cost

Service	Description	Average Cost
Home Energy Assessment	Comprehensive review of home to determine energy saving opportunities and blower door air leakage test	$800.00
Weatherization	LED lighting, advanced power strips, water tank and pipe insulation, air sealing including caulking windows, sealing penetrations, and installing weather stripping, duct sealing including return air plenum, connections, and joints, and attic insulation.	$3,800.00

Service	Description	Average Cost
Electrical Service Upgrade	Install 200 Amp Service Panel	$8,000.00
HVAC - Ductless Minisplits	Install high efficiency air source heat pump	$16,000.00
Water Heater	Install high efficiency heat pump water heater	$3,300.00
EnergyStar Roof	Install EnergyStar rated roof	$14,000.00
EnergyStar Windows	Install double pane EnergyStar rated windows	$7,500.00
EnergyStar Doors	Install EnergyStar rated exterior doors	$4,500.00
Water conservation	High efficiency shower heads, faucet aerators, and chair-height toilets	$900.00
Wi-Fi Thermostats	Google Nest Smart Thermostat	$250.00
Rooftop Solar	Install rooftop solar panels	$22,000.00
EV Charging	Level 2 EV Charger	$2,200.00
Battery Storage	Residential battery storage system	$12,000.00
Food Waste Prevention and Composting (for 265 homes)	Supplies (bilingual education materials, and printing): $20,000 Materials (food waste prevention toolkit and home composting starter kit): $75,000 Contractual Labor (resident education materials hand out, surveys and waste audit): Equivalent of 1 FTE @ $60K for 2 years (+30% fringe): $168,000	$263,000

Total Cost

$20,263,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

$20,263,000/835 MTCO2e = **$24,265.00/MTCO2e**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
The City of Albuquerque, along with Bernalillo County (stipulated as a subrecipient) recently submitted an application for the State of New Mexico's Community Energy Efficiency Development Block Grant (CEED). The amount requested is $2 million (split between the City and County), the areas that will be served if granted will be CEJST LIDAC census tracts in the Albuquerque MSA. There has been no award notice. Aside from direct allocation from individual local governments, and the CEED program, no other funding opportunities currently exist for this resiliency work.

For the food waste prevention and composting component, currently, no available funding sources are known. Past relevant funding opportunities, EPA's Recycling Education and Outreach opportunity–if there is another round; NRDC's Food Matters project assistance–these funds are often too small to cover this project.

What other funding sources have you secured for this same GHG measure (if any)?
The City of Albuquerque, through City Council is allotted $100,000 annually for this specific project.

For the food waste prevention and composting component, no other funds have been secured to date.

Demonstration of funding need: How are requested funds filling an existing funding gap?
Currently, the Community Energy Efficiency Project is limited to the allotted $100,000 from City Council. While this amount is a great step in the right direction, it's limiting to what can be improved at a residence. For example, if a house is in need of replacement of their swamp cooler for an HVAC unit the roof needs to be in good condition to withstand the replacement and weight of the new unit. With the funds the project currently receives it's not possible to replace the roof and the swamp cooler, there is currently a cap of $8,000 per household.

Energy efficiency improvements that have been implemented in past phases for a smaller region (within Albuquerque city limits) include LED lighting, advanced power strips, high efficiency shower heads and faucet aerators, water tank and pipe insulation, air and duct sealing, programmable/smart thermostat, high efficiency toilets, evaporative coolers, and attic insulation. Residential safety measures include smoke alarms, carbon monoxide detectors, and kitchen fire extinguishers. Deep energy efficiency improvements (which will be implemented using grant funds) will include electrical panel upgrades, HVAC units (mini-splits or stand-alone), water heaters, Energy Star® roofs, windows, and doors.

If awarded, the deep energy improvements mentioned above are imperative to creating safe, comfortable spaces for the City's LIDAC residents, and ensuring resilience to climate change for current and future generations.

The other potential funding opportunities (CEED and City of Albuquerque allocation) do not provide sufficient funding to serve the residents of the City's LIDAC communities. The funds do provide critical support, but are not sufficient to meet the great need.

For the food waste prevention and composting component, the City was not positioned for EPA's Recycling Education and Outreach funding opportunity in 2022-2023. Now, there are no other known opportunities on the horizon for this type of work.

Benefits, Primary:

GHG Emission Reductions[1]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Total: 839 metric tons of CO2 equivalent (MTCO2E)

- Energy efficiency: 835 MTCO2E, based on 60 homes being serviced per year.
- Food waste prevention and composting: 3.9 MTCO2E

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Total: 9,680 MTCO2E

- Energy efficiency: 9650 MTCO2E, based on 60 homes being serviced per year
- Food waste prevention and composting: 29.9 MTCO2E

Data source(s) and assumptions

Initiative	Sources and Assumptions
Energy Efficiency	The City of Albuquerque Community Energy Efficiency (CEE) has successfully coordinated projects that help improve the health, safety, and energy efficiency of homes in neighborhoods with the highest energy burdens. The energy burden is a way to measure the cost of energy relative to a family's income and research suggested that many families were struggling to keep up with their energy bills and still afford rent, food, and medication. Prosperity Works in collaboration with local community organizations and local liaisons identified residents in need of clean energy services and resources. In collaboration with existing energy efficiency programs provided by New Mexico Gas Company, PNM, and Albuquerque Bernalillo County Water Utility Authority, Prosperity Works and the City of Albuquerque delivered comprehensive benefits to residents. The projects have provided critical services to 47 homes. Services have included EnergyStar roofs, air source heat pump HVAC systems, high efficiency water heaters, LED lighting, advanced power strips,

[1] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

	high efficiency showerheads and faucet aerators, water heater tank and pipe insulation, air sealing, duct sealing, and high efficiency chair height toilets, and attic insulation. The Community Energy Efficiency program is an innovative model for the delivery of energy-saving services. The combination of energy efficiency programs, collaboration with neighborhood leaders, and referral to other social services provides a comprehensive resource to help residents reduce their energy burden, reduce their carbon footprint, and fight climate change. The services provided through the CEE program will improve the efficiency of the home, lower the utility bills, and save electricity, natural gas, and water resources.
Food Waste Prevention and Composting	Background: WRI's residential campaign study results showed a 20% reduction in food waste (though there are challenges to that number as well); USDA estimates that 290 pounds of food is wasted per capita per year, which means the program could reduce up to 58 pounds (0.029 tons) of food waste per person per year. Using census data for the average household size in Albuquerque MSA of 2.4 people, with 60 homes serviced per year during this project, the impact is (2.4*60= 144 people). Impact: (0.029*60) 1.74 tons each year and compounding during the grant period, since 60 homes are serviced each year. For the GHG calculation, using the EPA WARM Tool, version 16, for composting (a conservative calculation since the reduction will be through prevention, which has a higher GHG reduction value) for 1.74 tons yields 0.26 MTCO2E reduction per year and compounding during the grant period, since 60 homes are serviced each year. Assumptions: Since this program works with people who are interested in the programs and provides home composting education and a toolkit in addition to food waste prevention, it is assumed that all of the potential to prevent waste is prevented/composted starting after the household is serviced and is maintained for the duration of the project. More research is needed to inform these estimates. (found 0 studies to reference, so used conservative numbers). Food Waste Prevented/Diverted: 8.7 tons per site tons in the first year. 2025-2030 Calculation: GHG = 3.9 = 0.26*5 +0.26*4 +0.26*3 +0.26*2 +0.26*1 2025-2050 Calculation: GHG = 29.9 =0.26*25 +0.26*24 +0.26*23 +0.26*22 +0.26*21

Co-benefits, Secondary:

Health Benefits

While reduction of GHGe on its own has positive environmental impacts, community resilience will have various positive impacts, including, reduction of air pollutants like those emitted from gas appliances and antiquated HVAC systems, increased safety from replacing inefficient electrical systems and panels, increased thermal comfort from energy efficient windows, doors, and appropriate insulation; with the most impactful health benefit being the overall improvement of quality of life for residents.

Food waste prevention educational materials will teach people how to use their senses to understand if items are still good to eat, which can reduce food-related illness. It will also provide materials on how to best store perishable foods, increasing the amount of healthy foods consumed instead of wasted.

Composting has multiple health-related benefits including:

- Increased outdoor physical activity
- Recycles nutrients from input items that is available to grow local food without the need for synthetic fertilizers that contain nitrosamine, a chemical that has been linked to contributing to health issues (Alzheimer's disease, diabetes mellitus, non-alcoholic steatohepatitis, and pro-inflammatory cytokine activation).
- Creating compost at home can be used on home gardens, which yield more nutritious produce than commercial foods.

References: ILSR's Community Composting and Priority Climate Action Plans Guide, Farhidi, Madani, Crichton, *Environmental Health Insights*, 2022.

Environmental Benefits

A. Reduction of energy use that will come from implementation of the proposed measures: 841,600 kWh annually – 11,658,970 kWh lifetime energy savings
B. Reduction in carbon intensity of energy consumption from implementation of the proposed measures: 835 tons of $CO2$ reduced annually, 9560 tons of lifetime reduction
C. Other identified measured impact(s): Estimated annual reduction of 70,500 Therms, and 2,255,230 gallons of water per year,

Air Quality Benefits

Aerobically recycling the nutrients in food locally avoids methane emissions that occur when food waste is deposited in the landfill. Local (i.e., household) collection, processing, and application also avoids GHG emissions from transportation. Applying the finished compost on home or community gardens/soils builds healthy soils, which also reduces erosion and airborne particulate matter during and after high wind events.

Water Quality/Quantity Benefits

It is anticipated that this measure will save 462,840 gallons of water per year, for the anticipated 265 households that will be serviced.

In a region where water is scarce and soils are often depleted, increasing resident's ability to create their own high-quality soil amendment material and encouraging local application of the material will provide much needed water quality and quantity benefits. The semi-arid region is known for sediment laden stormwater runoff and flooding during rain events. Local application of finished compost increases the soil's ability to absorb and retain water, which reduces runoff and erosion during rain events. Giving the soils more capacity to soak up and hold water, reduces erosion and increases water conservation. As water infiltrates into soils, the soil acts like a filter, cleaning the water as it moves through the system. All these water quality and quantity benefits are especially important in arid and semi-arid regions such as the Albuquerque MSA, which frequently experiences drought followed by high intensity rain events. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Land & Soil Benefits

In the arid and semi-arid Southwest, soils tend to be depleted of organic matter. Applying finished compost, adds much needed organic matter to the depleted, semi-arid soils, which increases nutrient content, improves plant growth, and helps regenerate the soils. Using compost as a soil amendment material helps soils retain moisture, which supports water conservation—especially important for semi-arid environments. Soils augmented with compost are also able to soak up more rainfall, which allows the soils to serve as a filter and improve water quality while also reducing erosion. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Ecological Benefits

Prosperity Works has worked closely with local utilities to coordinate the energy efficiency improvements listed above. They will be able to utilize these energy efficiency programs to supplement the CEED funding and maximize benefits for residents. If awarded, the deep energy improvements mentioned above are imperative to creating safe, comfortable spaces for the City's LIDAC residents, and ensuring resilience to climate change for current and future generations.

The composting process cultivates an ecosystem of small organisms that break down the organic material so that the nutrients once trapped in the food and green waste will again be available, instead of being trapped in a landfill. Finished compost is considered stabilized organic matter, which has a variety of beneficial uses including soil restoration, carbon sequestration, and replacing or reducing the need for synthetic chemical inputs that have negative environmental inputs. Applying compost also increases increasing soil microbe biodiversity, which leads to healthier soils. Reference: Pergola, M., et al., Science Direct, 2018.

Economic Benefits

A. Reduction of energy cost that will come from implementation of the proposed measures: $13,403 annually (this includes kWh, Therms, H_2O use reduction, and total tons CO_2 eliminated), $219,487 lifetime cost savings.

B. Average impact by household: $223 annual cost savings, $3,658 lifetime cost savings
C. Aggregated impact of the project: $13,403 of estimated energy savings per 60 households.
D. Number of project participant underserved households: 265
E. Avoiding costs for purchasing soil amendment material to grow food at home.
F. Preventing food waste can save residents up to $1,500 per year for an average 4-person household (USDA).
G. Teaching people how to generate compost at home (i.e., locally) saves residents money and provides access to soil amendment material that supports a resilient food system and can spur the local, home -and neighborhood-scale urban agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., Sustainability 2020, 12(11):4456.

Total Cost of Ownership

N/A, services are provided. Any procured items will be distributed to residents.

Workforce Needs & Quality of Jobs

Prosperity Works strives to include members of Albuquerque's LIDAC communities throughout the Community Energy Efficiency Projects. In addition, community liaisons that are used to help residents apply to the program, are compensated for their work, and reside within these communities. With grant funds, more liaisons will be needed to secure the applicants necessary. These community liaisons will also be able to connect residents with other resources. The food waste prevention and composting portion will add the equivalent of 1 FTE for 2 years. Success of this measure will serve as a foundation for further scaling the work and the workforce to support these services.

Prosperity Works will recruit and train local contractors so they can provide energy efficiency, electrical, and HVAC services through the program. Contractors will be connected to all regional apprentice and training programs to access additional employees. The use of local contractors builds capacity and longevity. The knowledge and skills they gain while working in the program will enhance their future opportunities to succeed in the clean energy transition. These jobs provide above average wages and benefits and will continue to be in high demand for the future.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

All of the work in this measure will be focused in LIDAC tracts in the Albuquerque MSA Here is a list of all 80 LIDAC tracts in the Albuquerque MSA: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200, 35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004602, 35001004604, 35001004712, 35001004713, 35001004715, 35001004716, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, 35001004749, 35001940700, 35043010503, 35043010713, 35043010716, 35043010900, 35043011000, 35043011200, 35043940200, 35043940500, 35043940600, 35043940700, 35043940900, 35057963201, 35057963202, 35057963600, 35057963700, 35061940300, 35061970101, 35061970102, 35061970301, 35061970302, 35061970303, 35061970401, 35061970901, 35061970902, 35061971000, 35061971100, 35061971300.

Summary of past/ongoing community engagement

Applying for the CPRG implementation funds will allow this program's reach to go further into communities the City of Albuquerque alone can't reach. The combined capacity and expertise of all entities, will ensure the greatest amount of benefit can be achieved for our community.

Prosperity Works (contractor) energy equity work is grounded in clean and affordable solutions. They believe the only way to meet State clean energy goals is with strategies that include low-income communities. The energy burden is high in many New Mexico communities, which is why Prosperity Works is involved in every step of the Community Energy Efficiency Project. They strive to build strong relationships within our LIDAC communities and find equitable energy solutions.

Past Community Engagement: The City of Albuquerque's 2021 Climate Action Plan was developed as a result of extension community engagement and contains goals supporting community energy efficiency, composting and waste reduction education.

Other Composting Community Engagement: Currently, the City of Albuquerque has partnered with FUSE Corps to host an Executive Fellow focused on conducting community engagement and designing an equity-focused citywide composting program, Since the Fellow started on October 30th, 2023, this effort has involved 15 community meetings, over 15 stakeholder meetings, a digital feedback from, and the formation of 4 working groups to support the program design. A summary of community feedback from these meetings can be viewed here: https://www.cabq.gov/sustainability/documents/compost-listening-tour-summary_02-2024.pdf.

Priority Climate Action Community Engagement: The following shows what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement).

- Community energy efficiency had 52 responses:
    - 43 selected high benefit
    - 5 selected medium benefit
    - 3 selected low benefit
    - 1 selected no perceived benefit

- Food waste prevention (Residential and Restaurant work was grouped in the survey) had 53 responses:
    - o 37 selected high benefit
    - o 9 selected medium benefit
    - o 6 selected low benefit
    - o 1 selected no perceived benefit
- Community-centered composting had 54 responses:
    - o 27 selected high benefit
    - o 22 selected medium benefit
    - o 4 selected low benefit
    - o 1 selected no perceived benefit

A list of comments collected on these components through the PCAP community engagement effort are provided as a supplement at the end of this document.

Benefits to LIDACs

The Community Energy Efficiency Project creates household impact through energy efficiency improvement. By relieving the energy burden on our LIDAC residents, they are able to get closer to financial stability, supporting families and communities, improving resiliency, and creating an equitable economy. Specifically, this project will service 265 homes in historically disadvantaged communities, maximizing funds provided through the CEED Block Grant, through use of Prosperity Works capital stacking model for capturing all available resources. This approach has allowed Prosperity Works to become the trusted entity for providing the resources that are available from utilities for limited income populations, and from municipal jurisdictions and their agencies. In addition, since all homes serviced as part of this work will be located in LIDAC tracts, 100% of the benefits mentioned in the co-benefits section will be seen in LIDAC communities.

Disbenefits to LIDACs

There are no anticipated disbenefits.

Authority to Implement Measure:

The City has the authority and experience to serve as the administrator and implementation manager for this measure. If funding is awarded, City Council and Mayor approval will be needed, and the City will adhere to federal procurement policies for contractor procurement. Time for the needed procurement and approval process is accounted for in the timeline for this measure.

Supplement: Comments from PCAP Community Engagement

Community Energy Efficiency

- Community Energy Efficiency Project - Renters are struggling, sometimes becoming homeless. High utility bills make it worse. What projects could help renters in this "renters' crisis"??
- I would love to see the Community Energy Efficiency Project move forward.
- How will you identify the folks for the community engagement project?

Restaurant and Residential project: See Supplement at the end of WR1: Food Waste Prevention & Composting

Community Composting:See Supplement at the end of WR1: Food Waste Prevention & Composting

SB2: MULTI-FAMILY DECARBONIZATION

Priority Climate Action Plan (PCAP) Appendix

Measure Description:

This measure stacks decarbonization initiatives to effectively decarbonize low-income multi-family housing complexes located in LIDAC tracts within the Albuquerque Metropolitan Statistical Area (MSA). Each component is listed below:

- Retrofits: Infrastructure in the form of building energy efficiency retrofits/improvements for low-to-medium income multi family units (estimates based on a minimum reach of 20 buildings or 160 units).
- Clean Transportation: Provision of clean micro mobility methods for renters in units serviced, such as an electric scooter or bike, and installation of EV chargers.
- Education: Financial literacy and food waste prevention/composting education for all units.
- Waste Diversion: On-site community-centered composting or food waste collection for about 10 buildings.
- Policy: Development and advocacy for energy disclosure policy of rental units across the MSA.
- Jobs: Expansion of Job Training Albuquerque program for energy efficiency projects and employment of individuals in the LIDAC tracts serviced.

Project/Program Alternate title:

Multifamily Decarbonization in the Albuquerque MSA
SB2: Multi-Family Decarbonization

Mechanism

Through partnering with local community-based organization Prosperity Works, the PNM Trade Ally network, PNM Multi-family rebate program, the Office of Sustainability, the Office of Financial Empowerment, and deploying policy actions, this measure will leverage existing resources to overcome traditional barriers to energy burdens for those living in low-income rental units. In this model, the PNM Multifamily rebate program and Prosperity Works will work together to identify qualifying multi-family buildings to receive these all-encompassing decarbonization upgrades. These upgrades will include PNM's current multi-family rebates for lighting and energy star refrigerators, Prosperity Works' capital and resource stacking model, and the additional incentives included in this measure. PNM Trade allies and community leaders, trained through Prosperity Works, will provide the retrofits and educational resources for other available programs, such as financial literacy, social services, food waste prevention, etc.

This measure brings together the best of Prosperity Works Low Income EE program and the Elevate Energy Multi-Family program. For owners of affordable multifamily buildings, it offers a "one-stop hub" approach which helps overcome traditional barriers preventing owners from investing in efficiency improvements. For renters, it offers a community-to-community approach to overcoming the trust barrier that is broadly held by limited income people who have had less than optimal experiences with the entities that are supposed to "serve" them.

List any potential risks for this mechanism

This measure is grounded in the success in an existing City of Albuquerque program for single-family housing. With more multi-family households in need than this funding will cover, the City, as the Administrator, will ensure that the community organizations are able to continue the City's successful model. Another risk is that multi-family housing owners may not want to participate. Tenants have little control over what modifications and/or upgrades they are allowed to do to their individual units. As such, they are almost completely reliant upon the good faith efforts of property owners to make improvements. This will be mitigated by focusing on existing partners who have relationships with multi-family property owners who are interested in the program and/or have previously participated in some sort of energy efficiency program. Similarly, there is a risk that not all buildings are good fits for EV charging stations or a community compost bin program. This risk is mitigated by budgeting for only half of the buildings to receive these services. It is also mitigated by having two options for composting: onsite composting (i.e., community composting) and a composting drop-off hub, which can have a smaller footprint.

Finally, as weatherization improvements are made to multi-family buildings, indoor air quality problems can be exacerbated. This risk can be mitigated by taking special care to ensure pollution sources are removed (such as mold, radon, etc.) and proper ventilation and moisture management is employed. Utilizing the EPA's Master Verification Checklist will further ensure this measure improves indoor air quality.

Transformative Impact (i.e., scalability/replicability)

This measure will create transformative change within the Albuquerque MSA's identified LIDAC communities and will create safer, more resilient communities for generations to come. The most transformative impact of this measure is the reduction of low income energy burdens and an increase in energy equity. Additional mechanisms in place expand upon this and provide these families with quieter, cleaner, and more accessible homes thanks to window upgrades, electrification, and electric mobility, respectively.

The holistic approach this measure employs, directly addresses some of the largest barriers low-income renters face. All activities are targeted towards building personal wealth, health, and safety. For example, financial literacy can flip the cycle of intergenerational debt to intergenerational wealth, electric mobility mechanisms provide immediate and long-term access to transportation technology, and food waste prevention can result in savings of up to $1,500 per year for a 4-person household.

Key Implementing Agencies

Measure Roles	Assigned

Administrator, Implementation Coordinator	City of Albuquerque
Project Manager	Office of Sustainability
Project Implementers	Prosperity Works/Energy Works or DNV
Project Support	PNM & PNM Trade Ally Network DNV Multi-family program Job Training Albuquerque Office of Financial Empowerment, Bank On Burque

IMPLEMENTATION SCHEDULE & MILESTONES

Previously completed implementation? (if any)

The following are existing programs related to this measure:

- Retrofits: The Prosperity Works Low Income EE Program, was launched in 2021. Since its inception, there have been "phases" launched annually, with each contract renewal. To date the Community Energy Efficiency Project has serviced 47 houses in Albuquerque's LIDAC communities. In 2023, the PNM Multi-Family Energy Efficiency Rebate Program serviced 20 projects at 19 properties for a total of 1,463 units in 2023. Most upgrades focused on LED lighting in common areas and switching to Energy Star-certified refrigerators in-unit. This resulted in 1,950,332 kWh in savings across all projects.
- Clean Transportation: Since 2019, the City of Albuquerque has installed sixteen (16) publicly-accessible Level 2 EV charging stations throughout the City. In February 2024, the City of Albuquerque and non-profit Forth successfully launched AMP, New Mexico's first EV car share program located at a low-income multifamily community.
- Education: For financial literacy, the City of Albuquerque's Bank On Burque program has existing training, programming, and resources targeted towards the city's unbanked population. For food waste prevention, the City of Albuquerque developed a "Waste as Resources" webpage with food waste and composting sections along with educational content posted on social media.
- Waste Diversion: The City of Albuquerque Office of Sustainability constructed four community composting sites in May/June 2023 the Albuquerque MSA as part of 7 new sites in the State.[2] The City has also partnered with FUSE Corps to host a fellow who has conducted composting-focused listening sessions.
- Policy: No development has occurred, however existing policies do exist.
- Jobs: The City of Albuquerque has partnered with the Central New Mexico Community College (CNM) to provide Job Training Albuquerque. The program provides free training for people to gain necessary skills in order to fill gaps and meet the workforce needs of

[2] Details on the community composting sites is available here: https://www.nmhealthysoil.org/community-composting/

existing and potential employers. [From 2020-2023](), the program has skilled-up 622 employees, created 544 jobs, engaged 152 small businesses & non-profits, and assisted in driving $23 million in annual wage earning increases.

Progress between March 1st and October 1st (if any)

Prior to the anticipated start date, the following progress will be made on existing programs related to this measure:

- Retrofits: The PNM Multi-Family Energy Efficiency Rebate Program will continue to reach out to multifamily units across the MSA to prequalify sites for implementation.
- Clean Transportation: none anticipated.
- Education: The City will provide food waste prevention social media and web-based content for Food Waste Prevention Week (April 1-7) and periodically during that time period.
- Waste Diversion: The City will continue to operate the two sites on City properties.
- Policy: Research of existing policy will commence. Policy will be drafted and routed for approval through the Mayor's office.
- Jobs: The City's Economic Development Office and CNM will ensure programming specific to energy transition jobs is available from September 2024 - August 2029.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Contract procurement: October through December 2024.
- Contract period: January 2025 through August 2029.
- Identify multi-family buildings: January 2025 through June 2025.
- Conduct initial assessment and provide services to multi-family buildings: May 2025 - July 2029.
- Contractor final report: August 2029.

Geographic Scope

LIDAC communities in the Albuquerque MSA. The specific tract numbers are listed in the "Impacts on Low-Income and Disadvantaged Communities" section.

Metrics for Tracking Progress:

- Retrofits: Subcontractors (PNM's Trade Ally Network or EnergyWorks) will collect the data required to complete the energy savings and carbon avoidance calculations for each multi-family building. The analysis will be based on the New Mexico Technical Resource Manual for the Calculation of Energy Efficiency Savings, leading industry standards, and resources from the Department of Energy and Environmental Protection Agency. A report of all services and savings will be provided for each apartment building to DNV and the City.
- Clean Transportation: EV meter data pulled from PNM will provide monthly data on station usage.
- Education: The City will track the number of individuals and households served at the beginning of the project and will conduct two surveys - one at the beginning of the

project and one at the end to identify areas for improvement and any transformative impact the programming created.

- Waste Diversion: Track inputs, estimated number of people contributing material, contamination (items that do not belong), outputs (finished compost), training, and estimated number of people caring for the bin. A pre and post waste audit will be conducted to assess waste reduction and transformative impacts. Community composting metrics will be tracked according to the best practices developed by the Institute of Local Self-Reliance (ILSR).
- Policy: Number of councilor's engaged to support policy, level of funding set aside to support rollout.
- Jobs: The number of skilled-up employees, created jobs, engaged small businesses & non-profits, and wage earning increases specifically for jobs in the energy transition sector.

Cost Estimates for Implementation:

Program Unit Cost

Service	Description	Range	Best Estimate
Sub-Contractor	Subcontract to program implementer, to include personnel costs, participation stipends, and new employees hired from LIDAC multifamily units served.	$500,000 - 10,000,000	$750,000
Apartment Energy Assessment	Comprehensive review of entire building (common areas and in-unit) to determine energy saving opportunities, including blower door air leakage test ($400-$800 per unit * about 160 units).	$64,000 - 128,000	$96,000
Weatherization & Electrification	LED lighting, Energy Star-certified appliances, advanced power strips, hot water heater and pipe insulation, air sealing including caulking windows, sealing penetrations, and installing weather stripping, duct sealing including return air plenum, connections, and joints, and attic insulation. ($3,000 - $3,800 per unit * about 160 units). Install 200 Amp electrical service panel ($8,000 * 4-9 panels per building), high efficiency shower heads, faucet aerators, and chair-height toilets (about $3000 per building), Google Nest Smart Thermostats (about $2000 per building), high efficiency heat pump water	$1,688,000 - 1,988,000	$1,888,000

Service	Description	Range	Best Estimate
	heater (about $5,300 per building) and mini split HVAC systems (about 16,000 per building).		
Envelope Upgrades & Fuel-switching	Install triple pane EnergyStar rated windows and/or doors (about $10,000 per unit * 160 units). Provide gas capping and add electrical outlets. (about $1,000 per unit* 160 units).	$1,760,000	$1,760,000
Electric Mobility	Level 2 EV Chargers (about $2,200 each * 20 buildings). Provision of one electric scooter or ebike per unit serviced until funds are depleted (about $1000 per scooter or ebike * 160 units).	$204,000	$204,000
Educational Supplies & Materials	Supplies (bilingual education materials, and printing) Materials (financial literacy & food waste prevention toolkits, home composting starter kit, and bicycle safety etc.).	$850,000	$850,000
Job Training Albuquerque	Additional funding for marketing and energy transition training supplied to LIDAC workers.	$100,000	$100,000

Total Cost

$ 5,648,000.00

<u>**Cost Effectiveness of GHG Reduction (for requested funds)**</u>

$5,648,000/1,593 MTCO2e = **$3,545.51/MTCO2e**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Component	Intersection with Other Funding Availability
Retrofits	PNM offers rebates specifically for multi-family projects (see below).

Component	Intersection with Other Funding Availability
	MFA and Homewise are lenders. However, significant barriers exist for multifamily property owners to access funds for the comprehensive upgrades this measure is seeking to implement.
Clean Transportation	PNM rebate program (see below).
Education	The City of Albuquerque would provide an in-kind match to cover financial literacy education through its Office of Financial Empowerment. There are currently no available funding opportunities for food waste prevention of this scale.
Waste Diversion	Available funding opportunities: New Mexico Environment Department's Recycling and Illegal Dumping annual grant (only for infrastructure, not staff support); USDA's Composting and Food Waste Reduction Grant. Past relevant funding opportunities: If there is another application round: EPA's Solid Waste Infrastructure Program.
Policy	None identified.
Jobs	Existing resources are allotted for the Job Training Albuquerque, however, supplemental funds directed to energy transition training will help accelerate workforce development across the MSA.

WHAT OTHER FUNDING SOURCES HAVE YOU SECURED FOR THIS SAME GHG MEASURE (IF ANY)?

In 2024, for multi-family projects, PNM is providing the following rebates:

New Construction

- Interior and exterior DLC or Energy Star-certified LED lighting.
- Lighting fixture controls i.e., photocells and occupancy sensors.
- LED exit and open signs.
- Electric heating and cooling systems (including mini-splits and chillers).
- Electric heat pump water heaters.
- Pool pumps, motors, and controls.
- Low-flow faucet aerators and showerheads (if electric water heating).
- Energy Star-certified refrigerators, dishwashers, washers, and electric dryers.
- Electric vehicle chargers.

Retrofits:

- Interior and exterior DLC or Energy Star-certified LED lighting.
- Lighting fixture controls i.e., photocells and occupancy sensors.
- LED exits and open signs.
- Electric heating and cooling systems (including mini-splits and chillers).
- SMART and programmable thermostats.

- Electric heat pump water heaters.
- Pool pumps, motors, and controls.
- Low-flow faucet aerators and showerheads (if electric water heating).
- Energy Star-certified refrigerators, dishwashers, washers, and electric dryers.
- Full replacement windows (glazing only does not qualify).
- Electric vehicle chargers.

Utilizing Prosperity Work's resource stacking model, all available rebates will be exhausted before CPRG funding is used to ensure maximum leveraging of funds.

Demonstration of funding need: How are requested funds filling an existing funding gap?

While PNM adds a 10% "bonus" to low and medium income (LMI) rebates, this is often not enough to influence multi-family property owners to do upgrades to existing properties. New construction projects tend to be built with some focus on sustainability factored into the project design and cost whereas cost is almost always the barrier to performance when dealing with renovations. Thus, the need for additional funding rests with existing properties with a focus on deeper weatherization (i.e., windows, insulation) and electrification (converting gas-fueled space heating, water heating, and stove/ovens). The most successful projects start with analysis of sites to identify GHG-reducing opportunities, implementing the changes, then verifying that the changes have, or will, lead to GHG-reduction. The verification component is often singled-out as cost prohibitive. Particularly when placed atop the expense of improvements and modifications.

Seemingly, a disproportionate number of LMI properties have gas-fueled components compared to market-rate. Moreover, there is opportunity to make multi-family rebates more aggressive for the following improvements: Wall and ceiling thermal barriers, pipe and duct insulation, duct sealing and testing, and the evaluation of proper HVAC system sizing.

However, the most obvious high-impact opportunity within LMI communities are window upgrades. Many of the existing LMI properties are upwards of 50 years old or more with original single pane windows, which result in significant energy loss and solar heat gain, which are huge contributors to overall GHG consumption in the built environment. The energy loss through older windows can negate other in-unit energy efficiency improvements.

The United States Green Building Council (USGBC) oversees the LEED rating system. The LEED rating system focuses on more sustainability building practices, which lead "to healthier, more productive places, reduced stress on the environment, impressive savings through reduced utility costs, and enhanced building value." USGBC attributes 31% of GHG emissions to residential and commercial buildings. As an aside, using LEED's Neighborhood Development guidelines could be a model for developing programs within New Mexico.

A key component of LMI properties is that, since they receive federal subsidies, they must follow U.S. Department of Housing and Urban Development (HUD) guidelines. HUD's approach to "evaluating cost-effectiveness requires three primary steps: Evaluating the energy and energy cost savings of code changes, Evaluating the incremental and replacement costs related to the changes [, and] Determining the cost-effectiveness of energy codes." The Minimum Property Standards (MPS), established by HUD, defines certain minimum requirements for buildings constructed under HUD housing programs, including new multi-family housing. The key element is building code compliance mandating adherence to either nationally-recognized building codes or State/local building codes based on nationally- recognized standards. HUD evaluates whether State or local codes are comparable to the model building code. For low rise multi-family buildings, HUD uses the International Energy Conservation Code (IECC) as the model code. While ASHRE standards are used for multi-family with 4 or more stories. In New Mexico, very few multi-family communities have more than 3 stories. As of 2022, New Mexico adopted the 2009 IECC, and ASHRAE 90.1-2016, which sets standards far below those capable of reducing GHG to the magnitude necessary to meet the GHG-reduction challenge.

Beyond energy efficiency modifications, improved standards for material purchases (i.e., buy local, "green" procurement), building operations (largely a behavioral component), and maintenance (i.e., keeping the improvements effective) should be addressed through education and training. In this measure, this will be provided and expanded upon, using Prosperity Work's community-to-community model will be used for all components of this measure. In this model, trusted and known community organizations will identify community leaders who are trained and compensated by Prosperity Works to conduct outreach and education. This essential community-based approach will be used to overcome the trust barrier created when "outsiders" enter low income areas as well as help to address the lack of control that tenants have in improving their living situation.

Funding from this grant will elevate how New Mexico addresses urban poverty and uplift the Albuquerque MSA's most vulnerable.

Benefits, Primary:

GHG Emission Reductions[3]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Total estimated GHG reduction = 1,593 MTCO2E

- Retrofits: 472 MTCO2e
- Clean Transportation E-Bike: 108 MTCO2E
- Clean Transportation EV Charger: 994 MTCO2e
- Education: 5 MTCO2E
- Waste Diversion: 14 MTCO2E
- Policy: More research needed.
- Jobs: None anticipated.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Total estimated GHG reduction = 18,175 MTCO2E

- Retrofits: 3,619 MTCO2e

[3] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

- Clean Transportation E-Bike: 828 MTCO2E
- Clean Transportation EV: 13,579 MTCO2E
- Education: 39 MTCO2E
- Waste Diversion: 110 MTCO2E
- Policy: More research needed.
- Jobs: None anticipated.

Data source(s) and assumptions

For all the calculations, we make the assumption that this measure will service 4 buildings (32 units, or households) per year during this project.

Component	Sources and Assumptions
Retrofits	Energy data from similar energy efficiency upgrades to local low-income single-family homes resulted in average annual energy use reductions of 858 kWh and 310 Therms. Assuming proportional energy use reductions (50%) for multi-family households, average annual energy use reductions of 429 kWh and 155 Therms were used. Emissions factors for CO2, CH4, and N2O were used to calculate GHG emissions from natural gas and electricity use and taken from the EPA Center for Corporate Climate Leadership, GHG Emission Factors Hub, "2023 GHG Emission Factors Hub," dated September 2023. https://www.epa.gov/climateleadership/ghg-emission-factors-hub Natural gas emissions factors were from Table 1 - Stationary Combustion. Electricity emissions factors were from Table 6 – Electricity, eGRID Subregion AZNM (WECC Southwest), Total Output Emission Factors.
Clean Transportation	For e-bike/scooters: According to McQueen et al, E-bikes have the potential to reduce car trip mode share by 9.9%, resulting in an average reduction of 225 kg of CO2 per person per year (2020). Given this data and the assumptions regarding the servicing of units listed above we can expect the following GHGe reductions: 225 kg CO2 = 2025: 32 e-bikes used = 7,200 2026: 64 e-bikes used = 14,400 2027: 96 e-bikes used = 21,600 2028: 128 e-bikes used = 28,800 2029: 160 e-bikes used = 36,000 2030-2050: 160 e-bikes used * 20 years = 720,000 Totalling 108,000 Kg CO2E from 2025-2030 = 108 MT CO2E Totaling 828,000 MTCO2E from 2025-2030 = 828 MT CO2E

	Michael McQueen, John MacArthur, & Christopher Cherry (2020). The E-Bike Potential: Estimating regional e-bike impacts on greenhouse gas emissions. Transportation Research Part D: Transport and Environment, 87 (2020) 102482. ISSN 1361-9209. https://doi.org/10.1016/j.trd.2020.102482. For EV Chargers: AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1 https://afleet.es.anl.gov/infrastructure-emissions/public Inputs: Eight (8) Level 2 EV charging ports installed annually from 2025-2029. Total of forty (40) Level 2 EV charging ports installed by 2030. High charger utilization from 2026-2030 (since most charging is done at home), charger utilization increasing 20% per year from 2031-2035 (due to increasing demand for multi-family residential EV charging), 200% of high charger utilization from 2036-2050, 100% light-duty vehicle utilization for Level 2 EVSE, WECC EIA regional electricity mix for New Mexico. 13,579 MTCO2e
Education	Background and Assumptions: WRI's residential campaign study results showed a 20% reduction in food waste (though there are challenges to that number as well); USDA estimates that 290 pounds of food is wasted per capita per year, which means the program could reduce up to 58 pounds (0.029 tons) of food waste per person per year. Since this program works with people who are interested in the programs and provides home composting education and a toolkit in addition to food waste prevention, it is assumed that all of the potential to prevent waste is prevented/composted starting after the household is serviced and is maintained for the duration of the project. More research is needed to inform these estimates. (found 0 studies to reference, so used conservative numbers). Using census data for the average household size in Albuquerque MSA of 2.4 people, with the assumption for this calculation that 4 buildings (32 units, or households) serviced per year during this project, the impact is (2.4*32= 76.8 people). Impact: (0.029*76.8) 2.23 tons each year and compounding during the grant period, since it is assumed that 32 units are serviced each year. For the GHG calculation, using the EPA WARM Tool, version 16, for composting (a conservative calculation since the reduction will be through prevention, which has a higher GHG reduction value) for 2.23 tons yields 0.34 MTCO2E reduction per year and compounding during the grant period, since the equivalent of 60 homes are serviced each year. Food Waste Prevented/Diverted: 2.23 tons in 2025, and 11.1 tons annually by 2030. 2025-2030 Calculation: GHG = 5.1 = 0.34*5 +0.34*4 +0.34*3 +0.34*2 +0.34*1 2025-2050 Calculation: GHG = 39.1 = 0.34*25 +0.34*24 +0.34*23 +0.34*22 +0.34*21
Waste Diversion	Background and Assumptions: Based on local food waste collection data provided by Little Green Bucket (a local food waste hauling company),

	households generate on average 3.8lbs of compostable food waste per week. For the purposes of calculation, it is assumed that each site will have 32 households participating per site, resulting in 3.16 short tons (3.8*52*32 converted from lbs to short tons) per site. Note, since only 10 of the 20 sites will have composting, it is assumed that only 2 sites (buildings) set up per year for a total of 10 buildings by 2030. 3.16*2=6.32 tons per year of the grant, compounding since 2 sites will be added each year of the grant. Using the EPA WARM Tool, version 16, GHG reduction from diverting landfill material to compost is 0.96 MTCO2E per site annually. Organic Material Diverted: 266.76 tons of food waste per year 2025-2030 Calculation: GHG = 0.96*1+.96*2+.96*3+.96*4+.96*5 = 14.4 2025-2050 Calculation: GHG = 14.4 + 0.96*5*20 = 110.4
Policy	More research needed.
Jobs	N/A

Co-benefits, Secondary:

Health Benefits

- Retrofits: The electrification of gas appliances (stoves, ovens, hot water heaters, and HVAC systems) will greatly improve indoor air quality and health. Electrification will also better position low-income areas for conversion to solar power and electric vehicles. These improvements will be particularly beneficial to the more senior members of low income communities as well as those who have medical conditions.
- Clean Transportation:
- Education: Food waste prevention educational materials will teach people how to use their senses to understand if items are still good to eat, which can reduce food-related illness. It will also provide materials on how to best store perishable foods, increasing the amount of healthy foods consumed instead of wasted.
- Waste Diversion: Composting has multiple health-related benefits including: Increased outdoor physical activity, recycling of nutrients into local food without the need for synthetic fertilizers that contain nitrosamine (a chemical that has been linked to contributing to health issues such as Alzheimer's disease, diabetes mellitus, non-alcoholic steatohepatitis, and pro-inflammatory cytokine activation), and more nutritious produce in home gardens.References: ILSR's Community Composting and Priority Climate Action Plans Guide, Farhidi, Madani, Crichton, Environmental Health Insights, 2022.
- Policy: None anticipated
- Jobs: None anticipated

Environmental Benefits

- Retrofits: Reduction of energy use and carbon intensity that will come from implementation of the proposed measures as described in Benefits, Primary.
- Clean Transportation:

- Waste Diversion: Aerobically recycling the nutrients in food locally avoids methane emissions that occur when food waste is deposited in the landfill. Local (i.e., household) collection, processing, and application also avoids GHG emissions from transportation. Applying the finished compost on home or community gardens/soils builds healthy soils, which also reduces erosion and airborne particulate matter during and after high wind events.
- Policy: None anticipated
- Jobs: None anticipated

Water Quality/Quantity Benefits

- Retrofits: The average daily water usage is 260 gallons. With water efficiency improvements, this measure expects to see an average water savings of XX gallons of water per apartment per day, resulting in over XX gallons of water over the next five years.
- Clean Transportation:
- Education: Local application of finished compost increases the soil's ability to absorb and retain water, which reduces runoff and erosion during rain events. Giving the soils more capacity to soak up and hold water, reduces erosion and increases water conservation. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.
- Policy: None anticipated
- Jobs: None anticipated

Land & Soil Benefits

- Retrofits: None anticipated
- Clean Transportation: None anticipated
- Education/Waste Diversion: In the arid and semi-arid Southwest, soils tend to be depleted of organic matter. Applying finished compost, adds much needed organic matter to the depleted, semi-arid soils, which increases nutrient content, improves plant growth, and helps regenerate the soils. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.
- Policy: None anticipated
- Jobs: None anticipated

Ecological Benefits

- Retrofits: None anticipated
- Clean Transportation: None anticipated
- Education/Waste Diversion: The composting process cultivates an ecosystem of small organisms that break down the organic material so that the nutrients once trapped in the food and green waste will again be available, instead of being trapped in a landfill. Applying compost also increases soil microbe biodiversity, which leads to healthier soils. Reference: Pergola, M., et al., Science Direct, 2018.
- Policy: None anticipated
- Jobs: None anticipated

Economic Benefits

Economic Value of Health Benefits

- Retrofits: None anticipated
- Clean Transportation: None anticipated
- Education/Waste Diversion: Generating compost locally improves access to soil amendment material that supports a resilient food system and can spur the local, small-scale agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., Sustainability 2020, 12(11):4456.
- Policy: None anticipated.
- Jobs: None anticipated.

Economic Value of Environmental Benefits

- Retrofits: Reduction of energy cost that will come from implementation of the proposed measures: \$223.38 annually per household (this includes kWh, Therms, H2O use reduction, and total tons CO2 eliminated), \$3,658 per household of lifetime cost savings.
- Clean Transportation: None anticipated.
- Education/Waste Diversion: Preventing food waste can save residents up to \$1,500 per year for an average 4-person household (USDA). Teaching people how to generate compost at home (i.e., locally) saves residents money and provides access to soil amendment material that supports a resilient food system and can spur the local, home -and neighborhood-scale urban agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., Sustainability 2020, 12(11):4456.
- Policy: None anticipated
- Jobs: None anticipated

Total Cost of Ownership

N/A, services are provided. Any procured items will be distributed to residents/sites.

Workforce Needs & Quality of Jobs

This program strives to include members of Albuquerque's LIDAC communities facilitated through the Job Training Albuquerque program, Prosperity Works, and PNM's Trade Allies. In addition, community liaisons that are used to help residents apply to the program, are compensated for their work, and reside within these communities. With grant funds, more liaisons will be needed to secure the applicants necessary. Additional staffing paid for through this grant will provide needed programmatic and educational support and will serve as a foundation for further scaling the work and the workforce to support these services. See Cost Estimates for Implementation for more information.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

All of the work in this measure will be focused in LIDAC tracts in the Albuquerque MSA Here is a list of all 80 LIDAC tracts in the Albuquerque MSA: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200, 35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004602, 35001004604, 35001004712, 35001004713, 35001004715, 35001004716, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, 35001004749, 35001940700, 35043010503, 35043010713, 35043010716, 35043010900, 35043011000, 35043011200, 35043940200, 35043940500, 35043940600, 35043940700, 35043940900, 35057963201, 35057963202, 35057963600, 35057963700, 35061940300, 35061970101, 35061970102, 35061970301, 35061970302, 35061970303, 35061970401, 35061970901, 35061970902, 35061971000, 35061971100, 35061971300.

Summary of past/ongoing community engagement

This measure was developed as an expansion of a community-supported program that addressed low income homeowners. It has also been informed by the City of Albuquerque's [2021 Climate Action Plan] (written by community members and contains goals supporting community energy efficiency, composting and waste reduction education) and additional public engagement sessions, including:

- FUSE Corps Executive Fellow community engagement & design for an equity-focused citywide composting program. This effort has involved 15 community meetings, over 15 stakeholder meetings, a digital feedback form, and the formation of 4 working groups to support the program design. A summary of community feedback from these meetings can be viewed here: https://www.cabq.gov/sustainability/documents/compost-listening-tour-summary_02-2024.pd
- Priority Climate Action Community Engagement conducted two community meetings and a survey to gauge what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement).
    - Community energy efficiency had 52 responses: (43 selected high benefit, 5 selected medium benefit, 3 selected low benefit, 1 selected no perceived benefit
    - Food waste prevention (Residential and Restaurant work was grouped in the survey) had 53 responses (37 selected high benefit, 9 selected medium benefit, 6 selected low benefit, 1 selected no perceived benefit)
    - Community-centered composting had 54 responses: (27 selected high benefit, 22 selected medium benefit, 4 selected low benefit, 1 selected no perceived benefit)

Benefits to LIDACs

This measure creates impact through energy efficiency improvement, education, and improved access to clean transportation. The primary way this measure benefits LIDAC is by relieving the energy burden on residents so they are able to get closer to financial stability, support families and communities, improve resiliency, and create an equitable economy. Specifically, this project will service multi-family units in historically disadvantaged communities, maximizing funds provided through the use of Prosperity Works capital stacking model, and PNM's multi-family energy efficiency rebates. This approach has allowed Prosperity Works to become the trusted entity for providing the resources that are available from utilities for limited income populations, and from municipal jurisdictions and their agencies.

In addition, since all multi-family homes serviced as part of this work will be located in LIDAC tracts, 100% of the benefits mentioned in the co-benefits section will be seen in LIDAC communities.

Disbenefits to LIDACs

With successful implementation of the energy disclosure policy, there are no anticipated disbenefits. Should the energy disclosure policy not pass, there is a risk that rental costs may rise, however capitalistic market mechanisms should prevent this. Additional research is required.

Authority to Implement Measure:

City Council and City Leadership approval are required to hire staff and execute the contract. The needed time for these processes is provided in the timeline for the projects. City of Albuquerque's Leadership approval is required for purchases, and time for that process is allotted in the timeline for the project.

SB3: COMMUNITY CENTER EFFICIENCY & EDUCATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Taking steps to reduce emissions, build greater resiliency, and more equitably distribute resources and infrastructure to community centers in LIDAC communities across the Albuquerque MSA. This project will involve combinations of energy efficiency and education projects (e.g EV charging stations and infrastructure, solar PV canopies, energy efficiency updates, food waste prevention education, community-centered composting or food waste drop-off) at a minimum of 32 community centers that predominantly LIDAC communities in Bernalillo County and other portions of the Albuquerque MSA.

Project/Program Alternate titles:

Energy Efficiency Updates for Albuquerque MSA Community Centers
SB3: Community Resiliency Centers

Mechanism

The City of Albuquerque will serve as the fiscal agent and implementation manager, including providing funding to MSA subrecipients (local government agencies), who will implement the measure at their respective community centers.

List any potential risks for this mechanism

The greatest potential risk with this mechanism would be the possibility of not securing enough funding to cover the costs of the prescribed energy efficiency upgrades and resiliency measures at all community centers that meet the program criteria.

