

## **Introduction**

The City of Sedona is submitting a grant proposal to advance climate goals in our community. This proposal highlights the background of Sedona, illustrates who Sedona is as a community today, and the current plans and projects that are being conducted to combat climate change. The last two sections of the grant proposal are the proposed projects that need funding. The first proposed project pertains to the established Home Energy Retrofit Project and the need to expand the current efforts to help more residents have energy efficient homes. Tangentially tied to that project, the funds would help residents that have either gone through the retrofit project, or the Northern Arizona Solar Co-op, to have access to a solar-plus-battery rebate program. The second project proposal involves electrifying the city's fleet and expanding electric vehicle charging station infrastructure. These project proposals align with measures 1, 3, and 8 of the Clean Arizona Priority Climate Action Plan (PCAP).

## **Sedona Background Narrative**

Sedona is a rural northern Arizona city known for its unique natural environment of towering red rock formations and mountainous landscapes. The Oak Creek is a perennial creek that runs through the center of the city providing natural riparian habitat for wildlife and a source of water for the community throughout the Oak Creek Watershed. Within the city there is a mix of businesses, residential spaces, schools, and public spaces that offer the community and visitors a unique place to live and visit. Sedona's natural environment attracts millions of visitors from around the world to explore the many trail systems and natural spaces throughout the city and the surrounding areas. The City of Sedona has a population of 9,790 residents and an estimated 20,548 people visit each day, increasing Sedona's active population to over 30,000 people each day ([US Census, 2022](#)).

Historically, Sedona's distinct landscape and natural resources have attracted people to the area for thousands of years. Native American tribes, such as the Sinagua, Yavapai, and Apache, were the predominant tribes that once thrived in the Sedona region. These tribes and others, such as the Hopi and Navajo tribes, had ties to Sedona and continue to have a sacred connection to Sedona today. ([Justo, 2023](#)). The diverse cultures of these tribes can be found in preserved areas nearby and are expressed in artwork throughout the city. Many people today visit Sedona for a similar spiritual connection that the Native Americans found long ago. In the late 1800s, Anglo settlers began inhabiting areas along the Oak Creek. The historical presence of these settlers can be found on street names, historical landmarks, remanences of preserved apple orchards, and the city's name itself, which was the name of a woman settler. ([History, 2018](#)) The Native American tribes, early Anglo settlers, and the communities living in Sedona today, have all utilized the land and natural resources to live in this unique desert climate.

## **General Overview of Who Sedona is as a Community**

Today, Sedona is a community of people representing different experiences, genders, age, ethnicities, and values. The vision for Sedona, illustrated in the Community Plan, is to nurture connections between people, encourage healthy and active lifestyles, and support a diverse and prosperous economy, with priority given to the environmental protection. The natural

environment has historically been a top priority to preserve and protect in Sedona. Keep Sedona Beautiful (KSB) is a local organization created 50+ years ago to ensure that not only the aesthetics of Sedona stay beautiful, but the watershed, ecosystems, and other natural areas are protected. One of the most successful initiatives pushed forward by KSB is the dark sky movement, making Sedona the 8<sup>th</sup> city in the world to become a dark sky community in 2014. Sedona's median age is 58.5 years old (US Census, 2022) making a majority of the city much older, but Sedona is also home to families, young people, and seasonal residents. Approximately 24% of the population speaks Spanish in the home (US Census, 2022) Much of Sedona's housing is built single-family residential housing and has a year-round occupancy rate of 76.1% as of 2022. (U.S. Census 2022). The population of Sedona has been slowly decreasing in the last decade partly due to the rise in housing and rental costs, and the increase of residential housing being used for short-term rentals. Those that continue to live in Sedona vary in economic status and a majority are either part of the workforce or retired. Most of the jobs that feed the economy are in the hospitality industry. The City of Sedona offers various free year-round city-hosted events for residents to help bolster community togetherness. Many of the residents are active members in the community and participate in community workshops, attend council meetings, and take part in feedback surveys. Residents have shown a deep concern towards the effects of climate change in the community. In 2019, the city of Sedona created a Sustainability Program to address climate change issues and involved the community during the development of the city's first Climate Action Plan adopted in 2021.

### **Context of Climate Change**

People have lived in the Sedona and Verde Valley region for thousands of years and while many still view Sedona as having a cooler climate compared to cities like Phoenix and Tucson, the Sedona region has become significantly hotter and drier in recent decades due to climate change and the prolonged release of greenhouse gasses. Recent climatic changes are impacting Sedona's natural environment in a way that is detrimental to the human health and well-being of those that live there. The environmental factors that pose the highest risk to Sedona are extreme temperatures, prolonged droughts, and forest fires.



### Average Area-Wide Model

The average model is produced by averaging together the morning, afternoon and evening models with equal weight.

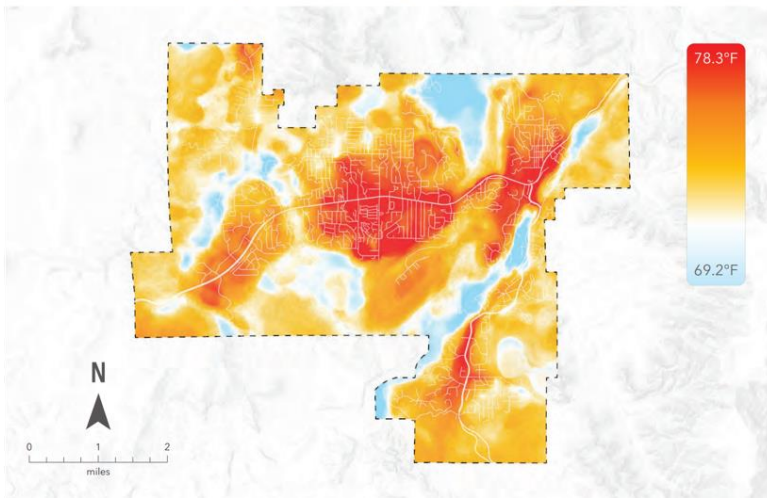


Figure 1: Heat map of City of Sedona in June 2023 from [Sedona's Heat Watch Report](#)

From 1961-1990, approximately 25 days each year would reach above 95°F in the Verde Valley region. It is now estimated that by 2030, the region will experience an average of 50 days of extreme heat every year.

([Verde Valley, 2020](#)) Despite those projections, in June through September of 2023, Sedona experienced 76 days at or above 90°F and 18 of those days were over 100°F. ([Iowa, 2024](#)) In June of 2023, the City of Sedona conducted a Heat Watch mapping

campaign in coordination with NOAA and Arizona's State Climatologist to discover surface level heat

distribution across the city and eventually develop solutions for combating extreme heat increased by the city's heat island effect. In Figure 1, the red zones represent points in the city with the highest surface heat levels. Notably, these red zones are predominately located in residential and commercial areas. This report demonstrates an increased need for residential communities to have access to additional weatherization programs (CAPA, 2023) The year-round average temperature of the region is projected to increase 4 to 6 degrees by 2050, raising the average annual temperature to 59-61 degrees. While precipitation has always varied year-to-year, the rising temperatures expected for the region will lead to increased evaporation and transpiration rates, ultimately leading to drier soils and an increased rate of extreme droughts ([Verde Valley, 2020](#)) If greenhouse gas emissions continue at the current rates, extreme heat will become more common, causing greater harm to those living in Sedona. The large amount of elderly residents living in Sedona, as well as those on fixed incomes or disadvantaged portions of the population, are typically at a higher risk of extreme heat-related illness due to the lack of resources to combat extreme heat.

## Municipal Sustainability Plan and Sedona Climate Action Plan

The City of Sedona recognizes these risks associated with climate change, which is why in July 2021 the city adopted its first Climate Action Plan (CAP) to mitigate the causes of climate change, adapt to the changing climate, and increase resiliency as a community. Sedona's CAP was crafted in a year-long process with extensive community engagement, technical assessments, consultations with local experts, and engagement with the broader community through workshops and surveys. The CAP sets a goal to cut Sedona's greenhouse gas emissions by 50% by 2030 based off 2018 levels. This goal corresponds with the international scientific recommendation for preventing the worst climate change impacts. Additionally, the City of Sedona is taking measures to reduce greenhouse gas emissions within municipal operations. In

2020 the Municipal Sustainability Plan (MSP) was adopted to ensure there was a commitment of being a sustainable organization. The vision of the MSP is to ensure the City of Sedona leads by example, is a resilient organization, evaluates successes through a triple bottom line lens, and stewards the natural resources for present and future generations. Those who live in disinvested neighborhoods and have limited access to resources can be at greater risk from the effects of climate change, which is why both plans share a common goal to provide climate action solutions that improve equity in the community.

### **Ties to [Clean Arizona PCAP](#)**

The first goal in Sedona's Climate Action Plan, "Buildings and Energy", addresses the need to increase residences and community buildings' energy efficiency and provide resources for long-term access to clean energy to help reduce fiscal and environmental impacts of consumption. Measure 1, "Expand access to weatherization, energy efficiency upgrades and electrification" and measure 3, "Deploy solar-plus-battery systems" of the Clean Arizona PCAP directly address that CAP goal to build resiliency in homes and maximize renewable energy generation and storage capacity. Currently, the City of Sedona has two programs for residents to participate in, which provide fiscal resources and/or education to improve building efficiencies and renewable energy. The projects are The Home Energy Retrofit Project and the Northern Arizona Solar Co-op. The details of these projects, and the need to expand and implement solar-plus-battery rebates will be covered in section 1 of proposed projects.

Both the Sedona CAP and MSP address the need for expansion of electric vehicle infrastructure for the community and municipal sector. In goal 5 of the MSP, "Be Carbon Neutral", the objective is to reduce emissions associated with city transportation systems. Measures have been taken to push these initiatives forward, such as the city's adoption of the Green Fleet Policy, however, there is a need for additional resources to meet the goal of being carbon neutral by 2030. In measure 8 of the PCAP, "Public fleet electrification, public fleet charging infrastructure, and publicly available charging infrastructure development", the goal explicitly correlates with Sedona's goal to procure electric vehicles and ultimately convert all light-duty municipal fleet vehicles to zero emissions vehicles. Details of the current efforts and needs for municipal fleet electrification will be discussed in section 2 of proposed projects.