Transformative Impact (i.e., scalability/replicability)

Within the first year of implementation, this measure will transform community centers across the Albuquerque MSA that serve frontline communities (people who live in LIDAC tracts). The utility savings alone from 4 Bernalillo County community centers that have undergone extensive energy assessments, is estimated to save $40,668.00 in utility costs and a 564,914 lb reduction in CO2 in just the first year after implementation. By averaging these cost estimates and savings calculations, we can roughly project what similar interventions could achieve, as this project expands to the roughly 30 LIDAC serving community centers we have identified so far. And with the addition of systems-level impacts from composting and food waste prevention education, and publicly accessible electric vehicle charging infrastructure, we are confident this measure will directly provide multiple benefits to LIDAC community members, including reducing an estimated 19,771 metric tons of CO2 equivalent in the first 5 years and 98,860 metric tons of C02 equivalent in the first 25 years after implementation.

Among the key components that create systems-level changes, the measure includes a distributed, community-centered model for transforming waste disposal into a local, circular system that also supports local agriculture, heat mitigation, soil health, erosion control, and more.

By supporting the compost component with quality jobs that allow time to have an iterative fine-tuning process, the compost systems will be able to further demonstrate the transformative impact, support scaling to other communities in arid and semi-arid regions, and give time for setting up the system for long-term success.

If each of these facilities were to install a roughly 35 kW solar installation and at least one level 2 EV charging station, the MSA would gain nearly 1 MW of renewable energy and make substantial progress toward reducing the barriers to the wider adoption of electric vehicles.

Key Implementing Agencies

The City of Albuquerque - fiscal manager, implementation coordinator for the overall measure
Other local governments, including Bernalillo County - measure implementation management

Partners

The City of Albuquerque has partnered with local contractors for these services. For community centers run by other agencies, the agency will utilize existing partners, while adhering to EPA's procurement policies. For example, Bernalillo County is partnering with YearOut Energy Services and Positive Energy Solar to contract out similar services and manage construction for their community centers.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

For community-based composting four community composting sites were constructed in May/June 2023 the Albuquerque MSA (one in the Village of Los Ranchos, two in the City of Albuquerque, and one in Pueblo of Isleta) as part of 7 new sites in the State.[4] The City has also partnered with FUSE Corps to host a fellow who has conducted composting-focused listening sessions. For food waste prevention education, the City of Albuquerque developed a "Waste as Resources" webpage with food waste and composting sections along with educational content posted on social media.

Progress between March 1st and October 1st (if any)

Contact all local agencies involved and do pre-award preparations.

[4] Details on the community composting sites is available here: https://www.nmhealthysoil.org/community-composting/

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

The following Gantt charts detail the proposed implementation schedule and milestones for infrastructure updates (e.g., energy efficiency, EV charging infrastructure, etc.):

Project Schedule	CY 24	CY 25				CY 26				CY 27
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Grant Agreement										
Construction Plans										
Procurement										
Permits										
Public Outreach										
Construction										
Inspection										
Closeout										

The following are key milestones for the composting and food waste components:

Food Waste Education

- Hiring and contract procurement: October through December 2024 (4th Quarter [Q4] 2024)
- Contractor working period: January 2025 through September 2028
- Food Waste Prevention Workshops (2 year/site + initial and follow up questionnaires): January 2025 through September 2028

Composting

- Hiring and contract procurement: October through December 2024 (4th Quarter [Q4] 2024)
- Coordinator working period: January 2025 through September 2029 (Q1-4 2025, Q1-4 2026, Q1-4 2028, Q1-4 2028, and Q1-3 2029)
- Bin construction: February through September 2025 (part of Q1 2025, Q2 2025, and Q3 2025)
- Bin operations: July 2025 through beyond the grant period

Long-term scaling plan (if applicable)

This measure can be scaled to community centers in other tracts within the Albuquerque MSA and beyond.

Geographic Scope

The measure will be available to the following community centers located in or ones that serve community members in LIDAC tracts:

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Thomas Bell Community Center	3001 University Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
West Mesa Community Center	5500 Glenrio Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Westgate Community Center	10001 De Vargas Rd SW, Albuquerque, NM 87121	Bernalillo	35001004739
South Valley Multipurpose Center	2008 Larrazolo Rd SW, Albuquerque, NM 87105	Bernalillo	35001002300

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Mountain View Community Center	201 Prosperity Ave SE, Albuquerque, NM 87105	Bernalillo	35001004001
West Side Community Center	1250 Isleta Blvd SW, Albuquerque, NM 87105	Bernalillo	35001004300

Community Center	**Address**	**County**	**Census Tract**
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Los Padillas Community Center	2117 Los Padillas Rd SW, Albuquerque, NM 87105	Bernalillo	35001004602
Sabana Grande Recreation Center	4110 Sabana Grande Ave SE, Rio Rancho, NM 87124	Sandoval	35043010716

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Bernalillo Senior Center	801 Rotary Park Rd, Bernalillo, NM 87004	Sandoval	35043940500
Cuba Senior Center	16 W Cordova St A, Cuba, NM 87013	Sandoval	35043010900

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Jemez Senior Center	110 Sheep Springs Cir, Jemez Pueblo, NM 87024	Sandoval	35043011200
Belen Senior Center	715 S Main St A, Belen, NM 87002	Valencia	35061970901

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Del Rio Senior Center	351 Rio Communities Blvd, Rio Communities, NM 87002	Valencia	35061970302
Meadow Lake Community Center	100 Cuerro Ln, Los Lunas, NM 87031	Valencia	35061970302

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Estancia Senior Center	305 E Highland Ave, Estancia, NM 87016	Torrance	35057963600
Moriarty Senior Center	120 Roosevelt Ave, Moriarty, NM 87035	Torrance	35057963202

Community Center	Address	County	Census Tract
Barelas Community Center	801 Barelas Rd SW, Albuquerque, NM 87102	Bernalillo	35001001400
Cesar Chavez Community Center	7505 Kathryn Ave SE #5260, Albuquerque, NM 87108	Bernalillo	35001000901
Dennis Chavez Community Center	715 Kathryn Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Heights Community Center & Therapeutic Recreation Program	823 Buena Vista Dr SE, Albuquerque, NM 87106	Bernalillo	35001001300
Herman Sanchez Community Center	1830 William St SE, Albuquerque, NM 87102	Bernalillo	35001001300
Jack Candelaria Community Center	400 San Jose Ave SE, Albuquerque, NM 87102	Bernalillo	35001001300
Joan Jones Community Center	3828 Rincon Rd NW, Albuquerque, NM 87105	Bernalillo	35001002401
Johnny Tapia Community Center at Wells Park	500 Mountain Rd NW, Albuquerque, NM 87102	Bernalillo	35001002700
Loma Linda Community Center	1700 Yale Blvd SE, Albuquerque, NM 87106	Bernalillo	35001001200
McKinley Community Center	3401 Monroe St NE, Albuquerque, NM 87110	Bernalillo	35001000205
Mesa Verde Community Center	7900 Marquette Ave. NE, Albuquerque, NM 87108	Bernalillo	35001000603
Singing Arrow Community Center	13200 Wenonah Ave SE, Albuquerque, NM 87123	Bernalillo	35001000713
Mountainair Senior Center	107 N Summit Ave, Mountainair, NM 87036	Torrance	35057963700

Metrics for Tracking Progress:

Metrics will vary based on the types of projects done at each community center. The following details the metrics per type of project:

- Energy efficiency updates metrics: utility expenses, energy usage, water usage
- EV charging stations and infrastructure metrics: utility expenses, energy usage, usage by vehicles
- Solar PV canopies and battery storage metrics: solar energy produced
- Food waste prevention education metrics:
- Community-centered composting / food waste drop off metrics: inputs, estimated number of participants (contributors) and contamination (items that do not belong). For on-site composting, the following additional metrics will be tracked: outputs (finished compost), training, and participants. All community composting metrics will be tracked according to the best practices developed by the Institute of Local Self-Reliance (ILSR).

Cost Estimates for Implementation:

Unit Cost

Cost estimates for this regional measure are based on detailed estimates at four community centers in Bernalillo County as proxy for the projected costs at other community centers. The average cost from the four example community centers is used to scale the estimate.

Examples for Upgrades

Los Padillas Community Center		
Initiative	**Description**	**Cost**
LED Lighting	105 fixtures	$ 51,398.00
Solar PV	31.5 kW carport solar array	$263,829.00
Building Envelope	90 LF sealed penetrations / 12 weather strips / 14 door sweeps / 3 astragals	$ 6,307.00
Water conservation	22 fixes or improvements to valves, flow control flush systems, urinals	$ 8,588.00
Wi-Fi Thermostats	12 Pelican Wireless style thermostats for split system RTU or furnace	$ 40,431.00
Gym Destrat Fans	1 HVLS fan installed in gym	$ 22,406.00
EV Charging	1 dual pistol level 2 EV charging station	$ 64,793.00
Food Waste Prevention Education	2 hands-on workshops per year, for three years with initial and follow-up	$1,500

	questionnaires for tracking.	
Composting	Supplies (tools): $500 Contractual (materials, site prep, construction/installation): $75,000 Labor: 1FTE/7 sites: $30,000 per site over 5 years	$105,500.00

Los Vecinos Community Center		
FIM Name	**Description**	**Cost**
LED Lighting	115 fixtures	$48,572.00
Building Envelope	76 LF sealed penetrations / 5 weather strips / 5 door sweeps /	$ 2,458.00
Water conservation	38 fixes or improvements to valves, flow control flush systems, urinals	$15,423.00
Wi-Fi Thermostats	6 Pelican Wireless style thermostats for split system RTU or furnace	$20,215.00
Gym Destrat Fans	1 HVLS fan installed in gym	$22,406.00
EV Charging	1 dual pistol level 2 EV charging station	$97,190.00
High Efficiency Transformers	50 kVA from 1 low voltage, low efficiency; replaced to high efficiency	$16,428.00
Food Waste Prevention Education	2 hands-on workshops per year, for three years with initial and follow-up questionnaires for tracking.	$1,500
Composting	Supplies (tools): $500 Contractual (materials, site prep, construction/installation): $75,000 Labor: 1FTE/7 sites: $30,000 per site over 5 years	$105,500.00

Paradise Hills Community Center		

Initiative	Description	Cost
LED Lighting	131 fixtures	$ 57,182.00
Solar PV	39 kW roof mounted solar array	$182,917.00
Building Envelope	230 LF sealed penetrations / 14 weather strips / 16 door sweeps / 3 astragals	$ 7,938.00
Water conservation	27 fixes or improvements to valves, flow control flush systems, urinals	$ 13,856.00
Gym Destrat Fans	1 HVLS fan installed in gym	$ 22,406.00
EV Charging	1 dual pistol level 2 EV charging station	$ 80,992.00
High Efficiency Transformers	150 kVA from 1 low voltage, low efficiency; replaced to high efficiency.	$ 29,629.00
Battery Storage & Infrastructure	General estimate for battery storage system large enough to power the facility for three days in sub-optimal solar generating conditions	$ 500,000.00
Food Waste Prevention Education	2 hands-on workshops per year, for three years with initial and follow-up questionnaires for tracking.	$1,500
Composting	Supplies (tools): $500 Contractual (materials, site prep, construction/installation): $75,000 Labor: 1FTE/7 sites: $30,000 per site over 5 years	$105,500.00

West Side Community Center		
Initiative	**Description**	**Cost**
LED Lighting	132 fixtures	$ 55,247.00
Solar PV	36 kW playground solar shade	$ 261,005.00

Building Envelope	337 LF sealed penetrations / 16 weather strip /16 door sweeps / 4 astragals	$ 9,756.00
Water conservation	20 fixes or improvement to valves, flow control, flush systems, urinals	$ 6,385.00
Wi-Fi Thermostats	9 pelican wireless style thermostats	$ 30,323.00
Window Inserts	18 window inserts installed	$ 4,388.00
Gym Destrat Fans	1 HVLS fa installed in gym	$ 22,406.00
EV Charging	1 dual pistol level 2 EV charging station	$ 80,992.00
Food Waste Prevention Education	2 hands-on workshops per year, for three years with initial and follow-up questionnaires for tracking.	$1,500.00
Composting	Supplies (tools): $500 Contractual (materials, site prep, construction/installation): $75,000 Contractual labor: 1FTE/7 sites: $30,000 per site over 5 years	$105,500.00

Average cost per community center: $552,443.67

Total Cost
$552,443.67 (average cost per community center, above) * 32 (community centers that serve LIDAC) = (total cost) **$17,678,197.44**

Note: The total cost estimate for the measure is scaled based on the estimates for the Bernalillo County example community centers.

Cost Effectiveness of GHG Reduction (for requested funds)

$17,678,197/11,696 MTCO2E = **$1,511/**MTCO2E

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
Have not applied for any additional funding yet. FEMA grants and Direct Pay Incentives are being considered as potential sources of additional funding in

addition to CPRG or in place of CPRG. Additional funding availability is identified in the table below by initiative.

Initiative	Intersection with Other Funding Availability
Energy Efficiency	EPA Community Change grant is a possible source for additional funding. There are also upcoming DOE, HUD, and FEMA grants that could potentially be pursued for energy efficiency work. It is unclear at this time whether those sources could be used to supplement the work proposed for MSA community centers.
EV Charging	Future rounds of the EPA Charging and Fueling Infrastructure grant (CFI) or the National Electric Vehicle Infrastructure (NEVI) Formula Program, are possible sources for additional funds for EV infrastructure.
Food Waste Prevention Education	Available funding opportunities: None identified Past relevant funding opportunities, if there is another application round: EPA's Recycling Education and Outreach opportunity; NRDC's Food Matters project assistance–these funds are often too small to cover one round of this project.
Composting	Available funding opportunities: New Mexico Environment Department's Recycling and Illegal Dumping annual grant (only for infrastructure, not staff support); USDA's Composting and Food Waste Reduction Grant Past relevant funding opportunities, if there is another application round: EPA's Solid Waste Infrastructure Program.

What other funding sources have you secured for this same GHG measure (if any)?

- Energy Efficiency: Bernalillo County secured general funds to pay for energy efficiency improvements and solar installations at Los Padillas and West Side community centers.
- EV Charging: No other funds have been secured to date outside of local government funds at this time.
- Residential project: No other funds have been secured to date.
- Community composting project: The New Mexico Environment Department's Recycling and Illegal Dumping grant funded construction of the three bins in the MSA and four other bins across the state. The municipalities and tribal entity are providing in-kind contributions of staff time to coordinate and support operations.

Demonstration of funding need: How are requested funds filling an existing funding gap?

Some communities (e.g. Bernalillo County) have allocated general funds. Electric vehicle charging infrastructure at these community centers are not currently included in this allocation. CPRG would be used to cover these additional expenses. CPRG funds would be needed to expand the energy efficiency, solar and EV charging infrastructure work to the other LIDAC serving community centers throughout the MSA. At the time this was written, no other funding source is known that can make this regional, multifaceted project a reality.

For the food waste prevention and composting components, the City was not positioned for EPA's Recycling Education and Outreach funding opportunity in 2022-2023. Now, there are no other known opportunities on the horizon for this type of work. The composting component of this project does qualify for the USDA Composting and Food Waste Reduction Grant; however, the grant duration is 2 years instead of 5 years. From the City's experience, it is difficult to find a quality person who is willing to commit to only two years. The five-year grant opportunity also gives more time for community members to get up to speed, learn the process, fully adopt the bin, and advocate for other funding—if desired—to permanently fund a compost coordinator position before the end of the grant period. By having more than two years, the project will be able to better position for long-term success, by giving time to identify needs, which can vary across seasons. The longer timeline also allows for iterative small adjustments to best meet community needs for adoption and to ensure long-term success after the end of the grant period.

Benefits, Primary:

GHG Emission Reductions [5]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Total: 11,696 MTCO2E

- Energy Efficiency and EV Charging: 10,826.03 MTCO2E
- Food waste prevention: 726 MTCO2E
- Composting: 144 MTCO2E

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

62,180.52 metric tons of CO2 emission reductions over 24.75 years.

- Energy Efficiency and EV Charging: 58,535.72 MTCO2E
- Food waste prevention: 2,925 MTCO2E
- Composting: 720 MTCO2E

Data source(s) and assumptions

Utilized EPA estimates and Greenhouse Gas Equivalencies Calculator for the majority of these calculations. Some data was provided by the County's energy contractor YearOut Energy as part of an IGA assessment.

[5] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

For the food waste prevention initiative:
Background: WRI's residential campaign study results showed a 20% reduction in food waste (though there are challenges to that number as well); USDA estimates that 290 pounds of food is wasted per capita per year, which means the program could reduce up to 58 pounds (0.029 tons) of food waste per person per year. Using census data for the average household size in Albuquerque MSA of 2.4 people, an average class size of 30 participants per workshop (assuming 75 percent are from different households) and 2 workshops per year per site (over three years, or 6 workshops total), that is a reach of 324 people per site (2.4*30*.75*2*3=324). Impact: 9.396 tons per year per site. For the GHG calculation, using the EPA WARM Tool, version 16, for composting (a conservative calculation since the reduction will be through prevention, which has a higher GHG reduction value) for 9.396 tons yields 1.43 MTCO2E reduction per site for the year after implementation.
Assumptions: 100% of the potential GHG reduction for the first year after a workshop, 75% for the following year (assuming 25% revert back to old practices), and 50% for each subsequent year (assuming half the participants adopt life-long waste reduction habits); (found 0 studies to reference, so used conservative numbers). Assuming one workshop in the first half of the year, and one in the second half for the three years.
Food Waste Prevented: 9.396 tons per site in the first year.
2025-2030 Calculation for per site: GHG = 22.7 = 6*1.43+ 6*0.75*1.43+ 1.43*0.4*3.5+ !QA1.43*0.4*3+ 1.43*0.4*2.5+ 1.43*0.4*2+ 1.43*0.4*1.5+ 1.43*0.4*1
2025-2030 Calculation for 32 sites: GHG = 22.7*32 = 726.4
2025-2050 Calculation for per site: GHG = 91.4 = 6*1.43+ 6*0.75*1.43+ 1.43*0.4*23.5+ 1.43*0.4*23+ 1.43*0.4*22.5+ 1.43*0.4*22+ 1.43*0.4*21.5+ 1.43*0.4*21
2025-2050 Calculation for 32 sites: GHG = 91.4 *32 = 2,924.8

For the composting initiative:
Background and Assumptions: Based on local food waste collection data provided by Little Green Bucket (a local food waste hauling company), households generate on average 3.8lbs of compostable food waste per week. The project scope estimates 60 households per site, resulting in 5.928 tons of food waste being diverted from landfill to composting each year. Using the EPA WARM Tool, version 16, GHG reduction from diverting landfill material to compost is 0.9 MTCO2E per site annually.
Organic Material Diverted: 266.76 tons of food waste per year
2025-2030 Calculation: GHG = 0.9*32*5 = 144
2025-2050 Calculation: GHG = 0.9*32*25 = 720

Co-Benefits, Secondary:

Health Benefits
From a public health and environmental justice perspective we believe the associated Co-Benefits of these projects, while not direct, are still significant. Many sections of Bernalillo County, including the locations where these community centers are located, suffer from above average concentrations of diesel and particulate matter pollution, ozone, and air toxic cancer risks. Three of the proposed community centers are also in the 95-100th percentile for their proximity to EPA

superfund sites, while the remaining two are within the 70 -80th percentile. This is to say that the areas where these community centers are located bear an outsized environmental and health burden due to the energy and industrial activities within Bernalillo County. Therefore, we believe the efforts we make to reduce our energy usage at our facilities and generate our own renewable energy can indirectly affect outcomes within these communities.

A reduction of 2,344 metric tons of CO_2 emissions from these community centers annually is the equivalent of removing 522 cars, and their emissions, from the road each year. Or examined another way, this reduction in CO_2 is equivalent to 2,625,640 pounds of coal not being burned each year. Coal fired power plants like those we have historically had across New Mexico, can emit numerous hazardous bioproducts into the air, all of which can contribute to poor air quality and increase ozone risks. For every 266 lbs. of coal burned, it is estimated that 1lb of sulfur dioxide goes up into the atmosphere with it. So that is roughly 9,870 lbs of (SO_2) prevented from going up into the atmosphere. Similarly, Nitrogen Dioxide (NO_x), a gas that can mix with (SO_2) and increase harmful Ozone pollution, would also be reduced. With the amount of coal diverted by the work in this project, it is estimated roughly 5,477lbs of (NO_x) would be avoided with it. Even these somewhat minor potential reductions in air pollutants can make a significant difference from a health standpoint, meaning fewer poor air quality days, fewer asthma related emergency visits, heart attacks avoided, and fewer upper respiratory emergencies.

Food waste prevention education will teach people how to use their senses to understand if items are still good to eat, which can reduce food-related illness. It will also teach people how to best store perishable foods and use edible portions of food that are often thrown away, increasing the amount of healthy foods consumed instead of wasted.

Community composting has many health-related benefits including:

- Supports mental health benefits through the community mentality of participating and a connection to nature
- Increased outdoor physical activity
- Recycles nutrients from input items that is available to grow local food without the need for synthetic fertilizers that contain nitrosamine, a chemical that has been linked to contributing to health issues (Alzheimer's disease, diabetes mellitus, non-alcoholic steatohepatitis, and pro-inflammatory cytokine activation).
- Spurs community and youth engagement and deepens community connections, which are shown to support mental health
- Improves climate resiliency for communities and crops against extreme weather and natural disasters like flooding and heat island effects that often impact frontline communities the most.

References: ILSR's Community Composting and Priority Climate Action Plans Guide, Farhidi, Madani & Crichton. 2022.

Environmental Benefits

Air Quality Benefits

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	GHG (metric tons CO2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BAU	11,723.83	1.18	–	2.15	–	–
PCAP	-11,723.83	-1.18	–	-2.15	–	–

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Aerobically recycling the nutrients in food and green waste locally avoids methane emissions that occur when food waste and green waste is deposited in the landfill. Local collection, processing, and application also avoids GHG emissions from transportation. Applying the finished compost locally builds healthy soils, which also reduces erosion and airborne particulate matter during and after high wind events.

Data source(s) and assumptions:
https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results

For the food waste and composting components, see data sources and assumptions for the primary benefits section. Assumptions: Annual reduction calculated using the average annual reduction during the 2025-2030 time period. (Average Annual GHG= 749+148.8=897.8/5 = 179.56)

Water Quality/Quantity Benefits

The water conservation measures slated for the community centers include replacing outdated flush valves on all bathroom toilets and urinals. The flush valves will reduce water usage from 1.6 gpf to 1.2 gpf, a 25% reduction in water usage. Because water usage at these community centers fluctuate quite frequently due to use or time of year, it is difficult to guarantee how much water these changes will save each year.

In a region where water is scarce and soils are often depleted, increasing access to local, high-quality soil amendment material and encouraging local application of the material will provide much needed water quality and quantity benefits. The semi-arid region is known for sediment laden stormwater runoff and flooding during rain events. Local application of finished compost increases the soil's ability to absorb and retain water, which reduces runoff and erosion during rain events. Giving the soils more capacity to soak up and hold water, reduces erosion and increases water conservation. As water infiltrates into soils, the soil acts like a filter, cleaning the water as it moves through the system. All these water quality and quantity benefits are especially important in arid and semi-arid regions such as the Albuquerque MSA, which frequently experiences drought followed by high intensity rain events. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Land & Soil Benefits

In the arid and semi-aridSouthwest, soils tend to be depleted of organic matter. Applying finished compost, adds much needed organic matter to the depleted, semi-arid soils, which increases nutrient content, improves plant growth, and helps regenerate the soils. Using compost as a soil amendment material helps soils retain moisture, which supports water conservation—especially important for semi-arid environments. Soils augmented with compost are also able to soak up more rainfall, which allows the soils to serve as a filter and improve water quality while also reducing erosion. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Ecological Benefits

This effort to improve the energy efficiency and operation of community centers across the MSA, expand solar production and expand access to EV charging infrastructure, will help to combat climate change by reducing overall GHG contributions throughout the region. The total reduction in emissions is estimated to be 2,344.77 metric tons of CO2 in the first year after the completion of work. This is equivalent to the amount of energy it would take to power 295 homes for one year. We believe this reduction in energy use and emissions will help contribute to improved air quality for all those who call the Rio Grande Valley home.
In addition to emission reductions, we believe our water conservation measures, while not easy to track, will contribute positively to the issue of water scarcity in this region.
Both of these issues can have an equally profound effect on the health of the people that call this region home as well as the health of our local plants, animals, and ecosystems.

The composting process cultivates an ecosystem of small organisms that break down the organic material so that the nutrients once trapped in the food and green waste will again be available, instead of being trapped in a landfill. Finished compost is considered stabilized organic matter, which has a variety of beneficial uses including soil restoration, carbon sequestration, and replacing or reducing the need for synthetic chemical inputs that have negative environmental inputs. Applying compost also increases increasing soil microbe biodiversity, which leads to healthier soils. Reference: Pergola, M., et al., Science Direct, 2018.

Economic Benefits

Generating compost locally improves access to soil amendment material that supports a resilient food system and can spur the local, small-scale agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., *Sustainability* **2020**, *12*(11):4456.

Economic Value of Health Benefits

This project provides a reduction in GHG emissions through diversion of food and green waste from landfills. The final product supports locally produced agricultural products through increased availability of high-quality soil amendment material, which makes it easier for community members to increase their consumption of locally grown, nutritious food, especially in areas identified as LIDAC tracts. Finished compost also reduces the need for chemical fertilizers. A 2018 study found that nitrosamine, a standard chemical fertilizer component, contributes to a variety of health conditions, such as Alzheimer's Disease, Diabetes Mellitus, Non-Alcoholic Steatohepatitis, and others. Reducing chemical fertilizer use and need will also avoid the potential health risks associated with its use. Reference: Farhidi, Madani, Crichton, *Environmental Health Insights*, 2022.

Economic Value of Environmental Benefits

By processing the food and green waste locally, the project is increasing local access to high quality compost that will help build soil health. This project also serves as a scalable pilot for nearby tribal communities and other towns across the arid Southwest.

Keeps profits and benefits nearby, creating a sustainable ecosystem responsive to community needs with greater personal investment and higher-quality products. Launches and scales up more quickly and is less expensive than landfills or incinerators.

Total Cost of Ownership

Initiative	Total Cost of Ownership
Energy Efficiency	N/A, the project involves services not assets.
EV charging	Operations and maintenance costs are covered by charging fees.
Food Waste Prevention Education	N/A, the project involves services not asset.
Community composting and food waste collection	The value of the bin materials and tools $6,000 - $10,000 depending on initial site condition (if a pad is needed, etc.) plus occasional tool replacement as needed, which is estimated to be less than $500/year for all sites. The systems are designed to last for at least 25 years.

WORKFORCE NEEDS & QUALITY OF JOBS

The 2022 Renewable Energy Industry of America (REIA) in New Mexico reports 6,000 clean energy jobs in Bernalillo County, of these are 500 clean vehicle jobs. Clean energy jobs pay 12% more than the median wage. The Natural Resource Defense Council (NRDC) in 2019 estimated 9,000 renewable energy jobs to be created by 2030 due to the Governor's Climate Executive Order.
It is worth noting that through the course of this project, Bernalillo County will be enlisting the services of numerous local electricians. Electricians will be needed for the installation of solar arrays, EV chargers, high efficiency transformers, HVAC updates, and battery storage. The pace of the project will be dictated by the availability of electricians, during a time where the state of New Mexico is vastly lacking in trained electricians. This is why Bernalillo County hopes to support any State, Federal, or local efforts to train and retain more electricians or trade positions that will support our energy efficiency and climate goals.

For the composting portion, this project will require hiring 4.6 full-time positions ranging in pay from $17.96 - $32.25 per hour plus benefits. One staff member will be required for every 7 sites. These persons will coordinate the expansion, train site-managers and volunteers, and help the community take over operations of the system by the end of the grant period. The value of this position, shown during this pilot period, will also help leverage City and other funds to maintain a funded community compost system coordinator position beyond the grant period.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will serve multiple LIDAC tracts in the Albuquerque MSA, which are listed in the table of community centers in the Geographic Scope section.

Summary of past/ongoing community engagement

Past Community Engagement:

In addition to the comprehensive community engagement conducted during the development of the 2021 Climate Action Plan, the City of Albuquerque engaged community members as part of the PCAP process, and both the City of Albuquerque and Bernalillo County have further engaged community members. The following shows what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement).

- Community center energy efficiency had 48 responses:
  - 19 selected high benefit
  - 21 selected medium benefit
  - 5 selected low benefit
  - 3 selected no perceived benefit
- Food waste prevention (Residential and Restaurant work was grouped in the survey) had 53 responses:
  - 37 selected high benefit
  - 9 selected medium benefit
  - 6 selected low benefit

    - 1 selected no perceived benefit
- Community-centered composting had 54 responses:
    - 27 selected high benefit
    - 22 selected medium benefit
    - 4 selected low benefit
    - 1 selected no perceived benefit

A list of comments collected on these components through the PCAP community engagement effort are provided as a supplement at the end of this document.

Additional Community Engagement:
Bernalillo County has participated in seven community meetings as of February 21st with another two meetings planned in February 2024 to present its Climate Pollution Reduction projects to LIDAC residents.
https://www.bernco.gov/public-works/bernalillo-county-sustainability-project-meetings/

Currently, the City of Albuquerque has partnered with FUSE Corps to host an Executive Fellow focused on conducting community engagement and designing an equity-focused citywide composting program, Since the Fellow started on October 30th, 2023, this effort has involved 15 community meetings, over 15 stakeholder meetings, a digital feedback from, and the formation of 4 working groups to support the program design. A summary of community feedback from these meetings can be viewed here:
https://www.cabq.gov/sustainability/documents/compost-listening-tour-summary_02-2024.pdf.

Benefits to LIDACs

We believe the benefits of this project to our LIDAC communities will include improved air quality, improved community well-being, and improved health outcomes, as we ensure the longevity of our community centers, reduce our energy use, increase our renewable energy output, and promote wider adoption of electric vehicles throughout the County.

Since all sites are located in and/or serve LIDAC community members, 100% of the benefits mentioned in the co-benefits section will be seen in LIDAC communities.

Disbenefits to LIDACs

While a component of this project involves installing electric vehicle (EV) charging stations at the selected community centers, we recognize that access to EVs and overall adoption within LIDAC communities is lower than in more advantaged communities. We are committed to ensuring that we equitably distribute the necessary infrastructure and believe this will at the very least help reduce some of the barriers for LIDAC community residents and ensure that as improvements in technology or incentives occur, the infrastructure is ready to accommodate.

Authority to Implement Measure:

The City of Albuquerque has the authority to implement this measure on City facilities under [NM Stat § 3-18-4 (2019)](). Bernalillo County is authorized under NMSA 1978 § 4-37-1 Counties: powers, ordinances; Bernalillo County Charter, Article XI.

The City also has the authority and experience to coordinate this regional effort and serve as a pass-through entity to other local government agencies (e.g., cities and counties) to implement this measure in their jurisdiction.

Supplement:
Comments from PCAP Community Engagement

Community Center Energy Efficiency

- None provided specifically for this project.

Restaurant and Residential projects

Where to have resources/toolkits available:

- All communities (+1 support)
- Food waste in restaurants and residential spaces is great. What about businesses / small, medium, and large corps. / manufacturing?? Education and engagement is needed to push for profit places to action.
- SE Heights
- food pantries open to all
- Food distribution is a heavily regulated industry for health purposes. Waste is an aspect of the industry.
- This sounds great and I think it could be a citywide effort in everywhere from public institutions to private households, and definitely the food industry
- Anyone who prepares food that results in green waste should be included/ should be composting
- I don't know anything about this
- Any and all communities could benefit from wasting less food. I would also put it in our schools and teach our next generation more about reducing food waste.
- Perfect to reduce hunger in the community
- Food pantries in all community centers with composting, small crop and livestock production, crop production, canning/processing, and cooking - self-sufficiency centers
- Offer information. Don't assume private families are wasting a lot of food. Start with validation.
- It will be beneficial to have them in Food Pantries, Homeless Shelters, Churches etc. What about having a website with these sites located on the web.

- More than telling people the benefits of composting, residents and restaurants could use support with collection and processing and/or redistribution of food waste.
- Not sure about residential areas, but around community centers and gardens would be excellent. Restaurants: Sawmill, 505 food hall, Restaurant strip around Jefferson and Montano, and South Valley.
- Homeless population
- International District distribution.

Other feedback:

- As far as food waste, it is a better idea if there is that much waste to turn it into liquid gas or whatever you call it to heat homes or for automobiles that is a good idea. Let's turn it into fuel for homes and cars? If there is that much waste?
- don't waste the time and money. just put info on the city website.

Residential-Specific:

- Incentive/support for residents who home compost and can support their neighbors! green waste
- Education - backyard options; -Resources (5-gal. bucket); -easy, local drop-off areas
- Partners with Little Green Bucket. Encourage more private business involvement. Offer subsidies for LIDAC area residents
- If there is funding for it I think it would really help to be able to supply composting bins, maybe worms for vermicomposting. Similar to the Earn a bike program with Esperanza maybe? Have participants attend a certain number of classes and commit to composting as much as possible in exchange for the materials.

Community Composting

Suggested site locations:

- Project in all affordable housing development projects
- Tiny Home Village 12/4: Marble Open Space (Lomas Louisiana) | New Bern Co Space
- (x2) Phil Chacon Park. we want a recycling center
- Lot at Florida / Zuni SE. Enrique Cardiel (sp?) & ECM regent
- I live in the northeast heights by Paseo del Norte and Ventura. It wouldn't be considered a LIDAC area, but would benefit from a compost facility if there isn't one here already.
- Utilize available county and city right of way
- Perhaps apartments around intersection of Indian School NE and Juan Tabo NE (where I live until I get into Senior Housing.)
- Westside on Elison and 528 - across from Cibola High School.
- I'm thinking West Mesa, Cottonwood Area, South Valley, Northeast Heights, and International District.
- (x2) UNM area and nob hill; UNM campuses?

- Composting is not something I'm familiar with, but I imagine Nob Hill, the International District, and Mesa del Sol would all like this (despite all being in the same council district)

Other feedback:

- These likely need to be paid positions to have much success.
- Composting, and Parks and Rec Green Waste management plans should be integrated into a larger program which also includes the waste generated at the BioPark. The BioPark produces several tons of animal waste on a monthly basis. Currently this material is being disposed of in the municipal landfill where it will decay and produce methane gas (a powerful greenhouse gas). If all of this material is added to bioreactors, not only can compost be generated, but waste methane gas can be used for energy generation that can be fed back into the electrical grid. Detroit zoo has developed a program like this, and there is interest from staff at the BioPark. Siting a bioreactor of this type at or in close collaboration with the BioPark has the added benefit of highlighting the usefulness of this technology to their over 1 million annual visitors.
- city-wide initiative for composting please!
- public schools combined with green schoolyards act
- waste of time. no pun intended.
- I love this idea, and I think it could be a great way to improve our soil quality here as well where we don't have a lot of organic matter naturally occurring. I think it would be really important to have a champion be a paid position because this is labor, and it would allow low income folks to participate while also being compensated, we need to make sure that these systems work well in apartments
- i am sure there are communities that would like this... having the capacity is another issue esp in a Justice40 community, would have to be a paid position
- Libraries are great places for information
- Yes it would be good for the community.

SB4: LOS POBLANOS OPEN SPACE

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

The City of Albuquerque Parks and Recreation Department's Open Space Division manages Los Poblanos Open Space as Major Public Open Space for the benefit of the community and native and migratory wildlife. Since 1997, The City has partnered with Rio Grande Community Farm (RGCF), which is located on Los Poblanos Open Space, at 1701 Montano Rd NW in Albuquerque, NM 87107.

Rio Grande Community Farm has a lease agreement to farm and provide public and ecosystem services at Los Poblanos Open Space. As a 501(c)3, Rio Grande Community Farm (RGCF) serves the public with education in climate-smart sustainable agricultural practices and equitable gardening access for diverse growers. There are currently 100 community gardeners with 150-foot garden rows, and 48 small producers farming ⅛-acre plots such as Tres Hermanas Refugee Agriculture Program, Celestial Mountain Farms Neurodivergent Agriculture Program,, KidPower Therapy, recipients of an Indigenous Urban Grower scholarship, an outpatient rehabilitation program, and others.
Using regenerative farming methods, RGCF provides the training, tools, irrigation, and equipment to cultivate a variety of crops. The RGCF hosts 17,000 attendees per year at iconic educational agritourism events such as Lavender In the Village and Maize Maze Fall Festival and teaches sustainable farming to hundreds of growers of all ages and abilities. Each spring, RGCF provides 3,000 pesticide-free vegetable starts from their greenhouse and non-toxic forage for small producers like the Young Farmers of America. They also administer a Neighborhood Composting Program. In 2023, RGCF returned 6,600 gallons of food waste to the soil, preventing the release of 4,900 lbs of greenhouse gas (GHG). In addition to these agricultural activities, RGCF provides native and migrating wildlife habitat at the Open Space property.

RGCF prioritizes becoming a sustainable carbon-free farm at Los Poblanos Open Space and demonstrating the process and benefits of their transition to the public through outreach and education. The following infrastructure projects have been identified to achieve this ambitious goal:

1. **Solar-powered Agriculture Storage Structure**
2. **Solar-powered Workshop**
3. **Two Outhouses with Electric Incinerating Toilets and Portable Sinks**
4. **Stormwater Management Infrastructure**

Project/Program Alternate Title:

Sustainability Improvements at Los Poblanos Open Space and Rio Grande Community Farm
SB5: Rio Grande Community Farm

Mechanism:

The City of Albuquerque will manage capital projects in coordination with the Rio Grande Community Farm during the grant period for construction of infrastructure to reduce GHG emissions and pollutants from energy use and effluent waste and manage stormwater to protect rivers from turbidity and pollutants, and to utilize the collected rainwater catchment in habitat creation and food production.

List any potential risks for this mechanism

There are no potential risks perceived for this mechanism.

Transformative Impact (i.e., scalability/replicability)

This GHG reduction measure has the potential to create transformative opportunities or impacts that can lead to significant additional GHG emissions reductions because the City of Albuquerque can serve as a model for other municipalities that manage Major Public Open Spaces for agriculture, education, and recreation.

RGCF is a public leader in regenerative and sustainable agricultural education and agri-tourism. Once this measure is completed, tens of thousands of individuals from agriculture industry professionals, small farmers and hobbyists, sustainability researchers and educators, event attendees, members of the public and social sectors, children, students, and underserved communities will become aware of the benefits and processes of using engineered utility buildings combined witch solar energy infrastructure to reduce their contributions to climate change and decrease costs. They will also discover sanitary solutions for communities in areas with no indoor plumbing. Publicly demonstrating the community farm-level applications of these technologies while implicating industry-wide scalability ensures the potential for transformative impact.

Key Implementing Agencies:
The City of Albuquerque Open Space Division
Rio Grande Community Farm

Partners:
City of Albuquerque Open Space Division
Rio Grande Community Farm
Rio Grande Community Farm agricultural partners:
- Blue Fly Farms
- Tres Hermanas Refugee Partnership Agriculture Program
- Pretty Weeds Farm
- Rockyard Farm
- Space Dog Farm
- Long Count Farm
- Celestial Mountain Farm Neurodivergent Agriculture Program

Gemini Farm
- Organic Planet
- Albuquerque Master Gardeners

Rio Grande Community Farm educational partners:
- NM Solar Energy Association

Explora!
University of New Mexico Sustainability Studies Program

University of New Mexico Engineers Without Borders
Village of Los Ranchos Agri-Nature Center

Implementation Schedule & Milestones:

Previously completed implementation? (if any)

First steps of the project completed:
Initial research on cost estimates for materials and labor
Presentation to RGCF Board of Directors
Presentation to the Parks and Recreation Department
Presentation to the Open Space Advisory Board

Progress between March 1st and October 1st (if any)

Phase 1: Planning, Design, and Community Engagement (03/01-10/01/24)

- March 1 - April 1: Begin developing a site plan and visual representation of the project for the public information campaign. Schedule a public meeting.
- April 2 - June 1: 15 days before the public meeting, mail and email Neighborhood Associations and households who will be impacted. Place project signage, publish print announcements and newsletters, and post on City and RGCF websites and social media.
- June 1 - June 15: Hold public meetings.
- June 15 - July 15: Quarterly Progress Meeting between City Open Space and RGCF
- July 15 - Sept. 15: Complete site map, architectural drawings, and elevations.
- Sept. 15-Oct. 1: Quarterly Progress Meeting between RGCF and City Open Space.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Phase II. Permitting & Approvals (10/01/24 - 03/01/25)

- *Oct. 1 - Nov. 1:* Prepare application for Environmental Planning Commission.
- *Oct 15 - Oct 31:* Meet with and request recommendations from the Open Space Advisory Board and Parks and Recreation Department.
- *Nov. 1 - Dec 15:* Quarterly Progress Meeting with RGCF and City Open Space.
- *Dec 15 - Dec 31*: Submit completed application to Environmental Planning Commission with recommendations and evidence of public information campaign attached.
- *Jan. 1 - Mar 1, 2025:* Receive Permit from Building Department.

Phase III. Secure Proposals & Procurement Process (03/01/25 - 06/15/25)

- *Mar. 1 - Mar. 15:* Request bids from contractors
- *Mar. 15 - Mar. 31:* Quarterly Progress Meeting between RGCF and City Open Space
- *Mar. 31 - April 15:* Secure bids and submit invoices
- *April 15 - May 1:* Schedule date to break ground
- *May 1- May 15*: Order Materials and submit invoices
- *May 15 - June 1:* Begin public outreach and education campaign
- *June 1 - June 15:* Quarterly Progress Meeting between RGCF and City Open Space.

Phase IV. Project implementation & Construction. (07/15/25 - 12/31/2025)

- *June 15 - Oct. 1:* Implement construction of infrastructure improvements
- *Sept. 1 - 15:* Quarterly Progress Meeting between RGCF and City Open Space.
- *Oct. 1 -Dec. 31:* Complete all required inspections and begin utilizing new infrastructure.

Phase V. Public education and outreach (01/01/2026 - 09/30/2029)

***Jan 1, 2026- Sept. 2029*:** Development and delivery of curricula and associated programs and materials engaging the public in education on the environmental, economic, and human health benefits of transitioning to appropriate sustainable technologies, and the STEM sciences and careers involved. Provide mentorship and consultation to other municipalities and community projects on the transition and implementation process as requested.

Long-term scaling plan (if applicable)

Ongoing development and delivery of curricula and associated programs and materials engaging the public in education on the environmental, economic, and human health benefits of transitioning to appropriate sustainable technologies, and the STEM sciences and careers involved. Continue to provide mentorship and consultation to other municipalities and community projects on the transition and implementation process as requested.

Geographic Scope

Los Poblanos Open Space, Rio Grande Community Farm 1701 Montaño Rd NW, Albuquerque, NM 87107

Metrics for Tracking Progress:

Tracking progress will involve engaging in Quarterly Progress Meetings between the City's Open Space Division and Rio Grande Community Farm at which time success will be measured using the completion of identified milestones within the Implementation Schedule as the defining metric.

By successfully implementing the proposed infrastructure project, the reduction of GHG emissions by RGCF is assured. No additional metric to measure progress toward GHG reduction is necessary.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Photovoltaics	(42) Silfab Sil-490 HM (490W) solar panels.	$30,000 - $45,000	$45,000

Item	Description	Range	Best Estimate
Agricultural Storage structure	28’ deep and 56’ wide with a 9’ height on the south facing low end, and 12’ height on north end.	$20,000 - $25,000	$25,000
Labor	168 hours	$3,000 to $15,000	$15,000
2x Outhouse structures	Building Materials	$4,000 to $10,000	$10,000
Incinerating Toilets	*2 x Incinolet* 240 v Incinerating Toilet**s**	$6,100 to $11,000	$11,000
Labor	80 hours	$,1600 - $2,500	$2,500
Portable handwashing sinks	2 x Serenelife Sinks/Hand Washing Stations	$170	$170
Labor	3 hours	$60 - $100	$100
Rain Gutters Installed on Existing Barn, Proposed Workshop, and Proposed Agricultural Storage Structure	82 LF of 6” Seamless Color Coated Aluminum Gutters – Including 6 sets of end caps. c.) Install up to 6 – 3” x 4” Downspouts * Including 24-A Elbows	$4,065	$4,065
Cisterns	7 x 500 gallon rain barrels from National Tank	$3,500 - $4,000	$4,000
Workshop Structure	Metal building 18’ w x 30’ l x 12’h	$8,500 - $12,000	$12,000
Labor	150 hours	$3.240 to $5,400	$5,400
Site Planning	Architectural drawings	$5,000 - $15,000	$15,000
Public Mailing	Public outreach	$1,00 - $2,000	$2,000

Total Cost:
$151,235

Cost Effectiveness of GHG Reduction (for requested funds)

$151,235 /450 MTCO2e = **$336/MTCO2E**

Reasonableness of Cost

At $336 per metric ton of CO_2 reduced over the span of four years, this project is a more than reasonable investment in public health, especially considering the ongoing and highly public education and outreach components of the project.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

At this time, the City has not applied for funding for the proposed project. The Federal Direct Pay Program will cover a portion of the cost of the solar panels (already included in the final estimate.). Other potential sources of funding include Albuquerque Parks and Recreation General Obligation Bonds, State of NM Capital Outlay Funds, individual donations, and corporate sponsorships.

What other funding sources have you secured for this same GHG measure (if any)?

At this time, the City has not secured funding for the proposed project.

Demonstration of funding need: How are requested funds filling an existing funding gap?

The Rio Grande Community Farm is a 501(c)3 and works to solicit funds through membership, donations, hosting public events, and securing grants. They also sell forage to small producers. These funds allow the RGCF to support public education and outreach along with practicing sustainable agriculture that promotes healthy local food and wildlife habitat. Their operating budget does not support large-scale infrastructure projects.

The City of Albuquerque also provides infrastructure used by RGCF, including chemical toilet rental and electricity costs. The additional funds from this grant will allow the City and RGCF to implement capital projects that will result in cost savings for the City of over $40,000 per year while allowing RGCF to increase public awareness of and education in sustainable and carbon-free agriculture practices and technologies.

Benefits, Primary:

GHG Emission Reductions[6]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

1. **Solar-powered Agricultural Storage Structure and Solar-powered Workshop**
    a. Electricity
       Total Current Energy Consumption to be reduced: 23,475 kw/yr.
       Excess grid-tied solar energy to be generated: 11,737.5 kw/yr
       Total GHG emissions from electricity to be reduced: 26,726 lbs./yr.

[6] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

b. Propane
Total Current Propane Consumption to be reduced: 600 gallons/yr.
Total GHG emissions from propane to be reduced: 7,608 lbs./yr.

Total energy emissions to be reduced = 34,334 lbs./yr.

2. **Incinerating Toilet Outhouses Sewage**
   Total sewage from two chemical toilets treated: 43,368 lbs./yr.
   Total GHG emissions from sewage treatment to be reduced: 190,819 lbs. of GHG/yr. (34,344+190,819=225,153) *4 years (assuming implementation is completed in 2025)= 900,611 lbs.
   Converted to metric tons = **450 metric tons of CO2e reduced between 2025-2030.**

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

(450 metric tons of CO2) *24 years (assuming implementation is completed in 2025) = **2,702 metric tons of CO2e reduced between 2025-2050.**

Data source(s) and assumptions

References:

1. **Solar-powered Agricultural Storage Structure and Solar-powered Workshop**
   Current kw usage averaged from utility bills.

   PNM Energy Source Breakdown:
   (https://www.dnv.com/cases/views-from-the-industry-public-service-company-of-new-mexico-pnm--191758)
   Coal 27% Nuclear 35% Natural Gas 14%

   US Energy Information Administration
   https://www.eia.gov/tools/faqs/faq.php?id=74&t=11)
   (https://www.eia.gov/environment/emissions/co2_vol_mass.php
   Coal produces 2.3 lbs. GHG/kw
   Nuclear produces 15 grams GHG/kw with 453.592 grams per lb
   Natural gas produces 0.97 lbs. GHG/kw
   Propane produces 12.68 lbs. GHG

2. **Incinerating Toilets**
   Current sewage generation calculations: Two chemical toilets x 50-gallon waste tanks each =100 gallons with tanks emptied 52 times per year = 5,200 gallons (43,368 lbs.)

   City of Albuquerque GHG Inventory 2020
   Albuquerque Water Authority Albuquerque's Southside Wastewater Reclamation Plant processes 55m gal./day (458,700,000 lbs.) producing 104,760,000 lbs. of GHG
   GHG per lb. of sewage calculations: 4.4 lbs. of GHG/lb. of sewage treatment.

Greenhouse gas emission potential of sewage treatment plants in Himachal Pradesh.
Study finds electricity consumption by Sewage Treatment Plants is responsible for 43% of emissions. The activated sludge process contributes 31% of the emissions, while storage of sludge in landfills accounts for 24%. Additionally, transportation contributes 2% of the emissions.

None of the identified sewage treatment processes are present in the incinerating toilet process. Incinerating Toilet GHG emissions are purported to be insignificant at only a few ppm CO_2 and CH_4 per flush, but no precise technical data could be found.

Co-benefits, Secondary:

Health Benefits

In addition to cutting GHG emissions, which reduces the impact of climate change that threatens our air quality, food production, and water resources, the proposed solar facilities will impact human health by improving air and water quality.

Proposed solar structures will reduce black carbon particulate pollution and NOx from burning coal which improves air quality and public health, especially for children, the elderly, and those who experience respiratory issues such as asthma and emphysema. Black carbon pollution has been shown to cause respiratory and cardiovascular disease, cancer, and birth defects.

From the EPA website: “Independent scientific research shows that reductions in air pollution are associated with widespread public health benefits. For example, one study found that reductions in fine particle pollution between 1980 and 2000 in U.S. cities led to improvements in average life expectancy at birth of approximately seven months.”
Pope, C.A. III, E. Majid, and D. Dockery, 2009. “Fine Particle Air Pollution and Life Expectancy in the United States,” New England Journal of Medicine, 360: 376-386.”

The proposed incinerating toilets will reduce nitrogen and phosphorus pollution in surface water which improves public drinking water quality and, by extension, public health.

Environmental Benefits

Air Quality Benefits

In the annual BAU scenario, current GHG emissions from electrical utility, propane, and sewage treatment in metric tonnes of CO_2 equivalent are considered. The variability of on-site sewage effluent makes calculations of NOx and VOC too variable for this purpose, so only CO_2 emissions are used.

In the Future-Year-2023 scenarios, only CO_2 is used again. Under the PCAP scenario, the number entered is the negative value of emissions calculated in the BAU scenario, as requested.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
Sustainability Improvements at Los Poblanos Open Space and Rio Grande Community Farm – Solar Structures and Incinerating Outhouses	113	n/a	n/a	n/a	n/a	n/a

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	GHG (metric tons CO2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BAU	450	n/a	n/a	n/a	n/a	n/a
PCAP	- 450	n/a	n/a	n/a	n/a	n/a

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
See EPA website for health benefits of reducing CO2 and air pollutants.
EPA Black carbon Pollution research

Water Quality/Quantity Benefits

Wastewater effluent from treatment plants decimates certain invertebrate orders such as stonefly and caddisfly while it advantages pollution-tolerant taxa according to reaasearch.

Land & Soil Benefits

According to the University of Nebraska, soil erosion will be reduced by implementation of stormwater management technologies.

Ecological Benefits

Using solar technologies to reduce black carbon particulate from burning coal also helps tackle climate change. According to the World Health Organization, black carbon is also one of the largest contributors to climate change, warming Earth's atmosphere by absorbing sunlight and accelerating the melting of snow and ice.

Stormwater collection and diversion (instead of allowing rainwater to flood the driveway and become a nuisance for vehicles) will provide increased opportunities for cost-free and site-specific irrigation strategies which will support the growth of native trees and vegetation, expand pollinator habitat, assist agricultural irrigation practices, and reduce urban heat island effects.

Economic Benefits

The City of Albuquerque will save $1,000,000+ over 25 years in energy and chemical toilet rental costs allowing them to invest in the community - augmenting economic growth.

From 8M Solar.com, (pp)
"Solar energy systems can last for 25-30 years, providing a stable, long-term investment that yields cost savings and environmental benefits over a long period."

"Peak demand charges, which are based on the maximum amount of electricity used during peak periods, can form a large portion of consumer electricity bills. By generating solar power during peak demand periods, the project can help lower these costs, freeing resources for other purposes, thereby invigorating the local economy."

"As solar energy can be produced locally, it reduces reliance on overseas energy sources, fostering energy security and economic benefits, and minimizing the threat of energy supply disruptions"

Economic Value of Health Benefits

Moving away from natural gas to solar can have economic health benefits as well. Volitile Organic Compounds (VOCs) are emitted in oil and gas production and cause smog that can irritate eyes, nose, and throat, causing headaches, nausea, and nervous system damage. **$2,640** is the average cost of public health damages from each metric ton of VOCs emitted from natural gas systems, which emit millions of tons of VOCs each year.

An EPA peer-reviewed 2011 study found that "Economic welfare and economic growth rates are improved because cleaner air means fewer air-pollution-related illnesses, which in turn means less money spent on medical treatments and lower absenteeism among American workers. The study projects that the beneficial economic effects of these two improvements alone more than offset the expenditures for pollution control."

Economic Value of Environmental Benefits

Although quantifying an economic value for benefits to ecosystem services experienced by reducing GHG emissions on one farm is challenging, we know that every metric ton of GHG produced contributes to a cumulative impact on the quality of life we experience as a result.

Total Cost of Ownership

Estimated cost of maintenance over 25 years is $235,750.

Workforce Needs & Quality of Jobs

For every Megawatt of commercial solar panels installed, 20 jobs and 13 job-years are created. Installing our small 10-20 kw (DC) system will create 0.2 - 0.04 jobs. The four major categories of solar jobs include: Manufacturing, system design, project development, installation/operations, which often come with benefits, above average pay, and advancement opportunities. (Stalix study).

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts:

This measure will be located near the following tracts identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): 35001003501, 35001003201, 35001003202, 35001003400, 35001003736.

The Rio Grande Community Farm serves people from around the entire City of Albuquerque, which include those living in LIDAC Tract numbers: 35001000501, 35001000604, 35001000603, 35001000901, 35001000904, 35001000903, 35001003736, 35001004716, 35001002500, 35001002700, 35001002000, 35001002100, 35001002700, 35001002500, 35001004749, 35001001400, 35001001500, 35001001200, 35001004300, 35001002300, 35001004401, 35001001102, 35001004741, 35001004712, 35001004736, 35001004738, 35001004733, 35001004713, 35001004739, 35001004502, 35001004501, 35001004001, 35001000713, 35001000708, 35001000712, 35001000129, 35001000904, 35001000903, 35001004602, 35001004715, 35001004733, 35001004713, 35001004736, 35001004604.

Summary of past/ongoing community engagement

When permitting the structures, The City's Open Space Division and Rio Grande Community Farm will mail and/or email descriptions of the project and requests for feedback to Impacted Neighborhood Associations and neighborhoods. Additionally, RGCF will outline the proposal in their monthly newsletter, on their website, and on social media, and invite public comment at monthly Board Meetings.

The City of Albuquerque sponsors annual educational Farm Camps for children from LIDAC that take place on Rio Grande Community Farm. Once the measure is complete, these Farm Camps will include a curriculum on carbon-free solar-powered farming. Rio Grande Community Farm will develop additional programming based on the sustainable technologies employed in the grant project, as well as develop dedicated educational website pages, hosted videos, and newsletter articles, all free of charge. Rio Grande Community Farm will give educational tours of the projects and invite LIDACs through their Neighborhood Associations.

Benefits to LIDACs

The City of Albuquerque collaborates with Rio Grande Community Farm to provide educational opportunities to underserved children and families. Replacing the portable chemical toilets with electrical incinerating toilets improves sanitation and hygiene, reducing the risk of waterborne diseases, and promoting overall community health.

The free and low-cost educational programming that will be developed and offered by the Rio Grande Community Farm based on these proposed sustainable technology upgrade projects will benefit LIDACs as information spreads about how these sustainable technologies can be utilized to improve communities and the environment.

Demonstrating the benefits of the proposed incinerating toilets will allow local officials, city planners, environmental designers, and social services to consider these technologies for communities with no indoor plumbing (such as those in TRACTS 35001003400 and 35001003736) and/or no sewer or septic access, could introduce new options that empower LIDAC to advocate for improved sanitation.

Learning how photovoltaic systems generate power and can fight climate change can inspire class attendees to study the STEM disciplines and pursue good jobs and careers in the solar industry.

Demonstrating these technologies to LIDACs and small farmers can help them save money since rebates and reduced costs are making solar technologies more affordable. Both the photovoltaic system and the incinerating toilets can save money in the long-term and reduce expensive fossil fuel dependence.

The proposed sustainable technologies reduce pollution, which disproportionately harms LIDACs. Solar energy use does not produce black carbon particulate pollution, methane pollution, or radioactive spent fuel rods. Incinerating toilets do not produce nitrogen and phosphorus releases that pollute surface water.

LIDACs are also disproportionately impacted by climate change. The solar energy technologies and incinerating toilets being proposed do not produce significant greenhouse gasses when operating. The reduction of GHG emissions from the local wastewater treatment plants will reduce local climate effects. Using solar energy technology can have positive direct and indirect effects on the environment when solar energy replaces or reduces the use of other energy sources.

In addition, the City of Albuquerque will save $1,000,000+ over 25 years in energy and chemical toilet rental costs allowing more money to be invested in LIDACs.

Disbenefits to LIDACs

There are no anticipated disbenefits to LIDACs.

Authority to Implement Measure:

The City of Albuquerque does not currently have statutory or regulatory authority to implement the proposed measures without the permitting and approval by Albuquerque's Environmental Planning Commission, Open Space Advisory Board, City Planning Department, Land Use Hearing Officer, and City Council.

Standard milestones for authorizing implementation of the proposed measure are as follows:

1. Open Space Advisory Board conducts an administrative review of the site plan and extraordinary structures and makes recommendations to the Environmental Planning Commission (EPC)
2. City and RGCF give public notice and hold a meeting(s) to inform residents and solicit input
3. City Planning Dept. conducts an administrative review of applications and makes recommendations to EPC
4. City Planning Dept. staff refer applications for comment and forward comments from commenting agencies to EPC
5. EPC conducts Public Hearing on applications and issues administrative decisions with possible conditions

RE1: COLLEGE SOLAR CANOPIES

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Building solar panel canopies at Central New Mexico Community College (CNM) Main, Market Place, Montoya, Westside, and Workforce Training Center Campuses

Project/Program Alternate title

RE1: College Solar Canopies

Mechanism

The funds will be awarded to the Parking and Fleet Department to offset or fully cover the cost of building solar panel canopies at all five campuses.

List any potential risks for this mechanism

No known risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

The Central New Mexico Community College Fleet and Parking Department seeks to significantly reduce its carbon footprint and increase its sustainability overall by building solar canopies across its Main, Market Place, Montoya, Westside, and Workforce Training Center campuses. The use of solar canopies over parking lots and structures accomplishes this by saving overall energy and maintenance costs, making efficient use of space, and encouraging future integration with electric vehicle (EV) charging infrastructure. Solar canopies and onsite energy generation significantly reduce energy expenses, resulting in energy savings. Moreover, the use of solar canopies atop existing lots and structures minimizes renewables proliferation on undeveloped land, thereby mitigating harm to ecosystems already severely impacted by climate change. In addition, the structures provide shade and protection from the elements to customers' vehicles, leading to better fuel efficiency. They also provide protection to the lots themselves, which can significantly reduce the need for materials and maintenance typically required for non-covered lots. Lastly, EV charging stations can easily be integrated with solar canopies, providing a much needed resource to Parking and Fleet customers and further contributing to greenhouse gas emissions reductions by making that resource readily available and easy to access.

Key Implementing Agencies

Central New Mexico Community College Fleet and Parking Department will receive funds from the MSA lead agency (City of Albuquerque) and will be responsible for implementing the project once funds are received.

Partners

No partners identified.

Implementation Schedule & Milestones

Progress between March 1st and October 1st (if any)

The CNM Parking and Fleet Department will continue trying to secure funding to build solar canopies at these priority campuses and once funding is secured, will immediately develop and release RFPs for the design and architecture phases. Once a local vendor is identified and awarded, the Department will develop all relevant project plans and bidding documents for the construction and installation phases by October, 2024. The first solar canopy project will focus on the Main and Market Place campuses. The Department will continue building additional canopies as funding permits, and based on EVES purchases and installation.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- October 2024 - begin bidding and construction of solar canopy at Main Campus fleet yard
    - Canopy 1 generating power March 2025
- January 2025 - design/engineering for second solar canopy (campus TBD)
- June 2025 - begin bidding and construction of second solar canopy and begin design/engineering for third canopy (campus TBD
    - Canopy 2 generating power December 2025
- January 2026 - begin bidding and construction of third canopy; begin design/engineering for fourth canopy (campus TBD)
    - Canopy 3 generating power June 2026
- June 2026 - begin bidding and construction of fourth canopy; begin design/engineering for fifth canopy (campus TBD)
    - Canopy 4 generating power December 2026
- January 2027 - begin bidding and construction of fifth canopy
    - Canopy 5 generating power June 2027
- All construction completed by June 2028
- January 2029 - Evaluate the overall impact of the construction, including environmental benefits, cost savings, and operational efficiency gains.

Geographic Scope

Location 1 (Southeast Albuquerque):
CNM Main Campus
900 University Blvd SE
Albuquerque, NM 87106

Location 2 (Southeast Albuquerque):
CNM Market Place Building
Main Campus
719 University Blvd SE
Albuquerque, NM 87106

Location 3 (Northeast Albuquerque):
CNM Montoya Campus
4700 Morris St NE
Albuquerque, NM 87111

Location 4 (Northwest Albuquerque):

CNM Westside Campus
10549 Universe Blvd NW
Albuquerque, NM 87114

Location 5 (Northeast Albuquerque, Jefferson & I-25)
CNM Workforce Training Center
5600 Eagle Rock Ave NE
Albuquerque, NM 87113

Metrics for Tracking Progress:

Total number of solar canopies across five priority campuses.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Solar Canopy - Design and Construction	Across 5 campuses		$5,000,000

Total Cost: $5,000,000

Cost Effectiveness of GHG Reduction (for requested funds)

Estimated $.10/MTCO2E
$5,000,000/52,000,000 MTCO2E (from 2025-2050)

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Investment Tax Credit for Energy Property - will secure for the project
Renewable Electricity Production Tax Credit - will secure for the project
Greenhouse Gas Reduction Fund (via the New Mexico Climate Investment Center) - will secure for the project

What other funding sources have you secured for this same GHG measure (if any)?

None at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?

Existing CNM funding is generally restricted to administrative services of implementing our coursework and running the college. The IRA and BIL are historic opportunities for hard hit higher education institutions to implement sustainability projects.

Benefits, Primary:

GHG Emission Reductions[7]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)*

This project could displace ~2 GWh of regional fossil fuel generation per year, or **12 GWh cumulatively from 2025 to 2030.**

- Two canopies generating by end of 2025, four canopies generating by end of 2026, five total canopies generating by mid 2027

This is approximately 2,000,000 metric tons of CO2 reduced annually.

This the equivalent of 12,000,000 Metric Tons of CO2 reduced from 2025 to 2030.

These calculations are estimates based on a draft project plan and timeline. Further analysis and calculations are encouraged as the scope is defined.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)*

This project could displace ~2 GWh of regional fossil fuel generation per year, or **52 GWh cumulatively from 2025 to 2050.**

This the equivalent of 52,000,000 metric tons of CO2 reduced from 2025 to 2050.

- Two canopies generating by end of 2025, four canopies generating by end of 2026, five total canopies generating by mid 2027

These calculations are estimates based on a draft project plan and timeline. Further analysis and calculations are encouraged as the scope is defined.

Data source(s) and assumptions

The calculations were generated using the EPA's Avoided Emissions & Generation (AVERT) Tool, and estimates of ~140MWh generated (for included EV charging)

GWH were then calculated to metric tons using the EPA's Greenhouse Gas Equivalency Calculator.

Co-benefits, Secondary:

Health Benefits

The use of solar canopies over parking lots and structures contributes to the overall reduction in carbon pollution and therefore community health through their integration with EV charging and accessibility as well as overall energy and space savings without further harm to ecosystems.

Environmental Benefits

Air Quality Benefits

Solar canopies play a crucial role in integrating with and protecting EV charging stations which power and help sustain the shifts in consumer behavior toward

[7] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

electric vehicles. Anticipated annual reduction is 2,000,000 metric tons of CO_2 equivalent.

Data source(s) and assumptions:
The calculations were generated using the EPA's Avoided Emissions & Generation (AVERT) Tool, and estimates of 2 GWh per year

GWH were then calculated to metric tons using the EPA's Greenhouse Gas Equivalency Calculator.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts
CNM campuses are predominantly located within or adjacent to LIDAC census tracts, and given the workforce training component of curricula, all campuses serve LIDAC communities regardless of their physical location within a LIDAC census tract.

Main Campus & Market Place Building - Tract Number: 35001001200
Montoya Campus - Tract Number: 35001003719
Westside Campus - Tract Number: 35001004746
South Valley Campus - Tract Number: 35001004604
Workforce Training Center Campus - Tract Number: 35001003736
Rio Rancho Campus - Tract Number: 35043010718

Summary of past/ongoing community engagement
A student survey is scheduled to be conducted in the coming months to determine electric vehicle charging infrastructure needs as well as the most frequently utilized campuses that will help to make the case for the location of parking lot solar canopies within the scope of project plans.

Benefits to LIDACs
Significant energy savings, accessibility to shade and EV charging, contribution to overall carbon pollution reduction.

Disbenefits to LIDACs
None expected

Authority to Implement Measure:
The Central New Mexico Community College Governing Board holds all the rights, powers, duties, and responsibilities conferred upon and vested in it by the State of New Mexico, including those prescribed by **Sections 21-13-1 to 21-13-27** and **21-16-1 to 21-16-22 NMSA 1978**, consistent with the provisions of the Constitution of the State of New Mexico. These powers and responsibilities include the budgeting, master plans and contracting associated with this greenhouse gas reduction measure project.

CT1: TRANSIT-ORIENTED DEVELOPMENT

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

To create multi-system, long-term changes to improve transit access, focused on LIDAC community members, the City of Albuquerque is designing a transit plaza co-located with affordable housing in close proximity to a large number and broad spectrum of jobs. This scalable and transformative project is further described below.

Uptown Connect will provide low-income housing, which when combined with high-frequency transit service, will allow residents to reduce their combined housing and transportation costs. Residents will have access to many jobs and services without needing a vehicle. Housing, employment, and transit in close proximity has the best chance of reducing the overall number of single occupancy vehicle trips. Mixed-use development that is co-located with high capacity transit service is an excellent form for transportation-efficient land use and design. The project will result in a highly walkable urban plaza with open space, services, and amenities for both residents and the larger community. This transit center provides convenient transit access to Downtown, Sandia National Labs, Kirtland Air Force Base, UNM, Presbyterian Hospital, and other major employers and activity centers.

This Transit-Oriented Development[8] (TOD) will help reduce automobile emissions by increasing the number of transit riders; the project will result in further reductions in bus emissions as the City of Albuquerque shifts the fleet to low and no-emission vehicles. The project will include at least 12 electric charging stations for residents and customers. Due to the co-location of residential uses at a transit center, Uptown Connect will result in an anticipated 17.5% fewer vehicles being owned by residents of Uptown Connect. As a result of the reduced number of vehicles that are owned per household, the project will result in a reduction of 955,188 Vehicle Miles Traveled (VMTs) per year, in relation to what a similar development with less frequent transit service would have generated. The project will be designed to meet energy efficiency building standards, further reducing consumption of GHG-creating fuels.

The City of Albuquerque's Transit Department (ABQ RIDE) is developing a Joint Development Program to implement future TOD projects on land owned by the City of Albuquerque as well as encouraging similar developments that are entirely privately-funded. The monitoring and evaluation of the benefits of this project can be used to promote future private, multi-family TOD development near transit centers and BRT station areas. This makes this pilot project scalable over time and across the ABQ RIDE service area.

Project/Program Alternate titles

Uptown Connect: The Uptown Transit Center Joint Development
CT1: Transit-Oriented Development

[8] The FTA has a unique program and name for Transit-Oriented Development that occurs on property that has received federal funding. The official program name is "Joint Development."

Mechanism
The City of Albuquerque will obtain an FTA Joint Development Agreement and this partner team includes a contractor who will complete the construction.

List any potential risks for this mechanism

No identified risks for this mechanism. The project partner has already been selected through a competitive RFP process. The project is well underway in the design phase.

Transformative Impact (i.e., scalability/replicability)

This project is transforming an underutilized parking lot in an area that community members described as feeling "isolated from pedestrian traffic in the dark hours of early morning commutes and evenings" into a vibrant and walkable center to improve access to public transit, retail spaces, affordable housing, and electric vehicle charging stations. These system-level changes will create lasting benefits to the community members and long-term, significant greenhouse gas emissions reductions over the life of the building. The project will increase transit ridership and decrease the need for personal vehicles and their associated GHG emissions by adding over 200 residential dwellings to the transit center and within close walking distance to 18,000 jobs. After completion of this project, the same project team will complete a private TOD development that leverages the shared underground parking; this project will add another 200 dwelling units. This separate project will double the reduction in GHG emissions, scaling up the benefit of the project with no additional public investment needed for that subsequent project.

The project is developed under the FTA's Joint Development program, which guides Transit Oriented Developments that occur on properties purchased with FTA funds. This program is replicable across the multi-jurisdictional ABQ RIDE service area. Firstly, ABQ RIDE is developing a Joint Development program to be able to take lessons learned from this project and implement future Joint Development projects where there is excess publicly-owned land at transit facilities. Secondly, the City of Albuquerque will also coordinate with other governmental agencies within the ABQ RIDE service area to explore TOD and Joint Development opportunities within their jurisdiction. Finally, the City will market and promote the benefits measured from this project to encourage future private developers to do TOD development. It is projected that each dwelling unit constructed within a ¼ mile of a transit center or station would result in a reduction of 2 MTCO2e per year over the life of the dwelling (60+ years).

Key Implementing Agencies
The City of Albuquerque, lead agency responsible for implementing the project. ABQ RIDE, the City's Transit Department, is managing the project.

Partners
PacifiCap Construction, Palindrome Communities, and Family Development Corporation are private development partners who will design, build, and manage the property.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The City of Albuquerque issued an RFP and selected PacifiCap Construction and their development team for a Partnership Agreement to develop this project. The design has advanced through the feasibility stage and is nearing completion of 30% design documents. The required NEPA documentation has been completed, along with the land acquisition appraisal.

Progress between March 1st and October 1st (if any)

- Federal Transit Association (FTA) Approvals and RAISE grant obligation: 2024
    - Submit NEPA documentation: 2024 (Q2)
    - RAISE Paper Grant Agreement: 2024 (Q2)
    - Submit Joint Development Agreement: 2024 (Q3)
- Architectural Design & Engineering: 2024-2025

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Federally compliant appraisal: 2024 (Q4)
- Land acquisition: 2025 (Q1)
- Building permits: 2025 (Q1)
- Design and Engineering completed: 2025 (Q2)
- Construction Begins: 2025 (Q3)
- Construction Ends: 2027 (Q4)

Long-term scaling plan (if applicable)

After this project demonstrates community benefits, the City aims to use this project as a model for future projects within the City of Albuquerque. The City will support utilizing this project as a model for other communities across the metropolitan statistical area (MSA) and the State. See response to Transformative Impact, above, for more detail about the replicability and scalability of the project.

Geographic Scope

Between America's Parkway and Indiana Street, and between Uptown Boulevard NE and Indian School Road NE in the Uptown District.

Metrics for Tracking Progress:

This project will track the following metrics: total boardings per year, unlinked passenger trips. The change in ridership will help us understand the increased ridership volume and reduction in GHG emissions and VMT can be imputed. These measures will also be reported to the FHWA/FTA to measure the impact of the $25,000,000 RAISE grant awarded to the project.

The project will also track electric vehicle charging metrics (electricity usage, times in use). That will help us evaluate the impact of the 12 Stage 2 EV chargers.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Contractor/Construction	Project Construction of transit plaza, 215 dwelling units built to Energy Star ratings, associated parking, and 12 Stage 2 EV chargers		$7,000,000 for gap closing

Total Cost

$7,000,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

$7,000,000/895.4 MTCO2e = **$7,818/MTCO2e across the grant period of 2025 to 2030.**

$7,000,000/53,724 MTCO2e = **$130/MTCO2e over the 50-year lifespan of this project.**

<u>Reasonableness of Cost (optional for PCAP)</u>

Affordable housing projects are required to demonstrate affordability over a period of 30 years, so this is the *minimum* amount of time this project will maintain these greenhouse gas benefits. This project is anticipated to result in a reduction of 26,862 MTCO2 over 30 years, at a cost of $261 per MTCO2 over 30 years.

The actual lifespan of multi-family and commercial developments in Albuquerque is much longer than this, so over time, the benefit gained by the project investment will continue to increase. Some tax credits require demonstration of affordability over 60 years. During this time period, the project will result in a reduction of 53,724 MTCO2, at a cost of $130 per MTCO2.

Once implemented, the City of Albuquerque will pursue future Joint Developments and encourage similar private TOD developments as a way to scale and replicate the benefits of this grant.

Once this project is implemented, the private development partner will begin construction on a second residential multi-family tower that will approximately double the amount of residential dwelling units on this block. This separate, private development will double the amount of GHG emission reduction that is attributable to the Transit Access Improvements Co-located with Housing Projects, adding another 382 tons of GHG emissions reduced per year. If awarded, this project grant will ultimately result in a reduction of nearly 25,000 metric tons of CO2 over a 30-year period following construction, or nearly 50,000 metric tons over a 60 year period, which is a conservative lifespan of a residential development.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

The total project cost is estimated to be $117 million. The project has been awarded $25,500,000 in federal FHWA/FTA grants, along with $125,000 in local match provided through government General Obligation fund allocation and $475,000 through an inter-governmental agreement for in-kind services. The project's pro forma includes $37,000,000 in Low-income Housing Tax Credits (LIHTC), $24,500,000 in Tax Exempt Bonds, and $12,700,000 in private funding.

With the current design, there is a $17,000,000 funding gap. This project has a $10 million capital infrastructure grant request at the NM State Legislature in the 2024 Budget session. Our project partners are exploring other affordable housing grant funds and tax credits to reduce the funding gap, as well as value engineering. Reducing the number of underground parking spaces will be the main strategy to reduce costs.

What other funding sources have you secured for this same GHG measure (if any)?

The project has secured $100.3 million in funding. Private Funding - $12,700,000; Federal grants - $25,500,000; Local match - $600,000; LIHTC Equity - $37,000,000; Tax Exempt Bonds - $24,500,000.

Demonstration of funding need: How are requested funds filling an existing funding gap?

The City has obtained support from a variety of sources, but still needs additional construction funds to close a $7,000,000 gap to complete the project.

Transit Oriented Development projects - by nature - consist of more dense and intense development forms, to capitalize on their proximity to transit service. They typically incorporate structured parking, which is costly at $53,000 per parking space for underground parking. This is needed to maximize the number of dwellings within close proximity to the transit center, which can maximize the utility of transit service and access. This project also incorporates 215 affordable housing units, which is a development type that traditionally requires public subsidies. Due to the high costs of housing + transportation, low-income households are more likely to rely on public transit and active forms of transportation. We anticipate a greater transportation mode-shift away from single-occupancy vehicles in affordable housing TOD projects. Along with escalating construction and labor costs, this project type is likely to have construction funding gaps.

Benefits, Primary:

GHG Emission Reductions[9]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)*

This project will be constructed by 2028. In its 2 years of operations before 2030, the project will result in a reduction of 895.4 metric tons of CO2 equivalent (447.7*2 years).

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)*

In the 22 years of operations of Uptown Connect between 2028 and 2050, the project will result in a reduction of 9,849.4 metric tons of CO2 equivalent (382*22 years).

Data source(s) and assumptions

Memo: Transit Ridership & VMT Estimation Methodology, ABQ RIDE, 2023. Posted: https://www.cabq.gov/transit/our-department/transit-grants

Benefit-Cost Analysis, page 27 of the RAISE Grant Application. Posted: https://www.cabq.gov/transit/our-department/transit-grants

EV Chargers: AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1
https://afleet.es.anl.gov/infrastructure-emissions/public/

> Inputs: Twelve (12) Stage 2 EVSE charging ports, medium-to-high default charger utilization, 100% light-duty vehicle utilization, WECC EIA regional electricity mix

Co-benefits, Secondary:

Health Benefits

This project will add more residential options in the Uptown Urban Center, which is one of the most employment-dense locations in the city but has little residential development. Mixing jobs and housing can improve multi-modal access, as well as quality of life and transportation safety improvements. This project also adds amenities to the transit center that support transit riders. The entertainment plaza will be a new amenity and destination for all area residents, as well as tourists who stay in the short-term rental element of the project. There are no known disadvantages for the community.

Environmental Benefits

Air Quality Benefits

Increasing walking and public transit use improves air quality by decreasing the number of vehicles in the community by 17.5%. As a result of the reduced number of vehicles that are owned per household, the project will result in a reduction of 955,188 Vehicle Miles Traveled (VMTs) per year, in relation to what a similar development with less frequent transit service would have generated. The

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[9] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

project also includes at least 12 Stage 2 EVSE chargers. The total GHG reduction per year is 447.7 metric tons.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	**GHG (metric tons CO_2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
Transit Access Improvements Co-located with Housing Projects	382	0.9	0.02	0.08	--	--
12 Stage 2 EV chargers	65.7	0.0074	0.0006	0.0001	0.0288	–

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	**GHG (metric tons CO2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
BAU	9,856	0.9	0.02	0.08	--	--
PCAP	-9,856	-0.9	-0.02	-0.08	--	--

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
TOD Benefits Source: Uptown Connect Benefit-Cost Analysis, WSP 2023, begins on page 27 of the RAISE Grant Application, posted here: https://www.cabq.gov/transit/our-department/transit-grants

EV Chargers: AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1
https://afleet.es.anl.gov/infrastructure-emissions/public/

> Inputs: Twelve (12) Stage 2 EVSE charging ports, medium-to-high default charger utilization, 100% light-duty vehicle utilization, WECC EIA regional electricity mix

<u>Water Quality/Quantity Benefits</u>

The project will also reduce the chance of automotive contaminants impacting the groundwater by reducing the number of internal combustion vehicles.

Land & Soil Benefits

The project will also reduce the chance of automotive contaminants entering local soils by reducing the number of internal combustion vehicles.

Ecological Benefits

The project will include enhanced landscaping and street trees. Because this is an urban center, we do not anticipate substantial ecological benefits to wildlife, pollinator habitat, or wildlife corridors.

Economic Benefits

Economic Value of Health Benefits

The avoided vehicle needs, which improves air quality by reducing personal vehicle miles traveled, is estimated to result in collective savings of $547,128 per year in auto ownership costs for the residents. The project will also enable more active transportation options due to the close proximity to excellent transit service and the 18,000 jobs and services that are within close walking distance.

Economic Value of Environmental Benefits

Collectively, residents of the Uptown Connect development will save $547,128 per year in reduced vehicle ownership and operation costs. As a result of fewer vehicles owned per household, the project will result in a reduction of 955,188 VMTs per year in relation to what a similar development with less frequent transit service would have generated. This project will result in a reduction of 43,026 gallons of gasoline per year needed by project residents and consequently 382 metric tons of CO_2 gas per year.

Total Cost of Ownership

The project development team will be responsible for ongoing maintenance and security services for the transit center. Those services will be provided according to the terms of the Joint Development Agreement, which is still in progress. The annual costs for operations and maintenance of the existing transit facility are estimated at $162,000, of which we expect the project developer to be responsible for $152,000, and the City of Albuquerque will be responsible for $10,000. The City of Albuquerque will count the $152,000 per year as a form of income (via in kind services) to support transit services.

Workforce Needs & Quality of Jobs

Yes, construction jobs will be created. The project includes creation of 18,000 SF of commercial space and 215 dwelling units, which will generate numerous ongoing employment opportunities.
Our project partner has committed to contributing to the department's 4.5% DBE goal for hiring minority-, women-, and veteran-owned businesses for the construction phase of the project.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in Census Tract 35001000207. Census Tract 35001000207 was identified as a Justice 40 HDC as a Transportation Disadvantaged Community in version 1.0 of the screening tool. The basis for being designated as a Historically Disadvantaged Community is that it has higher than the State averages for Particulate Matter (PM 2.5), Ozone, Diesel PM (0.69 vs. 0.19), Air Toxics Cancer Risk (30 vs. 18), Air Toxics Respiratory Hazard Index (0.4 vs. 0.21), Toxic Releases to Air (40 vs. 29), Traffic Proximity and Volume (460 vs. 84), Lead Paint Indicator (0.62 vs. 0.19), Superfund Proximity, RMP Proximity, and Hazardous Waste Proximity (3.1 vs. 0.73). The only Environmental factors this area had a lower average was for the underground storage tank indicator and wastewater discharge indicator.

The EPA EJ Screen Tool identifies this census tract as being in the 90%ile for low income populations and 77%ile for people of color. The overall demographic index is rated in the 87%ile. Source: EJ Screen: https://ejscreen.epa.gov/mapper/.

This project further serves to enhance access for frontline communities across the city. As one of 5 transit centers in Albuquerque, this hub is a transfer point between many of the routes in the northeast part of the city. With a direct connection to the Alvarado Transit Center, this transit center connects to all city transit routes. ABQ RIDE's service area has 62.7% Minority population and 33.2% low-income households (defined as households with income less than $35,000 per year). From ridership surveys, household income for riders is relatively low, with a majority of riders (88%) reporting annual household income less than $35,000. Approximately 5% of riders speak English less than "very well." More than half of riders (63%) come from households without a car.

Summary of past/ongoing community engagement

Previous public comment was solicited through various presentations to transit and multi-modal transportation advisory groups as well as business interest groups. The project received 11 letters of support based on the conceptual designs; a variety of organizations supported the project including local business organizations, active transportation advisory boards and advocacy groups, Albuquerque Public Schools' Superintendent, the NM Coalition to End Homelessness, and the Urban Land Institute.

Some of the input already gathered on the project is that the Uptown Transit Center is perceived to be a nuisance that generates vandalism and indecent behavior due to limited security, especially overnight. Stakeholders have generally welcomed the prospect of a mixed-use development that adds multi-family residences and retail because of the prospect of increased activity, security, and "eyes on the street." There is also support for the affordable housing project component—something that is needed in the area—with no concerns raised so far.

Some of the public input and perspective is shared in the Letters of Support, posted here: https://www.cabq.gov/transit/our-department/transit-grants

Benefits to LIDACs

Since this project is located in a LIDAC tract, all of the benefits previously mentioned will be seen by LIDAC community members. In addition, the project results in collective savings of $547,128 per year in auto ownership costs for the residents.

This project will improve the quality of the transit center, making transit a more comfortable and viable option for people who live and work in the area, and provides connections to many other LIDAC communities throughout the city.

Disbenefits to LIDACs

There are no known disadvantages for the community.

Authority to Implement Measure:

The City of Albuquerque has the authority to implement this project. ABQ RIDE successfully manages millions of dollars of federal grants each year, and has a demonstrated track record in implementing projects. ABQ RIDE staff have the capacity to manage the administration of this grant and the experience reporting project outcomes to project funders.

This project requires FTA approval of the Joint Development Agreement and terms because this is a federal-interest property. Key approval milestones are FTA approval of the RAISE grant agreement, NEPA documents, and Joint Development Agreement (anticipated 2024). Local building permit approvals are anticipated in 2025.

This project also requires City Council approval for implementation, which is accounted for in the timeline and milestones.

CT2: BICYCLE SAFETY CORRIDORS

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

This measure will add two key new all ages and abilities bicycling network spines, which can encourage more people to bike (and walk) for transportation. This can help to decrease greenhouse gas emissions by decreasing the need to drive, improve community health by providing an opportunity for people to reach the Center for Disease Control's (CDC) recommended 150 minutes of activity per week, improve mental and physical health, and help people save money by decreasing the need to drive. Once complete, San Pedro Drive from Bell to Claremont will be a key long-distance bicycling spine in Albuquerque's bike network. It includes restriping the corridor to add new bike lanes and upgrade signalized intersections as per a 2022 scoping report. Full and utility survey for intersection reconstruction at Menaul is required and identifying locations for new bikeway signage.

The Claremont Bike Boulevard is another key low-stress, high-comfort spine from Richmond to Moon. This project includes improved crossing treatments at collectors/arterials, which not only improves crossings for people biking but also for people walking. A full survey of Claremont Avenue and Carlisle Blvd intersection is likely required as well as any other mid-block crossing locations that would be implementing improvements. Utility surveys would also be necessary to identify possible utility conflicts. Existing traffic equipment may need to be upgraded to support the addition of new signals (Rectangular Rapid Flashing Beacons/Pedestrian Hybrid Beacons; RRFBs/PHBs) and investigate right-of-way at all midblock crossing locations: at San Mateo (PHB) with pedestrian island refuge, at San Pedro (RRFB), at Louisiana (PHB), at Pennsylvania (crosswalk markings), at Wyoming (PHB) with pedestrian island refuge in "Z" configuration. The City already implemented a traffic calming striping pattern to support the bike boulevard at a few locations and this striping pattern will continue between Carlisle and San Pedro. This project also includes bike blvd signage, adding 11 traffic circles at locations identified in the 2022 scoping report.

Project/Program Alternate titles

San Pedro bike lanes and Claremont bike boulevard
CT2: Bicycle Safety Corridor

Mechanism

The funds will be used to design and construct these two projects. Given the size and complexity of the projects, the City will select a Federally procured on-call to design the projects and then bid out the projects selecting vendor(s) to construct them.

List any potential risks for this mechanism

Adding bike lanes and bike boulevards are fairly standard of practice, with many other facilities throughout the City of Albuquerque. Staff do not anticipate any potential risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

According to the City's Climate Action Plan, transportation accounts for 40% of Albuquerque's emissions. Based on the 2017 National Household Travel Survey, 45.6% of trips are three miles or less, which is a perfect bike ride distance. In the City's Bikeway and Trail Facilities Plan (BTFP), San Pedro and Claremont are identified as key bikeway network spines. These are corridors that support longer-distance travel by bicycle and connect several neighborhoods and community destinations. By implementing key bike spines, the City is creating transformative opportunities to make the existing bikeway network more robust and connected and also enable people access to different transportation options such as biking. The proposed projects are low-traffic stress, all ages and abilities spines, which when implemented may attract people who feel more comfortable biking in a lower-stress facility. Implementing these facilities may increase community demand to add more bikeways and key spines, which can lead to even more people choosing to bike for transportation.

Key Implementing Agencies

The City of Albuquerque's Department of Municipal Development will be responsible for implementing these projects. This includes project design and construction. The City will likely hire private engineering firms to design and construct these projects.

Partners

The City's Greater Albuquerque Active Transportation Committee (GAATC) assisted the City in putting together a list of projects they were interested in seeing the City pursue. These are two projects that were higher priority projects. This is also discussed in the community engagement sections and associated attachment 2.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The City of Albuquerque hired a transportation engineering consultant to further study these two projects, and identify potential preliminary designs, cost estimates, and potential challenges to be able to implement these projects. This study/scoping report was completed in May 2023 and helped to inform the estimated cost and complexity of these projects.

Progress between March 1st and October 1st (if any)

These two projects are included and prioritized in the City's Bikeway and Trail Facilities Plan Update, which is expected to go to City Council for approval sometime between March 1 and October 1.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

	2024	2025				2026				2027				2028				2029
Task	Q1	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
City work with federally procured on-call to put together scope/fee																		
City route scope/fee for approval																		
Kick-Off Meeting																		
30% design plans											A							
30% design plan review																		
Address 30% comments																		
60% design plans																		
60% City Design Review Committee (DRC)																		
Address 60% comments & move into 90% design plans																		
90% City Design Review Committee (DRC)																		
Address 90% comments																		
Plans, Specifications and Estimates (PS&E) Review Meeting																		
100% City Design Review Committee (DRC)																		
Address final comments/final plans																		
Bidding																		
Procurement																		
Installation/construction																		
Start of GHG Reduction																		

Long-term scaling plan (if applicable)

As the City of Albuquerque identifies additional funding, staff will continue to implement priority bikeway projects.

Geographic Scope

San Pedro Blvd, between Bell Ave. and Claremont Ave., Albuquerque, NM
Claremont Blvd, between Richmond and Moon, Albuquerque, NM

Metrics for Tracking Progress:

- Query Strava before and after data for bicycle and pedestrian use
- Work with the Mid-Region Metropolitan Planning Organization (MRMPO), who manages the regional bicycle/pedestrian count program, to collect bicycle and pedestrian counts for each corridor
- Before and after crash data: fatal and serious injury crashes for drivers, people walking, people biking. Given bike lanes, refuge islands, pedestrian hybrid beacons, and rectangular rapid flashing beacons are FHWA proven safety countermeasures decrease in serious injury and fatal crashes for all roadway users but especially people walking and biking would be an outcome of success.
- The City hosts an annual Bike to Wherever Day (formerly Bike to Work Day) each May. We distribute a survey to participants and ask how they feel about biking in Albuquerque and if it's improving. We also asked people to share specific bikeway improvements they like. We could either ask a targeted question about these projects to see how people feel about them or we could see if people wrote them in as successful projects.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
San Pedro	Design	$150,000-$170,000	$160,000
San Pedro	Construction (Menaul intersection improvements, Copper improvements, restriping)	$930,000-$950,000	$940,000
Claremont	Design	$550,000-$570,000	$560,000
Claremont	Construction (signing/striping, Carlisle intersection improvements, San Mateo refuge island with pedestrian hybrid beacons, San Pedro refuge island with rectangular rapid flashing beacons, Louisiana pedestrian hybrid beacon, Pennsylvania crosswalk markings/signage, Wyoming, z-configuration refuge island with pedestrian hybrid beacons, traffic circles)	$2,830,000 - $2,850,000	$2,840,000

Total Cost: $4,500,000

Cost Effectiveness of GHG Reduction (for requested funds)

$4,500,000/21.3530 metric tons CO2 equivalent (2025-2030) **=$210,233.00/MTCO2e**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

The City of Albuquerque has not applied for any local, regional, or federal funding for these projects. If the City is awarded funds to design and implement these projects, the City may pursue a soft match. Due to hardship, we may utilize in-kind services instead of cash. The City's Department of Municipal Development receives some Bikeways and Trails General Obligation (GO) Bonds. However, these funds are used to pay for staff time for active transportation/engineering, and the remaining funds are already obligated to other federal projects to serve as a match. If awarded funds, the City Councilors for which these projects are in, may decide to contribute funds toward these projects but this is not guaranteed. The City's Vision Zero program receives some funds through the speed safety camera program, however, funding amounts are not predictable and depend on the number of violators and the number of violators that pay their violation. These funds are dedicated for use on traffic safety projects on the High Fatal and Injury Network where most people are dying or being seriously injured. Neither project location is on the HFIN. However, both projects cross HFIN corridors, so some Vision Zero funds could potentially supplement but would not be adequate to fund the entire cost of these projects.

What other funding sources have you secured for this same GHG measure (if any)?
The City of Albuquerque has not secured any funding to implement these projects.

Demonstration of funding need: How are requested funds filling an existing funding gap?
The City of Albuquerque Department of Municipal Development does not receive any general funds to implement infrastructure projects and relies on Federal funding to be able to implement large infrastructure projects such as these. DMD receives Bikeway and Trails GO bond funds, but these funds are used to pay for staff time and remaining funds are already obligated as a match to other Federal projects that will be incorporating new bikeways or trails. Every four years, DMD applies for and receives bikeway funds through the Mid-Region Metropolitan Planning Organization (MRMPO) Transportation Improvement Program (TIP). However, these are programmatic funds that can only be used for design and the amount is inadequate for the cost to design these projects. These funds are also used for travel demand management programs such as Bike to Work Day and Bike Thru Burque. These are the funds we used to put together the study/scope for these projects.

Benefits, Primary:

GHG Emission Reductions[10]
21.3530 metric tons CO2E/year

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)
Estimated date to begin realizing GHG emission reductions January 1, 2029
January 1, 2029 – January 1, 2030 = 12 months = 1 year
21.3530 metric tons CO2E/year x 1 year
=21.3530 metric tons CO2E

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)
Estimated date to begin realizing GHG emission reductions January 1, 2029
January 1, 2029 – January 1, 2050 = 252 months = 21 years
21.3530 metric tons CO2E/year x 21 years
=448.413 metric tons CO2E

Data source(s) and assumptions
Staff used the EPA's Travel Efficiency Assessment Method (TEAM) User Guide: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P101358W.pdf (page 70 outlines a Bicycle Strategy Calculation)
And the EPA's Greenhouse Gas Equivalencies Calculator – Calculations and References to calculate the above results: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references (Miles driven by the average gasoline-powered passenger vehicle)
Staff calculated existing miles of bikeways and multi-use trails: 565.77
Then calculated the total miles the new projects would add to the existing network: 6.13

[10] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Then added these together: 571.90
The City of Albuquerque is 189.9 square miles, so staff calculated bike facilities per square mile: 3.02913
Then staff subtracted bike lanes per square mile from bike lanes per square mile with the proposed projects implemented: 0.032468

Existing miles of bike lanes and multi-use trails	Proposed bikeways # of miles	New total miles of bike lanes & multi-use trails	Existing land area City of ABQ	Bike lanes per square mile	Bike lanes per square mile with projects implemented	Increase in bike mode share
565.77	6.1300	571.90	188.8 square miles	2.99666	3.02913	0.0324

Column A: Staff identified the BAU mode share from the 2022 ACS Data.
Assumption: Staff removed “work from home” for the total % of non-bike mode share since this stat does not reflect any trips taken: 84.6%
Column B: Staff divided each non-bike mode share by 84.6
Column C: Using the estimated increase in mode share: 0.032468, staff multiplied this number to column B
Column D: staff added columns A and C
Column E: staff followed the TEAM Guide: column c multiplied by 5,000,000
Column F: Assumptions from TEAM Guide: Auto drive alone is 1 person, Carpool is 2 people
TEAM Assumption: Average bike ride is 2.5 miles
Auto drive alone: divide column E by 2.5
Carpool: divide column e by 2 people x 2.5 bike trip
The outcome estimates change in VMT
The total estimate VMT reduction adds auto drive alone, carpool, and taxi, motorcycle, or other means

Mode	BAU Mode Share (A)	% of non-bike mode shares	Change in mode share	Future mode share	Change in Trips	Change in VMT	
	A	B	C	D	E	F	
	ACS 2022 data	A divided by sum of non-bike modes (84.6) (leaving out work from home)	Equals estimated increase in mode share * B	equals A + C	Equals C *5,000,000	Auto drive alone, E. VMT reduction = trips reduced *bike trip length (2.5) Carpool, E vmt reduction = trips reduced/carpool occupancy (avg 2 people) * bike trip length (2.5)	
		84.60%	-0.0324822		5,000,000		Estimated VMT reduction
Car, truck, or van - drove alone	70.00%	82.74%	-2.6877%	67.312%	-134382.6241	-53753.04965	(54,751.32)
Car, truck, or van - carpooled	10.00%	11.82%	-0.3840%	9.616%	-19197.51773	-3839.503546	
Public transit	1.40%	1.65%	-0.0538%	1.346%	-2687.652482		
Walk	1.90%	2.25%	-0.0730%	1.827%	-3647.528369		
Bike	0.90%		0.0300%	0.930%	1500	600	
Taxi, motorcycle, or other means	1.30%	1.54%	-0.0499%	1.250%	-2495.677305	-998.270922	
Work from home	14.60%						

After calculating the estimated reduction in VMT, staff used the Miles driven by the average gasoline-powered passenger vehicle calculation and the estimated VMT reduction to identify GHG reductions each year.

8.89 × 10-3 metric tons CO2/gallon gasoline × 1/22.9 miles per gallon car/truck average × 1 CO2, CH4, and N2O/0.993 CO2 = 3.90 x 10-4 metric tons CO2E/mile
3.90 x 10-4 metric tons CO2E/mile x estimated VMT reduction = **21.3530 metric tons CO2E/year**

Co-benefits, Secondary:

Health Benefits

Creating new bikeways could lead to community health benefits. These facilities are key spines as part of an existing 565-mile bikeway and trail system in Albuquerque. In addition to more people bicycling, these projects could lead to more people walking because the bike lanes will provide extra walking comfort by creating extra space between driving lanes and the sidewalk. The bike blvd project will improve crossings at major arterials and at midblock crossing locations that are far from existing signalized crossings. These projects can help people meet the 150-minutes of CDC-recommended activity each week.

Environmental Benefits

Water Quality/Quantity Benefits

Less VMT means there will be fewer chemicals, tire wear particles, or other products that come from automobiles in the stormwater runoff. This has an impact on water quality and also our primary river, the Rio Grande.

Land & Soil Benefits

As mentioned above, less VMT means less polluted stormwater runoff, which can also impact land and soil.

Ecological Benefits

These projects will lead to a decrease in VMT, which can have positive ecological and biodiversity impacts. While it has not been well-studied in the past, there is newer research to show the negative impact driving has on wildlife and biodiversity even within an urban environment like Albuquerque. Fewer drivers could mean fewer insect or animal deaths and also noise pollution created by driving. Noise can have negative impacts on wildlife and animals. This information and related findings are explored in Traffication, by Paul Donald.