## Proposed Projects

### 1. Home Energy Retrofit Project Expansion and Solar-Plus-Battery Rebates

#### Home Energy Retrofit Project Background

Upon adoption of the City of Sedona's Climate Action Plan (CAP), efforts began to develop a home energy efficiency program to meet the community building incentive objective of the CAP. The goal of the program is to benefit local homeowners by reducing emissions and utility costs and improving the quality of life provided by the building envelope. In March of 2022, the Home Energy Retrofit Project (HERP) was created to meet this objective. The HERP is applicable to 'Measure 1: Expand access to weatherization, energy efficiency upgrades and electrification' of the Clean Arizona Plan Priority Climate Action Plan for the State of Arizona.

This was the first project of its kind attempted by the City of Sedona, and it has been a resounding success. The HERP has had three rounds of operation since it launched. As of March 26<sup>th</sup>, 2024, 58 households have been through the project. The program was set up to provide air sealing, duct sealing, weather stripping, mini-split installations, heat pump installations, insulation repair or replacement, and LED lighting retrofits. The program tackles the primary avenues to improve building envelope efficiencies and reduce utility demand.

Residents who applied for the program have qualified for additional assistance based the area's median income (AMI). Funding allotments were set up on a sliding scale using Coconino County's AMI. Residents who are below 80% of the AMI may qualify for up to \$5,000 of services. Residents between 80-100% of the AMI qualify for up to \$3,500. If a household is between 100-120% of the AMI, \$2,000 worth of these services are provided. If a household is over the 120% AMI threshold, they would still qualify for \$100 towards a home energy audit.

Self-reported demographic information has been analyzed for all applicants of the program. Percentages were based off applicants who completed demographic sections. Non-responses were not tabulated in the percentages. 95% of applicants who reported demographic information identified themselves as being Caucasian. 58% and 42% of HERP applicants identified as female and male respectively, and 9% of applicants responded as being a veteran. 68% responded as being over the age of 55, with 67% of respondents reported having an Associate's degree or higher.

The program is also set up in a unique way. The City of Sedona has partnered with a regional contractor, CozyHome LLC, based out of Flagstaff to provide building and weatherization services. Approved households have a home energy audit performed by the contractor. The



Figure 2: Participant Attic Pre and Post HERP Services



contractor and household agree to projects or improvements based off the results of the audit and in compliance with the aforementioned services.

If the costs of the services rendered remain under the allotments for that household, the homeowner does not have to provide any out-of-pocket expenses to the contractor. The contractor invoices the City of Sedona directly for the services rendered on the approved residence. This reduces the hassle for the homeowner to deal with rebate paperwork or the difficulties with paying upfront with limited income. Energy audits, reports, and pictures are provided by the contractor to the City of Sedona for confirmation of performed services.

## Solar Co-op Background

The City of Sedona has helped connect residents to a free solar co-op hosted by the 501(c)(3) nonprofit organization Solar United Neighbors. For the last three years, the City of Flagstaff, Coconino County, and the City of Sedona have helped with messaging, marketing, outreach, and information gathering for residents to participate in a solar co-op and decide whether or not solar is right for them. The residents can participate in the free co-op that helps leverage the entirety of the co-ops size to solicit bids under a (Request for Proposal) RFP created by SUN on behalf of the co-op members. From 2021-2023, 533 households signed up for the Northern Arizona Solar Co-ops. 127 of those signups were from Sedona, with 24 of them going on to sign solar agreement for 171.18 kW of installed solar photovoltaics systems.



Figure 3: Flyer for Northern Arizona Solar Co-op

A group of co-op members select a potential contractor, and residents can then individually enter into agreements with the selected contractor to install solar on their home. The homeowners who participate in the program get to make that choice and direct impact. The local governments and SUN who facilitate the co-ops act as facilitators, but the community members themselves get the opportunity to choose the solar option that works best for them. This effort is most closely related to 'Measure 3 – Deploy solar-plus-battery systems' of the Clean Arizona Plan.

## How CPRG Fills a Gap

Funding provided by the CPRG opportunity helps expand the reach of the program to more residents, which will speed up greenhouse gas emissions reductions, build resiliency within Sedona households, and foster equity improvements across the city that otherwise would not be achievable.

The program has averaged around 22 homes through each round of municipal funding. CPRG funding would allow the HERP to double its reach and provide greater connection to underserved community members who are most impacted by climate change. Currently, the program does not offer any solar incentives, and CPRG would help provide that opportunity for households that have gone through the project.

CPRG funds would help create a solar rebate program for residents in the HERP project or who have participated in a solar co-op. CPRG would help expand energy efficiencies, increase solar uptake, and provide additional resiliency in the form of solar-plus-battery incentives that are not currently covered by the HERP building weatherization and energy efficiency services.

### **Home Energy Retrofit Project Expansion and Solar-Plus-Battery Rebate Approach**

If awarded, CPRG funds would be utilized to double the household capacity of the HERP. Currently, an average of 22 homes have been able to receive services in each round of the project. CPRG funding would allow for an average of 44 homes in each round. The City of Sedona would release an RFP and follow all applicable procurements guidelines to enter into an agreement with a qualified contractor to perform the associated weatherization services for approved households under the expanded capacity. This may result in an expansion of the current contractor agreements or entirely new agreements depending on the availability of qualified contractors in the area to perform the requested services.

Energy audits, reports, photographs, and participants surveys would be collected. Participant surveys would be collected once per reporting year, and all other documents would be collected per completion of services on a respective household. Applicant demographics information will be summarized and tallied to analyze the effectiveness of the HERP's reach to disadvantaged community members (i.e. seniors on fixed income, non-English speaking households, etc.) A formal report highlighting the year's efforts would be created and provided at the end of the reporting period.

With the expansion of the HERP, the project would further focus on outreach to connect disadvantaged community members to the project. The Sedona-Oak Creek Unified School District is a Title 1 school district. Outreach and collaboration would target student families within Sedona to connect them with the program. Additionally, collaboration with community groups, such as the Northern Arizona Institutions for Community Leadership (NAICL) and the Verde Valley Caregivers Coalition, would be pursued to reach community members who may not have access to the application materials. The HERP application would also be translated into Spanish, since approximately 24% of the Sedona population speaks a language other than English at home ([US Census Bureau, 2023](#)). Translation and interpretation services would be pursued to connect non-English speaking community members with the program and help ease hurdles faced within the programming.

A rebate and incentive program would be created for the proposed funding towards solar-plus-battery systems. The City of Sedona would leverage participants in the HERP and regional solar co-ops to facilitate additional uptake of the program. The rebate program would be similarly structured to the AMI requirements of the HERP program. Households that have gone through either the HERP or a regional solar co-op would have access to the new solar-plus-battery rebate program. A sliding scale based off income would be implemented that provides additional resources for individuals who are further below the respective AMI thresholds. The solar rebate program would target approximately 40 households each year.

Additional outreach and marketing materials would target Sedona families in the Title 1 Sedona-Oak Creek Unified School District, and the materials would be translated into Spanish. Interested applicants would be advised to participate in the HERP or a free solar co-op. Participating in the HERP beforehand would help ensure the households would have a solar system ‘right-sized’ to the more efficient building envelope. Participants who go through a solar co-op would be eligible as the information and resources needed for the homeowner to make an informed decision on whether solar is right for their respective household.

## Description of GHG Reduction Measures

The HERP is estimated to reduce annual household emissions by an average of 1.59 MT CO<sub>2</sub>e per household to date. Cumulatively, households through the program are estimated to have reduced emissions by 82.44 MT. Building envelope improvements are estimated to have resulted in a 21% decrease annual household emissions and 22% in utility costs for participant households. The average 22 households through the program each year are estimated to avoid emissions by approximately 35 MT through reductions in natural gas and electricity usage and improvements in building efficiencies found within the program. If awarded, the weatherization and energy efficiencies services are estimated to be 70 MT for the potential 44 households through the expanded program each year.

The average HERP home consumes an estimated 9,000 kWh of electricity annually. If awarded and coupled with additional solar-plus-battery systems, an approximate 3.2 MT worth of emissions would be reduced per the average HERP household. When coupled with the building efficiency improvements, an average of 4.8 MT per household could be reduced, over half of the average HERP household’s emissions footprint, which is ~8 MT prior to HERP participation.

By 2030, 264 households would go through the Home Energy Retrofit Project, which would result in an estimated emissions reductions of 420 MT annually through the program. Solar-plus-battery systems on the same number of households would avoid 846 MT annually of emissions from the AZNM eGRID region. When paired together, an estimated 1,265 MT annually would be avoided. By 2050, over 29,000 MT would be cumulatively avoided.

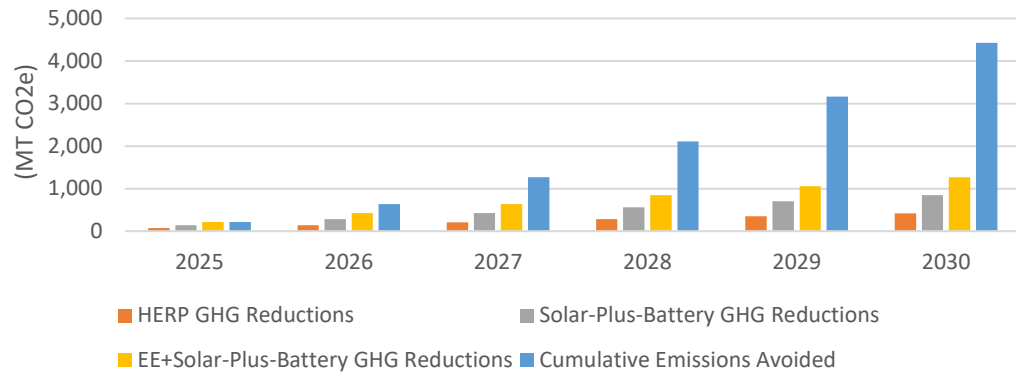
## Impacts of GHG Reduction 2025-2030 and 2030-2050