Economic Benefits

Economic Value of Health Benefits

According to the Bureau of Transportation Statistics 2022 analysis, it costs approximately $10,729 each year to own a private automobile (https://www.bts.gov/content/average-cost-owning-and-operating-automobilea-assuming-15000-vehicle-miles-year). Not everyone can afford to own a private

automobile. Or not everyone may want to drive for every car trip and want to spend money to own an automobile. By providing safe and comfortable access to other transportation options, people may choose not to drive for their trip or people who rely on walking, biking, and transit can more conveniently do so. Driving less or not driving means more money for people to spend on other needs.
These projects will work to create safe, convenient, connected, and comfortable bicycle and pedestrian infrastructure, which could lead to more people choosing these modes for trips. Switching to active transportation has many implications from environmental (less GHGs), economic (people save money), and personal health. There are economic costs to inactivity and obesity. The annual individual medical cost of inactivity ($622) is more than 2.5 times the annual cost per user of bike and pedestrian trails ($235) (Wang, G., et al., 2004. Cost analysis of the built environment: The case of bike and pedestrian trails in Lincoln, Neb, American Journal of Public Health, 94, 549-53). The annual cost of obesity to employers ranges from $175 for every overweight male employee to $2,485 for every grade-II (BMI 30-40) obese female (Finkelstein, E., et al., 2005. The costs of obesity among full-time employees, American Journal of Health Promotion, 20, 45-51).

Additionally, investments in bicycle and pedestrian infrastructure are good for the local economy. A growing body of evidence finds that when communities become more walkable, bikeable, and transit-accessible, retailers come out ahead (Jaffe, E. 2015. The Complete Business Case for Converting Street Parking Into Bike Lanes. CityLab). Research from Portland State University found that proximity to a network of high-quality bike facilities is associated with an increase in property values (Liu, J., Shi, W., 2016. Impact of Bike Facilities on Residential Property Prices).

Economic Value of Environmental Benefits

These projects will lead to safety improvements in the transportation network for everyone particularly people walking and biking. These safety improvements can encourage people to shift from driving to walking, biking, and/or taking transit trips, which will reduce transportation-related emissions. Increasing the mode share of all trips made by bicycling and walking from 12% to 15% could lead to fuel savings of 3.8 billion gallons a year and reduce greenhouse gas emissions by 33 million tons per year. This is equivalent to replacing 19 million conventional cars with hybrids (Rails-to-Trails Conservancy, 2008. Active Transportation for America).
Making safety improvements to existing infrastructure increases the longevity and efficiency of our roadways because they will serve more people than only those driving in single-occupancy vehicles. When people feel like it is safe and easy to bike/walk, they may be more likely to do so depending on the trip type. This mode share shift away from single occupancy vehicles can reduce wear and tear on roadways.

Total Cost of Ownership

Both these projects have maintenance costs such as pavement maintenance, restriping, street sweeping, and maintaining any related signage. Pavement maintenance and restriping would be rolled into the City's Annual Complete Street Maintenance Program in which 15-26 roadways every year are repaved/restriped. Roadways are selected based on their pavement index score being poor. Street sweeping and signage would be rolled into the City's existing maintenance and as issues arise they are addressed. For striping maintenance, it is approximately $1.63 per linear foot. Pavement bike symbols are approximately $342.39 each. Sharrow symbols are approximately $350.79 each. Signs, posts, and removal/relocation are approximately $203.80 each. These estimates are based on 2023 Engineer's Estimates and it is important to note over the past few years the local development community has been experiencing continued rapid price inflation, so it is anticipated these costs could continue to increase each year.

Workforce Needs & Quality of Jobs

These projects will create high-quality jobs for engineers to design both projects. It will also create construction jobs. Incidental job creation: safe, comfortable, and accessible bike lanes could lead to more people choosing to bicycle for trips. Both projects pass by and/or connect to local businesses and people will have easier access to them.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in the following tracts identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST):
San Pedro: 35001000903, 35001000904, 35001000501, 35001000604
Claremont: 35001003400, 35001000208, 35001000207,35001000122

Summary of past/ongoing community engagement

Both the proposed measures were included as proposed projects in the City of Albuquerque's 2015 Bikeway and Trail Facilities Plan, which was adopted by City Council in May 2015. Extensive community engagement was completed in putting this plan together, which is summarized in Appendix E of the final plan and attached as Attachment 1 2015 Bikeway and Trail Facility Plan community engagement.
In 2021, the City of Albuquerque's Active Transportation Committee prioritized key bike gap projects listed in the 2015 plan. These two projects were prioritized higher on the list to encourage the City to further study. Attachment 2 GAATC bikeway priority list. In turn, the City identified funding to further study these projects in 2022, with the study being completed in 2023. Staff presented the study/scoping report to the Committee at its May 2023 meeting for feedback and input.
The City is currently updating the 2015 Bikeway and Trail Facilities Plan and conducted several rounds of community engagement. The most recent round of engagement (October 2023) asked the community how they would prioritize proposed projects. 662 individuals participated in the prioritization survey, including seven participants in the Spanish language version. San Pedro was the third-highest project and Claremont was the fifteenth project. Community input will be sure to prioritize all proposed projects. Attached as Attachment 3 2024 BTFP Community Engagement.
In putting together this grant application, the Sustainability Department conducted further engagement. 43 people completed the survey, with 21 people finding these

projects would provide a high benefit and 12 finding a medium benefit. Survey respondents could provide a comment and two people highlighted that San Pedro bike lanes would be tremendously important to create.

Benefits to LIDACs

LIDAC communities in Albuquerque experience a disproportionate amount of traffic violence than in other parts of the City. Many of the City's High Fatal and Injury (HFIN) networks, which identifies where the most people are dying or being seriously injured in traffic crashes, are within LIDAC communities. Additionally, based on the US CDC Social Vulnerability Index (SVI) tool, many of these communities do not have access to a private automobile, so they rely on walking, biking, and transit to meet daily needs. These projects will provide people access to a low-stress bike facility to help facilitate easier and safer bike access to key destinations. Adding these facilities will improve the safety for LIDAC communities that rely on biking and it will also improve safety for people walking because the bike lane provides additional buffer space between a travel lane and the sidewalk. The bike boulevard project includes midblock crossing improvements with median refuge islands and pedestrian hybrid beacons or rectangular rapid flashing beacons that will help people walking and biking cross major and collector streets easily and safely. Many of the components of these projects include Federal Highway Administration Proven Safety Countermeasures:

- Bike lane additions can reduce crashes up to 49% for total crashes on urban 4-lane undivided collectors and local roads (https://highways.dot.gov/safety/proven-safety-countermeasures/bicycle-lanes)
- Pedestrian Refuge Islands can result in a 56% reduction in pedestrian crashes (https://highways.dot.gov/safety/proven-safety-countermeasures/medians-and-pedestrian-refuge-islands-urban-and-suburban-areas)
- Pedestrian Hybrid Beacons can result in a 55% reduction in pedestrian crashes, 29% reduction in total crashes, and a 15% reduction in serious injury and fatal crashes (https://highways.dot.gov/safety/proven-safety-countermeasures/pedestrian-hybrid-beacons)
- Rectangular Rapid Flashing Beacons can reduce crashes up to 47% for pedestrian crashes and increase motorist yielding rates up to 98% (https://highways.dot.gov/safety/proven-safety-countermeasures/rectangular-rapid-flashing-beacons-rrfb)

Enabling people safe and comfortable access to non-motorized transportation options can also improve community health by helping people reach the CDC's 150 minutes of weekly exercise. These projects will also improve LIDAC community's access to schools, jobs, retail, transit, and key community destinations.

Disbenefits to LIDACs

Not implementing these projects would be a disbenefit LIDAC communities. If these projects receive funding for implementation, the disbenefits would be temporary construction to implement the projects, which may impact the travel patterns of LIDAC communities.

Authority to Implement Measure:

The City of Albuquerque is authorized under NM Stat § 3-49-1 (2021) to lay out, establish, open, vacate, alter, repair, widen, extend, grade, pave or otherwise improve streets; including, but not necessarily limited to median and divider strips, parkways and boulevards; alleys, avenues, sidewalks, curbs, gutters and public grounds, and may: A. regulate their use and use of structures under them; B. prohibit and remove encroachments or obstructions on them; C. provide for their lighting, cleaning, beautification, landscaping and maintenance; D. regulate their opening or repair; E. require the owner or occupant of any premise to keep the sidewalk, along the premise, free from any snow or other obstruction;
F. regulate and prohibit the throwing or depositing of any offensive matter on them; G. prohibit injury to them; H. provide for and regulate crosswalks, curbs and gutters; I. regulate and prohibit their use for signs, signposts, awnings, awning posts, telegraph poles, horse troughs, posting handbills and advertisements; J. regulate and prohibit the exhibition or carrying of banners, placards, advertisements or handbills in the streets or upon the sidewalks; K. regulate and prohibit the flying of banners, flags or signs across the streets or from houses; L. regulate traffic and sales upon streets, sidewalks and public places; M. regulate the numbering of lots and houses; N. name and change the name of any street, alley, avenue or other public place; and O. with the written consent of the owner, regulate the speed and traffic conditions on private property. These proposed projects are consistent with this statute and would include the City of Albuquerque improving City-owned streets.

CT3: MULTIMODAL RAIL TRAIL

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Implementing the City of Albuquerque's Bikeways & Trails Facility Plan is a key mechanism to encouraging mode shifts from vehicular trips to active and mass transportation trips, which will help reduce greenhouse gas emissions. A keystone of the long-range Plan is the **Albuquerque Rail Trail**.

The Albuquerque Rail Trail is a planned 7-mile urban bike and pedestrian trail, an iconic and artistic parkway that will reflect Albuquerque's vibrant history and cultural diversity. The trail will be lined with attractions such as plazitas, art installations, and gardens. The Rail Trail will link Albuquerque's vibrant downtown area to nearby neighborhoods, cultural destinations, entertainment districts, and mass transportation options, creating a world class urban amenity that is expected to catalyze redevelopment. The trail is imagined both as a celebration of Albuquerque's cultural history and a bright vision for our shared future.

Almost entirely separated from vehicular traffic, this project will become the safest and most connected cycling and pedestrian infrastructure investment in Albuquerque, providing a safe, comfortable, and enjoyable active transportation experience. By connecting lower-income residential neighborhoods to jobs, entertainment, and mass transportation options, the project hopes to encourage mode shifts to non-single occupancy vehicle commutes and decrease car-related emissions in the greater downtown Albuquerque area.

The Rail Trail is a social equity infrastructure project that has the promise to:

- Increase active transportation (and decrease single-occupancy vehicle use) by expanding a network of safe pedestrian and cyclist infrastructure for commuters and families
- Increase green space in our historic communities and reduce severe urban heat island effects
- Expand economic opportunities for workers and businesses
- Uplift the cultural heritage of historic neighborhoods
- Grow public space acreage available for residents and community-based programming
- Activate and develop vacant lots and buildings, advancing economic development

Current bike infrastructure in the Downtown area is fragmented. Some bike routes end abruptly, leaving cyclists to navigate for several blocks until they reach another designated route. Additionally, many of the surface streets require bikes and cars to share lanes. Most designated bike lanes offer no physical barriers to protect cyclists from car lanes, leaving bicyclists exposed to distracted drivers. Creating a dedicated pedestrian and bicycle corridor that is offset from the road in the heart of downtown will serve both local and regional commuters, closing the missing link for safe access to jobs, amenities, and tourist destinations.

The lack of "first/last-mile" infrastructure[11] is a major impediment to uptake of alternative transportation modes. The Albuquerque Rail Trail will fill this missing link in in the active transportation network of greater downtown, providing connections to existing high-quality cycling facilities and connecting to Albuquerque's main Alvarado Transit Center (which offers over 26 bus and bus rapid transit routes, as well as commuter rail options between Belen, Albuquerque, and Santa Fe). Thus, the City of Albuquerque expects that commuters will become be more likely to select active and mass transportation options for commuting, errands, and leisure, resulting in decreased emissions from single-occupancy vehicles.

The Rail Trail will connect to the existing Bosque Trail and will be constructed in segments, each with independent utility for the neighborhoods within which they are located:

- Phase 1: Sawmill
- Phase 2: Downtown
- Phase 3: Barelas
- Phase 4: Old Town
- Phase 5: Wells Park

For the EPA's CPRG Implementation Grant, the City of Albuquerque is requesting funds to construct the Old Town segment—currently a critical funding gap. See Long-term Scaling section for a map of each segment.

Project/Program Alternate title:

Albuquerque Rail Trail

Mechanism

Requested funds will be used for construction of the physical trail, the installation of landscaping, utility relocation, street and parking restriping, traffic signal upgrades, pedestrian hybrid beacons, and other trail-related upgrades. The City of Albuquerque will go out to bid for construction following federal procurement guidelines. The City of Albuquerque is well versed with federal grants, including bidding, expending, and reporting on federal funds.

List any potential risks for this mechanism

Primary risks to implementing the Bikeways & Trails Facility Plan, which includes the Rail Trail as a key component, include ensuring adequate funding for each plan component. Specifically for the Rail Trail, designing the trail in five phases means that project timing and scheduling construction must be carefully negotiated.

Risks to ensuring adequate funding include inflation, project staffing issues, and materials availability. Design documents are at varying stages for completion for each trail segment. Because design is underway, construction costs are currently

[11] Safe and accessible infrastructure pedestrians and cyclists need to connect from their homes to mass transportation options.

rough order of magnitude. Additionally, construction costs have been escalating and fluctuating unpredictably, so costs may increase by the time grant agreements have been singed.

These are all very typical risks for major infrastructure projects.

Transformative Impact (i.e., scalability/replicability)

The Rail Trail has promise to be the safest and most connected cycling and pedestrian infrastructure investment in Albuquerque, providing a safe, comfortable, and enjoyable active transportation experience. Looking to comparable projects in other cities, Albuquerque anticipates that the project will encourage mode shifts to non-single occupancy vehicle commutes and decrease car-related emissions in the greater downtown Albuquerque area. Further, the Rail Trail is likely to promote higher density housing and retail development near bike infrastructure, helping to decrease the carbon emissions of downtown developments. Finally, the trail will create green, shaded spaces in areas that currently include polluted rail right-of-way and industrial areas.

A mode shift assessment conducted for a one-mile segment of the trail estimates between 7,500 – 19,000 user shifts from car trips to cycling trips per year following the installation of the Rail Trail.[12] Generalized over the entire 7-mile loop, the installation of the Rail Trail could result in significant reductions in vehicle miles traveled on an annual basis, which will help reduce greenhouse gas emissions.

Measure	**Annual Projections *(7-mile loop)***
Annual Bike Trips	132,188
VMT Reduced	-264,369
CO Reduced (grams)	-934,283
HC Reduced (grams)	-60,277
NOx Reduced (grams)	-30,933
PM2.5 Reduced (grams)	-2,114

These estimates may be conservative, as cycling becomes more popular as an environmentally conscious form of commuting. Additionally, as a safer cycling facility, more residents and commuters who are hesitant to ride on streets shared with cars for safety reasons may be more inclined to utilize this more protected infrastructure, which offers mostly off-street facilities and requires limited vehicular crossings. These projections are assuming that only destinations within 1 to 2 miles will see mode shifts from cars to bikes; however, connections to other cycling infrastructure will offer more dedicated cyclists with options for going farther distances, which can

[12] Mode Shift Assessment and Reduced VMT in Support of the Proposed Albuquerque Rail Trail: Old Town Segment, November 2023

result in additional greenhouse gas reductions above and beyond the projections listed here.

Further, these estimates do not include walking trips that could replace car travel, which may increase the pollution reduction potential. It also does not consider the greenhouse gas reductions associated with biking to bus routes, replacing much longer distance travels with *both* biking and mass transportation.

Much of the downtown area is classified as an urban heat island. The Rail Trail will be a 7-mile-long green space, featuring shade trees, native plants, pollinator gardens, and medicinal gardens. It is estimated that over 350 trees will be planted along the trail, which will aid with CO_2, SO_2, NO_2, and PM_{10} uptake. Because the Rail Trail will connect to an existing Bosque Trail, which is a 17-mile mile long bike and pedestrian trail that runs parallel to the Rio Grande, the Rail Trail will also create a wildlife corridor deep into downtown—creating habitats for beneficial insects and other creatures.

Finally, the City of Albuquerque anticipates more sustainable land use patterns will grow out of this significant investment. Already, nearly 1,000 units of multi-family housing are planned by local developers directly along the Rail Trail alignment in anticipation of this high-quality amenity. Many of these developments will have only minimal parking spaces. These transit-oriented housing options could add thousands of additional residents who may be more likely to take alternative modes of transportation when provided with safe and highly connected active transportation infrastructure.

Key Implementing Agencies

- Metropolitan Redevelopment Agency (MRA, City of Albuquerque) – lead agency seeking funding and performing planning activities.
- Department of Municipal Development (DMD, City of Albuquerque) – department responsible for engineering design and construction oversight.
- Parks and Recreation Department (PRD, City of Albuquerque) – department responsible for maintenance once construction is completed.

Partners

- Friends of the Albuquerque Rail Trail (a nonprofit group currently in the planning stage)
- Neighborhood associations
- MainStreet organizations
- Local businesses
- Local and state philanthropies

Implementation Schedule & Milestones

<u>Previously completed implementation? (if any)</u>

- Phase 0: Bosque Trail (already constructed, 2 miles) – complete

<u>Progress between March 1st and October 1st (if any)</u>

- Phase 1: Sawmill Segment (0.75 miles) – in design, scheduled to commence construction Fall 2024
- Phase 2: Downtown Segment (1 mile) – in design, anticipated completion of design in Fall 2024

<u>Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029</u>

Downtown Segment:

- Engineering/Design: Oct 2023 - Oct 2024
  ROW & Permitting - Oct 2025 – Feb 2025
  Groundbreaking – March 2025
  Completion – March 2026
- GHG reductions anticipated to begin upon substantial completion, anticipated 2026. GHG 30-year reduction timeline: 2026 - 2056

Barelas Segment:

- Engineering/Design: October 2024 - Dec 2025
  ROW & Permitting - Jan 2026 - May 2026
  Groundbreaking - June 2026
  Completion - June 2027
- GHG reductions anticipated to begin upon substantial completion, anticipated 2027. GHG 30-year reduction timeline: 2027 - 2057

Old Town Segment:

- Engineering/Design: Jan 2025 - June 2026
  ROW & Permitting - June - Dec 2026
  Groundbreaking - Jan 2027
  Completion - May 2028
- GHG reductions anticipated to begin upon substantial completion, anticipated 2028. GHG 30-year reduction timeline: 2028 - 2058

<u>Long-term scaling plan (if applicable)</u>

- Phase 0: Bosque Trail (already constructed, 2 miles) – complete
- Phase 1: Sawmill Segment (0.75 miles) – in design, scheduled to commence construction 2024
- Phase 2: Downtown Segment (1 mile) – in design, scheduled to commence construction 2025
- Phase 3: Barelas (1 mile) – anticipated construction commencement 2026
- Phase 4: Old Town (1 mile) – anticipated construction commencement 2027
- Phase 5: Wells Park (1.5 miles) – anticipated construction commencement 2028

Connections to existing and future bikeways from the Rail Trail will offer cyclists the option to bike on 400 miles of bike infrastructure across Albuquerque. It will also connect residential communities to the Alvarado Transit Center, which offers overs local bus and bus rapid transit connections with free service, and commuter rail options that can take riders 30 miles south to Belen and 60 miles north to Santa Fe. The City of Albuquerque expects that commuters will become be more likely to select active and mass transportation options for commuting, errands, and leisure as they become more accessible and easier. These shifts will result in even greater emissions decreases from single-occupancy vehicles.

Geographic Scope

The Rail Trail will be constructed in the greater Downtown Albuquerque area, which includes Census Tracts 14, 15, 20, 21, 22, 27, 48 (Bernalillo County, New Mexico).

Metrics for Tracking Progress:

Measure: Bicycle and Pedestrian Volumes
Measurement Frequency: Annual

Measure: Funding and Construction Progress ($ funding secured, design progress, construction progress, construction completion)
Measurement Frequency: Annually

Measure: Number of trees planted/Acres of green space added
Measurement Frequency: Upon segment completion

Measure: Miles of contiguous bike and trail facilities connected to the Rail Trail
Measurement Frequency: Annually

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Sawmill Segment	0.75 miles of trail through the Sawmill neighborhood, connecting to the Old Town segment to the west and the Wells Park segment to the east	$5-12 million	$7M
Downtown Segment	1 mile of trail through Downtown, connecting to existing Rail Yards infrastructure to the south and the Wells Park segment to the north side	$14.5M - $16M	$16M
Barelas Segment	1 mile of trail in Barelas, connecting to the Rail Yards to the north and the Bosque Trail to the west.	$10M - $13M	$11.5M
Old Town Segment (to be requested in the CPRG	1 mile of trail through Old Town, connecting	$10M - $14M	$12M

Item	Description	Range	Best Estimate
Implementation Grant)	to the Bosque Trail to the west and the Sawmill segment to the east		
Wells Park Segment	1.75 miles of trail through Wells Park, connecting to the Sawmill segment to the north and the Downtown segment to the south	$30M - $50M	$35M
Construction estimates only. Does not include design, engineering, right of way, permitting, or easement costs.		**Total Cost:**	**$81.5M**

Cost Effectiveness of GHG Reduction (for requested funds)

$81.5M/4.001 metric tons = $20.35M/MTCO2e

Reasonableness of Cost (optional for PCAP)

The proposed Albuquerque Rail Trail, with an estimated total budget of $81.5M, represents a scalable and holistic approach to sustainable urban planning and community well-being. While the project will help reduce greenhouse gas emissions, it is important to look at the larger impacts of the project to truly understand the benefits to our environment, community, and economy.

Greenhouse Gas Emission Reduction: Improving and expanding cycling infrastructure is a response to the pressing need to reduce greenhouse gas emissions. By fostering a cultural shift towards sustainable transportation, we aim to decrease reliance on carbon-intensive vehicles. Numerous studies underscore the potential emissions savings associated with increased bike and pedestrian commuting, positioning this project as a strategic investment in our city's carbon reduction goals.

Improved Bicycle and Pedestrian Safety: The addition of 7 miles of off-street active transportation facilities is not merely about creating pathways; it's about redefining safety in our urban landscape. New Mexico is home to of the most dangerous streets in America for pedestrians and cyclists. By providing off-street facilities, we hope to reduce incidents of traffic injuries and deaths for our most vulnerable road users. This shift is fundamental to creating a healthier, safer, and more equitable city for all residents.

Green Space and Urban Heat Island Mitigation: Underserved communities in the greater downtown area are disproportionately affected by the urban heat island phenomenon. The integration of green spaces and trees not only addresses environmental justice concerns but also acts as a natural solution to mitigate rising temperatures. By cooling the city and reducing energy demand for air conditioning, this project aligns with our commitment to resilience and sustainability in the face of climate change.

Sustainable Land Use and Incentives for Multifamily Housing: The Albuquerque Rail Trail goes beyond transportation; it's a vision for sustainable urban living. By connecting the bicycle and pedestrian project with incentives for dense multifamily housing, we promote sustainable land use. This approach not only reduces urban sprawl but also concentrates resources efficiently, fostering long-term environmental benefits such as reduced car dependency and energy consumption.

Economic Development Benefits: While the primary focus is on environmental and equity progress, it is crucial to recognize the economic development benefits that accompany this project. Increased foot traffic to small businesses, newly developed vacant land, and rejuvenated dilapidated buildings will inject vitality into the local economy. This isn't just about building trails; it's about building a thriving, interconnected community where economic prosperity is a natural byproduct of sustainable urban planning.

In conclusion, this bicycle and pedestrian project represents a pivotal moment for our city. By investing $81.5M in this initiative, the City is merely creating a new bike path; we are building a recreation-oriented infrastructure that will build a legacy of sustainability, safety, and prosperity. This project paves the way for a greener, healthier, and more economically vibrant future for all Albuquerque residents.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

The City of Albuquerque has secured approximately $40M in resources to support this project, which are detailed in the following response field. Additional funds have been identified that will support closing funding gaps in the next few years. As follows:

- State Capital Outlay request, $10M expected, to support the Barelas trail segment
- State Junior Bill funding, around $300,000 expected for any trail segment
- U.S. Environmental Protection Agency, Outdoor Recreation Legacy Partnership grant, up to $15M awards made with $5M-7M expected for segments in distressed census tracks

If secured, these funds will come about half-way to closing the anticipated funding gap for the full trail.

What other funding sources have you secured for this same GHG measure (if any)?

- State of New Mexico Grant – Sawmill Segment (Phase 1) $11.5M
- USDOT RAISE Grant (2022) – Downtown Segment (Phase 2) $10M

- Congressional Earmark (2022) – Wells Park Segment (Phase 5) $3M
- Local funds (various) - $15M for design, construction, and grant match for RAISE (already committed to other segments)

Total raised to date: Over $39.5M

Demonstration of funding need: How are requested funds filling an existing funding gap?
Total funds raise (nearly $40M) are insufficient to construct the full trail (ROM costs between $80 - $100M for total project construction).

Each segment outlined in this appendix provides independent utility for the neighborhood in which it is located, with each independently advancing the mission of reducing greenhouse gas emissions. However, the greatest environmental, economic, and community benefits of the project cannot be realized until the full loop is completed. Completion of the 7-mile loop will dramatically improve connectivity to other bike routes and mass transportation options.

The requested $12M under the CPRG Implementation Grant will help construct Segment 4, the Old Town Segment.

Benefits, Primary:
GHG Emission Reductions

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Annual Projections	2025	2026	2027	2028	2029	2030	Total
Vehicle Miles Traveled Reduced	-75,534	-103,859	-141,626	-179,393	-217,160	-217,160	**-934,733**
CO Reduced	-0.367	-0.501	-0.634	-0.767	-0.767	-0.968	**-4.004**
HC Reduced	-0.024	-0.032	-0.041	-0.050	-0.050	-0.062	**-0.258**
NOx Reduced	-0.012	-0.017	-0.021	-0.025	-0.025	-0.032	**-0.133**
PM2.5 Reduced	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	**-0.009**

All GHGs represented in Metric Tons.

KEY: CO = carbon monoxide; HC = hydrocarbons; NO_x = nitrogen oxides; PM2.5 = particulate matter with diameter <= 2.5 micrometers.
*$PM_{2.5}$ includes exhaust, brakewear, and tirewear on a per VMT basis.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Annual Projections	2025 - 2050
Vehicle Miles Traveled Reduced	**-5,277,938**
CO Reduced	**-23.357**
HC Reduced	**-1.507**

NOx Reduced	**-0.773**
PM2.5 Reduced	**-0.053**

All GHGs represented in Metric Tons.

KEY: CO = carbon monoxide; HC = hydrocarbons; NO_x = nitrogen oxides; PM2.5 = particulate matter with diameter <= 2.5 micrometers.
*$PM_{2.5}$ includes exhaust, brakewear, and tirewear on a per VMT basis.

Data source(s) and assumptions

A mode shift analysis was conducted for one segment and extrapolated across the 7-mile loop. See the analysis and methodology for the Old Town Segment here: https://sfftp.cabq.gov/link/8DesSbrMZMs/

Co-benefits, Secondary:

Health Benefits

The Albuquerque Rail Trail is expected to provide major health benefits to low-income and historically underserved communities. The Trail promises to bring a host of health benefits, mitigating the urban heat island effect and addressing environmental justice concerns and promoting well-being. By incorporating green spaces, landscaping and shade trees throughout the project, the Rail Trail will enhance air quality, mitigating the impact of pollutants from nearby trains and roads. More green space will also aid in reducing respiratory issues and improving overall lung health for community residents along the trail, who are among the groups in Albuquerque who bear the disproportionate burden of air pollution. Further, green spaces serve as natural stress relievers and have been proven to improve mental health.

The trail's emphasis on pedestrian and cyclist safety encourages alternative modes of transportation, contributing to increased physical activity levels and reducing the risk of sedentary lifestyle-related diseases. In underserved areas prone to the urban heat island effect, the project's incorporation of trees and greenery acts as a cooling mechanism, mitigating temperature extremes. This not only enhances comfort but also minimizes the risk of heat-related illnesses.

Overall, the green trail infrastructure not only addresses environmental disparities but is positioned to become a catalyst for comprehensive health improvements, fostering more resilient and vibrant communities in the process.

Environmental Benefits

As mentioned, the Rail Trail promises to offer a host of environmental benefits, as summarized below.

Uptake of Environmental Pollutants: One of the central pillars of this project is the strategic planting of over 350 trees along the trail. Beyond providing aesthetic beauty, these trees serve as nature's purifiers, actively absorbing environmental pollutants and enhancing air quality. This initiative goes beyond transportation infrastructure; it's a green lung for our city, contributing to a healthier atmosphere for all residents.

Soil Remediation on Former Rail Right of Way: The trail's alignment includes areas previously designated as rail right of way, presenting an opportunity for environmental remediation. Through targeted soil remediation efforts, we aim to transform neglected spaces into thriving ecosystems. This not only revitalizes the soil but also contributes to the overall ecological health of the region, fostering biodiversity and resilience.

Native Plantings and Pollinator Habitats: The Rail Trail will incorporate native plantings and create habitats for pollinators, a deliberate step towards ecological balance. These plantings are not just ornamental; they play a vital role in supporting local ecosystems. By providing food and shelter for pollinators, we promote biodiversity and contribute to the health of our natural surroundings.

Improved Flood Readiness with Green Infrastructure: Recognizing the increasing challenges posed by climate change, the project incorporates green infrastructure to enhance flood readiness related to monsoons typical in the region. Through the strategic use of permeable surfaces and natural drainage systems, we aim to mitigate the impact of urban flooding. This forward-thinking approach not only safeguards the trail but also contributes to the overall resilience of the surrounding areas.

Reduction of Urban Heat Island Effect: The City’s commitment to environmental stewardship extends to addressing the urban heat island effect. By integrating green spaces, trees, and reflective surfaces, the project actively works towards cooling the urban environment.

Encouraging Sustainable Land Use Practices: The trail project is not an isolated initiative; it's poised to be a catalyst for broader change in our city's development patterns. By incentivizing multifamily housing and other denser development patterns, particularly in trail- and transit-oriented locations, we promote a more sustainable and efficient use of land. This approach not only reduces dependency on private vehicles but also encourages a vibrant, connected community with reduced environmental footprints.

In summary, the proposed trail project is a visionary investment in our city's environmental future. It's a blueprint for sustainable urban living that addresses air and soil quality, supports biodiversity, enhances flood resilience, combats the urban heat island effect, and sets the stage for more environmentally conscious land use practices.

Air Quality Benefits

In addition to reducing future greenhouse gas emissions, the proposed Rail Trail addresses poor air quality present in these disadvantaged communities that are burdened by heavy freight train traffic and major highways. Trees act as natural filters, capturing particulate matter and absorbing gaseous pollutants emitted by transportation sources. This green infrastructure, in the form of hundreds of trees and more natural vegetation and bushes, not only reduces the concentration of harmful particles in the air but also contributes to oxygen production and carbon sequestration, helping counterbalance emissions from nearby vehicles. Additionally, the project's focus on creating microclimates through tree canopies aids in moderating temperature extremes and mitigating the urban heat island effect. Overall, the introduction of diverse plant species enhances biodiversity and ecosystem resilience, offering a holistic approach to improving air quality and fostering a healthier living environment for the community.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	**GHG (metric tons CO_2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
Albuquerque Rail Trail – Mode shift from Car to Bike	-0.968	-0.035	-0.058	–	–	–

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	**GHG (metric tons CO2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
BAU	+4.004	+0.147	+0.01	–	–	–
PCAP	-4.004	-0.147	-0.01	–	–	–

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
See the Mode Shift, Reduced VMT, and Reduced GHG methodology for the Old Town segment here: https://sfftp.cabq.gov/link/8DesSbrMZMs/ These results have been generalized across the entire 7-mile segment.

Water Quality/Quantity Benefits

N/A

Land & Soil Benefits

The trail's alignment includes areas previously designated as rail right of way, presenting an opportunity for environmental renewal. Through targeted soil remediation efforts, we aim to transform neglected spaces into thriving, green, ecosystems that create shade and provide habitat for insects and wildlife. This not only revitalizes the soil but also contributes to the overall ecological health of the region, fostering biodiversity and resilience. A proposed partnerships with Soilutions, a local composting company, will help transform local composting waste into soil that can be used for the Rail Trail plantings. A community composting waste program has been proposed as another aspect of this PCAP, which can be a source of the soil used to install the proposed trail plantings. Other local philanthropies are planned to support pollinator and medicinal gardens.

Ecological Benefits

<<Benefits to plants, animals, and ecosystems that are not listed under any of the other environmental benefit categories (e.g., increasing wildlife habitat, increasing pollinator habitat, expanding urban wildlife corridors, reducing heat island effect, etc.)>>

Incorporating native plantings and creating habitats for pollinators is a deliberate step towards ecological balance. These plantings are not just ornamental; they play a vital role in supporting local ecosystems. By providing food and shelter for pollinators and other wildlife, the Rail Trail will promote biodiversity and contribute to the health of our natural surroundings. Because the Trail will connect to the Bosque Trail at two points, which runs parallel to the Rio Grande and is a major wildlife corridor, it may function as a wildlife corridor for some animals and insects.

Underserved communities, disproportionately affected by the urban heat island phenomenon in our city, will see a profound transformation. The integration of green spaces and over 350 new trees not only addresses environmental justice concerns, but also acts as a natural solution to mitigate rising temperatures. By cooling the city and reducing energy demand for air conditioning, this project aligns with our commitment to resilience and sustainability in the face of climate change.

Economic Benefits

Urban trails and linear parks have been shown to help create jobs, encourage new businesses to open, and increase consumer spending. An Indiana University study of the Indianapolis Cultural Trail showed that 48% of businesses along the downtown Indianapolis Cultural Trail reported seeing an increase in revenue since the trail's construction; 40 – 50 full time and 50 part-time jobs were added to existing businesses; and 25% of businesses surveyed reported they were new to the area, and had selected the location because of the trail.

Downtown Albuquerque is home to an entertainment and arts district that has been challenged in the aftermath of COVID-19. As the city attempts to draw customers back to the district, creating an outdoor urban amenity like the Rail Trail could attract residents and tourists alike. Conveniently located adjacent to the Albuquerque

Convention Center and several hotels, the Rail Trail is well-positioned to serve as a draw for new tourists and enhance existing tourism. The authentic cultural offerings in downtown enhance its character, heritage, and beauty, and creates a unique sense of place not easily replicated elsewhere. A strong identity, mixed with vibrancy and activity created by the Rail Trail, could enhance and strengthen the economy of Albuquerque's Downtown.

Other urban trail projects have helped boost property values and the City anticipates similar outcomes locally. Downtown Albuquerque has experienced inconsistent property value growth over the past 10 years, fluctuating from negative to positive numbers, while County Assessor property values have increased consistently around 3% annually. Downtown Albuquerque's total property value increase since 2010 has lagged behind the rest of the city. The construction of linear parks or urban trails have been demonstrated to help boost property values. In Indianapolis, a study showed that after the construction of their Cultural Trail, property values within 500 feet of the trail increased by 148%. Along the Rail Trail there are a mix of privately and publicly owned properties, most of which are commercial, multifamily, industrial, or vacant. This is an opportunity for the City to capture increased tax revenue to reinvest in the Downtown core as the trail spurs development investment.

There are few single-family homes directly adjacent to the trail; those that do exist are protected from major tax fluctuations by a county-wide 3% cap on annual property tax increases. This ensures that existing residents can stay in place to enjoy the recreational, environmental, and economic benefits of the Rail Trail.

Economic Value of Health Benefits

Though not comprehensively quantified for this PCAP, the economic value of health benefits cannot be understated. Investing in the Rail Trail will not only yield environmental benefits, but also substantial economic value through improved public health.

Increased access to outdoor recreation opportunities contributes to a more active and physically fit population. This can help spur a reduction in sedentary lifestyles and obesity-related illnesses, which can enhance workforce productivity and decrease healthcare expenses.

The shift from single-occupancy vehicles to bikes, facilitated by the improved bicycle infrastructure system, will result in a tangible reduction in greenhouse gas emissions. This not only contributes to a cleaner environment but also brings about significant economic savings by mitigating the healthcare costs associated with respiratory illnesses, particularly asthma. The strategic planting of trees along the trail further reinforces this impact, actively improving air quality and reducing healthcare expenses related to pollution-induced health issues.

In addition, the creation of safer off-street biking and pedestrian infrastructure directly correlates with a decrease in injuries and fatalities. This, in turn, results in substantial economic savings by reducing the financial burden on healthcare systems and the societal costs associated with accidents, emergency responses, long-term medical care, and death. The overall economic value generated through these health benefits underscores the trail project's significance as a holistic and economically viable investment in community well-being.

In the Downtown Segment of the trail alone, severe and fatal bicycle crashes are anticipated to drop from 13 incidents to 2 incidents annually by converting on-street bicycle users to off-street bicycle users. A Benefit Cost Analysis of the Downtown Segment of the trail poses these economic benefits for just a 1-mile segment over a 30-year period:

Table 23 - Project Benefits by Long-Term Outcome Category, 2022-2051

Type of Benefit	Relationship to RAISE Goals	Undiscounted (2020$)	Discounted (7%) (2020$)
Safety	Improved safety from construction of cycle track and an off-street multi-use trail.	$315.7M	$101.5M
Health	Health benefits from increase bicycle ridership	$80.1M	$25.8M

Figure 1 - Downtown Segment Benefit Cost Analysis (prepared for 2022 RAISE Grant application) (1 mile segment)

Extrapolated across the 7-mile segment, this could result in $400M (undiscounted) or $129M (discounted) in health benefits over a 30-year period. That’s $13M (undiscounted) or $4.3M (discounted) in annual health benefits.

Economic Value of Environmental Benefits

The Rail Trail has the potential to lower costs of travel and commuting for residents who elect to bike or walk to destinations rather than take vehicles. As a part of a Mode Shift Analysis for the Old Town segment, extrapolated to the entire 7-mile loop, the project anticipates annual savings of $105,300 in decreased costs of operating a vehicle for all users who may replace car trips with bike trips. These savings can be meaningful, especially for low-income households.

Table 5: Summary VMT Reduction and Cost Savings from Old Town Segment

Factor	Low Scenario	High Scenario
New Annual Trips	7,465	18,884
Annual VMT Reduction	11,197	37,767
Annual User Cost Savings	$2,216	$7,494
Total Emissions Costs per VMT	$2,239	$7,553
Lifetime User Cost Savings (30 year span)	$66,480	$224,820
Lifetime Emissions Cost Savings (30 year span)	$67,170	$226,602
Annual Total Cost Savings	**$4,455**	**$15,047**
30-Year Total Cost Savings	**$133,650**	**$451,422**

Figure 2 - Table from Mode Shift Memo demonstrating cost savings for replacing car trips with cycling trips on the Old Town Segment.

Actual savings may be higher; this analysis assumes bike trips are *only* replacing trips between 1 - 2 miles. Once the trail is fully constructed, longer trips are expected to be more possible and desirable. It does not consider pedestrians, nor does it calculate the possibility of longer vehicular trips being replaced by bike-to-bus trips.

Additional benefits include the project's contribution to mitigating the urban heat island effect and enhanced air quality, which can translate into economic benefits. Cooler urban temperatures lead to decreased energy consumption for air conditioning, lowering utility costs for residents and businesses.

The table below further quantifies additional economic benefits of the Rail Trail specifically in the Downtown segment of the trail.

Table 23 - Project Benefits by Long-Term Outcome Category, 2022-2051

Type of Benefit	Relationship to RAISE Goals	Undiscounted (2020$)	Discounted (7%) (2020$)
Safety	Improved safety from construction of cycle track and an off-street multi-use trail.	$315.7M	$101.5M
Health	Health benefits from increase bicycle ridership	$80.1M	$25.8M
Cycling Facilities	New dedicated bicycle lane that will increase and improve bicycle ridership	$51.7M	$16.6M
Reduced Fuel Costs & Auto/Truck O&M	Fuel savings and reduced Auto/Truck O&M from reduced VMT	$723.8k	$232.7k
Emissions	Emissions reductions due to reduced VMT	$112.3k	$52.3k
Residual Value	Remaining usable life of trail facilities at the end of 25-year study period	$2.3M	$281.0k

Figure 3 - Quantified project benefits in Benefit Cost Analysis performed for the Downtown Segment of the Rail Trail (as part of the City of Albuquerque's 2022 RAISE grant application).

<u>Total Cost of Ownership</u>

The benefit-cost analysis for the Rail Trail Downtown Segment identified the following costs for operations and maintenance for a 1-mile segment over a 30-year period:

Table 23 - Project Benefits by Long-Term Outcome Category, 2022-2051

Type of Benefit	Relationship to RAISE Goals	Undiscounted (2020$)	Discounted (7%) (2020$)
Increased O&M	Increased O&M from new trails that require maintenance	($62.5k)	($20.1k)

Extrapolating this cost to the rest of the trail, these increased operations and maintenance costs for all new trail constructed (~5 miles) total costs over a 30-year period will be $3,125,000 (undiscounted) or $1,005,000 (discounted). Annually, this translates to $104,000 (undiscounted) or $34,000 (discounted).

Workforce Needs & Quality of Jobs

The Rail Trail promises to create direct jobs immediately upon construction start, as well as indirectly over the long term by fostering economic development and spurring new housing and business creation near the trail.

Project labor agreements. Prior to start of project construction, City of Albuquerque ordinance requires a Project Labor Agreement for the Rail Trail and a collective bargaining agreement between the General Contractor, all subcontractors, the New Mexico Building and Construction Trades Council, and unions. These agreements have been written and will be finalized and signed prior to construction start.

Good paying jobs and strong labor standards. Construction of the Rail Trail will create numerous good paying jobs at Davis-Bacon rates. The Project Labor Agreement will ensure that all contractors will adhere to strong labor standards. Participating workers will have the free and fair choice to join a union.

Private jobs and small business opportunities. The Rail Trail is expected to have a long-term positive impact on the local economy and quality job creation by fostering development and activity along and near the trail by attracting residents and tourists alike. Located adjacent to the Albuquerque Convention Center and several hotels, the Rail Trail can serve as a draw for new tourists and enhance existing tourism, which can grow economic base tourism jobs.

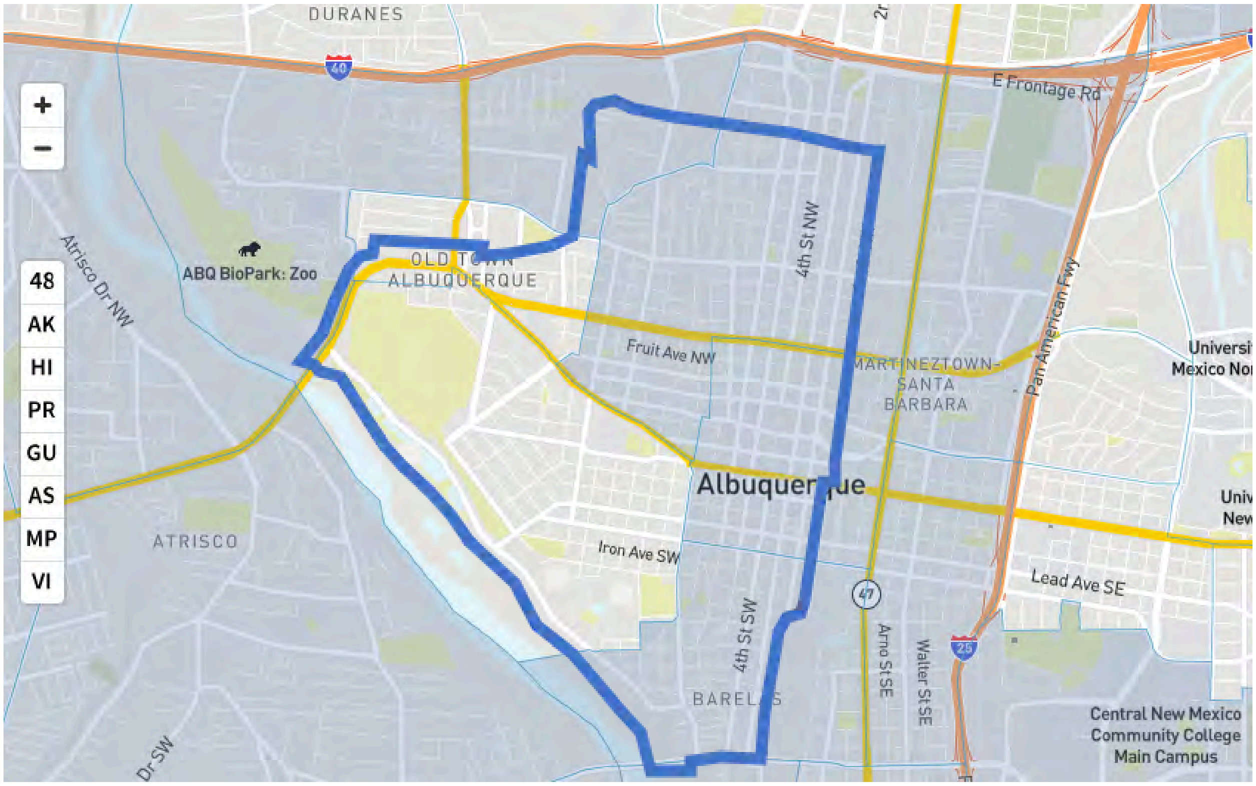
Urban trails and linear parks have been shown to help create quality jobs, encourage new businesses to open, and increase consumer spending. For instance, an Indiana University study of the Indianapolis Cultural Trail showed that 48% of businesses along the trail reported seeing an increase in revenue since the trail's construction; 40 – 50 full time and 50 part-time jobs were added to existing businesses; and 25% of businesses surveyed reported they were new to the area and had selected the location because of the trail. It is expected that the Rail Trail will increase the economic diversity and health of the greater Downtown area, increasing the type and number of quality jobs.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in and serve people in the following tracts identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST) (listed as tract numbers as identified in the CEJST tool):

- 35001002500
- 35001002700
- 35001002000
- 35001001500
- 35001002100
- 35001001400



Summary of past/ongoing community engagement

Urban trail projects similar to the Rail Trail have transformed neighborhoods, providing significant economic, cultural, and recreational benefits. As the City invests in the Rail Trail, it seeks to ensure that the communities around the trail directly benefit from this transformative investment.

The City of Albuquerque has conducted in-depth public outreach efforts to seek input on the design and programming of the Rail Trail. To date, over 700 community members have given input on the Rail Trail in a variety of formats (open houses, surveys, and meetings). Input from the community has helped create the design, landscaping, and programming planned for the Rail Trail. From these activities, the City also understands that equitable development and inclusive growth is a key priority for many neighborhood stakeholders. To review community engagement results from the Albuquerque Rail Trail Framework Plan, click here: https://www.cabq.gov/mra/documents/part-vii-appendix-survey-results.pdf

Community input opportunities will continue as the Rail Trail advances. Recent public engagement opportunities include the publication of a Public Comment Draft of a new report, "Advancing Inclusive Growth through the Albuquerque Rail Trail" (visit https://cabq.gov/railtrailequity to read the report, available in both English and Spanish). The survey and public comment period was open for 6 weeks after the report's late January publication; a final version of the report is underway and will incorporate community input.

For additional information on ongoing community engagement efforts, visit https://cabq.gov/railtrailequity.

Benefits to LIDACs

The Rail Trail has tremendous potential to foster economic development, create jobs, and improve the quality of life for residents across Albuquerque. The Rail Trail will run through and by the neighborhoods of Barelas, Country Club and Huning Castle, the Downtown Core, East Downtown and Huning Highlands, Old Town, Santa Barbara/Martineztown, Sawmill, South Broadway, and Wells Park. These are some of the City's most historic and diverse areas; most of them qualify as LIDACs. As the City invests in this major infrastructure project, it is taking steps to ensure that these local communities directly benefit from this transformative investment.

A recent report, Advancing Inclusive Growth through the Albuquerque Rail Trail, highlights the existing conditions in Rail Trail neighborhoods, studies trends over the last ten years, and identifies a suite of programs that can promote neighborhood stability and vibrancy based on past community engagement efforts. The report draws from years of public input: some specifically centered on the Rail Trail, and some from other equitable development and needs assessments conducted in these communities. The Inclusive Growth Report is built on feedback from thousands of Albuquerque residents whose priorities include preserving cultural heritage, generating good jobs, advancing equitable development, and maintaining affordable costs of living.

These greater Downtown neighborhoods are at higher risk of environmental risks, including:

- Urban heat island effect
- Higher rates of severe and fatal pedestrian and cyclist traffic-involved injuries
  - This is exacerbated by the fact that 24% of greater downtown households do not have a car, compared to a city-wide rate of 15% without cars
- Airborne hazards, including higher rates of harmful particulate matter (due to close proximity of polluting traffic such as heavy freight trains and two interstate highways)

The Albuquerque Rail Trail will address these and other disparities by:

- Planting hundreds of trees that will help reduce the urban heat island effect and aid with uptake of harmful airborne materials
- Providing 7 miles of safe off-street interconnected cycling infrastructure
- Adding 5 miles of new green space for outdoor recreation
- Expanding economic opportunity for small business owners
- Funding and providing community-generated and culturally relevant programming

Disbenefits to LIDACs

Urban trail projects similar to the Rail Trail have transformed neighborhoods, providing significant economic, cultural, and recreational benefits. Major green infrastructure projects can, however, cause in unintended consequences such as rent and property tax increases, which can put residents at risk of displacement.