Year	Total HERP Households	HERP GHG Reductions	Solar-Plus-Battery GHG Reductions	EE+Solar-Plus-Battery GHG Reductions	Cumulative Emissions Avoided
2025	44	70	141	211	211
2026	88	140	282	422	633
2027	132	210	423	633	1,265
2028	176	280	564	844	2,109
2029	220	350	705	1,054	3,163
2030	264	420	846	1,265	4,429

Figure 4: Emissions in Metric Tons of Carbon Dioxide Equivalent



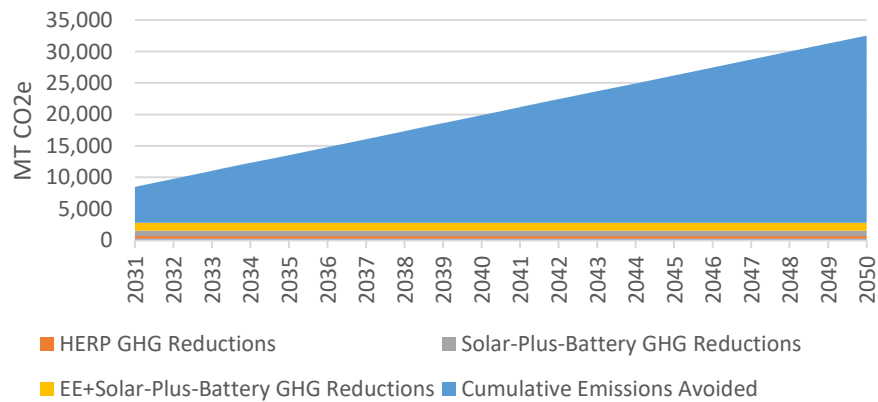
### HERP and Solar-Plus-Battery GHG Reduction Estimates (2025-2030)



Year	Total HERP Households	HERP GHG Reductions	Solar-Plus-Battery GHG Reductions	EE+Solar-Plus-Battery GHG Reductions	Cumulative Emissions Avoided
2031	264	420	846	1,265	5,694
2032	264	420	846	1,265	6,959
2033	264	420	846	1,265	8,225
2034	264	420	846	1,265	9,490
2035	264	420	846	1,265	10,755
2036	264	420	846	1,265	12,020
2037	264	420	846	1,265	13,286
2038	264	420	846	1,265	14,551
2039	264	420	846	1,265	15,816
2040	264	420	846	1,265	17,082
2041	264	420	846	1,265	18,347
2042	264	420	846	1,265	19,612
2043	264	420	846	1,265	20,878
2044	264	420	846	1,265	22,143
2045	264	420	846	1,265	23,408
2046	264	420	846	1,265	24,674
2047	264	420	846	1,265	25,939
2048	264	420	846	1,265	27,204
2049	264	420	846	1,265	28,470
2050	264	420	846	1,265	29,735

Figure 5: Emissions in Metric Tons of Carbon Dioxide Equivalent

### HERP and Solar-Plus Battery GHG Reduction Estimates (2030-2050)



## **Scope & Deliverables (Years 1-5)**

### **Year 1:**

- City of Sedona releases RFB to select contractors for expanded HERP services.
- HERP program expanded to cover an average of 44 households.
- HERP and rebate program applications are translated into Spanish.
- Solar-plus battery rebate program is created.
- Comprehensive report delivered to track progress of the project, including GHG estimates, household demographics, marketing materials created, and participant surveys.

### **Year 2:**

- Sedona facilitates community connections to annual solar co-ops for residents and coordinates with community organizations to connect disadvantaged community members to the programs.
- Additional 44 households through the HERP
- Comprehensive report delivered.

### **Year 3:**

- Annual workshops are held to provide residents with information and resources to connect with developed programs.
- Additional 44 households through the HERP
- Comprehensive report delivered.

### **Year 4:**

- Program is monitored and evaluated for effectiveness.
- Processes and outreach are adjusted to optimize programs.
- An additional 44 households through the HERP.
- Comprehensive report delivered.

### **Year 5:**

- Annual workshops are held to provide residents with information and resources to connect with developed programs.
- An additional 44 households through the HERP.
- Comprehensive report delivered.
- HERP program reaches approximately 264 total households.

## **Risks**

Expanding the Home Energy Retrofit Project has a few risks that could impact future successes. While the program has been effective to date, there are few weatherization and residential building optimization contractors in the area. A recent request for proposal had only two contractors submit applications to continue the HERP. The current contractor, who has performed quality work, is based in Flagstaff (35 miles away) and the other applicant was in Gilbert, Arizona (140 miles away). Locally available providers to meet the expanded services to more households may be limited.

Similar hurdles would be found with identifying solar-plus-battery contractors in the region. There are a few in the Verde Valley and Flagstaff areas, but the ability of contractors to meet the demand of the new program may be difficult to achieve. Being a rural community in northern

Arizona, with less than 10,000 residents, makes achieving applicable scale to attract contracted services a significant hurdle. These barriers exist in projects across the city.