The Advancing Inclusive Growth through the Albuquerque Rail Trail report seeks to ensure the City is proactive in recognizing and mitigating risks to LIDAC communities. The report identifies a suite of programs that can promote neighborhood stability and vibrancy based on past community engagement efforts—both specifically about the Rail Trail, and also from other community engagement and equitable development efforts recently conducted in these communities.

Authority to Implement Measure:

The City of Albuquerque's Metropolitan Redevelopment Agency is authorized the State of New Mexico Metropolitan Redevelopment Code (Section 3-60A-l et seq. NMSA 1978) and the local City of Albuquerque Metropolitan Redevelopment Ordinance (§ 14-8-4) to advance catalytic projects that help improve physical and economic conditions in underserved and distressed communities. The Metropolitan Redevelopment Agency can improve conditions through infrastructure projects, public-private partnerships, applying for and issuing grants, and providing various other various incentives that serve the purpose of advancing inclusive growth in designated Redevelopment Areas. The Albuquerque Rail Trail will help improve walkability, activate vacant and underutilized lots, and improve economic viability in these LIDAC neighborhoods (many of which are designated Metropolitan Redevelopment Areas).

CT4: JUAN TABO CONNECTIVITY TRAIL

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

This multi-modal urban commuter trail investment will not only decrease the amount of greenhouse gas emissions in the Foothills of Albuquerque and City Council District 9, but it will also increase pedestrian and bicyclist access to the Singing Arrow Community Center and Tijeras Biozone for the Singing Arrow Neighborhood (identified by the J40 Mapping Tool as a low-income/disadvantaged community (LIDAC). This project can serve as a model for further multi-modal urban commuter trail investments throughout various parts of the city that reduces greenhouse gas emissions and serves both the functions of a commuter connectivity trail and a recreational connectivity trail. Investments can also support the construction of educational infrastructure surrounding the edges of the trail, providing education to the public about the environmental and ecological biodiversity of the Tijeras Biozone.

Project/Program Alternate title:

CT4: Juan Tabo Connectivity Trail

Mechanism

Requested grant funds will be used for construction of the physical multimodal trail. The City of Albuquerque's Parks and Recreation Department will go out to bid for construction following federal procurement guidelines. The Department is well versed with federal grants, including bidding, expending, and reporting on federal funds.

List any potential risks for this mechanism

There is a risk that construction cost will exceed the amount of the grant award. However, this risk is mitigated by the use of General Obligation Bond funds for Council District 9 and New Mexico legislature capital outlay funding that was recently awarded.

Other risks to ensuring adequate funding include inflation, project staffing issues, and materials availability. Additionally, construction costs have been escalating and fluctuating unpredictably, so costs may increase by the time grant agreements have been signed.

Transformative Impact (i.e., scalability/replicability)

This reduction measure demonstrates the transformative impact of funding small-scale connectivity trail projects that initiate modal shifts among nearby residents both commuting to work and engaging in recreational activities in surrounding neighborhoods. In a community like Albuquerque, where commuter bike trails traverse interweaving patches of urban and rural patches of land, the Juan Tabo Connectivity Trail can serve as a catalytic multi-modal, multi-jurisdictional investment that can be replicated in other parts of the city. This project also aligns with the City of Albuquerque's Bikeway and Trail Facilities Plan (updated in May

2023) and can serve as a model for implementing its mission: Embracing bicycling by implementing convenient on-street bikeway and paved multi-use trail facilities that enhance safety and appeal to people of all ages, abilities, and backgrounds.

This reduction measure also aligns with theTijeras Arroyo Biological Zone (Bio-Zone) Open Space Resource Management Plan, which gives the City of Albuquerque's Open Space Division, developers, and property owners a guiding document for restoring, protecting, and developing its lands within the zone throughout the years and through various city government administrations. This project also opens up educational opportunities surrounding the edges of the trail, supporting culture change in the way the public both navigate and appreciate the environmental and ecological biodiversity of the Tijeras Biozone.

Key Implementing Agencies

Albuquerque City Council staff have initiated the development of this PCAP project proposal. The City of Albuquerque's Parks and Recreation Department, Open Space Division will be responsible for implementing the project and working with non-government agencies/contractors on project management throughout the design and construction process.

Partners

- Wilson & Company conducted the Juan Tabo Connectivity Study for the City of Albuquerque.
- Souder Miller through Sites Southwest (preparing the survey and civil engineering for the City of Albuquerque).
- Neighborhood associations and surrounding residents who have shown support during public meetings

Implementation Schedule & Milestones

Previously completed implementation? (if any)

Completion and delivery of the Juan Tabo Connectivity Study by Wilson & Company to the City of Albuquerque on February 9, 2021.

Progress between March 1st and October 1st (if any)

The City of Albuquerque Parks & Recreation Department is in the process of negotiating a contract for design with Souder Miller and Sites Southwest. We expect their work to commence between March 1 and October 1. The design work will be funded by City Council, leaving grant funds available for construction.

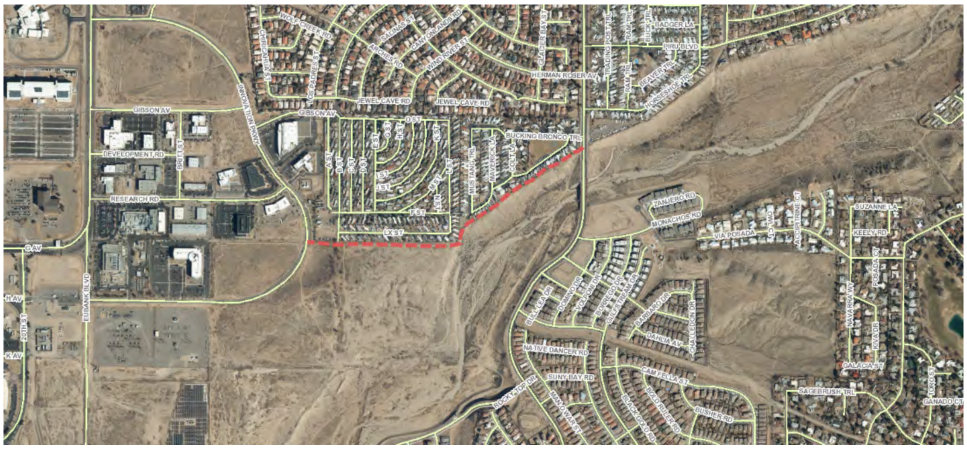
Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Project kickoff, May 1, 2024
- Site survey and geotechnical analysis, May 1, 2024, to August 1, 2024
- and preliminary design, August 1, 2024, to December 1, 2024
- Public Engagement, October 1, 2024, to February 1, 2025
- Final design, February 1, 2025, to April 1, 2025
- Construction bidding and contracting, May 1, 2025, to July 1, 2025
- Construction, August 1, 2025, to February 1, 2025

CPRG funding would help fund the public engagement and final design components of the project, completed between October 1, 2024 and April 1, 2025.

Geographic Scope

North rim of Tijeras Arroyo between Juan Tabo Boulevard and Innovation Parkway in Albuquerque.



Metrics for Tracking Progress:

A combination of financial, environmental, social, and governance metrics should all be tracked to measure the progress of the project. Examples of metrics for each type should include:

- Financial: Cost-benefit analysis conducted by the Parks and Recreation Department
- Environmental: reduction in electricity usage, change in fuel consumption for surrounding neighborhoods like Singing Arrow, etc.
- Social: Health and well-being of surrounding neighborhoods
- Governance: Any changes in City policy related to the City's Bikeway and Trail Facilities Plan and/or the City's Comprehensive Plan

A few specific metrics might include:

- Measure: Bicycle and Pedestrian Volumes / Measurement Frequency: Annual
- Measure: Funding and Construction Progress ($ funding secured, design progress, construction progress, construction completion) / Measurement Frequency: Annually

Cost Estimates for Implementation:

Unit Cost

The complete project stretches along the northern rim of the Tijeras Arroyo, from the southern end of Innovation Parkway to the corner of Juan Tabo and Bucking Bronco Trail, as featured below (trail in red):

Item	Description	Range	Best Estimate
LX St. SE (Segment 1)	1000+ feet of trail along the northern rim of the Tijeras Arroyo (parallel to Wild Horse Trail) Contractual services for trail construction and personnel	$110,000 - $150,000	$130,000
Wild Horse Trail SE (Segment 2)	1000+ feet of trail along the northern rim of the Tijeras Arroyo (parallel to Wild Horse Trail) Contractual services for trail construction and personnel	$75,000 - $125,000	$130,000
Total			**$260,000**

Total Cost
$260,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

$260,000 / 0.178836 metric tons of CO2 equivalent (MTCO2E) = $1,453,846/MTCO2E

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Total Project Cost: $900,000

$500,00 in City Councilor Discretionary Set-Aside Funding has been earmarked for Road Deficiencies projects in District 9 of Albuquerque. "The scope of the project is to construct roadway improvements that correct inadequate service, provide system backup capability, or minimize downtime in City Council District 9."

$140,000 in State Capital Outlay Funding has been awarded from New Mexico State Legislators in the 2024 State Legislative Session. This funding request is scoped for the following: "Study, map, plan, design, develop, construct, furnish, equip, and acquire right of way for a new commuter bike trail between Juan Tabo Boulevard and Innovation Parkway in Albuquerque in Bernalillo County."

Total raised to date: with $640,000 secured for the project, the City of Albuquerque requests $260,000 in CPRG grant funding in order to fully fund this project.

Contingency funding sources/other potential funding sources available to complete this project include:

- Federal RAISE Grant (NMDOT would serve as a pass through for funding). This federal grant would build capacity for this reduction measure project to incorporate sustainability and equity in its implementation.
- Trails+ Grant (also pass-through the State). This grant would help fund an ADA accessible trail near where the new District 9 Visitor/Education Center is to be located along Central.
- Smaller ($5-10,000) grants from American Trails and other resources.

What other funding sources have you secured for this same GHG measure (if any)?
As part of the City's General Obligation Bond Program, 3% of the general obligation bond cycle must be dedicated towards Energy Conservation projects. Also as part of the City's General Obligation Bond Program, each City Council District dedicates $1 million per two-year bond cycle for projects in that District. Council District 9 has $500,000 earmarked for this project.

Demonstration of funding need: How are requested funds filling an existing funding gap?
City Parks & Recreation staff estimate the total cost for this multi-use trail will be $900,000. This preliminary estimate is based on recent comparable projects and knowledge of the terrain in the project area. City Council has $640,000 on hand but needs another $260,000 to fully fund the project.

Part of this trail will cross a former landfill site that is located adjacent to a community of manufactured homes. The landfill presents technical challenges to development that add to the burden of this already overburdened community. EPA CPRG implementation funding for a multiuse trail in this area will allow for an appropriately engineered facility that increases access to City Open Space for an underserved community while it makes emissions-free bicycle and pedestrian commuting to Kirtland Air Force Base feasible for a large neighborhood to the east.

Benefits, Primary:
GHG Emission Reductions[13]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

With the project instigating an annual VMT reduction of 8,434, and an average CO2 emission of 3.534 grams per mile, there will be an annual CO2 emission reduction of 29,806 grams (or 0.029806 metric tons). Since the trail is expected to be completed by February 2025, the reduction will be over the course of 6 years (5.9 years, 2025 – 2030), this would be a cumulative CO2 reduction of 0.178836 metric tons.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Over the course of nearly 26 years (25.9 years from 2025 – 2050), this would be a cumulative CO2 reduction of 0.774956 metric tons.

Data source(s) and assumptions

Calculations were made using a methodology developed by researchers at the Institute for Transportation Studies at the University of California-Davis to more effectively quantify emissions reductions associated with improvements in bikeway infrastructures. Specifically, the formula applied in this document estimates the mode shift and the reduction in VMT that are likely to result from new bikeways. The assumptions used in the assessment are described below, including trip length and mode shift. Additional calculations are made to quantify the user costs savings from reduced vehicle operations and the societal value of improved air quality through reduced greenhouse gas (GHG) emissions. Finally, the analysis projects total GHG emissions reduced by the installation of new cycling facilities.

The City of Albuquerque/MRCOG collects bicycle counts data through Strava, a mobile app that allows users to record their rides. Strava aggregates the data for commercial purposes and produces daily and monthly user totals by segment that can be used for planning purposes. An important caveat of the Strava app is that users are more likely to be higher income and bike for recreational purposes. However, a growing body of research indicates that Strava data can be used to estimate total daily bicyclists by applying an adjustment factor. On principal arterials, Badashova et al. indicates that Strava represents 8% of total users.

Furthermore, the screen shot below contains the proposed methodology from researchers at the University of California-Davis for calculating the shift in travel mode from personal vehicle to bicycle and the associated decrease in VMT from a new bikeway facility.

[13] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Equation 4: Auto VMT Reductions (alternative method)

$$Auto\ VMT\ Reduced = (D) * (BC) * (S) * (GF) * (AS) * (C) * (T) * (L)$$

Where,

			Units
D	=	days of use per year (default is 365 days, since counts can be adjusted seasonally)	Days/year
BC	=	average hourly (or daily) bicycle count (counts taken on the street to be improved with the bike facility, or, in the case of a facility not on an existing street, a parallel street)	Trips/day
S	=	seasonal adjustment factor (adjusts bicycle count to annual average daily bicycle trips)	-
GF	=	growth factor (expected rate of increase in bicycle count, e.g. 1.0 for a 100% increase in trips on the route)	-
AS	=	automobile substitution rate (expected rate at which cyclists who did not bike on the same route prior to bicycle facility installation switched from driving, or being driven in, an automobile to cycling)	-
C	=	carpool factor (default is 1/1.15, to reflect the California average number of vehicle trips per person trips by personal auto)	-
T	=	trip type factor (optional inclusion for conservative estimates; default is 0.506)	-
L	=	bike trip length (default is 1.5 miles/trip in one direction)	Miles/trip

Co-benefits, Secondary:

Health Benefits

The trail's emphasis on pedestrian and cyclist safety encourages alternative modes of transportation, contributing to increased physical activity levels and reducing the risk of sedentary lifestyle-related diseases.

This multiuse trail will make bicycle and pedestrian commuting from the Juan Tabo Hills neighborhood to Kirtland Air Force Base safer and more efficient. Residents who take advantage of this facility will experience the health benefits of daily exercise. It will also increase access to the City's Open Space Trail Network in the Tijeras Arroyo Biozone for the Singing Arrow Neighborhood.

Environmental Benefits

Encouraging Sustainable Land Use Practices: This multi-modal trail is an example of a City of Albuquerque project that can be based more upon sustainable land use practices. This trail project is not an isolated initiative, and is similarly being employed in the heart of the city through the Rail Trail project, which is a catalyst for broader change in our city's development patterns. This approach not only reduces dependency on private vehicles but also encourages a vibrant, connected community with reduced environmental footprints.

Air Quality Benefits

In addition to reducing future greenhouse gas emissions, the proposed trail addresses poor air quality present in surrounding disadvantaged neighborhoods burdened by historic heavy volumes of automobile traffic along I-40.

The following annual reductions were calculated using the methodology previously mentioned that was developed by researchers at the Institute for Transportation

Studies at the University of California-Davis to more effectively quantify emissions reductions associated with improvements in bikeway infrastructures.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	**GHG (metric tons CO_2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
Multi-Modal Urban Trail Investment	-0.029806	-0.00108798	-0.000073855	-	-	-

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	**GHG (metric tons CO2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
BAU	0.571189 (per year) x 6 years = +3.427134	0.020845075 (per year) x 6 years = +0.125070451	0.001425304 (per year) x 6 years = +0.008551826	-	-	-
PCAP	0.029806 *6 years = -0.178836	0.00108798* 6 years = -0.0065274	0.000073855* 6 years = -0.0004428	-	-	-

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:

The EPA's Office of Transportation and Air Quality provides an estimated national average of vehicle emission rates by vehicle type by GHG. It is presumed that the Juan Tabo Connectivity Trail will only result in the substitution of light-duty passenger vehicles. Based on the projected VMT reduced, the following table shows the projected reduction in various GHGs associated with substituting car trips with bicycle trips in the high scenario. The following table provides projected estimates of greenhouse gasses (GHGs) in grams per VMT in gas-using vehicles in 2024 (as opposed to diesel and electric).

Emission Type	Emissions per VMT (in Grams)
CO	3.534
HC	0.228
NO_x	0.117
$PM_{2.5}$*	0.008

KEY: CO = carbon monoxide; HC = hydrocarbons; NO_x = nitrogen oxides; PM2.5 = particulate matter with diameter <= 2.5 micrometers.
*$PM_{2.5}$ includes exhaust, brakewear, and tirewear.

The complete narrative outlining the process for calculating each of these GHG types can be found in the “Data source(s) and assumptions” section on the previous page.

Land & Soil Benefits

The Tijeras Arroyo, or Tijeras Creek, is one of the largest arroyos in Albuquerque. This waterway conveys snow melt and rain flows from Tijeras Canyon. The Tijeras Arroyo has surface and subsurface flows that allow water to infiltrate the aquifer. It creates a habitat for local wildlife and migratory birds. In 2014, the City of Albuquerque adopted the Resource Management Plan (RMP) for Tijeras Arroyo Biological Zone to conserve vegetation, wildlife, and cultural resources, and to recharge the aquifer. A biozone is an area of high concentration of natural resources that are protected and preserved. The Tijeras Arroyo Bio-Zone (TABZ) stretches 3.7-miles long and approximately 1,000 feet wide, see Figure 17. It begins east of the Study Area, crosses west under Juan Tabo Boulevard, and ends at the Kirtland Air Force Base property lines to the west and the south. A portion of the Juan Tabo Hills West community currently under construction, is being built within the identified TABZ area. The plan recommends restricting development within the 2013 TABZ 100-year floodplain in order to preserve biological and cultural resources. An obstacle to implementing the RMP is that the City of Albuquerque does not own all of the land within the TABZ, and the plan recommends that the City Open Space Division acquires these parcels. The City of Albuquerque has already begun purchasing land outside of the Study Area, near Interstate 40.

Ecological Benefits

A key ecological benefit to developing this multi-modal connectivity trail is that it would help conserve and restore the remaining native vegetation and wildlife habitat to increase biodiversity in the Tijeras BioZone.

This project also complements the goals and objectives of the Resource Management Plan (RMP) for Tijeras Arroyo Biological Zone by providing greater access to the vegetation, wildlife, and cultural resources of the Tijeras Arroyo.

Economic Benefits

Urban commuter trails have the following economic benefits:

- Outdoor recreation now outpaces the oil and gas industry in economic impact. The outdoor recreation industry is built on trails, making trails an important economic driver.
- Properties near trails increase in value.

- Trails both drive tourism, and make communities a more desirable place to live.
- Trails boost physical activity, creating measurable and substantial savings in healthcare costs.
- Trails create jobs through the planning and implementation of pedestrian and bicycle infrastructure projects.

Economic Value of Health Benefits

Although not comprehensively quantified for this PCAP, the economic value of health benefits cannot be understated. Investing in this trail will not only yield environmental benefits, but also substantial economic value through improved public health. This can be seen in the way that increased access to outdoor recreation opportunities contributes to more active and healthy residents commuting to work.

The shift from single-occupancy vehicles to bikes, facilitated by the improved bicycle infrastructure system, will result in a tangible reduction in greenhouse gas emissions, and also contributes to significant economic savings by mitigating the healthcare costs associated with respiratory illnesses.

Safer off-street biking and pedestrian infrastructure also correlates in a decrease in injuries and fatalities. This reduces the financial burden on healthcare systems.

Economic Value of Environmental Benefits

The trail has the potential to lower costs of travel and commuting for residents who make the choice to bike or walk to work or other nearby destinations rather than take vehicles.

Based upon the California Air Resources Board methodology for estimating VMT reductions from new bicycle facilities, the lifetime user cost savings over a 30 year span is $50,073 and the lifetime emissions cost savings over a 30 year span is $50,606. This is based upon the assumption that that cost per VMT of operating a vehicle is $0.198 and the total emissions costs per VMT is $0.20.

Below is a summary of the cost savings from the project (according to a low scenario and high scenario):

Lifetime User Cost Savings (30 year span)	$14,846	$50,073
Lifetime Emissions Cost Savings (30 year span)	$15,004	$50,605
Annual Total Cost Savings	$995	$3,356
30-Year Total Cost Savings	$29,850	$100,678

Total Cost of Ownership

With the total cost of the project being $900,000 and there being a 10% design fee for the overall value of the project, the value of the project is $990,000. Operating costs for the project are estimated to be $10,000 per year (over 30 years, this would be a total of $300,000 in operating costs). In total, this amounts to a total cost of ownership at $1,290,000.

Workforce Needs & Quality of Jobs

Approximately 9,500 cars enter Kirtland Air Force Base through the Eubank Boulevard gate on an average day. According to tube count and turning movement data collected in 2022, an average of 551 of those cars are coming from the Juan Tabo Hills neighborhood. Though the entrance to that neighborhood is .8 miles away from the Eubank Gate, the drive is 3.4 miles away by car using the existing road network. Due to traffic volume, the morning commute can take 20 minutes or more depending on Air Force personnel available to check passes. The proposed multi-use trail will shorten the commute, decrease automobile emissions, and increase quality of life for the commuters who use it. The ready access to existing trails between the Juan Tabo Hills, Singing Arrow, and Four Hills neighborhoods suggests that base commuters from those neighborhoods would use the new trail as well. Though this project will not create jobs, it will increase access to existing jobs on base.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

Tract Number: 35001000713

Summary of past/ongoing community engagement

The City of Albuquerque (COA) has conducted multiple public outreach efforts to seek input on the design and programming of the proposed trail, as outlined below.

COA Juan Tabo Connectivity Study – Public Meeting #1 - 12/1/2020
There were 56 attendees, plus additional City and Wilson & Company staff who attended as Panelists. Wilson & Company gave a presentation on the scope of the study which will document the existing traffic conditions resulting from commuting patterns of Juan Tabo Hills residents and evaluate potential alternative connections to improve these conditions. The Councilor at the time was looking forward to finding good resolution for concerns that neighbors have regarding traffic.

COA Juan Tabo Connectivity Study – Public Meeting #2 - 1/19/2021
There were 117 registrants and 82 attendees, plus additional City and Wilson & Company staff who attended as Panelists. City staff and Wilson & Company gave a presentation. The presentation included the analysis of the project alternatives and the recommended alternative, the no-build option.

Updated Bikeway and Trail Facilities Plan (Public Meetings took place at different times in 2023): The project was also considered during the City's process of updating its Bikeway and Trail Facilities Plan. During this community engagement process, the Juan Tabo Connectivity Trails came up as a community-prioritized "long-term" project slated for a small portion of Tijeras Arroyo between Juan Tabo and Eubank, but not the entire trail.

Benefits to LIDACs

The Singing Arrow neighborhood, which is comprised of a high number of low-income individuals and households, would benefit from having improved walking/biking access to the Singing Arrow Community Center and Tijeras Biozone. Besides improved recreational access, this new trail would improve private automobile traffic congestion in the neighborhood caused by Kirtland Air Force base commuters, including reducing greenhouse gas emissions, sound pollution, and other associated negative impacts.

Disbenefits to LIDACs

None

Authority to Implement Measure:

The Parks and Recreation Department is authorized under Section § 2-12-7 of the City of Albuquerque's Code of Ordinances, entitled Trails and Bikeways Set Aside, to allocate set aside funding to trails and bikeway projects. Due to the fact that part of the funding available to fund this project is coming from set aside funding, Parks and Recreation is the appropriate implementing agency for this project. State Capital Outlay funding that was recently awarded will also pass through the Parks and Recreation Department in order to complete the project.

CT5: TRANSIT ELECTRIC VEHICLES

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

By prioritizing the replacement of buses and paratransit vans, this measure will reduce greenhouse gas emissions (GHGs) for the transportation sector that EPA states has the largest share of GHG emissions and will also work towards achieving the City's goal of a zero emission fleet by 2040.

Project/Program Alternate titles:

CT5: Transit Electric Vehicles

Replace fossil fuel powered Transit Department vehicles with zero emission vehicles:

- CABQ Zero Emission Bus Deployment
- Replacing Gasoline Powered Transit Department Paratransit Vehicles with Electric Vehicles

Mechanism

Approximately 58% of funds needed for replacement vehicles can be secured through Federal Transit Administration formula grants. The remaining 42% of funds, the non-fossil fuel vehicle components, are through a competitive process. This CPRG funding instrument is a great source of funding to reduce GHG emissions because other bus and bus facilities grants will be used to fund facility replacements that have exceeded their useful life but do not have the large GHG emissions reductions.

List any potential risks for this mechanism

Fund availability and competition with other transit agencies are chief risks

Transformative Impact (i.e., scalability/replicability)

By reducing the GHG emissions through replacing gasoline powered buses and vans with zero emission vehicles, in addition to reducing the CO2 emissions of 14 pounds per 100 passenger square miles, as the City of Albuquerque Transit Department continues to work towards making their services the preferred transportation option in the City, moving people out of their passenger cars to traveling on buses and vans will decrease each passenger car carrying one person emission by 89 pounds of CO2 per 100 passenger miles.

Key Implementing Agencies

City of Albuquerque Transit Department, local transit agency serving Albuquerque, New Mexico and Bernalillo County and southeastern Sandoval County

Partners

Center for Transportation and the Environment (CTE) will help guide the decision making process for the City of Albuquerque in the deployment of zero emission vehicles, along with charging and fueling infrastructure. Bus and Van manufacturers such as Gillig, New Flyer, Phoenix Motorcars, and Creative Bus provide the vehicles.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

City of Albuquerque Transit has a bus fleet of 163 and van fleet of 84. Thus far, 5 buses have been replaced with electric buses in 2022 and 20 more replacements planned in 2025. This funding request through CPRG will keep us in line to continue to replace 14 more buses and 44 paratransit vehicles with zero emission vehicles. Zero emission transition plans have been completed by CTE for both buses, vans and non-revenue vehicles and those plans help provide a time for vehicle replacement to stay on track for the zero emission goal for our fleet by 2040.

Progress between March 1st and October 1st (if any)

City of Albuquerque Transit is currently working on electric bus infrastructure to support 20 electric buses and this infrastructure will also support the future bus replacement. Four (4) fast chargers for vans are being added in March 2024, though an additional 20 chargers will be needed in the future for the CPRG requested tasks. Currently, we are in the process over the next 6 months and beyond to work with community partners to develop workforce development curriculum.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Bus and Van Deployment Tasks	Assigned To	Start	End
Execute Federal Grant	EPA/FTA	10-1-2024	03-31-2025
Route Modeling / Charging Analysis	CTE	03-31-2025	09-30-2025
Charger Design / Vehicle Selection	City Transit	09-30-2025	02-28-2026
Buy America Pre-Award	CTE	02-28-2026	04-30-2026
Vehicle/Charger Procurement	City Transit	04-30-2026	09-30-2026
Infrastructure Deployment	City Transit	10-01-2026	06-30-2027
Vehicle/Charger Build	Mfg	10-01-2026	09-30-2027
Workforce Development	City Transit	07-01-2027	03-31-2028
Buy America Post-Award	CTE	10-1-2027	10-31-2027
Vehicle and Infrastructure Deployment	City Transit	11-1-2027	12-31-2027
Vehicle and Infrastructure Deployment	City Transit	10-1-2027	12-31-2027
Monthly KPI Reports	CTE	01-01-2028	09-30-2029

<u>Long-term scaling plan (if applicable)</u>

As part of our vehicle replacement plan and continued goal for a zero emission fleet by 2040, future van replacements will continue in 2030 and 2031 to complete vehicle transitions for our 84 vans to zero emission. From 2029 – 2034, a total of 71 buses will be replaced with zero emission vehicles.

Geographic Scope

City of Albuquerque Transit Department, local transit agency serving Albuquerque, New Mexico and Bernalillo County and southeastern Sandoval County. Year 2023 ridership for all bus service was 6.7 Million passengers and 188,000 for Paratransit. Current annual mileage per bus is 30,000 though we are running 30% less service than pre-pandemic times due to staff shortage. Current annual mileage per van is 20,000.

Metrics for Tracking Progress:

The following metrics will be used to track progress and when applicable will be compared with other fueling source vehicles:

- Daily Fleet Availability
- Daily Fleet Efficiency (kwh/mile)
- Average daily distance (miles)
- Average time in service (hours)
- Energy charged (kwh)
- Energy used according to power bill (kwh)
- Percent difference between energy used and charged
- Energy use per mile as it relates to outside temperature
- Average daily state of charge use
- Cost per mile
- Well-to-wheel GHG's net (metric tons)
- NOx Tailpipe Net
- PM10 Tailpipe Net

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Battery Electric Bus (BEB)	QTY 14 - 2026 40' – 37 seats – 446 KWH	150-175 miles	$17,750,000
Battery Electric Van (BEV)	QTY 44 – 2027	100 miles	$8,800,000
Inspections, Audits, Consulting BEB & BEV			$915,000

Item	Description	Range	Best Estimate
Chargers for Vans - BEV	QTY 20 – Level 3 Fast Chargers		$900,000
Battery Storage - BEB			$4,970,000
Solar - BEB			$4,600,000

TOTAL COST **$37,935,000**

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

BEB - $27,945,000 / 6,424.50 tons = $4,350 per ton
BEV - $9,990,000 / 7,121 tons = $1,403 per ton

$ 37,935,000/ (6424.5+7121)MTCO2e = **$2800.6/MTCO2e**

INTERSECTION WITH OTHER FUNDING AVAILABILITY:

WHAT OTHER POSSIBLE FUNDING SOURCES EXIST FOR YOUR PROJECT (GRANTS, TAX INCENTIVES, ETC.)?
Federal Transit Administration Section 5307 Formula Grant funds are eligible for the Battery Electric Buses to fund the normal replacement cost value for a diesel replacement bus. This is valued at $700,000 per bus and so we believe there is $9,800,000 in funding available through these sources for bus replacement. In addition, through this same funding source is half of the Battery Electric Van cost available which is valued at $4,400,000. Both of these amounts include local match through local General Obligation Bonds at 15% of the total cost. There is also rebate money available from the utility provider for electric vehicle chargers and infrastructure.

WHAT OTHER FUNDING SOURCES HAVE YOU SECURED FOR THIS SAME GHG MEASURE (IF ANY)?
We do not have any additional funding sources for this same GHG measure.

DEMONSTRATION OF FUNDING NEED: HOW ARE REQUESTED FUNDS FILLING AN EXISTING FUNDING GAP?
The funding gap is needed to support the non-fossil fuel components or the additional cost of having the fuel source be batteries. In addition, any other costs such as infrastructure for solar charge or battery chargers does not have an existing funding source. General Obligation Bonds are issued semiannually to assist with the matching ratio of 15%-20% for vehicle purchase, however funds are not easily obtained for infrastructure needs. Thus, the majority of the expenses related to GHG reduction must come through a competitive grant application process.

Benefits, Primary:

GHG Emission Reductions[14]

BEB - Annual GHG emissions for Current Fleet of Diesel Hybrid Buses for 14 vehicles is 1,284.9 short tons
BEV – Annual GHG emissions for Current Fleet of Gasoline Vans for 44 vehicles is 1,424.20 short tons

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

BEB - Over a 5-year period this would result in a reduction of 1284.90 at 5 years or 6,424.50 tons
BEV - Over a 5-year period this would result in a reduction of 1424.20 at 5 years or 7,121 tons
Total: 6,424.50+7,121=13,545.5

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

BEB - Over 25-year period this would result in a reduction of 1284.90 at 25 years or 32,122.50 tons
BEV - Over 25-year period this would result in a reduction of 1424.20 at 25 years or 35,605 tons
Total: 32,122.50+35,605=67,727.5

Data source(s) and assumptions

Data source: https://afleet.es.anl.gov/afleet/public/ and diesel hybrid bus 4.5 MPG

Co-Benefits, Secondary:

Environmental Benefits

Air Quality Benefits

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BEB – Electric Buses	787	2,318	14	15	78	
BEV – Electric Vans	2476	70	15	14	284	

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

[14] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

LIDAC tract numbers in the Albuquerque metro area include: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200,35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004604, 35001004712, 35001004713, 35001004715, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, and 35001004749.

Summary of past/ongoing community engagement

In 2022, the City of Albuquerque Transit Department did an on-board survey in January and February 2022. The results included discovering that over 60% of passengers do not have a household vehicle and over 75% of passengers have income less than $25,000 annually.

The "2022 On-Board Survey," which contains further details on the community engagement process and results was provided to the EPA along with the submission of this document.

Benefits to LIDACs

Based on the survey results and the CEJST Data tool the majority of passengers affected will have a direct impact on these projects.

Disbenefits to LIDACs

No known disbenefits.

Authority to Implement Measure:

Authority to implement this measure is currently under application and submission and a decision will be made from our governing body within 60 days after this document is due.

CT6: MUNICIPAL FLEET ELECTRIFICATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Vehicles are the largest contributor of hazardous air pollutants, including local government vehicles that are critical to delivering a wide variety of basic services to its citizens. Government agencies around the country are transitioning their fleets to electric vehicles and seeing the environmental and economic benefits of doing so, including major operational savings over time. This grant funding request should complement the City's Vehicle Acquisition Policy and Procedures Administrative Instruction 4-3 that prioritizes electric vehicle acquisition. This grant funding request also aligns with the City's Reduced Emission Light and Heavy-Duty City Vehicles Executive Instruction 34.

Project/Program Alternate titles

Replacing Gasoline Powered City Fleet Vehicles with Electric Fleet Vehicles across Multiple City Departments
CT6: Municipal Fleet Electrification

Mechanism

The funds will be utilized directly by the grant applicant to purchase ZEV buses, passenger vehicles and associated charging infrastructure.

List any potential risks for this mechanism

Availability of EVs at the time funding is available; this is a minor risk.

Transformative Impact (i.e., scalability/replicability)

Replacing Gasoline Powered City Fleet Vehicles with Electric Fleet Vehicles across Multiple City Departments will improve the air quality of the entire City. These vehicles will be driving throughout the City completing job functions.

Key Implementing Agencies

City Council/General Services Department/All City Departments with Fleet Vehicles

Partners

No partners identified.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The General Services Department uses CIP/GO Bond funding to purchase fleet replacement vehicles for various Departments (1 ton and under), but these are typically not for EV vehicles. There is currently no other source of funding that is specifically for EV fleet replacement vehicles.

Progress between March 1st and October 1st (if any)

If any funding becomes available, we will purchase available ZEV vehicles.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- (5 total) Heavy duty ZEV and level 3 charger starting Oct. 2024 purchasing 1 vehicle per year ending on Sept. 2029.
- (10 total) Pickup ZEV starting Oct. 2024 purchasing 2 vehicles per year ending on Sept. 2029.
- (20 total) Sedan ZEV starting Oct. 2024 purchasing 4 vehicles per year ending on Sept. 2029.
- (10 total) Van ZEV starting Oct. 2024 purchasing 2 vehicles per year ending on Sept. 2029.
- (15 total) Three level 2 charging stations (dual-port) installed per year ending on Sept. 2029.
- All vehicles purchased will follow the City of Albuquerque procurement methods using the approved vendors.

Needed infrastructure: 3 stations (dual-port) installed per year ending on Sept. 2029 (excluding 5 level 3 charging equipment that is already included in vehicle cost estimate). All these stations would be municipal use, not publicly accessible.

Long-term scaling plan (if applicable)

After Sept. 2029, the current non-ZEV class 1 vehicles in the City's fleet will start to come due for replacement. At this time, we will replace with ZEV vehicles. The availability of other ZEV vehicles should have expanded to other vehicle classes, to allow for purchasing a wider range of ZEV vehicles.
The installation of the required infrastructure during 2024 to 2029 will support the growth of the future EV fleet.

Geographic Scope

Departments throughout the City. Vehicles will be driving throughout the City.

Metrics for Tracking Progress:

For every non-EV we replace, we will measure the CHG reduced.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Heavy duty ZEV	Class 6 and 7 vehicles + 5x level 3 fast chargers (w/o installation)	$312,000 to $500,000	$2,000,000
Pickup ZEV	Class 2a vehicle	$50,000 to $70,000	$700,000
Sedan ZEV	Class 1 vehicle	$30,000 to $70,000	$1,400,000
Van ZEV	Class 2b vehicle	$105,000 to $150,000	$1,500,000

Infrastructure	Installation of level 3 charger included with heavy duty ZEV purchase	$100,000	$500,000
Infrastructure	Level 2 chargers (dual port), includes engineering, permitting, equipment, and installation.	$50,000 to $75,000	$1,125,000

Total Cost $7,225,000

Cost Effectiveness of GHG Reduction (for requested funds)

$ 6,816.59 / MTCO2E

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
The General Services Department uses CIP/GO Bond funding to purchase fleet replacement vehicles for various Departments (1 ton and under), but these are typically not for EV vehicles. There is currently no other source of funding that is specifically for EV fleet replacement vehicles.

What other funding sources have you secured for this same GHG measure (if any)?
None so far.

Demonstration of funding need: How are requested funds filling an existing funding gap?
The funding Fleet receives is used for vehicles that meet the replacement criteria. The trend of these vehicles is mostly ¾ ton trucks and large vans. At this time, there are no EV options for these. This funding will be utilized to purchase EVs that are not currently funded.

Benefits, Primary:

GHG Emission Reductions[15]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

1,059.91 metric tons CO2e

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

9,728.70 metric tons CO2e

Data source(s) and assumptions

AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1
https://afleet.es.anl.gov/infrastructure-emissions/public/

[15] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Inputs: Six (6) Level 2 and one (1) DCFC EVSE charging ports installed per year for five years (2025-2030), medium-high charger utilization from 2025-2030, high charger utilization from 2030-2050, 100% light-duty vehicle utilization for Level 2, 100% heavy-duty vehicle utilization for DCFC, WECC EIA regional electricity mix

Congestion Mitigation and Air Quality Improvement Program (CMAQ) Emissions Calculator Toolkit, Electric Vehicles and EV Charging Infrastructure (June 2022 version)
https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

Inputs: Unrestricted Access EV Charging Infrastructure, phased implementation of vehicles 2025-2030, vehicle categories and annual mileage:

- Passenger car – 3,000 miles
- Passenger truck – 3,000 miles
- Light Commercial Truck – 3,500 miles
- Single-Unit Short-Haul Truck – 2,000 miles

Co-Benefits, Secondary:

Environmental Benefits

Air Quality Benefits

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
CABQ Fleet EVs and EV Chargers	211.98	0.16582	0.0027744	0.00059932	0.080234	–

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	GHG (metric tons CO2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BAU	211.98	0.16582	0.0027744	0.00059932	0.080234	–
PCAP	-211.98	-0.16582	-0.0027744	-0.00059932	-0.080234	–

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Replacing fleet vehicles across various City Departments would support low-income/disadvantaged communities throughout the city.

Impacted LIDAC tracts

LIDAC tract numbers in the Albuquerque metro area include: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200,35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004604, 35001004712, 35001004713, 35001004715, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, and 35001004749.

Summary of past/ongoing community engagement

This measure supports work towards electrification goals, and was included in the PCAP-focused community engagement meeting and survey.

- Fleet Electrification had 52 responses:
    - 25 selected high benefit
    - 14 selected medium benefit
    - 11 selected low benefit
    - 2 selected no perceived benefit

Benefits to LIDACs

Since the fleet electric vehicles will be replacing vehicles that currently drive through LIDAC communities in the Albuquerque metro area, the benefits will be air quality and noise reduction from travel in those communities.

Disbenefits to LIDACs

No disbenefits expected.

Authority to Implement Measure:

The City of Albuquerque's Fleet Department has the authority to purchase vehicles.

The City of Albuquerque's City Council and leadership approval will be obtained to procure a contractor to install the electric vehicle charging stations. The implementation timeline takes into account time for the contract approval and execution.

CT7: COLLEGE FLEET ELECTRIFICATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

To accelerate the availability of public electric vehicle charging infrastructure, CNM seeks to purchase and install Electric Vehicle Supply Equipment (EVSE) including Level 2 and Level 3 Fast Charging stations and infrastructure.

Project/Program Alternate title:

CT13: College Public Charging

Mechanism

The funds will be awarded to the CNM Parking and Fleet Department to offset or fully cover the cost of purchasing and installing EVSE, including Level 2 and Level 3 Fast charging stations and infrastructure.

List any potential risks for this mechanism

No known risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

Charging the growing number of EVs in use requires a robust network of stations for both consumers and fleets. As the CNM seeks to electrify its own fleet, it also aims to serve as a good partner to its customers, students and staff by providing readily available stations that are easy to access. Moreover, as the College plans to build solar canopies on existing parking structures and lots across its campuses, those canopies can produce around 140 megawatt-hours per year for EV charging, generating energy and cost savings for the College while also offsetting even greater amounts of fossil fuel production in the region.

Key Implementing Agencies

The CNM Fleet and Parking Department will receive funds from the MSA lead agency (City of Albuquerque) and will be responsible for implementing the project once funds are received.

Partners

None.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

Installed 2 Level 2 chargers in the CNM Physical Plant Department Fleet yard for fleet vehicles. Two Level 2 Chargers at Marketplace located on Main Campus, one at Student Services on Main Campus, and one level two at the Tom Wiley Building on Main Campus.

Progress between March 1st and October 1st (if any)

The CNM Parking and Fleet Department will continue trying to secure funding to purchase and install EVSE at priority campuses and once funding is secured, will immediately develop and release RFPs for the expansion of that installation.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Year 1 (2024-2025)

- Complete construction of the Fleet Yard Phase I project before the end of 2024. The project includes two new dual port electric vehicle charging stations.
- Complete a comprehensive analysis of charging infrastructure requirements, considering the fleet's size and operating patterns.

Year 2 (2025-2026) - Charging Infrastructure Expansion:

- Evaluate existing charging infrastructure and identify gaps.
- Finalize plans for the Fleet Yard Phase II project which contemplates one fast-charging Level 3 and one dual-port Level 2 charging stations.
- Complete installing charging stations at other CNM campuses.

Year 3 (2026-2027) - Employee Training & Engagement

- Continue to develop training requirements to educate drivers and maintenance staff on EV operation, charging procedures, and general maintenance requirements.
- Encourage driver feedback and address concerns to foster acceptance and enthusiasm for the transition.

Year 4 (2027-2028) - Charging Network Optimization

- Monitor charging patterns and optimize the charging network to ensure efficient utilization and minimize downtime.
- Consider load management strategies to balance charging demand and optimize the use of available electricity capacity.

Year 5 (2028-2029) - Grant Proposals and other Public Incentives:

- Explore economic incentives that support expansion of the EV fleet and additional EV infrastructure at all CNM campuses. Such incentives include, but are not limited to, PNM, State of NM, US DOT, others etc.
- Collaborate with charging infrastructure providers to expand public charging options for fleet vehicles.

Geographic Scope

Location 1 (Southeast Albuquerque):
CNM Main Campus
900 University Blvd SE
Albuquerque, NM 87106

Location 2 (Southeast Albuquerque):
CNM Market Place Building
Main Campus
719 University Blvd SE
Albuquerque, NM 87106

Location 3 (Northeast Albuquerque):
CNM Montoya Campus
4700 Morris St NE
Albuquerque, NM 87111

Location 4 (Northwest Albuquerque):
CNM Westside Campus
10549 Universe Blvd NW
Albuquerque, NM 87114

Location 5 (Northeast Albuquerque, Jefferson & I-25)
CNM Workforce Training Center
5600 Eagle Rock Ave NE
Albuquerque, NM 87113

Location 6 (Southwest Albuquerque)
CNM South Valley Campus
5816 Isleta Blvd SW
Albuquerque, NM 87105

Location 7
CNM Rio Rancho Campus
2601 Campus Blvd NE
Rio Rancho, NM 87144

Metrics for Tracking Progress:

EV chargers across all campuses throughout the Albuquerque and Rio Rancho area, including chargers in shaded areas and fast-charging stations at each.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Level 2 and 3 Charging Infrastructure - Design and Construction	Across all campuses		$800,000

Total Cost: $800,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

<<Please include a calculation of $/GHG reduced in metric tons per CO2 equivalent from 2025-2030 (see the second table in the Air Quality section).>>

$<total cost>/<GHG value in the second table of the air quality section> MTCO2e =
$ 1,510 / MTCO2e

<u>Reasonableness of Cost (optional for PCAP)</u>

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Alternative Fuel Vehicle Refueling Property Credit - will secure for the project
Commercial Clean Vehicle Tax Credit - will secure for the project
Investment Tax Credit for Energy Property - will secure for the project
National Electric Vehicle Infrastructure (NEVI) Grants - will secure for the project

What other funding sources have you secured for this same GHG measure (if any)?

None.

Demonstration of funding need: How are requested funds filling an existing funding gap?

Existing CNM Community College funding is generally restricted to administrative services of implementing our coursework and running the college. The IRA and BIL are historic opportunities for hard hit higher education institutions to implement sustainability projects.

Benefits, Primary:

GHG Emission Reductions[16]

<u>Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)</u>

450.5 metric tons CO2 equivalent

<u>Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)</u>

2,570.5 metric tons CO2 equivalent (MTCO2E)

[16] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

<u>Data source(s) and assumptions</u>

AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1
https://afleet.es.anl.gov/infrastructure-emissions/public/

Inputs: Six (6) Level 2 and two (2) DCFC EVSE charging ports, medium-to-high default charger utilization, 100% light-duty vehicle utilization, WECC EIA regional electricity mix

Since the annual GHG reductions is estimated to be 106 MTCO2E, and installation will be at the end of year 2, giving 1 quarter in 2026 and subsequent years, here are the calculations for the two time ranges:
2025-2030: 106*4.25 = 450.5 MTCO2E
2025-2050: 106*24.25 = 2,570.5 MTCO2E

Co-Benefits, Secondary:

Health Benefits

Widespread shifts in consumer behavior toward electric vehicles in the next five years will have significant health benefits including cleaner air that lessens the likelihood of child asthma, allergies, and pollution induced headaches and other side effects. EV charging infrastructure provides a robust network to encourage and sustain the shifts in consumer behavior toward electric vehicles.

Environmental Benefits

<u>Air Quality Benefits</u>

Emissions from the transportation sector are the second highest contributor to poor air quality and carbon emissions in the State of New Mexico. Providing the infrastructure to service electric vehicles will help CNM do their part to reduce carbon emissions from customers, as well as their own fleet.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
CNM EVSE	106.0	0.01311	0.001103	0.0002195	0.05122	

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:

See Benefits section above.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts
CNM campuses are predominantly located within or adjacent to LIDAC census tracts, and given the workforce training component of curricula, all campuses serve LIDAC communities regardless of their physical location within a LIDAC census tract.

Main Campus & Market Place Building - Tract Number: 35001001200
Montoya Campus - Tract Number: 35001003719
Westside Campus - Tract Number: 35001004746
South Valley Campus - Tract Number: 35001004604
Workforce Training Center Campus - Tract Number: 35001003736
Rio Rancho Campus - Tract Number: 35043010718

Summary of past/ongoing community engagement
A student survey is scheduled to be conducted in the coming months to determine electric vehicle charging infrastructure needs as well as the most frequently utilized campuses that will help to make the case for the location of parking lot solar canopies within the scope of project plans.

Benefits to LIDACs
Increased accessibility to shade and EV charging, contribution to overall carbon pollution reduction.

Disbenefits to LIDACs
None expected

Authority to Implement Measure:
The Central New Mexico Community College Governing Board holds all the rights, powers, duties, and responsibilities conferred upon and vested in it by the State of New Mexico, including those prescribed by **Sections 21-13-1 to 21-13-27** and **21-16-1 to 21-16-22 NMSA 1978**, consistent with the provisions of the Constitution of the State of New Mexico. These powers and responsibilities include the budgeting, master plans and contracting associated with this greenhouse gas reduction measure project.

CT8: AVIATION SHUTTLE ELECTRIFICATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

The Aviation Department is in the initial phases of converting its vehicle fleet to zero emission vehicles (ZEVs).

Project/Program Alternate titles:

Convert Aviation fleet to ZEVs.
CT8: Aviation Shuttle Electrification

Mechanism

The funds will be utilized to purchase ZEV buses, passenger vehicles and associated charging infrastructure.

List any potential risks for this mechanism

No known potential risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

The addition of ZEV shuttle buses for airport passengers to and from the Albuquerque International Sunport will greatly reduce the amount of emissions that conventional diesel buses would emit. Since the shuttle buses operate almost 24/7, the reduction of emissions would be significant. With the addition of ZEV for the Aviation fleet, the emissions from conventional gasoline vehicles would be reduced since they would no longer be operated for Aviation use.

Key Implementing Agencies

City of Albuquerque Aviation Department; Alex Schroeder, Environmental Program Manager

Partners

None.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The Aviation Department received an FAA ZEV grant in 2020 to procure ZEV shuttle buses along with their associated charging infrastructure. The Aviation Department is very interested in continuing to convert its shuttle buses to electric. The Aviation Department also received another FAA ZEV grant in 2023 to procure ZEV pickup trucks to initiate the conversion of its fleet to electric. Again, the Aviation Department would like to continue this important sustainability initiative in converting its conventional diesel/gasoline powered vehicles to electric.