55% of current HERP applicants have identified themselves as being over the age of 65. The average self-reported household income is \$34,770, with an average household size of 2 people. This well below the 80% AMI for a 2-person household in Coconino County, which is \$58,200. Additional services, such as installing a solar-plus-battery system, may not be in reach of these households on fixed incomes, even with the incentives that would be provided by solar rebate program.

## **Community Benefits**

The HERP expansion and solar rebate program would help build community resilience at a local level. The programs would reduce financial burdens from home energy usage, improve quality of life within the home, and provide energy backup from battery systems in the event of power outages that occur from grid maintenance, wildfire, flooding, accidents etc. Resiliency against high heat events would also increase, as the building envelopes of the households would be improved. This would lead to an improved ability for HERP households, which have been predominantly below 80% of Coconino County's AMI and over the age of 65, to navigate those events comfortably. Reductions in household emissions would also help reduce community emissions, where buildings and energy were estimated at 79% of community emissions in Sedona's Climate Action Plan. These programs help lead to direct community impact to the climate crisis.

## **2. Municipal Fleet Electrification**

### **Sedona Fleet Electrification Background**

The City of Sedona is a rural municipality with approximately 180 employees, serving 9,684 residents with around 3 million visitors every year. In 2020, the city set a goal to be carbon neutral from a municipal operations standpoint. Since then, the city has produced and adopted a Climate Action Plan (CAP) and a Municipal Sustainability Plan (MSP) with the second iteration of the MSP set for release this year. Listed in both the CAP and MSP is to create and implement a municipal Green Fleet Policy. In 2021 Sedona's Sustainability Department created this Green Fleet Policy and was adopted by the city that same year. The goal for the Green Fleet Policy is to transition all passenger vehicles over to 100% zero emission vehicles by 2030. Passenger vehicles do not include heavy duty vehicles like busses, trailers, or construction equipment. Since the policy was adopted in 2021, the city has installed public-facing chargers and have transitioned a few (less than 10) fleet vehicles to EV.

In 2018, the municipal vehicle fleet emitted 357 MT CO<sub>2e</sub>, approximately 12.7% of the 2018 municipal inventory. Since then, in 2023 that number has grown to 484 MT CO<sub>2e</sub> or 21% of the estimated municipal inventory. Passenger vehicles are estimated to have contributed 390 MT of this total. These emissions are largely from light-duty trucks and sport utility vehicles. Currently

Sedona owns or leases 74 passenger vehicles with a majority operated by the Police and Public Works Departments.

Over the last few years, Sedona has worked to build up its charging infrastructure with five level two chargers and four DC fast chargers dispersed throughout the city and are all located on city property. These chargers, however, are all public-facing and are utilized by public and government vehicles alike. The city currently does not operate any municipal-facing chargers that would ensure consistent access, especially for police vehicles.

Sedona is currently working with a consulting firm to produce a decarbonization roadmap. The roadmap will, among other things, provide guidance and well researched suggestions that will allow the city to accomplish its 2030 goal laid out in our Green Fleet Policy. Suggestions will include different rates of vehicle transition, charging infrastructure needs based on current fuel use, charging location suggestions, and cost analysis.

As a rural community, Sedona lacks access to many common services and skilled professionals that would commonly be found in urban centers. In Sedona's case, this comes in the form of mechanics that are not sufficiently equipped, trained, or willing to repair and maintain EVs. The Sustainability Department conducted interviews with five mechanic shops in the Verde Valley to determine their capacity to repair electric vehicles. A few of the major conclusions from those interviews are listed below:

- Most shops were willing to work on EVs but lacked experienced staff.
- Lack of experience on EVs stems from the fact that EVs naturally require less maintenance, which means fewer visits to private repair shops. Another reason EVs are rarely taken to auto shops, at this point, is because many EVs on the road today are still under warranty and are most likely being taken to their respective dealership owned repair facilities.
- Some shops were not willing to work on EVs because it's been difficult to find quality spare parts in a timely fashion.

The Sustainability Department has identified a local program that provides an intensive, hands-on 1–2-week course that teaches mechanics how to work on a variety of EVs, common problems, and the basic necessary equipment to conduct repairs. Some of the shops said they were open to sending their staff to the program if the city supported them.

## How CPRG Fills a Gap

Without the assistance of funds from the CPRG, Sedona's EV transition will to be a much slower process with a good chance that it will not meet its science-based goals of reducing emissions by 2030 or sooner. The sheer up front cost of EVs and charging infrastructure, especially DC fast chargers, consistently prevent or delay Sedona's transition towards electrifying its vehicle fleet.

If awarded, funds from the CPRG will go towards the purchase of municipal facing chargers. To date, all charging infrastructure projects in Sedona have been public-facing and have been accomplished through public private partnerships with companies like APS and Electrify America providing free chargers in exchange for free use of highly trafficked public property (parks and parking lots).

The city has taken full advantage of this public private partnership, but there is minimal applicable publicly available space to expand on those efforts. Additional municipal-facing chargers will be installed at City Hall, the wastewater treatment plant, municipal maintenance yard, and at government facilities located in South Sedona. The Police Department, which constitutes the largest portion of the city vehicle fleet, is in need of dedicated chargers, including DC Fast Chargers, to adequately make the change to ZEVs and maintain essential services.



*Figure 6: Public Facing DC Fast Chargers at Posse Grounds Park*

Funds from the CPRG will also be used to help Sedona purchase all 74 of its light duty passenger vehicles. Despite major upticks in national and state EV sales, the upfront costs of purchasing new EVs are still quite high. While there are projected fuel and maintenance savings associated with EVs, compared to internal combustion vehicles, the sheer upfront costs presents a barrier to uptake, and recouped cost savings may take several years to realize.

Lastly, the CPRG will be used to help support the development of a Verde Valley EV Mechanic Education and Training Program to trainee local mechanics and community college students in EV maintenance and repair. This would not only support Sedona and its municipal fleet for years to come but support the electrification of passenger vehicles throughout the entire Verde Valley. This would also support the small, yet vital business owners throughout the Verde Valley as mechanic shops would be able to make a smoother transition as EVs continue to constitute a larger portion of their clientele.

## Municipal Fleet Electrification Project Summary and Approach

The process of electrification will be completed in phases with increased investment every year for a span of five years. Additional EV charger and infrastructure needs may be additionally expanded at the completion of the Decarbonization Roadmap, anticipated to be completed by June of 2024.



In its first year, the city would conduct a request for bid (RFB) process of numerous EV charger companies. Following that process, the Sustainability Department would purchase one Police dedicated DC Fast Charger for City Hall. The Police would also transition two vehicles, one patrol and one administration, to EVs. The Sustainability Department would also purchase 2 level two chargers for the city's wastewater treatment plant. The city would then purchase 3 EV vehicles for the wastewater treatment plant.

In its second year, the Sustainability Department would implement its Verde Valley EV Mechanic Education and Training Program to train willing mechanics and students from our local community college. The city will also purchase and install 1 level two charger at City Hall. The city would then purchase 10 additional EVs for various departments with 7 of them dedicated for the Police Department.

In its third year, the Sustainability Department would purchase a DC Fast Charger and two level two chargers intended for the city's maintenance yard. The Sustainability Department would also purchase 15 additional vehicles with 7 of them dedicated for the Police Department.

In its fourth year, the city would purchase two additional level two chargers intended for City Hall with one of them strictly for the Police and another for other city departments. The city will also purchase an additional 20 vehicles with 14 of them dedicated towards the Police Department.

In its fifth year, the Sustainability Department will purchase 2 level two chargers on its campus in South Sedona. The city would also purchase 24 EVs with 19 of them dedicated towards the Police Department.

### **Description of GHG Reduction Measures**

In 2018, Sedona's municipal vehicle fleet emitted 357 MT CO<sub>2</sub>e, approximately 12.7% of the 2018 municipal inventory. Since then, in 2023 that number has grown to 484 MT CO<sub>2</sub>e or 21% of the estimated municipal inventory. Passenger vehicles are estimated to have contributed 390 MT of this total. These emissions are largely from light-duty trucks and sport utility vehicles. Currently Sedona owns or leases 74 passenger vehicles with a majority operated by the Police and Public Works Departments.

Projections show that between the year 2025 and 2030, that without the support of the CPRG, Sedona's vehicle fleet will emit approximately 2,340 MT CO<sub>2</sub>e. However, with the support of the CPRG it is estimated that within that same time frame, Sedona's fleet would be able to avoid 964 MT CO<sub>2</sub>e. The remaining 413 MT CO<sub>2</sub>e would come from the energy grid without city investments in renewable energy. Sedona plans to continue its Green Power Purchase Agreement (GPPA) with APS which allows the city to claim zero emissions from municipal energy consumption. Assuming Sedona continues with their GPPA into the future, in combination with the CPRG, we project that by 2030, the city will be carbon neutral from our passenger fleet and energy use.

Projecting out from 2030 to 2050, using the available data, it is likely that without the support of the CPRG, that Sedona's passenger vehicle fleet will continue to, at the very least, emit 390 MT CO<sub>2</sub>e every year resulting in 8,190 MT CO<sub>2</sub>e by 2050. With the support of the CPRG, but sourcing energy from the regional electric grid, it is estimated that between 2030 and 2050, Sedona's passenger fleet will be able to avoid 5,972.5 MT CO<sub>2</sub>e with the remaining 2,217.53 MT of CO<sub>2</sub>e coming from the electrical grid. With the support of the CPRG and sourcing renewable energy, such as through Green Power Partners Agreement with APS or onsite renewables, the passenger fleet between 2030 and 2050 Sedona will have emitted zero CO<sub>2</sub>e.