Progress between March 1st and October 1st (if any)

There is a possibility that the ZEV pickups could be delivered mid to late fall 2024.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Milestones would include the development of vehicle specifications for the solicitation of an RFB to procure the ZEVs; delivery of the ZEVs; installation of any electric charging infrastructure; initiating the use of the ZEVs, ultimately starting the GHG reduction.

- ZEV Specs and RFB solicitation; 10/1/2024 – 2/28/2025
- ZEV delivery by awarded bidder; Depends on availability of the ZEV
- Installations of electric charging infrastructure; 10/1/2025 – 3/31/2026
- Put ZEVs into service, initiating GHG emission reduction; 4/15/2026

Geographic Scope

The ZEV buses will be stationed and charged at the SP Plus bus depot on Aviation property just north of the Sunport. They will operate in a loop from the Sunport to the Rent a Car center; each bus will operate approximately 90 miles per 8-hour shift. The ZEV passenger vehicles will be located and charged on Aviation property within the secure area of the Sunport. They will be used for official Aviation Department use only.

Metrics for Tracking Progress:

The Aviation Department has an internal GHG emission tracker which considers all of the diesel and gasoline powered vehicles that are owned by and operated on Aviation Department property. With this baseline information, it will be relatively easy for the Aviation Department to track any reduction in GHG emissions once the ZEV are put into service.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
ZEV Shuttle Bus	ZEV Shuttle Bus	\$480,000 - \$750,000	\$550,000
ZEV Passenger Vehicle	ZEV Passenger Vehicle	\$30,000 - \$100,000	\$55,000

Total Cost

\$550,000 + \$55,000 = \$605,000 for one ZEV Bus and one ZEV passenger vehicle
2 ZEV buses + 2 ZEV passenger vehicles = **\$1,210,000**

Cost Effectiveness of GHG Reduction (for requested funds)

EV Bus & EV Passenger Vehicle; Total NO_x + VOC Reduction = 0.440 Tons/10 years
Cost Effectiveness Over Useful Life of the ZEV Bus & ZEV Passenger Vehicle = \$5,000,000 / 0.440 Tons = \$11,363,636.36/ton
\$5,000,000/ 255.5 (GHG reduction 2025-2030) = **\$4,736/MTCO2E**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

The Aviation Department has submitted an FAA ZEV grant for electric pickups in 2023; which it was awarded. The delivery of those vehicles is still pending. The Aviation Department also submitted a pre-application for an FAA ZEV grant for this year, 2024. That grant is for the procurement of 3 ZEV shuttle buses. The Aviation Department is waiting to hear from the FAA if they have been chosen to move forward and submit an official application.

What other funding sources have you secured for this same GHG measure (if any)?

None so far.

Demonstration of funding need: How are requested funds filling an existing funding gap?

Without the assistance of the FAA, State of NM or EPA; it will be extremely difficult for the Aviation Department to procure ZEVs to assist in our goal of reducing GHG emissions. The FAA ZEV grant program is not always guaranteed, so the ability to have multiple funding sources is extremely important.

Benefits, Primary:

GHG Emission Reductions[17]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

After utilizing the EPA's MOVES emission simulator program, the output generated for a diesel emission bus & a conventional pickup truck was 73 tons of CO_2 equivalent per year. Since the implementation will be completed by April 2026, that leaves 3.5 years of benefit between 2025 and 2030. Thus, the cumulative GHG for 2025-2030 is 73*3.5=**255.5 metric tons of CO_2 equivalent over 5 years**

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

73 tons CO_2 equivalent x 23.5 years = **1,715.5 metric tons of CO_2 equivalent over 25 years**

Data source(s) and assumptions

Calculations were made utilizing the EPA's MOVES emission simulator.

Co-Benefits, Secondary:

Health Benefits

The operation of ZEVs will reduce the amount of pollutants put into the atmosphere which may affect passengers coming to and from the Albuquerque Sunport.

Environmental Benefits

[17] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

The operation of ZEV's will reduce the amount of GHGs put into the atmosphere that contributes to climate change.

Air Quality Benefits

The air quality benefits from incorporating ZEVs into the Aviation Department's fleet will be seen by passengers coming to and from the airport as well as communities surrounding the Sunport.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
Convert Aviation Fleet and Shuttle Buses to ZEV	73	0.245	–	–	0.194	–

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:

Calculations were made utilizing the EPA's MOVES emission simulator.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in the following tract identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): 35001001200

Summary of past/ongoing community engagement

This measure supports work towards electrification goals, and was included in the PCAP-focused community engagement meeting and survey.

- Aviation Shuttle Electrification had 51 responses:
  - 23 selected high benefit
  - 11 selected medium benefit
  - 9 selected low benefit
  - 8 selected no perceived benefit

Benefits to LIDACs

The conversion to electric vehicles of the Aviation's department fleet, including rent-a-car shuttle buses, will greatly reduce the amount of greenhouse gas emissions from conventional diesel and gasoline powered vehicles. The Albuquerque International Sunport is not directly located inside a LIDAC community; however, any reduction in vehicle emissions will be a benefit to surrounding neighborhoods.

Disbenefits to LIDACs
No expected disbenefits.

Authority to Implement Measure:
The City of Albuquerque Aviation Department has the authority to purchase vehicles.

The City of Albuquerque's City Council and leadership approval will be obtained to procure a contractor to install the electric vehicle charging stations. The implementation timeline takes into account time for the contract approval and execution.

CT9: ELECTRIFICATION OF PARKS EQUIPMENT

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Vehicles and gas-powered equipment are the biggest pollutants in our Park Management Maintenance Operations. In order to reduce our carbon footprint, we must minimize our gas-powered equipment and replace it with more environmentally friendly tools so that we can continue to provide this service to the public. This can be done in a variety of ways: New vehicles, handheld maintenance equipment (weed eaters, backpack blowers, pole pruners, inverters, edgers, etc.), electric forklift, zero turn mowers (60” deck), and UTVs.

Project/Program Alternate titles:

CT9: Electrification of Parks Equipment
Replacing gas powered equipment and vehicles with a more environmentally friendly product

Mechanism

The City of Albuquerque will directly purchase all items under this measure through qualified vendors.

List any potential risks for this mechanism

While transitioning the Park Management Division fleet/equipment to electric solutions offers numerous benefits, potential risks may include initial implementation costs, the need for a robust charging infrastructure, and potential challenges in managing the transition period. It's essential to carefully plan and address these factors to ensure a seamless integration and successful long-term sustainability without compromising the event's efficiency and effectiveness.

Transformative Impact (i.e., scalability/replicability)

By adding the requested vehicles and equipment, the Parks Management Division can demonstrate its commitment to reducing the greenhouse gas emissions, yet still provide our maintenance services to all properties under our care. Transformative impact can also be measured by our Agencies success on mission consistency, meeting the goals and objectives of the strategic plan, meeting all standards and practices in the field, and compiling data to support the adjustments.

Key Implementing Agencies

City Council / General Services Division (fleet) / Parks and Recreation Department / Park Management Division. City Council to appropriate funding, General Services Division to acquire vehicles, Parks and Recreation/Park Management Division to implement equipment into operations and track all work performed.

Partners

Contractors for equipment procurement, no other partners identified.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The Park Management Division has started to make adjustments to electric/battery operated equipment in its operations (ie. Hand held power tools) and would be able to scale up should we be provided the opportunity.

Progress between March 1st and October 1st (if any)

The Park Management Division will soon get a demo from the equipment vendor in May 2024 to test the electric equipment.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Finalize Procurement Contract, October 1, 2024

- Analytic assessment of turf square footage and needs for equipment, October, 2024
- Estimates received for all equipment, November, 2024
- Issue PO to Procure needed equipment, December, 2024
- Finalize order for all equipment, December, 2024.
- Process order with vendor and receive equipment, December, 2024 – March, 2025.
- Installation, setup, and training, March, 2025 – March, 2025

Items can be purchased by December 2024 with a transitional plan to roll out to maintenance crews, one crew at a time (2-4 employees per crew).

Long-term scaling plan (if applicable)

If electrification tools and equipment are proven to be utilized on a full time scale and with success in the maintenance side, plans to further adjust our equipment will soon follow, provided we have adequate funding and supply chain to scale.

Geographic Scope

The following equipment will be distributed to all satellites within the Park Management division. This breakdown is as follows:

- 3 E-trucks, trailers, and 60” mowers to each satellite (Los Altos, 6th st, Pino, 3 total set ups) to utilize on pocket park mowing schedules (approx 20-30 parks a week).
- 2 e-trucks, trailers, and 60” mowers to the trails crew, who maintains over 160 miles of multi use trail systems.
- 2 E-trucks for executive administration within the Forestry section. Will be branded for clean energy as well as our tree planting initiative, both conducive to positively impacting our carbon footprints.
- 1 E-truck for Horticulturist position. Will be branded with clean energy and utilized with all planting objectives within the Park Management operations.
- 1 E-truck for operations at the New Mexico Veterans Memorial facility. Will be utilized for any maintenance operational needs.
- 3 Electric UTV’s for herbicide applications on approximately 300 park properties.
- 60 Battery powered weed eaters to implement across the division as a part of daily maintenance operations.

- 60 Battery powered hand blowers to implement across the division as a part of daily maintenance operations.
- 60 Battery powered backpack blowers to implement across the division as a part of daily maintenance operations.
- 60 Battery powered edgers to implement across the division as a part of daily maintenance operations.
- 60 Battery powered hedgers to implement across the division as a part of daily maintenance operations.
- 60 Battery powered pole hedgers to implement across the division as a part of daily maintenance operations.
- 60 Battery powered pole pruners to implement across the division as a part of daily maintenance operations.
- 80 Batteries to implement across the division as a part of daily maintenance operations for utilization with new gasless equipment.
- 70 battery chargers for maintenance crews for all gasless equipment.
- 70 Trip-Lite Inverters to be installed in all maintenance operations trucks for battery charging capabilities while out in the field.

Metrics for Tracking Progress:

Greenhouse Gas Emissions Reduction: Measure the actual reduction in greenhouse gas emissions by comparing the emissions from the updated electric fleet to the previous emissions from conventional vehicles. This can be expressed in terms of CO_2 equivalent emissions.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range ($)	Best Estimate ($)
Ford Lightning truck	9 in total for PMD	50-80k	80k
Polaris ranger EV/UTV	3 in total for PMD	30-35k	30k
60”zero turn riding mowers	5 in total for PMD	45k	45k
Electric forklift	1 for PMD supply deliveries	50k	50k
Electric trimmers	60 in total for PMD	409.99	409.99
Electric hand blowers	60in total for PMD	479.99	479.99
Electric backpack blowers	60 in total for PMD	699.99	699.99
Electric edgers	60 in total for PMD	449.99	449.99
Electric Hedgers	60 in total for PMD	549.99	549.99

Electric Pole hedgers	60 in total for PMD	479.99	479.99
Electric pole pruners	60 in total for PMD	669.99	669.99
Batteries for equipment	80 in total for PMD	379.99	379.99
Battery chargers	70 in total for PMD	179.99	179.99
Trip-Lite inverters	70 in total for PMD	880.76	880.76

Total Cost
$1,414,047.50

Cost Effectiveness of GHG Reduction (for requested funds)

$1,414,047.50/223.44 MTCO2e = **$6,057/MTCO2e**.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
This is the first application for funding of this measure. We will explore other federal grants, community organization funding, and utility incentives to supplement our existing state grants, general fund, and limited bond money for our project aimed at replacing gas and diesel equipment with electric alternatives, thereby reducing greenhouse gas emissions.

What other funding sources have you secured for this same GHG measure (if any)?
No other funding has been secured at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?
The identified sources, including existing state grants, general fund, and limited bond money, are insufficient for the electrification project due to their allocation constraints, scope mismatch, and competitiveness in securing funds. These resources may not cover all costs associated with transitioning to electric equipment and are often designated for other projects, limiting their applicability to the electrification initiative.

Benefits, Primary:

GHG Emission Reductions[18]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)
A greenhouse gas reduction estimate based on fuel consumption is 233.44 metric tons CO2 equivalent for 2025 to 2030.

[18] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

A greenhouse gas reduction based on fuel consumption is 1167.19 metric tons CO2 equivalent for 2025 to 2050.

Data source(s) and assumptions

For the greenhouse gas estimate, it is estimated that 1/3 of the annual fleet fuel consumption (listed below) will be replaced during the implementation of this measure.

- Unleaded: 4,252.44 gallons (⅓ = 1,417.48)
- Diesel: 12,542 gallons (⅓ = 4,180.67)

Energy usage to greenhouse gas emissions reduction estimates was calculated using EPA's 2024 GHG Emissions Hub Factors.

The following vendors were contacted for pricing for the following items:

- Stihl (all battery powered hand tools)
- Grainger – for Trip-Lite inverters for trucks
- Polaris – for UTV's , annual mileage estimate: 3k miles per year;
- Ford – for Ford Lightning trucks ,annual mileage estimate: 13K miles per year
- Mowers – T&S equipment
- Fork Lift – Abq forklift

The other items and what will be replaced is listed in the table below:

Electrified equipment	**Gas-Powered Equipment that will be replaced**
Polaris ranger EV/UTV	Kaboda RTX 500 UTV
60"zero turn riding mowers	Kubota Zero turn ZD1211R
Electric forklift	Hyster Forklift H50XM
Electric trimmers	Stihl Trimmer FS131R
Electric hand blowers	Stihl Hand Blower BG86
Electric backpack blowers	Stihl Backpack Blower BR800X
Electric edgers	Stihl Edger FC111
Electric Hedgers	Stihl Hedger HS87R
Electric Pole hedgers	Stihl Pole Hedger HL100K
Electric pole pruners	Stihl Pole Saw HT135

Co-Benefits, Secondary:

Health Benefits

The Park Management Division can benefit from electrification for a number of health reasons. First, we will no longer have a need to utilize gas powered equipment (where applicable) which minimizes our carbon footprint, as well as preserve a natural resource (gas/2 cycle mix). Will also keep our maintenance employees from breathing in fumes from their current equipment.

Environmental Benefits

The benefits for electrification of specific equipment can minimize our impact to GHG, as well as noise being made with the utilization of equipment (gas powered equipment is much noisier than electric)

Data source(s) and assumptions:

GHG emissions reduction calculations were completed using estimated fuel usage data of existing gasoline-powered UTVs and park maintenance equipment and diesel-powered mowers and light-duty trucks with an estimated fuel economy of 15 mpg for existing UTVs, mowers, and light-duty trucks. Energy use for new electric replacement equipment and vehicles was translated into an estimated electrical energy use of comparable electric-powered UTVs, park maintenance equipment, mowers, and light-duty trucks with an energy efficiency of 7 miles/kWh for UTVs and mowers, 0.75 kWh/gallon gasoline for park maintenance equipment, and an EPA estimated efficiency of 2.041 mi/kWh for a Ford F-150 Lightning 4WD. Emissions factors for CO2, CH4, and N2O were used to calculate GHG emissions from gasoline, diesel, and electricity use and taken from the EPA Center for Corporate Climate Leadership, GHG Emission Factors Hub, "2023 GHG Emission Factors Hub," dated September 2023 (https://www.epa.gov/climateleadership/ghg-emission-factors-hub).

Gasoline Emissions Factors for UTVs were from Table 2 - Mobile Combustion CO2 and Table 5 - Mobile Combustion CH4 and N2O for Non-Road Vehicles, Recreational Equipment, Gasoline (4 stroke).
Gasoline Emissions Factors for park maintenance equipment were from Table 2 - Mobile Combustion CO2 and Table 5 - Mobile Combustion CH4 and N2O for Non-Road Vehicles, Lawn and Garden Equipment, Gasoline (2 stroke).

Diesel Emissions Factors for mowers were from Table 2 - Mobile Combustion CO2 and Table 5 - Mobile Combustion CH4 and N2O for Non-Road Vehicles, Lawn and Garden Equipment, Diesel.

Diesel Emissions Factors for light-duty trucks were from Table 2 - Mobile Combustion CO2 and Table 4 - Mobile Combustion CH4 and N2O for On-Road Diesel and Alternative Fuel Vehicles, Light-Duty Trucks, Diesel, 2007-2020.

Electricity Emissions Factors were from Table 6 – Electricity, eGRID Subregion AZNM (WECC Southwest), Total Output Emission Factors

Land & Soil Benefits

The transition to electric solutions in the Park Management Operations not only mitigates air pollution but also safeguards local land and soil health by reducing the potential contamination from oil spills, fluid leaks, and emissions associated with traditional vehicles, promoting a more sustainable and ecologically responsible infrastructure.

Ecological Benefits

The adoption of electric vehicles in the Park Management Operations fosters a healthier environment, benefiting plants, animals, and ecosystems by minimizing air pollution and noise disturbances, ultimately contributing to the preservation of biodiversity and ecological balance.

Economic Benefits

Economic Value of Health Benefits

Enhances the well-being of the community but also generates economic value by reducing healthcare costs, increasing productivity, and fostering a more vibrant and active local workforce.

Economic Value of Environmental Benefits

The environmental benefits derived from adopting electric solutions in Park Management not only contribute to long-term sustainability but also hold economic value by mitigating the potential costs associated with climate change, preserving natural resources, and enhancing the region's ecological resilience. By changing up equipment, we are also being good stewards of clean energy and leading as an example for the public to hopefully follow suit.

Total Cost of Ownership

More analysis is needed to assess the cost of ownership.

Workforce Needs & Quality of Jobs

The initiative to update the Park Management fleet with electric solutions aligns with the U.S. Department of Labor's Good Jobs Principles by fostering the creation of high-quality jobs through the development, installation, and maintenance of the electric vehicle infrastructure. This includes skilled positions in electric vehicle technology, charging station installation, and ongoing system maintenance, ensuring the generation of employment opportunities that offer fair wages, benefits, and career advancement, thereby contributing to a resilient and inclusive local economy.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will provide electrified park maintenance equipment that will be used across all LIDAC tracts in the Albuquerque city limits. The tract numbers in the Albuquerque metro area include: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200,35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004604, 35001004712, 35001004713, 35001004715, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, and 35001004749.

Summary of past/ongoing community engagement

This measure elevates the goal from the 2021 Climate Action Plan to "Sustain efforts to convert city fleet vehicles to electric vehicles where feasible." This community-driven goal lifts the many community member voices that helped develop that plan.

Benefits to LIDACs

This measure will provide the following benefits in LIDAC tracts:

- Air quality improvements from replacing two-stroke motorized equipment used in LIDACs with electric-powered equipment.
- Noise reduction by replacing internal combustion equipment, that often ranges from 56 to 78 decibels, to the electric versions, which make less noise.
- Utilizing less possible contamination from oils and gasses that can potentially spill or leak during use for park maintenance operations.

Disbenefits to LIDACs

No disbenefits anticipated for this measure.

Authority to Implement Measure:

The Parks and Recreation Department is authorized under the City of Albuquerque to purchase electric equipment for the maintenance of park and trail properties throughout Albuquerque. This program aligns with the City of Albuquerque's authorizing statutes and regulations, exemplifying a commitment to environmental stewardship and sustainable practices in accordance with the city's policies aimed at reducing carbon emissions, promoting clean energy adoption, and fostering a resilient and eco-friendly community.

CT10: BALLOON FIESTA PARK ELECTRIFICATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Transitioning the Balloon Fiesta Park (BFP) fleet of Utility Vehicles and Turf Maintenance Equipment to electric solutions presents a significant opportunity to minimize the event's environmental footprint. By embracing electric technology, the BFP not only reduces carbon emissions and air pollution but also contributes to a cleaner and healthier atmosphere for both participants and spectators. This eco-friendly approach aligns with global efforts to combat climate change and sets a positive example for other events, fostering a commitment to sustainability in the community. Moreover, the long-term benefits include decreased noise pollution, preserving the serene atmosphere of the Fiesta while championing a more environmentally conscious approach to event management.

Project/Program Alternate titles

Balloon Fiesta Park Electrification
CT10: Balloon Fiesta Park Electrification

Mechanism

The funds will be awarded via grants to eligible vendors who meet the maintenance needs of the park to transform to all electric utility vehicles and equipment.

List any potential risks for this mechanism

While transitioning the Balloon Fiesta fleet to electric solutions offers numerous benefits, potential risks may include initial implementation costs, the need for a robust charging infrastructure, and potential challenges in managing the transition period. It's essential to carefully plan and address these factors to ensure a seamless integration and successful long-term sustainability without compromising the event's efficiency and effectiveness.

Transformative Impact (i.e., scalability/replicability)

Implementing electric solutions for the Balloon Fiesta fleet not only directly reduces greenhouse gas emissions through the vehicles' operation but also creates transformative opportunities with cascading impacts. By pioneering the use of electric vehicles, the Fiesta can inspire other events and organizations to adopt similar sustainable practices, triggering a ripple effect that extends beyond its immediate sphere of influence. This collective shift towards electric mobility could lead to the widespread adoption of low-emission technologies, fostering a substantial and cumulative reduction in greenhouse gas emissions across various sectors. The Balloon Fiesta, by serving as a catalyst for change, has the potential to contribute significantly to a broader movement toward a more sustainable and low-carbon future.

Key Implementing Agencies
COA Parks and Recreation

Partners
Turf and Soil Management, LLC

Implementation Schedule & Milestones
Previously completed implementation? (if any)

Research performed for possible equipment. Estimate received from potential vendors to support this mechanism.

Progress between March 1st and October 1st (if any)

Earth Day Demonstrations at BFP of the robotic mowing solutions.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Finalize Procurement Contract, October 1, 2024
- Analytic assessment of turf square footage and needs for equipment, October 15, 2024
- Estimates received for all equipment, November 1, 2024
- Issue PO to Procure needed equipment, December 1, 2024
- Finalize order for all equipment, December 2, 2024.
- Process order with vendor and receive equipment, December 2, 2024 – March 1, 2025.
- Installation, setup, and training, March 3, 2025 – March 7, 2025

Long-term scaling plan (if applicable)

Eventual electrification of all mowing and turf maintenance equipment for all Park Management needs.

Geographic Scope
Balloon Fiesta Golf and Event Center - 9401 Balloon Museum Dr NE, Albuquerque, NM 87113

Metrics for Tracking Progress:
Greenhouse Gas Emissions Reduction: Measure the actual reduction in greenhouse gas emissions by comparing the emissions from the updated electric fleet to the previous emissions from conventional vehicles. This can be expressed in terms of CO2 equivalent emissions.

Cost Estimates for Implementation:

Unit Cost
Utility Terrain Vehicles

Item	Description	Quantity	Best Estimate
UTV	AMP 4X4	3	$66,602.65
UTV	AMP 4X2	2	$35,955.58
UTV	AMP 4X4 Crew	5	$148,955.20
UTV	AMP 4X2 Crew	1	$21,682.78

UTV	AMP 4X2	1	$17,977.79
UTV	AMP 4X2	1	$17,977.79

Robotic Mowing Units

Item	**Description**	**Quantity**	**Best Estimate**
CEORA PRODUCT	970468105 (Husqvarna CEORA Charging Station CS4)	8	$12,799.94
CEORA PRODUCT	970467905 (Husqvarna CEORA 546 EPOS (Drive Unit))	8	$127,993.60
CEORA PRODUCT	970468002 (Husqvarna CEORA Razor 43M (Standard Cutting Deck))	8	$51,999.94
CEORA PRODUCT	529318910 (Husqvarna CEORA Wheel Brush Kit CEORA PROP65)	8	$9,599.94
REFERENCE STATIONS	970468205 (Husqvarna EPOS Reference Station)	3	$2,159.98
REFERENCE STATIONS	534971910 (Husqvarna EPOS Reference Holder, PROP65)	3	$67.18
ACCESSORIES	599805312 (Husqvarna Blade Set Automower Enhanced HSS 300 pcs)	4	$3,399.97
SETUP	New Equipment Setup Fee (Ceora) - Onboarding and 2 Followup Site Visits	1	$7,500.00
MONITORING FEE	Multiple Unit - Annual Health Monitoring Fee/Recurring Charged Annually	1	$500.00
INSTALLATION	*Installation Labor/Hour	24	$3,360.00

Total Cost: $528,532.34

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

$26,334 / MTCO2E

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

This is the first application for funding of this measure. We will explore other federal grants, community organization funding, and utility incentives to supplement our existing state grants, general fund, and limited bond money for our project aimed at replacing gas and diesel equipment with electric alternatives, thereby reducing greenhouse gas emissions.

What other funding sources have you secured for this same GHG measure (if any)?
No other funding has been secured at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?
The identified sources, including existing state grants, general fund, and limited bond money, are insufficient for the electrification project due to their allocation constraints, scope mismatch, and competitiveness in securing funds. These resources may not cover all costs associated with transitioning to electric equipment and are often designated for other projects, limiting their applicability to the electrification initiative.

Benefits, Primary:

GHG Emission Reductions[19]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)
20.07 metric tons CO2 equivalent (4.013 metric tons CO2 equivalent annually)

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)
100.33 metric tons CO2 equivalent

Data source(s) and assumptions
GHG emissions reduction calculations were completed using actual fuel usage data of existing gasoline-powered UTVs and turf maintenance equipment with an estimated fuel economy of 20 mpg and translated into an estimated electrical energy use of comparable electric-powered UTVs and turf maintenance equipment with an energy efficiency of 7 miles/kWh. Emissions factors for CO2, CH4, and N2O were used to calculate GHG emissions from gasoline and electricity use and taken from the EPA Center for Corporate Climate Leadership, GHG Emission Factors Hub, "2023 GHG Emission Factors Hub," dated September 2023 (https://www.epa.gov/climateleadership/ghg-emission-factors-hub).

Gasoline Emissions Factors were from Table 2 - Mobile Combustion CO2 and Table 5 - Mobile Combustion CH4 and N2O for Non-Road Vehicles, Recreational Equipment, Gasoline (4 stroke)

Electricity Emissions Factors were from Table 6 – Electricity, eGRID Subregion AZNM (WECC Southwest), Total Output Emission Factors

[19] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Co-Benefits, Secondary:

Health Benefits

1. Air Quality Improvement: The transition to electric vehicles at the Balloon Fiesta contributes to better air quality, reducing the presence of harmful pollutants. This, in turn, enhances respiratory health and reduces the risk of respiratory diseases for both event participants and the local community.
2. Noise Reduction: Electric vehicles operate quietly, minimizing noise pollution during the Fiesta. This not only creates a more enjoyable and serene atmosphere for attendees but also positively impacts the overall well-being of the community by reducing noise-related stress and disturbances.
3. Promotion of Active Lifestyles: The cleaner air and quieter environment fostered by electric vehicles encourage active participation in outdoor activities. This supports a healthier lifestyle for community members who attend or live near the Balloon Fiesta, promoting physical well-being and community engagement.
4. Demonstrating Environmental Leadership: By prioritizing health-friendly electric solutions, the Balloon Fiesta sets a positive example for the community, encouraging individuals and other organizations to consider their environmental impact. This can inspire a broader commitment to healthier living and sustainable practices in daily life.

Environmental Benefits

1. Greenhouse Gas Emissions Reduction: The shift to electric vehicles significantly reduces the carbon footprint of the event, contributing to broader climate change mitigation efforts. This aligns with global environmental goals and demonstrates the Balloon Fiesta's commitment to sustainability.
2. Biodiversity Conservation: Lowering emissions from the fleet also indirectly benefits local ecosystems by reducing air pollution. Cleaner air supports biodiversity, preserving the health of plants, animals, and ecosystems in the surrounding areas.
3. Resource Conservation: Electric vehicles typically have longer lifespans and require fewer resources for maintenance compared to traditional vehicles. This contributes to resource conservation and a more sustainable use of materials, aligning with principles of environmental stewardship.
4. Education and Awareness: The initiative provides an opportunity to educate the community about the environmental impact of transportation choices. Through outreach programs, the Balloon Fiesta can raise awareness about the importance of transitioning to eco-friendly alternatives, fostering a culture of environmental responsibility within the community.
5. Long-Term Environmental Legacy: By adopting electric solutions, the Balloon Fiesta contributes to a lasting positive environmental legacy. This investment in sustainable practices helps ensure that the event remains an environmentally conscious and responsible fixture in the community for years to come.

Land & Soil Benefits

The transition to electric solutions at the Balloon Fiesta not only mitigates air pollution but also safeguards local land and soil health by reducing the potential contamination from oil spills, fluid leaks, and emissions associated with traditional vehicles, promoting a more sustainable and ecologically responsible event infrastructure.

Ecological Benefits

The adoption of electric vehicles at the Balloon Fiesta fosters a healthier environment, benefiting plants, animals, and ecosystems by minimizing air pollution and noise disturbances, ultimately contributing to the preservation of biodiversity and ecological balance.

Economic Benefits

Economic Value of Health Benefits

Enhances the well-being of the community but also generates economic value by reducing healthcare costs, increasing productivity, and fostering a more vibrant and active local workforce.

Economic Value of Environmental Benefits

The environmental benefits derived from adopting electric solutions at the Balloon Fiesta not only contribute to long-term sustainability but also hold economic value by mitigating the potential costs associated with climate change, preserving natural resources, and enhancing the region's ecological resilience.

Workforce Needs & Quality of Jobs

The initiative to update the Balloon Fiesta fleet with electric solutions aligns with the U.S. Department of Labor's Good Jobs Principles by fostering the creation of high-quality jobs through the development, installation, and maintenance of the electric vehicle infrastructure. This includes skilled positions in electric vehicle technology, charging station installation, and ongoing system maintenance, ensuring the generation of employment opportunities that offer fair wages, benefits, and career advancement, thereby contributing to a resilient and inclusive local economy.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure is not located in a LIDAC tract according to the Climate and Economic Justice Screening Tool (CEJST) tool.

Summary of past/ongoing community engagement

None.

Benefits to LIDACs

No direct benefits since this measure is not located in a LIDAC tract.

Disbenefits to LIDACs

No known disbenefits.

Authority to Implement Measure:

The Parks and Recreation Department is authorized under the City of Albuquerque to purchase electric equipment for the maintenance of the Balloon Fiesta Park. This program aligns with the City of Albuquerque's authorizing statutes and regulations, exemplifying a commitment to environmental stewardship and sustainable practices in accordance with the city's policies aimed at reducing carbon emissions, promoting clean energy adoption, and fostering a resilient and eco-friendly community.

CT11: GOLF CART ELECTRIFICATION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Gas-powered golf carts run on gasoline known to produce carbon monoxide emissions. Though newer models have lower emissions, it is still a concern to the environment as the American golf cart market is expected to grow by 3.9% by 2026. On the other hand, electric golf carts run on rechargeable golf cart batteries and produce no emissions or fumes.

Project/Program Alternate titles

Conversion of Gas Powered Golf Cart Fleet to Emission Free Electric Powered Golf Carts
CT11 Golf Cart Electrification

Mechanism

The City of Albuquerque will directly procure items to implement this measure.

List any potential risks for this mechanism

No known potential risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

A single gas-powered golf cart with a 10.5 horsepower engine that operates for 2.5 hours each week emits 1474.2 pounds of CO_2 each year, on average a golf facility is open 16 hours a day and carts are in operation 12- 14 hours. A conversion to electric would tremendously reduce these numbers to 0 emissions. Community's proposed gas golf cart ban too much of a green thing? - CNET

Key Implementing Agencies

City of Albuquerque, Parks and Recreation, Golf Management Division

Partners

None

Implementation Schedule & Milestones

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Finalize Procurement Contract, October 1, 2024
- Analytic assessment of needs, October 15, 2024
- Estimates received, November 1, 2024
- Issue PO to Procure needed equipment, December 1, 2024
- Finalize order for all equipment, December 2, 2024.
- Process order with vendor and receive equipment, December 2, 2024 – March 1, 2025.
- Installation, setup, and training, March 3, 2025 – March 7, 2025

Long-term scaling plan (if applicable)

Implementation of and converting 200+ gas golf carts at all four of the City's golf courses to electric golf carts.

Geographic Scope

(22) Electric Golf Carts
Puerto Del Sol Golf Course
1800 Girard SE, Albuquerque, New Mexico 87106

Metrics for Tracking Progress:

Greenhouse Gas Emissions Reduction: Measure the actual reduction in greenhouse gas emissions by comparing the emissions from the updated electric golf carts to the previous emissions from the gas-powered versions. This can be expressed in terms of CO2 equivalent emissions.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Fleet Golf Cart	Electric		$330,000
Infrastructure improvements	Charging capabilities		$70,000

Total Cost

$400,000

Cost Effectiveness of GHG Reduction (for requested funds)

$ 18,232 / MTCO2e

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

This is the first application for funding of this measure. We will explore other federal grants, community organization funding, and utility incentives to supplement our existing state grants, general fund, and limited bond money for our project aimed at replacing gas-powered golf carts with electric alternatives, thereby reducing greenhouse gas emissions.

What other funding sources have you secured for this same GHG measure (if any)?

No other funding has been secured at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?

The identified sources, including existing state grants, general fund, and limited bond money, are insufficient for the electrification project due to their allocation constraints, scope mismatch, and competitiveness in securing funds.

Benefits, Primary:

GHG Emission Reductions[20]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

21.94 metric tons CO2 equivalent (4.39 metric tons CO2 equivalent annually)

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

109.71 metric tons CO2 equivalent

Data source(s) and assumptions

GHG emissions reduction calculations were completed using actual fuel usage data of existing gasoline-powered golf carts with an estimated fuel economy of 30 mpg and translated into an estimated electrical energy use of comparable electric-powered golf carts with an energy efficiency of 7 miles/kWh. Emissions factors for CO2, CH4, and N2O were used to calculate GHG emissions from gasoline and electricity use and taken from the EPA Center for Corporate Climate Leadership, GHG Emission Factors Hub, "2023 GHG Emission Factors Hub," dated September 2023 (https://www.epa.gov/climateleadership/ghg-emission-factors-hub).

Gasoline Emissions Factors were from Table 2 - Mobile Combustion CO2 and Table 5 - Mobile Combustion CH4 and N2O for Non-Road Vehicles, Recreational Equipment, Gasoline (4 stroke)

Electricity Emissions Factors were from Table 6 – Electricity, eGRID Subregion AZNM (WECC Southwest), Total Output Emission Factors

Co-Benefits, Secondary:

Health Benefits

Benefits will be extended to our golfers, employees and the general public by operating zero emission vehicles.

Environmental Benefits

Air Quality Benefits

Overall, a benefit from reduction of GHG emitted into the environment. Conversion to electric vehicles will aid in higher air quality benefiting the general public. Other benefits include noise reduction as the electric golf carts are quieter than the gas-powered versions.

Land & Soil Benefits

Conversion to electric powered vehicles reduces the possibilities of fuel spills that contaminate our soils and waterways.

[20] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Economic Benefits

Economic Value of Health Benefits

A cleaner quality emission free environment will help the general public reduce the possibility of respiratory issues, reducing health care visits.

Total Cost of Ownership

Further analysis is required.

Workforce Needs & Quality of Jobs

The initiative to update the golf fleet with electric solutions aligns with the U.S. Department of Labor's Good Jobs Principles by fostering the creation of high-quality jobs through the development, installation, and maintenance of the electric vehicle infrastructure. This includes skilled positions in electric vehicle technology, charging station installation, and ongoing system maintenance, ensuring the generation of employment opportunities that offer fair wages, benefits, and career advancement, thereby contributing to a resilient and inclusive local economy.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in the following tract identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): 35001001102

Summary of past/ongoing community engagement

None.

Benefits to LIDACs

Since 100% of the measure is focused in a LIDAC tract, the LIDAC community will see all the benefits mentioned in the co-benefits section.

Disbenefits to LIDACs

No expected disbenefits.

Authority to Implement Measure:

The Parks and Recreation Department is authorized under the City of Albuquerque to purchase electric equipment for the City operated golf properties. This program aligns with the City of Albuquerque's authorizing statutes and regulations, exemplifying a commitment to environmental stewardship and sustainable practices in accordance with the city's policies aimed at reducing carbon emissions, promoting clean energy adoption, and fostering a resilient and eco-friendly community.

CT12: DC FAST CHARGERS

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Install DC Fast Chargers downtown and at Route 66 Visitors Center at Central & I-40 to include 6 level 3 and 2 upgraded level 2 charging ports. The EV charging station at Route 66 Visitor Center will include solar canopies.

Project/Program Alternate titles:

Bernalillo County Public Works/ Technical Services Department/ Transportation Program
CT12: DC Fast Chargers

Mechanism

CPRG funds will be awarded to Bernalillo County to use for installing EV charging infrastructure.

List any potential risks for this mechanism

No known potential risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

DC fast charging infrastructure located in Downtown and Southwest Albuquerque and Bernalillo County create transformative opportunities to reduce GHG emissions for southwest Albuquerque LIDAC communities which currently do not have this infrastructure.

Key Implementing Agencies

Bernalillo County Technical Services Transportation staff will manage the public EV charging project.

Partners

PNM Transportation Electrification Program is a partner on this project and will be involved in its implementation.

Implementation Schedule & Milestones

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Table 2: Project Schedule	**CY 24**	**CY 25**				**CY 26**				**CY 27**
	Q4	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**
Grant Agreement										
Procurement										
Environ Clearance										
Public Outreach										
Construction Plans										
Permits										
Construction:										

Table 2: Project Schedule	CY 24	CY 25				CY 26				CY 27
Route 66 V.C.										
Alvarado Square										
Inspection										
Closeout										

Geographic Scope

Downtown Alvarado Square at 4th Street SW and Silver Avenue SW and Route 66 Visitor Center on Central Avenue SW at I-40.

Metrics for Tracking Progress:

Metrics will include meeting construction project milestones and monthly and quarterly reports for usage: number of vehicles charged, length of charging time, and electricity used by location.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Unit Cost	Total Cost
4 ports - 200 kW PL 2000 charger	Route 66 Visitor Center	$525,000	$2,100,000
2 ports – 200 kW EP 250 charger	Alvarado Square Downtown	$218,750	$ 875,000
2 ports – 22 kW CT 6000 charger			
8 ports total			**$2,975,000**

Total Cost

$2,975,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

$372/MTCO2e

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

The County applied for a Charging and Fueling Infrastructure grant but unfortunately was not awarded.

What other funding sources have you secured for this same GHG measure (if any)?

The County has secured matches from PNM and NMDOT.

Demonstration of funding need: How are requested funds filling an existing funding gap?
The County does not have bond capacity for this infrastructure. The PNM and NMDOT funding are dependent on receiving federal funding.

Benefits, Primary:

GHG Emission Reductions[21]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Since the stations will be completed by Q4 of calendar year 2026, the total for 2025-2030 is 2,000*4 (2027-2030) or **8,000 metric tons GHG reduction**. Once in stalled, the measure will avoid 2,000 metric tons of CO_2 annually.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

48,000 metric tons GHG reduction over twenty-four years (2027-2050).

Data source(s) and assumptions

https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle

Co-Benefits, Secondary:

Health Benefits

The County's EV charging projects will help to combat climate change by phasing out the internal combustion engine (ICE) vehicles on the road. Air quality issues and urban heat islands associated with climate change have more severe impacts on LIDAC residents than others. A study completed by City of Albuquerque in 2020 illustrates temperatures in the Downtown and Southwest Mesa are 10 degrees Fahrenheit higher than other parts of the Albuquerque area. Severe drought, heat waves, and associated wildfires degrade air quality and can affect public health. EPA's EJ Screen Tool reports elevated particulate matter and ozone levels in the Downtown and Southwest Mesa. The New Mexico Community Data Collaborative (NMCDC) reports higher emergency room visits due to breathing problems and congestive heart disease for seniors and children in these parts of the city.
https://ejscreen.epa.gov/mapper/
https://chi-phi-nmcdc.opendata.arcgis.com/

Environmental Benefits

Air Quality Benefits

Air quality benefits can be calculated using data from EPA including reduced GHGs and smog pollutants:

- The typical car drives 11,500 miles and emits 4.6 metric tons CO_2 GHGs annually.
- Smog pollutants are reported in grams per mile: 1 US Ton = 907,185 grams.

[21] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

- 200 charging ports, 11,000 EVs in the Albuquerque area. 55 EVs per charging port. 1 gram = .002205 lbs.

Smog Pollutants (Tier 2)	NO_x	$PM_{2.5}$	SO_2	VOC (NMOG)	HAP (HCHO)
Avg Vehicle Bin 5 (grams per mile)	0.07	0.01	N/A	0.09	0.018
Annual grams/ vehicle	805	115	N/A	1035	207
Annual grams/ port saved	44,275	6,325	N/A	56,925	11,385

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
EV charging infrastructure	2,000	.049	.007	N/A	.063	25.1

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	GHG (metric tons CO2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BAU	8,000	2.45	.035	N/A	.315	125.5
PCAP	-8,000					

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
https://www.epa.gov/greenvehicles/smog-vehicle-emissions

Water Quality/Quantity Benefits

Fracking for oil and gas can pollutant groundwater. EVs do not contribute towards this pollution.

Land & Soil Benefits

Electric vehicles do not contribute towards oil and gas spills so reduce costs associated with cleanup.

Ecological Benefits

The County's EV charging projects will help to combat climate change by phasing out the internal combustion engine (ICE) vehicles on the road. Severe drought, heat waves, and associated wildfires degrade air quality and can affect wildlife along the Bosque. A study completed by City of Albuquerque in 2020 illustrates temperatures in the Downtown and Southwest Mesa are 10 degrees Fahrenheit higher than other parts of the Albuquerque area.

Economic Benefits

Economic Value of Health Benefits

The County's EV charging projects will improve the health of Downtown and Southwest Mesa residents by reducing their medical cost burden by $2,500 a year. Air pollution from fossil fuels contributes to 107,000 premature deaths per years in the U.S. costing $820 billion per year or $2,500 on average per person in extra medical expenses (Natural Resources Defense Council report, 2021). Heat waves, which can cause strokes and worsen cardiovascular disease, cost $263 million each year and resulting wildfire smoke costs $16 billion annually. Both heat waves and wildfires are more frequent and intense because of climate change. LIDAC communities are particularly vulnerable to health-related problems due to air pollution.
https://www.nrdc.org/press-releases/report-health-costs-climate-change-and-fossil-fuel-pollution-tops-820-billion-year

Economic Value of Environmental Benefits

The County's EV charging projects will benefit the environment by reducing catastrophic wildfires and severe drought estimated to cost residents $500 annually. Fossil fuels contribute to air pollution which can cause damage to agriculture and wildlife habitat and to water pollution through fracking that contaminates groundwater and drinking water. Fracking wells use millions of gallons of groundwater in arid states such as New Mexico. Extreme weather events including wildfires and droughts due to climate change are estimated to have cost $606.9 billion between 2016 and 2020 in the U.S.
https://www.nature.com/articles/s41467-023-41888-1

Total Cost of Ownership

Maintenance costs are $64,000 annually for electricity costs to be covered by charging fees. ChargePoint provides a five-year warranty covering all maintenance of its charging equipment. The economic benefit to Downtown and Southwest Mesa residents to own an electric vehicle is substantial. Consumer Reports found EV drivers spend 60% less on fuel costs although this varies by car model and location.
https://www.consumerreports.org/car-repair-maintenance/pay-less-for-vehicle-maintenance-with-an-ev/

Workforce Needs & Quality of Jobs

The 2022 Renewable Energy Industry of America (REIA) in New Mexico reports 6,000 clean energy jobs in Bernalillo County, of these are 500 clean vehicle jobs. Clean energy jobs pay 12% more than the median wage. The Natural Resource Defense Council (NRDC) in 2019 estimated 9,000 renewable energy jobs to be created by 2030 due to the Governor's Climate Executive Order.
https://reia-nm.org/
https://www.nrdc.org/bio/noah-long/50-renewable-energy-would-create-jobs-investment-nm

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will be located in Downtown and Southwest Mesa identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): Census Tracts (3500100) 21.00 and (3500100) 47.12.

Summary of past/ongoing community engagement

Bernalillo County held 2 community meetings in January and 3 in February 2024 to present its Climate Pollution Reduction projects to LIDAC residents. Residents commented on the high costs of EVs and infrastructure and wondered if charging stations can be collocated with gas stations.

Benefits to LIDACs

The benefits to LIDAC communities include improved air quality, improved health outcomes, and economic benefits due to lower energy costs as well as to new jobs.

Disbenefits to LIDACs

The cost to LIDAC residents to purchase new/used electric vehicles is still high even with tax rebates. Some models don't receive federal tax rebates because they don't meet Buy America requirements. New Mexico doesn't currently offer tax rebates. It is expected costs will come down over the long term so more LIDAC residents may be able to purchase EVs by 2030.

Authority to Implement Measure:

Bernalillo County is authorized under NMSA 1978 § 4-37-1 Counties: powers, ordinances; Bernalillo County Charter, Article XI to construct public EV charging infrastructure.

CT13: COLLEGE PUBLIC CHARGING

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

To accelerate the availability of public electric vehicle charging infrastructure, CNM seeks to purchase and install Electric Vehicle Supply Equipment (EVSE) including Level 2 and Level 3 Fast Charging stations and infrastructure.

Project/Program Alternate title:

CT13: College Public Charging

Mechanism

The funds will be awarded to the CNM Parking and Fleet Department to offset or fully cover the cost of purchasing and installing EVSE, including Level 2 and Level 3 Fast charging stations and infrastructure.

List any potential risks for this mechanism

No known risks for this mechanism.

Transformative Impact (i.e., scalability/replicability)

Charging the growing number of EVs in use requires a robust network of stations for both consumers and fleets. As the CNM seeks to electrify its own fleet, it also aims to serve as a good partner to its customers, students and staff by providing readily available stations that are easy to access. Moreover, as the College plans to build solar canopies on existing parking structures and lots across its campuses, those canopies can produce around 140 megawatt-hours per year for EV charging, generating energy and cost savings for the College while also offsetting even greater amounts of fossil fuel production in the region.

Key Implementing Agencies

The CNM Fleet and Parking Department will receive funds from the MSA lead agency (City of Albuquerque) and will be responsible for implementing the project once funds are received.

Partners

None.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

Installed 2 Level 2 chargers in the CNM Physical Plant Department Fleet yard for fleet vehicles. Two Level 2 Chargers at Marketplace located on Main Campus, one at Student Services on Main Campus, and one level two at the Tom Wiley Building on Main Campus.

Progress between March 1st and October 1st (if any)

The CNM Parking and Fleet Department will continue trying to secure funding to purchase and install EVSE at priority campuses and once funding is secured, will immediately develop and release RFPs for the expansion of that installation.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

Year 1 (2024-2025)

- Complete construction of the Fleet Yard Phase I project before the end of 2024. The project includes two new dual port electric vehicle charging stations.
- Complete a comprehensive analysis of charging infrastructure requirements, considering the fleet's size and operating patterns.

Year 2 (2025-2026) - Charging Infrastructure Expansion:

- Evaluate existing charging infrastructure and identify gaps.
- Finalize plans for the Fleet Yard Phase II project which contemplates one fast-charging Level 3 and one dual-port Level 2 charging stations.
- Complete installing charging stations at other CNM campuses.

Year 3 (2026-2027) - Employee Training & Engagement

- Continue to develop training requirements to educate drivers and maintenance staff on EV operation, charging procedures, and general maintenance requirements.
- Encourage driver feedback and address concerns to foster acceptance and enthusiasm for the transition.

Year 4 (2027-2028) - Charging Network Optimization

- Monitor charging patterns and optimize the charging network to ensure efficient utilization and minimize downtime.
- Consider load management strategies to balance charging demand and optimize the use of available electricity capacity.

Year 5 (2028-2029) - Grant Proposals and other Public Incentives:

- Explore economic incentives that support expansion of the EV fleet and additional EV infrastructure at all CNM campuses. Such incentives include, but are not limited to, PNM, State of NM, US DOT, others etc.
- Collaborate with charging infrastructure providers to expand public charging options for fleet vehicles.

Geographic Scope

Location 1 (Southeast Albuquerque):
CNM Main Campus
900 University Blvd SE
Albuquerque, NM 87106

Location 2 (Southeast Albuquerque):
CNM Market Place Building
Main Campus
719 University Blvd SE
Albuquerque, NM 87106

Location 3 (Northeast Albuquerque):
CNM Montoya Campus
4700 Morris St NE
Albuquerque, NM 87111

Location 4 (Northwest Albuquerque):
CNM Westside Campus
10549 Universe Blvd NW
Albuquerque, NM 87114

Location 5 (Northeast Albuquerque, Jefferson & I-25)
CNM Workforce Training Center
5600 Eagle Rock Ave NE
Albuquerque, NM 87113

Location 6 (Southwest Albuquerque)
CNM South Valley Campus
5816 Isleta Blvd SW
Albuquerque, NM 87105

Location 7
CNM Rio Rancho Campus
2601 Campus Blvd NE
Rio Rancho, NM 87144

Metrics for Tracking Progress:

EV chargers across all campuses throughout the Albuquerque and Rio Rancho area, including chargers in shaded areas and fast-charging stations at each.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Level 2 and 3 Charging Infrastructure - Design and Construction	Across all campuses		$800,000

Total Cost: $800,000

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>

<<Please include a calculation of $/GHG reduced in metric tons per CO2 equivalent from 2025-2030 (see the second table in the Air Quality section).>>

$<total cost>/<GHG value in the second table of the air quality section> MTCO2e =
$ 1,510 / MTCO2e

Reasonableness of Cost (optional for PCAP)

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
Alternative Fuel Vehicle Refueling Property Credit - will secure for the project
Commercial Clean Vehicle Tax Credit - will secure for the project
Investment Tax Credit for Energy Property - will secure for the project
National Electric Vehicle Infrastructure (NEVI) Grants - will secure for the project

What other funding sources have you secured for this same GHG measure (if any)?
None.

Demonstration of funding need: How are requested funds filling an existing funding gap?
Existing CNM Community College funding is generally restricted to administrative services of implementing our coursework and running the college. The IRA and BIL are historic opportunities for hard hit higher education institutions to implement sustainability projects.

Benefits, Primary:

GHG Emission Reductions[22]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)
450.5 metric tons CO2 equivalent

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)
2,570.5 metric tons CO2 equivalent (MTCO2E)

Data source(s) and assumptions
AFLEET Charging and Fueling Infrastructure (CFI) Emissions Tool version 1.1
https://afleet.es.anl.gov/infrastructure-emissions/public/

Inputs: Six (6) Level 2 and two (2) DCFC EVSE charging ports, medium-to-high default charger utilization, 100% light-duty vehicle utilization, WECC EIA regional electricity mix

Since the annual GHG reductions is estimated to be 106 MTCO2E, and installation will be at the end of year 2, giving 1 quarter in 2026 and subsequent years, here are the calculations for the two time ranges:
2025-2030: 106*4.25 = 450.5 MTCO2E
2025-2050: 106*24.25 = 2,570.5 MTCO2E

[22] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Co-Benefits, Secondary:

Health Benefits

Widespread shifts in consumer behavior toward electric vehicles in the next five years will have significant health benefits including cleaner air that lessens the likelihood of child asthma, allergies, and pollution induced headaches and other side effects. EV charging infrastructure provides a robust network to encourage and sustain the shifts in consumer behavior toward electric vehicles.

Environmental Benefits

Air Quality Benefits

Emissions from the transportation sector are the second highest contributor to poor air quality and carbon emissions in the State of New Mexico. Providing the infrastructure to service electric vehicles will help CNM do their part to reduce carbon emissions from customers, as well as their own fleet.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
CNM EVSE	106.0	0.01311	0.001103	0.000219 5	0.05122	

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
See Benefits section above.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

CNM campuses are predominantly located within or adjacent to LIDAC census tracts, and given the workforce training component of curricula, all campuses serve LIDAC communities regardless of their physical location within a LIDAC census tract.

Main Campus & Market Place Building - Tract Number: 35001001200
Montoya Campus - Tract Number: 35001003719
Westside Campus - Tract Number: 35001004746
South Valley Campus - Tract Number: 35001004604
Workforce Training Center Campus - Tract Number: 35001003736
Rio Rancho Campus - Tract Number: 35043010718

Summary of past/ongoing community engagement

A student survey is scheduled to be conducted in the coming months to determine electric vehicle charging infrastructure needs as well as the most frequently utilized campuses that will help to make the case for the location of parking lot solar canopies within the scope of project plans.

Benefits to LIDACs
Increased accessibility to shade and EV charging, contribution to overall carbon pollution reduction.

Disbenefits to LIDACs
None expected

Authority to Implement Measure:
The Central New Mexico Community College Governing Board holds all the rights, powers, duties, and responsibilities conferred upon and vested in it by the State of New Mexico, including those prescribed by **Sections 21-13-1 to 21-13-27** and **21-16-1 to 21-16-22 NMSA 1978**, consistent with the provisions of the Constitution of the State of New Mexico. These powers and responsibilities include the budgeting, master plans and contracting associated with this greenhouse gas reduction measure project.

WR1: FOOD WASTE PREVENTION & COMPOSTING

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

To pilot systems-level changes to the life cycle of food and green waste at multiple levels of EPA's wasted food scale, this food waste prevention-focused measure is grounded in community support, and focuses benefits on LIDAC communities. This translates to a cleaner, healthier planet for generations to come. This 3-year pilot project includes workshops and technical assistance services for food waste prevention, food rescue, and food waste recycling in small, local restaurants that are located in and serve frontline communities. The City will hire a community-based organization with experience in food waste prevention, rescue, and diversion, experience operating kitchen and training chefs and kitchen staff, and a strong connection to the importance of local food, food waste reduction, and composting.

This work is supported by goals in the City of Albuquerque's 2021 Climate Action Plan, which involved extensive community engagement, and the 2019 Albuquerque Food and Agriculture Action Plan.

Project/Program Alternate titles

Restaurant Food Waste Prevention and Reduction
WR1: Food Waste Prevention & Composting

Mechanism

The City of Albuquerque's Sustainability Office will coordinate implementation, and the City will fund contractors to implement the projects (i.e., provide technical, outreach, construction services). The distribution of funds will strictly adhere to established procurement rules or any specific terms outlined in the signed memorandum of understanding or as agreed upon by the coalition partners.

List any potential risks for this mechanism.

As this method of implementation is commonly used by the City, any potential risks are accounted for in the City's processes.

Transformative Impact (i.e., scalability/replicability)

This measure is designed to build on existing work, and sets the work up for being further scalable.. This measure aims to create transformational changes by demonstrating how food waste prevention, rescue, and composting are beneficial to restaurants, both economically and to attract customers who care about the environment. These multifaceted benefits enable long-term, transformational changes to small restaurants, a sector that has seen a lot of challenges over the last few years. In addition, the project itself is scalable, and results and lessons from the project will be available to other communities. Demonstrating the successes will also support scaling the project within the Albuquerque area.

Key Implementing Agencies
City of Albuquerque - Sustainability Office

Partners
This project builds on the successes of an existing Food Scrap Pilot project, which involves with the following partners: Three Sisters Kitchen (non-profit, community-based organization, runs the concessions site), Explora (interactive children's museum, location of concessions) and Little Green Bucket (food waste hauler), and Soilutions (food waste composting facility).

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The City's Food Scrap pilot project started July 2023 and will run through June 2024. The pilot involves data collection to better understand food waste prevention and diversion potential on two distinct scales: commercial-scale and concessions-scale, which includes consumer side prevention and diversion work.

Progress between March 1st and October 1st (if any)

Between March 1st and October 1st the City will provide food waste prevention social media and web-based content for Food Waste Prevention Week (April 1-7) and periodically during that time period, and the Food Scrap Pilot Project will be completed.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Contract procurement: October through December 2024
- Contract period: January 2025 through December 2027
- Contractor annual report: Due December 31st of each year (2025, 2026, 2027, 2028, 2029)
- Identify restaurants for technical assistance cohort: January through April 2025
- Workshops: four per year for the first 4 years
- Quarterly data collection and reporting for the duration of the grant period

Long-term scaling plan (if applicable)

Materials from the pilot, and the project model, will be available to be replicated across the country, especially in other arid- and semi-arid regions.

The City is currently partnering with FUSE Corps to host a fellow who is designing an equity-focused citywide composting program that will likely help support waste diversion to composting at restaurants in years 2 and 3 of this measure.

Geographic Scope
Restaurants that are located in/serve LIDAC communities within the Albuquerque MSA.

Metrics for Tracking Progress:

To track the effectiveness of the project and inform efforts after the grant period, The City will require the contractor conduct a walk-through assessment (qualitative) and waste audit (quantitative) prior to and at the end of technical support for each restaurant. Diversion data and progress tracking will be required for restaurants that receive technical services. All data will be collected according to best practices. Each workshop (free to chefs and kitchen staff from small, local restaurants across the MSA) will include a survey to better understand the needs and opportunities at additional restaurants across the area.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Restaurant Project: Contractual	Restaurant Technical Services Contract (for 5 years)	\$100,000/year	\$500,000

Total Cost: \$500,000

Cost Effectiveness of GHG Reduction (for requested funds)

\$500,000/135 metric tons of CO2 equivalent (MTCO2E) = **\$3,704/MTCO2E**

Reasonableness of Cost (optional for PCAP)

Investing in this measure provides the following benefits that demonstrate the reasonableness of the cost:

- Impact of investment: Investing in behavior change and creating systems that will be able to operate well beyond the grant period has long-lasting impacts that generally extend well beyond the initial anticipated reach.
- Small, local restaurants, who serve people in LIDAC communities and are among the most negatively impacted by climate change and economic challenges, will gain long-term benefits from the measure and be able to share some of the lessons and benefits with the many people they serve.
- Investing in preventing GHG emissions through food waste prevention and composting yields additional benefits that are difficult to quantify (described in the co-benefits section), yet are also highly valuable, especially in arid and semi-arid regions.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Available funding opportunities: None identified

Past relevant funding opportunities, if there is another application round: EPA's Recycling Education and Outreach opportunity; NRDC's Food Matters project assistance–these funds are often too small to cover one round of this project.

What other funding sources have you secured for this same GHG measure (if any)?

For the current Food Scrap Pilot Project, which laid the foundation for this initiative: a $5,000 grant from NRDC and $27,700 from the City of Albuquerque.

Demonstration of funding need: How are requested funds filling an existing funding gap?

There are no known opportunities on the horizon for this important type of work.

Benefits, Primary:

GHG Emission Reductions[23]

The scalable project, which instills food waste prevention practices in restaurants, enables greenhouse gas (GHG) reductions beyond the scope of the Plan (2050) and an accumulative emissions reduction of 1,003 metric tons of carbon dioxide equivalent (MTCO2E) by 2050, which does not consider any scaling beyond the scope of this Priority Climate Action Plan measure.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

135 MTCO2E

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

1,003 MTCO2E

Data source(s) and assumptions

GHG emissions were calculated using the EPA WARM Tool, version 16.

Background and Assumptions: Workshops: four per year for the first 4 years, each on a different topic, free to chefs and kitchen staff from small, local restaurants across the MSA. Technical assistance: 10 restaurants total (two per year located in or primarily serve EJ communities (i.e., LIDAC tracts). Background: NRDC estimated restaurant employees generate 3,000 lbs (1.5 tons) of food waste per employee per year (see page 118 https://www.nrdc.org/sites/default/files/food-waste-city-level-technical-appendices.pdf).

[23] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Estimate and Assumptions (per year): *Workshops*: 4 workshops per year with an average of 10 chefs per workshop = 40 people. Assuming that chef reduces 25% o f their waste after the workshop (0.375 tons each year, and 0.1875 tons the first year assuming the workshops are in the first half of the year). The diversion for year 1 : 0.1875 tons x 40 people = 7.5 tons. Year 2: 0.375*40 people [previous participants] + 0.1875*40 [new participants that year]. Year 3: 0.375*80 people [previous participants] + 0.1875*40 [new participants that year]. Year 4: 0.375*120 people [previous participants] + 0.1875*40 [new participants that year]. Year 5 and 6 (2029 and 2030): 0.375*160 people [previous participants]. Total tons: 232.5 tons. Using the EPA WARM Tool, version 16, for composting (a conservative calculation since a significant portion will be prevented or rescued, which have higher GHG reduction values and are not accounted for in version 16 of the EPA WARM model) for 232.5 tons yields 35.37 MTCO2E.

Restaurant Technical Services: Each year the project will support composting, food repurposing and food donations among 2 small, local restaurants (40 employees, average of 20/restaurant—we will need to ask restaurants interested in participating how many staff they have and change this number accordingly) for 40 weeks (first 12 weeks of the 1-year project are devoted to restaurant on-boarding and assessment). Based on the City and County of Denver's Department of Public Health & Environment case study results, which saw at least 90% of restaurant food waste with technical assistance (see slide 11 for link), 90% of food waste is expected to be prevented/diverted at each of the participating restaurants. Estimated project impact of diverting 104 restaurant tons will be diverted due to project implementation. This is calculated by taking: 1) 1.5 tons per employee year x 40 employees divided by 52 weeks = 1.15 tons weekly estimated food waste; 2) 1.15 tons x 90% food waste diversion = 1.03 tons diverted weekly; 3) 41.03 tons x 40 weeks = 41.5 tons the first year of technical services for restaurants new to the program. Assuming 75% diversion is maintained after the first year of technical services, an amount of 45 tons (1.15 tons x 75% food waste diversion x 52 weeks). Diversion for year 1: 41.5 tons; Diversion for year 2: 41.5 tons + 45 tons (previous cohort). Year 3: 41.5 + 45*2. Year 4: 41.5 + 45*3. Year 5: 41.5 + 45*4. Total diversion: 658 tons. Using the EPA WARM Tool, version 16, for composting (a conservative calculation since a significant portion will be prevented or rescued, which have higher GHG reduction values and are not accounted for in version 16 of the EPA WARM model) for 658 tons yields 100.1 MTCO2E. Caveats: This calculation does not consider things they might already be doing to reduce food waste. Different restaurants will be supported each year.
Food Waste Prevented/Diverted: 232.5+658 = tons in the first year after implementation.
2025-2030 Calculation: GHG = 35.37+100.1 = 135.47 MTCO2E
2025-2050 Calculation: Diversion (tons) [Workshops] 232.5 + 0.375*160*20 + [Restaurants] 658 + 45*5*20 = 6,590.5 tons. Using EPA WARM Tool, version 16, equates to 1,002.65 MTCO2E

Co-Benefits, Secondary:

Health Benefits

Generating less food waste at restaurants and diverting food waste from the landfill (and the dumpster) reduces the weight of the trash bags staff need to haul to (and often lift into) the trash dumpsters. Helping chefs and food preparation staff understand how to use more of the ingredients they order in their dishes, supports restaurants in serving more healthy foods, especially edible portions of vegetables that are often thrown away (e.g., beet greens).

Teaching restaurants how they can safely donate food to feed people (when possible) or animals helps reduce food insecurity in an area where it is estimated that 25% of people in and around Albuquerque experience food insecurity, with about 20% living in food deserts.

Environmental Benefits

The service that provide the most environmental benefit is teaching restaurants how to divert materials to be composted and applied to local soils. The benefits listed in this subsection focus on composting benefits.

Air Quality Benefits

Aerobically recycling the nutrients in food and green waste locally (by composting the remaining waste) avoids methane emissions that occur when food waste and green waste is deposited in the landfill. Local collection, processing, and application also avoids GHG emissions from transportation. Applying the finished compost locally builds healthy soils, which also reduces erosion and airborne particulate matter during and after high wind events.

Water Quality/Quantity Benefits

In a region where water is scarce and soils are often depleted, increasing access to local, high-quality soil amendment material (made from composted restaurant waste) and encouraging local application of the material will provide much needed water quality and quantity benefits. The semi-arid region is known for sediment laden stormwater runoff and flooding during rain events. Local application of finished compost increases the soil's ability to absorb and retain water, which reduces runoff and erosion during rain events. Giving the soils more capacity to soak up and hold water, reduces erosion and increases water conservation. As water infiltrates into soils, the soil acts like a filter, cleaning the water as it moves through the system. All these water quality and quantity benefits are especially important in arid and semi-arid regions such as the Albuquerque MSA, which frequently experiences drought followed by high intensity rain events. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Land & Soil Benefits

In the arid and semi-arid Southwest, soils tend to be depleted of organic matter. Applying finished compost, adds much needed organic matter to the depleted, semi-arid soils, which increases nutrient content, improves plant growth, and helps regenerate the soils. Using compost as a soil amendment material helps soils retain moisture, which supports water conservation—especially important for semi-arid environments. Soils augmented with compost are also able to soak up more rainfall, which allows the soils to serve as a filter and improve water quality while also reducing erosion. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Ecological Benefits

The composting process cultivates an ecosystem of small organisms that break down the organic material so that the nutrients once trapped in the food and green waste will again be available, instead of being trapped in a landfill. Finished compost is considered stabilized organic matter, which has a variety of beneficial uses including soil restoration, carbon sequestration, and replacing or reducing the need for synthetic chemical inputs that have negative environmental inputs. Applying compost also increases increasing soil microbe biodiversity, which leads to healthier soils. Reference: Pergola, M., et al., Science Direct, 2018.

Economic Benefits

Providing technical assistance to small, local restaurants on how to prevent food waste helps the small restaurant business sector save money by keeping more of their purchased materials in their final products and reducing the waste volume (and associated hauling expenses).

For the remaining restaurant waste that is sent to be composted, generating compost locally improves access to soil amendment material that supports a resilient food system and can spur the local, small-scale agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., *Sustainability* **2020**, *12*(11):4456.

Economic Value of Health Benefits

This project provides a reduction in GHG emissions through reduction of food and green waste sent to the landfill. For the restaurants that choose to compost their remaining waste, the final product supports locally produced agricultural products through increased availability of high-quality soil amendment material, which makes it easier for community members to increase their consumption of locally grown, nutritious food, especially in areas identified as LIDAC tracts. Finished compost also reduces the need for chemical fertilizers. A 2018 study found that nitrosamine, a standard chemical fertilizer component, contributes to a variety of health conditions, such as Alzheimer's Disease, Diabetes Mellitus, Non-Alcoholic Steatohepatitis, and others. Reducing chemical fertilizer use and need will also avoid the potential health risks associated with its use. Reference: Farhidi, Madani, Crichton, *Environmental Health Insights*, 2022.

Economic Value of Environmental Benefits

By preventing wasted food and directing those items into the final product, restaurants will be able to save money from increased product (prepared foods) and reduced waste volume (and associated hauling expenses). For the restaurants that participate in composting, processing the food and green waste locally increases local access to high quality compost that will help build soil health and boost the local urban agriculture economy. This project also serves as a scalable pilot for communities across the arid Southwest.

Total Cost of Ownership

N/A, the project involves services not assets

Workforce Needs & Quality of Jobs

This project gives a community-based organization the chance to hire a 0.5 FTE employee to run the five-year program. The services provided will help local restaurants located in and who serve LIDAC community members to save money along with preventing/reducing/diverting food waste, which will improve the resiliency of the local restaurant economy, the most vulnerable portion of the restaurant economy, and one that is still recovering from challenges during the COVID-19 lockdown era. The contractor will charge between $45 and $55 per hour of staff time, which covers benefits, administrative overhead, and still directs between $20 and $30 to the employee.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

The contractor will identify restaurants from LIDAC communities in the Albuquerque MSA and will use the Climate and Economic Justice Screening Tool (CEJST) to verify that each restaurant is located in a LIDAC tract. The tract numbers in the Albuquerque MSA include: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200, 35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004602, 35001004604, 35001004712, 35001004713, 35001004715, 35001004716, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, 35001004749, 35001940700, 35043010503, 35043010713, 35043010716, 35043010900, 35043011000, 35043011200, 35043940200, 35043940500, 35043940600, 35043940700, 35043940900, 35057963201, 35057963202, 35057963600, 35057963700, 35061940300, 35061970101, 35061970102, 35061970301, 35061970302, 35061970303, 35061970401, 35061970901, 35061970902, 35061971000, 35061971100, 35061971300.

Summary of past/ongoing community engagement

Past Community Engagement: The City of Albuquerque's 2021 Climate Action Plan was developed as a result of extension community engagement and contains goals supporting community composting and waste reduction education.

Other Composting Community Engagement: Currently, the City of Albuquerque has partnered with FUSE Corps to host an Executive Fellow focused on conducting community engagement and designing an equity-focused citywide composting program, Since the Fellow started on October 30th, 2023, this effort has involved 15 community meetings, over 15 stakeholder meetings, a digital feedback from, and the formation of 4 working groups to support the program design. A summary of community feedback from these meetings can be viewed here: https://www.cabq.gov/sustainability/documents/compost-listening-tour-summary_02-2024.pdf.

Priority Climate Action Community Engagement: The following shows what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement).

- Restaurant and Residential projects (grouped for community engagement) had 53 responses:
    - 37 selected high benefit
    - 9 selected medium benefit
    - 6 selected low benefit
    - 1 selected no perceived benefit

Community members also provided written feedback about site locations, the need for community composting to be supported by paid position(s), and other audience and initiative design feedback. A list of comments collected on this measure through the PCAP community engagement effort are provided as a supplement at the end of this document.

Ongoing: The City of Albuquerque's Sustainable Waste Specialist regularly attends community meetings, talks to community members, and gathers feedback on existing programs and other related interest from community members. The Sustainable Waste Specialist also collaborates with other Departments to engage community members and understand how to continue to align with the community's vision.

Benefits to LIDACs

Since 100% of the restaurants who will receive technical services will be located in or serve LIDAC communities, LIDAC communities in the Albuquerque MSA will see all the benefits mentioned in the co-benefits section. The contractor will identify restaurants from LIDAC communities in the Albuquerque MSA and will use the Climate and Economic Justice Screening Tool (CEJST) to verify that each restaurant is located in a LIDAC tract.

Disbenefits to LIDACs
No known disbenefits.

Authority to Implement Measure:
City of Albuquerque - The City of Albuquerque has the authority and the extensive experience needed to implement this measure. City Council and City Leadership approval are required to hire staff and execute the contract. The needed time for these processes is provided in the timeline for the project.

Supplement:
Comments from PCAP Community Engagement

Restaurant-Specific and General Feedback

Restaurant-Specific:

- Visitors from Portland, OR - Food portions are much much bigger in ABQ restaurants - lods of food waste!
- Meals on Wheels of ABQ throws away huge loads of food DAILY!
- There is a national organization that sets up the selling of 2nd day products at a discounted price called TooGoodtoGo.
- I love the idea of chefs + local restaurants as community "influencers" in the food waste space. Small restaurants seem like a good starting ground for influencing/informing future programs for residents + large institutions.
- Would be great to create a comprehensive list of food recovery options (+regulations) in the city.

Other feedback:

- As far as food waste, it is a better idea if there is that much waste to turn it into liquid gas or whatever you call it to heat homes or for automobiles that is a good idea. Let's turn it into fuel for homes and cars? If there is that much waste?
- don't waste the time and money. just put info on the city website.

WR2: TRIBAL LANDFILL DIVERSION

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

Food and Green Waste diversion, composting and local soil application: To create solutions to divert food waste and green waste from the Pueblo of San Felipe's transfer station to landfill waste stream, this measure will create opportunities for returning to sustainability, soil building, and best use opportunities for low-greenhouse gas composting solutions.

Project/Program Alternate titles:

Pueblo of San Felipe Composing Project
WR2: Tribal Landfill Diversion

Mechanism

The City of Albuquerque will be the fiscal agent responsible for receiving and distributing the funds to partners. The distribution of funds will strictly adhere to established procurement rules or any specific terms outlined in the signed memorandum of understanding or as agreed upon by the coalition partners.

List any potential risks for this mechanism

No known potential risks for this mechanism based on the City of Albuquerque's experience managing federal grants.

Transformative Impact (i.e., scalability/replicability)

This greenhouse gas (GHG) reduction measure has the "create transformative opportunities or impacts that can lead to significant additional GHG emissions reductions by reducing or eliminating the significant volume of food and green waste from the Pueblo of San Felipe (Pueblo) that are taken to the landfill. Additionally, soil building efforts are needed as the region has been in longstanding drought conditions. Further, there is a significant cost-savings potentially associated with this diversion project as our hauling and tipping fees are material. Finally, the Pueblo of San Felipe has a very high unemployment rate (21.3% according to American Community Survey Profile). Bringing jobs to San Felipe Pueblo raises the quality of life in the Pueblo.

Key Implementing Agencies

Pueblo of San Felipe Department of Natural Resources and Public Improvement Authority will be responsible for implementing this project on the Pueblo.

Partners

Pueblo of San Felipe works with the NM Recycling Coalition, Eight Northern Indian Pueblos Council Office of Environmental Technical Assistance

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The Pueblo of San Felipe is working to improve its Transfer Station, but does not have any food/green waste projects underway.

Progress between March 1st and October 1st (if any)

Positioning for award.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Equipment procurement, Oct. 2023 – May 2024
- Outreach to promote the program, June 2024 – July 2029
- Collection and Composting of Food Scraps and Green Waste, July 2024-beyond the end of the grant period at Sept. 2029
- Quarterly data collection/reporting, Oct. 2023 – Sept. 2029

Long-term scaling plan (if applicable)

By demonstrating the ability for this local hub collection and composting model to serve a small community, this project will showcase how other communities can start similar systems to divert waste, generate compost, and support local soils, agriculture, and economy.

Geographic Scope

The Pueblo of San Felipe, located in Sandoval County, New Mexico. The hub location is near the center of the San Felipe Pueblo.

Metrics for Tracking Progress:

Quarterly tracking of green waste and food waste quantities diverted from the landfill to be composted. Tracking contributors (i.e., participants).

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Labor	1,234 hours per year, according to EPA WARM Tool	1,234 hours per year at $20/hour	$24,680 per year $123,400 for 5 years
Fencing	Chain link fences with gates to keep dogs, horses or other animals out of the up to 2,400 sq. foot compost area	$5,000 -$8,000	$7,750
Back Hoe	To turn the compost, mix, manage materials	$160,000-$200,000	$185,000
Fuel and Maintenance	To keep the Backhoe operating properly	$3,000-$4,000 per year	$3,500 per year $17,500 over 5 years

Item	Description	Range	Best Estimate
Outreach Materials and Hand Tools, PPE	To provide signage, communication to the community, to provide for minimal hand tools and PPE such as shovels and gloves to complete the goals and deliverables.	$3,000-$5,000 per year	$4,000 per year $20,000 for 5 years

Total Cost
$451,450

<u>Cost Effectiveness of GHG Reduction (for requested funds)</u>
$451,450/684.7MTCO2e = **$659/MTCO2e**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
Possible funds from other New Mexico state grants such as the New Mexico Environment Department's Recycling and Illegal Dumping grant, which has insufficient funds for getting composting at this scale started. As of the 2022-2023 funding opportunity, only about $264,000 (one third of the total $800,000) was available for recycling projects. Capital outlay is also an option down the road, if needed.

Past funding options that are not reoccurring opportunities: EPA Solid Waste Infrastructure Recycling Grant Funding. There are a lot of unmet needs, unmet trust responsibilities on the Pueblo. We have applied for other EPA, RAID, and Capital Outlay funding to address solid waste and environmental / recycling needs, however this is the first grant application to address food and green waste.

What other funding sources have you secured for this same GHG measure (if any)?
None at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?
There has not been any funding to date for the Pueblo of San Felipe to address composing of food and green waste.

Benefits, Primary:

GHG Emission Reductions
GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants, soil building opportunities, and improved quality of life for the Pueblo of San Felipe community members.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

684.7 MTCO2E

Calculation: 927.2 tons annually (697.15 food waste and 230.05 green waste) or 130.42 MTCO2E annually based on EPA WARM Tool version 16 with .25% diversion in 2025. GHG = 684.7 = 130.42*.25+ 130.42*5

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

3,293.1 MTCO2E

Calculation: 927.2 tons annually (697.15 food waste and 230.05 green waste[yard trimmings]) or 130.42 MTCO2E annually based on EPA WARM Tool with .25% diversion in 2025. GHG = 3,293.1 = 130.42*.25+ 130.42*25

Data source(s) and assumptions

The food waste and green waste drop off center will serve the 3,820 community members. For this site, food waste generation is estimated to be higher than the average US community based on strong cultural importance of food and feast days. Thus, 1lb of food waste per day per person (697.15 tons per year) is estimated as the potential food waste diversion for the system. It is assumed that browns collected and composted on site are 1/3 by weight of the food scraps, or 230.05 tons per year). EPA WARM Tool is used to estimate GHG reduction, using food waste and yard waste categories, which is 92.90 MTCO2E/year

Operations: Only 25% of the diversion capacity is estimated for 2025 based on schedule for being operational by Q3 2025 and to account for time for community members to learn about and start using the system. Full diversion potential is assumed for subsequent years. It is assumed that once operational, the Pueblo of San Felipe will maintain operations of the facility.

Co-Benefits, Secondary:

The following details additional benefits this measure will bring to the community members of the Pueblo of San Felipe.

Health Benefits

Diverting food scraps and green waste away from the landfill helps mitigate climate change and improves health by improving air quality and making compost more accessible to help community members grow healthy local food. Air quality improvements created by avoiding methane generation from landfilling the items, avoiding the need to transport those items 20 miles to the nearest landfill, and improving local access to using finished compost to amend soils, which can reduce fugitive dust during wind events.

Additionally, food waste is heavy, and increases tribal funds which need to be spent on tipping fees, rather than sustainability efforts and food waste creates corrosion in our trash trucks, increasing maintenance costs.

Environmental Benefits

Air Quality Benefits

Aerobically recycling the nutrients in food and green waste locally avoids methane emissions that occur when food waste and green waste is deposited in the landfill. Local collection, processing, and application also avoids GHG emissions from transportation. Applying the finished compost locally builds healthy soils, which also reduces erosion and airborne particulate matter during and after high wind events.

The annual reduction anticipation from this implementation mechanism is 130.42 MTCO2E.

Future-Year 2030 emissions reduction is 684.7 MTCO2E from this single, scalable measure.

Data source(s) and assumptions:
For this measure, the same calculations and assumptions as used in estimating GHG reduction.

Water Quality/Quantity Benefits

In a region where water is scarce and soils are often depleted, increasing access to local, high-quality soil amendment material and encouraging local application of the material will provide much needed water quality and quantity benefits. The semi-arid region is known for sediment laden stormwater runoff and flooding during rain events. Local application of finished compost increases the soil's ability to absorb and retain water, which reduces runoff and erosion during rain events. Giving the soils more capacity to soak up and hold water, reduces erosion and increases water conservation. As water infiltrates into soils, the soil acts like a filter, cleaning the water as it moves through the system. All these water quality and quantity benefits are especially important in arid and semi-arid regions such as the Albuquerque MSA, which frequently experiences drought followed by high intensity rain events. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Land & Soil Benefits

In the air Southwest, soils tend to be depleted of organic matter. Applying finished compost, adds much needed organic matter to the depleted, semi-arid soils, which increases nutrient content, improves plant growth, and helps regenerate the soils. Using compost as a soil amendment material helps soils retain moisture, which supports water conservation—especially important for semi-arid environments. Soils augmented with compost are also able to soak up more rainfall, which allows the soils to serve as a filter and improve water quality while also reducing erosion. References: EPA, Composting, last updated 2023; Pergola, M., et al., Science Direct, 2018.

Ecological Benefits

The composting process cultivates an ecosystem of small organisms that break down the organic material so that the nutrients once trapped in the food and green waste will again be available, instead of being trapped in a landfill. Finished compost is considered stabilized organic matter, which has a variety of beneficial uses including soil restoration, carbon sequestration, and replacing or reducing the need for synthetic chemical inputs that have negative environmental inputs. Applying compost also increases increasing soil microbe biodiversity, which leads to healthier soils. Reference: Pergola, M., et al., Science Direct, 2018.

Economic Benefits

Generating compost locally improves access to soil amendment material that supports a resilient food system and can boost the local, small-scale agricultural economy. References: EPA, Community Composting Basics, last updated 2023; EPA, Composting Food Scraps in Your Community: A Social Marketing Toolkit, 2023; Ayilara, M.S., et al., *Sustainability* 2020, 12(11): 4556.
The Pueblo of San Felipe is an agricultural community and building soil will help the Pueblo to maintain our traditional way of life and return to food sovereignty.

Economic Value of Health Benefits

This project provides a reduction in GHG emissions through diversion of food and green waste from landfills. The final product supports locally produced agricultural products through increased availability of high-quality soil amendment material, which makes it easier for community members to increase their consumption of locally grown, nutritious food, especially in areas identified as LIDAC tracts. Finished compost also reduces the need for chemical fertilizers. A 2018 study found that nitrosamine, a standard chemical fertilizer component, contributes to a variety of health conditions, such as Alzheimer's Disease, Diabetes Mellitus, Non-Alcoholic Steatohepatitis, and others. Reducing chemical fertilizer use and need will also avoid the potential health risks associated with its use. Reference: Farhidi, Madani, Crichton, *Environmental Health Insights*, 2022.

Economic Value of Environmental Benefits

By processing the food and green waste locally, the project is increasing local access to high quality compost that will help build soil health. This project also serves as a scalable pilot for nearby tribal communities and other towns across the arid Southwest.

Total Cost of Ownership

Beyond the initial capital cost of setting up the system ($192,750), the Pueblo of San Felipe estimates an annual operation and maintenance cost of $185,580, which includes the 0.59 FTE predicted by EPA WARM Tool, backhoe maintenance and operations, and the cost of outreach and education to the community.

Workforce Needs & Quality of Jobs

Our transfer station and Pueblo Public Improvement Authority which manages solid waste, drinking water, roads and other public health functions are woefully underfunded. Additionally, San Felipe Pueblo has a very high unemployment rate, as high as 24%. Funding for jobs for tribal members are much needed, and we will have a preference for hiring our tribal members to provide training, job skills and employment.

This project will require 472 hours annually or (0.22 FTE) per EPA WARM Tool, version 16.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

To respect Tribal sovereignty and self-government and to fulfill Federal trust and treaty responsibilities to Tribal Nations, land within the boundaries of Federally Recognized Tribes are designated as disadvantaged on the map. This measure will be located in San Felipe Pueblo tribal land identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): 35043940700

Summary of past/ongoing community engagement

The Pueblo of San Felipe has a strong commitment of providing outreach and education to our tribal members through a variety of methods including: community meetings, newsletters, door to door information, etc.

Benefits to LIDACs

Since the project will be located in and serve the Pueblo of San Felipe, considered a LIDAC community, all the benefits listed in previous sections (both GHG benefits and co-benefits) for this project will be seen by LIDAC community members.

Disbenefits to LIDACs

No disbenefits are expected for this project

Authority to Implement Measure:

Yes. The Pueblo of San Felipe is authorized under its inherent sovereignty to implement these measures.

WR3: MUNICIPAL GREEN WASTE

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

To accelerate the diversion of green waste material from local landfills and increase the conversion of this waste into reusable inputs to grow the green infrastructure, this measure will: Increase green waste reuse and formation into usable compost material, increase education and outreach of composting methods, create bioreactors and other composting methods infrastructure to produce product, and centralize input material dumping point for reuse.

Project/Program Alternate titles

Parks and Recreations Green Waste Management
WR3: Municipal Green Waste

Mechanism

The fund will be utilized to procure equipment and materials needed to form multiple types of composting mechanisms from bioreactors and consolidated bays for traditional compost turning. Funding will also be used for the expansion of educational materials and volunteer engagement.

List any potential risks for this mechanism

None

Transformative Impact (i.e., scalability/replicability)

The City of Albuquerque Greenhouse serves as a green waste dumping location for nearly half of the city's 300+ parks. Green waste ranges from bark, leaves, weeds, and bush trimmings that all serve as needed inputs for composting mechanisms. This material that is traditionally transferred to landfills has the potential to be transformed into compost that can be reused within the city parks and other open space properties to maintain and grow new components of green infrastructure such as trees or other pollinating plants. Increasing the number and improving the health of trees and other carbon-absorbing plants within the city's green spaces can have a compounding impact on GHG emissions reduction in carbon capture and sequestrations along with overall l air quality improvements.

Key Implementing Agencies

Parks and Recreation Department, Park Management Division, Horticulturist, and City Forester.
Park and Recreation Department, Open Space Division, Biologist, and Urban Agricultural Coordinator.
Solid Waste Department, Clean City's Division, Operational Coordinator.

Partners

Tree New Mexico
Master Gardeners
Master Composters
Think Link a Bee

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The creation of multiple Bio Reactors for compost creation have been created at the city Greenhouse and other local organic farm locations. Green waste streamlining to the site has been better organized, and extra used equipment such as wood chippers have been transported and stored on-site for input material preparation. Space allocation for composting needs has been organized and prepared for future scaling needs of project.

Progress between March 1st and October 1st (if any)

Other community-based organizations and non-profits have been consulted to gauge the interest from these organizations and the community as to the interested and expected level of interest for composting material that will be produced by the project as well as community involvement to help alleviate staff burden in keeping material in the composting phase so produce in created and input material is used to prevent built up at the dumping locations.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Formation of input material organization and breakdown scheduling building (10/1/24- 4/1/2025)
- Organize material input schedule to prevent material buildup at the dumping stage or pre-composting stage. (10/1/24 - 2/1/25)
- Create 6 – 8 bioreactors in dedicated space with needed infrastructure and design to ensure the material maintains conditions for the reaction process to occur. (10/1/24 - 9/30/29)
- Engage the public and schools in the process of increasing volunteer corps to maintain the reaction process and material reuse. (10/1/24 - 9/30/29)
- Utilize material within the greenhouse operations and other city park needs. (10/1/24 - 9/30/29)
- Create mechanisms to allow material created to be utilized in community gardens in support of the city's pollinator habitat goals. (10/1/24 - 9/30/29)

Long-term scaling plan (if applicable)

- Create large stockpiles of reusable compost to be used within city operations and ability to give the product away to improve neighborhood-level green infrastructure.
- Create various levels of material from compost to compost teas
- Maintain scheduling of input material drop points and timely material preparation for compositing.

Geographic Scope

City of Albuquerque Greenhouse for site operation

Metrics for Tracking Progress:
- Weight compost product produced
- Number of Bioreactors in operation
- Rolling schedule to bioreactor processing
- Increase operation outputs at program success increases

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Tractor	Material Movement	150K – 185K	168K
Wood Chipper	Material Breakdown	80K – 100K	80K
Bioreactor material	Material / Education Needs	185K – 200K	190K

Total Cost $438,000

Cost Effectiveness of GHG Reduction (for requested funds)

Initial estimate: $438,000/38.13MTCO2E = **$11,487/MTCO2E**

A more accurate cost can be calculated when a product is formed and used to increase the survivability and vitality of newly planted green infrastructure such as trees. Carbon capture and air quality improvement models can be run to determine GHG reduction and the cost per unit effort.

Reasonableness of Cost (optional for PCAP)

The improvement of a city's green infrastructure by increasing the soil biome health will have compounding returns to the indicial investment.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

Funding has been applied to small-scale feasibility studies into bioreactors to assess the viability of this working direction and the need to improve input material mechanisms to support this effort. Additional funding will be needed from a non-internal budget source to scale this effort.

What other funding sources have you secured for this same GHG measure (if any)?

None.

Demonstration of funding need: How are requested funds filling an existing funding gap?

Additional funding sources are needed to scale the operational realities of creating a composing production site that has the potential to improve the city's parks, open spaces, streetscapes, and neighborhood communities. Funding is needed to scale the level of input material available into a commercial-grade operation that will benefit the city as a whole.

Benefits, Primary:

GHG Emission Reductions[24]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Initial estimate: 38.13 metric tons of CO_2 equivalent. Further analysis is needed to refine this estimate.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Initial estimate: 165.21 metric tons of CO_2 equivalent. Further analysis is needed to refine this estimate.

Data source(s) and assumptions

EPA WARM, version 16.
Assumption/estimate: 5 short tons of green waste produced each month, which is reserved and then processed starting at the beginning of the grant.
5 tons x 12 months/year x 6 years = 360 tons = 38.13 metric tons of CO_2 equivalent
5 tons x 12 months/year x 26 years = 1,560 tons = 165.21 metric tons of CO_2 equivalent

Co-Benefits, Secondary:

Health Benefits

With the reuse of traditionally exposed green waste material to improve soil health the ecosystem services of trees and other plant material within green spaces will increase in overall net benefit. Access to green spaces has been shown to have a host of health benefits from mental to physiological. The production of shade trees provide as they grow over generations aids in the meditation of the "Urban Heat Island Effect". Heat waves are one of the deadliest types of natural disasters impacting urban areas. Improving the vitality of the health of urban green spaces will have both market and nonmarket health benefits to the urban populations.

Environmental Benefits

Improving the health and vitality of the soil found in urban green spaces will have a compounding return to the overall environmental health and benefits these spaces provide to each individual community, and the city overall. Improved soil health will not only benefit the growth realities of plant material but will also improve the soil's water holding capacity decreasing overall urban storm water runoff and sequestering natural water sources such as ran into the soil where it can be used by plant material.

Air Quality Benefits

Through proposed compost recuse in soil improvements monitoring will be conducted on soil health and the resulting improvements to plan health. Air quality models can be conducted to determine the net benefit trees provide as present and hypothetical increases due to tree health improvements and the increased duration of tree's growth life and environmental services. Projected and past air quality benefits can be assessed utilizing i-tree on CO, NO_2, O_3, PM2.5, PM10, SO_2, and carbon sequestration and storage.

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[24] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	**GHG (metric tons CO_2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
Improved Green Space Soil Health for Tree Plantings	123777	45	3	52	1.6	N/A

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
See Benefits section.

Water Quality/Quantity Benefits

Water holding capacity of treated vs non-treated soils with compost will be conducted to determine expected capacity increases due to improved soil health.

Land & Soil Benefits

Soil monitoring will be conducted between treated and untreated soil. Overall plant health observations will be conducted on plants from within a control plot to those plants within a soil-treated plot. If overall plant health is observed to have been improved during soil treatment increased ecosystem benefits can be deduced.

Ecological Benefits

Improved soil health within green infrastructure will help to improve urban wildlife habitat, green space connectivity within communities, reduce urban heat island impact, and improve air quality.

Economic Benefits

Economic Value of Environmental Benefits

This can be determined through plan health assessment post soil health improvements on metrics such as; CO2 Storage monetary benefit, Air Quality Monetary Benefit, and Stormwater Monetary benefit modeling.

Total Cost of Ownership

Can be assessed through plant and soil health surveying and modeling.

Workforce Needs & Quality of Jobs

The educational aspect of this program will hopefully lead to advanced education and career pursuits.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

Within LIDAC areas as determined by CEJST census blocks there are ~109 city parks, ~200 acres of medians, and 4000 acres of Open Space areas. The product of composting efforts and future expansion of the program has the potential to be implemented and improve the soil health of these city-owned and publicly accessible spaces.

Summary of past/ongoing community engagement

The City Greenhouse has extensive relationships with volunteer organizations and individuals who commit their time to improving the space and the benefits it provides. Future community engagement around compositing efforts hopes to expand to the community gardens with the help and partnership with the Open Space Divisions, within Parks and Recreations, that are currently operating in these areas.

Priority Climate Action Community Engagement: The following shows what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement). Green Waste Management had 52 responses:

- 33 selected high benefit
- 15 selected medium benefit
- 3 selected low benefit
- 1 selected no perceived benefit

Benefits to LIDACs

- Improved green space resilience
- Educational and outreach opportunities
- Community engagement and activation

Disbenefits to LIDACs

- No disbenefits expected from this measure.

Authority to Implement Measure:

Proposed areas of project implementation and areas of project benefits will focus on city-owned property either within the Parks and Recreation Department or the Solid Waste Department. The Parks and Recreation Department is authorized under the City of Albuquerque to process green waste for use on parks and open space properties.

CN1: COUNTY GREEN STORMWATER INFRASTRUCTURE

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

This project will install street trees and green stormwater infrastructure along residential roads impacted by flooding in the unincorporated area of the Albuquerque South Valley. The project will reduce greenhouse gas emissions and directly benefit a community that is low-income and disadvantaged by reducing flooding, improving stormwater quality, increasing shade and mitigating urban heat island effect, reducing air pollution, calming traffic and improving walkability, and improving physical and mental health outcomes. The project will be implemented in phases and will begin with a pilot project that installs trees and green stormwater infrastructure on approximately four residential streets.

Project/Program Alternate title

South Valley Street Tree & Green Stormwater Infrastructure Pilot Project
CN1: County Green Stormwater Infrastructure

Mechanism

The grant funding will be used for design, construction, and three years of maintenance of a pilot project that will install approximately 240 street trees and 40,000 square-feet of green stormwater infrastructure features along four residential streets in the Albuquerque South Valley. The funds will be expended in accordance with the procurement rules of the applicant and granting agency requirements.

List any potential risks for this mechanism

There is a potential risk of no one submitting bids or for the bids to come in at a cost higher than the available funding.

Transformative Impact (i.e., scalability/replicability)

Green stormwater infrastructure features planted with trees and vegetation reduce greenhouse gas emissions. The approximately 240 trees that will be installed in this pilot project will sequester an estimated 658 metric tons of greenhouse gas emissions over 25 years. This estimate excludes the carbon dioxide sequestered by understory shrubs, grasses, and perennials that will be planted in green stormwater infrastructure features. In addition, this project provides direct benefits to an overburdened and underserved community that experiences greater impacts from climate change. This pilot project is scalable and replicable. Bernalillo County intends to use the next phase of implementation funding from the Climate Pollution Reduction Grant Comprehensive Climate Action Plan to install street trees and green stormwater infrastructure in areas impacted by flooding throughout the South Valley, resulting in significantly expanded greenhouse gas emission reductions and co-benefits.

Key Implementing Agencies
Bernalillo County Natural Resource Services will manage the project.

Partners
Bernalillo County will partner with South Valley-based community-based organizations to implement the project.

Implementation Schedule & Milestones
Previously completed implementation? (if any)

Bernalillo County has completed a Geographic Information System (GIS) Analysis to assist in prioritizing project locations. This study uses data including flood risk, existing tree canopy, and sociodemographic, environmental, and health vulnerability criteria to identify preferred locations for the project. Additionally, the study quantifies the benefits associated with individual green stormwater infrastructure features throughout the study area, including the volume of stormwater treated, percent of irrigation budget met by stormwater runoff, greenhouse gas reductions, and air pollution reductions (i.e. ozone, nitrogen dioxide, sulfur dioxide, and particulate matter). Results are presented in an ArcGIS StoryMap at: www.bernco.gov/SouthValleyGSI.

Progress between March 1st and October 1st (if any)

Updates to the GIS Analysis with new information as it becomes available.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

South Valley Street Tree & Green Stormwater Infrastructure Projected Implementation Schedule	
Task	Timeframe
Community Engagement	October 1, 2024 – October 31, 2028
Green Stormwater Infrastructure Design	October 1, 2024 - June 30, 2025
Green Stormwater Infrastructure installation	September 1, 2025-October 31, 2025
Green Stormwater Infrastructure maintenance	November 1, 2025-October 31, 2028

Long-term scaling plan (if applicable)

Bernalillo County intends to apply for future implementation funds from the Climate Pollution Reduction Grant as part of the region's Comprehensive Climate Action Plan to significantly expand installation of street trees and green stormwater infrastructure in areas impacted by flooding in the South Valley, based on lessons learned from the pilot project.

Geographic Scope

The South Valley Street Tree & Green Stormwater Infrastructure Pilot Project will be located in the south and southwestern portions of unincorporated Bernalillo County, including neighborhoods located between Coors Blvd on the west and the Rio Grande on the east, Central Ave on the north and I25 on the south and the Mountain View neighborhood (bounded by the Rio Grande on the west and Broadway Blvd on the east, Rio Bravo Blvd on the north and I25 on the south).

Metrics for Tracking Progress:

The following metrics will be tracked for the project:

1. Project status in relation to the implementation schedule and milestones
2. Number of community engagement activities, number of people reached in community engagement activities
3. Number of trees and square footage of green stormwater infrastructure features installed
4. Number, type, and costs for maintenance activities
5. Tree and plant mortality in green stormwater infrastructure features

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
Community Engagement	Meetings with partners and community members to inform design and maintenance; neighborhood education on green stormwater infrastructure	$20,000-$40,000	$30,000
Design	Green stormwater infrastructure feature design	$150,000-$250,000	$210,000
Installation	Installation of green stormwater infrastructure features	$990,000-$1,300,000	$1,090,000
Maintenance	3 years of maintenance for green stormwater infrastructure features	$200,000-$220,000	$220,000

Total Cost:

Best Estimate: $1,550,000

Cost Effectiveness of GHG Reduction (for requested funds)

$1,550,000/131 MTCO2e = **$11,832/MTCO2E**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

A similar green stormwater infrastructure project in the Pueblo Alto/Mile Hi neighborhood of Albuquerque sought funding through the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) funding. However, these programs do not sufficiently emphasize the co-benefits that are associated with green stormwater infrastructure to establish a viable benefit cost ratio to qualify for funding. Similarly, this project also investigated funding options available through the U.S. Army Corps of Engineers (USACE) with the Continuing Authorities Program (CAP) and Eco-System Restoration funds. This project again did not qualify because these programs also require an extensive benefit-cost analysis that focuses primarily on large storm event benefits and/or large contiguous areas that have perennial or coastal flows.

What other funding sources have you secured for this same GHG measure (if any)?

$79,933 in Bernalillo County Environmental Gross Receipts tax funding for the GIS Study

Demonstration of funding need: How are requested funds filling an existing funding gap?

Climate Pollution Reduction Grant funds will provide full funding for the South Valley Street Tree and Green Stormwater Infrastructure Pilot Project, inclusive of community engagement, design, construction, and maintenance during plant establishment. See other possible funding section for details on how other sources are not sufficient for this measure.