### Impact of GHG Reduction 2025-2030 and 2030-2050

GHG Projections Between 2025-2030			
Without CPRG	With CPRG but Without Clean Energy	With CPRG and Renewable Energy	
MT CO <sub>2</sub> e			YEAR
390.000	390.000	390.000	FY25
390.000	288.982	312.506	FY26
390.000	243.135	267.862	FY27
390.000	197.289	200.897	FY28
390.000	151.443	111.609	FY29
390.000	105.596	0.000	FY30 - Goal Window
<b>2,340.00</b>	<b>1,376.45</b>	<b>1,282.87</b>	<b>TOTALS (MT CO<sub>2</sub>e)</b>

GHG Projections Between 2030-2050			
Without CPRG	With CPRG but Without Clean Energy	With CPRG and Renewable Energy	
MT CO <sub>2</sub> e			YEAR
390.000	105.596	0.000	FY30 - Goal Window
390.000	105.596	0.000	FY31
390.000	105.596	0.000	FY32
390.000	105.596	0.000	FY33
390.000	105.596	0.000	FY34
390.000	105.596	0.000	FY35
390.000	105.596	0.000	FY36
390.000	105.596	0.000	FY37
390.000	105.596	0.000	FY38
390.000	105.596	0.000	FY39
390.000	105.596	0.000	FY40
390.000	105.596	0.000	FY41
390.000	105.596	0.000	FY42
390.000	105.596	0.000	FY43
390.000	105.596	0.000	FY44
390.000	105.596	0.000	FY45
390.000	105.596	0.000	FY46
390.000	105.596	0.000	FY47
390.000	105.596	0.000	FY48
390.000	105.596	0.000	FY49

390.000	105.596	0.000	FY50
8,190.00	2,217.53	-	TOTALS (MT CO <sub>2e</sub> )

### **Scope and Deliverables. Yearly breakdown of what you would be accomplished.**

#### **Year 1:**

- Purchase 1 DC fast charger (Police Dedicated) for City Hall.
- Purchase 2 Police vehicles, 1 patrol and 1 administration.
- Purchase 2 level two chargers for the wastewater treatment plant.
- Purchase 3 additional EVs for the Wastewater Treatment plant.

#### **Year 2:**

- Fund the Verde Valley EV Mechanic Training and Education Program.
- Purchase 1 level two charger intended for City Hall
- Purchase 10 EVs with 7 of them dedicated for the Police.

#### **Year 3:**

- Purchase 1 DC fast charger for the city's maintenance yard.
- Purchase 2 level two chargers for the city's maintenance yard.
- Purchase 15 EVs with 7 of them dedicated for the Police.

#### **Year 4:**

- Purchase 2 level two chargers for City Hall. One of the chargers will be dedicated for the police, the other will be for all other departments.
- Purchase 20 EVs with 14 of them dedicated for the Police.

#### **Year 5:**

- Purchase 2 level two chargers for Sedona's south campus
- Purchase 24 EVs with 19 of them dedicated for the Police.

### **Risks**

The transition to zero emissions vehicles for the municipal fleet requires a significant shift in municipal operations to meet Sedona's climate goals. Internally, electric infrastructure may need significant upgrade and investment to meet the electrical demands of high-use and emergency response needs for Police and Public Works Departments. Additional collaboration with the region's electrical utility will be required. Behavioral change will also have to occur with the transition to alter charging habits, perceptions of electric vehicles, and maintenance requirements.

Numerous externalities also pose risks to the proposed fleet electrification project. Electric vehicle material needs, supply chains, procurement timelines, availability of applicable EV models, etc. have all seen delays in recent years. The lack of regional mechanics who are certified to work on electric vehicles also pose a hurdle, as maintenance, repair work, and vehicle down time are negatively impacted by the need to then transport vehicles significant distances

for service. Additionally, unforeseen future State or Federal policy changes may make it harder or more expensive to procure electric vehicles and charging infrastructure. Continued disruptions in any of those categories may result in either delayed project success or failure to meet CPRG goals and objectives.

### **Community Benefits**

There are numerous community benefits that can be gained from this project. First, residents will live in a town that lives up to its sustainability goals and values of protecting people and the planet. A fully electric fleet will also reduce local air and noise pollution, improving community health. Our projections also show that a fully electric fleet will save taxpayers just over \$40,000 a year and \$294,000 over a ten-year period. Most of these savings will come from the city no longer having to pay for expensive fuel and consistent maintenance throughout the year associated with internal combustion vehicles.

### **Staff Expertise**

Sedona's Sustainability Department consists of three full-time staff and has further augmented team resources by partnering with AmeriCorps for 1-2 team members per year. All full-time staff members possess college degrees in sustainability and natural resources with two full-time staff members possessing advanced degrees in Sustainability from Northern Arizona University and the University of Colorado Boulder. The same two staff members will also hold a master's certificate in greenhouse gas accounting within the next month with one staff member already fully certified.

Over the last two years Sedona's Sustainability Department staff have led climate action projects and initiatives within municipal and community programs. Bryce Beck, Sustainability Manager, will be leading the proposed projects and has 14 years of local government project experience. Zach Schwarz, Sustainability Coordinator, has 11 years of experience (professional and academic) in environmental fields and has created and established municipal and community programs and will be leading the municipal fleet electrification. Sarah Estrada, Sustainability Coordinator, has 10 years of environmental project experience (professional and academic) has extensive experience developing outreach programs and sustainability events and will be integral to leading the solar rebate program.

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