Benefits, Primary:

GHG Emission Reductions[25]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

All species of trees sequester carbon at unique rates due to differences in plant physiology. The type and quantity of each tree species planted provides a range of cumulative GHG reductions values. The values presented within the tables of this proposal represent the median values for GHG reductions from nine suitable tree species, while the range of GHG reductions represents a planting scenario where the least productive species is planted exclusively and another scenario where the most productive species is planted exclusively.

[25] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Over the first five years of planting (the time period of 2026 to 2030), we estimate 131 metric tons (median value) of GHG emission reductions. Estimates range from 58 metric tons to 1,274 metric tons of GHG reductions.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Over the first 25 years of tree growth (the time period of 2026-2050), we estimate 658 metric tons (median value) of GHG emission reductions. Estimates range from 287 metric tons to 6,371 metric tons of GHG reductions.

Data source(s) and assumptions

Greenhouse gas reductions were calculated using values from the USDA Forest Service's i-Tree Planting Calculator tool, which provides peer-reviewed tree benefit estimations. Estimates were based on median values for the 9 arid-adapted trees available in the i-Tree tool that are listed on the Bernalillo County Green Stormwater Infrastructure Plant List. Estimates include both sequestered carbon and avoided carbon from reductions in energy use in adjacent buildings. Estimates only reflect trees and do not include the greenhouse gas reductions associated with shrubs, grasses, and perennials planted in green stormwater infrastructure features.

Co-Benefits, Secondary:

Health Benefits

Trees and plants in green stormwater infrastructure provide a wide range of human health benefits. Based on a 2020 paper published in the International Journal of Environmental Research and Public Health that reviewed 201 studies on the physical and mental impacts of urban trees, these impacts include the following: 1) Cooling by trees mitigates urban heat island effect and increases resilience to heat waves, 2) Trees intercept and remove air pollutants, 3) Trees reduce stress, depression, anxiety, cognitive decline, and chronic diseases including cardiovascular disease and cancer, 4) People live more active lifestyles when living in proximity to urban forests, 5) The presence of urban trees is associated with reductions in crime rates, 6) Residents in communities with more trees feel a greater sense of connectedness, belonging, and trust (Wolf et al, Urban trees and human health: a scoping review, 2020).

Environmental Benefits

Landscaped areas reduce urban heat by providing shade and cooling, and minimizing paved surfaces that absorb and re-emit heat from the sun. Trees used in green stormwater infrastructure features contribute to improved air quality, including the EPA criteria air pollutants ozone, nitrogen dioxide, sulfur dioxide, and particulate matter. Green stormwater infrastructure features capture and treat stormwater, improving stormwater quality and reducing pollutants that are transported to the Rio Grande. Supporting landscapes with harvested stormwater conserved potable water, preserving and extending the community's water supply. Green stormwater infrastructure replicates natural ecosystems and creates corridors of wildlife habitat in urban areas. The use of native plant species in green stormwater infrastructure supports local fauna and improves biodiversity.

Air Quality Benefits

Trees and vegetation remove pollutants from the air by absorbing gaseous pollutants and intercepting particulate matter. Although improvements to air quality resulting from urban forests in the U.S. are relatively low (less than one percent), they have an impact on human health (urban forests were estimated to prevent 850 incidences of human mortality and 670,000 incidents of acute respiratory symptoms in a single year) (Nowak et al, Tree and forest effects on air quality and human health in the United States, 2014). Trees also improve air quality by reducing air temperature, which alters pollution concentrations, and reducing energy consumption in buildings, which reduces air pollution from power generation. Estimated reductions for EPA criteria air pollutants associated with the project are provided in the table below. In addition to the pollutants represented in the table, the project will remove an estimated 0.003318 tons of ozone annually.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
County Green Stormwater Infrastructure	26.33	0.0082	0.0016	0.0073	0.0001	unknown

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	GHG (metric tons CO2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
BAU	NA	NA	NA	NA	NA	NA
PCAP	-131	-0.04	- 0.005	-0.037	-0.005	NA

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:

Air pollution reductions were calculated using values from the USDA Forest Service's i-Tree tool, which provides peer-reviewed tree benefit estimations. Estimates were based on median values for the 9 arid-adapted trees available in the i-Tree tool that are listed on the Bernalillo County Green Stormwater Infrastructure Plant List. Estimates exclude the air pollution reductions associated with the shrubs, grasses, and perennials planted in green stormwater infrastructure features.

Water Quality/Quantity Benefits

Direct benefits of green stormwater infrastructure include stormwater management and pollution reduction. Green stormwater infrastructure features enhance flood resilience by mimicking natural systems, slowing the flow of water during and after rainfall events (i.e., peak flow attenuation), reducing erosion, promoting infiltration, reducing stormwater discharges, and improving surface water quality by filtering and removing pollutants. Additionally, these features capture floatables, trash, and other debris, keeping them from being discharged into the Rio Grande. By adding landscaped areas that mimic natural conditions, green stormwater infrastructure promotes healthier waterways and improves stormwater quality.

A sustainable landscape design in an arid region like Bernalillo County needs to include green stormwater infrastructure. By harvesting rainwater and using native/drought-tolerant plants, green stormwater infrastructure features conserve potable water. Incorporating green stormwater infrastructure in landscaping can provide significant long-term water savings.

Land & Soil Benefits

Green stormwater infrastructure features help restore natural ecological function in urban and semi-urban areas by promoting increased capture and infiltration of stormwater, which increases flood resiliency and improves water quality. Additionally, green stormwater infrastructure features support native plants and have been shown to improve soil health, increase diversity in soil microbial communities, enhancing soil health over time (Buzzard et al, Green infrastructure influences soil health: Biological divergence one year after installation, 2021).

Ecological Benefits

See Environmental Benefits

Economic Benefit

Economic Value of Health Benefits

Green stormwater infrastructure has a positive effect on human health. Suppakittpaisarn et al 2017 conducted an extensive literature review of green stormwater infrastructure and health benefits, finding that as green infrastructure and tree density increase:

- crime rates decrease
- cortisol levels are optimized
- pregnancy and birth outcomes are improved
- cognitive development and performance is improved
- blood pressure is reduced
- mental health improves
- stress recovery improves
- attention spans are improved

i-Tree estimates the number of incidents avoided and the total dollar value of health factors related to four air pollutants: NO_2, SO_2, O_3, and $PM_{2.5}$. The estimates are based on health-care expenses (i.e., cost of illness), productivity losses associated with specific adverse health events, and the value of a statistical life in the case of mortality as derived from the U.S. EPA BenMAP model (Nowak et al. 2014, U.S. EPA 2012). The South Valley Street Tree and Green Stormwater Infrastructure Pilot Project will provide an estimated $2,100 of reduced health care expenses (median value). Estimates range between $1,418 and $36,000 in health benefits from improved air quality, depending on tree species planted.

Economic Value of Environmental Benefits

Based on iTree estimations, the South Valley Street Tree and Green Stormwater Infrastructure Pilot Project will result in the following over the first 25 years:

- Save residents $70,164 (median value) in electricity costs due to cooling provided by tree shading and evapotranspiration. Estimates range from $17,000 to $674,000 in electric savings.
- i-Tree Eco uses the U.S. national average dollar value of $0.008936/gallon to estimate the value of avoided runoff due to trees. The value is based on 16 research studies on costs of stormwater control and treatment (Nowak 2021).
    - This pilot project is estimated to provide $2,047 worth of ecosystem services for reducing stormwater quantity. Estimates range from $1,406 to $24,000.
- i-Tree Eco calculates the value of carbon storage and sequestration based on the social cost of carbon as reported by the Interagency Working Group on Social Cost of Carbon (2016). Social costs associated with a pollutant (e.g., CO2) refer to an estimate of total (global) economic damage attributable to an incremental increase in the level of that particular pollutant in a given year. The current CO2 value is estimated at $51.23 per tonne based on the estimated social costs of carbon for 2020 with a 3 percent discount rate to reflect 2018 dollars (Interagency Working Group 2016)
    - This pilot project is estimated to provide $19,000 (median value) worth of carbon dioxide sequestration. Estimates range between $13,000 and $210,000.

Total Cost of Ownership

As a progress metric for this pilot project, Bernalillo County will track the number, type, and costs for maintenance activities, which will inform the long-term, total cost of ownership of street-side trees and green stormwater infrastructure in Bernalillo County neighborhoods.

Workforce Needs & Quality of Jobs

Green stormwater infrastructure can promote economic growth and create construction and maintenance jobs. Design, installation, and the first three years of maintenance for this pilot project will be accomplished through contractors. Over the long-term, maintenance of the street trees and green stormwater infrastructure installed through this project will be accomplished by Bernalillo County staff. Bernalillo County, in partnership with other organizations such as the Arid Low Impact Development Coalition, has developed resources to train the local workforce in maintenance techniques for arid-adapted green stormwater infrastructure. These include the Middle Rio Grande Green Stormwater Infrastructure Maintenance

Manual and training videos and on-going in-person trainings on green stormwater infrastructure maintenance through the Albuquerque Bernalillo County Water Authority's WaterSmart Academy for landscape professionals.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

The South Valley Street Tree and Green Stormwater Infrastructure Pilot Project will be located in the Albuquerque South Valley. The majority of the South Valley is identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST): 35001002402, 35001002300, 35001004401, 35001004300, 35001004502, 35001004501, 35001004604, 35001004602, and 35001004001. Two tracts in the South Valley are not identified as disadvantaged in the CEJST: 35001004402 and 35001004603.

Summary of past/ongoing community engagement

Community engagement activities for CPRG Priority Climate Action Plan projects are summarized at: bernco.gov/SustainabilityProjectMeetings

Benefits to LIDACs

Low-income communities, people of color, and migrant communities typically have contributed the least to climate change, are the most vulnerable to climate hazards, and have the fewest resources to adapt to climate change (Anguelovski et al, Why green "climate gentrification" threatens poor and vulnerable populations, 2019). Street trees and green stormwater infrastructure have documented human health and community benefits and can mitigate impacts of climate change, helping to address inequities impacting underserved and overburdened communities. The South Valley Street Tree and Green Stormwater Infrastructure Project will be located in the Albuquerque South Valley, which is the largest LIDAC area in the jurisdictional area of Bernalillo County. To ensure equity in the selection of project sites, project locations will be informed by multiple criteria including mapping data on flooding, existing tree canopy, and vulnerable communities, and meaningful engagement and partnership with South Valley community members.

Disbenefits to LIDACs

Despite the potential of green infrastructure to improve the quality of life in underserved and overburdened communities, some studies have found that green stormwater infrastructure can lead to gentrification and exacerbate existing or create new socioeconomic inequities (Anguelovski et al, Equity impacts of urban land use planning for climate adaptation: Critical perspectives from the global North and South, 2016).

Authority to Implement Measure:

Bernalillo County is authorized under NMSA 1978 § 4-37-1 Counties: Powers, Ordinances; Bernalillo County Charter (Article XI); US EPA Watershed Based MS4 Permit NMR04A000, and the Bernalillo County Stormwater Quality Ordinance (Chapter 38, Article VI) to implement the South Valley Street Tree and Green Stormwater Infrastructure Pilot Project.

CN2: CITY GREEN STORMWATER INFRASTRUCTURE

Priority Climate Action Plan (PCAP) Appendix E

MEASURE DESCRIPTION:

The project involves installing a number of different Green Stormwater Infrastructure (GSI) solutions, including stormwater harvesting basins, bioswales, stormwater bump outs and underground infiltration basins throughout the neighborhood. These improvements will be placed in the roadway areas with the most frequent flooding. Implementation in Low Income and Disadvantaged Communities (LIDAC) census tracts will be prioritized. This project will reduce flooding, and increase stormwater infiltration, tree canopy and green space.

<u>Transportation Sector</u>: *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).*

The presence of the additional trees and landscaping within the bumpouts and other green infrastructure installations will add significant greenspace to each block, improving the overall aesthetic of the street and promote a sense of community and significantly encourage more pedestrian and bicycle use by transforming the urban landscape into a more accessible, safe, and pleasant space. Stormwater captured by these elements will augment irrigation of the vegetation.

Installation of stormwater bumpouts will also narrow the roadway in the project areas, which naturally encourages drivers to slow down as they approach and navigate these areas. This traffic calming effect is particularly beneficial in residential areas where high speeds can pose significant risks to pedestrians, including children and the elderly.

<u>Carbon Removal Measures</u>: *Urban afforestation and green infrastructure programs and projects.*

Installation of project elements will provide GHG reduction through direct carbon sequestration, energy savings from urban heat island mitigation, reduced demand for energy-intensive water management, promotion of sustainable transportation, soil carbon storage, lower lifecycle emissions, and enhanced ecosystem resilience.

Trees and other vegetation in bioswales and bumpouts act as natural carbon sinks, absorbing carbon dioxide (CO2) from the atmosphere during the process of photosynthesis. The carbon is stored in the biomass of trees (trunks, branches, leaves) and in the soil. Over time, as the green infrastructure matures, the capacity for carbon sequestration increases, making these installations increasingly valuable for GHG reduction.

Project/Program Alternate title:
Pueblo Alto & Mile Hi Green Stormwater Infrastructure (GSI) Project

Mechanism
Any funding received through this grant will be used to assist in the design and construction of the green stormwater infrastructure. The funds will be awarded through competitive public Requests for Proposals (RFP) and Invitations to Bid (ITB) following all applicable City and Granting Agency requirements.

List any potential risks for this mechanism

There is a potential risk of no one submitting bids or for the bids to come in at a cost higher than the available funding.

Transformative Impact (i.e., scalability/replicability)

The goal is to develop this concept as a fully scalable solution for not only the City of Albuquerque and Bernalillo County, but for any urban environment. The pilot project for the proposed green stormwater infrastructure is planned with scalability/replicability in mind.

The first phase of the project has been to establish a procedure for evaluating a given neighborhood for implementation of green stormwater infrastructure, including:

- Assessing the existing drain infrastructure and area hydrology.
- Evaluating the existing road network, traffic patterns and vehicular traffic.
- Completing community outreach and education.
- Identifying locations for project components.
- Completing subsurface testing to establish infiltration rates.

The second phase will be to complete implementation of the project.

- Determining available funding for scope of project area.
- Creating a landscape layout with maximal tree canopy coverage.
- Completing the design of the selected green stormwater infrastructure elements.
- Develop a tailored operation & maintenance plan for each specific area.
- Complete construction of designed green stormwater infrastructure.

The third and successive phases will be to replicate the process of the first two phases and expand the installation of the GSI elements throughout the City, focusing on suitable locations within LIDAC census tracts.

- Evaluate qualifying LIDAC census tracts.
- Identify potential project areas within LIDCA census tracts.
- Complete steps in Phase 1 (above).
- Complete steps in Phase 2 (above).

By using this phased approach, this concept can be replicated throughout the City in any suitable area. The timing of the implementation will be dependent on available funding. As shown in the initial investigations, this concept is highly adaptable and can provide climate resiliency to any part of the City or County that is currently developed, and has applicability throughout the arid southwest.

The proposed project can be especially effective for the benefit of existing low-income and disadvantaged census tracts that are fully developed. Typically, these census tracts have a higher density of development and less available green space. Further, these areas can have factors that disincentivize investment by the private sector, such as poor location and low property values, leading to a lower return on investment. The concepts proposed in this project are targeted specifically at fully developed areas and can be constructed in a minimally invasive manner with little to no right of way acquisition required.

Key Implementing Agencies

Storm Drainage Section/DMD; Bernalillo County

Partners

None.

Implementation Schedule & Milestones

Previously completed implementation? (if any)

The City of Albuquerque has completed several phases of this project, listed below:

1. The San Mateo to Moon Mini Drainage Management Plan was completed in November 2017.
2. The Pueblo Alto & Mile Hi Drainage Study was completed in May 2022.
3. The Design Analysis Report for Pueblo Alto / Mile Hi GSI Pilot Project Conceptual Design was completed in December 2023.

Progress between March 1st and October 1st (if any)

The City Storm Drainage Section is proceeding with full design of the proposed green infrastructure components. Between March 1st and October 1st, progress will be made on taking the design from 25% complete to 60% complete.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- 10/1/2024 – Begin public outreach to neighborhood residents regarding receipt of funding and project commencement. Continue public outreach throughout project.
- 10/2/24 – 2/15/25 – Develop Request for Proposals (RFP) for project design; Obtain funding agency approval; Advertise RFP.
- 2/16/25 – 6/1/25 – Review and award RFP to selected engineering design firm, including funding agency concurrence.
- 6/2/25 – 12/31/25 – Permitting Review and Approval. (NEPA, Wage Rates, etc.)
- 1/2/26 – 7/31/26 – Development final Plans & Specifications for Project improvements.
- 8/1/26 – 10/15/26 – Develop Invitation to Bid (IFB) for construction; Obtain funding agency approval; Advertise IFB
- 10/16/26 – 12/31/26 – Award project per NM Procurement Code.
- 1/2/27 – 2/28/27 – Contractor Obtains Bonds; Issue Notice to Proceed.
- 3/1/27 – 10/31/27 – Construction of Improvements.
- 9/1/27 - Start of GHG reduction
- 11/1/27 – 1/31/28 – Pilot Project Close Out.

Long-term scaling plan (if applicable)

The overall goal of the project is to expand this program and retrofit up to 75 additional acres of developed urban and rural areas annually from the end of the pilot project in 2027. This work will be supported and funded locally by the City of Albuquerque through the general obligation bond program and capital outlay funding through the New Mexico Legislature.

This program will result in an area benefited by green storm water infrastructure totalling 295 acres by 2030 and 1,795 acres by 2050.

Geographic Scope

The pilot project will be implemented in an area containing approximately 70 acres, specifically the area within the two city blocks bounded by Constitution St. to the north, Lomas Blvd. to the south, Washington Ave to the west and San Pedro St. to the east. Further phases of the project will be located throughout the City limits and will have varying locations based on:

- Presence of elevated flood risk and
- Presence of LIDAC census tract.

Metrics for Tracking Progress:

The project will use the following metrics for tracking progress:

1. Development of a full set of plans for construction of first phase
2. Construction of the proposed green stormwater infrastructure improvements
3. Number of trees planted.
4. Acres of land converted to permeable surface for infiltration.
5. Volume of stormwater diverted to the green stormwater infrastructure improvements.
6. Miles/Quantity of pedestrian transportation elements developed.
7. Miles of existing streets incorporating green stormwater infrastructure improvements

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
See Attached Cost Estimates	70 acres of watershed addressed	$2.5 – $3.4 Million	$3,000,000*

Total Cost

The range of the project is expected to be between $2,526,000.00 and $3,445,000.00. Please note that the project cost does not include the underground storage component included in the overall project cost estimate. Costs associated with the underground storage will be completed using available funding from the Storm Drainage Section capital fund budget.

*$3,000,000 is used as the best estimate for the time being.

Cost Effectiveness of GHG Reduction (for requested funds)

$3,000,000 /13.16 MTCO2e = **$227,964/MTCO2e**

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?

This project has utilized GO Bond funding and NM Capital Outlay funding for the existing study and design phases. Additional GO Bond Funds could be used to match any funds received from this project.

What other funding sources have you secured for this same GHG measure (if any)?

No other funding has been secured at this time.

Demonstration of funding need: How are requested funds filling an existing funding gap?

The City has aggressively sought other funding to support this project, including Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) funding. However, these programs do not emphasize the co-benefits that are associated with green stormwater infrastructure sufficiently to establish a viable Benefit Cost Ratio to qualify for funding.

Similarly, the City has investigated funding options available through the U.S. Army Corps of Engineers (USACE) with the Continuing Authorities Program (CAP) and Eco-System Restoration funds. These programs also require an extensive benefit-cost analysis that focuses primarily on large storm event benefits and/or large contiguous areas that have perennial or coastal flows in order to qualify for funding.

Benefits, Primary:

GHG Emission Reductions[26]

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Based on calculations detailed below, the cumulative GHG Emission Reduction through 2030 is 13.16 Metric Tons CO2. This was based on the benefits beginning after the trees were planted with a start date of 2028, along with additional phases completed annually consisting of adding 75 trees each year.

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Based on calculations detailed below, the cumulative GHG Emission Reduction through 2050 is 1,054.1 Metric Tons CO2.This was based on the benefits beginning after the trees were planted with a start date of 2028, along with additional phases completed annually consisting of adding 75 trees each year.

Data source(s) and assumptions

Benefits provided through the use of the i-Tree Tool. See assumptions below in "Data source(s) and assumptions".

[26] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

Co-Benefits, Secondary:

Health Benefits

Exposure to green spaces has been consistently linked with improvements in mental health. Natural environments can reduce stress, enhance mood, and improve overall psychological well-being. The presence of vegetated bumpouts and bioswales with trees can create small pockets of nature that offer residents a mental respite from the urban environment, contributing to lower levels of stress and anxiety.

By making streets more attractive and safer, green infrastructure can encourage residents to engage in more physical activities, such as walking, jogging, or cycling. Increased physical activity is associated with numerous health benefits, including reduced risk of obesity, cardiovascular disease, diabetes, and some forms of cancer.

Green spaces can serve as gathering points that foster social interactions and community cohesion. Strong social ties and community engagement have been linked to improved mental health outcomes and overall well-being. Vegetated areas within residential neighborhoods can become informal social spaces that encourage interactions among residents, contributing to a sense of belonging and community support.

Vegetation and trees can act as natural sound barriers, absorbing and deflecting noise pollution from traffic and other urban sources. Reduced noise levels can contribute to a more peaceful environment, which is beneficial for mental health and can improve the quality of sleep for residents.

Environmental Benefits

Air Quality Benefits

Trees and vegetation play a crucial role in filtering pollutants from the air, including particulate matter, nitrogen dioxide, and other harmful substances. By absorbing these pollutants, vegetated bumpouts and bioswales can contribute to cleaner air in residential areas, reducing the risk of respiratory conditions such as asthma, bronchitis, and other lung diseases.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
GSI w/Canopy	1.84*	<0.01*	<0.01*	<0.01*	<0.01*	UNK*

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants; UNK = unknown.

***First year of planting.**

Future-Year 2030 Co-Pollutant Emissions under Business as Usual (BAU) and PCAP Scenarios

Scenario	**GHG (metric tons CO2 equiv.)**	**NOx (US tons)**	**$PM_{2.5}$ (US tons)**	**SO_2 (US tons)**	**VOC (US tons)**	**HAP (lbs)**
PCAP	-13.16	-<0.1	-<0.1	-<0.1	-<0.1	-UNK

BAU = business as usual; PCAP = Priority Climate Action Plan; GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants; UNK = unknown.

Data source(s) and assumptions:
The implementation of the pilot project elements varies from block to block in residential and commercial areas. The GHG reduction is based on an average of one tree for every 85 linear feet of road frontage. Each side of the street counts as separate frontage for this assumption, e.g., a segment of street that is 255 feet long will be counted as 510 linear feet if green stormwater infrastructure is installed on both sides of the street segment. Based on the plan sheets of the preliminary design, the total linear feet is approximately 5,160 ft., which is equivalent to 60 trees.

A typical city block encompasses an area of approximately 150 acres with 57,800 linear feet of eligible road front length. Full implementation within a city block will be limited to 50% of the available frontage to address limitations and constraints on availability. Based on these assumptions, full build out of a typical city block would involve 28,900 linear feet, which is equivalent to 340 trees.

The first year calculations are based on the first year of tree growth assuming a 2 inch diameter trunk. Each successive year, an additional 340 trees will be added and the older trees will increase in trunk diameter by 0.5 inches annually. These adjustments are included in the cumulative totals.

Water Quality/Quantity Benefits

By filtering stormwater runoff, vegetated bumpouts and bioswales can reduce the amount of pollutants that reach local water bodies. Cleaner water bodies contribute to a healthier environment and can provide recreational opportunities for residents, further supporting physical and mental health.

By increasing the amount of pervious surface, the infiltrative capacity of each area will increase, returning more water to the underlying aquifers and increasing the amount of water reserved for later withdrawal from the aquifer.

Land & Soil Benefits

The City of Albuquerque relies heavily on groundwater for it’s potable water supply. The city is located in part of the Rio Grande rift, which is a north-south oriented continental rift zone extending from Colorado through New Mexico. The rift has created a classic basin and range topography, with narrow, elongated mountain ranges separated by a broad, flat basin that the Rio Grande flows through, from north to south. The Rio Grande is the central hydrological feature of the valley, providing water for irrigation, municipal use, and ecosystem support. The Middle Rio Grande Valley hosts a significant aquifer system which serves as the City's primary water supply. This aquifer is a vital water source for Albuquerque and the surrounding region. There is a dynamic interaction between the surface water of the Rio Grande and the groundwater of the surrounding aquifer systems. This interaction is influenced by irrigation, urban development, water management practices and more recently, by climate change. All of these factors have resulted in water being withdrawn from the aquifer at a faster rate that it is replenished.

A recent study by the U.S. Geologic Survey (USGS), titled, "Land Subsidence and Recovery in the Albuquerque Basin, New Mexico, 1993–2014", identified and quantified not only the drop in the aquifer levels but also showed significant land subsidence as a result of the impacts of the imbalance between groundwater pumping and aquifer recharge. A subsequent report, issued by the New Mexico Water Policy and Infrastructure Task Force in December of 2022, "Facing New Mexico's 21st Century Water Challenges", further quantifies the reduction in water resources within the Middle Rio Grande valley.
Although the City has obtained surface water rights to help offset this imbalance, the broad development of the City and increase in impervious surface has significantly reduced the area that historically recharged the aquifers beneath the Middle Rio Grande Valley. Specifically referenced in the 2022 Report,

> *[T]he climate will continue to warm over the next 50 years without a likely increase in*
> *precipitation, leading to greater statewide aridity. Hydrological modeling indicates declines in*
> *both runoff and recharge going forward, amounting to 3 to 5% per decade for both quantities.*
> *Historical trends in runoff indicate significant year-to-year variability, as do trends in soil*
> *moisture and recharge. But all are generally decreasing, consistent with the results of climate*
> *models that project a drying climate. Combining the historical trends with modeling of future*
> *changes, significant decreases in runoff and recharge seem very likely.*

This decline in runoff and recharge negatively impacts the surface soil moisture, which is critical to the agricultural community, increases the potential for surface subsidence, which can have a devastating economic impact on any structure affected by the subsidence and reduces the recharge of the Rio Grande, which supplies water to downstream communities and agriculture through the Rio Grande Valley.

By completing green storm water infrastructure improvements throughout the developed areas of the City and County, additional permeable areas will be established which will help increase infiltration to support recharge of the local surface aquifers. This will increase the amount of water available as a water supply and for local agriculture.

Ecological Benefits

Biodiversity and Connection to Nature: Green infrastructure supports urban biodiversity by providing habitats for birds, insects, and other wildlife. Exposure to biodiversity and the opportunity to interact with nature can have positive effects on mental health and provide educational opportunities for residents, fostering a deeper connection with the natural environment.

Reduced Heat Island Effect: Urban areas often suffer from higher temperatures due to the heat island effect, where concrete, asphalt, and buildings absorb and re-radiate heat more than natural landscapes. Vegetated areas help cool the surroundings by providing shade and through the process of evapotranspiration. Cooler temperatures can make outdoor activities more pleasant and reduce the risk of heat-related illnesses, particularly among vulnerable populations such as the elderly and children.

Economic Benefits

Economic Value of Health Benefits

Overall, greener environments are linked to improved health outcomes. Factors may include more opportunities for physical activity (and reduced risk of cardiovascular disease), the stress-relieving benefits of nature, and the facilitation of social contact. Green stormwater infrastructure can also be designed to combat climate-related conditions that are known to create negative health impacts, such as air pollution, extreme heat, and noise.

GSI strategies that incorporate vegetation directly improve outdoor air quality by absorbing pollutants into the plants. The health impacts of air pollution are significant. Particulate matter is ranked first among nine environmental risk factors with the highest health impact, (Hanninen, et al. (2014) Environmental Burden of Disease in Europe: Assessing Nine Risk Factors in Six Countries).

Extreme heat is the leading cause of weather-related deaths in the U.S. Extreme heat exposure is associated with heatstroke, hyperthermia, and other illnesses, and can worsen chronic conditions such as cardiovascular disease and respiratory disease. Heat waves are associated with increased hospital admissions for cardiovascular, kidney, and respiratory disorders. (USGCRP (2016) The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment, U.S. Global Change Research Program).

GSI strategies with vegetation lessen urban heat island impacts (see Climate Resilience guide), by providing direct shade and cooling the air through evapotranspiration. Shaded surfaces can be 20 to 45°F cooler than unshaded surfaces during peak summer temperatures. Evaporation can reduce peak temperatures by 2 to 9°F. (U.S. EPA (n.d.). Using Trees and Vegetation to Reduce Heat Islands.)

Economic Value of Environmental Benefits

Green stormwater infrastructure can effectively absorb and filter stormwater, reducing the burden on the existing storm sewer systems and mitigating the risk of flooding. This can translate into significant savings on flood damage repair costs and reduce the need for expensive infrastructure upgrades.

Vegetation used in green stormwater infrastructure contributes to urban cooling, reducing the urban heat island effect and lowering energy costs associated with air conditioning.

Rain gardens, swales and planters are quintessential applications of distributed GSI that are typically vegetated and allow stormwater to infiltrate into the ground. Their stormwater control impacts are well documented, but they also provide aesthetic appeal and other benefits that impact property values.
In Seattle and Philadelphia, it was determined that a 100% increase in square footage of rain gardens, swales or planters within 250 feet of a home is associated with a 0.38% to 0.69% higher residential sale price. (Green Stormwater Infrastructure Impact on Property Values, Center for Neighborhood Technology (CNT) and SB Friedman Development Advisors (SB Friedman), 2021.)

Total Cost of Ownership

The exact cost of ownership is unknown at this time, and will change as more GSI elements are added. However, this project will reduce the amount of asphalt paving in any area where it is installed. Maintenance costs associated with vegetated areas, such as the stormwater bumpouts and bioswales incorporated into this project, are traditionally lower than the cyclic maintenance costs associated with replacing asphalt paving.

Further, the ancillary benefits associated with GSI, such as recharging of the aquifer, will create future water supply cost savings by reducing the cost of pumping.

Workforce Needs & Quality of Jobs

This project will develop community infrastructure that requires a different set of skills from traditional gray infrastructure. From design through maintenance, this project and successive projects to install new GSI improvements will spur job creation within traditional industries such as tree care, landscape design, landscaping and groundskeeping, and construction.

GSI projects present opportunities to facilitate green jobs training programs to train a workforce to install, maintain and operate GSI. GSI projects require many trades, from landscapers to heavy equipment operators, which can accommodate individuals with a wide range of educational attainment, work histories, and language skills. These projects provide a “missing middle” that is disappearing – higher wage than retail, but not requiring a college degree. The demand for “green job” skills continues to rise, spurring economic development, and supporting workforce development. The U.S. Bureau of Labor Statistics projects “green” jobs to have the most rapid employment growth from 2016 to 2026. (*U.S. Department of Labor. (2018). Bureau of Labor Statistics*), (Green Values Strategy Guide, 2020, Center for Neighborhood Technology)

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

This measure will not be directly located in any tracts identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST). However, the project site is adjacent to the following disadvantaged census tracts: 35001000501 and 35001000604.

Further, this project is a pilot project that has applicability throughout the City and will be able to serve a significant number of disadvantaged census tracts when it is expanded to full implementation.

Summary of past/ongoing community engagement

The City of Albuquerque conducted an extensive community engagement process for the proposed project. Various studies conducted by the City and AMAFCA in 2016, determined that the San Mateo Boulevard and San Pedro Drive storm drains, which collect water flowing through the Pueblo Alto and Mile Hi neighborhoods, were under capacity during large storm events. In 2018, nearby Twin Parks was identified as a potential multi-use facility to alleviate neighborhood flooding. However, due to significant neighborhood opposition, the project was put on hold. The community engagement process was implemented to find localized solutions to the drainage issues through on-going collaboration with surrounding neighborhoods. The project is a unique collaboration between City Council District 7 Councilor and staff, City of Albuquerque Department of Municipal Development hydrologists, BHI planners and engineers, Groundwork Studio landscape architects and planners, the ARID LID Coalition, Pueblo Alto Neighborhood Association, Mile Hi Neighborhood Association and local residents. The Pueblo Alto and Mile Hi neighborhood engagement process involved the creation of an outreach committee, neighborhood walking tours and hybrid community meetings. The project team sought neighborhood input regarding flooding locations, desired interventions and prioritization of green stormwater infrastructure co-benefits. The outreach committee created a bridge between the neighborhood associations, the City and the contractors in order to inform outreach processes. The project sought to reach neighborhood residents through multiple avenues including:

- Outreach Committee meetings
- Project website
- Neighborhood Walking Tours 1 and 2
- Community meetings 1 and 2 (virtual and in-person)
- On-line survey

The outreach committee was formed in order to ensure transparency in the project process as well as provide a clear line of communication between the neighborhoods and the project team. The committee met five times, from November 2021 to March 2022, in order to set timelines, assist with disseminating information and offer feedback on outreach methods. Representation on the Outreach Committee included:

- Pueblo Alto Neighborhood Association

• Mile Hi Neighborhood Association
• Neighbors with flooding issues
• City of Albuquerque
- City Council Services
- Dept. of Municipal Development, Engineering
- Councilor Gibson's Office
- Councilor Fiebelkorn's Office
• Arid LID Coalition

The “Pueblo Alto & Mile Hi Drainage Study Report,” which contains further details on the community engagement process and results was provided to the EPA along with the submission of this document.

Benefits to LIDACs
Low-income and disadvantaged census tracts often face a range of development deficiencies that can be significantly alleviated through the implementation of green stormwater infrastructure (GSI) and increased tree canopy. These deficiencies typically include:

Poor Drainage and Increased Flood Risk: Many low-income areas in the City suffer from inadequate drainage systems and are more susceptible to flooding due to less investment in infrastructure and denser, more economical development, resulting in more impervious surface. GSI, such as rain gardens, permeable pavements, and bioswales, can help manage stormwater at its source, reducing runoff and mitigating flood risks.

Limited Access to Green Spaces: Urban low-income areas often lack green spaces, which are crucial for recreation, community cohesion, and mental health. GSI projects can introduce or enhance green spaces, providing social and recreational benefits to the community.

Urban Heat Island Effect: Areas with dense infrastructure and low tree coverage can experience significantly higher temperatures than surrounding regions, a phenomenon known as the urban heat island effect. This can lead to increased energy costs, heat-related illnesses, and lower quality of life. Increasing tree canopy and green spaces through GSI can help cool these areas, reducing the urban heat island effect.

Poor Air and Water Quality: Low-income areas often face higher levels of pollution, which can lead to adverse health outcomes. GSI and increased tree canopy can improve air and water quality by filtering pollutants, thus contributing to better public health.

Limited Wildlife Habitat: The lack of green spaces and natural landscapes in disadvantaged areas can lead to a decrease in biodiversity. Implementing GSI can create habitats for various species, promoting biodiversity and ecological benefits.

Erosion and Soil Degradation: Without adequate vegetation cover and natural landscapes, areas can be prone to soil erosion and degradation. GSI practices can help stabilize soil and reduce erosion through the use of native plants and natural landscapes.

Social and Economic Inequities: Disadvantaged communities often face systemic barriers to economic and social opportunities. Green infrastructure projects can provide local employment opportunities and improve the aesthetic and economic value of neighborhoods, contributing to social equity and community resilience.

Disbenefits to LIDACs

No anticipated disbenefits.

Authority to Implement Measure:

The Storm Drainage Section of the Dept. of Municipal Development of the City of Albuquerque is authorized under Chapter 14: Zoning, Planning and Building, Article 5: Flood Hazard and Drainage Control, Part 2: Drainage Control to construct, operate and maintain flood mitigation projects within the City limits. This project involves the construction of green stormwater improvements intended to address flooding in the Pueblo Alto and Mile Hi neighborhoods

CN3: TREE PLANTINGS & INVENTORY

Priority Climate Action Plan (PCAP) Appendix E

Measure Description:

All city parks, part of public golf courses, and bio park areas have acquired electric-based tree inventory data. Increasing this data within public-owned properties such as street medians and other city-owned facilities is critical to informing data-driven urban tree canopy expansion and stewardship. This data can also be used to model air quality improvements, stormwater uptake, and carbon capture and sequestering. Trees inventoried around buildings can be used to run energy-saving tree models provided by shading permanent structures. Funding to increase this data set will also contribute to the expansion of possible tree planting locations that ensure the right tree is planted in the best locations.

Project/Program Alternate titles

Increase Tree Plantings and Inventory
CN3: Tree Plantings Inventory

Mechanism

Funding will be utilized to contract tree inventorying survey work to professional arborists to input data. Funding will also be utilized to continue the support of volunteer groups who have participated in tree inventory and the identification of potential future tree planting locations.

List any potential risks for this mechanism

None

Transformative Impact (i.e., scalability/replicability)

Increasing the tree inventory data set allows for the analysis of present trees and their functions as carbon sinks. Ecosystem services or benefits can be calculated and modeled from tree inventory data. High-level data such as tree species, size, locations, and general present health conditions can be used to determine the past and present levels of carbon reduction, sequestration, and other air quality improvements urban trees provide as well as assist in informing future management needs of the urban forest.

The ability to evaluate the carbon sink function of each tree, an entire park, a stretch of street median, a neighborhood, or sections of the city's riparian forest is a critical need. As more data is available on the carbon sources and air quality levels around the city an understanding of the carbon sink potential of a community and its canopy needs will have compounding beneficial impacts. Understanding the balance between carbon sources and sinks at a high-resolution level within a city will help present and future generations work towards increasing the sink elements by improving, increasing, and stewarding the municipal green infrastructure.

Key Implementing Agencies
Parks and Recreations Departments
Solid Waste Department
Art and Culture Department
Family and Community Department

Partners
City of Albuquerque Police Department
City of Albuquerque Fire Department

Implementation Schedule & Milestones

Previously completed implementation? (if any)

All ~23,000 trees within the city's 300+ parks property have been surveyed. ~5,000 trees within public golf courses have been surveyed. ~1,000 within the city Zoo / Bio Park have been surveyed. ~200 trees within street medians have been surveyed. ~6,000 trees and potential plantable spaces have been volunteer surveyed in the city's downtown area.

Progress between March 1st and October 1st (if any)

New trees and new tree planting locations are conducted by Urban Forestry and other staff when time availability permits. This passive surveying yields about 100 points per month and is expected to continue.

Implementation Schedule and Milestones Oct. 1 2024 to Sept. 30, 2029

- Street Tree / Medians Inventory, Estimated 25,000 trees, 10/1/2024 – 6/30/2024
- Public Golf Courses, Estimated 2,000 trees, 10/1/204 – 6/30/2024
- Zoo / Bio Park, Unknown trees, 10/1/2024 – 10/1/2026
- Other City Properties, Unknown trees, 10/1/2024 – 10/1/2026
- Riparian Forest (bosque), Unknown but considerable number of trees, 10/1/2024 – 9/30/2029

Surveying is ideally conducted within growth months (Spring – Early Fall) to best assess tree health

Long-term scaling plan (if applicable)

Upon completion of tree inventory within all city properties continued surveying efforts within neighborhoods and the bosque are likely to continue based on expected community involvement over the years of communicated tree data and the sheer number of trees located with the bosque. The creation and education of local students and volunteers to become arborists is planned to continue surveying efforts at a revolving rate.

Geographic Scope
City Operated Facilities:
- Street Medians
- Zoo / Bio Park
- Public Parks
- Public Golf Courses
- Riparian bosque Forest

- Community Centers
- Public Libraries
- Fire Stations
- Police Stations
- Public Schools (As approved)

Other Locations

- Neighborhoods
- Commercial spaces (shopping centers, large buildings)

Metrics for Tracking Progress:

All data will be inputted into the "Let's Plant Albuquerque" TreePlotter data set. This data is publicly accessible and highly interactive with extensive data filter capabilities for resource managers.

Cost Estimates for Implementation:

Unit Cost

Item	Description	Range	Best Estimate
City Operated Facilities	~ 50,000 Trees	$4.00 - $8.00 / tree	$250,000
Bosque	~800,000 Trees	$4.00 - $8.00 / tree	$4,000,000
Other Locations	~100,000	$4.00 - $8.00 / tree	$500,000

Total Cost $4,750,000

Cost Effectiveness of GHG Reduction (for requested funds)

TreePlotter provides ecosystem benefits per tree inputted. These services are calculated using i-tree and provide values for pounds of carbon stored/sequestered, air quality benefits by pollution removal, and expected stormwater runoff avoided and intercepted. Further analysis can be conducted with this data evaluating the reduction and cost of other GHGs. The effectiveness of reduction of GHG analysis can be conducted on all future potential planting sites identified during the survey process.

$4,750,000/56,144.31 =**$84.6**/MTCO2E

Reasonableness of Cost (optional for PCAP)

The cost per tree to survey can be depended on the level of data requested. However, the average of $5.00 per tree and the ability to use this data not only for GHG reduction calculations but also for resource management, community engagement and involvement, and extensive record keeping for future generation management success leave additional returns to the upfront cost of surveying.

Intersection with Other Funding Availability:

What other possible funding sources exist for your project (grants, tax incentives, etc.)?
Other Urban Forestry Grant-centric grants exist for this type of work but a diversity of funding and need is required to maintain surveying efforts across the various types of properties urban trees are located on.

What other funding sources have you secured for this same GHG measure (if any)?
The Parks and Recreation Department has received funding through the Inflation Reduction Act to conduct some of this surveying work.

Demonstration of funding need: How are requested funds filling an existing funding gap?
Operating budgets tend to fulfill the operational needs of resource management such as equipment and maintenance, staff training, tree purchase, and facility repairs. Acquired grant funding will help fund data acquisition and analysis.

Benefits, Primary:

GHG Emission Reductions[27]

- Carbon Storage and Sequestration
- Input needed to increase the Carbon Sink characteristics of urban green infrastructure.
- O2 air quality improvements

Estimate of the Cumulative GHG Emission Reductions (2025 – 2030)

Additional modeling analysis of an assumed planting of 50,000 tree produced the following GHG reduction outcomes:

- Avoided CO2: 95,064,075.98 lbs (43,120.34 metric tons)
- Sequestered CO2: 28,712,948.42 lbs (13,023.97 metric tons)
- Removed O3 (lbs): 85,962.74
- Avoided NO2 (lbs) 35,184.48
- Removed NO2 (lbs): 10,139.32
- Avoided SO2 (lbs): 50,785.25
- Removed SO2 (lbs): 1,712.50
- Avoided VOC (lbs): 1,626.50
- Avoided PM2.5 (lbs): 721.26
- Removed PM2.5(lbs) 2,428.42

Initial total CO2 reduction in metric tons = 43,120.34+13,023.97 = 56,144.31

Estimate of the Cumulative GHG Emission Reductions (2025 – 2050)

Additional modeling analysis of an assumed planting of 100,000 tree produced the following GHG reduction outcomes:

- Avoided CO2: 190,128,151.95 lbs (86,240.68 metric tons)
- Sequestered CO2: 57,425,896.42 lbs (26,047.95 metric tons)
- Removed O3 (lbs): 171,925.47
- Avoided NO2 (lbs) 70,368.96

[27] GHG = greenhouse gas, which includes carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals such as refrigerants.

- Removed NO2 (lbs): 20,278.64
- Avoided SO2 (lbs): 101,570.51
- Removed SO2 (lbs): 3,424.99
- Avoided VOC (lbs): 3,253.01
- Avoided PM2.5 (lbs): 1,442.52
- Removed PM2.5(lbs) 4,856.84

Initial total CO2 reduction in metric tons = 86,240.68+26,047.95 = 112,288.63

Data source(s) and assumptions

- Tree Inventory data inputted into CABQ TreePlotter Data repository
- Data analysis conducted utilizing i-tree Planting US Forest Service tool: Report

Co-Benefits, Secondary:

Health Benefits

Access to green spaces has been shown to have a host of health benefits from mental the physiological. The production of shade trees provide as they grow over generations aids in the meditation of the “Urban Heat Island Effect”. Heat waves are one of the deadliest types of natural disasters impacting urban areas. Improving the vitality the health of urban green spaces will have both market and none market health benefits to the urban populations.

Environmental Benefits

Increasing data and understanding to better manage urban green spaces will have a compounding return to the overall environmental health and benefits these spaces provide to each individual community, and the city overall. Improving the ability to see and better manage the urban tree canopy will provide a host of ecosystem service and benefits for present and future generations.

Air Quality Benefits

Air quality models can be conducted to determine the net benefit trees provide as present and hypothetical increases due to tree health improvements and the increased duration of tree's growth life and environmental services. Projected and past air quality benefits can be assessed utilizing i-tree on CO, NO2, O3, PM2.5, PM10, SO2, and carbon sequestration and storage.

Annual reduction anticipated from Implementation Mechanism:

Priority Measure	GHG (metric tons CO_2 equiv.)	NOx (US tons)	$PM_{2.5}$ (US tons)	SO_2 (US tons)	VOC (US tons)	HAP (lbs)
Increased Urban Tree Plantings	123,777	45	3	52	1.6	N/A

GHG = greenhouse gases; CO_2 = carbon dioxide; equiv. = equivalent; NOx = nitric oxide (NO) and nitrogen dioxide (NO2); $PM_{2.5}$ = fine inhalable particles, with diameters generally 2.5 micrometers and smaller; SO_2=sulfur dioxide; VOC=volatile organic compounds; HAP=Hazardous Air Pollutants.

Data source(s) and assumptions:
See Benefits section.

Water Quality/Quantity Benefits

Urban trees slow and intercept stormwater runoff. Avoided runoff to lower watershed water sources can improve the Rio Grande's overall health and quality.

Land & Soil Benefits

Increasing the number of well-planted and cared-for trees improves land and soil health wile increasing the public usability of this space.

Ecological Benefits

Increasing the knowledge of urban tree locations and health while striving to increase the urban canopy will improve urban wildlife habitat, and green space connectivity within communities, reduce urban heat island impact, and improve air quality.

Economic Benefits

Economic Value of Health Benefits

Difficult to determine but can be modeled with additional tree survey data.

Economic Value of Environmental Benefits

This can be determined through tree health with metrics such as; CO2 Storage monetary benefit, Air Quality Monetary Benefit, and Stormwater Monetary benefit modeling.

Total Cost of Ownership

Can be assessed through TreePlotter system.

Workforce Needs & Quality of Jobs

The educational aspect of this program will hopefully lead to advanced education and career pursuits.

Impacts on Low-Income / Disadvantaged Communities (LIDAC):

Impacted LIDAC tracts

Within LIDAC areas as determined by CEJST census blocks there are ~109 city parks, ~200 acres of medians, 4000 acres of Open Space areas, and 69 public schools. Increasing the data understanding of these areas while striving to increase newly planted trees to expand the urban canopy in these areas increased with more data knowledge of the problems and realities.

The list for Albuquerque and Bernalillo County (i.e., the Albuquerque metro area ...NOT the MSA) is here: 35001000129, 35001000203, 35001000205, 35001000208, 35001000501, 35001000603, 35001000604, 35001000708, 35001000712, 35001000713, 35001000901, 35001000903, 35001000904, 35001001102, 35001001200,35001001300, 35001001400, 35001001500, 35001002000, 35001002100, 35001002300, 35001002401, 35001002402, 35001002500, 35001002700, 35001003201, 35001003202, 35001003400, 35001003501, 35001003714, 35001003733, 35001003736, 35001004001, 35001004300, 35001004401, 35001004501, 35001004502, 35001004604, 35001004712, 35001004713, 35001004715, 35001004733, 35001004734, 35001004735, 35001004736, 35001004737, 35001004738, 35001004739, 35001004741, and 35001004749.

Summary of past/ongoing community engagement

Mayor Tim Keller Let's Plant ABQ initiative encourages the public to help increase the city's urban tree canopy by planting trees in and around privately-owned communities. A website has been launched with marketing efforts to connect citizens with relevant tree information from various partnering non-profits and other government organizations working to improve the urban canopy. The city's present tree inventory data is accessible through this campaign and website.

Priority Climate Action Community Engagement: The following shows what community members thought about the benefit of the projects on LIDAC communities (across both in-person and digital community engagement). Green Waste Management had 51 responses:

- 35 selected high benefit
- 14 selected medium benefit
- 2 selected low benefit
- 0 selected no perceived benefit

Benefits to LIDACs

- Increase urban tree canopy within communities to help mitigate the Urban Heat Island of these areas
- Improved green space resilience
- Educational and outreach opportunities
- Community engagement and activation

Disbenefits to LIDACs

- Proper community engagement must be conducted before tree planting occur within communities. Municipal tree plantings within low tree canopy neighborhood without community engagement and communication have face low tree survivability as the community was not engaged with the planting event and stewardship of the tree planted in the community. Essentially planting trees without engaging and involving the community itself can lead to added tensions between the community and the government entity

Authority to Implement Measure:

Proposed areas of project implementation and areas of project benefits will focus on city-owned property either within the Parks and Recreation Department or the Solid Waste Department. The City of Albuquerque is authorized to care for the urban tree canopy, including tree plantings on City properties.

PRIORITY CLIMATE ACTION PLAN

sustainability@cabq.gov

www.cabq.gov/sustainability